THE SUCCESS OF THE EMBEDDED STATE IN ENGLAND*

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Abstract

Many states exhibit high degrees of capacity without the fiscal resources necessary to fund a modern bureaucracy. We argue that they achieve this by exploiting features of the social structure of the societies they govern to motivate individuals to engage in bureaucratic and governance tasks without pay. We develop and illustrate the concept of the "Embedded State" using a unique survey of British urban government from 1835. Since British local authorities had few resources, only two-thirds of positions were paid. We first show that unpaid positions were significantly more productive than paid ones. We then show that unpaid positions conveyed prestige and were 'stepping stone' positions, provided different on-the-job incentives, and were taken up by the socio-economic elite. We also show that the successful Embedded State featured patronage and corruption and could not fully motivate unpaid bureaucrats to implement onerous tasks.

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JEL classification: H11, H41, N43, N44, N13, D73, H50

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1 Introduction

Across the social sciences, successful governments are thought to be "Weberian," following Max Weber's account of the emergence of the modern state (Weber, 1922). In his view, successful states rest on "rational–legal" authority, characterized by meritocratic recruitment and salaried, professionally trained civil servants who implement policy impartially. But Weberian governments are expensive: The median OECD country government spends about 45% of GDP annually.[1] In part for this reason, most governments historically were *not* Weberian. For example, as the Industrial Revolution began, tax revenues in England were around 10% of national income (O'Brien, 2011). In Prussia, the number was 5% (Spoerer, 2010). These levels are comparable to those observed today in fragile and non-Weberian states such as Haiti, Yemen, and the Central African Republic. Yet England, for example, was able to govern its many cities and villages extensively, maintaining order, protecting property rights, and building infrastructure. How?

In this paper, we test the hypothesis that *unpaid* civil service positions help explain why some low-revenue governments provide public goods more successfully than others (Goldie, 2001). These positions differ from simple community-based public good provision (Ostrom, 1990): they are permanent roles with distinct responsibilities, but they do not carry a salary. This is a key departure from Weberian government, because salaried employment is what makes bureaucrats part of a professional "rational-legal" organization (Weber, 1922, p. 963). Whether unpaid positions improve public good provision depends on how the non-monetary incentives sustaining them shape both bureaucrat selection and performance incentives. These incentives may be social, such as civic duty or the pursuit of status and prestige (Ashraf and Bandiera, 2018). They may also be private, such as opportunities for later career advancement (Gibbons and Murphy, 1992). In either case, individuals who select into unpaid positions may differ from those who would accept an equivalent paid position (Finan et al., 2017). We study this hypothesis in two steps. First, we assess the efficiency consequences of instituting unpaid positions. Second, we examine the incentives that sustain such positions and the selection of individuals who take them up.

The setting of this paper is historical England. Until the late nineteenth century, England delivered most public goods through *local* government. For our empirical analysis, we construct a novel dataset of public good provision and employment for one tier of local government: self-governing boroughs (towns).[2] At the time of the Industrial Revolution, these boroughs varied widely in their organization, in-

[1] A substantial empirical literature associates these institutional features with improved public goods provision. Evidence ranges from cross-country analyses (Evans and Rauch, 1999), to natural experiments (Acemoglu et al., 2015; Dell et al., 2018) and randomized controlled trials that introduce Weberian incentive structures (e.g., Khan et al. (2016, 2019); surveyed in Besley et al. (2022)). The modern figures for taxes relative to GDP include entitlement spending components that were comparatively smaller historically.

[2] The other relevant tiers are counties (provinces) and parishes (villages). We discuss their governance in Section 2.

cluding the number of positions they maintained and whether those positions were paid (Collinson, 1994; Goldie, 2001). Our analysis draws on the Municipal Corporations Report, which provides a unique cross-section of the data needed to test our hypothesis in 1835 (Municipal Corporations Commissioners, 1835).[3] The report contains measures of seven distinct public goods, including assessments of overall borough governance, policing and financial administration, and the quality of the borough prison. Importantly, it also records each government position, whether it was salaried, and which public good or goods fell under its responsibility. These data allow us to link paid and unpaid positions to public good outcomes through the assignment of positions to specific public good provision tasks.

We begin by comparing the quality of public good provision across unpaid and paid positions, conditioning on borough fixed effects, task fixed effects, and position-title fixed effects (e.g., mayor). On average, unpaid positions are associated with a 12 percentage point improvement in public good provision. This corresponds to a 20 percent increase relative to the sample mean. Because each public good is provided by multiple individuals occupying several different positions, we next develop a simple structural model of team production, following Abowd et al. (1999) and Bonhomme (2025), that allows for diminishing returns to team size and makes the role of spillovers explicit. Accounting for spillovers, we find the same qualitative pattern: unpaid positions are associated with better performance, unpaid teams perform better, and boroughs with a larger share of unpaid positions perform better.

These results are consistent with the hypothesis that this way of organizing a government may help explain variation in performance across low-revenue governments. However, not paying a position may be correlated with other characteristics of that position and is not randomly assigned. Historically, there were many factors determining who got paid, including borough finances and the ability of boroughs to design incentives that would compensate for not being paid. Our strategy to address this issue is to focus on a predetermined financing constraint. Borough income was overwhelmingly composed of rental income from assets individually bequeathed to the borough in the past (Sweet, 2014). To substantiate Sweet's claim, we show that such income is balanced with respect to a wide range of borough observables, including location, size, and social structure. We then replace unpaid status with an indicator that captures whether a position *could* be paid under this constraint. To validate our approach we show that this indicator, in turn, is balanced with respect to *position* observables like title, task assignment, and a large set of other observables. We find that being 'out of budget' is associated with a performance increase of fifteen percent, similar to the baseline estimates. Finally, although this procedure isolates variation in unpaid status, the creation of a particular position and the assignment of particular tasks may themselves respond to anticipated payment status. We therefore subset to positions that are required by the founding

[3]For background on the report, see Finlayson (1963, 1966) and Moret (2015).

document of the town, its charter, and the typical tasks for these positions, and show that the effect of being unaffordable does not depend on endogenous position creation or endogenous task assignment.

The performance effects of unpaid positions ultimately depend on both the non-monetary incentives that the positions provide and the types of individuals who take them up. Using the Municipal Corporations Report, we construct proxies for both incentives and selection. For incentives, we measure the prestige associated with a position and whether it serves as a stepping-stone role. Going beyond the historical literature, we also capture on-the-job incentives by measuring the flexibility of task assignments and the presence of oversight (i.e., a principal). We find that unpaid positions are more prestigious, more likely to serve as stepping-stones, offer greater flexibility, and are less likely to involve oversight.

For selection, we use several new data sources to measure the titles and social status of individual officers. We find that unpaid positions are more likely to be held by members of the local socio-economic elite. These patterns are consistent with the historical literature on individual boroughs and bureaucrats, which suggests that prominent individuals—such as the wealthier middle class, the gentry, and the clergy—sought public positions for the social prominence they conferred (Webb and Webb, 1963). In addition, careers in public life often began with unpaid local government service, because such positions served as stepping stones to higher office in the counties or in the central government in London. We then decompose performance differences along these dimensions of incentives and selection, and show that selection accounts for the *positive* performance effect of unpaid positions. This finding helps explain why boroughs used paid positions at all, even if unpaid positions were on average associated with better performance: for some positions, the non-monetary incentives available to the borough may not have been sufficient to attract positively selected individuals, making remuneration necessary.

We then consider incentives and selection jointly, as a system of governance. We construct a composite index that summarizes our measures of both, and show that positions offering status and prestige are staffed by more self-selected officers *and* are more often unpaid. In fact, two distinct governance models emerge: a "Weberian" model, in which positions are paid, officers are not drawn from the social elite, and roles rely primarily on "rational-legal" incentives; and a model in which self-selected, unpaid officers are compensated through prestige and career opportunities. This second model draws on social incentives that individuals value and on segments of English society that self-select into unpaid public service. In this sense, the state "embeds" itself in society. Following Polanyi (2001), we label this model the "Embedded State."

In the final part of the paper, we study the limitations of the Embedded State. We examine both the feasibility of implementing different tasks under the Embedded State and the prevalence of corruption. To study task-feasibility, we show that at the task level, incentives and selection co-move. Some tasks —

such as governance and judicial functions — tend to be unpaid, prestigious, and staffed by educated elites, whereas other tasks — such as prison management and policing — are more likely to be paid. These latter tasks are less flexible and typically involve tighter constraints and less autonomy. They are harder to implement using 'embedded incentives,' and this is a limitation of the Embedded State, and another rationale to institute paid positions. To study corruption, we measure self-election, patronage appointments, and financial corruption. We find that unpaid individuals are more likely to self-elect, appoint family members, and accept bribes. Crucially, focusing on a subset of non-corrupt officials, we show that corruption is not a precondition for the performance advantage of unpaid positions.

In sum, we find that the Embedded State leveraged social incentives to motivate individuals to dedicate a part of their time to the state. This process grew the bureaucracy and improved public good provision, at the cost of corruption, patronage, and lower ability to implement onerous tasks — which were consequently more often assigned to paid positions. Consistent with the anecdotal evidence in Webb and Webb (1963), Eastwood (1994), and Goldie (2001), we interpret the central advantage of the Embedded State as providing a viable alternative mode of governance when a more Weberian, salaried state is fiscally out of reach. The success of the Embedded State may explain why in many countries, including England and the United States, the modernization of the civil service followed, rather than preceded, the onset of modern economic growth (Heldring, 2025).

While our econometric results provide one potential explanation for how states with low tax revenue display variation in public good provision, many features of the Embedded State described here are specific to the English sociological context. We conjecture that, although many historical states employed unpaid bureaucrats, the incentives sustaining participation and selection in(to) the Embedded State are context-specific. For example, Adams (2005) argues that in the Dutch Republic, the desire to be an unpaid 'regent' was primarily motivated by the downstream financial benefits office-holding may bring. Contemporary Rwanda does not pay most of the people who provide public goods, which may in part explain why its quality of governance is on par with Greece or Portugal, while its tax-to-GDP ratio is about 15%. Participation in public projects in Rwanda is thought to be mostly community-driven (Heldring and Robinson, 2023).[4]

Our paper relates to the recent literature on state capacity. Much of this, exemplified by the work of Besley and Persson (2009), identifies state capacity with tax revenues, and indeed, this is a standard way of measuring capacity in the literature (e.g. Dincecco (2017)). This approach is also common outside of economics (Tilly, 1992; Herbst, 2000). A now voluminous literature, surveyed in Besley et al. (2022),

[4]More speculatively, it is not clear how South Korea implemented its successful state-led development program (Lane, 2025) with tax revenues of only 10% of GDP.

studies individual incentives and bureaucratic reforms, both historically and today, that are associated with better performance (see e.g., Xu (2018) and Colonnelli et al. (2020)). Both these literatures are either implicitly or explicitly 'Weberian' in their view of what successful government looks like. Relative to this literature, we articulate a different form of government organization that is associated with success. While this literature is closely related to ours, one further differentiator is that it is less focused on comparative organizational analysis across bureaucracies. Research in sociology has paid more attention to the comparative organization of the state and the bureaucracy. A central focus of this research has been to explain the role of the state in East Asian economic growth (Jones and SaKong (1980), Johnson (1982), Wade (1990), Evans (1995)). Others have sought to explain failure rather than success and point to the relationship between the lack of capacity of many states and their lack of Weberian rational-legal features, in particular their "patrimonial nature" (Bratton and van de Walle, 1997). No previous research has, to our knowledge, emphasized the extent to which many state functionaries are unpaid, though this sometimes comes up in passing, see Ingelaere (2011) on the local state in Rwanda. Further, the comparative literature on the state, in part due to data constraints, has primarily focused on the central government and has focused less on local government, even though basic services such as public order, judicial services, and infrastructure were historically provided by the local government. Our paper relates directly to a literature in development economics that emphasizes various aspects of 'informal taxation' (Olken and Singhal, 2011). Governments, lacking the capacity to provide public goods, cooperate or co-opt local elites who work with the population to implement public goods (Balán et al., 2022; Aman-Rana et al., 2025). Relative to all these contributions, our study characterizes a model of state organization that sits the mobilization of the population for public good provision, and the Weberian state.

Our paper also relates to the historical literature on the organization of the English state. Following Elton (1953), scholars have examined the emergence of modern state institutions (see Corrigan and Sayer (1985), Braddick (2000), and Hindle (2000) for overviews). Most of this work focuses on central state institutions. Scholars such as Kent (1995) and particularly Eastwood (1994) and Eastwood (1997) have proposed an alternative account of state formation which focuses more on the local state. One empirical exception is Besley et al. (2025), who study the development effects of employing more justices of the peace across English counties.

The paper is organized as follows. In Section 2, we discuss the historical organization of the English state. Section 3 describes in detail the data we collect on municipal boroughs and their officeholders. Section 4 evaluates the performance of this organizational model in providing public goods in the municipal boroughs. Section 5 outlines mechanisms of selection and incentives for municipal positions. Section 6 studies how incentives and selection co-move and concentrate in certain public sector tasks, and uses

these findings to characterize the 'Embedded State.' Section 7 concludes.

2 Background: The Local State in England and Wales

The Embedded State, we hypothesize, relied on an unpaid workforce. In this section, we first bring together the available evidence on the size of the English central and local bureaucracy in the nineteenth century and what we know about its paid status. We find that the number of positions in local government was about 7 times the size of the number of individuals employed by the central state in London. Most were unpaid. We then discuss historical evidence on the organization of the boroughs. Three themes emerge. First, boroughs had a fragile fiscal base and relied mostly on rental income from bequeathed assets. Second, they were governed by a self-elected elite, often drawn from the local landowning, richer, and middle classes. Third, this elite saw office-holding as a means of acquiring social status and prestige, or as a means of ascending further on the socio-political ladder.

2.1 Comparing the Central and the Local State

Local government in England consisted of three main layers, which we map in Figure 1. Below the central government, there were 52 counties, and about 10,000 parishes. In between the counties and the parishes were cities and towns, which had various degrees of self-governance. Since we analyze a sample of boroughs, the relevant local term for a town, in more detail, in the next subsection, we discuss self-governance in more detail. In this section, we briefly describe the exercise of estimating the size of the local government and the extent to which this workforce was paid. We present an overview of our findings in Table 1, and we report the full exercise in Appendix Section A. In brief, we count up all individuals employed at all three levels of government using primary archival sources and the (small) secondary literature on this topic. We then follow Goldie (2001) and try to estimate the fraction of bureaucrats who were paid. We find, in line with Brewer (1989), that the central state grew from about 5,000 people in 1700 to about 21,000 in 1835. In contrast, local government amounted to *at least* 148,000 individuals in 1835. While all officers working in or out of London got paid, the image is very different outside London.[5] Of local government positions, nearly 95% did not receive a salary. This observation is the basis for studying English boroughs to understand the Embedded State.

Because the central state did not pay local positions, it also did not keep any records of them. While scattered records exist in local archives, there is no systematic data on local employment, with one ex-

[5]The central state employed bureaucrats in London and in select positions outside London. There were, for example, the excise officers in the countryside and the customs tax collectors in harbors (Brewer, 1989).

ception: the Municipal Corporations Commissioners (1835) report. This report records a vast amount of detail on municipal boroughs. We use this source to construct our dataset, and we map our sample boroughs in panel B of Figure 1. Before we discuss this report, we briefly discuss the history of these municipal boroughs.

2.2 The Municipal Boroughs

Municipal boroughs were urban areas that were mostly constituted by a royal charter, but could also be established "by practice and custom" (Chandler, 2007, p. 12). Their governing body, known as the corporation, arose likely by custom (Maitland, 1898). For example, the Webbs, in their multi-volume history of local government, identified the ability to independently appoint justices as being the key identifying feature of such a borough (Webb and Webb, 1908, pp. 261-6). The relevant fact for us is that there were cities that were self-governed, potentially creating variation between boroughs in their organization. What was the advantage of such a status? "For a town to be incorporated was a mark of status; it denoted the possession of special privileges, with respect to trade and government, which distinguished the town from its surrounding hinterland and its unincorporated neighbors. The rights ... generally included the right to hold courts ... Incorporation also gave the town an identity at law, meaning that it could sue or be sued in the courts" (Sweet, 2014, p. 34). There was significant heterogeneity in the rights that charters created or that custom established. Sweet points out that "[t]he rights conferred by a charter varied in detail from town to town" (Sweet, 2014, p. 34), leading to an "anarchy of local autonomy" (Webb and Webb, 1963, p.5). The origins of these charters are complex, with some arguing that they simply formalized ancient Anglo-Saxon privileges (Chandler, 2007) and others claiming they emerged later as urban areas negotiated with the monarchy for privileges and autonomy in exchange for taxation (Reynolds, 1977).

The municipal corporation appointed both its members and instituted other positions within the borough, and appointed the officers holding these. The members of the corporation were simultaneously the local politicians, making decisions on borough policy, and part of its bureaucrat corps. They frequently, for example, sat as judges or were involved with finances.

There is consensus that the boroughs had few resources and thus needed to use non-financial instruments to motivate the members of the corporation to engage in administration. While parish government could tax property and other things with some flexibility, "[i]n urban areas raising funds was more problematical as the charters of incorporation of many towns did not allow for the imposition of rates" (Chandler, 2007, p. 22). Some boroughs did have endowments of land that could generate income, but there were often further restrictions on doing so. Sweet notes about corporations that "their finances were

generally extremely restricted. In many cases their governing charter actually stipulated a limit to the value of the property, which they might hold – a limit that was not adjusted to keep pace with inflation" (Sweet, 2014, p. 106). This was significant because outside of ports such as Bristol, Liverpool, or London, which had property rights over the harbor and could levy tolls, "corporate wealth tended to be derived chiefly from land" (Sweet, 2014, p. 106). The Webbs document different idiosyncratic sources of revenues in different boroughs (Webb and Webb, 1906, pp. 228, 482) but stress the general "paucity of resources" (Webb and Webb, 1906, p. 535). Eastwood summarizes a gamut of restrictions by stating that "towns enjoyed relatively weak fiscal powers" (Eastwood, 1997, p. 79).[6]

Bereft of resources, boroughs could not afford to pay people to undertake all of the functions necessary for the town to function. To understand the structure of incentives, it is important to note that the "corporation" was usually composed of local elites. As Innes and Rogers put it "Contemporaries often suggested, and historians have largely agreed that the early modern period saw a trend towards the concentration of corporate power in the hands of a relatively narrow elite of townsmen" (Innes and Rogers, 2008, p.538). These elites would be very different depending on the location. In Bristol, merchants—"a powerful body of wealthy magnates"—were "largely made up of members of the Corporation" (Webb and Webb, 1908, p.450). This was typically the case in coastal boroughs, like Great Yarmouth (Gauci, 1996), Ipswich (Clemis, 1999), or Liverpool. In other places, more traditional elites kept their grip. In Morpeth or Droitwich it was the Lords of the Manor, the Earl of Carlisle (Webb and Webb, 1908, p.493), and the Third Baron Foley (Salmon, 2005, p.94) respectively; in Berwick-upon-Tweed or Coventry it was local Guilds and in Leeds the Corporation consisted of "the leading Church of England families in the town" (Webb and Webb, 1908, p.415); in Gloucester the rulers "were wealthy figures with standing among the county's upper classes, as well as in the city. The gentry contingent included the major landowners Sir John Guise and Sir Duncombe Colchester" (Clark, 1984, pp.325-326). Pulling these themes together, Sweet observes that the corporation of Leeds "had prestige and authority, but a very restricted income, being poorly endowed with lands" (Sweet, 2014, p. 32).

The Webbs document that the most common borough constitution "was the distinctively oligarchical structure of a close body recruiting itself by co-option" (Webb and Webb, 1963, p.31). By "co-option" they mean "the common obligation to hold public office and vocational organization as the basis of government" (Webb and Webb, 1963, p.37). Those controlling the borough were obliged to govern it on a "vocational" basis, namely, without remuneration. They could, in turn, decide to institute further positions, depending on the availability of funds to pay these, or on their ability to provide non-monetary

[6]There is absolute consensus among scholars on this topic. For example, (Hennock, 1963, p.214) writes that "[a] remarkable feature of these bodies was the narrow financial foundation on which most of them were reared." See also Keith-Lucas (1980, p.32).

incentives.

Elites sought positions in the borough because they generated status and prestige. Sweet notes "Office ... became a mark of status and prestige within the community and was, ideally, desirable in itself" (Sweet, 2014, p. 110). The idea that holding positions generated prestige is commonly articulated: "members of the elite gladly became servants of the state ...not simply for the direct material rewards, but also for the prestige and influence those offices conveyed" (Patterson, 1999, p. 3) (see also (Aylmer, 1959, p. 238)). Innes and Rogers also refer to membership of the corporation offering "status or power" (Innes and Rogers, 2008, p. 539). In Bolton, Rochdale, and Salford, "it was possible even for small proprietors to augment considerably their social visibility and position during, and as a result of, successful municipal careers"(Garrard, 1983, p.33) and "recruitment to every position – including the mayoralty – was not just a recognition of social standing but in itself an act of social elevation ... the various positions in, or connected with, the council (aldermanic bench, mayoralty, borough magistracy) were often used to mark the successive stages of social elevation" (Garrard, 1983, pp.33-34). Fraser argues that "The mayoralty ... attached a very special kudos ... [and] offered status" and "enshrined economic leadership with a very special confirmatory imprimatur" (Fraser, 1976, p.149). He quotes a Mrs. Gaskell as stating that people were willing to make economic sacrifices "for the power and privilege of being mayor, and the power which it gives them of getting into society." Some positions were part-time, and might be held in addition to another occupation (e.g., in the trades) in the town.

Case study evidence further establishes the potential link between members of the corporation and 'getting into society,' especially the House of Commons. As the *Times* newspaper put it in 1833, there was "scarcely an instance of any town sending representatives to parliament where the mayor, aldermen etc. have not regularly seized upon, or clutched at the nomination of the members" (Salmon, 2005, p.97). In Gloucester "the bench enjoyed a near monopoly of parliamentary representation with six of our aldermen elected by the freemen to Westminster" (Clark, 1984, p.319). Of course, it could be onerous to undertake the governing tasks of a borough. In Bristol "In 1810, no fewer than fourteen gentlemen in succession refused to accept nominations as Common Councilmen" (Webb and Webb, 1908, p.469).

Finally, aside from being selected from certain segments of society, the members of the municipal corporation were often relatively wealthier (Garrard, 1983; Gauci, 1996; Clemis, 1999). They also often contained the gentry, as we saw in Gloucester: "[t]hroughout the early modern period the rulers of the major cities probably enjoyed the title and reputation of gentlemen within their own communities" (Borsay, 1989, p.229).

Taken together, boroughs were run by a 'municipal corporation', or a council, which appointed officers

in the borough.[7] Unpaid members of the council and officers may, in part, have been motivated to take up such positions by prestige and recognition, as well as by the prospect of moving up the political ladder. This political system may have evolved this way in the absence of a steady flow of income. We did not discuss in this section the enormous variation in performance between boroughs. Whereas some, such as the corporation of Liverpool, managed a bustling global harbor, others were not able to preserve order.[8] We now introduce the data we use to measure the performance of paid and unpaid positions. We also introduce the data we use to study the organization and selection of the unpaid bureaucratic workforce.

3 Data: State Organization in Municipal Boroughs

In this section, we introduce our primary data source, the Municipal Corporations Commissioners (1835) report. We discuss its structure, and then detail how it records the officers that work in each borough and the characteristics of each position, such as whether it attracts a salary. Boroughs provide several public goods, and we observe the assignment of individual positions to the tasks of providing such public goods. We also observe whether the borough was successful at providing those public goods. Furthermore, the report allows us to measure several aspects of the incentives associated with individual positions. Finally, we complement the report with additional data that speak to the selection of individuals into the positions instituted within the bureaucracy. We find that boroughs varied considerably in their workforce, whether it is compensated, their performance in providing public goods, and the type of individuals they attract to their positions. This variation is the basis for the remainder of our paper.

3.1 Our Data: The Municipal Corporations Report

Our study of the English local state relies primarily on the 1835 *Report of the Commissioners Appointed to Inquire into the Municipal Corporations in England and Wales*. We discuss its origin before discussing its contents. The report, in a systematic manner, discusses each of 258 municipal boroughs in England. The fact that it systematically discusses the organization of each borough and its performance on public good provision allows us to use it as the basis for our analysis.

[7] A remaining issue is the presence of parishes within boroughs. Oftentimes, a borough encompassed several parishes, which, in an urban context, were often named after (the church of) a particular saint, such that Bedford St. Michael would be a parish centered around the church of St. Michael within Bedford. These parishes did provide public goods. Most centrally, they were responsible for the implementation of the Poor Law. See Trotter (1919) for a detailed description of parish governance. We cannot measure parish governance or any variation within boroughs across parishes. Our empirical strategy compares positions within a borough, and any between-parish (geographical) variation is unlikely to affect our estimates.

[8] This variation can be best observed in the general discussion of the performance of the borough in the report we use to measure employment structure in this paper. We therefore discuss how to measure borough performance after we introduce our report.

3.1.1 Origins and Administration

In 1833, Parliament authorized a royal commission to investigate the English municipal boroughs, whose methods of government were largely unknown at the time. Twenty commissioners[9] were appointed. Most were lawyers or legal scholars, such as Sir Fortunatus Dwarris, author of a renowned 1830 treatise on statute law, and Peregrine Bingham, a contributor to *The Westminster Review* and friend of Jeremy Bentham and John Stuart Mill. The commissioners were asked to investigate all aspects of the municipal corporations — especially their constitutions, positions, finances, justice systems, and privileges—and given significant powers to do so. They could compel testimony under oath with full authority to summon witnesses and demand all of a town's records (e.g., charters, deeds, and accounts). The commissioners also visited boroughs to assess their infrastructure.

The commissioners were unable to find any official list of municipal corporations. They investigated 285 places, 246 of which they found to possess municipal functions. Five towns refused to offer up any information, while four participated in an incomplete way.[10] Across the main report and an 1838 follow-up (Hogg, 1838), we have data for 258 boroughs. We omit London.[11]

3.1.2 Contents

What does the report tell us about the administration of the local state? The commissioners sent the mayor or town clerk of each borough a form letter describing sixteen topics of interest, listed in full in Appendix Section B.1. This standardized survey, in combination with borough records and witness reports, resulted in towns' reports having a relatively uniform structure. To illustrate the contents of the report, we focus on the borough of East Looe. We provide photographs of the relevant excerpts of the report in Figures 2-6.

After discussing the geographical boundaries of the borough, and details on its governing charter, each borough description lists the municipal positions in the town. From now on, we use the terminology *officer* to describe an *individual* who holds a *position* that exists in a borough, such as the mayor. See Figure 2 for the several positions from the position list of East Looe.

[9]Their names were John Blackburne, Sir Francis Palgrave, George Long, Fortunatus Dwarris, Sampson Augustus Rumball, George Hutton Wilkinson, Thomas Jefferson Hogg, Peregrine Bingham, David Jardine, Richard Whitcombe, John Elliot Drinkwater, Edward John Gambier, Thomas Flower Ellis, James Booth, Henry Roscoe, Charles Austin, Edward Rushton, Alexander Edward Cockburn, John Buckle, and Daniel Maude.

[10]This is because the attempt by parliament to collect information was seen in some boroughs as an illegitimate exercise of authority - see the discussion in Chapter 5 of Sweet (2014).

[11]London was governed in its own particular way, being split between the city of London and the much larger London conurbation. In London, for example, the livery companies were important for the election of officers to the London Corporation, the body that governed the city of London, but not beyond.

Position List Critically, the commissioners requested information on "[t]he several Officers of the Corporation, how, and by whom elected, or removed; the time for which they hold their respective offices; their respective Functions and Privileges, and their Salaries and incidental Emoluments." This resulted in a comprehensive list of positions for each borough. A typical town's chapter enumerates *all* positions in the corporation, and first records the means of appointment for an officer. An officer holding a position can be elected or appointed. If the officer was *appointed*, the principal is named. From this information, we record an indicator equal to one if an officer has a principal. Next, the report describes the position's designated functions, i.e., the *tasks* that a holder of this position is expected to perform. Some positions performed only a single task; others were assigned to a range of roles across several domains. The report then lists the salaries attached to all positions. Fees or in-kind payments are mentioned, and often an estimate is given of their total monetary value. It is explicitly mentioned if a position does not receive any salary *or* piece-rates. We record an indicator equal to one if a position does not receive compensation.[12] The position list is also clearly ordered by *prestige*. It always begins with the mayor and governing body. It then lists all municipal positions, starting with judges and clerks, before discussing the 'inferior officers', such as the crier or mace-bearer. For example, Figure 4 shows that in East Looe the Recorder, who holds an important legal position (in East Looe, in other boroughs, recorders have other tasks), is more prestigious than a Serjeant at Mace. The *names* of officers are not systematically recorded. We therefore complement our data with additional data sources on individuals, which we describe below.[13] There are two remaining parts of the report. First, the report records financial data. Often, there are detailed borough accounts, showing a line-by-line account of sources of income and items of expenditure. As an example, we report East Looe's revenue and expenditure accounts in Figures 5 and 6 respectively. Second, there is information on public good provision. We will outline these in more detail in the next section.

3.2 Positions and Tasks

We digitize all positions from the municipal report. We record their titles, paid status, and salary where applicable. We also map positions to their respective tasks. In this section, we discuss these tasks, which are simply the provision of the principal borough public goods. Appendix Section B.2 provides summary statistics.[14] In Table 2 we present statistics of the number of positions for several boroughs. For

[12] In the Appendix, we also show robustness to measuring paid status by market wages, rather than any compensation. Our results are also unchanged if we include in-kind payments, which were usually symbolic (e.g., the watchman receiving a hat), into the definition of "paid." Piece-rates (called a 'fee' in England) were usually paid for services, in addition to a base wage. This was common for, for example, a coroner.

[13] In brief, we compile evidence on officers' identities and characteristics from three sources: first, from a 1790 gazetteer of notable inhabitants of English towns, second, from the biographies of members of Parliament—for whom holding a municipal position was often a stepping stone to national honors, and third, from the compilation of wealthy individuals produced by Rubinstein (2009).

[14] Some positions are held by several individuals. There can be, for example, more than one constable. We truncate position size at the 90th percentile (10 officers) to reduce the scope for outliers to affect our results. We demonstrate robustness of our main results

example, the first line of this table shows that the largest borough in terms of employment, Liverpool, employed 203 officers, and that the most common position title is a 'watchman' who is employed in law enforcement. The smallest borough, Newtown, employs three officers, none of whom get paid, and the most common position is a clerk. In Table 3, in contrast, we present data at the level of the position. The most common position across all boroughs is the constable. We observe constables in 226 out of 258 boroughs, and in total, we observe 1228 constables. 70 percent of constables are unpaid, and they are, on average, assigned to 1.13 tasks. The most commonly assigned task is law enforcement. The least common position we observe is the catcher, which is employed in two boroughs, and each borough has one catcher. One out of two catchers gets paid, and they are, on average, assigned to two tasks. Their most common task is clerical work.

The first public good that boroughs provide is the general management of their affairs. This includes personnel management and general oversight of public good provision. For example, if the police don't function well because insufficient policemen have been hired, this is a managerial problem. We label this task 'governance' and record positions which are listed as "conducting the affairs of the borough" as governing. Typical positions engaged in governing are the mayor and the alderman. The second public good that was provided was a judicial system. Through several different courts, boroughs provided opportunities to redress grievances ranging from small claims to criminal charges.[15] Figure 3 reports the courts present in East Looe. Several positions are typically either listed as local judges or justices of the peace, a judicial title that connected them to the county judicial system. We record as being involved with judicial services any positions that are listed as active judges. These are often the mayor and (capital) burgesses,[16] and sometimes dedicated justices. The third borough task is the management of its finances. Although boroughs were often impoverished, they did manage the collection and disbursement of their funds. Some kept accounting records. The typical position in charge of funds is called the 'chamberlain'. Fourth, in addition to financial management, the borough had various clerical tasks to perform. These ranged from managing judicial process, to transacting the legal business of the borough, to coroner's inquests. The most common position in charge of this task was the Town Clerk. Fifth, boroughs built and maintained several types of infrastructure. These ranged from roads and street lighting to borough-specific public property, like harbors. Finally, boroughs were in charge of various aspects of law and order. We record as the 'prison' task the management of the borough 'gaol'. The typical position in charge of

to this choice in Appendix Section C.

[15] In more detail, there are courts akin to small claims courts, typically related to markets. There are various criminal courts, and finally, there are courts that historically had a role in the appointment of officers that were part of the manorial affiliation of a borough, called courts leet and courts baron.

[16] Capital burgesses, just like regular burgesses, are wealthier individuals who have the right to be part of the municipal corporation. The rules that determined who became a burgess varied by city.

prison management is a 'gaoler' (jailer). Finally, we observe policing. The most common position title in charge of public order was the constable. Figure 4 shows the report's evaluation of policing, prisons, and infrastructure in East Looe.

Positions can be assigned to execute several different tasks. While some positions, such as that of gaoler, are tightly connected to some particular task, others are not. Mayors, for example, often engage in governing, judicial tasks, and yet other tasks, like financial management or infrastructure management.

3.3 How were public goods provided?

So far, we have described the historical background of the boroughs and the report. In this section, we provide a stylized description of public good provision. Before we do so, it is important to note that the organization of each borough was the outcome of a historical process that led to significant heterogeneity between boroughs and even the compensation for similar positions within a borough, or the same position, like that of mayor, across boroughs.

That said, the primary means in which public goods were actually provided was as follows. First, the municipal corporation decided on the implementation of a public good, such as a court or the keeping of accounts. It then either assigned its implementation to one of its own members or appointed/hired someone into a fixed position. Most public goods were provided by giving up time. For example, a judge sat in court, and a constable kept order in town by walking their 'rounds'. Some public goods require capital inputs, such as the construction of a road. Typically, if only small outlays were necessary, these were paid out of the borough budget or by issuing debt. If an ongoing outlay was necessary, the corporation might attempt to raise an earmarked tax on property owners. Because raising such a tax was hard, we observe few ongoing investments. While there is a great deal of variation between boroughs, the main commitment on behalf of bureaucrats appears to have been time. This contrasts with modern 'informal taxation' which often takes the form of community members contributing small amounts of money for, say, a road (Aman-Rana et al., 2025).

3.4 Other data on individual officers

Because our dataset does not contain names of individual *officers*, we rely on several three further data sources to reconstruct information on social titles, elite political status, and elite economic status. From Barfoot and Wilkes (1790), a directory of prominent residents in many English towns, we collect data on the names and titles of many individual office-holders. From Thorne (1986), Fisher (2009), and House of Commons (1806), we record information on whether officers came from a family that has links to

Parliament or the local military elite. Finally, we use a compilation of biographies of wealthy individuals to measure whether a position was held by a member of the economic elite Rubinstein (2009). We discuss the variables we record from these sources in detail when we discuss selection, in section 5.2.[17]

3.5 Boroughs

We observe a wide array of borough characteristics, which we use as covariates in our analysis. Appendix Section B.3 details each source and provides summary statistics. To capture location, we record distance to the nearest river; to the nearest market town, to London; to the nearest coal field; and to the country border. To capture historical economic development, we code an indicator equal to one if a borough was a seaport or a market town in 1680, and we collect the amount of tax revenue raised in the fourteenth century as a measure of initial differences in wealth. To capture local geography, we measure the soil suitability for growing wheat, maximum attainable wheat yields, maximum attainable yields on pasture, slope, longitude, latitude, and town size by area. To capture baseline political characteristics, we code an indicator variable equal to one if the manorial lord was involved in borough government, the year of the borough's latest charter, and the number of noblemen living in the town, and similarly the numbers of members of Parliament, knights, gentlemen, bishops and baronets who reside in the borough, all measured in 1680. We also include the number of gentry present in 1370.

4 Performance of the Embedded State

We now evaluate how well the Embedded State performed at providing public goods. Specifically, we compare the performance of unpaid to paid positions in each borough across the seven core borough tasks. Our analysis proceeds in four steps. First, we describe the construction of the borough-task performance data. Second, we present descriptive comparisons of performance outcomes for paid versus unpaid positions. Third, we outline how our empirical strategy addresses issues of estimation and identification. Fourth, we report results and associated robustness checks.

4.1 Measuring Performance

We discussed in the previous section that boroughs provided a range of public goods. We consider the provision of each public good a *task* within the borough, and the positions assigned to a task the *team*

[17] In addition, we use the information on the occupations of municipal officers mentioned either as victims or defendants in the proceedings of trials at the Old Bailey court in London to develop a *position*-level measure of part-time status (Old Bailey Proceedings Online, 2023). We record a position as being part-time if any holder of that position is mentioned as holding two occupations simultaneously, e.g., "constable and shoemaker."

performing that task. Because we want to compare positions *within* borough by remuneration status, we need to measure task-level performance consistently across public goods. We therefore binarize each performance variable at the median to generate seven binary performance indicators per borough, one for each task. Appendix Section B.4 provides details and summary statistics. We report robustness to alternative binarization thresholds in Appendix Section C.4. In this Appendix section, we also record performance measures that do not rely on the report and verify our results.

We start with the overall governance of the borough. The management of the borough was in the hands of the municipal corporation. An ideal measure of performance, therefore, assesses how well a borough is governed, from appointments of individual officers to the application of public goods and services, such as the police, to their desired ends, like public order. To assess overall governance quality, we use the *Analytical Index* of the Municipal Corporations Report. This index systematically records mismanagement from the open-ended discussion of the general management of the borough, which appears in the report. In total, it records *mis*management in seven categories ranging from 'neglect' to 'incompetency'. We count the number of times a borough is mentioned in these categories and code a variable that is equal to $7 - \zeta$ where ζ is the number of times a borough is mentioned from zero to seven. This way, a higher score captures better governance. For judicial performance, we simply count the number of courts held in a borough. These range from zero to nine, as recorded in the Municipal Corporations Report. To measure how well a borough had its finances in order, we record from the report an indicator for whether the borough kept official accounts, as recorded in the report. Separately from financial administration, we record the quality of clerical administration. The report records how many documents about its history and organization the borough supplied to the commissioners of the report. We record the total, which ranges from zero to 137.[18] For infrastructure, we directly measure, from the report, whether a borough was paved or lit at night. We thus construct a count variable that ranges from zero (neither paved nor lit) to two (both paved and lit), to capture basic public infrastructure provision. Finally, the report contains two performance measures on law and order. First, the report classified the quality of the town's prison facilities as either 'absent,' 'inadequate,' 'adequate,' or 'superior.' We thus construct an ordinal variable ranging from zero ('absent') to three ('superior'). To capture the quality of policing, we follow the same structure as for prisons. Boroughs are categorized as having no police force, or one deemed 'inadequate,' 'adequate,' or 'superior,' which we convert into a four-level ordinal variable.

We then binarize all count or ordinal performance measures at their median. This results in a comparable performance indicator at the borough-task level bt. We provide a tabular overview of the information

[18]These include current and past charters, financial documents, and other documents such as maps, bye-laws, and lists of members of the corporation.

in this section in Table B.3.

4.2 Descriptive Evidence

Our objective is to compare the performance of unpaid versus paid positions across tasks. Using the position-task linkage described in Section 3.2, we assign to each position and task the corresponding performance of these tasks. In a first step, we examine unconditional differences in performance: For each position, we calculate the mean performance across all tasks to which they are assigned. We then average across positions.

Figure 7, Panel A reports position-level performance averages separately for paid and unpaid positions. Unpaid positions exhibit significantly higher average task performance than their paid counterparts. The difference is statistically significant. Panel B controls for borough-level confounders. Specifically, we estimate the relationship between unpaid status and performance after partialing out borough fixed effects. The horizontal axis reports the position-level predicted probability of being unpaid, while the vertical axis shows residualized performance. We find a positive and statistically significant linear association: moving from a predicted unpaid probability of zero to one is associated with an increase in residualized mean performance from approximately 0.43 to 0.6.

These correlations reveal the wide variation in performance between boroughs in the report. An example of a successful town is Liverpool (Municipal Corporations Commissioners, 1835, pp. 2689-2780). Liverpool provides all public goods we record and runs the bustling Liverpool harbor. Liverpool holds quarter sessions and daily petty sessions to settle disputes. In addition, a civil court heard 21,334 cases (presumably mostly trade-related). There is a sizeable police force (at least 200 individuals), and the 'inhabitants consider themselves a very well protected community' (Municipal Corporations Commissioners, 1835, p. 2715).[19] No complaints are lodged with respect to the gaol, in fact, 'it has been found larger than requisite' (Municipal Corporations Commissioners, 1835, p. 2716). The borough oversees two weekly markets and brings in a large amount of revenue. The accounts of the borough are kept with 'a punctuality, clearness and regularity' (Municipal Corporations Commissioners, 1835, p. 2726). Other boroughs, such as Leeds, Richmond, and Gloucester, also manage to provide all public goods we record.

Yet other boroughs perform less well. Buckingham, the county town of Buckinghamshire, has a court, but no police force, jail, or systematic financial management. Its Quarter Session court tried only 10 cases in the last eight years preceding the publication of the report. Other courts, such as the Three Weeks Court, have simply ceased to function. The 'corporation have no property or revenue whatsoever' and whatever

[19] Neighboring ToxtethParkk was poorly run, and the Liverpool police had been helping out keeping order.

income there is is spent on fees to the person managing this income and on 'idle and unnecessary feasting' (Municipal Corporations Commissioners, 1835, p. 30).

4.3 Empirical Strategy

Our empirical strategy aims to measure the effect of being unpaid on performance, while addressing two central challenges in identifying this effect.

First, we observe position-level unpaid status, whereas performance is measured at the borough-task level. To link the two, we consider each borough-task pair as a *team* composed of the positions assigned to it (e.g., a town clerk and a mayor engaged in legal work). Following the econometrics of team production (Bonhomme, 2025), we attribute team-level outcomes to differences in individual-level unpaid status in Section 4.3.2.

Second, getting paid is not randomly assigned, nor are position-to-task assignments. To address this, we first control for a broad range of potential confounders across boroughs, tasks, and positions. We then isolate a plausibly exogenous variation in the likelihood of being unpaid. We discuss our approach in Section 4.3.3. Finally, we discuss the possibility of not instituting a particular position, anticipating (non)payment, or not assigning tasks to a given position, anticipating (non)payment. To mitigate these issues, we focus on positions that are instituted by charter and are therefore predetermined, and on tasks that are the modal task for a given position *title* (e.g., if the gaoler were to do another task, he would not be called the gaoler).

4.3.1 Main Estimating Equation

In our dataset, we observe 258 boroughs (b). For each borough, we record performance on the seven distinct tasks (t), resulting in 1,332 unique borough-task teams, indexed by bt. We observe a total of 5,710 positions (bp) assigned to at least one team.

First, a performance indicator for each team:

$$Y_{bt} = 1 \text{ if team } bt \text{ records above median performance, } 0 \text{ otherwise.}$$

We then record an assignment indicator for each position-team pair:

$$w_{bpt} = 1 \text{ if position } bp \text{ is assigned to team } bt, 0 \text{ otherwise.}$$

Finally, we record unpaid status:

$u_{bp} = 1$ if position bp is unpaid, 0 otherwise.

Our baseline approach rests on a simple triple difference estimating equation at the position-task level:

$$Y_{bt} = a\, w_{bpt} + b\, w_{bpt} u_{bp} + X_b\, \mathbb{1}(\tau = t)'\theta + \delta_b + \delta_t + \delta_p + e_{bpt}, \tag{1}$$

where b captures the difference in performance of unpaid positions, relative to paid positions, conditional on teams assignment (w_{bpt}) and controls: $X_b\, \mathbb{1}(\tau = t)'\theta$ denotes borough latitude and longitude polynomials, X_b, interacted with task indicators $\mathbb{1}(\tau = t)$. δ_b, δ_t, and δ_p are borough, task, and position title fixed effects, respectively.[20] Standard errors are clustered at the team (bt) level.

4.3.2 Empirical approach: Team Production

Our setting is a team production setting. In Appendix Section C.1, we develop a simple team production model following Bonhomme (2025). This model allows us to do three things. First, it allows a robustness check in which we estimate the structural equivalent of equation 1. Second, this model shows that to correctly estimate the effect of being unpaid, we need an assumption on spillovers. In particular, we have to assume that there are (1) no within-team spillovers and (2), no cross-team spillovers. Third, the model shows that we only estimate the effect of being unpaid correctly if we correctly estimate the estimated returns to team size (assumption (3)).

Appendix Section C.2 addresses potential violations of assumptions (1) and (2) in four ways. First, we assess the robustness of our estimates to alternative clustering levels of our standard errors, such as borough or county, and allow for spatial dependence in the error structure. Such dependence may occur if the performance of a team spills over onto a team in another borough. Second, we account for the performance of *other* teams within the same borough, directly capturing potential local spillovers. Third, we restrict the sample to contexts where within-team spillovers are likely limited by focusing on single-member teams. Fourth, we aggregate the data to higher levels: To internalize within-team spillovers, we estimate results at the borough-task (team) level; to address cross-team spillovers, we aggregate to the borough level.

To address potential violations of assumption (3), Appendix Section C.3 shows the robustness of our results to a wide range of returns-to-size parameters, suggesting that our findings do not hinge on a

[20] These are effects for each distinct position title. They distinguish, for example, mayors from chamberlains.

particular assumption about scale effects.

4.3.3 Empirical approach: Position-Task Assignment

While Section 4.3.2 outlines conditions under which average differences in individual contributions to team performance can be estimated, being paid is not randomly assigned, nor is task assignment. In this section, we review three strategies we follow to address these concerns.

Fixed Effects Equation (1) includes a rich set of fixed effects to absorb several sources of variation in performance, paid status, and task assignment. Borough fixed effects δ_b capture differences across boroughs, including variation in resource endowments and the identities of Municipal Report surveyors. Task fixed effects δ_t absorb average differences in task complexity, staffing norms, and compensation structures (e.g., governing may be more complex and differently staffed than infrastructure). Position title fixed effects δ_p account for performance differences associated with specific positions — e.g., mayors might perform better on average. In addition, we can introduce task scope fixed effects δ_s and county-by-task fixed effects δ_{ct} to absorb unobserved, task combination- or county-specific influences on task performance in Appendix Section C.4.[21]

Controls Remaining sources of confounding arise at the borough-task (bt) and position-task (bpt) levels. We address these in four ways. First, equation (1) includes borough latitude and longitude polynomials interacted with task indicators: the term $X_b \, \mathbb{1}(\tau = t)'\theta$ flexibly captures location-specific heterogeneity in task feasibility — for example, revenue collection may be easier in coastal towns, or policing more difficult near London. Second, we can control directly for position characteristics that may be correlated with performance, such as whether the officer holding the position also serves as a Justice of the Peace (Besley et al., 2025). Third, we implement a matching exercise, matching each position to a nearest neighbor using a full set of borough and position characteristics. Finally, we can account for potential outliers by leaving out one task at a time from estimating equation (1), or by varying the threshold rules in constructing our binarized performance data. These robustness checks are reported in Appendix Section C.4. In this Appendix section, we also show robustness to alternative measures of task performance.

Quasi-Exogenous Variation: Affordability Our final strategy is to isolate variation in unpaid status u_{bp} that is plausibly exogenous. As discussed in Section 2, most borough revenues were low and predetermined. This means that the predetermined component of borough income constrained the *affordability* of

[21] Task scope fixed effects are fixed effects for each task-assignment combination. For example, all positions that are involved with both policing and prison are in one group, as are positions that are just involved with policing, or just involved with prisons.

a position, given a market wage for that position type. We construct a measure of affordability combining wages of positions across all boroughs with a borough's predetermined income. This measure, which we describe in detail in Section 4.5, is a strong predictor of whether positions were paid, yet is balanced across a wide range of borough characteristics and position characteristics. We show that our results remain robust when we instead relate performance to whether a position was affordable, rather than to whether the position was actually paid. We also show that these results are not driven by functional form choices for calculating affordability.

4.4 Results: Unpaid positions

Table 4, Column (1), presents estimates of equation (1) including borough and task fixed effects, estimated using OLS. Conditional on a position being assigned to a specific task t, unpaid status is associated with a performance increase of 0.09 (clustered standard error: 0.02), relative to a mean of 0.61. This effect is statistically significant at the 1% level. In Column (2), we add geographic-task interaction controls, and in Column (3), we include position title fixed effects. The estimated coefficients are 0.11 (s.e. 0.02) and 0.12 (s.e. 0.02), respectively. The last effect is equal to about 19% of the mean of the dependent variable. This effect size does not take into account decreasing returns to team size. In Appendix Section C.1, we show that the effect of turning a median-size team from paid to unpaid increases performance by 34 percentage points relative to the mean team performance.[22] These results mirror the descriptive patterns shown in Figure 7: Unpaid positions, on average, outperform their paid counterparts.

Interpreting $\hat{b}$ as the causal effect of unpaid status on performance requires the identifying assumptions discussed in Sections 4.3.2 and 4.3.3 to be met. Specifically, this requires that spillovers (within and across teams), returns to team size, and borough-task or position-level characteristics do not jointly influence both performance outcomes and compensation status. We implement robustness checks discussed in Sections 4.3.2 in Appendix Sections C.2 (spillovers) and C.3 (team size). We report robustness checks associated with Section 4.3.3 in Appendix Section C.4. Together, our robustness exercises suggest that the observed performance premium among unpaid positions is unlikely to be driven by measurable confounders or spillovers.

In this section, we found that the unpaid positions outperform paid positions. In the Appendix, we apply the standard AKM fixed effects technique to recover individual contributions to team production (Abowd et al., 1999). We find that the officers who fill unpaid positions are, on average, higher ability than their paid counterparts. This may explain why, when unpaid status and its concomitant incentives

[22]The median team size is two. To compute this effect, we estimate the returns to scale to team size, multiply the estimated unpaid coefficient by these estimated returns, and divide by the mean team performance in our sample.

attract higher status individuals, they subsequently outperform their counterfactual paid counterparts.[23] We return to the selection of unpaid officers below.

4.5 Results: Unaffordable positions

If the team production assumptions are met, the results in the preceding section can be interpreted as causal if being paid is assigned exogenously. In this section, we isolate a predetermined component v_{bp} of paid status u_{bp}, and relate this to performance outcomes. Our strategy builds on the observation, detailed in Section 2, that boroughs operated under tight fiscal constraints. Borough income is mainly derived from rents on inherited assets, primarily land. These were allocated to boroughs in a manner that was predetermined and plausibly unrelated to borough performance centuries later. Therefore, the ability to pay positions was partially shaped by predetermined and exogenous features of borough finances. Formally, this implies a decomposition of unpaid status u_{bp} into an affordability component v_{bp} due to rental income, and an idiosyncratic component ν_{bp} which might nest other borough income or funds earmarked toward certain positions.

We operationalize this idea by computing whether a position was *affordable* to the borough, given its rental income and the prevailing market wage. We then replace whether a position was actually paid with whether that position was *affordable* given rental income. In Appendix Section C.5, we show that choices of functional form when computing affordability do not drive our results. The construction of an affordability indicator for each position proceeds in three steps. First, we digitize historical borough balance sheets around the time of the reform to record predetermined rental income.[24] Second, we proxy the prevailing market wage for a given position type by calculating the average salary of paid positions with the same task profile across all boroughs. For example, the average wage among paid governing positions defines the market wage for considering whether a governing position would be affordable.[25]

Third, we construct a salary prioritization scheme. We construct this priority order by calculating, for each position title, the share of positions in *other* boroughs with that task profile that were paid. Titles that are paid more frequently receive higher priority. This prioritization simply reflects the fact that, over time, strict norms became associated with the non-payment of some positions and the payment of others.

[23] This result is not a stand-alone finding, but simply a different way to recover the effect of being unpaid on performance. The advantage of implementing this exercise is to recover individual fixed effects, which in the literature are often taken as a measure of 'ability'.

[24] The Municipal Corporations Report provides the first comprehensive survey of borough income, typically averaging accounts from the years preceding the report. We also digitize budget surveys from 1837 and 1838 and average across years. Our results are not sensitive to the choice of reference year.

[25] In the largest boroughs, the wages of municipal employees might be comparable to or in excess of local and global market wages, as well as of central government employees. For instance, clerks in Liverpool made £814 per annum, while entry-level clerks in the civil service contemporaneously averaged £100-£180 (House of Commons, 1822). Clerks in most boroughs, however, were paid significantly less—not at all in Fordwich and Newtown, two of the smallest. See Appendix Table C.21 for more details.

For example, most mayors were not paid, as the mayoralty became a public service position for the elite, but most policemen were paid. We then use these data components to proxy whether an individual position was affordable for a borough. We consider each position sequentially. For each position, we check whether the market wage of others in that position can be covered by the remaining disposable predetermined rental income after accounting for prior salary commitments. This procedure yields a position-specific affordability prediction v_{bp}.[26] In Appendix Section C.5, we consider robustness to the calculation of market wages and prioritization.[27]

Affordability v_{bp} is thus jointly determined by borough rental income, market wages, and prioritization. One implication of this is that high salary priority positions with low market wages will almost always be affordable, while low salary priority positions with high market wages will rarely be affordable. To focus on those positions where borough rental income actually makes a difference for affordability, we can restrict our sample to 'compliers': positions on the margin of being affordable or not. We operationalize this concept as follows. We randomly permute borough rental incomes (within counties) 1,000 times and recompute affordability. For each position, we then calculate the fraction of iterations in which the position would be affordable under this counterfactual rental income. We classify a position as a *complier* if its affordability status is sensitive to borough rental income. To do so, we compare actual affordability to this average counterfactual affordability. A position is a complier if either of these two conditions holds: (1) The position is unaffordable in its observed borough, but would be affordable under at least 75% of counterfactual rental-income assignments. These are positions that are typically affordable (and likely paid), but are unaffordable in their borough. These are compliers in the sense that the predetermined borough income is meaningful for their paid status. Or, (2), the opposite: the position is affordable in its observed borough, but would be unaffordable under at least 75% of counterfactual rental income assignments. The two cases identify compliers from both sides of the distribution of (counterfactual) unaffordable status: the first condition removes those that are always unaffordable (including in their own borough), and the second removes those that are never unaffordable (including in their own borough). The remainder are those on the margin, which are the compliers. Appendix Figure C.7 provides a graphical illustration of this procedure.[28] We identify 3,487 complier positions out of 5,710 total positions.

[26]For example, consider a borough with ten pounds of rental income and two positions: A constable responsible for law enforcement (market wage seven pounds) and a governing mayor (market wage ten pounds). In other boroughs, law enforcement positions are paid more often than those involved in governing, so the constable is prioritized. Paying the constable costs seven pounds, leaving three pounds. The mayor's wage cannot be covered, so $v_{bp} = 0$ for the mayor, and $v_{bp} = 1$ for the constable.

[27]An additional feature of this procedure is that it works against borough economic potential as a potential confounding factor. Affordability will be higher in richer boroughs, and thus the predicted unpaid status of positions will be lower.

[28]Appendix Figure C.7 illustrates that positions that are always affordable or never affordable under counterfactual rental incomes are excluded, while positions whose affordability status changes across counterfactuals are retained. As a simpler alternative in the same spirit, one can define compliers at the level of position titles: We restrict the sample to positions outside the lowest and highest quartiles of average paid status across boroughs. Appendix Section C.5 reports robustness of the results to using this alternative definition.

By construction, this procedure excludes positions at both extremes of the affordability distribution: those who are almost always affordable or rarely affordable across counterfactual scenarios. For example, gaolers and town clerks are unaffordable under nearly all counterfactual assignments and therefore meet the complier criterion in only 43% and 54% of boroughs, respectively. At the other extreme, commissioners are rarely unaffordable and are classified as compliers in only 55% of boroughs in which the position appears. The position of porter, by contrast, is sometimes affordable, and sometimes unaffordable across counterfactual assignments and is classified as a complier in 90% of cases.

Balance. Two key testable implications derive from the historical evidence in Section 2. First, rental income should exhibit balance with respect to predetermined borough characteristics. Second, predetermined aspects of a position should be unrelated to unaffordability v_{bp} (but not necessarily to unpaid status u_{bp}), especially in the complier sample.

To evaluate this, we estimate the following linear models using OLS:

$$I_b = \beta_0 + C_b\Gamma + \varepsilon_b, \tag{2}$$

where I_b is borough-level rental income, and C_b is a vector of borough-level covariates. The borough characteristics introduced in Section 3 comprise several measures of location, historical economic development, features of the soil, and historical political and social structure. All covariates are standardized for comparability. Figure 8, Panel A summarizes the results. We plot coefficients $\hat{\Gamma}$ along with 95 percent confidence intervals. We find that, for all covariates, estimated coefficients are equal to or below .2 of a standard deviation, and all covariates are not statistically different from zero. Rental income is thus balanced for all borough characteristics. This finding substantiates the consensus in the historical literature, which we outlined in section 2 that borough income was often unrelated to (current) borough performance but instead was the outcome of a long idiosyncratic historical process. We therefore use it in our construction of the unaffordability indicator v_{bp}. In Appendix Figure C.6 we implement a permutation test, in which we randomly permute incomes and show that the observed relationship between unpaid and unaffordable is not driven by our choice of treatment of market wages or the salary prioritization ranking: The variation in unaffordability comes from predetermined (and balanced) borough income.

Next, we turn to position-level characteristics:

$$x_{bp} = \beta_0 + C_{bp}\Gamma + \delta_b + \varepsilon_{bp}, \tag{3}$$

where $x_{bp} \in \{u_{bp}, v_{bp}\}$ is either an indicator for whether position bp was unpaid or unaffordable, and C_{bp} is a vector of position-level covariates. We include all position characteristics from Appendix Table C.13, indicators for the top ten positions in our data, and indicators for the modal task profile of each position. δ_b denotes borough fixed effects. Standard errors are clustered at the borough level.

Figure 8, Panel B summarizes the results, again plotting coefficients $\hat{\Gamma}$ along with 95 percent confidence intervals. Unpaid status is significantly related to position characteristics (Panel B.1). Panel B.2, by contrast, shows that unaffordability is much more balanced across characteristics. All estimated coefficients are small. In Panel B.3, where we restrict attention to compliers, coefficients are statistically insignificant throughout. This balance supports the interpretation of v_{bp} as a plausibly exogenous source of variation in position payment status. Note that these characteristics include whether a position is a *particular* position (e.g., mayor) or does a particular task (e.g., governing). Unaffordability is therefore unrelated to a particular position or task; it is driven by predetermined borough income and (exogenous) market wages.

Results. We now estimate the main regression equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp}. Table 5 presents these results in the same structure as Table 4 for the restrictive complier sample.[29] In the most stringent specification (column 3), unaffordability is associated with an increase in performance of approximately 0.15 (clustered s.e. 0.04), relative to a sample mean of 0.61. The comparable effect size in the previous section is 0.12. The estimated coefficient is somewhat larger, is significant at the 1% level, and supports a similar conclusion: Unpaid positions, identified using predetermined borough budgets, outperform paid positions.

We address three potential concerns with this finding in Appendix Section C.5. First, we vary the definitions of market wages and priority rankings (by, for example, using only data from the county in which a borough is located). Second, we consider that larger rental income might directly affect financial performance, dropping this task from the analysis. Finally, we study the idea that boroughs may just not fill certain positions, anticipating that they may have to pay for them. We address this issue by subsetting to positions explicitly mentioned in the borough charter and to their modal tasks (given their position title). These positions were always filled, and their modal tasks are arguably predetermined: a position expected to only work in the jail would not be titled 'mayor' but 'gaoler'. We then repeat our analysis using just charter positions and modal tasks. Throughout, our results are qualitatively similar. This last robustness check is very important, because it removes any selection coming from *which* positions are instituted in a borough (anticipating paying for the position or not) and which tasks are assigned to a given position (anticipating paying for them or not): Among predetermined positions and their modal

[29] In Appendix Section C.5, we show the (very similar) results from using the unrestricted sample.

tasks, isolating predetermined (un)affordability we find a similar result to the basic comparison in section 4.4.

Our results show that even when looking at predetermined positions, task assignments, and payments, we find a similar result to Table 4. In order to interpret these results through the lens of the Embedded State, there are two remaining issues with the interpretation of these results. First, we discussed above that many boroughs simply did not perform several tasks. If being unpaid only acts on the *quality* margin, but not on the extensive (provision) margin, the concept of the Embedded State would be less well positioned to explain the variation in historical public good provision. In Appendix Table C.16, we find that being unpaid affects both the extensive and intensive margins of public good provision. Second, we measure being unpaid by whether remuneration was offered. It may, however, be that what is relevant is whether a position gets paid an equivalent market wage or not, rather than whether it gets paid at all. In Appendix Table C.20, we thus redefine treatment to capture whether a position gets paid a market wage or not, rather than being paid at all, and we verify our results. Finally, and relatedly, compensation may also come in the form of bribes, kickbacks, and favors. We discuss this type of corruption in section 6.3 below. In Appendix Figure D.3, we then show that our main results are not driven by corruption as non-wage compensation.

We have so far interpreted our results through the lens of incentives and selection. The Embedded State provides incentives that compensate for being unpaid, and this package, plus its concomitant task assignment, attracts a particular group of people who happen to be higher ability than those who fill the average paid position. We now study these factors empirically.

5 Officers: Incentives and Selection

In this section, we study how an unpaid local state organization in England was sustained. We focus on the incentives faced by officers in unpaid positions, as well as the selection of officers into those positions. We develop measures of several incentives and margins of selection and assess their co-movement with unpaid status. In Appendix Section B.5, we discuss these measures in detail and show descriptive statistics. We cannot hope to measure the full set of incentives that bureaucrats in historical England faced, nor to capture all margins of socio-economic selection. We focus on the most salient measures from the literature and our reading of the Municipal Corporations report. For incentives, these include incentives to take up a position, such as prestige, and on-the-job incentives, such as having a principal. For selection, we focus both on social background, such as having a title, and other elite markers, such as being rich or coming from a family with ties to politics.

5.1 Incentives

Our discussion of the organization of the municipal corporations in section 2 and the Municipal Corporations in section 3 report both suggest several dimensions along which positions differed, and which may have acted as substitute incentives for payment. Here we discuss prestige, career concerns, flexibility, and autonomy. We operationalize each incentive as a variable based on our data. In Appendix Section B.5, we derive an alternative measure for each incentive and demonstrate robustness to the specific measurement choices.

Prestige. One way to motivate officers was through prestige. To measure this, we use the fact that in each report chapter, borough positions are ranked by prestige, by virtue of being discussed in order of importance. This order first features the most senior position in the borough—most commonly, the mayor and the headborough. The report then lists positions of lesser standing.[30] We thus measure prestige by examining the *ordering* of individual positions within each borough record in our data source. Since boroughs vary in their number of positions, we normalize the ranking to lie between zero and one within each borough.

Career Concerns. Another way to motivate officers was through career concerns. In particular, serving in a borough position was often a stepping stone to becoming a Member of Parliament. At least 11% of MPs held a borough position at some point in their careers. To measure career concerns, we consider the careers of Members of Parliament. We use the database of biographies of MPs collected by the History of Parliament project (Namier and Brooke, 1964; Thorne, 1986; Fisher, 2009). We process the career paths of all MPs between 1754 and 1832. We record whether an MP held a municipal position and, if so, which one. This gives us a list of positions, such as Mayor or Town Clerk, that served as stepping stones to a career in Parliament. We then record an indicator equal to one if a position is a stepping stone position to measure the potential of career advancement through position holding. On average, about half of the positions we observe in the report have ever been held by an individual who subsequently went on to be an MP.

Flexibility. Positions varied in their flexibility of tasks. While each position was usually tied to a clear task, in some boroughs, positions were tasked with a broader range of activities, providing flexibility: a gaoler might have inspected infrastructure in addition to keeping the gaol; a mayor, tasked with governing, could also be involved with justice and infrastructure management. We derive a position-specific measure of flexibility. First, we measure the modal task assignment of each position. Second, we compute the share of actual tasks that an officer in a borough executes that are outside the modal assignment. The

[30] Figures 2-6 and Appendix Section B.5 show example pages of our data source.

more non-standard tasks an officer executes, the higher this measure is. On average, one-third of tasks assigned to an officer are non-standard.

Autonomy. A key margin of officer autonomy was whether open positions were filled by appointment or election. Some officers were directly appointed by the governing body of the borough. Elected officers, on the other hand, had no direct principal. We construct an indicator of whether an officer was appointed by a direct principal (usually a member of the governing body) or not.

5.2 Selection

The historical literature on borough government is in agreement that borough officers were often from elite segments of society. In this section, we introduce several measures of such selection to understand whether the officers holding unpaid positions were more likely to have been selected from these groups.

Gentry and Clergy. The literature we discussed in section 2 suggests that several social groups were disproportionately represented in local public office (see e.g. Eastwood (1994)). These include members of the local landed middle class, the 'gentry', and members of the clergy. To identify titles, we need to link our positions to *individuals*. To do so, we collect data on individuals from Barfoot and Wilkes (1790). This data source records lists of prominent inhabitants of hundreds of towns in England, with their names, titles, and their borough position, if they held one. This allows us to measure whether, at the time of this survey, a position in a borough was held by someone with a title.[31] From this data source, we measure an indicator variable equal to one if a position was held by a gentleman or a member of the clergy, and zero otherwise.[32]

Political and Financial Elites. The elite that, according to the literature, governed the boroughs, was not just restricted to individuals with titles. We aim to measure the local political and economic elites as follows. To measure the local political elite, we focus on local political representation in Parliament and on local military matters.[33] To capture whether an officer was a member of the local political elite, we link officers to the biographical data on English MPs we described in the previous paragraphs. We take our list of named officers we measured in the previous paragraph, and code whether an officer shared a last name with an MP who held a local position. From this, we record if a particular position was held by an individual from a political family.[34] Second, we perform a similar exercise to link officers by last name to

[31] Unfortunately, no comparable data sources are available closer in time to 1835 when the Municipal Corporation report was compiled.

[32] Specifically, we assign gentry status if someone holds the following titles: Esquire (esq.), Sir, Gentleman (Gent.), and Baronet (Bart.). We assign clergy status if someone is addressed as Reverend (Rev.).

[33] Our results are similar if we focus on just one of the two aspects of local prominence.

[34] Note the contrast with the previous paragraph in which we used the MP data to measure which *positions* were stepping stone positions, rather than which families were in Parliament.

an 1806 list of commanders of local volunteer regiments mustered to serve in the Napoleonic Wars (House of Commons, 1806). The militia, as these volunteer regiments were called, were the backbone of domestic defense, and commanding them was an influential local position. We similarly code an indicator variable equal to one if an officer's last name was held either by an MP or a commander of the volunteers and zero otherwise. Finally, we combine these two indicators into one. This indicator, which we label 'political elite', is one if a position was held by someone with a last name that is shared with either an MP or a militia commander.[35]

To measure membership of the economic elite, we would ideally measure the income and wealth of all officers. No such data exist, but we can rely on a unique survey compiled by Rubinstein (2009) to make progress. He went through all surviving wills of individuals who left at least £100,000 at death and recorded brief biographical data on each, including whether they held a municipal position. This does happen, and not all rich individuals holding a municipal position have titles. For example, Robert Myddleton Biddulph, a banker, was a common councilor and recorder in Denbigh between 1795 and 1814. We code an indicator whether a *position* is ever held by a rich person in *any* borough in our sample.[36]

5.3 Incentives and Selection: Descriptive Evidence

We study whether the incentive and selection measures introduced above are correlated with unpaid status. This is informative about which aspects of a position compensate for not getting paid, and about who selects into an unpaid position given these incentives. We construct a dataset at the level of individual positions, in which we can relate unpaid status to the incentives and selection variables introduced in the previous sections. Within this dataset, we estimate the following linear model, using OLS:

$$Y_{bp} = \beta u_{bp} + \delta_b + \epsilon_{bp}, \tag{4}$$

where Y_{bp} are the dependent variables introduced above, measured for officer bp in borough b. u_{bp} is an indicator variable equal to one if officer bp is not paid. δ_b is a vector of borough fixed effects. ϵ_{bp} are heteroskedasticity robust standard errors, clustered at the borough level. Tables 6 and 7 report estimated coefficients $\hat{\beta}$.

[35] Our results hold if we restrict to either subgroup. These results are available upon request to the authors.

[36] The reason for this coding scheme is that £100,000 is a very high threshold for inclusion and we therefore obtain too few matches if we were to directly code this variable to the borough-position level (i.e., we code a mayor to be part of the economic elite if their position, say the mayoralty of Leeds, is directly mentioned).

5.3.1 Incentives

Table 6 shows results. Across columns, we vary outcome variables, and the first row of this table provides estimates of β across our four outcomes. In Columns (1) and (2), we study prestige and career concerns. In both regressions, we include borough fixed effects, and we therefore compare unpaid to paid officers, partialing out borough-level differences in outcomes and unpaid status. We find that being unpaid is positively correlated with prestige and career concerns. Unpaid positions are, on average, about 38% more prestigious than paid positions relative to the baseline mean, and are about 56% more likely to be stepping stone positions to a Parliamentary career relative to the baseline mean.

In Columns (3) and (4), we study the flexibility and autonomy of unpaid and paid positions. In Column (3), we document a positive correlation between being unpaid and the flexibility of assigned tasks. On average, unpaid positions' task assignments are about a third more flexible than paid positions' assignments. In Column (4), we document that officers in unpaid positions are about 42% more likely to be elected than appointed. We interpret this difference as being consistent with greater autonomy, since those appointed have a recorded direct principal.

5.3.2 Selection

Next, we study whether individuals taking up unpaid positions are different from those taking up paid positions. Table 7 reports results of estimating equation (4) using selection outcomes.

In Column (1), we use as the dependent variable an indicator variable equal to one if an officer had a gentry title. We find that officers in unpaid positions are about 45% more likely to have a gentlemanly title than officers in paid positions. In Column (2), we study whether unpaid officers are more likely to be members of the clergy. We find a large effect: Being unpaid doubles the probability of being a member of the clergy, relative to the sample mean. In Columns (3) and (4), we instead focus on the political and economic elite. In Column (3), we find that unpaid officers are, on average, more likely to share a last name with an MP or militia officer. 75% of officers share a name with an MP or milita officer on average, and being unpaid is associated with an increase in this probability by 38 percentage points. In Column (4), we instead study whether a position was ever held by a person who is among the very rich as identified by Rubinstein (2009). We find that being unpaid is strongly positively correlated with occupying such a position. Our estimated effect is equal to 0.24 relative to a mean of 0.26.

5.4 Incentives and Selection as Determinants of Performance

In Appendix Section D, we decompose our performance results into the contributions of incentives and selection by removing selected individuals according to the measures we used in this section. When we remove these and therefore focus on incentives alone, we find that paid and unpaid positions perform equally well. When we add selected individuals back, we reproduce our main results. These results suggest that the positive effect of being unpaid is driven by positively selected individuals. This result supplements our results in section 4.4, which showed that unpaid officers were higher ability. The two results combined suggest that the unpaid positions outperformed paid ones because officers in these positions were of higher ability, which may be in part driven because they were (positively) selected.

In this section, we analyzed several margins of selection and characteristics of individual officers that are correlated with being unpaid. We find that both 'embedded' incentives and selection are correlated with being unpaid. We now ask whether all three co-move.

6 A Characterization of the Embedded State: Costs and benefits

Section 5 analyzed separate correlations between unpaid status, non-monetary incentives, and individual-level selection margins. In this section, we ask whether these elements co-move — whether they together constituted a *system* of borough governance. In the introduction, we posited that the benefit of the Embedded State is that, through extending 'into' society by providing social incentives that attract individuals willing to work for free in exchange for prestige and other non-monetary benefits, it is able to provide public goods more successfully. By characterizing the Embedded State as a system, we provide evidence for this assertion.

Naturally, the Embedded State also has costs. For example, the historical literature cited in our background section emphasizes the corruption of the municipal corporation. The elite that ran the corporation elected itself, appointed their family, and took bribes both to obtain the position and on the job. A more subtle cost has to do with what tasks the Embedded State can implement. It stands to reason that not all tasks can be implemented by embedded incentives: For example, tasks that are not visible or prestigious are likely not attractive.

We first find that unpaid status, incentives, and selection strongly co-move. Moreover, we find that boroughs are typically either run as an Embedded State, in which predominantly unpaid bureaucrats face embedded incentives and are selected to be part of the social groups we identified in the previous section, or as 'Weberian' governments, in which most bureaucrats get paid, and we see less selection. Second,

we examine whether incentives and selection co-occur across tasks in Section 6.2. We show that, indeed, unpaid status, incentives, and selection margins concentrate in certain tasks. Some tasks are mostly paid, are not prestigious, and do not select elites. These are more difficult to implement via the mechanisms of the Embedded State. Finally, we find that being unpaid is associated with nepotism, self-election, and bribery. Importantly, however, we show that corruption alone cannot explain our main results.

6.1 Benefits: Incentives and Selection Across Officers

We analyze the relationship between incentives, selection, and unpaid status in our position-level data. Our goal is to assess whether these dimensions co-move systematically — whether they form a broader organizational logic. To do so, we proceed in two steps. First, we estimate the relationship between incentives and selection. Second, we highlight unpaid status in the resulting incentive–selection space to assess whether unpaid positions occur in particular regions of incentive and selection intensity.

We construct standardized indices for selection and incentives at the position-by-borough level. Specifically, for position bp, we normalize each underlying incentive variable to have mean zero and unit variance, then average across the four variables to form a composite index $Incentive_{bp}$, and analogously for the selection index $Selection_{bp}$ (where higher values indicate 'positive' selection).

We construct a binned scatterplot using the following OLS specification:

$$Selection_{bp} = \beta Incentive_{bp} + \delta_b + \epsilon_{bp}. \tag{5}$$

As in equation (4), we include borough fixed effects and cluster standard errors at the borough level.[37] We classify each bin as 'unpaid' or 'paid' based on whether the share of unpaid positions exceeds the population share of unpaid positions.

Figure 9 shows results. The x-axis plots the incentive index, and the y-axis the selection index. Vertical and horizontal lines indicate the respective conditional means. Majority-unpaid bins are represented by blue circles, while red diamonds denote majority-paid bins. We adjust the size of each bin to reflect the number of underlying observations.

The figure shows a strong positive relationship between incentives and selection: nearly all bins fall in either the top-right or bottom-left quadrants. Furthermore, the unpaid–paid classification aligns with this structure: majority-unpaid bins are concentrated in the top-right quadrant, and majority-paid bins in the bottom-left. Thus, unpaid status and above-average incentives and selection systematically co-occur. We

[37] Our baseline specification uses 30 bins. Appendix Figure D.1 shows robustness to varying the number of bins $10, 20, 30, 40$. Appendix Table D.1 reports the results of the unbinned regression in equation (5).

interpret the top right quadrant as the Embedded State. We interpret the bottom left quadrant as the more familiar, 'Weberian', state. For example, Liverpool, which we discussed before, employs relatively few officers with a title, and most positions have a direct principal. Consequently, it is at the 25th percentile of both the selection and incentive indices in Figure 9. 86% of positions get a wage. On all these metrics, Liverpool looks 'Weberian'. Nottingham, similarly, pays 90% of its positions. Both towns are successful in the sense that they provide public goods satisfactorily. In the Embedded quadrant, Plymouth is at the 75th percentile of both indices. Plymouth pays only 15% of its positions. It successfully manages its harbor and provides all seven public goods in our dataset. In fact, the report notes that the 'constitution and character of the corporation of Plymouth are very superior to those of the other municipal bodies in the West of England' (Municipal Corporations Commissioners, 1835, p. 595). Not all boroughs, of course, perform well. Denbigh, the county town of Denbighshire, pays about half its positions. It has not managed to light and pave the streets, and 'Pigsties, and other offensive structures, bear certainly a very prominent part in the borough' (Municipal Corporations Commissioners, 1835, p. 2668). Generally, 'No public works are in progress' (Municipal Corporations Commissioners, 1835, p. 2669).

In this section, we characterized the Embedded State as a system of governance and contrasted it with a Weberian model of governance. In the first part of this paper, we showed that more 'Embedded' positions, teams, or boroughs tend to perform better. In the remainder of this paper, we discuss the costs of the Embedded State.

6.2 Costs: Incentives and Selection Across Tasks

Figure 9 documents strong co-movement of incentives and selection at the officer level. A natural next question is whether similar patterns exist across tasks — i.e., whether certain tasks are systematically associated with strong incentives and selection, while others are not.

To investigate this, we disaggregate unpaid status, incentives, and selection margins by task. For each position bp and fixed task $\dot{t}$, we define an indicator $w_{bp\dot{t}}$ equal to one if the position is assigned to task $\dot{t}$. We then estimate the association between this task assignment and various position characteristics c_{bp} (including unpaid status, incentives, and selection indices) using the following linear model, estimated separately for each task and characteristic:

$$w_{bp\dot{t}} = \beta_0 + \beta_1 c_{bp} + \epsilon_{bp}. \tag{6}$$

The coefficient β_1 captures the extent to which officers with characteristic c_{bp} are disproportionately

involved in task t.

We begin by examining heterogeneity in unpaid status across tasks. Panel A of Figure 10 presents estimates of equation (6) with $c_{bp} = Unpaid_{bp}$. Tasks are ordered by the magnitude of the estimated coefficients. The results document substantial variation: tasks such as governing and administering justice are disproportionately assigned to officers in unpaid positions, while clerical work, gaol-keeping, and policing are more likely to be performed by officers in paid positions. Next, we assess whether the co-movement of incentives and selection documented in Figure 9 also appears across tasks. Specifically, we test whether tasks with a higher prevalence of unpaid positions are systematically associated with stronger non-monetary incentives and selection margins. To this end, we re-estimate equation (6) for each incentive and selection variable c_{bp}, maintaining the task ordering from Panel A to facilitate comparison.

Panel B considers variation in incentive structures. The first figure reports results for prestige. Tasks such as governing and justice score high on prestige, while gaol-keeping and policing score low. The downward slope in the coefficients — mirroring Panel A — indicates that prestige and unpaid status co-move across tasks. This pattern is consistent with the notion of substitutability between monetary and non-monetary rewards: tasks with greater intrinsic or reputational rewards can attract officers even in the absence of pay. Similar patterns hold for other incentive measures. We observe analogous downward-sloping gradients for career concerns, flexibility, and autonomy. In each case, tasks with higher levels of these non-monetary incentives also exhibit higher shares of unpaid positions. Some tasks, such as policing and keeping the gaol, are mostly unpaid, do not select for elites, and do not face embedded incentives. Conversely, these are tasks that are hard to implement by the Embedded State and are typically performed by paid positions.

6.3 Costs: Corruption

While individual officers can be positively selected on social status and, perhaps, civic dutifulness, they can also be negatively selected. They may try to use positions for private gain or use the powers of a position to appoint friends and family. In fact, the borough report features many instances of patronage and financial corruption. To measure the prevalence of these individuals, we focus on a particularly interesting part of our data source. Each borough record includes a discussion of the general management of the borough. This includes discussions of patronage and corruption.[38] We record an indicator variable

[38]For example, for patronage, the report mentions that Aldeburgh suffered from the "perversion of the whole of the municipal institutions to the political interests of ... the Marquis of Hereford." In Grimsby, the recorder—who was the town's patron—was "for the last fourteen years uniformly successful in procuring his own political adherents to be elected aldermen." He also managed to annually select his preferred candidate from the set of aldermen, in spite of existing rules regarding seniority and rotation. Financial corruption was notably rampant in Maldon, where the water-bailiff stole the port dues he was supposed to collect, the chamberlains failed to publish accounts and appropriated corporate property, and aldermen pocketed fees charged for the admission of freemen.

equal to one if a position in a borough was associated with cases of corruption, and zero otherwise.[39] We similarly record an indicator for nepotism. Table 8 shows results.

In Column (1), we use an indicator equal to one if a position was mentioned in relation to nepotistic appointments. In Column (2), we instead code an indicator if a position was ever mentioned in relation to bribery. We find that both nepotism and bribery are significantly positively correlated with being unpaid. We then focus on electoral corruption. In Column (3), we find that being unpaid is strongly positively correlated with being in a position that elects itself (such as the governing body, which often voted for appointment into its own ranks). In Column (4), we use an indicator equal to one if a position was mentioned in the report in relation to rigging of borough or Parliamentary elections through bribery, partisan control of municipal positions, and cooping.[40] Being unpaid is positively correlated with this practice. The effect sizes in all columns are large, ranging from 50% to about 100% of the sample mean. In other words, while being unpaid selects for elites and is associated with higher quality public good provision, one way in which the elites were compensated was through corruption. A natural next question is, therefore, whether corruption was the main factor sustaining participation in the Embedded State. In light of the historical evidence in this section, this does not seem plausible, but we nevertheless test this idea in Appendix Figure D.3. We separate our sample into officers found to be corrupt and those not. We find that the treatment effect in the corrupt subsample is higher, suggesting that corruption partly compensates for being unpaid, but is positive and significant in both subsamples, indicating that corruption alone cannot explain the unpaid provision of public goods and services.

In this section, we have characterized the costs and benefits of the Embedded State. The chief benefit is the ability of pre-modern governments to run a bureaucracy that is larger and more effective than their financial means would enable. Because of the particular incentives necessary to sustain such a state, it attracts an elite. This elite is more corrupt and cannot be motivated to engage in non-prestigious tasks. The bureaucrats engaged in those tasks are often paid. Across England, two models of government emerge: The Embedded State and the Weberian State. The Embedded State outperforms the Weberian State, likely due to the positive selection of its bureaucrats who, counterfactually, may not have taken up public positions.

[39] Appendix Section B.5 shows examples.

[40] Cooping refers to the practice of influencing voters to either not vote or vote for a particular candidate.

7 Conclusion

What explains the large variation in the performance of government around the world? Most contributions focus on the organization and staffing of the salaried public administration (Besley et al., 2022; Finan et al., 2017). In this paper, we identify another dimension of government: the unsalaried individuals who perform tasks that today would be executed by salaried bureaucrats. The state extends, as it were, into society. We refer to states that do so successfully as Embedded States.

We study the Embedded State by comparing unpaid to paid officers' performance on the provision of a range of public goods. We first find that unpaid officers outperform paid officers. We find, using rich new data on incentives sustaining particular jobs and the individuals taking them up, that unpaid officers are different from paid officers. They are more likely to be drawn from the elite, and face different incentives. Their jobs are more likely to confer status and prestige, and are part of a career in public service.

We then characterize the co-movement of such incentives, officer selection, and unpaid status, and find evidence for a system of governance in which all three measures co-move. Boroughs organize their workforce either primarily along embedded lines or along formalized, paid, 'Weberian' lines.

When Weberian government is financially infeasible, variation in the success of Embedded organization may help explain the differences in performance of equally resource-constrained governments. We conjecture that the particular incentives and the particular margins of selection sustaining the Embedded State in England are specific to the English sociological context. We therefore believe that while the notion of an Embedded State may be found elsewhere, the particular incentives that potential officers value, may differ across contexts.

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Figure 1: Local Organizational Units

[t]0.32

Panel A: Parish

[t]0.32

Figure 2: East Looe Position List

Recorder. The Recorder is appointed by the mayor and capital burgesses, being the common council of the borough, or the major part of them. He holds his office so long as he shall well behave himself. He is required by the charter to be an able, honest and fit person. He is a justice of the peace for the borough, and may appoint a deputy who is also a justice of the peace. It has not been usual to appoint a barrister to the office, which has, in fact, been generally bestowed upon the patron of the borough, or some one nominated by him. The following is a list of the recorders, since the year 1754:

1754: The Rev. J. Buller.
1786: The Rev. W. Buller.
1797: Dr. W. Buller, bishop of Exeter.
1797: William Graves, esq.
1802: Edward Buller, esq.
1802: John Buller, esq.
1807: Edward Buller, esq.

The present recorder is John Drummond Buller Elphinstone, esq. He resides in Hertfordshire, and was formerly an officer in the guards. His age is between 40 and 50. He formerly resided near the borough, and was then in the habit of sitting as a magistrate.

The deputy recorder is Thomas Hope, esq. He resides at Trenant Park, near Looe, and in Duchess-street, London. He was appointed on the 29th September 1830. He has not since his appointment performed the usual duties of his office.

Town Clerk. The Town Clerk or Common Clerk of the courts within the borough is nominated by the recorder; he is clerk of the peace, clerk to the magistrates, and solicitor to the corporation; he receives a salary of 15*l.* per annum, and the other emoluments of his office do not exceed 20*l.* The present town clerk is Mr. William Tickell, solicitor, aged 44; he has filled the office for seven or eight years.

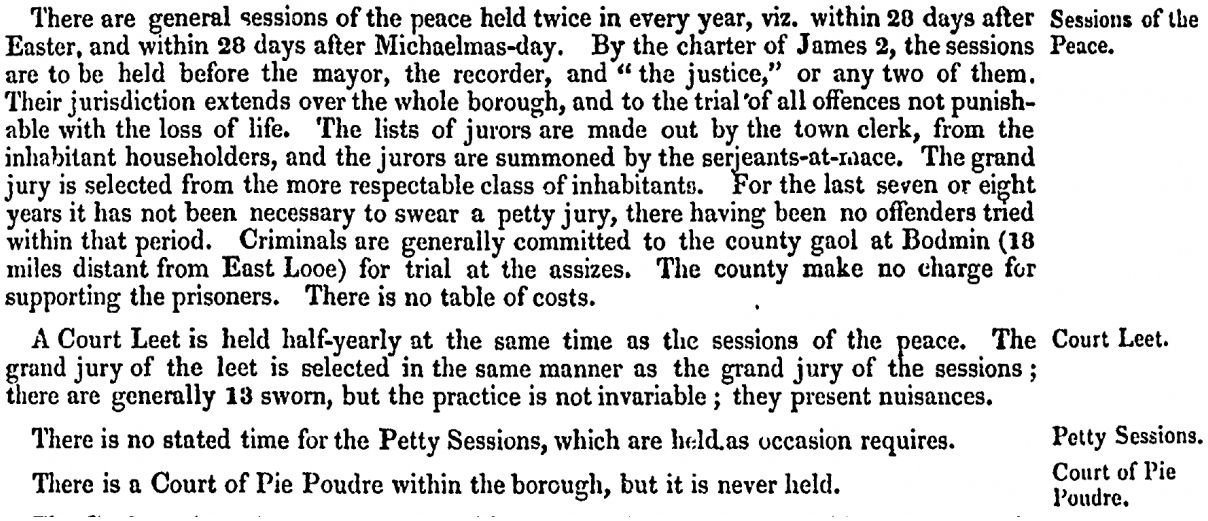
Serjeants at Mace. There are two Serjeants-at-Mace for the execution of precepts, mandates, attachments, and other process within the borough; they also attend upon the mayor; they receive a stipend of 2*l.* 6*s.* 6*d.* each in lieu of cloaks and hats.

Constables. There are nine Constables; they are appointed by the court leet.

Quay Master. The Quay Master is appointed by the corporation; he collects the quay dues and ballast dues, and has the general superintendence of the quays; he also collects the market dues; he receives a salary of 10*l.* per annum.

Note: Figure presents an example position list from the municipal report chapter on East Looe. Positions' method of appointment is highlighted in gray; task assignments in yellow; and remuneration in turquoise.

Figure 3: East Looe Courts



There are general sessions of the peace held twice in every year, viz. within 28 days after Easter, and within 28 days after Michaelmas-day. By the charter of James 2, the sessions are to be held before the mayor, the recorder, and "the justice," or any two of them. Their jurisdiction extends over the whole borough, and to the trial of all offences not punishable with the loss of life. The lists of jurors are made out by the town clerk, from the inhabitant householders, and the jurors are summoned by the serjeants-at-mace. The grand jury is selected from the more respectable class of inhabitants. For the last seven or eight years it has not been necessary to swear a petty jury, there having been no offenders tried within that period. Criminals are generally committed to the county gaol at Bodmin (18 miles distant from East Looe) for trial at the assizes. The county make no charge for supporting the prisoners. There is no table of costs. Sessions of the Peace.

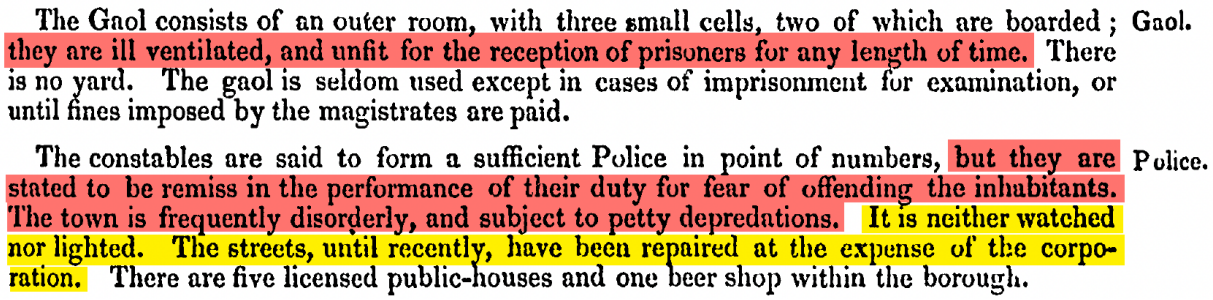
A Court Leet is held half-yearly at the same time as the sessions of the peace. The grand jury of the leet is selected in the same manner as the grand jury of the sessions; there are generally 13 sworn, but the practice is not invariable; they present nuisances. Court Leet.

There is no stated time for the Petty Sessions, which are held as occasion requires. Petty Sessions.

There is a Court of Pie Poudre within the borough, but it is never held. Court of Pie Poudre.

Note: Figure presents the list of courts in East Looe. Here, the Sessions of the Peace (quarter sessions), Court Leet, and Petty Sessions are active, while the Court of Pie Poudre is defunct.

Figure 4: East Looe Performance

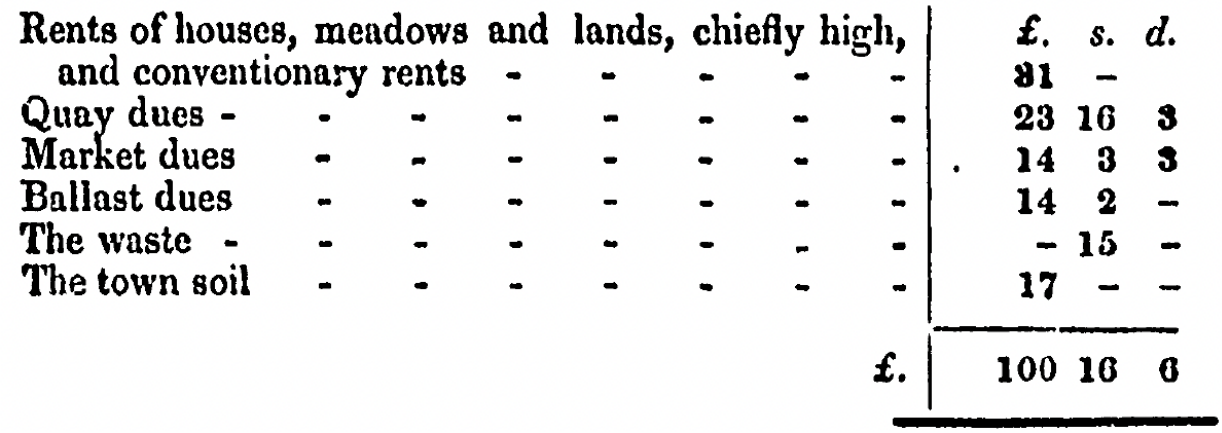


The Gaol consists of an outer room, with three small cells, two of which are boarded; they are ill ventilated, and unfit for the reception of prisoners for any length of time. There is no yard. The gaol is seldom used except in cases of imprisonment for examination, or until fines imposed by the magistrates are paid. Gaol.

The constables are said to form a sufficient Police in point of numbers, but they are stated to be remiss in the performance of their duty for fear of offending the inhabitants. The town is frequently disorderly, and subject to petty depredations. It is neither watched nor lighted. The streets, until recently, have been repaired at the expense of the corporation. There are five licensed public-houses and one beer shop within the borough. Police.

Note: This figure discusses the performance of three local public goods in East Looe: the prison, the police, and infrastructure. The former two are highlighted in red, the latter in yellow. The gaol is inadequate for holding prisoners. The police are also unable to keep public order. For infrastructure, the streets are paved but not lit.

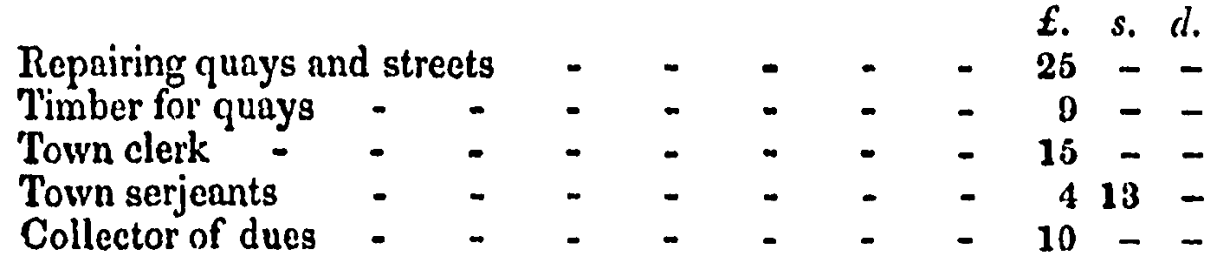
Figure 5: East Looe Revenue



	£.	s.	d.
Rents of houses, meadows and lands, chiefly high, and conventionary rents	31	–	
Quay dues	23	16	3
Market dues	14	3	3
Ballast dues	14	2	–
The waste	–	15	–
The town soil	17	–	–
£.	100	16	6

Note: Figure presents line-by-line *revenue* accounts for East Looe (expenditures not pictured). As was common, rents on property were the largest source of corporate income, but the town was also able to tax maritime trade.

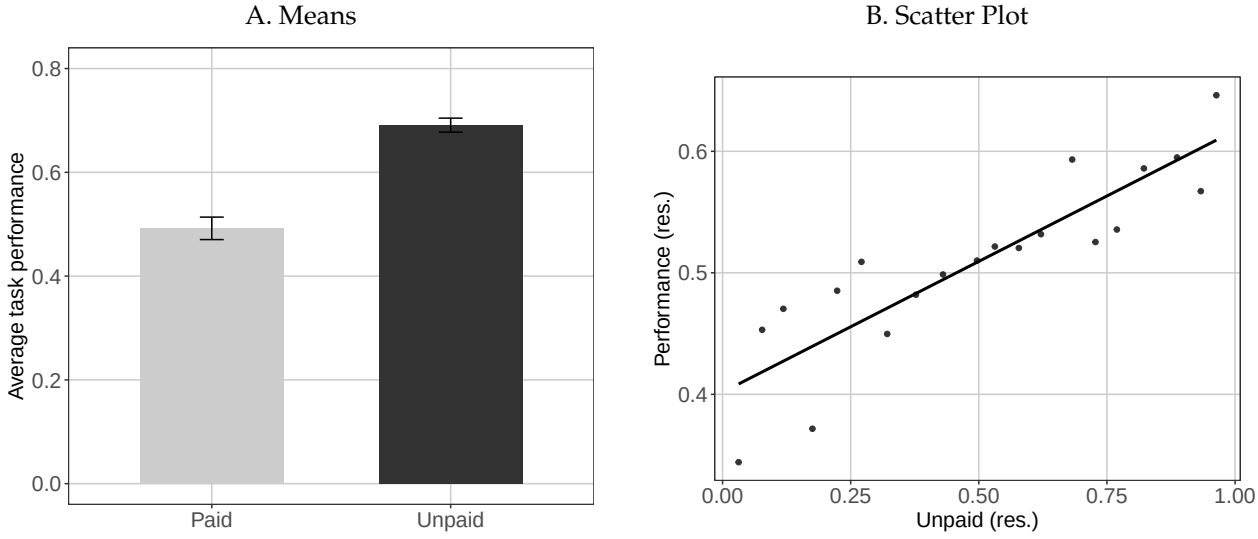
Figure 6: East Looe Expenditure



	£.	s.	d.
Repairing quays and streets	25	–	–
Timber for quays	9	–	–
Town clerk	15	–	–
Town serjeants	4	13	–
Collector of dues	10	–	–

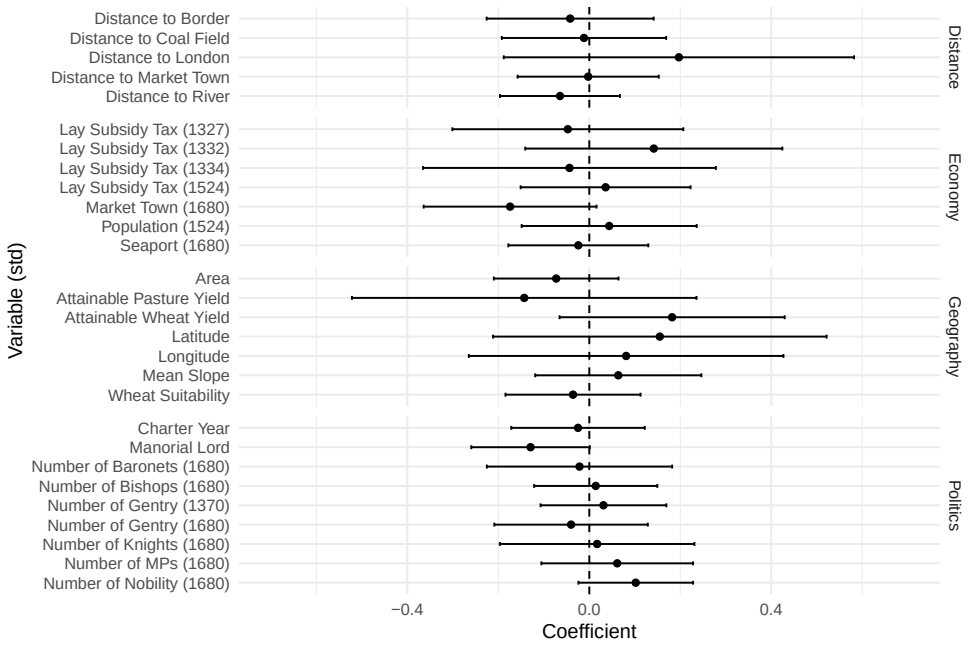
Note: Figure presents line-by-line *expenditure* accounts for East Looe. Expenditures were divided between infrastructure maintenance and officer salaries.

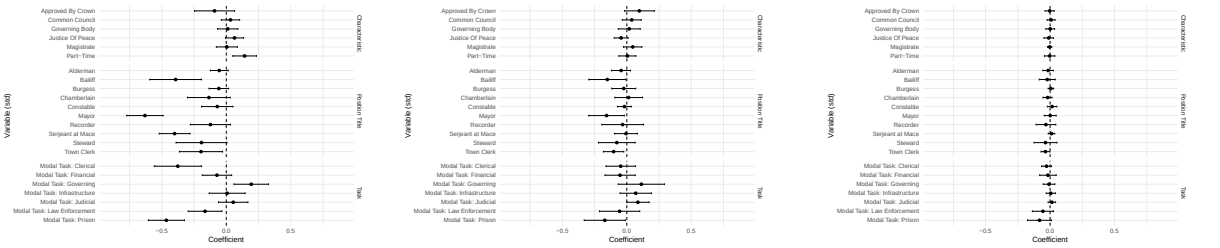
Figure 7: Position Performance and Paid Status



Note: This plot shows (Panel A) position-level performance averages separately for paid and unpaid positions, with 95 percent confidence intervals, and (Panel B) results of estimating the relationship between unpaid status and performance after residualizing performance with respect to borough fixed effects. The horizontal axis reports the position-level predicted probability of being unpaid (i.e., unpaid propensity), while the vertical axis shows residualized performance, in a binned scatterplot. Observations are at the level of a position. The sample comprises of 5,710 positions. The dependent variable is the mean performance across all tasks to which an officer is assigned, as introduced in Section 4.

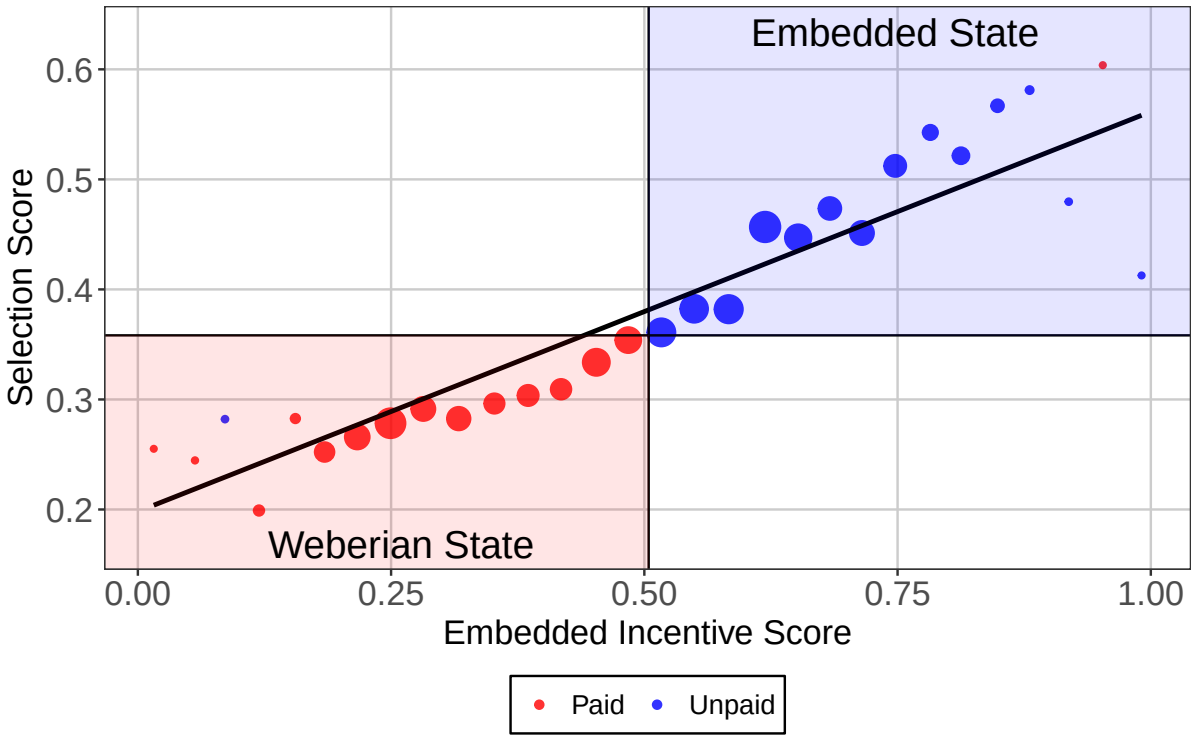
Figure 8: Borough Characteristics and Rental Income





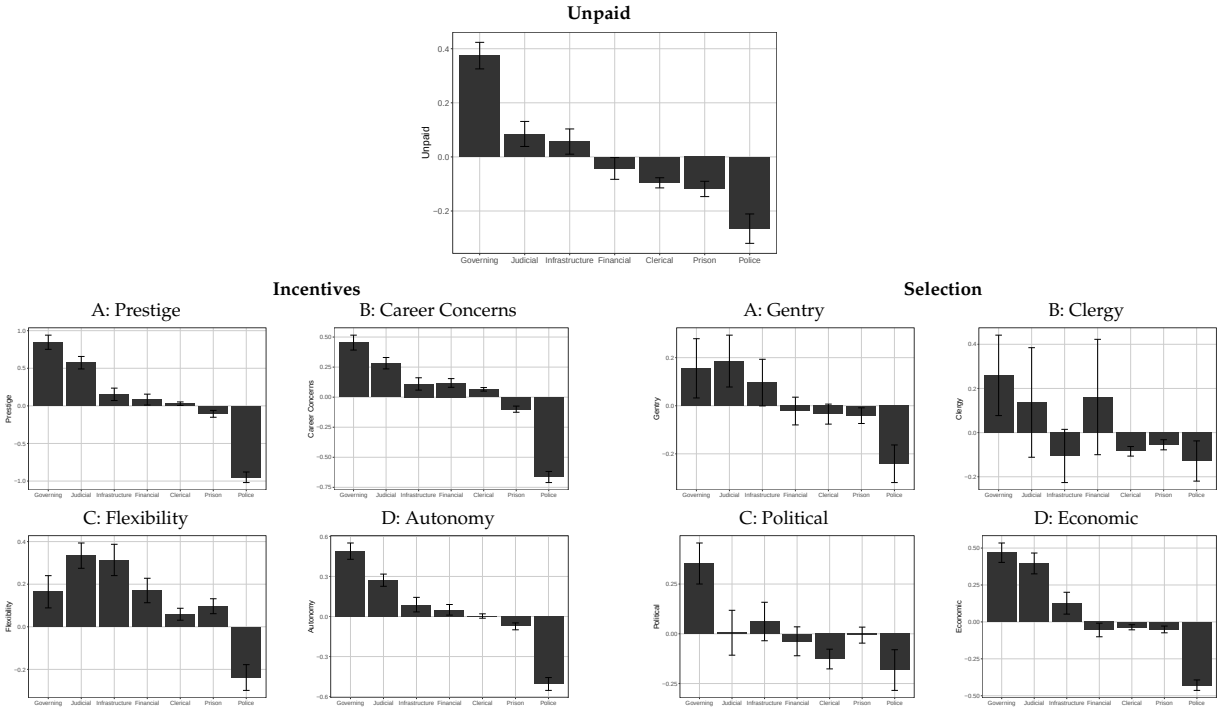
Note: The figure presents results of estimating equation (2) (Panel A) and (3) (Panel B) with 95 percent confidence intervals. Observations are at the level of a borough (Panel A) or an position (Panel B.) The sample comprises of 258 boroughs and 5,710 positions (3,487 in the complier sample). The dependent variable is standardized borough rental income (Panel A) or unpaid/unaffordable status (Panel B). Standard errors are clustered at the borough level.

Figure 9: The Embedded State Within Boroughs



Note: The figure presents results of estimating equation (5) in a binned scatterplot. The x-axis plots the incentive index, and the y-axis the selection index introduced in Section 5. Vertical and horizontal lines indicate the respective conditional means. Majority-unpaid bins are represented by blue circles, while red circles denote majority-paid bins. We adjust the size of each bin to reflect the number of underlying observations. Observations are at the level of a position. The sample comprises of 5,710 positions.

Figure 10: The Embedded State Across Tasks



Note: The figure presents results of estimating equation (6), with 95 percent confidence intervals. Observations are at the level of a position. The sample comprises of 5,710 positions. Standard errors are clustered at the borough level. The dependent variables are the incentive and selection measures introduced in Section 5.

Table 1: Comparing the Central and Local State: Size and Paid Status

	Total size		% Male pop.		% Unpaid
	1700	**1835**	**1700**	**1835**	**1835**
Central	4,920	21,305	0.33	0.63	0.00
Parish	50,000	95,520	3.33	2.81	100.00
County	25,084	40,994	1.65	1.20	90.30
Borough	7,660	12,268	0.51	0.36	70.69
Borough (our sample)	—	5,095	—	0.15	85.42
Total (Local)	82,744	148,782	5.52	4.38	94.91

Note: Columns show totals and shares of adult male population employed in central and local government positions in 1700 and 1835, and the share of local positions which were unpaid in 1835. Central government figures are from Brewer (1989) (1700) and Cook and Keith (1975) (1835). Local government data draw on Goldie (2001), Landau (1984), and original data collected for this project. Percent male population = total divided by adult male population. Total (Local) sums rows 2–4.

Table 2: Common Positions and Tasks by Borough

Borough	Population	# Positions	Share Unpaid	Most Common Position Title	Most Common Task
Liverpool	165,175	203	0.07	watchman	law enforcement
Leeds	123,393	121	0.31	watchman	law enforcement
Norwich	61,096	176	0.49	common councilman	infrastructure
Bristol	59,034	338	0.38	constable	law enforcement
Nottingham	50,220	119	0.03	constable	law enforcement
…	…	…	…	…	…
Caerwys	500	1	1.00	recorder	judicial
Fordwich	487	8	1.00	borsholder	law enforcement
Kenfig	487	2	0.00	portreeve	clerical
Dunwich	232	31	0.97	common councilman	judicial
Newtown	68	3	1.00	clerk	financial corporation

Note: This table offers summary statistics for the five largest and smallest boroughs in our sample. The most common position title is the one with the largest employment in the borough; the most common task is the one to which the most positions are assigned.

Table 3: Position Title Descriptives

Position	# Boroughs	# Positions	Share Unpaid	Avg Tasks	Most Common Task
Constable	226	1228	0.70	1.13	Law Enforcement
Town clerk	195	204	0.40	3.27	Clerical
Serjeant at mace	187	397	0.23	2.70	Law Enforcement
Recorder	186	224	0.64	1.53	Judicial
Mayor	182	202	0.53	3.20	Judicial
…	…	…	…	…	…
Assessor	2	6	0.17	0.83	Infrastructure
Bridgeman	2	4	1.00	0.50	Financial Corp.
Brother	2	20	1.00	0.30	Governing
Catcher	2	2	0.50	2.00	Clerical
Claviger	2	4	1.00	1.00	Clerical

Note: This table describes the five most and least common (defined by the number of boroughs where present) position titles that perform any *relevant* tasks in our dataset. 'Most common task' is weighted by the number of positions — effectively the task done by the most individuals with that position title.

Table 4: Unpaid and Performance

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.09***	0.11***	0.12***
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1). Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table 5: Unaffordable and Performance

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.15***	0.15***	0.15***
	(0.04)	(0.04)	(0.04)
Observations	24,409	24,409	24,409
R^2	0.33	0.40	0.40
Boroughs	208	208	208
Positions	3,487	3,487	3,487
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp} and subsetting to 3,487 complier positions. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table 6: Position Incentives

	External		Internal	
	Prestige	Career Concerns	Flexibility	Autonomy
	(1)	(2)	(3)	(4)
Unpaid	0.18***	0.30***	0.10***	0.22***
	(0.02)	(0.03)	(0.03)	(0.03)
Observations	5,710	5,710	5,710	5,710
R^2	0.21	0.23	0.24	0.28
Boroughs	258	258	258	258
Positions	5,710	5,710	5,710	5,710
Outcome Mean	0.48	0.54	0.31	0.52
Cluster	Borough	Borough	Borough	Borough
Borough fixed effects	✓	✓	✓	✓

Note: The table presents results of estimating equation (4). Observations are at the level of a position. The number of positions in each sample is indicated in the table. Standard errors are clustered at the borough level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variables are the incentive measures introduced in Section 5.

Table 7: Officer Selection

	Title		Elite	
	Gentry (1)	Clergy (2)	Political (3)	Economic (4)
Unpaid	0.20***	0.02***	0.38***	0.24***
	(0.05)	(0.006)	(0.05)	(0.03)
Observations	1,785	1,785	1,785	5,710
R^2	0.47	0.19	0.44	0.22
Boroughs	163	163	163	258
Positions	1,785	1,785	1,785	5,710
Outcome Mean	0.45	0.01	0.75	0.26
Cluster	Borough	Borough	Borough	Borough
Borough fixed effects	✓	✓	✓	✓

Note: The table presents results of estimating equation (4). Observations are at the level of a position. The number of positions in each sample is indicated in the table. Standard errors are clustered at the borough level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variables are the selection measures introduced in Section 5.

Table 8: Position Corruption

	In Office		During Election	
	Nepotism (1)	Bribery (2)	Self-Appointment (3)	Vote Rigging (4)
Unpaid	0.09***	0.05**	0.24***	0.11***
	(0.02)	(0.02)	(0.03)	(0.02)
Observations	5,710	5,710	5,710	5,710
R^2	0.53	0.49	0.35	0.55
Boroughs	258	258	258	258
Positions	5,710	5,710	5,710	5,710
Outcome Mean	0.11	0.13	0.22	0.11
Cluster	Borough	Borough	Borough	Borough
Borough fixed effects	✓	✓	✓	✓

Note: The table presents results of estimating equation (4). Observations are at the level of a position. The number of positions in each sample is indicated in the table. Standard errors are clustered at the borough level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variables are the corruption measures introduced in Section 6.3.

Supplementary Appendix: For Online Publication

A The Local State: Details

A.1 Estimating the Size and Remuneration of the State

The central state was mostly confined to London, and managed the military, foreign policy, and raised several direct taxes, mainly customs dues on trade and the excise tax on domestic consumption.[1] To raise these taxes, it employed a rotating corps of revenue officers in the countryside and ports. The central state expanded over the course of the eighteenth and nineteenth centuries from about 5,000 people in 1700 to about 21,000 in 1835. This development has been described in detail by Brewer (1989). The comparatively small number of bureaucrats has led some to comment that the English government was laissez-faire, and did not touch the lives of ordinary people (Hanlon, 2024). It is true that the central state essentially did not interfere in individuals' lives at all (on this see also Collinson (1994), especially p. 17). Yet the state did reach everyone; it is just that the legal system, property rights protection, and public good provision were all organized by *local* government.

Local government in England consisted of three main layers. Below the central government, there were 52 counties, and about 10,000 parishes. In between the counties and the parishes were cities and towns, which had varying degrees of self-governance. Since we analyze a sample of towns in more detail, in the next subsection, we discuss self-governance in more detail. We now attempt to characterize the size of the local state.

It is hard to measure the number of individuals who were part of the local state. This is fundamentally because most individuals who held an official position in a parish, borough, or county did not get paid. They were not registered with any central government institution, nor were they supervised by the central state. The fact that most were unpaid means that they were 'off the books' from the perspective of London, and their appointment was recorded in vestry proceedings and borough council meeting notes, which were often not kept or didn't survive.

Below, we bring together the available data and reconstructions by historians to arrive at an estimate of the size of the local state, following a similar exercise by Goldie (2001). The result is in Table 1 in the paper. The first two columns provide the number of public employees in levels, and the second two columns normalize by the adult male population. The last column contains an estimate of the fraction of employees who were paid. The first row provides, as a comparison, the size of the central state, which we discussed before. In 1700, the central state employed 4,920 individuals (0.33% of the adult male population), all of

[1] There was some overlap; see Dal Bó et al. (2022).

whom were paid. By 1835, this number increases to 21,305 (0.66% of the adult male population), which is close to the standard estimate in Brewer (1989).

In the next three rows we estimate the size of the local state. We start with the lowest level, the parish, which we map in panel A of Figure 1. At the parish level, there were several offices that were yearly rotated among the inhabitants of the parish. For example, parishes usually had two overseers of the poor who were responsible for social security under the Elizabethan Poor Laws. In addition, they had officers like the churchwarden and the constable, who were responsible for law enforcement.[2] We estimate that the total number of individuals who had such recognized offices at the parish level was equal to about three percent of the population. This means that in 1700 there were about 50,000 individuals who executed government tasks at the parish level, and by 1835 this number had grown to about 95 thousand. Interestingly, none of these positions got paid. Some were allowed to collect some fees, the constable for example was sometimes allowed to collect a fee for law enforcement (Kent, 1981). Yet the vast majority of officers had a day job and performed their government functions in addition to their regular source of income.

The next level of government is the borough or town. We map towns in panel B of Figure 1. It is not clear what defines a town relative to a large village. We discuss this issue in the next section. What is clear, however, is that there were cities that were chartered as cities, and large cities, such as Birmingham, that were never chartered but that were obviously cities. We use a definition based on an urban indication available in the 1841 census to define what a city is; details are in the Appendix. At the city level, there were a myriad government positions because cities were at liberty to structure their own governance. Table 2 describes the employment of the five largest and smallest towns in our dataset. Populous cities like Liverpool and Leeds might employ hundreds of officers, mostly unpaid, though with wide variation in both categories. Liverpool, with more than twice the population of Norwich, employed a similar number of officers. Liverpool paid nearly all of officers, while Norwich paid only half of its own. Gomme (1879) provides a detailed overview and discussion of city officers. Table 3 lists the most and least common offices in our sample. While there is a lot of diversity, most boroughs have a person in charge of the borough, often called a Mayor or Headborough. Typically, they employed someone to keep records, and sometimes officers to keep order. Most boroughs had at least one constable or watchman, and the largest might employ over a hundred. Since our main dataset consists of borough officers, we return to borough government in the next section. According to our calculations, borough government grew from about 7,660 individuals in 1700 to about 12 thousand individuals in 1835. Most borough officers were also unpaid: we estimate that about 71% did not get a salary.

[2]For a brilliant treatment of parish governance, see Tate (1969).

The final level of local government is the county.[3] We map counties in panel C of Figure 1. At the county level, governance was less dense than at the lower levels of government. The key government task that was executed at the county level was law enforcement. The most common positions at this tier of government were the Sheriffs and the Justices of the Peace. The last common officer was the militia officer, responsible for military recruitment. Formally, the county was headed by a Lord Lieutenant of the county. Importantly, at the county level, too, most positions were unpaid. We estimate that there were 25,000 positions at the county level in 1700 and that this grew to about 41,000 by 1835. 90% of them did not get a wage.

In total, local government amounted to *at least* 148,000 individuals in 1835. Of these, nearly 95% did not receive a salary. This is the main reason why this fact is not widely discussed in the literature on the development of the English state (e.g., in Brewer (1989)). These positions were appointed at the local level and neither supervised nor paid by London. The number of unpaid positions is about 7 times the size of the paid bureaucracy.[4]

A.2 Estimation Details

In section, we explain our rough estimates of the size of the English local state in 1700 and 1835, building on work by Goldie (2001, pp. 161-62) with original data from this project. We then make comparisons with the size of the central 'Weberian' administration using data on government bureaucrats in 1708 and 1832 from Brewer (1989) and Cook and Keith (1975). No exact tabulations of local officeholders were made in 1835, let alone 1700, so producing even imprecise figures for each year requires investigation of each of the three major tiers of local government:

1. County positions

2. Parish positions

[3]Other levels of government did historically, and contemporaneously, exist in the nineteenth century. These include the hundreds, which were a level in between counties and parishes. Other units includes sokes and wapentakes in different counties, hamlets and townships below parishes, and some units within cities, such as the city of London within London itself. Since these mostly did not tend systematically employ individuals, we do not include them here. Similarly, there were medieval manorial courts, called 'courts leet, which appointed individuals. These were especially prominent in parish government, where positions such as the pinder, the hayward, or the hogringer were appointed by manorial courts. Some positions in boroughs were also appointed by manorial courts, if a manorial court was still relevant for that borough. We do not code such manorial officers, because no systematic data exist. For the history of these units, see Webb and Webb (1963), and for a case study of an individual parish that discusses manorial officers, see Trotter (1919).

[4]Our estimate of the size of local government is an underestimate. This is so for two reasons. First, there was a diffuse array of positions that were appointed by the surviving manor courts, or courts leet, at the parish and town level. For example, these courts would appoint individuals to check the quality of agricultural output (*aleconners*, for example) or round up stray animals (the pinder). We omit these from our calculations because they didn't exist everywhere and their number is uncertain. Second, Goldie (2001) points out that most unpaid positions rotated yearly, whereas most salaried positions had longer tenure times. In Appendix Section A.3, we account for this turnover and find that over 27.6% of the male population may have held some local position in any given decade during the early nineteenth century.

3. Borough positions

We discuss each category in turn.

County Government

Goldie (2001, p. 162) offers rough figures for three main categories of county-level positions, offering Rudolf van Gneist's estimates for these totals in 1800: "In addition, he reckoned 10,000 assize and quarter sessions jurors at each sitting, 8,000 militia officers and 3,800 active JPs."

From Landau (1984, pp. 367-73), we can improve on the number of JPs for 1670-1761; these totals are listed in Table A.1. Note that these constitute the number of members of the Commission of the Peace, not necessarily active JPs. The number for 1829 comes from House of Commons (1829).

Year	1670	1702	1761	1829
JPs	2570	3700	8478	19610

Table A.1: JP counts across England and Wales (Landau, 1984, pp. 367-72).

van Gneist conjectured that there were 8,000 militia officers in 1800; an 1828 Parliamentary report gives a total of 5,781 officers and 50,888 privates (House of Commons, 1828). This figure seems difficult to improve upon for 1700.

As for assize and quarter sessions jurors, there were 212,335 men *eligible* to serve on juries in 1835, but we do not know the actual number serving (House of Commons, 1836). For the present, then, we assume that van Gneist's total of 10,000 was static across both years.

On top of JPs, militia officers, and jurors, there were a litany of smaller offices.

- **High Constables (unpaid):** There was nominally one high constable per hundred or equivalent, and there were roughly 1,438 hundreds in England and Wales in both 1700 and 1835. We consequently take 1,438 to be the total across all counties.
- **Sheriff (unpaid):** There was one sheriff for each of the 52 counties in England and Wales.
- **Coroner (unpaid):** A Parliamentary report for 1839 found that there were 148 county coroners for England and Wales (House of Commons, 1840).
- **Custos Rotulorum (paid):** 52 — one per county

- **Lord Lieutenant (paid):** 52 — one per county. The offices of Lord Lieutenant and Custos Rotulorum were unified in 1836, but at the time of the Municipal Corporations report, they were at least nominally distinct.
- **Militia Staff positions (paid):** According to a 1828 Parliamentary report, there were 2,841 militia staff in that year. This category encompasses the quartermaster, paymaster, surgeon, adjutant, and others (House of Commons, 1828).
- **Clerk of the Peace (paid):** There appears to have been one clerk of the peace per county quarter sessions.
- **Gaol Keeper (paid):** There were 968 prison staff, essentially all paid, working in county gaols and houses of correction in 1833. Common offices include the gaoler, turnkey, matron, and chaplain (House of Commons, 1833).

We make the unrealistic assumption (for lack of an alternative) that the local state did not grow between 1700 and 1835 in all categories for which we do not have prior data. Summing up, therefore, we have 25,084 county positions in 1700 and 40,994 in 1835, of which 84.2 and 90.3 percent, respectively, were paid. The former figure is almost certainly too low, because it seems probable that the paid prison establishment was significantly smaller in 1700.

Parish Government

Goldie (2001, pp. 161-62) offers the following estimate for the number of parish positions in 1700 and 1800: "In the seventeenth century, there were approximately 9,700 parishes in England and Wales. If each had one constable, two churchwardens, and two overseers, then we have a total of around 50,000 parish officers at any one time. Thus, around the year 1700, about one-twentieth of adult males were governing in any year; in principle, that might mean one-half were governing in any decade.

Rudolf van Gneist estimated that around the year 1800, there were 14,000 parishes and townships annually choosing at least one constable, one surveyor, two churchwardens, and two overseers, so that perhaps 100,000 people held office."

For 1700, we take Goldie's suggested five positions and roughly 10,000 ancient parishes to be our baseline. For 1835, assuming each parish had approximately six positions, we need only calculate the number of parishes in that year and multiply the two figures. In the 1831 census, there were around

15,920 parishes in England and Wales. These figures give us the total number of positions for that year as follows:

Estimate for 1835:

$$\text{15,920 parishes} \times 6 \,\text{positions} = 95,520 \,\text{parish positions in any year}$$

This estimate is almost certainly a lower bound because many parishes also had such offices as the clerk, beadle, sexton, scavenger, reeve, hayward, and pinder. Additionally, there may have been more of the statutory four offices described above—e.g. two surveyors of highways or up to four overseers of the poor. We assume, for lack of data, that parish positions were uniformly unpaid, though it seems plausible that some would have been remunerated through fees or in-kind payments, even if salaries were uncommon.

Borough Government

We have the number of positions for 258 municipal boroughs. These boroughs, however, represent only a subset of the 1,050 towns recorded in the 1841 census. Urban governance was patchy at best outside of the chartered corporations, historically a mix of parish and manorial officers, though some expanding industrial towns passed Local Acts establishing commissions for policing and sanitation. Manchester (more populous than any municipal borough in 1841), for example, was governed by a manorial court leet, which appointed a boroughreeve and constables to enforce its bylaws. These officers were supplemented in 1792 under a Local Act that enabled the raising of a police rate to fund lighting, paving, cleansing, drainage, street widening, and the night watch.

To estimate the aggregate size of urban government in England and Wales, we match our boroughs to population data for all towns in the late seventeenth century from Bennett (2012). For 1835, we use town populations from the 1841 census. We then crudely predict the number of positions in each town outside our sample based solely on population. To account for the lower intensity of governance outside our sample, we assume that towns smaller than the median municipal borough in 1841 had no positions (outside of parish officers), and that non-municipal boroughs smaller than the median 1841 municipal population had 50% of the predicted number of positions. For 1835, we combine the actual numbers of positions from the 277 boroughs in our sample with the predictions for the remaining above our median sample size. The numbers for 1700 are all predicted from the late seventeenth-century population figures.

From this exercise, we get:

- **1700**: ∼7,659 municipal positions
- **1835**: ∼12,267 municipal positions

These estimates are probably conservative, but as a lower bound, one could consider just the positions employed in municipal boroughs whose tasks we directly observe. This comes out to 5,095 positions, which we get directly from the municipal report.

Summing Up:

Adding together the county, parish, and borough government tiers, we get the following totals for 1700 and 1835:

- **1700**: 7,659 borough + 50,000 parish + 25,084 county = 82,743
- **1835**: 12,267 borough + 95,520 parish + 40,994 county = 148,781

Central Bureaucratic State

We know from Brewer (1989) that about 4,920 paid central positions were employed in 1708 across the military and fiscal bureaucracies (especially excise and customs). For the early nineteenth century, we have Table A.2 from Cook and Keith (1975, p. 150), which gives us 21,305 paid civil servants in 1832.

Table A.2: British Civil Service employment, 1797–1914

Year	Civil Service employment	Per thousand population	Notes
1797	16,267	1.83	
1815	24,598	2.42	
1821	27,000	2.25	
1832	21,305	1.53	
1841	16,750	1.05	(excludes clerks, messengers, etc.)
1851	39,147	2.18	
1861	31,943	1.59	
1871	53,874	2.37	(includes some workmen)
1881	50,859	1.96	(excludes telegraph, telephone services)
1891	79,241	2.73	
1901	116,413	3.58	(includes General Post Office)
1914	280,000	6.86	(includes Scotland)

Sources: Table 3.1 from Hanlon (2024). Original civil service employment data from Cook and Keith (1975, p. 150); population data from Mitchell & Deane (1962), corresponding to England and Wales except in 1914, which includes Scotland.

Summary Table

Table A.3 below combines our estimates of the numbers of central and local positions employed in any single year. We are excluding for both years A) the rank-and-file of the militia and B) the entirety of the regular army and navy, though we do retain clerks in the military establishment.

In both years, local government dwarfs Whitehall—by nearly 17 times in 1700, and by seven times even after the eighteenth-century expansion of the English fiscal state documented by Brewer (1989) and others.

To get a sense of the relative scale of the relational state, we divide our totals by the size of the male population of England and Wales in each benchmark year. There is no exact data for 1700, a century before the first census, but If we go off Wrigley et al. (1997) and Keibek (2017) suggest that the actual total was likely around 1.5 million (not the 1 million used by Goldie). There were 3,394,638 adult males reported in the 1831 census. We then represent each category of local (as well as central) government as a share of the adult male population in 1700 and 1835 in columns three and four.

Category	**Total**		**% male pop.**	
	1700	**1835**	**1700**	**1835**
Central	4,920	21,305	0.33	0.63
Parish	50,000	95,520	3.33	2.81
County	25,084	40,994	1.67	1.21
Borough	7,660	12,268	0.51	0.36
Total (Local)	82,744	148,782	5.52	4.38

Table A.3: Total numbers and population shares of central and local positions in 1700 and 1835 (% male population = total/adult male population in year t). Total Local sums rows 2-4.

Building upon the previous discussion, we can also estimate the fraction of employees who were unpaid in 1835, and thus informally organized. As noted above, we assume that all parish employees were unsalaried, and we found that 91 percent of county positions received no salary. In our sample of boroughs, we found that 73.8 percent of borough positions were unsalaried. Extrapolating the number of unsalaried positions based on population and dividing based on the total number of positions for the rest of the English and Welsh boroughs, we find that around 70.7 percent of borough officeholders were unpaid. These estimates are reflected in Table A.4.

	Total size		% Male pop.		% Unpaid
	1700	**1835**	**1700**	**1835**	**1835**
Central	4,920	21,305	0.33	0.63	0.00
Parish	50,000	95,520	3.33	2.81	100.00
County	25,084	40,994	1.65	1.20	90.30
Borough	7,660	12,268	0.51	0.36	70.69
Total (Local)	82,744	148,782	5.52	4.38	94.91

Table A.4: Totals, (male) population shares, and 1835 unpaid shares by category.

A.3 Tenure and Rotation

Goldie (2001, p. 161) offers another, slightly different perspective on the scale of local government: "[A]n astonishingly high proportion of early modern people held office. This can readily be deduced schematically. In the seventeenth century there were approximately 9700 parishes in England and Wales. If each had one constable, two churchwardens and two overseers, then we have a total of around 50,000 parish officers at any one time. Thus, around the year 1700, about one-twentieth of adult males were governing in any year; in principle, that might mean one half were governing in any decade."

Goldie's estimates about the proportion of the male population employed on an annual/decadal basis imply that A) there were a million adult males in 1700 and B) that the rotation of parish officers was more or less annual. We improve on those figures in two respects: first, we use the more accurate adult male population figure of 1.5 million from Wrigley et al. (1997) and Keibek (2017), and second, we collected data on the rotation of important borough positions and magistrates showing that annually-rotated offices like the mayoralty were usually held by 6-8 distinct individuals within any given decade (House of Commons, 1834).

We start with the assumption that offices that are *not* life-tenured have seven unique holders per decade. From our digitization of the Municipal Corporations report, we know that 30.78 percent of positions are life-tenured. We assume that these have one holder per decade, although in practice, there was almost always some rotation induced by death or retirement. Finally, we have the three categories of county positions: JPs, militia officers, and jurors. We conservatively assume that JPs, militia officers, and the other miscellaneous county offices were rotated once per decade. Given the vast discrepancy between the number of eligible jurors and the number required, rotation was probably frequent in that category.

So, as a first pass, we assume for local government that:

1. **borough positions**: 31% 1 holder per decade, 69% 7 holders per decade
2. **JPs, militia officers, other county offices**: 2 holders per decade
3. **jurors**: 10 holders per decade
4. **parish positions**: 7 holders per decade

For 1700, then, we see a grand total of 546,350 officeholders, and for 1835, we get 938,297.

Taking the population figure of 1,500,000 for 1700, our calculations suggest that 36.4% of adult males held some local position in any given decade. The 1831 census reported 3,394,638 adult males in England and Wales; this gives us 27.6% of adult males in local government.

Central Government

How often did central government employees rotate? Brewer (1989, p. 66) wrote that "Employment in administration not only offered prospects but also came, in some departments, to offer security of tenure and promotion on the basis of seniority. Once the political purges of the late seventeenth and early eighteenth century had ended, an assiduous officer in such departments as the Treasury could look forward to an undisturbed career culminating in promotion to the post of senior clerk. (Between 1714 and 1800 only one senior clerk and four under-clerks in the Treasury were dismissed from office.) Not every department was so kind to its employees—dismissal rates in the Excise ranged between 2 and 9 per cent per annum—but in many central offices the acquisition of a post meant security for life."

However, this seems to have been less frequently the case early on in the eighteenth century; Brewer writes that "Security of tenure, longevity of service and departmentalism emerged only gradually ... This fluidity was facilitated by the frequent turnover in government personnel occasioned by the political purges of the 1690s. Twenty-two of the thirty-eight customs commissioners appointed between 1688 and 1715 served for five years or less. The comparable Excise figure was twenty of thirty-seven Board members. Excise commissioners appointed before 1715 held their appointments for less than half the time of those who took office after the Hanoverian Succession" (Brewer, 1989, pp. 67-68).

We conservatively assume that central offices turned over once per decade (or every five years, either because of firings/political patronage or promotion. Then two individuals would hold each central gov-

ernment position in a given decade, giving us 9,840 officeholders in 1700 and 42,610 in 1835, or 0.66 and 1.3% of the adult male population of England and Wales, respectively.

Putting our estimates together, we arrive at the following table:

Category	**Total**		**% decadal male pop.**	
	1700	**1835**	**1700**	**1835**
Central	4,920	21,305	0.33	0.63
Parish	50,000	95,520	23.33	19.70
County	25,084	40,994	8.36	4.80
Borough	7,660	12,268	2.62	1.86
Total (Local)	82,744	148,782	36.42	27.64

Table A.5: Central and local positions as shares of *decadal* adult-male population.

B Data: Details

B.1 Municipal Report Form

Each chapter of the municipal report follows a largely uniform structure. One major reason for this is that the commissioners sent the mayor or town clerk of the borough a form letter requesting information on sixteen categories. We list these categories below.

I. The local limits of the Corporation.

II. The Charters by which it is constituted.

III. The Title of the Corporation, a copy of the governing Charter, and the date of all other Charters.

IV. The several Officers of the Corporation, how, and by whom elected, or removed; the time for which they hold their respective offices; their respective Functions and Privileges, and their Salaries and incidental Emoluments.

V. The mode by which persons become Free; their Duties, Privileges and Emoluments; the Number of Resident and Non-resident Freemen.

VI. By whom and from whom the Ruling Body of the Corporation is elected.

VII. Fees paid on admission to the Freedom or any office in the Corporation, and to whom paid.

VIII. Courts, Criminal and Civil; the Officers or Magistrates presiding or otherwise acting in them; the extent of their jurisdiction, whether exclusive or otherwise; the nature of their process; what Fees are paid in them, and to whom; and Tables of Costs.

IX. The Juries, Grand and Petty, Criminal and Civil; by whom, and from whom selected.

X. The management of the Local Police, and general regulation of the town.

XI. The superintendence of the Gaols; by whom exercised, and under what control.

XII. Fines imposed by the Corporation on their own members or others.

XIII. The nature of the Property; the amount of Receipts of the Corporation, from whom derived, by whom received, to what purposes, and by whom applied; how, and to whom accounted for.

XIV. The Patronage, ecclesiastical and other, exercised by the Corporation, through whom dispensed.

XV. A Schedule of the dates and titles of the Local Acts of Parliament relating to Municipal Government, or Local Taxation.

XVI. The general state and prospects of the Town.

B.2 Position-Task Data

Appendix Table B.1 shows descriptive statistics.

Table B.1: Position-Task Data

Position	# Boroughs	# Positions	Share Unpaid	Avg Tasks	Most Common Task
Constable	226	1228	0.70	1.13	Law Enforcement
Town clerk	195	204	0.40	3.27	Clerical
Serjeant at mace	187	397	0.23	2.70	Law Enforcement
Recorder	186	224	0.64	1.53	Judicial
Mayor	182	202	0.53	3.20	Judicial
...	...	...	...	...	...
Assessor	2	6	0.17	0.83	Infrastructure
Bridgeman	2	4	1.00	0.50	Financial Corp.
Brother	2	20	1.00	0.30	Governing
Catcher	2	2	0.50	2.00	Clerical
Claviger	2	4	1.00	1.00	Clerical

Note: Table shows descriptive statistics associated with the position-task data introduced in Section 3. Each row presents one position. We record the number of boroughs that have the respective position, the number of positions in our data, the share unpaid, and the average number of tasks as well as the most common task taken on by the position.

B.3 Borough Data

Appendix Table B.2 shows descriptive statistics.

Table B.2: Borough Data

Variable	Mean	SD	Min	Max
Manorial Lord	0.34	0.47	0.00	1.00
Charter Year	1630.83	94.00	1278.00	1827.00
Area	16293866.23	19593104.78	134817.61	144776160.92
Lay Subsidy Tax (1327)	4.88	7.96	0.00	51.36
Lay Subsidy Tax (1332)	7.50	12.84	0.00	91.76
Lay Subsidy Tax (1334)	10.30	15.04	0.00	100.00
Number of Gentry (1370)	1.17	16.64	0.00	240.00
Market Town (1680)	0.71	0.48	0.00	2.00
Seaport (1680)	0.19	0.42	0.00	2.00
Number of Gentry (1680)	2.44	2.30	0.00	24.00
Number of Baronets (1680)	0.24	0.43	0.00	1.00
Number of Knights (1680)	0.20	0.43	0.00	2.00
Number of MPs (1680)	0.88	1.02	0.00	4.00
Number of Nobility (1680)	0.04	0.22	0.00	2.00
Number of Bishops (1680)	0.02	0.14	0.00	1.00
Longitude	-2.07	1.76	-5.54	1.67
Latitude	52.03	1.14	50.10	55.78
Distance to Coal Field	45589.20	45981.69	0.00	184097.20
Distance to Border	20132.16	22637.59	78.27	86650.92
Distance to London	207212.22	102222.10	16078.60	495034.66
Distance to Market Town	2954.22	4168.72	17.43	25350.39
Distance to River	2099.99	2444.34	1.63	16454.80
Mean Slope	3.06	2.17	0.26	17.77
Wheat Suitability	34.49	14.26	1.86	88.31
Attainable Pasture Yield	0.79	0.06	0.64	0.93
Attainable Wheat Yield	3.25	0.72	0.10	4.12
Lay Subsidy Tax (1524)	8545.54	20596.32	0.00	191120.50
Population (1524)	55.52	152.42	0.00	1449.00

Note: Table shows descriptive statistics associated with the borough data introduced in Section 3. Each row presents one variable. We record the mean, standard deviation, min, and max of each variable.

B.4 Task Performance Data

Appendix Table B.3 shows descriptive statistics.

Table B.3: Performance Data

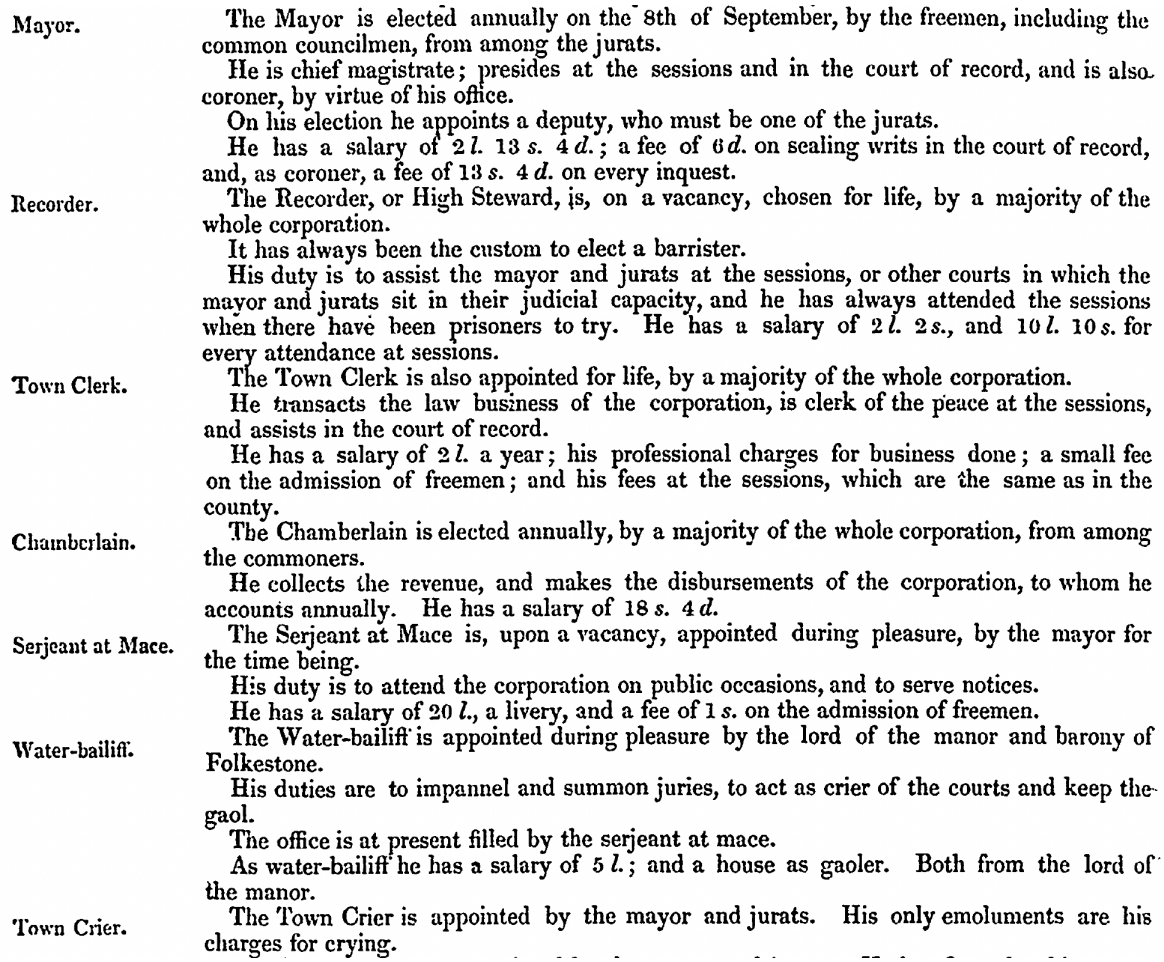
Task	Binary Outcome	Mean	Range	Cutoff
Governance	Overall performance assessment	0.69	[0, 7]	6
Justice	More than two courts held	0.70	[0, 9]	3
Infrastructure	Borough lit or paved	0.68	[0, 2]	1
Clerical Work	Borough reported more than three documents	0.62	[0, 137]	4
Financial Management	Borough keeps accounts	0.89	[0, 1]	1
Prison	Gaol reported adequate	0.30	[0, 3]	2
Law Enforcement	Police reported adequate	0.39	[0, 3]	2

Note: Table shows descriptive statistics associated with the borough-task performance data introduced in Section 4. Each row presents one task. We record the outcome description, the binarized mean, the raw range, and the cutoff for binarization for each task performance measure.

B.5 Incentive and Selection Data

Appendix Tables B.4 and B.5 show descriptive statistics of the incentive and selection measures.

Figure B.1: Prestige and Position Order



Mayor. The Mayor is elected annually on the 8th of September, by the freemen, including the common councilmen, from among the jurats.

He is chief magistrate; presides at the sessions and in the court of record, and is also coroner, by virtue of his office.

On his election he appoints a deputy, who must be one of the jurats.

He has a salary of 2 *l.* 13 *s.* 4 *d.*; a fee of 6 *d.* on sealing writs in the court of record, and, as coroner, a fee of 13 *s.* 4 *d.* on every inquest.

Recorder. The Recorder, or High Steward, is, on a vacancy, chosen for life, by a majority of the whole corporation.

It has always been the custom to elect a barrister.

His duty is to assist the mayor and jurats at the sessions, or other courts in which the mayor and jurats sit in their judicial capacity, and he has always attended the sessions when there have been prisoners to try. He has a salary of 2 *l.* 2 *s.*, and 10 *l.* 10 *s.* for every attendance at sessions.

Town Clerk. The Town Clerk is also appointed for life, by a majority of the whole corporation.

He transacts the law business of the corporation, is clerk of the peace at the sessions, and assists in the court of record.

He has a salary of 2 *l.* a year; his professional charges for business done; a small fee on the admission of freemen; and his fees at the sessions, which are the same as in the county.

Chamberlain. The Chamberlain is elected annually, by a majority of the whole corporation, from among the commoners.

He collects the revenue, and makes the disbursements of the corporation, to whom he accounts annually. He has a salary of 18 *s.* 4 *d.*

Serjeant at Mace. The Serjeant at Mace is, upon a vacancy, appointed during pleasure, by the mayor for the time being.

His duty is to attend the corporation on public occasions, and to serve notices.

He has a salary of 20 *l.*, a livery, and a fee of 1 *s.* on the admission of freemen.

Water-bailiff. The Water-bailiff is appointed during pleasure by the lord of the manor and barony of Folkestone.

His duties are to impannel and summon juries, to act as crier of the courts and keep the gaol.

The office is at present filled by the serjeant at mace.

As water-bailiff he has a salary of 5 *l.*; and a house as gaoler. Both from the lord of the manor.

Town Crier. The Town Crier is appointed by the mayor and jurats. His only emoluments are his charges for crying.

Note: Figure illustrates how position lists are ordered in terms of prestige. Heads of the corporation (here, the mayor) and judges (here, the Recorder) and are listed first; support positions, here the water-bailiff and town crier, come toward the end.

Table B.4: Incentive Data

Variable	Mean	SD	Min	Max
Prestige	0.48	0.31	0	0.99
Career Concerns	0.54	0.50	0	1.00
Flexibility	0.31	0.46	0	1.00
Autonomy	0.52	0.50	0	1.00

Note: Table shows descriptive statistics associated with the position incentive data introduced in Section 5. Each row presents one variable. We record the mean, standard deviation, min, and max of each variable.

Table B.5: Selection Data

Variable	Mean	SD	Min	Max
Gentry	0.45	0.50	0	1
Clergy	0.01	0.12	0	1
Political	0.75	0.44	0	1
Economic	0.26	0.44	0	1

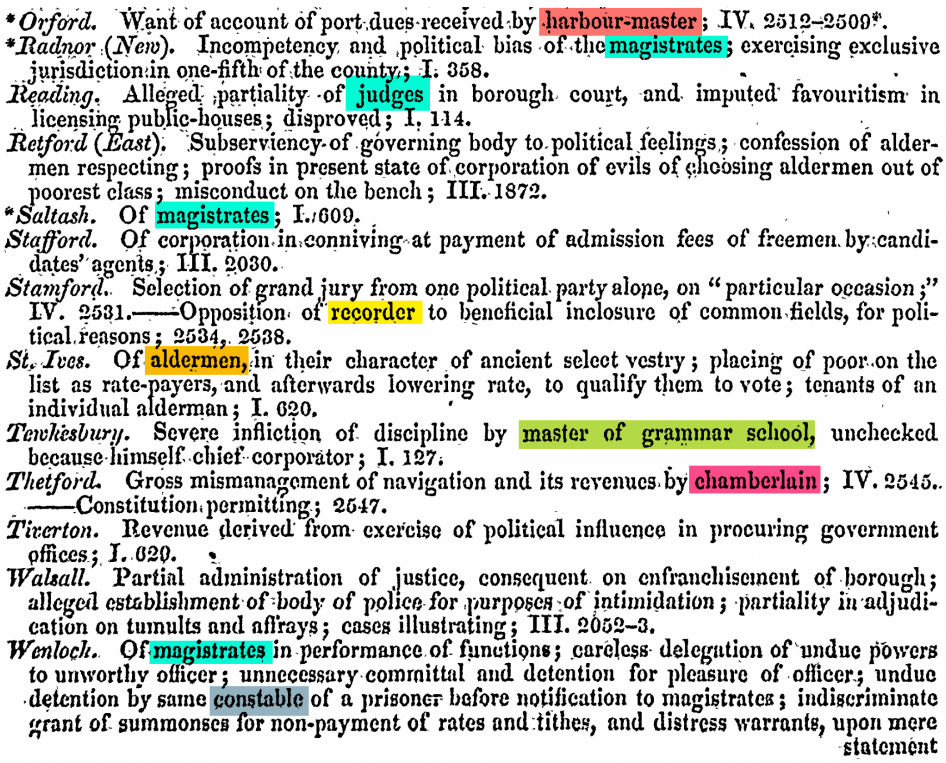
Note: Table shows descriptive statistics associated with the officer selection data introduced in Section 5. Each row presents one variable. We record the mean, standard deviation, min, and max of each variable.

Table B.6: Corruption Data

Variable	Mean	SD	Min	Max
Nepotism	0.11	0.31	0	1
Bribery	0.13	0.33	0	1
Self-Appointment	0.22	0.42	0	1
Vote Rigging	0.11	0.31	0	1

Note: Table shows descriptive statistics introduced in Section 5. Each row presents one variable. We record the mean, standard deviation, min, and max of each variable.

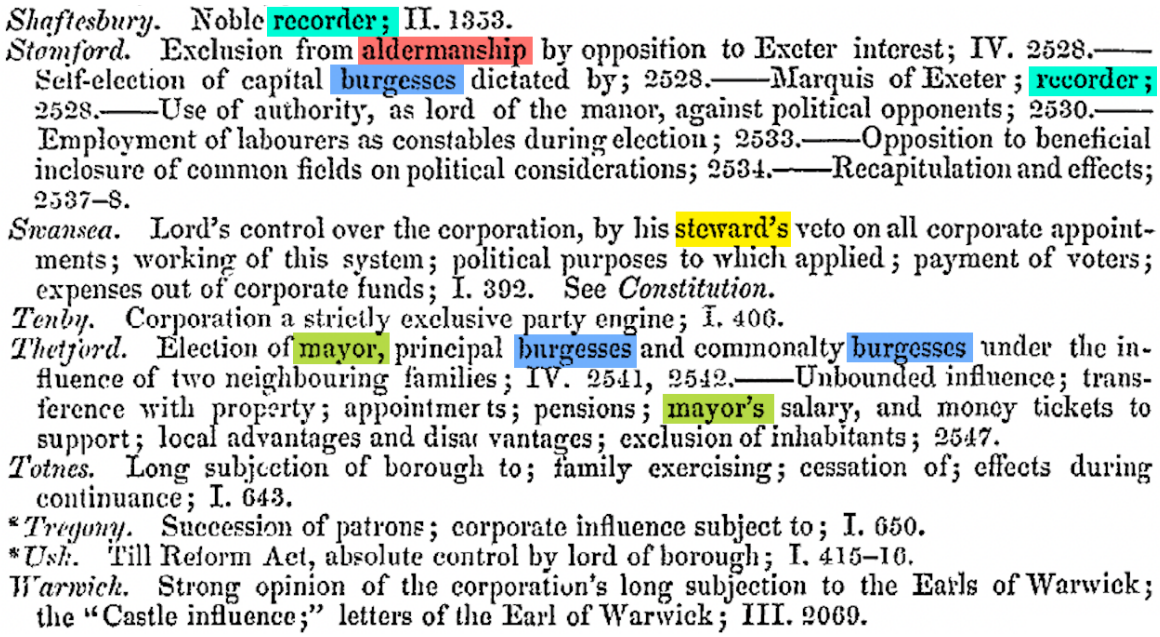
Figure B.2: Position-Level Corruption



**Orford.* Want of account of port dues received by harbour-master; IV. 2512–2509*.
**Radnor (New).* Incompetency and political bias of the magistrates; exercising exclusive jurisdiction in one-fifth of the county; I. 358.
Reading. Alleged partiality of judges in borough court, and imputed favouritism in licensing public-houses; disproved; I. 114.
Retford (East). Subserviency of governing body to political feelings; confession of aldermen respecting; proofs in present state of corporation of evils of choosing aldermen out of poorest class; misconduct on the bench; III. 1872.
**Saltash.* Of magistrates; I. 609.
Stafford. Of corporation in conniving at payment of admission fees of freemen by candidates' agents; III. 2030.
Stamford. Selection of grand jury from one political party alone, on "particular occasion;" IV. 2531.——Opposition of recorder to beneficial inclosure of common fields, for political reasons; 2534, 2538.
St. Ives. Of aldermen, in their character of ancient select vestry; placing of poor on the list as rate-payers, and afterwards lowering rate, to qualify them to vote; tenants of an individual alderman; I. 620.
Tewkesbury. Severe infliction of discipline by master of grammar school, unchecked because himself chief corporator; I. 127.
Thetford. Gross mismanagement of navigation and its revenues by chamberlain; IV. 2545.——Constitution permitting; 2547.
Tiverton. Revenue derived from exercise of political influence in procuring government offices; I. 620.
Walsall. Partial administration of justice, consequent on enfranchisement of borough; alleged establishment of body of police for purposes of intimidation; partiality in adjudication on tumults and affrays; cases illustrating; III. 2052–3.
Wenlock. Of magistrates in performance of functions; careless delegation of undue powers to unworthy officer; unnecessary committal and detention for pleasure of officer; undue detention by same constable of a prisoner before notification to magistrates; indiscriminate grant of summonses for non-payment of rates and tithes, and distress warrants, upon mere statement

Note: Distinct positions highlighted in different colors. Corruption category is 'misconduct.'

Figure B.3: Position-Level Patronage



Shaftesbury. Noble recorder; II. 1353.
Stamford. Exclusion from aldermanship by opposition to Exeter interest; IV. 2528.——Self-election of capital burgesses dictated by; 2528.——Marquis of Exeter; recorder; 2528.——Use of authority, as lord of the manor, against political opponents; 2530.——Employment of labourers as constables during election; 2533.——Opposition to beneficial inclosure of common fields on political considerations; 2534.——Recapitulation and effects; 2537–8.
Swansea. Lord's control over the corporation, by his steward's veto on all corporate appointments; working of this system; political purposes to which applied; payment of voters; expenses out of corporate funds; I. 392. See *Constitution.*
Tenby. Corporation a strictly exclusive party engine; I. 406.
Thetford. Election of mayor, principal burgesses and commonalty burgesses under the influence of two neighbouring families; IV. 2541, 2542.——Unbounded influence; transference with property; appointments; pensions; mayor's salary, and money tickets to support; local advantages and disadvantages; exclusion of inhabitants; 2547.
Totnes. Long subjection of borough to; family exercising; cessation of; effects during continuance; I. 643.
**Tregony.* Succession of patrons; corporate influence subject to; I. 650.
**Usk.* Till Reform Act, absolute control by lord of borough; I. 415–16.
Warwick. Strong opinion of the corporation's long subjection to the Earls of Warwick; the "Castle influence;" letters of the Earl of Warwick; III. 2069.

Note: Distinct positions highlighted in different colors. Corruption category is 'political patronage.'

C Performance of the Unpaid State: Details

This section proceeds in three steps. First, we demonstrate that our main results closely match the structural model estimates reported in Appendix Section C.1.
Next, we evaluate the robustness of our findings to alternative model specifications:

- Appendix Section C.2 examines robustness with respect to within- and cross-team spillovers.
- Appendix Section C.3 examines robustness with respect to the estimation of returns to team size.

Finally, we analyze the identification of the regression results within the structural framework, as discussed in Appendix Sections C.4 and C.5.

C.1 Model

Inputs

Denote the task-specific input of position bp to performance of team bt as α_{bpt}. To address our research question, we decompose individual inputs without loss of generality as follows:

$$\alpha_{bpt} = \alpha + \gamma \cdot u_{bp} + \varepsilon_{bpt}, \tag{7}$$

where α is the expected input of a paid position, $\alpha+\gamma$ is the expected input of an unpaid position, and ϵ_{bpt} is an position-team specific component. Our primary parameter of interest is γ, the expected difference in team production inputs between unpaid and paid positions.

Team Production

Following canonical models of team production (Abowd et al., 1999; Bonhomme, 2025), we assume that team output is additively separable in individual position inputs:

$$Y_{bt} = \lambda_{N_{bt}} \sum_{bp \in P_{bt}} \alpha_{bpt} + \varepsilon_{bt}, \tag{8}$$

where Y_{bt} denotes the output of team bt, P_{bt} are the positions on team bt, ε_{bt} captures shocks to team output unrelated to position inputs, $N_{bt} = |P_{bt}|$ is the size of team bt, and $\lambda_{N_{bt}}$ is a team-size-dependent scaling factor (normalized so that $\lambda_1 = 1$), which governs returns to scale in team production.

Plugging individual-level inputs from equation (7) into the team production equation (8), we get

$$\begin{aligned} Y_{bt} &= \lambda_{N_{bt}} \sum_{bp \in P_{bt}} (\alpha + \gamma \cdot u_{bp} + \varepsilon_{bpt}) + \varepsilon_{bt} \\ &= \alpha \lambda_{N_{bt}} N_{bt} + \gamma \lambda_{N_{bt}} U_{bt} + \underbrace{\lambda_{N_{bt}} \sum_{bp \in P_{bt}} \varepsilon_{bpt} + \varepsilon_{bt}}_{\epsilon_{bt}} \end{aligned} \tag{9}$$

where U_{bt} is the number unpaid positions on team bt.

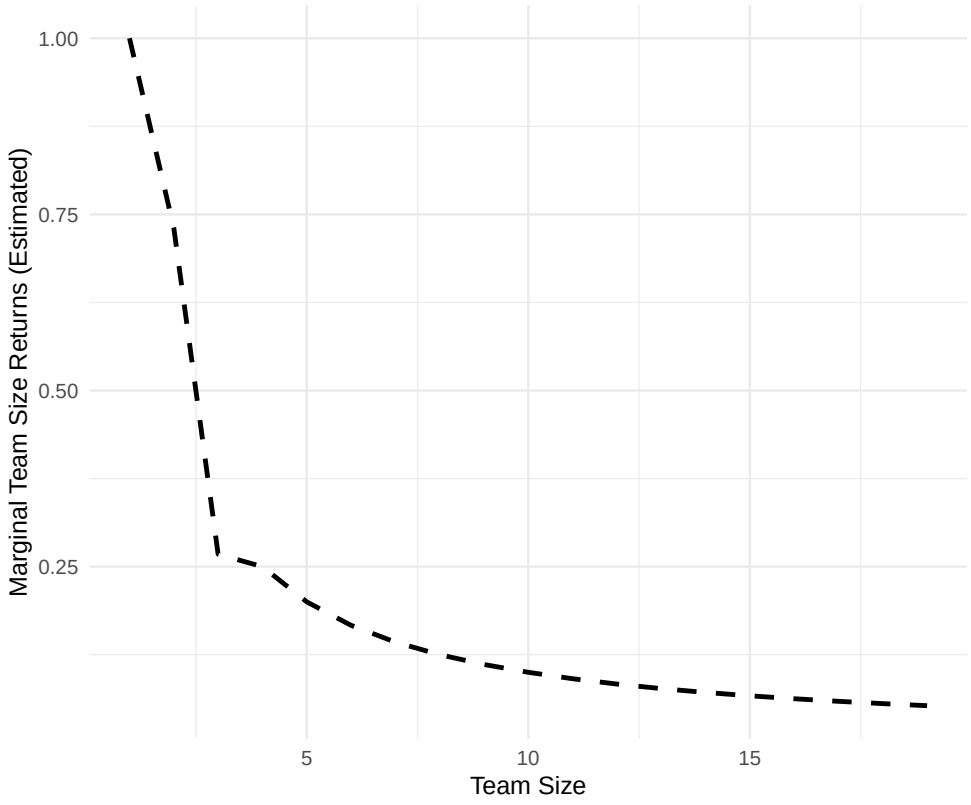
Estimating $\lambda_{N_{bt}}$

We first estimate the parameter that governs returns to team size $\lambda_{N_{bt}}$. Drawing on the algorithms proposed in Bonhomme (2025), we use our data on position-team assignment and team performance to estimate returns to team size.

This approach, which is rooted in a canonical 'movers' design (Abowd et al., 1999), relies on observing individuals across teams. Given the limitations of our historical data, we can estimate the returns to team sizes up to three positions: $\hat{\lambda} = (\hat{\lambda}_1, \hat{\lambda}_2, \hat{\lambda}_3) = (1, 0.73, 0.28)$. This covers 74% of all teams. We then extrapolate the estimated sequence by assuming that the median effective team size remains constant as team size grows beyond our estimated range.

Appendix Figure C.1 plots the estimated sequence of $\hat{\lambda}_{N_{bt}}$ as a function of team size. In Appendix Section 4.3.2, we provide robustness to alternative paths of $\lambda_{N_{bt}}$.

Figure C.1: Estimated Values of $\lambda_{N_{bt}}$ across Team Sizes



Note: The figure displays the estimated and extrapolated values of $\lambda_{N_{bt}}$, as a function of team size N_{bt}. Team sizes range from 1 to 45.

Position-Level Decomposition

Then, we estimate the team production function in a setup symmetric to our baseline estimating equation (1). Define as w_{bpt} an indicator equal to 1 if officer bp is assigned to team bt and 0 otherwise. Rewrite equation (8) to isolate the contribution of a single position bo:

$$Y_{bt} = \alpha \cdot w_{bpt}\lambda_{N_{bt}}N_{bt} + \gamma \cdot w_{bpt}u_{bp}\lambda_{N_{bt}}U_{bt} + \alpha \cdot (1 - w_{bpt})\lambda_{N_{bt}}N_{bt} + \gamma \cdot (1 - w_{bpt}u_{bp})\lambda_{N_{bt}}U_{bt} + \epsilon_{bt}, \quad (10)$$

which holds for every position bo and can thus be estimated in our borough-task panel. Appendix Table C.1 shows results of estimating the empirical analogue of equation (10), using the estimated $\hat{\lambda}$ and a full set of fixed effects. Results are very similar to the baseline results in Table 4.

Table C.1: Unpaid and Performance (Model Estimation)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.18***	0.21***	0.21***
	(0.04)	(0.03)	(0.03)
Observations	39,970	39,970	39,970
R^2	0.35	0.41	0.41
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Model Controls	✓	✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), modified according to equation (10). Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

C.2 Team Production: Spillovers

Clustering Because team performance may be correlated within boroughs, we assess the robustness of our results to alternative clustering choices. Appendix Table C.2 reports results from estimating equation (1) with standard errors clustered at various higher aggregation levels. Across all specifications, our main findings remain statistically robust.

Relative Performance To limit the scope for cross-team spillovers biasing our results, we construct alternative outcome variables:

1. Team performance relative to the leave-out mean of other teams in the borough,
2. Team performance relative to the leave-out max of other teams in the borough,
3. A binary indicator of whether team performance exceeds the leave-out mean of other teams in the borough, and

Appendix Tables C.3, C.4, and C.5 show results from estimating equation (1) using the outcome variables defined in (1)-(4) above. Our findings qualitatively hold up across these increasingly restrictive outcome variables.

Subsets To limit the score for within-team spillovers, we restrict our sample to borough-tasks with just one position. Appendix Table (C.6) shows results. To assess robustness to including very large teams, we can drop our restriction of truncating team size at ten positions: Appendix Table (C.7) shows results when instead using the full team size distribution.

Aggregation We next assess the robustness of our findings to aggregating to the team level, to abstract from within-team spillovers. Equation (9) motivates a team-level empirical specification in which we estimate γ by regressing team performance on the number of unpaid positions, controlling for overall team size. Specifically, we estimate:

$$Y_{bt} = b\hat{\lambda}_{N_{bt}} U_{bt} + a\hat{\lambda}_{N_{bt}} N_{bt} + X_b \, \mathbb{1}(\tau = t)'\theta + \delta_b + \delta_t + \delta_{ct} + e_{bt}, \tag{11}$$

where all variables are as defined above, and δ_{ct} are county-by-task fixed effects. Standard errors are clustered at the borough level.

Appendix Table C.8 presents the results. The coefficient on U_{bt} is positive and statistically significant, indicating that a greater number of unpaid positions is associated with higher team performance, even after accounting for total team size and fixed effects.

To account for potential spillovers *between* teams, we aggregate our data to the borough level. We thus estimate

$$Y_b = bU_b + aN_b + X_b + \delta_c + e_b, \tag{12}$$

with $U_b = \sum_{t=1}^{T} \hat{\lambda}_{N_{bt}} U_{bt}$, $N_b = \sum_{t=1}^{T} \hat{\lambda}_{N_{bt}} N_{bt}$, and $Y_b = \frac{1}{T} \sum_{t=1}^{T} Y_{bt}$ the mean performance of the borough across tasks and all other variables as borough-level aggregates of the variables in equation (11). Appendix Table C.9 shows results, which again qualitatively affirm the association between unpaid status and performance.

Table C.2: Unpaid and Performance (Standard Errors)

	Performance						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Unpaid Position on Team	0.12***	0.12***	0.12***	0.12***	0.12***	0.12***	0.12***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Standard-Errors	Borough × Task	Task Scope	Borough	County	50km	100km	200km
Observations	39,970	39,970	39,970	39,970	39,970	39,970	39,970
R^2	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Outcome Mean	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Borough fixed effects	✓	✓	✓	✓	✓	✓	✓
Task fixed effects	✓	✓	✓	✓	✓	✓	✓
Position Title fixed effects	✓	✓	✓	✓	✓	✓	✓

Note: The table presents results of estimating equation (1), using varying standard errors as indicated in the table. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table C.3: Unpaid and Relative Performance (Leave-Out Mean)

	Relative Performance (Leave-Out Mean)		
	(1)	(2)	(3)
Unpaid Position on Team	0.11***	0.13***	0.14***
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.18	0.25	0.25
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.00	0.00	0.00
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1). Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, subtracting the leave-out mean of borough-task performance in the respective borough.

Table C.4: Unpaid and Relative Performance (Leave-Out Max)

	Relative Performance (Leave-Out Max)		
	(1)	(2)	(3)
Unpaid Position on Team	0.09***	0.11***	0.12***
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.30	0.36	0.36
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	-0.39	-0.39	-0.39
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1). Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, subtracting the leave-out max of borough-task performance in the respective borough.

Table C.5: Unpaid and Outperformance (Leave-Out Mean)

	Outperform Leave-Out Mean		
	(1)	(2)	(3)
Unpaid Position on Team	0.09***	0.11***	0.12***
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.35	0.40	0.40
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.57	0.57	0.57
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1). Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is a binary indicator of whether borough-task performance exceeds the leave-out mean of borough-task performance in the respective borough.

Table C.6: Unpaid and Performance (Single-Position Teams)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.12***	0.08***	0.08***
	(0.03)	(0.02)	(0.02)
Observations	14,684	14,684	14,684
R^2	0.51	0.63	0.63
Boroughs	248	248	248
Positions	5,157	5,157	5,157
Tasks	7	7	7
Outcome Mean	0.50	0.50	0.50
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), restricting the sample to single-position teams. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.7: Unpaid and Performance (Unrestricted Team Size)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.07**	0.11***	0.12***
	(0.04)	(0.03)	(0.03)
Observations	62,874	62,874	62,874
R^2	0.34	0.39	0.39
Boroughs	258	258	258
Positions	1,912	1,912	1,912
Tasks	7	7	7
Outcome Mean	0.62	0.62	0.62
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), not truncating the size of exceptionally large teams. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.8: Unpaid and Performance (Team Level)

	Performance		
	(1)	(2)	(3)
Unpaid Positions	0.10***	0.12***	0.10***
	(0.03)	(0.03)	(0.04)
Observations	1,332	1,332	1,332
R^2	0.38	0.44	0.63
Boroughs	258	258	258
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough	Borough	Borough
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
County × Task fixed effects			✓

Note: The table presents results of estimating equation (11). Observations are at the level of a borough-task. The number of borough-tasks and boroughs in each sample is indicated in the table. Standard errors are clustered at the borough level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table C.9: Unpaid and Performance (Borough Level)

	Performance (Borough)		
	(1)	(2)	(3)
Unpaid Positions	0.12**	0.13**	0.10*
	(0.05)	(0.06)	(0.06)
Observations	258	258	258
R^2	0.39	0.53	0.59
Boroughs	258	258	258
Outcome Mean	3.57	3.57	3.57
Cluster	County	County	County
Controls			✓
County fixed effects		✓	✓

Note: The table presents results of estimating equation (12). Observations are at the level of a borough. The number of boroughs in each sample is indicated in the table. Standard errors are clustered at the county level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is the mean performance across all tasks in a borough, as introduced in Section 4.

C.3 Team Production: Returns to Team Size

Estimated Returns to Team Size Due to data limitations, we extrapolate estimated returns to team size beyond teams of three members. While this captures three quarters of all teams, we show results when restricting our sample to just those teams in Appendix Table C.10.

Plausible Returns to Team Size To assess the robustness of our results across all team sizes and all plausible returns to team size, we evaluate a family of functions for $\lambda_{N_{bt}}$ of the form:

$$\lambda(N_{bt}) = \zeta + (1 - \zeta)\frac{1}{N_{bt}}, \tag{13}$$

where $\zeta \in [0, 1]$. This specification interpolates between constant returns to scale ($\zeta = 1$) and a setting where the marginal contribution of each team member decreases inversely with team size ($\zeta = 0$).
Appendix Figure C.2 plots the resulting values of $\lambda_{N_{bt}}$ against observed team sizes, which range from 1 to 45. We consider $\zeta \in [0, 1]$ in step sizes of $\frac{1}{1000}$.
We then re-estimate regression equation (1), scaling both w_{bpt} and $w_{bpt}u_{bp}$ by the corresponding $\lambda_{N_{bt}}$. Across the full range of $\lambda_{N_{bt}}$ values considered, the estimated coefficient $\hat{b}$ remains positive and significant at the one percent level, indicating a robust positive relationship between unpaid status and team output.

Estimating Paid-Unpaid Differences In Inputs Finally, we can apply the methodology from Bonhomme (2025) to assess whether our general findings also hold up in a sample of estimated *individual* team inputs. Note that relying on the 'connected set' reduces our sample to 433 positions.[1]
We proceed in two steps:

1. We estimate individual position productivity inputs $\hat{\alpha}_{bp}$.
2. We then regress the estimated inputs $\hat{\alpha}_{bp}$ on the paid status of each position u_{bp}.

We thus test for statistically significant differences in individual inputs between unpaid and paid positions. Appendix Table C.11 reports the results of Step 2, both with and without the inclusion of borough fixed effects. Among unpaid positions, estimated inputs are significantly higher than among paid positions.

[1] As outlined in equation (7), our parameter of interest relies on the mean of the distribution of individual inputs, and does not require characterizing the full distribution of individual inputs. Hence, our main analyses use the entire sample.

Table C.10: Unpaid and Performance (Estimated Returns)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.10***	0.10***	0.10***
	(0.03)	(0.03)	(0.03)
Observations	22,583	22,583	22,583
R^2	0.44	0.52	0.51
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Model Controls	✓	✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

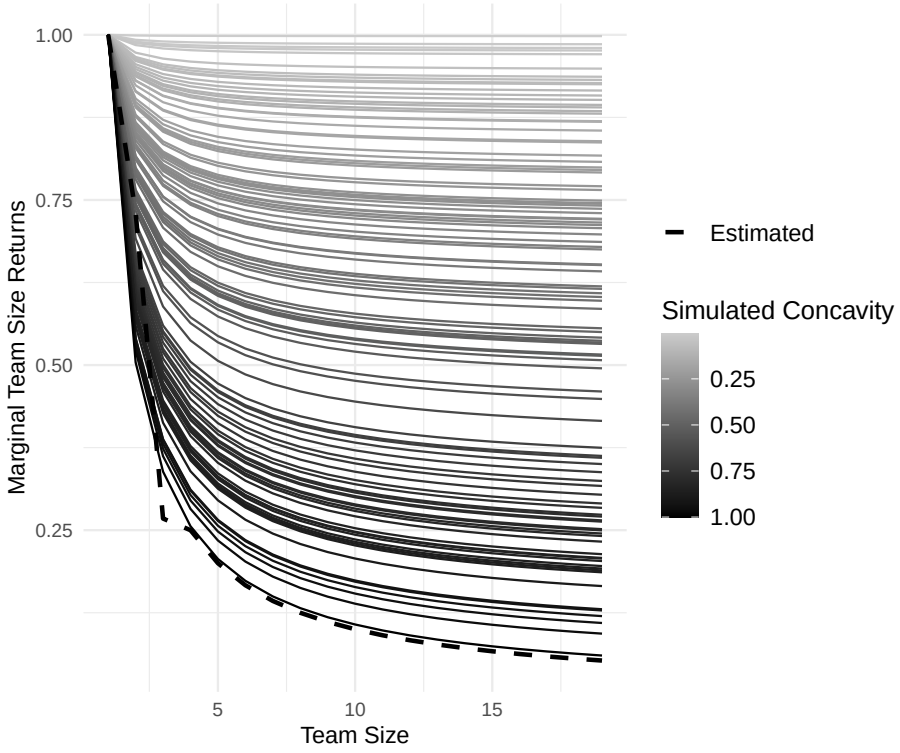
Note Note: The table presents results of estimating equation (1), using estimated returns to team size as described in Appendix Section C.3. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.11: Unpaid and Estimated Inputs (Team Level, Bonhomme, 2025)

	Officer Ability		
	(1)	(2)	(3)
Unpaid	0.22***	0.21***	0.26***
	(0.05)	(0.05)	(0.08)
Observations	433	433	433
R^2	0.05	0.07	0.42
Boroughs	219	219	219
Outcome Mean	0.00	0.00	0.00
Cluster	Borough	Borough	Borough
Controls		✓	✓
Borough fixed effects			✓

Note: Table presents results from regressing estimated team performance inputs using Bonhomme (2025) on unpaid status in a regression using borough fixed effects. Observations are at the level of an officer. The number of officers in each sample is indicated in the table. Standard errors are clustered at the borough level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Figure C.2: Simulated Values of $\lambda_{N_{bt}}$ across Team Sizes



Note: The figure displays the values of $\lambda_{N_{bt}}$ used in our robustness analysis, as a function of team size N_{bt}, for selected values of ζ. Team sizes range from 1 to 45.

C.4 Comparable Control Groups

We use the model from equation (9) to structure our discussion on potential omitted variable bias. To estimate γ consistently via OLS, we require $\mathbb{E}[\epsilon_{bt} \mid N_{bt}, U_{bt}] = 0$. This requires:

$$\mathbb{E}[\varepsilon_{bt} \mid N_{bt}, U_{bt}] = 0 \quad \text{and} \quad \mathbb{E}[\varepsilon_{bpt} \mid N_{bt}, U_{bt}] = 0 \text{ for all } bp \in P_{bt}.$$

Fixed Effects The inclusion of fixed effects in equation (1) implies a set of within-transformations that remove variation at the borough, task, and position level. Most importantly, borough and task fixed effects remove all components of ε_{bt} that do not vary across boroughs or tasks, respectively. These transformations thus help isolate variation that is orthogonal to systematic differences across boroughs, tasks, and position patterns. Below, we highlight the terms subtracted from the main variables in equation (1) as a consequence of the specific fixed effect.

- **Borough Fixed Effects** (δ_b)
  - Y_{bt}:
    $$\frac{1}{O_b \cdot T} \sum_{p=1}^{O_b} \sum_{t=1}^{T} Y_{bt} = \frac{1}{T} \sum_{t=1}^{T} Y_{bt}$$
    Captures borough-level productivity differences across tasks (i.e., 'some boroughs do better than others').
  - w_{bpt}:
    $$\frac{1}{O_b \cdot T} \sum_{p=1}^{O_b} \sum_{t=1}^{T} w_{bpt}$$
    Captures borough-level variation in staffing intensity (i.e., 'some boroughs have more positions' or 'some positions cover more tasks').
  - $w_{bpt} u_{bp}$:
    $$\frac{1}{O_b \cdot T} \sum_{p=1}^{O_b} \sum_{t=1}^{T} u_{bp} w_{bpt}$$
    Captures borough-level variation in unpaid staffing (i.e., 'some boroughs have more unpaid positions' or 'some boroughs assign them to more tasks').
- **Task Fixed Effects** (δ_t)
  - Y_{bt}:
    $$\frac{1}{B \cdot O_b} \sum_{b=1}^{B} \sum_{p=1}^{O_b} Y_{bt} = \frac{1}{B} \sum_{b=1}^{B} Y_{bt}$$

Captures task-specific difficulty (i.e., 'some tasks are easier').

- w_{bpt}:

$$\frac{1}{B \cdot O_b} \sum_{b=1}^{B} \sum_{p=1}^{O_b} w_{bpt}$$

Captures task implementation and staffing (i.e., 'some tasks are more common across boroughs' or 'some tasks have larger teams').

- $w_{bpt} u_{bp}$:

$$\frac{1}{B \cdot O_b} \sum_{b=1}^{B} \sum_{p=1}^{O_b} u_{bp} w_{bpt}$$

Captures unpaid staffing across tasks (i.e. 'some tasks are more often staffed with unpaid positions' or 'unpaid teams are larger in certain tasks').

- **Position Fixed Effects** (δ_p)

  - Y_{bt}:

$$\frac{1}{\underline{P}} \sum_{b=1}^{B} \sum_{p=1}^{O_b} Y_{bt} \mathbb{1}(p = \underline{p})$$

Captures the average task performance of positions with the same position title $\underline{p}$, with $\underline{P} = \sum \mathbb{1}(\text{p=}\underline{\text{p}})$.

  - w_{bpt}:

$$\frac{1}{\underline{P}} \sum_{b=1}^{B} \sum_{p=1}^{O_b} w_{bpt} \mathbb{1}(p = \underline{p})$$

Measures the scope of typical position task assignments (i.e. 'this position covers more tasks').

  - $w_{bpt} u_{bp}$:

$$\frac{1}{\underline{P}} \sum_{b=1}^{B} \sum_{p=1}^{O_b} w_{bpt} u_{bp} \mathbb{1}(p = \underline{p})$$

Measures the breadth of unpaid assignments (i.e. 'this unpaid position is assigned to more tasks').

In addition, we can vary the set of fixed effects included in the regression specification. Appendix Table C.12 presents results from a specification that includes task scope fixed effects, position-by-task fixed effects, and county-by-task fixed effects. The estimated correlation with unpaid status remains stable, indicating that our main findings are not sensitive to task-specific confounders that vary at the county level.

Controls Appendix Table C.13 reports results from equation (1), including position-level controls. This addresses potential omitted variable bias from components in ε_{bpt}. Specifically, we interact team assignment (w_{bpt}) with indicator variables capturing whether a position is a magistrate, a member of the governing body or the common council, a Justice of the Peace, subject to Crown approval, or part-time. Across all specifications, our main coefficient of interest remains stable and comparable to the baseline estimates. Moreover, the additional controls are not significantly associated with team performance, suggesting that these observed characteristics do not confound the main relationship.

Appendix Table C.14 reports results from equation (1), allowing borough report length to impact tasks differentially. We include the page length of the borough report, chunked into deciles, and interacted with task indicators. This addresses potential omitted variable bias from components in ε_{bpt} from reporting bias. Across all specifications, our main coefficient of interest remains stable and comparable to the baseline estimates, again suggesting that these observed characteristics do not confound the main relationship.

Matching To more comprehensively account for potential differences at the borough and position levels, we implement a propensity score matching approach. Specifically, we estimate a Probit model to predict a position's unpaid status using the full set of borough and position characteristics. Based on the estimated propensity scores, we use a nearest neighbor matching algorithm to pair each unpaid position with the most similar paid counterpart. We then re-estimate regression equation (1) on this matched sample. Results, reported in Appendix Table C.15, are qualitatively consistent with our main specification, indicating that the observed relationship is not driven by systematic differences in observables.

Outliers Next, we assess whether our results are driven by specific tasks. Appendix Figure C.3 presents estimates from regression equation (1), sequentially omitting one task at a time from the sample. Across all leave-one-out specifications, the estimated effect of unpaid status remains statistically significant and qualitatively consistent with our main findings, suggesting that no single task is disproportionately influencing the results.

Binarizing performance We also assess robustness to the binarization of task performance. Our main measure introduced in Section 4.1 binarizes each ordinal or count measure at the median. Instead, we consider alternative thresholds in a neighborhood of the median: for example, the cutoff for 'number of courts held' is three. We then consider cutoffs in $(2, 3, 4)$. We apply this neighborhood cutoff rule to all performance measures. Then, we choose a random draw from the cross-product of all possible

cutoff rules and re-estimate regression equation (1). Appendix Figure C.4 shows results: Throughout all permutations, coefficients remain significant and positive.

Alternative performance measures We also assess robustness to the definition of task performance. In addition to our main measures introduced in Section 4.1, we consider alternative measures. For governing, we consider whether a borough has adopted imperial measures. Borough used a plethora of measurement standards, and we use the adoption of the imperial metric system as a measure of quality of governance. For judicial, we count the number of days courts of request sat in 1836. This measure contrasts with the number of courts, our measure in the paper. For infrastructure, we construct an indicator for whether a borough had a market cross. For clerical, we use an indicator for whether the report surveyors were supplied with documents by the town clerk. For financial, we construct an indicator for whether accounts were audited. For prison, we consider the number of cells per prisoner. For law enforcement, we take the negative of the number of criminal convictions. Then, we choose a random draw from the cross-product of all possible variable combinations and re-estimate regression equation (1). Appendix Figure C.5 shows results: Throughout all permutations, coefficients remain significant and positive.

Extensive and intensive margins A further concern is the distinction between the *extensive* and *intensive* margins of performance: whether a public good is implemented at all versus how well it is implemented. Our performance measures introduced in Section 3 allow us to separate these margins. With the exception of the 'governing' category, a zero in the raw (pre-binarization) data indicates that a public good is not implemented at all. This motivates a set of robustness checks. Appendix Table C.16 applies a binarization at zero. For the 'governing' category, we instead define a binary variable that indicates whether any governing position is listed in the report as appointing subordinate positions. Coefficients are positive and statistically significant: unpaid status is associated with greater public goods provision. The effects are economically meaningful: adding an unpaid position to a team is associated with an eight percentage point higher likelihood of successful implementation. These results are robust and slightly stronger when excluding the 'governing' task (Appendix Table C.17).

Appendix Table C.18 examines the intensive margin by excluding tasks that are never implemented and using the logged raw performance measures as continuous outcomes. Unpaid status is again associated with better performance.

Finally, our main specification is, by construction, conditional on a position being assigned to a task; we do not observe nonexistent positions or unassigned tasks. To address this limitation, we adopt a borough-level correlational approach. We construct a variable measuring the fraction of tasks implemented, equal

to zero if a borough implements no public goods and one if it implements all. We then estimate equation (12) at the borough level. Appendix Table C.19 shows that unpaid status is associated with greater public goods provision, suggesting that our position–task–level estimates of the extensive-margin contribution of the Embedded State may be conservative.

Any wages versus market wages Finally, we assess robustness to the definition of paid status. We omit all positions from our data that are paid a small wage, where paid or unpaid status might be ambiguous. We omit all positions paid less than 20 pounds a year (the median wage among paid positions is 16 pounds) and show that results are robust to omitting positions with low wages in Appendix Table C.20.

Table C.12: Unpaid and Performance (Fixed Effects)

	Performance			
	(1)	(2)	(3)	(4)
Unpaid Position on Team	0.06***	0.07***	0.08***	0.06***
	(0.02)	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970	39,970
R^2	0.54	0.54	0.58	0.73
Outcome Mean	0.61	0.61	0.61	0.61
Controls	✓	✓	✓	✓
Cluster	Borough × Task	Borough × Task	Borough × Task	Borough × Task
Borough fixed effects	✓	✓	✓	✓
Task fixed effects	✓	✓		
Position Title fixed effects	✓	✓		
Task Scope fixed effects		✓	✓	✓
Position Title × Task fixed effects			✓	✓
County × Task fixed effects				✓

Note: The table presents results of estimating equation (1), using restrictive fixed effects as indicated in the table. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.13: Unpaid and Performance (Position Characteristics)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.11***	0.12***	0.13***
	(0.02)	(0.02)	(0.02)
Magistrate × On Task	0.06	0.06	0.06
	(0.04)	(0.04)	(0.04)
Part of Governing Body × On Task	0.01	0.007	0.007
	(0.05)	(0.04)	(0.04)
Part of Common Council × On Task	-0.02	0.01	0.01
	(0.04)	(0.04)	(0.04)
Justice of the Peace × On Task	-0.05	-0.04	-0.04
	(0.04)	(0.04)	(0.04)
Approval by Crown × On Task	0.07	-0.009	-0.008
	(0.07)	(0.06)	(0.06)
Part-Time Office × On Task	-0.01	-0.02	-0.02
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), controlling for position characteristics as indicated in the table. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.14: Unpaid and Performance (Report Length)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.09***	0.07***	0.08***
	(0.02)	(0.02)	(0.02)
Observations	39,970	39,970	39,970
R^2	0.33	0.45	0.45
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

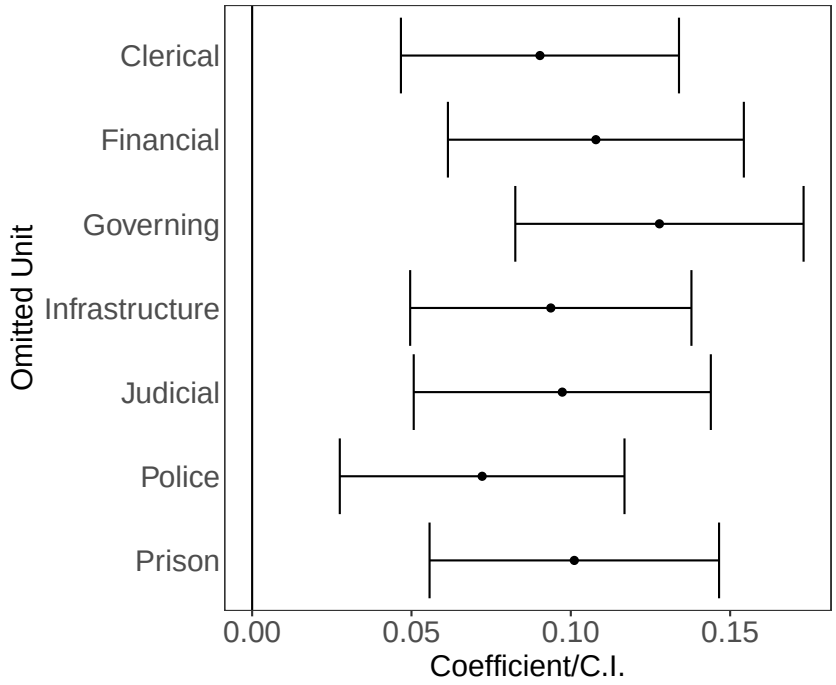
Note: The table presents results of estimating equation (1), additionally controlling for deciles of borough report page length interacted with task indicators. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.15: Unpaid and Performance (Matching)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.11***	0.13***	0.16***
	(0.03)	(0.03)	(0.04)
Observations	25,788	25,788	25,788
R^2	0.33	0.39	0.39
Boroughs	236	236	236
Positions	3,684	3,684	3,684
Tasks	7	7	7
Outcome Mean	0.62	0.62	0.62
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

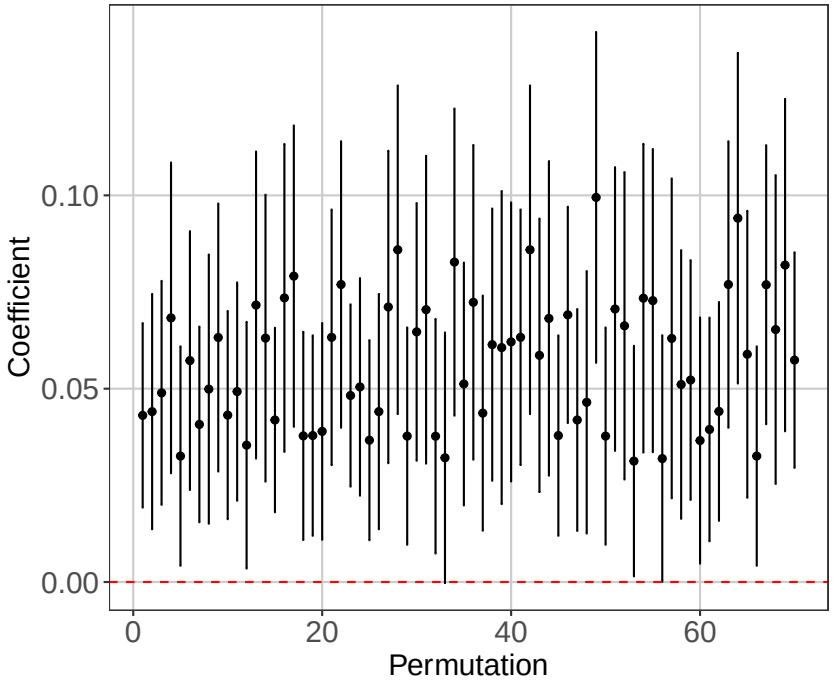
Note: The table presents results of estimating equation (1), in a matched sample. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Figure C.3: Unpaid and Performance (Leave-Out)



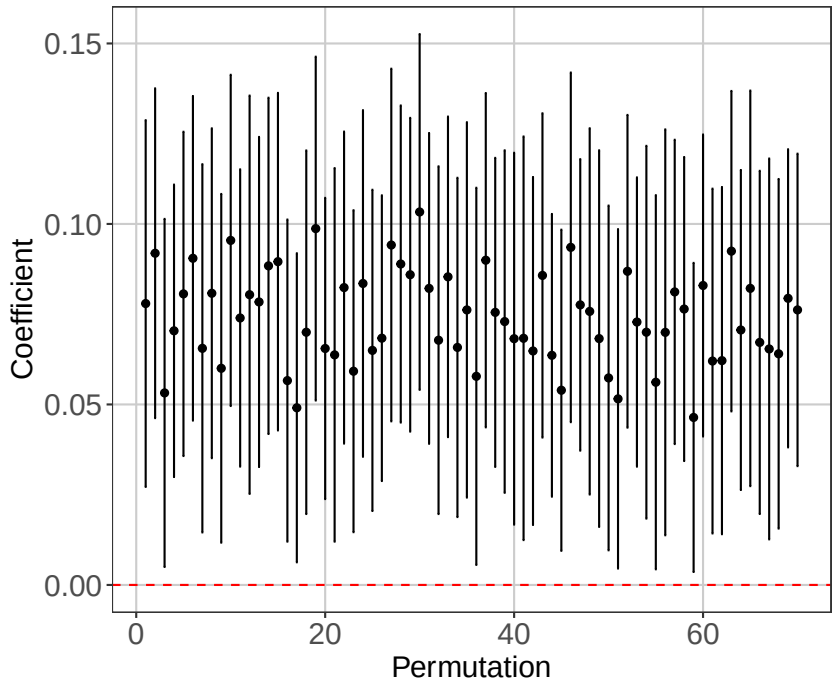
Note: The figure presents results of estimating equation (1), leaving out one task at a time. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Figure C.4: Unpaid and Performance (Binarization Variation)



Note: The figure presents results of estimating equation (1), varying the cutoffs for borough-task performance binarization as detailed in Appendix Section C. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Figure C.5: Unpaid and Performance (Definition Variation)



Note: The figure presents results of estimating equation (1), varying task performance definitions as detailed in Appendix Section C. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.16: Unpaid and Performance (Extensive Margin)

	Performance (Extensive)		
	(1)	(2)	(3)
Unpaid Position on Team	0.02**	0.03***	0.03***
	(0.01)	(0.01)	(0.01)
Observations	39,970	39,970	39,970
R^2	0.66	0.68	0.68
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.75	0.75	0.75
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), with extensive-margin performance as an outcome. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table C.17: Unpaid and Performance (Extensive Margin, Excluding Governing)

	Performance (Extensive)		
	(1)	(2)	(3)
Unpaid Position on Team	0.04***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)
Observations	34,260	34,260	34,260
R^2	0.38	0.42	0.42
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	6	6	6
Outcome Mean	0.87	0.87	0.87
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), with extensive-margin performance as an outcome, excluding the 'governing' task. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table C.18: Unpaid and Performance (Intensive Margin)

	Performance (Intensive)		
	(1)	(2)	(3)
Unpaid Position on Team	0.12***	0.11***	0.12***
	(0.03)	(0.02)	(0.03)
Observations	29,829	29,829	29,829
R^2	0.88	0.89	0.89
Boroughs	254	254	254
Positions	5,689	5,689	5,689
Tasks	6	6	6
Outcome Mean	-1.08	-1.08	-1.08
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), with intensive-margin performance as an outcome. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4.

Table C.19: Unpaid and Extensive Margin Performance (Borough Level)

	Performance (Extensive, Borough)		
	(1)	(2)	(3)
Unpaid Positions	0.01***	0.01***	0.01**
	(0.005)	(0.005)	(0.005)
Observations	258	258	258
R^2	0.30	0.51	0.60
Boroughs	258	258	258
Outcome Mean	0.76	0.76	0.76
Cluster	County	County	County
Controls			✓
County fixed effects		✓	✓

Note: The table presents results of estimating equation (12), with treatment and controls as defined in the estimating equation, and performance defined as 'share of tasks implemented.' Observations are at the level of a borough. The number of boroughs in each sample is indicated in the table. Standard errors are clustered at the county level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is the mean performance across all tasks in a borough, as introduced in Section 4.

Table C.20: Unpaid and Performance (Omitting Low Wages)

	Performance		
	(1)	(2)	(3)
Unpaid Position on Team	0.08***	0.09***	0.10***
	(0.02)	(0.02)	(0.02)
Observations	32,193	32,193	32,193
R^2	0.33	0.39	0.39
Boroughs	254	254	254
Positions	4,599	4,599	4,599
Tasks	7	7	7
Outcome Mean	0.62	0.62	0.62
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), omitting positions with low wages. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

C.5 Unaffordability

Unaffordability Construction The creation of the unaffordability variable v_{bp} relies on three components: (1) pre-determined rental income, (2) market wages, and (3) a salary prioritization ranking. One concern is that the specific functional form of (2) and (3), rather than (1), are driving the relevant variation in the variable. Figure 8, Panel B suggests that this is not the case, given the balance of v_{bp} on pre-determined position observables.

We provide further evidence to this end. First, we show that unaffordability calculated under true rental incomes, v_{bp} is more predictive of unpaid status than unaffordability calculated under counterfactual rental incomes $\tilde{v}_{bp}$. We randomly re-assign rental income within counties and predict unpaid status u_{bp} using counterfactual rental income $\tilde{v}_{bp}$ 1,000 times. Appendix Figure C.6 shows results: the t-statistic associated with the 'true' prediction is in the far right tail of the distribution of t-statistics under the counterfactual rental incomes.

Second, we show robustness to three alternative ways of calculating market wages and salary prioritization. Appendix Table C.22 shows results when calculating local wages and rankings (comparing just positions within the same county). Appendix Table C.23 inverts this logic, showing 'global' wages and rankings (using data on positions not in the same county to calculate wages and rankings). Finally, Appendix Table C.24 just uses charter positions to calculate wages and rankings.[2] Results are qualitatively similar to the main results in Table 5.

Third, we investigate the complier sample. Appendix Figure C.7 visualizes our approach. It plots a histogram of mean affordability across counterfactual rental income. Some positions are never or always affordable, as indicated by the mass of the distribution at the end points. The figure also highlights our complier sample. As intended, positions who are always affordable or never affordable under counterfactual rental incomes are excluded, while positions whose affordability status changes across counterfactuals are retained. Appendix Table C.26 shows that results from the unrestricted sample are qualitatively very similar to results obtained in the complier sample. Appendix Table C.27 shows results from defining compliers as offices outside the lowest and highest quartiles of average paid status across boroughs.

Direct Impact Another concern is that the rental income directly impacts borough financial performance: high rental income might require the keeping of accounts. Appendix Table C.28 shows that results are robust when omitting financial tasks from the estimation.

[2] In rare cases, we cannot form a task profile-specific market wage (for example, because there is no paid position doing governing and law enforcement mentioned in any charter.) In these cases, we impute wages using the sample mean.

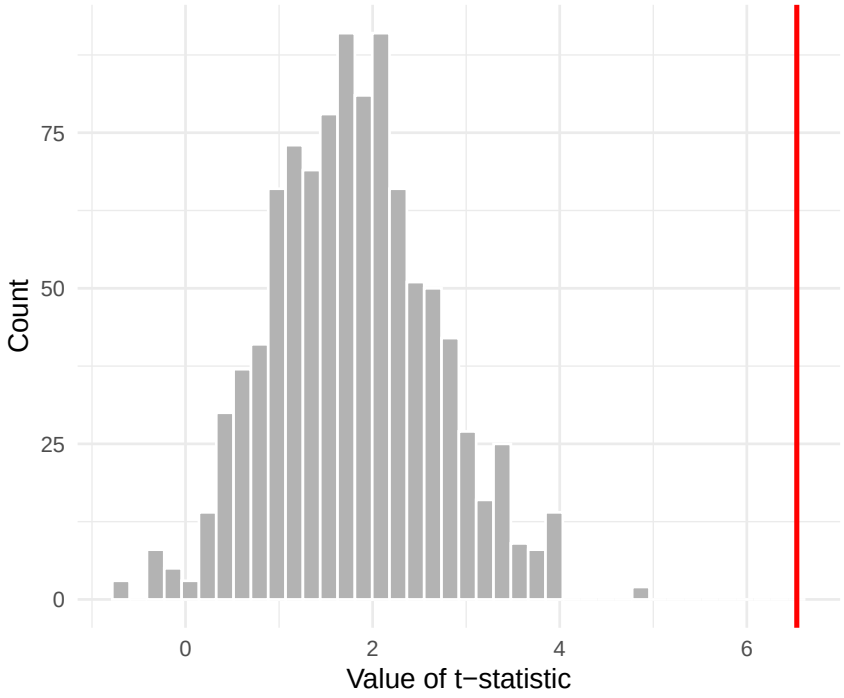
Substitution Another concern involves substitution along the extensive margin — such as boroughs reallocating tasks across positions or reducing the number of positions — which could affect team assignment, w_{bpt}. To address this concern, we use institutional constraints embedded in borough charters, which mandated the presence of specific positions. We subset our data to just positions that were specified in the charter, and just to the modal task of each position. We repeat the construction of unaffordability using charter positions and modal tasks. Appendix Table C.25 shows that results are robust to using this pre-determined set of positions.

Table C.21: Comparing Wages with Market Wages

Borough	Population	Position Title	Wage (£)	Local Wage (£)	Global Wage (£)	Tasks
Liverpool	165175	mayor	600.00	600.00	25.00	Governing, Judicial
		town clerk	813.96	813.96	900.00	Clerical, Financial, Law enforcement
		constable	49.40	49.40	7.64	Law enforcement, Prison
Leeds	123393	mayor	0.00	50.00	41.70	Governing, Infrastructure, Judicial
		town clerk	21.00	21.00	10.50	Clerical, Judicial
		constable	80.88	5.40	13.56	Law enforcement
Norwich	61096	mayor	300.00	300.00	41.70	Governing, Infrastructure, Judicial
		town clerk	0.00	490.00	30.00	Clerical
		constable	16.25	16.25	13.33	Law enforcement
…	…	…	…	…	…	…
Yarmouth	586	mayor	0.00	51.39	9.58	Governing
		town clerk	6.30	6.30	10.50	Financial
		constable	0.00	2.60	13.45	Law enforcement
Fordwich	487	mayor	0.00	51.39	9.58	Governing
		town clerk	0.00	57.75	30.00	Clerical
		constable	0.00	36.00	13.33	Law enforcement
Newtown	68	mayor	0.00	51.39	9.58	Governing
		town clerk	0.00	17.77	10.00	Financial
		constable	0.00	17.33	13.33	Law enforcement

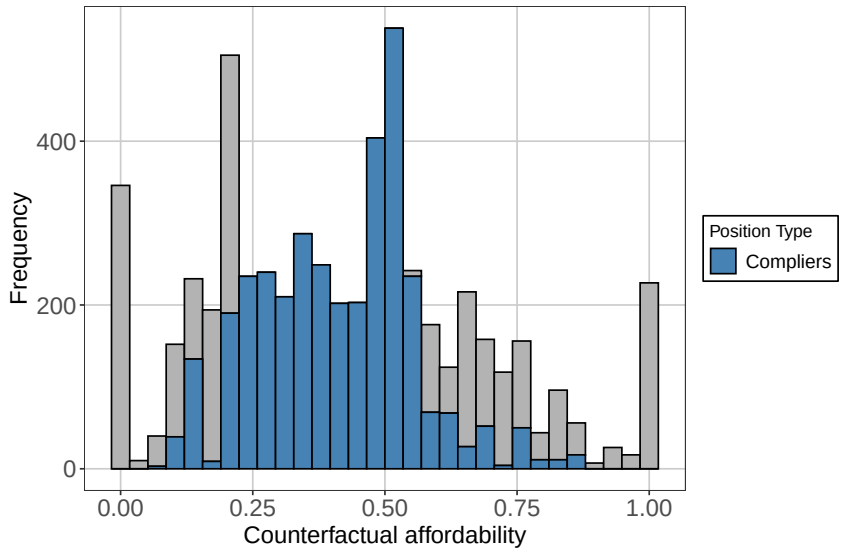
Note: This table compares the wages of three common position titles—the mayor, town clerk, and constable—with local and global *market* wages across three of the largest and smallest boroughs in our sample.

Figure C.6: Unaffordable and Unpaid Status (Randomization)



Note: Figure shows t-statistics associated with 1,000 OLS regressions of the form $u_{bp} = \beta_0 + \beta_1 \tilde{v}_{bp} + \varepsilon_{bp}$. $\tilde{v}_{bp}$ is obtained by randomly reassigning rental income within counties and re-calculating affordability as detailed in Section 4.5. The red line indicates the t-statistic associated with $\tilde{v}_{bp}$ under the true rental income of each borough. Observations are at the level of a position. The sample comprises of 5,710 positions.

Figure C.7: Affordability Across Counterfactuals and Complier Status



Note: Figure shows a histogram of average affordability of each position across 1,000 counterfactuals, $\tilde{v}_{bp}$. This variable is obtained by randomly reassigning rental income within counties and re-calculating affordability as detailed in Section 4.5. The plot highlights the fraction of each bin that is in our complier sample, as defined in Section 4.5. Observations are at the level of a position. The sample comprises of 5,710 positions.

Table C.22: Unaffordable and Performance (Local Comparison)

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.07***	0.08***	0.08***
	(0.03)	(0.03)	(0.03)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp} and restricting to positions within the same county to calculate market wages and salary rankings. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.23: Unaffordable and Performance (Global Comparison)

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.11***	0.11***	0.11***
	(0.03)	(0.03)	(0.03)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp} and restricting to positions outside the same county to calculate market wages and salary rankings. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.24: Unaffordable and Performance (Charter Comparison)

	Performance		
	(1)	(2)	(3)
Unaffordable Charter Position on Team	0.11***	0.11***	0.11***
	(0.03)	(0.03)	(0.03)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp} and restricting to chartered positions to calculate market wages and salary rankings. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.25: Unaffordable and Performance (Charter Positions)

	Performance		
	(1)	(2)	(3)
Unaffordable Charter Position on (Modal) Team	0.17**	0.14**	0.14**
	(0.07)	(0.07)	(0.07)
Observations	12,026	12,026	12,026
R^2	0.36	0.45	0.45
Boroughs	137	137	137
Positions	1,718	1,718	1,718
Tasks	7	7	7
Outcome Mean	0.64	0.64	0.64
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp}, and restricting the sample to charter positions and modal tasks. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.26: Unaffordable and Performance (Full Sample)

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.11***	0.11***	0.11***
	(0.03)	(0.03)	(0.03)
Observations	39,970	39,970	39,970
R^2	0.33	0.39	0.39
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	7	7	7
Outcome Mean	0.61	0.61	0.61
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp}. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.27: Unaffordable and Performance (Alternative Compliers)

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.12***	0.12***	0.12***
	(0.04)	(0.03)	(0.03)
Observations	24,164	24,164	24,164
R^2	0.33	0.39	0.39
Boroughs	250	250	250
Positions	3,452	3,452	3,452
Tasks	7	7	7
Outcome Mean	0.60	0.60	0.60
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp} and subsetting to an alternative set of complier positions as described in the text. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

Table C.28: Unaffordable and Performance (Task Subset)

	Performance		
	(1)	(2)	(3)
Unaffordable Position on Team	0.11***	0.11***	0.11***
	(0.03)	(0.03)	(0.03)
Observations	34,260	34,260	34,260
R^2	0.32	0.38	0.38
Boroughs	258	258	258
Positions	5,710	5,710	5,710
Tasks	6	6	6
Outcome Mean	0.56	0.56	0.56
Cluster	Borough × Task	Borough × Task	Borough × Task
Task Control	✓	✓	✓
Controls		✓	✓
Borough fixed effects	✓	✓	✓
Task fixed effects	✓	✓	✓
Position Title fixed effects			✓

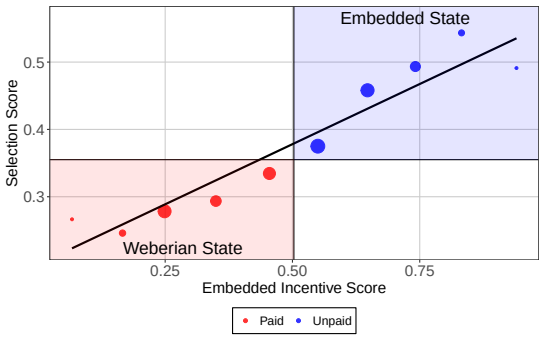
Note: The table presents results of estimating equation (1), replacing observed unpaid status u_{bp} with predicted unaffordability v_{bp}, and restricting the sample to non-financial tasks. Observations are at the level of a position-task. The number of position-tasks and positions in each sample is indicated in the table. Standard errors are clustered at the borough-task level. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. The dependent variable is borough-task performance, as introduced in Section 4..

D Incentive and Selection Robustness

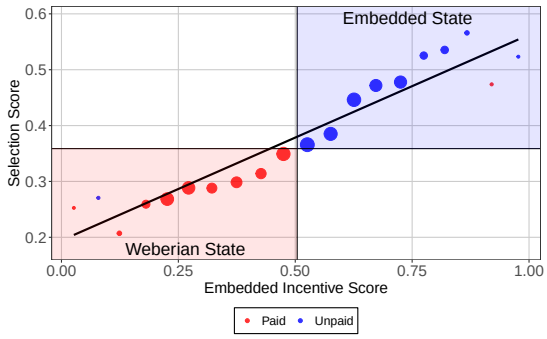
Appendix Figure D.1 shows versions of Figure 9 with varying bin sizes. Appendix Table D.1 shows the correlation between incentive and selection indices. Appendix Figure D.2 shows a decomposition of the main performance estimation of Table 4 into positions held by officers with and without a title, demonstrating that the effect of unpaid status is concentrated in those positions held by officers with a title. Finally, Appendix Figure D.2 shows a decomposition of the main performance estimation of Table 4 into positions with and without associated corruption, demonstrating that the effect of unpaid status is not concentrated in corrupt positions.

Figure D.1: The Embedded State Within Boroughs (Varying Bins)

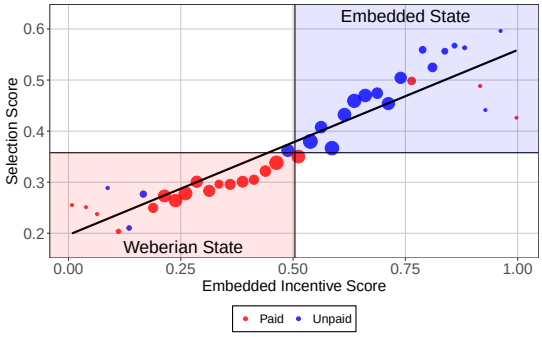
A: 10 Bins



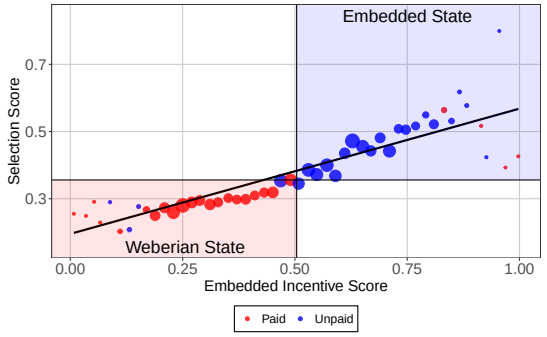
B: 20 Bins



C: 40 Bins



D: 50 Bins



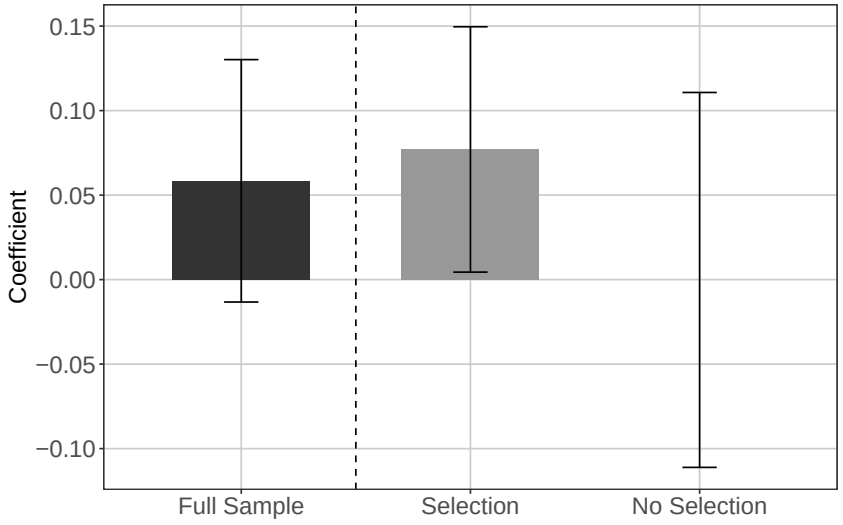
Note: The figure presents results of estimating equation (5) in a binned scatterplot using 10, 20, 50, and 50 bins, respectively, in Panels A–D. The x-axis plots the incentive index, and the y-axis the selection index introduced in Section 5. Vertical and horizontal lines indicate the respective conditional means. Majority-unpaid bins are represented by blue circles, while red diamonds denote majority-paid bins. We adjust the size of each bin to reflect the number of underlying observations. Observations are at the level of a position. The sample comprises of 5,710 positions.

Table D.1: The Embedded State Within Boroughs

	Selection Index		
	(1)	(2)	(3)
Incentive Index	0.35***	0.35***	0.36***
	(0.02)	(0.02)	(0.02)
Observations	5,710	5,710	5,710
R^2	0.30	0.30	0.45
Boroughs	258	258	258
Outcome Mean	0.19	0.19	0.19
Cluster	Borough	Borough	Borough
Controls		✓	✓
Borough fixed effects			✓

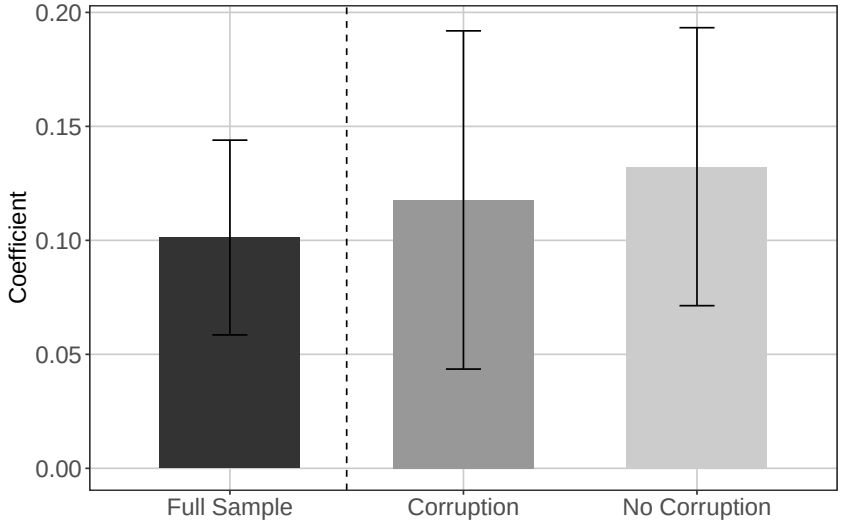
Note: The table presents results of estimating equation (5). Observations are at the level of a position. The sample comprises of 5,710 positions. *, **, and *** denote significance on the 10 percent, 5 percent, and 1 percent level, respectively. . The dependent variable is is the selection index introduced in Section 5.

Figure D.2: Performance of the Embedded State (Selection Split)



Note: The figure presents results of estimating equation (1) in a subset of positions held by officers with known names. The left bar shows the main coefficient in the named sample. The middle bar shows the main coefficient in a sample of positions held by officers with a title. The right bar shows the main coefficient in a sample of positions held by officers without a title. Observations are at the level of a position-task. The sample comprises of 1,785 (left bar), 795 (middle bar), and 990 (right bar) positions.

Figure D.3: Performance of the Embedded State (Corruption Split)



Note: The figure presents results of estimating equation (1). The left bar shows the main coefficient. The middle bar shows the main coefficient in a sample of positions that are identified as corrupt in the report, as described in Section 3. The right bar shows the main coefficient in a sample of positions that are not associated with corruption. Observations are at the level of a positions-task. The sample comprises of 5,710 (left bar), 1455 (middle bar), and 4,255 (right bar) positions.

E Local Government in Comparative Perspective

This paper studies the Embedded State in one context: early nineteenth-century England. In the following section, we suggest that the organization of municipal government was broadly similar in several other Western countries at the same time. Like England, both Prussia and France had long traditions of corporate urban governance, and like England, both countries introduced reforms to standardize city organization. We also discuss the United States, which adopted English institutions during the early phase of colonization.

Prussia

Pre-Reform Before the nineteenth century, Prussian municipal government was organized through a patchwork of corporate city constitutions rooted in chartered privilege and estate society. Urban authority typically rested with self-perpetuating councils (*Rat*, *Ratsherren*) dominated by patrician families or guild elites, alongside one or more *Bürgermeister* whose authority was derived from status rather than uniform public law. Municipal officers were not clearly distinguished from local notables: councilors, guild wardens, and market officers combined regulatory, judicial, and fiscal roles, while administrative staff such as town clerks and treasurers were personally dependent on ruling elites rather than embedded in a professional hierarchy. Compensation was equally heterogeneous. Although many governing offices

were formally unsalaried, officeholding conferred fees, perquisites, jurisdictional rights, and social status. Sander (1902) documents that out of roughly 141 municipal officers in fifteenth-century Nuremberg, 72 percent were salaried, while the remainder were either unpaid (17%) or feed (11%). As in the English context, high shares of the governing body and judges were unpaid. While many police were unpaid, all officers involved in infrastructure or property management were compensated. State supervision was irregular and patrimonial, with royal officers intervening episodically rather than through a standardized legal framework (but often exerting significant control).

Post-Reform The Municipal Ordinance of 1808 (part of the well-known Stein-Hardenberg reforms) fundamentally reorganized Prussian cities by replacing corporative privilege with generalized municipal self-government under public law. Urban government was reconstituted around two distinct organs: an executive *Magistrat* and a representative *Stadtverordnetenversammlung*. However, the reform did not professionalize municipal governance wholesale. Instead, it created a mixed system in which a small number of paid officers—the *Bürgermeister* and one or more salaried executive councilors—governed alongside a numerically dominant body of unpaid councilors (*Ehrenamt*). Service was made compulsory for eligible citizens, transforming unpaid positions from a status privilege into a civic obligation. At the same time, a modest corps of salaried clerks, treasurers, police officers, and other specialists exercised administrative functions (Goodnow, 1889, 1890; Bishop, 1908; Dorn, 1931, 1932).

Tiers of Government After the Stein-Hardenberg reforms, municipalities held self-government within an integrated multi-tiered administrative system. Cities enjoyed autonomy over local finance, policing, welfare, and infrastructure, but were legally subordinate to higher authorities. At the district or *Kreis* level, the *Landrat*—a paid, crown-appointed officer, often drawn from the local landed elite—served as an intermediary between municipalities and the state, relying on some unpaid local participation through district committees and estates. Above the *Kreis*, provinces were largely bureaucratic, staffed by salaried officers. The result was a distinctive Prussian synthesis: a thin, professional state bureaucracy governing through and alongside a thick layer of unpaid municipal and district officeholders. This arrangement preserved strong central oversight while embedding local elites directly in everyday administration, differentiating Prussia both from France's prefect-dominated model and from more fully professionalized municipal systems later in the nineteenth century (James, 1901a,b; Ashley, 1906; Munro, 1927).

France

Pre-Reform Before the Revolution in 1789, French municipal government was, like England's, fragmented and heterogeneous. Towns were governed by municipal corporations (*corps de ville*) whose composition and authority varied, featuring offices such as échevins, consuls, or capitouls. Local offices were monopolized by local elites and often venal. Many municipal offices lacked salaries but still yielded fees, exemptions, and social capital, while others were explicitly venal. Above the towns, effective territorial authority rested with royal intendants, appointed crown agents responsible for justice, policing, and finance within *généralités*. Coordination with the center was largely discretionary (Ashley, 1906; Mousnier, 1979; Collins, 1995).

Post-Reform The Revolution dismantled the municipal corporations and replaced them with a uniform system of communes, created by the law of 14 December 1789 and reorganized under Napoleon. Each commune was governed by a mayor (maire), deputies (adjoints), and a municipal council, while higher territorial administration was entrusted to prefects following the Law of 28 Pluviôse Year VIII (1800). Unlike Prussia, French reform did not embed unpaid officers within executive administration. Instead, it produced a sharp functional division: professional, salaried state administrators (prefects and sub-prefects) oversaw legality and execution, while municipal mandates were treated as "fonctions gratuites"—unpaid civic roles rooted in local representation rather than administrative expertise. By the 1830s, this system generated enormous numbers of unpaid municipal officers, reflecting the dense commune map, but concentrated executive authority above the local level (Ashley, 1906; Chapman, 2024).

Tiers of Government By the 1830s, French municipal government was embedded in a rigidly hierarchical territorial system. Communes exercised authority over local services and finance but operated under the prefect, who controlled budgets, appointments, and law. Arrondissements and departments functioned as extensions of central administration rather than as self-governing tiers, staffed by salaried officers and small paid councils of prefecture. This structure produced a distinctive pattern: mass unpaid participation at the municipal level combined with a professionalized, centralized executive apparatus above it. In contrast to Prussia, unpaid local officers in France remained largely representational, while effective administrative power was monopolized by the state's territorial bureaucracy (Chapman, 2024).

The United States

Origins Unsurprisingly, early American municipal governments were nearly identical to the English chartered corporations. Nearly all towns of sufficient size possessed a mayor, common council (often in-

cluding aldermen), a recorder, a town clerk, a high constable, a chamberlain, and a treasurer, or equivalent officers. Most of these officers were unpaid, and the corporation attempted to direct their fees to the town treasury (with varying degrees of success). Mayors were rarely salaried until the early nineteenth century, and even then only in larger cities, where they were offered modest salaries. City councilors were usually unpaid (Reed, 1926).

Evolution With rapid population growth, American cities began to start offering salaries to hire more qualified and dedicated (i.e., full-time professional) employees to manage policing, administration, and infrastructure. As the nineteenth century progressed, the mayors of larger cities (and also of smaller ones) began to be salaried, as did some city councilors. Cities also began to hire city managers to run local administrations, often offering them higher salaries than the mayor in order to attract educated professionals or businessmen. For most positions, however, cities were not entirely successful in offering high enough salaries to attract skilled professionals; (Reed, 1926, p. 80) notes that up to 1860, American cities were "almost always in the hands of bungling amateurs."

"As cities grew in size and the services which they must render multiplied, it became necessary to employ larger and larger numbers of persons to preserve the peace, sweep the streets, clean the sewers, and so on... The task of supervising this body of employees and of directing the expenditure of great sums of money in large municipal undertakings called increasingly for men of real capacity who should devote long hours of labor to their performance. Furthermore, in many branches of city administration there was a growing need of men possessed of a high degree of technical knowledge... No prudent individual or well-conducted business corporation would trust the management of important affairs to the care of inexperienced, incompetent or inadequately paid agents" (Reed, 1926, p. 79).

Comparison

England's largely unprofessional and autonomous local administration was, to an extent, mirrored in Prussia, France, and the United States before the French Revolution. At the municipal level, chartered corporations predominated, usually run by unsalaried (though not necessarily unpaid) local officeholders drawn from local elites who often performed a variety of tasks. From 1789 on, Prussia and France enacted significant reforms to rationalize their heterogeneous institutions. In Prussia, the Stein–Hardenberg reforms replaced corporate city privilege with a standardized public-law constitution and a uniform system of municipal officeholding. This entailed compulsory unpaid civic positions in the form of city councilors (*Ehrenamt*), salaried mayors, and a small cadre of paid specialists (clerks, police, etc.) who performed

most urban administrative tasks.

France, by contrast, dismantled municipal corporations altogether during the Revolution and replaced them with the communes, whose mayors and councilors were formally unpaid, but whose autonomy was circumscribed. Communes might employ a few paid workers, such as a clerk, teacher, or guard, but most administration was handled at a higher level. In the United States, municipalities adopted English institutions during the colonial period, and were typically also run by bureaucracies of unpaid amateurs. This began to change during the early nineteenth century, but until relatively late, salaries were not sufficiently high or extensive to attract many skilled professional employees.