Civil Service Exams and Bureaucrat Performance: Evidence from the End of Patronage in British India

Eric Robertson[†]

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Abstract

Modern bureaucrats are often selected on the basis of competitive exams, but the effectiveness of this strategy is disputed and its adoption has been repeatedly repealed or undermined in modern practice. I show that the selection of bureaucrats on the basis of competitive exams, rather than a common alternative of selection by patronage, results in the recruitment of higher-performing civil servants. Using newly digitized data from British India over the period 1846 to 1885, during which the Indian Civil Service abolished recruitment by patronage in favor of competitive exams, I show that district officers selected by these exams are eighty percent more likely to be highly rated on annual performance evaluations and that their districts are up to one-third less likely to experience a famine. I show that these differences are driven by officers who registered the highest scores on their entrance exams, and that low-scoring officers are indistinguishable from patronage appointees. The results indicate that civil service exams promote modern public sector performance by selecting high-ability bureaucrats, and that successfully identifying and recruiting the highest-ability candidates promotes state capacity.

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[†]University of Virginia. enr2ac@virginia.edu. I thank Sheetal Sekhri, Sandip Sukhtankar, Kerem Coşar, Gaurav Chiplunkar, and Jonathan Colmer for helpful guidance and support. This project benefited from funding assistance provided by the University of Virginia's Dumas Malone Fellowship, Bankard Fund for Political Economy, Department of Economics, and Quantitative Collaborative. Special thanks is owed to the British Library and staff. Kara Rippey and Jacob Slagle provided excellent research assistance.

1 Introduction

State capacity promotes economic development and economic growth (Besley and Persson, 2009; Acemoglu et al., 2015). However, a state's capacity to implement policy and deliver public goods depends upon the performance of its civil servants, and different strategies for selecting these officials may either improve or worsen performance. Many of the largest modern bureaucracies select civil servants by patronage or competitive civil service exams, though these exams have been repeatedly repealed or undermined in practice.[1]

Although these selection regimes may have substantial consequences for state capacity, it is not clear which can reliably select higher-performing bureaucrats, and evidence across settings is mixed (Moreira and Pérez, 2024; Muñoz and Otero, 2025). Moreover, civil service exams frequently incur additional operating costs for governments and opportunity costs on candidates (Mangal, 2024), so that the magnitude of any differences in performance are critical for comprehensively evaluating their relative social benefits. Further study of this question is limited by several common challenges; firstly, a lack of relevant empirical variation in modern settings; secondly, difficulty in measuring public sector performance; and thirdly, difficulty in attributing public sector output to individual bureaucrats within the civil service (Besley et al., 2022).

I solve these challenges in the context of the Indian Civil Service (ICS), Britain's colonial bureaucracy on the Indian subcontinent. Firstly, I leverage the empirical variation arising from a mid-1850's reform which abolished patronage in favor of civil service exams; secondly, I make use of British archival records which allow for the measurement of both objective and subjective performance across districts; thirdly, the assignment of individual officers as the head of each district office allows me to link annual district-level performance metrics to bureaucrats. Moreover, in contrast with other settings in which such linkages are possible only within narrowly defined departments or tasks, this setting allows me to measure relative performance within an office presiding over nearly every critical administrative function of government and across a region comprising more than ten percent of the world's population.

The ICS was the administrative predecessor of bureaucratic systems in modern India, Pakistan, Bangladesh, and Myanmar. It was born out of the commercial structure of the East India Company (EIC); as the EIC began to acquire territory, revenue authority, and administrative duties alongside its commercial interests, it gradually expanded the duties of its agents to include civil administration. The practice of patronage was formally observed from 1714 until 1856, under which the Directors of the EIC appointed bureaucrats at their discretion. Concerned about the quality of bureaucrats

[1] Patronage refers to the practice of making appointments to the civil service at the discretion of government leadership.

selected under this method, reformists waged a long campaign against this practice until it was abolished by an act of Parliament in 1853; entry into the civil service was exclusively determined by performance on annual civil service exams by 1857.

The relative effectiveness of these regimes is theoretically ambiguous; differences depend on the ability of civil service exam scores to predict skills and other abilities necessary for performance in the bureaucracy, relative to the ability of patronage to leverage private information for predicting these same qualities. Contemporary accounts involve debate over precisely this question, with critics arguing that competitively-selected candidates would lack "integrity, judgment, good sense, [and] vigour" (Chadwick, 1859, p. 57) while advocates proclaimed that civil service exams would "have at least as good a chance... of obtaining those other qualifications in the candidates" while also "secur[ing] intellectual superiority; and... obtain[ing] for the benefit of India such a service as the world has never yet seen" Wood (1853, pp. 108-109). The report which eventually outlined the core design for an ICS exam argued that civil service exams would raise standards in the civil service by substituting nepotism and favoritism for merit (Macaulay et al., 1855).

To evaluate the relative effectiveness of these selection regimes, I begin by constructing a novel dataset from archival records of bureaucrats selected through patronage or civil service exams, as well as their annual appointments as district officers across India over the period 1846-1885. I link this data with measures of annual bureaucrat performance and local economic conditions, in order to investigate whether they vary across selection regimes. Identification relies on the average differences in performance across bureaucrats selected by each regime over the narrow period during which members of each regime were assigned to at least one district.

My empirical strategy estimates these average differences while holding constant permanent district characteristics and common time-varying characteristics in the panel. The main threat to identification is that other characteristics across districts may have also changed over time, such that differences in performance across regimes may be due to factors outside of the competencies of the civil servants themselves. I support identification first by demonstrating balance of various time-varying district characteristics, and I show further empirical patterns in the data which are inconsistent with this threat to identification.

I examine the consequences of these selection regimes for the performance of district officers, the local representative and "universal agent of the Government in all matters" (Tupp, 1876, p. 91), who oversaw the magisterial, police, revenue, and broad executive authority of the district. Using data on subjective performance evaluations, I find that competitively-selected bureaucrats are approximately eighteen percentage points more likely to be named for good performance, a relative improvement of seventy percent over patronage appointees. Although I find no differences in collections of land tax revenues, I find that these differences in performance may have been due

to more efficiently conducting revenue business. The estimated value of defaulted property sold by revenue officials is roughly twice as large compared with patronage appointees, suggesting that competitively selected bureaucrats either recovered a greater share of revenues from the defaulted taxpayers, or else facilitated the sale of defaulted property more promptly.

I also investigate relative differences in local economic conditions under each of these groups. I focus on the incidence of famines, episodes which were common during this period and associated with substantial contractions in agricultural output and excessive mortality rates. I find suggestive evidence that famines were up to one-third less likely to occur under competitively selected bureaucrats, though this result is not robust across multiple data sources. However, I show that those with the highest scores on their civil service exams are driving these average differences with patronage appointees; famines incidence and intensity is half as large under these officials, with results robust across measures of famine. I also show that these officials explain almost all of the differences in subjective performance metrics. By contrast, bureaucrats with the lowest scores on their civil service exams are statistically indistinguishable from patronage appointees across all of these metrics.

To investigate the results further, I test whether the scores of competitively selected candidates were predictive of the abilities likely to be relevant for civil service performance. These candidates were required to take a series of exams administered on law, history, and languages of the subcontinent before proceeding to India; I show that their percentage scores on initial selection exams were highly predictive of their scores on these subsequent exams, with an elasticity across different subjects ranging from 0.6 to 0.8. However, I find evidence suggesting that these exams discriminated heavily against Indian candidates; conditional on selection, the average performance of Indian candidates on their subsequent exams was roughly 1.5-SD higher than their British counterparts, with their percentage scores on selection exams minimally predictive of their scores on exams relevant to civil service.

The results indicate that civil service exams select higher-performing bureaucrats than selection by patronage; modern episodes, such as China's reintroduction of civil service exams in the early 1990's, likely improved the state's capacity to govern effectively, at least insofar as it substituted patronage appointees for high-scoring examinees. Conversely, the results indicate that much of the improvements in bureaucrat performance come from the selection of civil servants in the right tail of performance on these exams. Efforts to undermine the integrity of these exams such as India's decades-long Vyapam scandal, during which thousands of public servants were recruited on the basis of fraudulent exam scores (Times of India, 2015; BBC News, 2015), may drastically hamper public sector performance and select officials who would perform no better than a patronage appointee. Although I find that civil service exams select more capable bureaucrats than under a

patronage system, the evidence also supports concerns about discrimination in civil service exams. Mounting evidence of discrimination has led some governments to limit their reliance on civil service exams, such as the United States federal government's decision to abandon its federal PACE exam in 1981 in the face of legal challenges alleging discrimination (Ban and Ingraham, 1988).[2] This finding suggests that, while a valuable and convenient mechanism for selecting effective bureaucrats, civil service exams may still fail to forecast the highest performers from the entire pool of test-takers, suggesting that an alternative mechanism may exist which would recruit even more capable civil servants.

This research contributes to the literature in two main areas. Firstly, given the evidence that state capacity promotes economic growth (Besley and Persson, 2009; Acemoglu et al., 2015), a growing literature studies how governments can influence and improve the performance of their civil servants.[3] I contribute to this literature by offering new evidence on the consequences of merit-based recruitment for performance, complementing existing literature on recruitment (Evans and Rauch, 1999; Xu, 2018; Moreira and Pérez, 2024; Muñoz and Otero, 2025) by demonstrating how selection on the basis of civil service exams affects performance across a range of administrative functions and tasks. Moreover, my findings support other studies which find that bureaucratic representativeness improves performance (Xu, 2023), and I offer new evidence that selection purely on the basis of civil service exams may still fail to select the highest-performing civil servants.

Second, I contribute to the literature on famines. Economists have argued that market systems (Smith, 1776), demographics (Malthus, 1826), political incentives (Sen, 1982), and state capacity Roy (2016) play a role in causing famines; many of these factors continue to be investigated in modern research (Besley and Burgess, 2002; Burgess and Donaldson, 2010; Ashraf and Galor, 2011; Meng et al., 2015; Markevich et al., 2024). My findings complement arguments concerning the political causes of famine, by showing in particular that the recruitment of civil servants can alter this margin. Beyond common considerations such as the state's political objectives or its fiscal capacity, the performance of the bureaucracy seems to also play a substantial role in preventing famine and mitigating food insecurity.

[2]PACE is the acronym for the Professional and Administrative Career Examination, an exam administered by the Civil Service Commission in the United States for those seeking to enter the federal civil service.

[3]For example, economists have studied bureaucrats' recruitment (Dal Bó et al., 2013; Weaver, 2021), training (Mehmood et al., 2023; Ash et al., 2025), incentives (Khan et al., 2016, 2019; Bandiera et al., 2021), promotions (Aman-Rana, 2025), and mission motivation (Khan, 2025). For a review of the literature on bureaucracy and development, see articles by Besley et al. (2022) on the relevant economics literature and (Pepinsky et al., 2017) for the literature in political science.

2 Background

In this section, I outline the origins of the Indian Civil Service and its initial system of appointments by patronage, as well as its reforms and introduction of its civil service exam in the 1850's, the subsequent organization of these competitive exams under the supervision of the Civil Service Commission, and the structure of ICS administration in India.

2.1 The Indian Civil Service and Recruitment by Patronage

The Indian Civil Service emerged from the East India Company's commercial establishment. In the early years of the Company, it dispatched its agents to facilitate trade and commercial activity, though as it acquired territory and the authority to collect tax revenues these servants were increasingly entrusted with the powers and responsibilities of civil administrators (O'Malley, 1931, p. 17-22). By the nineteenth century, this nascent administrative structure had matured into an elite civil service, charged with the administration of vast swathes of British territory in India, whose members performed the most critical executive and judicial functions within districts and staffed the offices of the provincial and central government (O'Malley, 1931, pp. 1-2);(Cohn, 1966, p. 27).

Before the reforms of the 1850's, entry into this service depended chiefly on patronage. The early practice of patronage emerged around 1714, when those seeking positions with the company were required to obtain the nomination of an East India Company Director in order to apply (Cohn, 1966, p. 92). Patronage could be tremendously lucrative for those involved; in some cases, nominations were sold on informal markets, fetching prices of up to £3,500 (Cohn, 1966, p. 103).[4] Nominations seem to have largely been preserved, however, for family and social connections; data collected by (Compton, 1968, pp. 104-106) suggests that around 23 percent of nominees were relatives of a director, with another 55 percent coming from social networks outside of their own families. While directors may have intended in many cases to nominate competent individuals from these social networks, contemporary accounts described cases in which nominees were "too idle or too stupid" for the civil service as well as episodes of blatant nepotism, including one Director who secured Company positions for nearly all of his nineteen children (O'Malley, 1931, p. 239).

The movement to introduce civil service exams began largely with Lord Wellesley, Governor-General of Bengal from 1798 to 1805, though he proposed these measures alongside the existing system of patronage, rather than as a substitute (O'Malley, 1931, p. 230-231). His concerns were followed by recommendations in 1804 that those individuals nominated for the civil service should

[4] This figure would amount to more than $\$400,000$ in 2026 USD.

receive a general education in courses such as classics, mathematics, law, and languages before their departure for India. By 1806, these recommendations were adopted and nominees required to pass through a limited examination process before attending at Haileybury, the name for the Company's training college for its civil servants, located near London (Compton, 1968, p. 265). Although the Directors agreed to these initial limits to their exercise of patronage, involving in some cases the failure of nominees to pass exams and advance to India, further efforts to restrict patronage were repeatedly and successfully resisted by the Court of Directors until the early 1850's (Moore, 1964, p. 246).

2.2 Reform and the Introduction of Civil Service Exams

Early reform movements, advocated by those such as Grenville (1813), were ultimately undermined by efforts from Directors who did not want to lose their privilege of patronage (O'Malley, 1931, p. 238). In particular, a proposal for selection by competitive exam was adopted in the Charter Act of 1833, but Directors managed to evade this clause and preserve nominations by patronage for another two decades (Cohn, 1966, p. 29). Meanwhile, reformers continued to argue that civil administration was too important to leave the selection of civil servants to the whims of the Directors, and that civil service exams would select more competent candidates (Compton, 1968, p. 266). The decisive push came only when Parliament moved against the Court's privileges a second time; the Charter Act of 1853 finally stripped the Directors of their right to patronage (Moore, 1964, p. 247), though the practice of patronage continued until a final cohort of nominees entered Haileybury in 1856 (Compton, 1968, p. 265).[5]

In the interim, a committee chaired by reform advocate T. B. Macaulay outlined the practical details for conducting ICS examinations (Macaulay et al., 1855), with the first of these civil service exams held in 1855. While critics worried that the examination system would reward "cramming" over the qualities truly needed for practical rule (Compton, 1968, p. 271), Macaulay et al. (1855, p. 5, 12, 18) argued that competition would raise standards for selection into the civil service by substituting favoritism for merit and that the design of the exam would give a candidate "no credit at all for taking up a subject in which he is a mere smatterer." The final design represented a grueling weeks-long competition across a wide range of subjects, in which no candidate was expected to score even half of the total marks; the exam included topics covered at educational institutions of the time, "of such a nature that no candidate who may fail shall... have any reason to regret the time and labour which he spent in preparing himself to be examined" (Macaulay et al., 1855, p. 7, 14).[6]

[5] Haileybury was closed at the end of 1858, after this final cohort had graduated.

[6] (Macaulay et al., 1855, p. 13) recommended the inclusion of English composition, English history, English literature, Greek, Latin, French, German, Italian, mathematics, natural sciences, moral sciences, Sanskrit, and Arabic; these subjects represented the bulk of the material tested in ICS exams over the following decades.

2.3 Early Exam Regimes: Competition and Probation

The system of recruitment by civil service exams underwent various iterations and revisions over the period from 1855 to 1879. In the first phase, from 1855 to 1857, selection was based on exam performance across a wide range of general subjects, while a second-stage probationary examination was planned but largely abandoned in practice due to high demand for additional ICS officers in India (Civil Service Commission, 1859, pp. xxi–xxii). In 1858, successful candidates assigned to the province of Bengal faced a short "further examination" in English composition, the history and geography of India, and Bengali or Hindustani (Civil Service Commission, 1859, p. xxiv, 294), though from 1859 to 1864, the system settled into its intended two-stage format, with a broad open competition followed by a year of study before departure to India as well as a further examination in Indian languages, Indian history and geography, jurisprudence, Hindu and Mohammedan law, and political economy, with performance at this second stage determining seniority in the service (Civil Service Commission, 1860, pp. 148–150). During this period, the selected candidates also spent their first year continuing this probationary training, either in Calcutta, Bombay, or Madras, depending upon the region to which they had been assigned (Moore, 1966, p. 152). Beginning with the 1865 competition, selected candidates were placed on a two-year probation in Britain and subjected to repeated examinations during probation rather than a single test before joining the ICS (Civil Service Commission, 1865, pp. 186-190). From 1865 to 1871, candidates were effectively expected to qualify in two vernacular languages, though from 1872 onward only one vernacular was compulsory and probationers could elect to take additional languages in order to improve their position for future promotions (Civil Service Commission, 1875, pp. 356-358). In these first twenty-five years of ICS exams, the final revision came in 1878, when age limits were reduced to 17–19; probation remained two years but was more explicitly facilitated via study at British universities and colleges (Civil Service Commission, 1877, p. viii).

2.4 Administration Under the Indian Civil Service

The district administration of India in the second half of the nineteenth century consisted of three main functions: the judge, who presided over the judiciary; the magistrate, who controlled the police, jails, and criminal courts; and the collector, the local executive officer who also controlled the district treasury and presided over the revenue courts. Of these roles, the executive authority in the district rested largely in the hands of the district officer, or the combined authority of a magistrate and collector, a position which combined in the hands of a single official the magisterial, police, revenue, and general executive authority of the district (O'Malley, 1931, pp. 67-69, 162-163).[7]

[7] In some parts of India up until 1858, the functions of magistrate and collector were served by different individuals; from 1859 onwards, these were unified under a single officer referred to as a collector-magistrate, or district officer.

This officer was entrusted with supervising all local government policy outside of the civil courts, "a universal agent of the Government in all matters" who, "if he be a man of ability and energy, nothing will be undertaken or decided which can in any way affect the district of which he has charge, without his opinion being asked... and without the advice which he may give being received with the utmost attention and consideration" (Tupp, 1876, p. 91). The competence of a district officer could therefore have a profound influence on the quality of local government administration.[8]

This structure characterized all of the regulation provinces, i.e. the regions governed exclusively by members of the civil service illustrated in Figure 2, while administration was often delegated to military officials in other provinces under British rule (O'Malley, 1931, p. 53), or else shared between the British government and local rulers in semi-independent "princely states".[9]

3 Data

I construct my data from a variety of published historical documents and unpublished archival records. I obtain the majority of the data by digitizing statistical appendices from government publications, focusing on the four provinces which were governed by members of the Indian Civil Service as highlighted in Figure 2.[10] I briefly describe each source involved in the construction of the data below.

Bureaucrat selection regimes I obtain the identities of patronage nominees appointed to the civil service from Danvers et al. (1894), and of candidates selected by civil service exam from the Civil Service Commission's *Annual Reports*. I also obtain from these reports the scores of both successful and unsuccessful candidates on their civil service exams, as well as the probationary exam scores of successful candidates.

District assignments I construct the history of district officer assignments from official registers.

[8] Tupp (1876, p. 91-92) describes in detail "how entirely the welfare of a district is dependent on its Magistrate-Collector; under a good officer every matter receives, as it arises, the attention it deserves, all the subordinates of every grade are efficiently supervised, and are made to feel that the eye of a vigilant superior is always on them; the orders of Government are strictly but considerately carried out; crime is vigorously repressed, and the law administered impartially but without undue severity; the people are governed with firmness, but so that they may feel the hand of power as little as possible; and the officials of all grades, though they know that any neglect or offence will be visited with certain punishment, yet are confident that while they do their duty, and perform intelligently and honestly the work assigned to them, they will be protected and supported by their superior officer. In short, the form of Government in an Indian district under a thoroughly efficient and conscientious Magistrate, probably conduces as much to the well-being and happiness of the governed, as any which prevails in any part of the world, although it be somewhat despotic according to our Western ideas."

[9] A local British resident was often appointed to princely states, in order to advance British political interests locally and to serve as liaison between the local authorities and the British government.

[10] These provinces are Bengal, the Northwest Provinces, Madras, and Bombay. These provinces are generally referred to by British officials as "regulation provinces," and their counterparts (administered primarily by military officials) in the Punjab, Central Provinces, and elsewhere as "non-regulation provinces."

These records provide the name and titles of the officer assigned to the district in each year, and also state the year of entry into the civil service for each official.

Tax and bureaucrat performance records I obtain data on land tax liabilities, collections, and tax write-offs from the land revenue reports of each province, over the period 1846 to 1885. I also obtain data from these reports on the sales of defaulted property, and the number of villages visited in the province of Madras.

The annual land revenue reports of Bengal also contain lists of officers commended by superior officers for their performance in the respective year, as well as a set of identical records for several years in the Northwest Provinces. I use these subjective evaluations to construct a binary measure of whether a district officer in a given district-year was commended for their performance.

Indian district boundaries The Indian Ocean World Center, McGill University kindly provided the initial shapefiles for this study, digitized from an 1871 census map (Office of the Registrar General et al., 2011).[11] I expand the coverage of districts by digitizing maps published alongside the Administration Reports of Bengal (1872-73) and the Punjab (1877-78), and use this data to measure total district area, spatially merge rainfall stations to the district in which they were located, and measure famines from maps as described below.

Great Britain counties I obtain the shapefiles of counties in Great Britain from the Historic County Borders Project,[12] and county-level surname distributions for the 1881 census from surnames.fpgenealogy.co.uk.

Famines My primary measure of of famine comes from the Imperial Gazzetteer (Nathan et al., 1909). I manually construct a measure of famine from the Gazzetteer by recording all calendar years listed under the famine section of each district's entry in the Gazzetteer.[13] I define district-years as famine-affected if a given year is mentioned in the district's history of famines reported in Nathan et al. (1909), or else if any part of the district overlaps with the region and period pertaining to a map in Srivastava (1968). I also obtain a measure of famine intensity by conducting a sentiment analysis of the text in Nathan et al. (1909), and separately from Srivastava (1968) by measuring the district area falling under each color-coded famine intensity classification.

[11] This data is covered by a CC-BY license, conditional on including the following accreditation: "This material was created at the Indian Ocean World Centre, McGill University for its Partnership Project, Appraising Risk, Past and Present (www.appraisingrisk.com). This project is supported by the Social Sciences and Humanities Research Council (SSHRC) of Canada."

[12] I use the SHP WGS84 Full Resolution (Definition A) provided by the Historic County Borders Project.

[13] Famines are difficult to measure, especially in a historical setting with limited data. I follow previous economics research by relying on the definition applied by authors examining the historical record. Researchers such as Burgess and Donaldson (2010) collected famine incidence from Srivastava (1968). I also measure famine from the maps published in Srivastava (1968), but those records are temporally limited. The text entries in Nathan et al. (1909) offer an ideal complementary measure, as they define famines clearly across all district-years in the nineteenth century.

Rainfall I obtain monthly rainfall for 434 stations from Blanford (1888). I follow Donaldson (2018) by spatially interpolating onto any missing station-month observation, and then averaging rainfall across all station-months within a district to obtain a district-month rainfall panel. For any missing district-months, I also supplement this with district-level rainfall data published in the annual land revenue reports for Madras.[14]

3.1 Descriptive statistics

Table 1 reports summary statistics in the district panel, over the period 1846-1885. Panel A shows that close to a fifth of district officers were selected by civil service exams during this period, with a similar fraction of district officers sharing a surname with an EIC director. Perhaps unsurprisingly, almost all of those surname-matches are among patronage-appointed district officers, with close to one quarter sharing a surname with an EIC director; by contrast, only around five percent of competitively-selected officers share these same surnames. There is substanital variation in tax and performance metrics in the panel, with uncollected land tax liabilities ranging from zero to more than 1.7 million rupees, though in most years roughly 94 percent of total liabilities are collected outright. Performance commendations are somewhat rare, with district officers commended for their performance in one-fourth of the panel.

Famines are infrequent events, taking place only nine percent of the time in the full sample statistics from the Imperial Gazzetteer, though occurring more frequently in the temporally restricted sample from Srivastava (16%).[15] Data from the province of Madras on additional revenue operations reports the number of villages visited and taxes settled by collector and by revenue office, as well as the quantity of defaulted property seized and sold by revenue officials within the year, both by estimated value of the property as well as by the actual revenues generated from the sale.

Finally, Table 2 reports descriptive statistics of exam scores across all candidates who were selected

[14] I measure rainfall shocks by standardizing rainfall in each district and year relative to the district-specific mean and standard deviations, as below:

$$rain\text{-}SD_{dt} = \frac{rain_{dt} - \mu_d}{\sigma_d}$$

where $rain_{dt}$ denotes the level of rainfall in the district d and year t, and μ_d and σ_d denote the average and standard deviation of rainfall in the district, calculated across all years with land revenue records; this covers nearly every year in Bengal from 1846 to 1885, in the Northwest Provinces from 1848 to 1885, in Madras from 1853 to 1885, and in Bombay from 1860 to 1885. I measure more extreme rainfall shortages, which I refer to as $droughts$, as:

$$drought_{dt} = \mathbb{1}\{rain\text{-}SD_{dt} < -1\}$$

Where $drought_{dt}$ is an indicator variable for the district-year rainfall falling at least one standard deviation below the district's average annual rainfall.

[15] Famine intensities across the two sources are more similar, with an average Gazzetteer intensity of five percent and Srivastava intensity of seven percent, likely suggesting that Srivastava (1968) simply chose to include more modestly-affected regions than did Nathan et al. (1909) in defining famine incidence.

for the civil service over the period 1855 to 1879 (the open competition), and across all subsequent probationary exams taken by individuals selected for service from 1859 to 1879. In contrast with many modern national civil service exams, there is an extremely wide range of exam scores across successful applicants, ranging from a score of 16 to 48 percent of the total points possible. Much of this is due to the presence of low-scoring candidates who passed early exams only due to high demand for officers in India, which led to temporarily relaxed admissions standards on these exams. These "surge hires," whose percentile ranks in early exams would not have warranted selection for service in any subsequent year over the period from 1864 to 1879, comprise close to one-fifth of successful candidates. I also note that there is a remarkably wide dispersion of abilities on subsequent probationary exams, with most exam scores ranging from close to ten or twenty percent on the low end to more than ninety percent on the high end, with the average scores across candidates largely between 50 and 75 percent.

4 Empirical strategy

I examine the average differences among competitively-selected bureaucrats, relative to those selected by patronage. I treat the policy variation arising from the introduction of competitive exams as a plausibly random treatment across districts within the narrow range of years during which at least one bureaucrat from each regime is assigned to a district.[16] My reduced form estimation strategy is designed to measure the differential effects of selection on various outcomes, inclusive of any differences in the characteristics of selected bureaucrats or the differences in their subsequent training across selection regimes.

My identification strategy compares average differences in measures of bureaucrat output, performance, or local economic conditions, while holding constant permanent district characteristics and aggregate time-varying characteristics. The identifying variation comes from two sources: firstly, the variation within a district, across years between bureaucrats selected under each regime; and secondly, the variation across districts governed by officials belonging to each selection regime, observed within the same year in the panel. Only the years in which I observe bureaucrats selected under both regimes contribute to the estimated effect of the selection regime.[17]

[16] This approach is appropriate if, after conditioning on the fixed effects and included controls, bureaucrat selection regimes are exogenous. Identifying assumptions are discussed further in the relevant section.

[17] In years in which I observe bureaucrats from only one of the selection regimes, treatment is collinear with a year fixed effect.

4.1 Empirical specification: relative effects in panel data

I employ a linear specification to estimate the average treatment effect of selection by competition, relative to patronage appointments, on outcomes related to bureaucrat output, performance, and local economic conditions in my district panel:

$$y_{dt} = \beta_1 \text{competitive}_{dt} + \delta X_{dt} + \lambda_d + \gamma_t + \epsilon_{dt} \tag{1}$$

where y_{dt} denotes the outcome variable in the district d and year t; competitive_{dt} denotes whether a competitively-selected bureaucrat was assigned to the district; X_{dt} is a vector of controls which is often null; and λ_d and γ_t are fixed effects at the district and year level, respectively. I make use of this linear model to test time-varying district characteristics for balance and also for recovering percentage-point coefficient estimates in the case of binary outcomes. I include additional terms in this specification when investigating mechanisms such as ability or loyalty.[18]

4.2 Identifying assumptions

The primary assumption for identification is a standard assumption about the absence of omitted variables bias:

$$E[\epsilon_{dt} \mid \text{competitive}_{dt}] = 0$$

which is met if the assignment of selection regime across observations in the panel is as good as random. An ideal experiment would assign this truly at random, rather than by changing the selection regime of bureaucrats altogether after a certain point of time, though I will argue that the variation in this setting is as good as random and satisfies this assumption.

The primary threat to identification is that that other district-level determinants of collector output, performance, or local economic conditions may have been systematically correlated with the timing of the rise of competitively-selected bureaucrats into their district appointments, which I will address by testing balance of district characteristics across regimes. Another potential threat is that bureaucrats could have been strategically allocated due to effects of their selection regime

[18] I compare patronage appointees against high- and low-scoring competitively selected bureaucrats in the following specification: $y_{dt} = \beta_1 \text{competitive}_{dt} + \beta_2 \text{exam}_{dt} + \delta X_{dt} + \lambda_d + \gamma_t + \epsilon_{dt}$, where exam_{dt} is either the bureaucrat's percentage score on their entrance exam (if selected by civil service exam), or else zero (if selected by patronage). I also compare bureaucrats who shared a surname with a director of the East India Company, who would have likely been appointed on the basis of nepotism under patronage but not under civil service exams. I consider the following specification to estimate coefficients on this additional intercept term and its interaction with competitive selection: $y_{dt} = \beta_1 \text{competitive}_{dt} + \beta_2 \text{EIC-surname}_{dt} + \beta_3 \text{EIC-surname}_{dt} \times \text{competitive}_{dt} + \delta_4 X_{dt} + \lambda_d + \gamma_t + \epsilon_{dt}$, where EIC-surname_{dt} denotes whether the collector shared a surname with any member of the East India Company's board of directors during the period 1805-1858.

on their expected performance, which I will also address by demonstrating that these districts are not systematically different. [19]

For time-varying district characteristics which I observe, I test balance of these characteristics in the panel across selection regimes; the coefficients of these standardized measures are reported in Figure 1. I find no differences in these characteristics in either contemporaneous or lagged measures of the railroad connection status of the district, the total and log of tax land liabilities for collection, the quantity of rainfall in inches, or the incidence of drought. These results suggest that there were no substantial differences in district characteristics, suggesting that competitively-selected district officers did not face systematically different local conditions than patronage appointees, and were also not strategically assigned.

If there is no bias arising from omitted variables, then $\hat{\beta}_1$ in Equation 1 is identified provided that the regression equation imposes the correct CEF.[20]

5 Results

I show first in Figure 3 that civil service exams reduced many of the disparities in the geographic concentrations of patronage appointees, consistent with weakening the strength of private information arising from connections to the social networks of EIC directors, with civil servants selected by patronage drawn from many of the same regions with stronger connections to Directors of the EIC. These disparities are considerably lower during the first twenty-five years of civil service examinations, as the probability of selection among these civil servants is much closer to its true share in the population across many counties of Great Britain. Table A1 reports coefficients from a regression of these county-level connectedness measures, for each group of civil servants, on the county-level connectedness of EIC directors. Column (1) shows that EIC director connections predict a higher degree of connection among patronage appointees; the coefficient suggests that a doubling of connectedness among EIC directors would increase the connectedness of patronage appointees by around forty percent. In contrast, column (2) suggests that the same increase in director connections to the county would increase the connectedness of competitively-selected civil servants by only 25 percent, with this difference (column 3) statistically significant ($p < 0.01$). Even despite the limited sample, these statistical results indicate that the reform was successful in

[19] This second threat is likely of minimal concern empirically due to the combination of strict adherence to seniority-based promotions in the Indian Civil Service along with the cohort-level nature of the treatment; in this setting, junior cohorts gradually fill into the roles vacated by senior cohorts.

[20] Equation 1 recovers the average treatment effect net of all subsequent information, skill, etc. accrued over the course of their career; in the results section, I also explore treatment heterogeneity along observable district and collector characteristics which may have augmented or attenuated the treatment.

weakening the importance of social connections for recruitment into the civil service.[21]

5.1 Tax collections and performance evaluations

In examining the differences in bureaucrat output, I focus first on the tax collections and subjective performance evaluations of district officers. I estimate Equation 1 in OLS, which recovers estimates of β_1, which I report in Table 3. Column 1 reports differences in tax collections in thousands of rupees, which are largely similar across regimes. Consistent with this, I likewise find a null difference in the share of liabilities collected (column 2).

Although revenue metrics do not differ across regime, I find that competitively selected district officers are approximately eighteen percentage points more likely to be commended on subjective performance reviews (column 3). This effect is large and statistically significant ($p < 0.01$), amounting to a roughly seventy percent increase relative to the average frequency of commendations for patronage-appointed officials.

In exploring these results further, I examine these differences by the performance on these exams by competitively-selected district officers in Table A4. I find that differences in revenue collections differ minimally between patronage appointees and high- and low-scoring district officers (columns 1 and 2), but that the differences in performance evaluations are driven largely by those officers with the highest performance on their entrance exam (column 3). Officers who scored in the 95th percentile on these exams are roughly 24 percentage points more likely to be commended, or double the average for a patronage appointee. By contrast, officers who scored in the 5th percentile on these exams are an imprecise eight percentage points more likely to be commended. These results suggest that much of the differences in performance across patronage and competitively-selected bureaucrats are due to differences in their ability.

Finally, Table A5 reports coefficient estimates for these tax outcomes for a specification with an interaction term for sharing a surname with an EIC director. Average differences between patronage appointees and competitively selected bureaucrats are largely in line with the coefficients reported in Table 3, though I find much larger differences among bureaucrats who shared a surname with an EIC director across these regimes. Patronage appointees who were likely selected by nepotism fail to collect roughly 40,000 rupees (column 1) less than those sharing director surnames but selected by competitive exams. I also find a similar difference in the share of tax liabilities collected, with

[21] Notably, Figure 3 shows that much of England and Wales continue to be under-represented across regimes, just as much of Scotland continues to be over-represented. One explanation for this is that the presence of friends or family in the civil service in India may raise the amenity value of entering the civil service, so that connected individuals are more likely to appear for civil service exams or to exert greater effort in preparing for them; another explanation is that EIC directors actively selected for certain qualities which were correlated with or predictive of exam performance.

nepotism appointees collecting roughly three percent fewer outstanding tax liabilities (column 2) compared to their competitively-selected counterparts. This difference seems particularly large given that, in the average district under a patronage appointee, only six percent of tax liabilities go uncollected in a district.

Nepotism appointees are also fourteen percentage points less likely to have been commended for their performance (column 3) which, although statistically imprecise, is in line with the average differences across these groups overall. Overall, the results suggest that one likely component of the differences in performance across selection regimes is the diminished revenue collections among nepotism appointees. Moreover, these results suggest that mechanisms by which patronage may potentially improve public sector performance, such as allowing for patrons to make use of private information to select the most loyal or motivated officials, are likely dwarfed by the costs of rent-seeking in practice. The revenue shortfalls suggest that nepotism in the public sector was particularly inefficient, costing the state up to 40,000 rupees in annual tax revenues, while transfers to an EIC director's family relation amounted to only 27,000 rupees at the most.

5.2 Revenue system operations

In examining the operations of the revenue system further, I make use of evidence reported annually in the province of Madras on the sale of defaulted property and number of villages visited to collect revenues, which I report in Table 4. Defaulted taxpayer property was often sold during the year to compensate the government for unpaid debts, and revenue officials visited villages regularly to collect taxes in this province.[22]

I find that while the number of villages visited are roughly equivalent across regimes (columns 3 and 4), competitively-selected bureaucrats sell roughly twice as much defaulted property, as measured by its estimated value (column 1), with the revenues generated from these sales imprecisely two-thirds higher (column 2). This suggests that part of the observed differences in performance across regimes may have been due to differences in their skill at orchestrating the sale of defaulted property, generating proceeds for the government while also establishing a future stream of tax revenues by settling new tenants.

5.3 Famine incidence and intensity

In examining local economic conditions, I focus on the incidence of famines; famines were extremely common in this setting, affecting roughly ten to fifteen percent of district-years in the

[22]Most villages in Madras were under a "ryotwari" revenue system, in which revenue officials visited local villages to assess and collect taxes directly, rather than via intermediaries.

sample, as reported in Table 1. Trends in the incidence of famines and transition across selection regimes, as demonstrated in Figure 4, suggest that the promotion of competitively selected into local administrative roles may have played a substantial role in preventing famines.

I estimate Equation 1 in OLS, which recovers estimates of β_1 in percentage points, which are reported in columns 1 and 3 in Table 5 for measures from Nathan et al. (1909) and Srivastava (1968), respectively. I find evidence of a substantial reduction in the probability of these events under competitively selected collectors, with central estimates suggesting a roughly three to six percentage point reduction in the probability of famine (columns 1 and 3, respectively), though this result is not statistically significant across both outcomes.[23] Remarkably, these estimates suggest that the rise of competitively selected officers into these influential positions reduced famine incidence by roughly one-third from its baseline under patronage appointees. The point estimates imply that much of India's famine era, the period during which famines were extremely common in the 20th century, can be explained by differences in the selection of local government officials.

I also report estimates of β_1 in terms of famine intensity, which jointly captures the incidence and intensity of famines in each district-year, measured on a scale from zero (no famine) to 1 (most intense famine). These estimates are are reported in columns 2 and 4 in Table 5 for measures from Nathan et al. (1909) and Srivastava (1968), respectively. The results similarly suggest that this joint measure substantially differed across the two groups, declining by close to one-half (columns 2 and 4) under competitively selected collectors compared to patronage appointees.

I examine these differences by the exam performance of competitively-selected officers in Table A6 and I find evidence that the differences in famine intensity are driven by the officials with the highest performance on their exams. The probability of famine declining by five to ten percentage points (columns 1 and 3) under officials at the 95th percentile of performance on these exams, while a much smaller and statistically imprecise difference between patronage appointees and district officers at the 5th percentile of exam performance. Notably, these differences across high performers and patronage appointees are robust across both sources and measures of famine, with all outcomes meeting at least marginal significance thresholds. In line with the evidence on performance commendations, these results further support the conclusion that officials selected by competitive exams were more effective at preventing adverse economic conditions from materializing locally, and that these effects were driven by the highest-ability bureaucrats.

Table A7 reports coefficient estimates for these outcomes for a specification which includes an intercept term for shared-surname with an EIC director, as well as its interaction with their selection

[23] The magnitudes of these effects are very similar in standard deviations, but are not statistically significant for the measure from the Gazzetteer. However, this may be due to statistical imprecision arising from the substantially lower degree of variation in this outcome compared with the measure from Srivastava.

regime. I find some evidence that famines may have been more likely (column 3) and more intense (column 4) under officials who were likely appointed by nepotism. However, this result is not robust across both sources, with a more modest and statistically imprecise reduction in incidence and intensity as measured form the Gazzetteer (columns 1 and 2). The results point to a similar conclusion as with tax collections: that civil service appointments on the basis of nepotism may be particularly harmful to citizen incomes as well as to state revenues, and that selection on the basis of competitive exams can insulate the state from these adverse effects.

5.4 Civil service exam scores as predictors of administrative ability

As is the case with many modern civil service exams, the exams introduced for selecting officers into the ICS in the mid-19th century were intended to select individuals of high intellectual ability. The expectation was that these high-ability individuals would be the most capable at developing and acquiring the skills necessary for efficient administration. Given the evidence that the highest performers were responsible for the largest improvements on subjective performance evaluations and famine incidence, compared with patronage appointees, it seems likely that this was indeed the case.

To test this, I make use of data on exam performance across a variety of task-relevant subjects during the probationary period before competitively selected ICS officers were deployed to India. These exams include courses in law, history and geography of the subcontinent, political economy, and a variety of courses on different languages of the subcontinent (which depended largely on the administrative region to which the officer was assigned). Table 6 reports the coefficient estimates from a regression of the percentage score on these task-relevant abilities on their percentage scores for their competitive exams. I find that these competitive exams were indeed highly predictive of performance on these subjects, with an elasticity across all subjects of approximately 0.73 (column 1), and ranging from roughly 0.6 to 0.8 across the main subjects (columns 2 through 5).

Although it may be tempting to claim that civil service exams may therefore be predictive of both performance and ability in general,

A common limitation in modern empirical settings is that many civil service exams are highly selective, so that it is not possible to draw conclusions about the general relationship between exam scores and future performance or candidate abilities across the entire population. In contrast with many modern civil service exams, which select a very small percentage of exam-takers, one advantage of examining these early ICS exams is that they selected a much higher percentage of candidates, and therefore include a dramatically expanded domain of potential exam-takers. In particular, a hiring surge in the early years of the exam led to the selection in some cases of more

than forty or fifty percent of all exam-takers into the civil service. These surge hires, as highlighted in Figure A1, included a large number of candidates whose rank would not have merited selection in any subsequent year in the data (from 1864 to 1879). In line with this, their scores on these exams were also significantly lower than the average selected candidate, as demonstrated in Figure A2.

The presence of these surge hires in the data allows me to observe a much larger domain of candidates, and to investigate whether exam performance may be predictive of the relevant competencies and abilities across the entire pool of candidates. To examine this, I test for differences in the performance elasticity of these surge hires compared with selective hires, whose ranks would have merited entry in at least one year during the period 1864-1879. I report these coefficients in Table A8.

I find no statistical difference in the performance elasticity of these exams across selective and surge hires on these abilities overall, or on any individual subject, suggesting that civil service exam performance is predictive of task-relevant ability in general. However, the elasticities are imprecisely higher among selective hires, often approaching or exceeding 1 (columns 1, 2, 4, and 5). The performance elasticity for languages, in particular, are about two-thirds higher among selective hires than surge hires.

These results imply that modern civil service exams are likely predictive of task-relevant ability across a wide domain of scores, and possibly across the entire spectrum, implying that civil service exams may be a reliable predictor of both bureaucrat ability and performance unconditional on selection. Moreover, central estimates suggest that these performance elasticities are largest among the highest performers on the entrance exams, implying that scores in the right tail of modern exam distributions may be an even stronger signal of administrative ability than for lower-scoring candidates.

5.5 Discrimination in civil service exams

Some modern bureaucracies have resisted adopting civil service exams due to concerns that they may discriminate against and systematically disadvantage certain groups. While early exams for the ICS were open to all subjects of the British Empire, they were designed to test abilities across academic subjects emphasized in British education, such as classics or British and European history. Moreover, despite significant interest from Indians in competing for the civil service, there was no ICS exam held in India until 1922, nearly seventy years after the introduction of the competition.

To examine whether this may have systematically disadvantaged Indians, and by how much, I test for differences in the average performance of successful Indian candidates on their probationary exams, compared with their British counterparts. I report these average differences in Table 7; I

find that, conditional on selection, Indian officers substantially outperform British officers. Across all subjects, they score more than 22 percentage points higher (column 1), or nearly one and a half standard deviations more, a result which is driven by their competencies in exams on languages. The performance of Indian officers on these exams is dramatically better, working out to roughly three standard deviations greater than the average British officer (column 5). Performance in law (column 2) is roughly on par across both groups, and performance on history and geography of India is one standard deviation higher for Indian officers (column 3), though this result is not statistically significant. British officers score significantly higher only in economics, by more than two standard deviations (column 4). These results imply that a large number of Indian candidates may have been rejected in favor of British officers of lesser talent for administration on the subcontinent, and suggest that concerns about discrimination in modern civil service exams may be entirely warranted.

I find similarly disconcerting evidence in examining the predictive power of the civil service exam scores among selected Indian candidates on probationary exam performance, which I report in Table A9. The performance elasticity in the average subject for selected Indian officers is close to zero (column 1), driven by a markedly lower and possibly negative performance elasticity in languages (column 5). Only the performance elasticity of Indian candidates in economics is clearly higher (column 4), while elasticities in history and geography (column 3) and law (column 2) remain similar to those of selected British officers, suggesting that, in addition to potentially filtering out highly talented Indian candidates, these early civil service exams may have also offered a much poorer signal of the performance-relevant abilities among Indian candidates. Despite this result, selection may still have been efficient if it sufficiently screened Indian candidates for other qualities such as loyalty which were critical for performance, though I am unable to offer a decisive answer to this question.

6 Conclusion

I have evaluated the differences between two of the most common strategies for recruitment in modern bureaucracies. These practices represent the two extremes through which civil servants may be selected: either by unbridled discretionary appointments such as patronage, or by their performance on an objective metric such as a civil service exam. Civil service exams are the clear winner in the setting which I have studied, and the results suggest that strategies which rely more heavily on objective metrics than on political discretion can improve public sector performance. However, I also find evidence that selection purely on the basis of exam performance may result in the exclusion of certain high-ability groups from the civil service. Strategies to address these

limitations further may therefore select higher-performing civil servants, though I leave this as an important question for further research.

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Figures

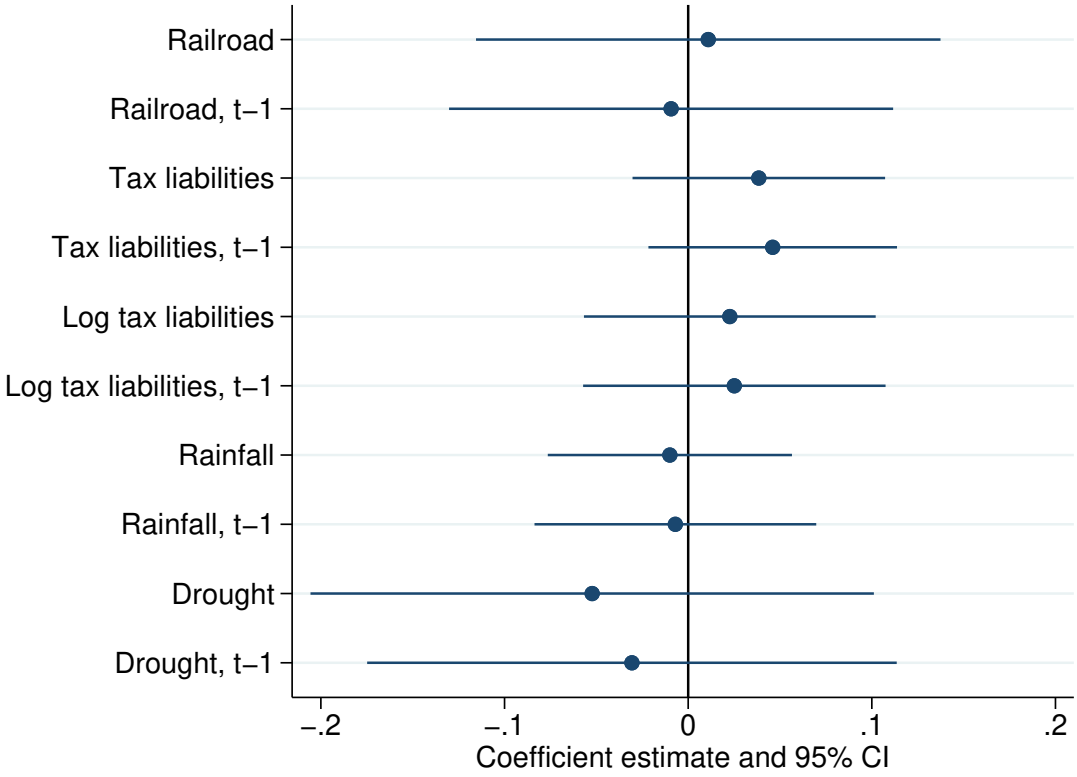


Figure 1: Balance tests: standardized coefficient estimates

Notes: Each row plots the coefficient estimate, β_1 from Equation 1, and its 95% confidence interval from a regression of each standardized district characteristic on an indicator of whether the district officer was selected by a civil service exam. All specifications include district and year fixed effects. The outcomes are standardized by subtracting the mean and dividing by the standard deviation of the outcome in the full panel; observations for lagged variables are missing in some years and therefore omitted from this operation and from the regression. Data on railroads are from Donaldson (2018) and indicate whether the district was connected to the railroad network in the respective year; tax liabilities refers to the total land taxes owed to the British government in the current or prior year based on tax assessments from previous years; rainfall is the number of inches of rain in the district-year; drought is an indicator of whether the district's rainfall fell at least one standard deviation below its mean within the district. Standard errors are clustered by district.

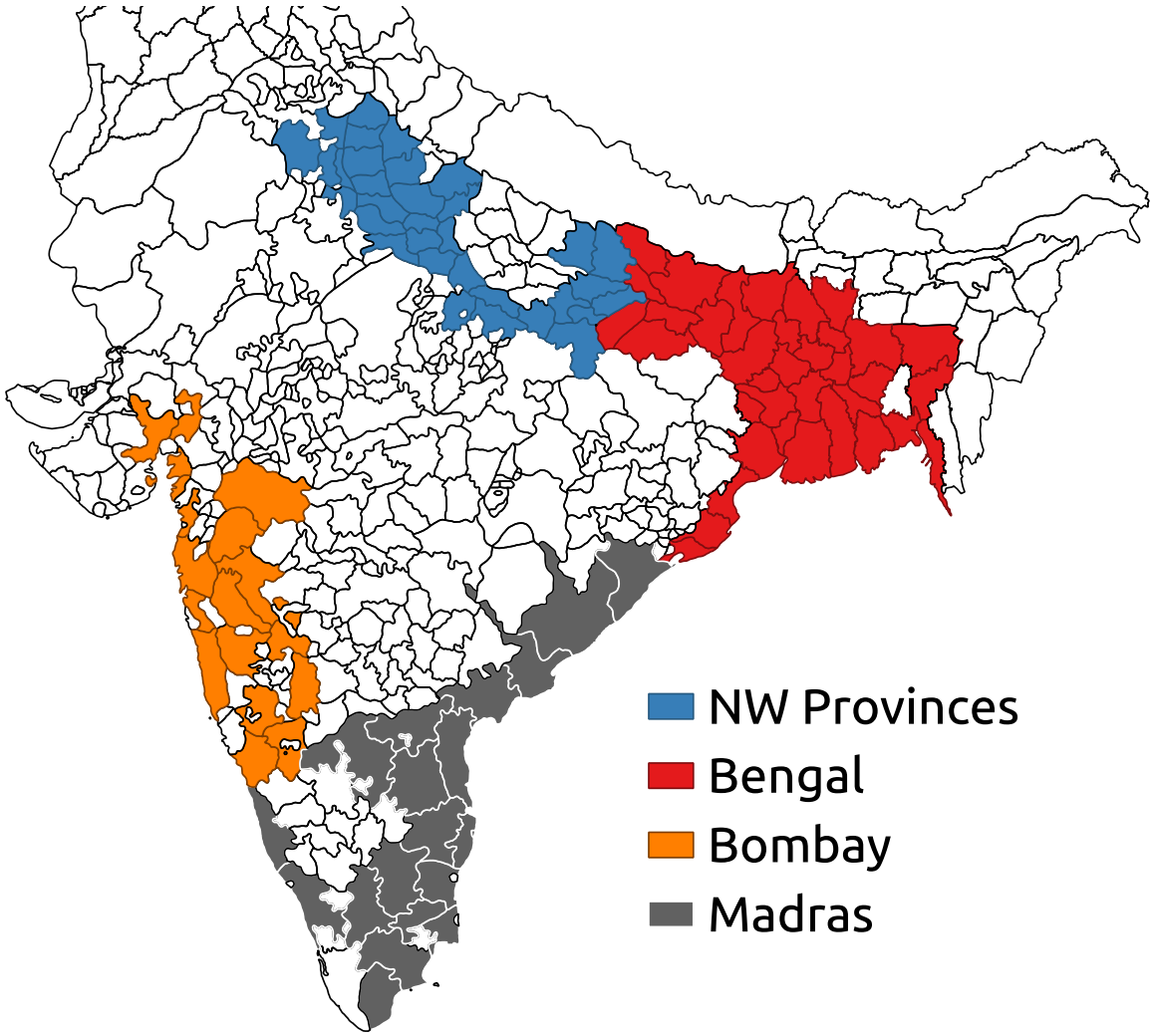
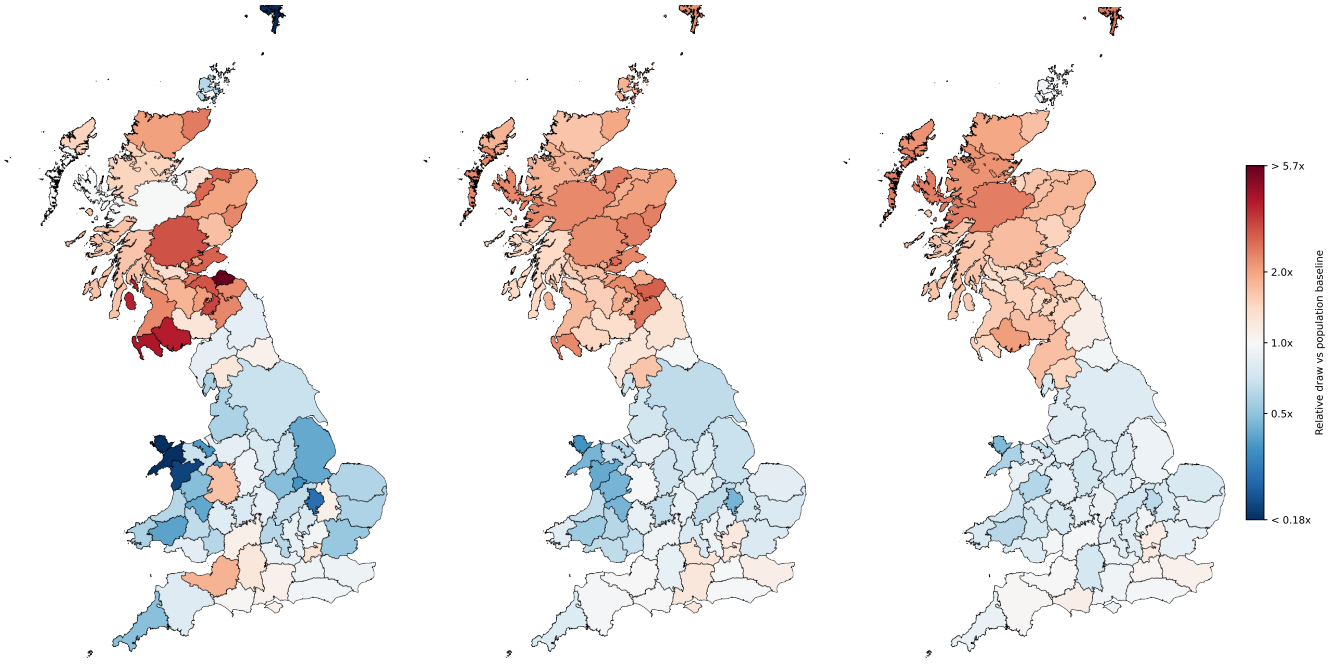


Figure 2: Districts and provinces under civil service administration

Notes: Figure illustrates the boundaries of the districts and provinces of much of the territory of south Asia under either British rule or administered by various semi-independent princely states as of the mid-1870's. Regions administered by the civil service of the British colonial government are shaded in blue (Northwest Provinces), red (Bengal), orange (Bombay), and grey (Madras). Other regions (white) were non-regulation provinces administered primarily by the British military or by princely states.



(a) EIC Directors (b) Patronage appointees (c) Civil service exam appointees

Figure 3: Surname distributions across counties in Great Britain

Notes: Sub-figure (a) shows the relative geographic concentration of family names of EIC Directors, and sub-figures (b) and (c) show the geographic concentration of family names of selected civil servants. For each director surname from 1834-1858, or civil servant surname appointed during the last 25 years of patronage or first 25 years of competitive exams, I calculate the probability that their surname corresponds to each county, according to the distribution of surnames across the entire population at the time of the 1881 census. I average these probabilities across all appointees in each list to obtain a county share for the full group, which I normalize by dividing by the share of the full population that resided each county in 1881. Counties in red are overrepresented relative to a random draw from the population; counties shown in blue are underrepresented; and counties show in white are roughly line with the population baseline. Darker shades indicate larger departures from parity.

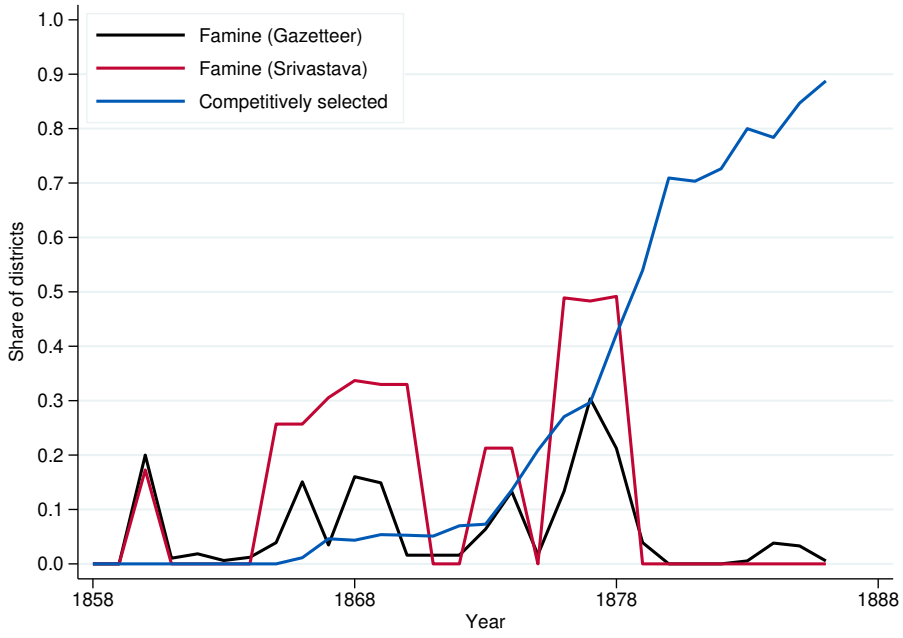


Figure 4: Annual share of districts affected by famine and competitively-selected district officer

Notes: Figure plots the annual share of districts affected by famine, either measured by Nathan et al. (1909) or from Srivastava (1968), as well as the share of district officers selected through civil service exams, over the period 1858 to 1885.

Tables

Table 1: Summary Statistics: Demographics, Exam Scores, Outcome Variables in District Officer Panel

Variable	Mean	SD	Min	Max	N
Panel A: Collector demographics					
Selected by competitive exam	0.18	0.39	0.00	1.00	3,169
EIC director surname match	0.20	0.40	0.00	1.00	3,169
Competitive x director surname	0.01	0.12	0.00	1.00	3,169
Exam score (%)	4.40	9.61	0.00	42.30	3,169
Officer experience (years)	21.2	5.0	5	46	3,169
Panel B: Tax Outcomes					
Uncollected tax liabilities ('000s Rs)	84.3	165.8	0.0	1,718	3,169
Share of tax liabilities collected	0.94	0.12	0.06	1.00	3,169
Commended for good performance	0.25	0.43	0.00	1.00	1,437
Panel C: Famine Outcomes					
Any famine (Gazetteer)	0.09	0.28	0.00	1.00	3,169
Famine intensity (Gazetteer)	0.05	0.17	0.00	0.88	3,169
Any famine (Srivastava)	0.16	0.37	0.00	1.00	2,492
Famine intensity (Srivastava)	0.07	0.19	0.00	1.00	2,492
Panel D: Coercive-Process Outcomes					
Property sold, estimated ('000s Rs)	20.8	38.3	0.0	307.0	467
Property sold, actual ('000s Rs)	19.2	33.1	0.0	220.8	467
Villages settled by collector	481.8	456.0	0	3,712	578
Total villages settled	1,427.5	920.1	19	4,952	578

Notes: Table presents summary statistics of district officer characteristics and outcome variables, as well as percentage score on civil service entrance exam. District officers selected by patronage are assigned a percentage score of zero. EIC director surname match is an indicator of whether the officer shared a surname with an EIC director. Uncollected tax liabilities are the number of outstanding land tax debts which were not collected within the revenue year, the share of liabilities collected is the share of these same debts which were collected within the revenue year, and commendations refer to whether the district officer was named for good performance over this same period. Gazzetteer refers to text-based measures from Nathan et al. (1909), while Srivastava refers to measures obtained from maps published in Srivastava (1968). Property sold refers to the estimated or actual sale value of property seized from defaulted taxpayers and sold by revenue officials within the revenue year; number of villages refers to either the number of villages visited by the district officer or total visited by any member of their revenue office.

Table 2: Summary Statistics: Exam Scores and Demographics, Candidates Selected for Civil Service

Variable	Mean	SD	Min	Max	N
Open Competitive Exam (1855-1879)					
Total points	1,569	364	913	3,200	1,047
Percentage score (%)	24.1	5.2	15.9	47.9	1,047
Percentile rank	0.14	0.11	0.00	0.51	1,047
Surge hire (1=Yes)	0.19	0.39	0.00	1.00	1,047
Indian officer (1=Yes)	0.01	0.10	0.00	1.00	1,047
Final Probationary Exam (1859-1879)					
Total points	1,788	445	924	3,628	890
Percentage score (%)	61.4	9.1	35.0	85.7	890
Final Exam by Subject, Percentage Score (1859-1879)					
History & Geography	57.0	12.5	22.0	94.3	890
Law	64.8	9.2	34.3	91.1	890
Political Economy	55.9	19.1	14.0	97.7	890
Hindustani	67.1	11.1	21.2	94.9	688
Sanskrit	48.6	24.3	0.0	99.2	270
Hindi	66.3	11.7	26.2	87.0	222
Persian	62.5	15.7	0.0	89.2	196
Bengali	62.8	17.9	0.0	94.8	167
Telugu	75.5	13.8	37.4	96.0	140
Tamil	65.7	15.5	7.0	97.8	104
Marathi	70.3	14.6	10.2	94.0	89
Gujarati	69.6	12.8	31.4	93.2	67
Arabic	64.4	15.3	32.5	89.4	44
Braj Bhasha	60.8	11.8	27.8	85.0	29
Canarese	51.0	17.4	23.5	73.0	13
Malayalam	36.0	17.0	14.0	59.2	9
Geology	28.4	30.1	2.9	81.4	6
Ooriya	20.1	12.8	8.5	34.2	4
Zoology	77.1	6.1	72.9	81.4	2
Botany	47.1	.	47.1	47.1	1

Notes: Table presents summary statistics of total and percentage points earned on initial entrance exams and subsequent probationary exams, "open competitive exam," for candidates selected for the civil service, as well as percentile rank in the initial exam, an indicator for whether the civil servant was a selective hire, and an indicator for whether the civil servant had an Indian surname. Selective hire refers to those candidates whose percentile rank on the exam would have warranted entry into the civil service in any year over the period 1864-1879, after an initial hiring surge. Probationary exams were waived for civil servants selected from 1855 to 1858 and therefore scores on these exams are only reported for candidates selected from 1859 onwards.

Table 3: Relative Differences in Tax Collections and Performance Commendations

	Uncollected tax liabilities ('000s Rs) (1)	Share of liabilities collected (2)	Commended for good performance (3)
Selected by competitive exam	-0.807	0.00580	0.176***
	(14.26)	(0.0107)	(0.0578)
Observations	3170	3170	1437
Outcome mean, patronage	84.25	0.94	0.25
Outcome SD, patronage	165.7	0.12	0.43
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of revenue output or performance on an indicator of whether the district officer was selected by their performance on a civil service exam. Uncollected tax liabilities are the number of outstanding land tax debts which were not collected within the revenue year, the share of liabilities collected is the share of these same debts which were collected within the revenue year, and commendations refer to whether the district officer was named for good performance over this same time period. All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table 4: Relative Differences in Revenue System Operations, Madras

	Property value (estimated) '000s Rs) (1)	Property value (actual) '000s Rs) (2)	Villages settled by dist. officer (count) (3)	Total villages settled (count) (4)
Selected by competitive exam	20.67*	12.31	22.96	47.76
	(11.20)	(10.81)	(68.79)	(84.38)
Observations	466	466	579	579
Outcome mean, patronage	20.86	19.24	482.1	1,426.5
Outcome SD, patronage	38.33	33.14	455.7	919.5
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of the value of property defaulted by indebted taxpayers and sold within the revenue year, or the number of villages visited by the district officer or a member of their revenue office, on an indicator of whether the district officer was selected by their performance on a civil service exam. Observations are less than in the full sample because this data is only available for a selection of years in Madras, and property values were additionally not reported for several of these years. All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table 5: Relative Differences in Famine Incidence and Intensity

	Gazetteer		Srivastava	
	Incidence (1)	Intensity (2)	Incidence (3)	Intensity (4)
Selected by competitive exam	-0.0324	-0.0225	-0.0561**	-0.0369***
	(0.0210)	(0.0138)	(0.0248)	(0.0137)
Observations	3169	3169	2492	2492
Outcome mean, patronage	0.09	0.05	0.16	0.07
Outcome SD, patronage	0.28	0.17	0.37	0.19
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of famine incidence or intensity on an indicator of whether the district officer was selected by their performance on a civil service exam. Gazzetteer refers to text-based measures from Nathan et al. (1909), while Srivastava refers to measures obtained from maps published in Srivastava (1968). All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table 6: Competitive Exam Performance and Task-relevant Performance on Probationary Exams

	Probationary exam score (%)				
	All subjects	Law	History, geography	Economics	Languages
	(1)	(2)	(3)	(4)	(5)
Open exam score (%)	0.729***	0.598***	0.727***	0.759***	0.778***
	(0.0617)	(0.0719)	(0.0952)	(0.113)	(0.101)
Observations	4716	889	889	889	2040
R-squared	0.317	0.274	0.229	0.610	0.295
Subject FE	Yes	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of subject-level percentage scores from probationary exams on the percentage score of selected candidates on their entrance exams, "open exam score". Data is available only for those candidates who were selected for civil service. All models include year-of-exam fixed effects, and models (1) and (5) include subject fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by bureaucrat, reported in parentheses.

Table 7: Average Task-relevant Performance on Probationary Exams, Indian vs. British Officers

	Probationary exam score (%)				
	All subjects	Law	History, geography	Economics	Languages
	(1)	(2)	(3)	(4)	(5)
Indian officer	22.55**	-2.330	12.70	-48.37**	54.82**
	(11.15)	(18.01)	(24.88)	(18.85)	(23.69)
Observations	4716	889	889	889	2040
Mean, British	61.13	64.81	56.88	55.77	63.83
SD, British	15.97	9.190	12.51	19.05	16.97
Subject FE	Yes	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.321	0.274	0.236	0.611	0.305

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of subject-level percentage scores from probationary exams on the and indicator of whether the candidate had an Indian surname. Data is available only for those candidates who were selected for civil service. All models include year-of-exam fixed effects, and models (1) and (5) include subject fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by bureaucrat, reported in parentheses.

A Appendix

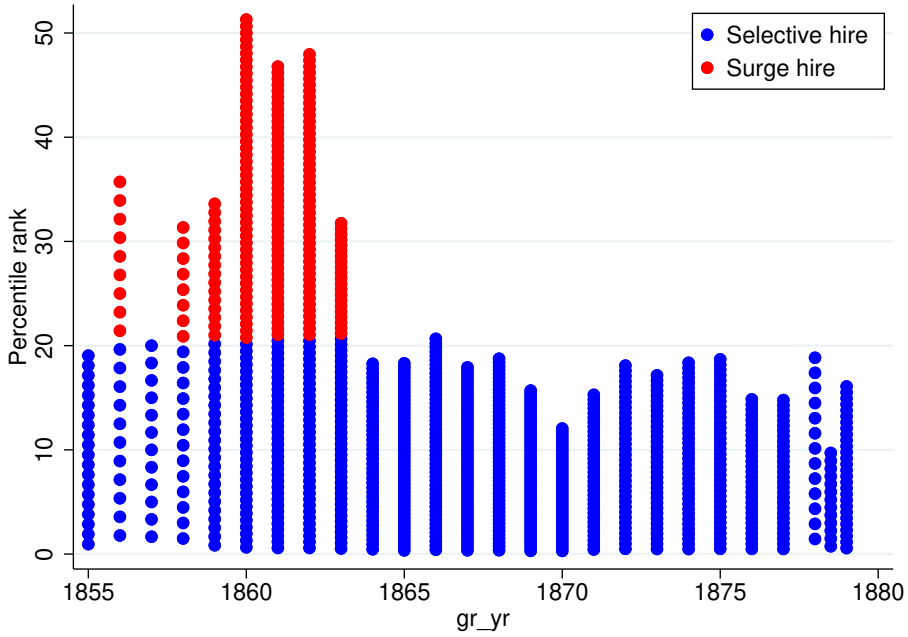


Figure A1: Annual percentile rank of selected candidates in ICS competition, 1855 to 1879

Notes: Figure shows the percentile ranks of selected candidates from each civil service exam administered over the period from 1855 to 1879. Surge hires refers to those early candidates who, due to shortages of civil servants in the ICS in India, were selected for service, but whose percentile rank would not have warranted selection in any other exam administered between 1864 and 1879. Selective hires are those candidates whose percentile rank would have warranted selection in at least one exam administered between 1864 and 1879.

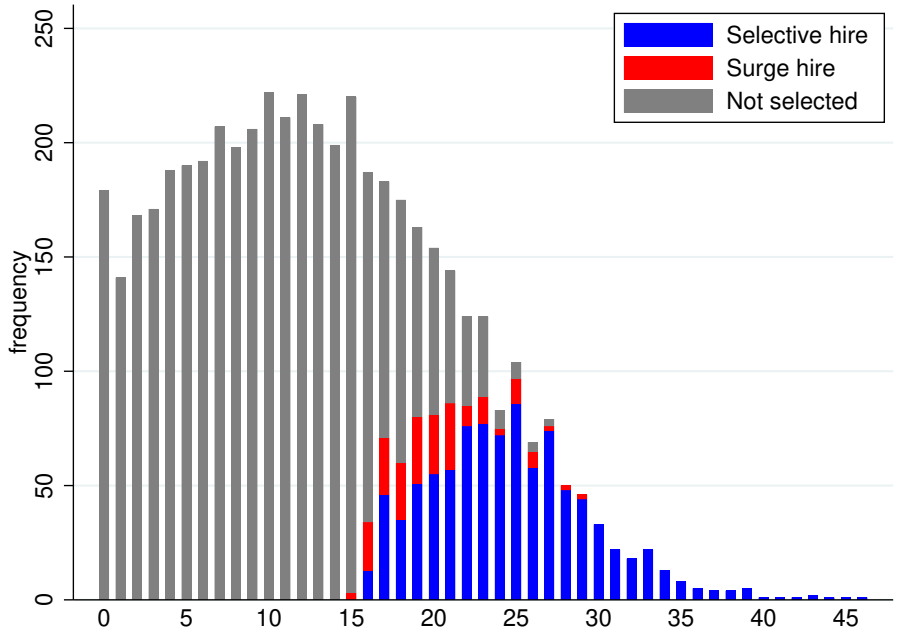


Figure A2: Histogram of candidate percentage scores in ICS open competition, 1855 to 1879

Notes: Figure presents a histogram of percentage scores of successful and unsuccessful candidates across civil service exams administered over the period from 1855 to 1879. Surge hires refers to those early candidates who, due to shortages of civil servants in the ICS in India, were selected for service, but whose percentile rank would not have warranted selection in any other exam administered between 1864 and 1879. Selective hires are those candidates whose percentile rank would have warranted selection in at least one exam administered between 1864 and 1879.

Table A1: Director and civil servant surname connections across counties of Great Britain

	Relative county connection		
	Patronage	CS exam	Patronage - CS exam
	(1)	(2)	(3)
Director, relative county connection	0.411***	0.255***	0.156***
	(0.0852)	(0.0529)	(0.0500)
Observations	85	85	85
R-squared	0.442	0.346	0.206
Outcome mean	1.2697	1.1705	0.0992
Outcome SD	0.6424	0.4503	0.3569

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficients and heteroskedastic-robust standard errors from a regression of the county-level relative connectedness of the surnames of civil servants appointed either (1) during the last 25 years of patronage, (2) during the first 25 years of civil service exams, or (3) the difference of these two measures, on the county-level relative connectedness of the surnames of EIC Directors from 1834-1858. I measure relative connectedness to each county first by taking each director surname from 1834-1858, or each civil servant surname appointed during the last 25 years of patronage or first 25 years of competitive exams, obtaining the probability that their surname corresponds to each county according to the distribution of surnames across counties in the 1881 census. I average these probabilities across all appointees in each list to obtain a county share for the full group, which I normalize by dividing by the share of the full population that resided each county in 1881. Patronage refers to the last 25 years of civil servants appointed by patronage, and CS exam refers to the first 25 years of civil servants selected for their performance on civil service exams.

Table A2: Balance of District Characteristics

Variable	Coef. (SE)	Mean (SD)	Observations
Railroad	0.005	0.392	3,146
	(0.031)	(0.488)	
Railroad, t-1	-0.004	0.372	3,146
	(0.029)	(0.483)	
Tax liabilities	32.070	1457.496	3,171
	(28.922)	(833.730)	
Tax liabilities, t-1	38.691	1459.598	2,995
	(28.695)	(840.536)	
Log tax liabilities	0.016	14.007	3,171
	(0.028)	(0.690)	
Log tax liabilities, t-1	0.017	14.006	2,995
	(0.029)	(0.693)	
Rainfall	-0.294	51.749	3,099
	(0.989)	(29.483)	
Rainfall, t-1	-0.207	52.034	2,927
	(1.149)	(29.711)	
Drought	-0.018	0.139	3,099
	(0.027)	(0.346)	
Drought, t-1	-0.011	0.147	2,927
	(0.026)	(0.354)	

Notes: * p < 0.1, ** p < 0.05, *** p < 0.01. Table reports means and standard deviations of time-varying district characteristics, as well as coefficient estimates and standard errors from a regression of each characteristics an indicator of whether the district officer was selected by civil service exam. All specifications include district and year fixed effects. Data on railroads are from Donaldson (2018) and indicate whether the district was connected to the railroad network in the respective year; tax liabilities refers to the total land taxes owed to the British government in the current or prior year based on tax assessments from previous years; rainfall is the number of inches of rain in the district-year; drought is an indicator of whether the district's rainfall fell at least one standard deviation below its mean within the district. Observations differ from the full panel (N=3,171) due to missing data. Standard errors are clustered by district.

Table A3: Indian Civil Service examination and probation regimes, 1855–1882

Period	Implementation of competitive selection exams and probationary secondary exams
1855–1857	Entry by open competitive examination in a broad range of liberal subjects. Initial plans for further examination in India-specific subjects are temporarily abandoned due to staffing demands in India.
1858	Candidates enter through a general competitive examination, but those selected for Bengal are required to pass a short "further examination" in English composition, the history and geography of India, and the elements of Bengali or Hindustani.
1859–1864	A stable two-stage system becomes standard; after open competitive examination, those selected for the ICS spend a year preparing for a scored further examination in Sanskrit or vernacular languages, Indian history and geography, jurisprudence and Hindu/Mohammedan law, and political economy. Service seniority is determined by performance on this second examination. The first Indian, Satyendranath Tagore, succeeds in the 1863 ICS competition.
1865–1871	The system is reorganized to include a two-year probation in Britain before departure to India. Law becomes a central component of probationary study, and in practice probationers are expected to pass in two vernacular languages.
1872–1877	The two-year probation and repeated examinations continue, but the language regime is relaxed; selected candidates are required to pass in only one vernacular language, while probationers are allowed the option to take additional languages for further marks in determining seniority. The general structure of probationary study remains centered on law, Indian history and geography, languages, and political economy.
1878–1879	The age of entry is lowered and probationary period remains two years, but becomes more closely linked to coursework at approved universities and colleges.

Notes: Table summarizes the various details of the implementation of civil service exams for the Indian Civil Service, over the period from 1855 to 1879, as described in the annual reports of the Civil Service Commissioners.

Table A4: Relative Differences in Tax Collections and Performance Commendations, Heterogeneity by Competitive Exam Score

	Uncollected tax liabilities ('000s Rs) (1)	Share of liabilities collected (2)	Commended for good performance (3)
Selected by competitive exam	-11.19	0.0401	-0.120
	(48.45)	(0.0275)	(0.186)
Exam score	0.212	-0.00105	0.0104
	(1.627)	(0.000986)	(0.00733)
Treatment effect, at p5 exam score	-7.589	0.022*	0.077
	(23.178)	(0.013)	(0.065)
Treatment effect, at p95 exam score	-4.061	0.005	0.238**
	(15.761)	(0.013)	(0.091)
5th percentile exam score	17.003	17.003	19.010
95th percentile exam score	33.658	33.658	34.481
Observations	3170	3170	1437
Outcome mean, patronage	84.25	0.94	0.25
Outcome SD, patronage	165.7	0.12	0.43
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of revenue output or performance on an indicator of whether the district officer was selected by their performance on a civil service exam and on their exam percentage score. Bureaucrats selected by patronage are assigned a percentage score of zero, so that coefficients for exam score are estimated only across competitively-selected officials. Uncollected tax liabilities are the number of outstanding land tax debts which were not collected within the revenue year, the share of liabilities collected is the share of these same debts which were collected within the revenue year, and commendations refer to whether the district officer was named for good performance over this same time period. All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table A5: Relative Differences in Tax Collections and Performance Commendations, Heterogeneity by Shared Surname with East India Director

	Uncollected tax liabilities ('000s Rs) (1)	Share of liabilities collected (2)	Commended for good performance (3)
Selected by competitive exam	-2.578	0.0129	0.169***
	(15.78)	(0.0109)	(0.0575)
EIC director surname	-3.383	0.00661	0.0841*
	(7.580)	(0.00489)	(0.0457)
Competitive × director surname	-37.04*	0.0137	-0.0298
	(20.21)	(0.0146)	(0.113)
Relative treatment effect, director-surname matches	-39.622**	0.027**	0.140
	(17.889)	(0.013)	(0.109)
Observations	3170	3170	1437
Outcome mean, patronage	84.25	0.94	0.25
Outcome SD, patronage	165.7	0.12	0.43
District FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of revenue output or performance on an indicator of whether the district officer was selected by their performance on a civil service exam, an indicator of whether the officer shared a surname with an EIC director, and their interaction. Relative treatment effect is the sum of the competitively-selected indicator and the interaction term. Uncollected tax liabilities are the number of outstanding land tax debts which were not collected within the revenue year, the share of liabilities collected is the share of these same debts which were collected within the revenue year, and commendations refer to whether the district officer was named for good performance over this same time period. All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table A6: Relative Differences in Famine Incidence and Intensity, Heterogeneity by Competitive Exam Score

	Gazetteer		Srivastava	
	Incidence (1)	Intensity (2)	Incidence (3)	Intensity (4)
Selected by competitive exam	0.0249	-0.00356	0.0878	0.0180
	(0.0698)	(0.0434)	(0.0611)	(0.0376)
Exam score	-0.00225	-0.000745	-0.00567**	-0.00216
	(0.00257)	(0.00149)	(0.00248)	(0.00135)
Treatment effect at p5 exam score	-0.013	-0.016	-0.009	-0.019
	(0.031)	(0.021)	(0.027)	(0.018)
Treatment effect at p95 exam score	-0.051*	-0.029*	-0.103***	-0.055***
	(0.029)	(0.016)	(0.036)	(0.017)
5th percentile exam score	17.003	17.003	17.003	17.003
95th percentile exam score	33.658	33.658	33.658	33.658
Observations	3169	3169	2492	2492
Outcome mean, patronage	0.09	0.05	0.16	0.07
Outcome SD, patronage	0.28	0.17	0.37	0.19
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of famine incidence or intensity on an indicator of whether the district officer was selected by their performance on a civil service exam and on their exam percentage score. Bureaucrats selected by patronage are assigned a percentage score of zero, so that coefficients for exam score are estimated only across competitively-selected officials. Gazzetteer refers to text-based measures from Nathan et al. (1909), while Srivastava refers to measures obtained from maps published in Srivastava (1968). All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table A7: Relative Differences in Famine Incidence and Intensity, Heterogeneity by Shared Surname with East India Director

	Gazetteer		Srivastava	
	Incidence	Intensity	Incidence	Intensity
	(1)	(2)	(3)	(4)
Selected by competitive exam	-0.0323	-0.0224	-0.0404	-0.0274*
	(0.0213)	(0.0140)	(0.0250)	(0.0147)
EIC director surname	-0.00135	-0.00254	0.0520*	0.0249
	(0.0163)	(0.0110)	(0.0269)	(0.0154)
Competitive × director surname	-0.00221	-0.00344	-0.0891**	-0.0632***
	(0.0416)	(0.0213)	(0.0414)	(0.0212)
Relative treatment effect, director-surname matches	-0.035	-0.026	-0.130***	-0.091***
	(0.042)	(0.023)	(0.041)	(0.019)
Observations	3169	3169	2492	2492
Outcome mean, patronage	0.09	0.05	0.16	0.07
Outcome SD, patronage	0.28	0.17	0.37	0.19
District FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from a regression of a measure of famine incidence or intensity on an indicator of whether the district officer was selected by their performance on a civil service exam, an indicator of whether the officer shared a surname with an EIC director, and their interaction. Relative treatment effect is the sum of the competitively-selected indicator and the interaction term. Gazzetteer refers to text-based measures from Nathan et al. (1909), while Srivastava refers to measures obtained from maps published in Srivastava (1968). All models include district and year fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by district, reported in parentheses.

Table A8: Competitive exam performance and task-relevant performance on probationary exams, heterogeneity by selective hire

	Probationary exam score (%)				
	All subjects	Law	History, geography	Economics	Languages
	(1)	(2)	(3)	(4)	(5)
Open exam score (%)	0.764***	0.632***	0.782***	0.798***	0.796***
	(0.0690)	(0.0814)	(0.111)	(0.119)	(0.110)
Selective hire	-2.462	-3.947	7.913	-2.788	-9.384
	(5.834)	(6.791)	(8.410)	(11.94)	(9.523)
Score (%) × Selective	0.191	0.260	-0.338	0.205	0.532
	(0.283)	(0.342)	(0.407)	(0.585)	(0.468)
Observations	4716	889	889	889	2040
R-squared	0.318	0.276	0.230	0.611	0.295
Subject FE	Yes	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from regression of subject-level percentage scores from probationary exams on the percentage score of selected candidates on their entrance exams ("open exam score"), an indicator for whether the candidate's percentile rank in the exam would not have warranted selection over the period 1864-1879, and its interaction with the entrance exam score. Data is available only for those candidates who were selected for civil service. All models include year-of-exam fixed effects, and models (1) and (5) include subject fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by bureaucrat, reported in parentheses.

Table A9: Competitive exam scores and task-relevant performance on probationary exams, heterogeneity by Indian officer

	Probationary exam score (%)				
	All subjects	Law	History, geography	Economics	Languages
	(1)	(2)	(3)	(4)	(5)
Open exam score (%)	0.720***	0.597***	0.718***	0.747***	0.767***
	(0.0622)	(0.0724)	(0.0958)	(0.114)	(0.101)
Indian officer	22.55**	-2.330	12.70	-48.37**	54.82**
	(11.15)	(18.01)	(24.88)	(18.85)	(23.69)
Score (%) × Indian	-0.566	0.107	-0.114	2.174***	-1.753*
	(0.449)	(0.714)	(1.088)	(0.811)	(0.919)
Predicted score elasticity, Indian officer	0.153	0.705	0.605	2.922***	-0.987
	(0.441)	(0.708)	(1.082)	(0.801)	(0.911)
Observations	4716	889	889	889	2040
Mean, British	61.133	64.811	56.884	55.769	63.831
SD, British	15.972	9.190	12.508	19.051	16.966
Subject FE	Yes	No	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R-squared	0.321	0.274	0.236	0.611	0.305

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Table reports coefficient estimates from regression of subject-level percentage scores from probationary exams on the percentage score of selected candidates on their entrance exams ("open exam score"), an indicator for whether the candidate had an Indian surname, and its interaction with the entrance exam score. Data is available only for those candidates who were selected for civil service. All models include year-of-exam fixed effects, and models (1) and (5) include subject fixed effects; the coefficient estimates for these variables are not reported in the table. Standard errors are clustered by bureaucrat, reported in parentheses.