Civil Service Reform and Bureaucratic Performance: Evidence from the 1883 Pendleton Act*

Diana Moreira
UC Davis

Santiago Pérez
UC Davis and NBER

PRELIMINARY AND INCOMPLETE: DO NOT CITE

Abstract

How do civil service reforms affect the personnel outcomes and performance of government organizations? We study the consequences of the 1883 Pendleton Act on the functioning of the US customhouses. The act required customhouses with 50 or more employees to recruit workers through competitive exams, but exempted the smaller ones. We collect personnel records and information on receipts and expenses to compare the functioning of exempted and non-exempted customhouses, before and after the reform. Employees in reformed customhouses stayed longer in their jobs and had stronger professional backgrounds. However, these improvements did not translate into greater cost-effectiveness at collecting revenue. We explore the interplay between the reformed mid-tier bureaucrats and the non-reformed tiers of the bureaucracy as a potential explanation of why revenue per dollar spent did not increase with the reform.

*dsmoreira@ucdavis.edu, seperez@ucdavis.edu. We thank Luiza Aires and Lisa Pacheco for outstanding research assistance, and Enrique Pérez for help with data collection. We have benefited from comments of Chris Meissner and Monica Singhal.

1 Introduction

A promise of civil service reforms that introduce merit as the main criteria for hiring is that doing so would enable governments to attract and retain more qualified employees. This professionalization, in turn, would translate into improvements in bureaucratic performance. While civil service reforms have been shown to improve bureaucratic performance in some contexts (Xu *et al.* (2018), Ornaghi (2016)), these reforms appear to be no silver bullet: In an assessment of 71 civil service reforms funded by the World Bank from 1999 to 2006, only 42% of the reforms were rated as successful in promoting institutional development according to an independent agency (Webb, 2008).[1] Moreover, direct evidence on whether these reforms actually enabled governments to hire and retain more qualified employees remains remarkably limited. Opening the black box of the bureaucracy can shed light on the mechanisms underlying these varying degrees of success.

This paper studies the impacts of the Pendleton Civil Service Reform Act of 1883. This act, which introduced open and competitive exams for the appointment of certain federal employees, is widely regarded as the first step towards the emergence of a modern bureaucracy in the US (Van Riper, 1976). Our analysis focuses on the effects of the act on the functioning of the US customhouses. By the early 1880s, customhouses scattered across the US collected more than half of the total revenue of the federal government. The act established that those customhouses with 50 or more employees by 1883 would become part of the "classified" civil service. Classified customhouses were required to hire some of their employees (i.e. mid-tier bureaucrats) through open and competitive exams, and were barred from dismissing them on the basis of their political affiliation. However, the reform enabled the smaller customhouses to keep hiring using patronage methods. We compare the functioning of "classified" and "non-classified" customhouses, before and after the passing of the act. Our data enable us to measure if the reform led to changes in personnel outcomes, as well as to changes in the cost-effectiveness with which customhouses collected revenue.

Proponents of civil service reform blamed patronage for the poor functioning of customhouses, and argued that the "errors and fraud" of customhouse employees implied losses of 25% in total customs revenue (House & of the Treasury, 1877; Rogers, 1921). Following mounting social and political pressure, in 1883 US Congress passed the Civil Service Reform Act. The conventional wisdom is that this reform improved the efficiency of the federal bureaucracy in general, and of customhouses in particular. For instance, Johnson & Libecap (1994b) argue that: "There is evidence that the reforms introduced by the Pendleton Act improved the performance of federal workers in the positions that were covered by the law."[2] The 15th report of the Civil Service commission stated that the reform resulted in a 25% decline in the cost of collecting customs revenue, which implied $2 million annual savings in the collection of customs (US Civil Service Commission, 1884).[3]

To conduct our analysis, we have combined data from a number of different sources: First,

[1] Schuster (2017) reports that, out of 117 countries for which data are available, 94 had laws establishing merit-based hiring in the public sector by 2015.

[2] Examples of similar quotes can be found in Fish (1905) and Van Riper (1976).

[3] This corresponds to roughly $50 million in 2020 US dollars.

we have collected the personnel records of all employees of the US federal government (including customhouse employees) from 1871 to 1893, using newly-digitized data from the "Official Registers of the United States" (Department of the Interior, 1871-1893). These records include a person's name, place of employment, position and salary. These data enable us to observe the complete personnel structure of the different customhouses, as well as to track a workers' careers within the civil service. Second, we have collected additional information on the professional background of some of these employees by linking the Registers to the 1850, 1860, 1870 and 1880 US censuses of population, using name-based matching techniques (Abramitzky *et al.* , 2019). With these data, we are able to assess the degree to which the reform brought an improvement in the professional background of customhouse employees. Finally, we have collected data on the expenses and receipts of each US customhouse from 1874 to 1893, using the "Annual report of the Secretary of the Treasury on the state of the finances" (US Congress, 1874-1893). Using these data, we are able to test if reformed customhouses became more cost-effective at collecting revenue.

Our identification strategy exploits the fact that only those customhouses that had 50 or more employees by 1883 were required to hire through examinations, whereas the smaller customhouses were exempted from this requirement. We use this feature of the reform to estimate a difference-in-differences model, comparing the functioning of customhouses that were subject to the reform to those that were not, before and after the passing of the reform. Our identification assumption is that, in the absence of the reform, the outcomes of customhouses that were above the 50 employees cutoff by 1883 would have evolved similarly than the outcomes of the customhouses that were below. To make this assumption more plausible, throughout the analysis we restrict the comparison group to the exempted customhouses that had at least 10 employees by 1883. We show that the outcomes of these two groups of customhouses evolved similarly prior to the reform with respect to all of the main outcomes that we include in our analysis. To further validate our empirical strategy, we estimate the "effects" of placebo reforms using alternative cutoffs for the number of employees above which a customhouse would have been required to hire through exams.

We start by analyzing the effects of the reform on the personnel outcomes of reformed customhouses. We find that the reform led to improvements along two main dimensions. First, employees in reformed customhouses were more likely to stay longer in their jobs. The reduction in turnover is sizable: customhouse employees were 12 percentage points less likely to leave their jobs (a 25% reduction) after the reform. This decline in turnover is particularly strong in years in which the Federal administration went from Republican to Democratic hands (and vice versa), suggesting that the reform was successful in reducing politically motivated dismissals. Also consistent with the decline in turnover operating through a reduction in patronage, we find that the decline is concentrated among workers in positions that were subject to exams (that is, those positions that the law explicitly protected from political influence).

Second, we document an improvement in the professional background of newly hired customhouse employees. Newly hired employees in reformed customhouses were more likely to have held a professional occupation, and were less likely to report an unskilled or no occupation prior

to joining the customs service. This improvement took place *only* among employees who were hired in positions that were subject to examination. In contrast, there is more limited evidence of an improvement in the professional background of the *average employee*, which includes employees hired prior to the reform as well as employees hired after the reform but in positions exempted from exams.

We next ask if the reform led to increased cost-effectiveness in the collection of revenue. We expect the reform to affect cost effectiveness through three main channels. First, limiting the room for patronage might have led to reduced incentives to hire employees with the sole purpose of rewarding political loyalty, hence curtailing operating expenses. Second, hiring on the basis of merit has been hypothesized to reduce corruption by creating a separation between politicians and bureaucrats, thus making it harder to coordinate on corrupt behavior (Dahlström *et al.* , 2012).[4] Third, a classic argument going back to Weber (1978) posits that a bureaucracy that is insulated from political influence would develop an *esprit de corps* that emphasizes integrity and effort in public service: Only high-skilled and experienced employees may be able to carefully implement the complex and highly specific procedures that characterize bureaucracies (Wilson, 2019), as well as revise existing (possibly inefficient) processes in place.

We start by showing limited effects of the reform on customhouses total expenses: Our results enable us to rule out a reduction in expenses that was larger than 14%. In other words, the reform did not seem to substantially reduce the incentives to inflate the bureaucracy and its operating expenses by rewarding loyalists with a job. Indeed, consistent with this lack of reduction in expenses, the reform did not decrease the total number of employees deployed in each customhouse. Similarly, the effect on the total revenue collected by customhouses was also small and not significant statistically. Finally, not surprisingly given the limited effects on both expenses and receipts, we also see no evidence of an improvement in the "cost to collect".

In the last part of the paper, we explore the question of why revenue per dollar did not seem to respond to the improvement in the professional background of employees and the reduction in turnover. We argue that the interplay between the reformed mid-tier bureaucrats and the non-reformed tiers of the bureaucracy is a key explanation for this pattern. The reform targeted employees in mid-tier positions, but exempted employees below a salary threshold as well as those employees at the top of the customhouse's hierarchy. This feature of the Pendleton Act is not uncommon in other civil service reforms, in which patronage and merit-based hires are allowed to coexist within the same organization.[5]

We start by showing that reformed customhouses changed their mix of positions in favor of

[4]Indeed, meritocratic appointments have been empirically associated to lower corruption among public officials (Rauch & Evans, 2000; Dahlström *et al.* , 2012; Meyer-Sahling *et al.* , 2018).

[5]Scholars in public sector administration refer to the legal coexistence of patronage and merit hires as "formal political discretion" (Meyer-Sahling, 2006). For instance, Teso *et al.* (2019) documents widespread patronage in Brazil, a country with civil service exams. Brassiolo *et al.* (2020) documents a similar pattern in the context of Ecuador. Brierley (2019) shows the coexistence of patronage and merit hires in the context of Ghana. See also Grindle (2012), which presents case studies of civil service reforms across the world and similarly documents the widespread coexistence of patronage and merit-based employees.

those that could be filled through patronage appointments. Specifically, we document a sharp increase in the proportion of workers making $900 or less a year, as well as an actual *reduction* in the number of bureaucrats in mid-tier positions. Unlike employees in mid-tier positions (such as clerks and inspectors), employees earning below $900 were exempted from exams and hence could be hired through patronage even in reformed customhouses. This shift towards lower-paying positions is likely pernicious for the performance of customhouses since, not surprisingly, these employees had weaker professional backgrounds than those hired for higher paying jobs. Hence, while we do see an improvement in the professional background of the average employee hired after the reform, we find that this improvement is smaller than what it would have been had reformed customhouses maintained the distribution of workers across positions as in the pre-reform period.

Each customhouse was administered by a "collector of customs". Unlike mid-tier bureaucrats, collectors continued to be political appointees after the reform. The lack of change in how collectors were appointed is important for two main reasons: First, since collectors were responsible of hiring, politically-aligned collectors might have facilitated the distortion in personnel structure discussed above. Second, to the extent that collectors played an important role in explaining the performance of the customhouses they administered (as argued in the historical literature (Parrillo, 2013; **?**)), the lack of change in how collectors were selected might have contributed to the reform's limited effects on cost-effectiveness. While we are not able to directly assess if the limited effects of the reform on cost effectiveness were partly due to lack of change at the top of the hierarchy, we can test a necessary condition for such hypothesis to be true: Namely, that collectors should have mattered for customhouses' outcomes. Because of the potential endogeneity of who gets appointed as a collector in a given customhouse, we use deaths of collectors while in office as a shock to a customhouse leadership, a similar strategy as in Jones & Olken (2005) and Besley *et al.* (2011). This analysis is still work in progress. These findings would suggest the importance of individuals (as opposed to organizations) as a source of state effectiveness (as highlighted in Best *et al.* (2017)).

This paper makes three main contributions. First, we contribute to the literature on civil service reforms (Rauch *et al.* , 1995). In the US, state and local civil service reforms have improved electoral accountability (Folke *et al.* , 2011), reduced political electoral cycles (Bostashvili & Ujhelyi, 2019) and improved bureaucratic performance (Ornaghi, 2016).[6] Remarkably, however, none of these papers directly investigates the consequences of these reforms for the main objects that the reforms are intended to change: namely, the personnel outcomes and characteristics of appointed bureaucrats. In contrast, we are able to show how such reforms affect *both* the personnel outcomes and the overall performance of the reformed units. We do so in an important context: the ability to collect revenue is a main determinant of state capacity, and customs remain an important source of revenue in many developing countries.[7] In addition, we uncover a nuanced consequence of such

[6]There is a growing literature on patronage in developing economies context that studies the political gains of patronage practices (Teso *et al.* , 2019). (Xu, 2018) shows how a reform that prohibited patronage in the appointment of leaders of colonies in the British Empire led to greater effort to perform, and improved performance. However, these papers do not study how civil service reforms changed personnel outcomes across all layers of the bureaucracy.

[7]For instance, out of 109 countries for which the World Bank reports customs revenue as a percent of

reforms: when the reform is limited to mid-tier bureaucrats, politicians avoid the constraints to patronage by promoting greater hiring at the low-tiers of the bureaucracy. This finding is parallel to the result that state politicians in the US deviated spending towards local governments when civil service reform was passed at the state level (Ujhelyi, 2014).

Our results also shed light on the political economy behind civil service reforms. Past work has shown that civil service reforms are more likely to be adopted when the ruling party faces more competition and expects to lose in the ballot (see Folke *et al.* (2013) and Johnson & Libecap (1994a)). Our results highlight another reason for taking into account political economy aspects when analyzing the effects of civil service reforms: Politicians will be more likely to pass reforms under which they would retain discretion. To the extent that such discretion might hamper the effectiveness of reforms, this could be one reason why civil service reforms often do not lead to the anticipated improvements.[8]

More broadly, we also contribute to the growing literature on the personnel economics of the state (summarized in (Finan *et al.* , 2017)). A usual focus of this literature has been on understanding the link between how government employees are screened and their subsequent performance on the job.[9] Our results show that changes in how some bureaucrats are screened might impact the delivery of public services not only through changes in the characteristics of selected employees, but also by inducing changes in the personnel structure of the targeted organizations.

Finally, we contribute to the literature on the Pendleton Act, a landmark legislation in US history (Theriault, 2003; Johnson & Libecap, 1994a,b; Libecap & Johnson, 2007). Specifically, we provide the first quantitative evaluation of the changes brought by the Pendleton Act which, as discussed in Johnson & Libecap (1994a), has not yet been possible due to lack of adequate data. Overall, our results suggest a nuanced assessment of the consequences of the Act (at least in its first ten years); while the Act led to reduced politically-motivated dismissals and an overall professionalization of the workforce in reformed customhouses, there is more limited evidence that it led to more efficient revenue collection.[10]

total revenue, there are 39 where this proportion is above 10%, and 17 where it is above 20%. See https://data.worldbank.org/indicator/GC.TAX.IMPT.ZS. There are a number of papers focusing on revenue collection. See for instance **?**.

[8]For example, Schuster (2017) shows that there is very little association between the formal existence of a law mandating merit-based hiring in the public sector and survey answers to the question of whether hiring in the public sector is actually based on merit.

[9]See for instance Dal Bó *et al.* (2013), Deserranno (2019).

[10]There is a substantial literature in history about the Pendleton act and the civil service reform movement. See for instance Hoogenboom (1968). Van Riper (1976) presents a history of the US civil service which includes a discussion of the Pendleton act. Finally, Skowronek *et al.* (1982) discusses the development of the American state in general and includes a discussion on the civil service.

2 Historical Background

2.1 The US Customs Service

The US Customs Service was established by the Tariff Act of 1789. Revenue collected by the Customs Service accounted for the vast majority of the revenue of the US federal government in the early decades of the 19th century, and continued to account for a significant proportion throughout the 19th century.[11]

Initially, the Act established 59 collection districts throughout the country, each of which would need to be administered by a "Collector of Customs".[12] Collectors were appointed by the President for four-year term and had to be confirmed by the Senate. The law provided collectors with significant prerogatives, including the ability to appoint and to fire employees.[13]

Since its establishment, most of the revenue generated by the customs service was due to the "collection of duties" on imported goods. Hence, to understand why changing the method for appointing employees could have led to improvements in cost-effectiveness it is important to first understand the procedure through which these duties were collected in the late 19th century. The key take away of this subsection is that the process was complex and prone to errors and corruption along its several steps.[14]

Upon arrival of the foreign goods into a US port, the captain of the vessel carrying the goods had to present a manifest detailing the articles included in the shipment to the customs officers in the corresponding collection district. After receiving this manifest, officers of the customs service had to verify its accuracy and establish the correct amount of duties that would need to be charged on the shipment. In essence, the role of customs officers was to guarantee that anyone bringing goods into the US passed through a customhouse and paid duties according to law.

Import duties fell into three classes: specific, ad valorem, or both specific and ad valorem. In the case of some goods that were subject to specific duties (for instance, those applying to a bushel of wheat), computing the amount owed by the importer only required correctly weighing

[11] The customs service remained the principal source of revenue until 1913, when the Sixteenth Amendment established the modern income tax.

[12] This number grew to include more than 100 during the 19th century (Schmeckebier, 1924). In 1912, Congress authorized the President to reorganize districts which led to a consolidation of some of the smaller districts.

[13] The act established that "It shall be the duty of the collector to receive all reports, manifests and documents made or exhibited to him by the master or commander of any ship or vessel, conformably to the regulations prescribed by this act, to make due entry and record in books to be kept for that purpose, as such manifests and the packages, marks and numbers contained therein; to receive the entry of all ships and vessels, and of all the goods, wares and merchandise imported in such ships or vessels, together with the original invoices thereof; to estimate the duties payable thereon, and to endorse the same on each entry; to receive ail monies paid for duties, and to take all bonds for securing the payment of duties; to grant ail permits for the unloading and delivery of goods, to employ proper persons as weighers, gaugers, measurers and inspectors at the several ports within his district, together with such persons as shall be necessary to serve in the boats which may be provided for securing the collection of the revenue to provide at the public expense, and with the approbation of the principal officer of the treasury department, store-houses for the safe keeping of goods, together with such scales, weights and measures as shall be deemed necessary, and to perform all other duties which shall be assigned to him by law." Some collection districts also had a "naval officer" and a "surveyor".

[14] This section follows Schmeckebier (1924) closely.

the shipment and applying the corresponding rates.[15] In other cases, a detailed examination of the physical properties of the goods being imported was required so as to establish the correct rate. For instance, the tariff on raw sugar depended on its saccharine content, thus requiring a chemical test to establish the correct amount to be levied (Schmeckebier, 1924).

In the case of imported goods that were subject to ad valorem duties, establishing the correct amount to be levied required to first conduct an appraisal of the monetary value of the goods. Ad-valorem duties posed the greatest challenge in terms of establishing the amount of duties to be levied. In our period of analysis, this value was determined (for custom purposes) with reference to the price of similar goods being commercialized in the market of the exporting country. Hence, it was essential for appraisers to be aware of current market values so as to detect cases in which the importer attempted to undervalue the contents of a shipment.[16] According to Parrillo (2013), however, employees hired through patronage were "were typically ignorant, sometimes unable to read the foreign languages in which invoices were written", making them ill equipped to assess the accuracy of the invoices.

After establishing the monetary value, the good had to be "classified" so as to determine the rate of duty that would be levied on it. Since some articles were not explicitly enumerated, the Tariff acts stated that in those cases the duty charged would be the one corresponding to the listed article most closely resembling it. This, in turn, implied that importers had incentives to have goods included in the classification entailing the lowest duties.[17]

2.2 US Customs Service before the Pendleton Act

Proponents of civil service reform targeted customhouses as prime example of the dangers of patronage appointments. In 1877, the US congress appointed a number of commissions to investigate the functioning of the major customhouses in the country. As part of its investigations, the Jay Commission (in charge of investigating the New York customhouse) compared the costs and functioning of US customhouses to those in other countries. The commission concluded that the cost of collection in proportion to amounts collected was much greater in the United States than in Germany, England or France (where employees were appointed through competitive examinations). The Commission blamed the over staffing of US custom houses for inflating operating expenses, as well as the lost revenue due to the inefficiency and corruption of employees hired through patronage (House & of the Treasury, 1877). "Errors and fraud" of patronage appointments were, according to proponents of civil service reform, responsible for substantial losses in government

[15] Schmeckebier (1924) describes a scandal involving a large importer of sugar who had tampered the scales so as to reduce the amount owed in tariffs.

[16] Appraisers were supposed to gather this information by routinely checking trade publications (Schmeckebier, 1924).

[17] Schmeckebier (1924) describes many examples of the difficulties in establishing the classification of some goods and on how importers took advantage of these ambiguities in order minimize the amount of duties that they paid. For instance, he describes the case of the importation of two pickle forks under the Tariff act of 1894. These forks could be plausibly assigned to three difference classes of goods, each of which had a different duty (ranging from 35 to 45%)

revenue.[18]

The reports of the Jay commission include several instances that highlight the inefficiency and corruption reigning in the New York customhouse prior to the Pendleton Act (House & of the Treasury, 1877). The customhouse was overstaffed, so that "many of the weighers and foremen rendered little, if any, service to the government, and that some of the clerks performed no duties at all". Moreover, corruption led to lower revenue since "the law against the acceptance of bribes was a dead letter."[19] Employees' carelessness further contributed to reduced revenue, as "some of the employees didn't have brains enough to do the work, that some were incapacitated by ignorance and some by carelessness and indifference."[20] Similar examples can be found in the reports corresponding to the Philadelphia and New Orleans customhouses.[21]

The findings of the Jay commission led in 1878 to the removal of Chester Arthur, the collector of the Port of New York (Newcomer, 1937).[22] The commission concluded by recommending a 20% reduction in the number of employees of the New York customhouse and the adoption of a merit reform. Indeed, the New York customhouse adopted a merit reform in March of 1879 (prior to the Pendleton act) that introduced competitive exams for the appointment of certain employees (Brown, 1882). Our results, however, are similar when we exclude the New York customhouse from the analysis (see Figure 8 in the Appendix).

2.3 Civil Service Reform Movement and the Pendleton Act of 1883

During the course of the 19th century, the growth in the size of government dramatically increased the cost of negotiating and monitoring patronage positions: From 1816 to 1881, the Federal government went from 5,000 to nearly 100,000 employees (Libecap & Johnson, 2007). Inspired by earlier reforms that took place in Europe, since the mid 1860s a civil service reform movement started pushing for "rational and bureaucratic means of staffing the federal departments" (Aron, 1987).[23]

[18] "Due to errors and frauds in the New York Custom-House. The investigating commission appointed by President Grant in l87l reported that the loss was probably twenty-five per cent. The New York Chamber of Commerce assured Sherman's commission that it had risen to forty per cent in l877." (Rogers, 1921).

[19] "Officer Cornell remarked on the violations of law by the acceptance of gratuities and by complicity in frauds".

[20] For instance, the report describes how weighers did not correctly perform their job, leading to lower revenue. "In fact, much of the weighable merchandise was not weighed at all. The Custom-House employees either took their figures from the city weighers or copied off the foreign marks of weight found on the packages." (Rogers, 1921)

[21] The commission in charge of investigating the Philadelphia customhouse asserted regarding the customhouse workforce that "Our conclusion that it can be somewhat reduced without injury to the service." The Philadelphia commission lists examples of corruption leading to lower cost-efficiency "as practices of taking the time of the Government for private business; of receiving presents of wines from the officers or agents of steamship lines; also the practices of delegating the appointing power and of making appointments, on political grounds, without sufficient assurance of the character and capacity of the appointee". The New Orleans commission similarly concluded that "the customs revenues at this port can be collected with a reduction of nearly 25 percent in the force employed".

[22] Ironically, Chester Arthur would later on become US president and sign the Civil Service Reform Act into a law in January 1883. Arthur, who was elected as vice president in the 1880 elections, replaced James Garfield in 1881 after his assassination in the hands of a disappointed office seeker.

[23] For instance, the United Kingdom established a Civil Service commission in 1855 in charge of holding "fair and competitive" examinations. An even earlier example of the use of exams for the appointment of state officials can be traced back to the Imperial Examinations in Imperial China.

While pressure was mounting for the adoption of a merit reform, the exact timing of the passing of the law is related to two political events. First, in July of 1881, newly elected president James A. Garfield was shot by a disappointed office seeker (Garfield would die by September). This assassination put civil service reform at the center of the political stage, and provided the reformists with a powerful example of the evils of the spoils system. Soon after the assassination (in December of 1881), Democratic senator George H. Pendleton introduced a bill with the aim of reforming the civil service. Second, Democrats took control of the House in March of 1882. Fearing that they would lose the 1884 presidential election, Republicans supported the civil service reform bill with the aim of protecting Republican office holders from politically-motivated dismissals (Hoogenboom, 1959). In January of 1883, president Chester Arthur signed the Pendleton Civil Service Reform Act into a law.

The Pendleton Act established a Civil Service Commission in charge of holding *"open, competitive examinations for testing the fitness of applicants"* (United States Civil Service Commission, 1883). Exams were aimed at testing practical knowledge relevant to an applicant's future position (rather than formal academic training) and could not include questions aimed at eliciting an individual's political orientation.[24] Figure A1 shows an example question of the arithmetics exam, for individuals who applied for the position of copyist. After a vacancy occurred, the Civil Service Commission would produce a list of the top four candidates (on the basis of the results of the exam), from which the head of the Department (in the case of the customs service, the collector) filling the vacancy would need to choose.[25]

The law divided the "classified" (that is, subject to exams) Civil Service into three branches: the "Classified Departmental Service", the "Classified Postal Service", and the "Classified Customs Service" (our focus in this paper) . The Custom and Postal classified services were restricted to custom districts and post-offices who had at least 50 employees by 1883, and to employees making no less than $900 within these offices.[26] At the time of the enactment of the law, 11 customhouses met the 50 employees threshold, which meant that about 2,500 employees in the custom service were added to the classified service.[27] Figure 1 shows the location of US customhouses in 1874, distinguishing between those that would become part of the classified service by 1883 and those that would not. Finally, unclassified positions in the civil service remained to be filled via traditional patronage appointments.

From 1883 to 1893, nearly 22,000 applicants completed an exam with the goal of joining the customs service, out of which about 2,800 were appointed prior to 1894 (United States Civil Service Commission, 1893, p.240).[28] By 1893, about 60% of the workforce in classified customhouses

[24] To further ensure political neutrality, exams were graded by a Board of Examiners who did not know the identities of the persons who completed the exams.

[25] This number was further reduced to three in March of 1888 (Commission, 1886, p.128).

[26] Customhouses that subsequently fell below the 50 employees cutoff would nevertheless have to remain as part of the classified service.

[27] These custom houses were New York City, NY; Boston, MA; Philadelphia, PA; San Francisco, CA; Baltimore, MD; New Orleans, LA; Chicago, IL.; Burlington, VT.; Portland, ME.; Detroit, MI. and Port Huron, MI.

[28] About 58% of the applicants obtained a passing grade in this period.

had been appointed through open and competitive examinations. It is important to emphasize that the reform *did not* grant tenure to employees, but rather just prohibited politically-motivated dismissals.[29]

The conventional wisdom is that this reform improved the efficiency of federal bureaucracy in general, and of customhouses in particular (Johnson & Libecap, 1994b). For instance, Hoogenboom (1959) argues that "service in post offices and customhouses was vastly improved".[30] The annual reports of the Civil Service Commission contain several instances in which customs collectors describe improvements in the functioning of their agencies with merit employees ((Commission, 1884, p.32-39) and (Commission, 1885, p.38)). Indeed, in its 15th report, the Commission argued that the reform had led to a 25% decline in the cost of collecting customs revenue (Commission, 1897).

3 Data

Our analysis combines data from multiple sources. First, we have digitized customhouses' personnel records. These records come from the "Official Registers of the United States", a biennial publication including the full roster of employees of the US federal government. The Registers were first published in 1816 and contain information about the Federal workforce, including the name of every employee, their job title (including which government unit they were employed with), state or country of birth, US state of appointment, the location of their post, and their compensation. Our data include information on approximately 55,000 employee-years of the US Customs Service and span the 1871 to 1893 period. Figure A2 shows an example page listing employees of the New York's customhouse.

The Registers include information on an individual's place of birth but have no additional background information about government employees. We collected additional information about these employees by linking the Registers to US censuses of population, using name-based matching techniques (Abramitzky *et al.* , 2019). Specifically, we linked each of the 1871-1893 Registers to the 1850, 1860, 1870 and 1880 censuses.[31] Through this procedure, we are able to obtain information about an individual's occupation prior to his or her employment in the federal government. We provide further details on the linking strategy and sensitivity checks in Online Appendix section A.1.

Second, we have collected data on the expenses and receipts of each custom house from 1874 to 1893. Specifically, for each customhouse in the US we have collected data on: (1) its annual receipts (separately by source of revenue), (2) its annual expenditures, and (3) its number of employees, their occupations and the compensations that they received. These data come from the

[29] Later reforms to the civil service further increased the stability of federal government employment (Johnson & Libecap, 1994a).

[30] Another example of similar quotes is Fish (1905).

[31] We chose these years since the 1850 is the first US population census to list persons individually, and there are no surviving individual-level records for the 1890 census.

"Annual report of the Secretary of the Treasury on the state of the finances" (US Congress, 1874-1893). This report was published annually and includes detailed information on the revenues and expenditures of different branches of the US federal government, including the Customs Service. Appendix section A.2 provides further details about each of the types of revenue that were collected by the US customhouses.

Finally, the data on collectors who died while in office come from the "Journal of the Executive Proceedings of the United States Senate" (Senate, 1875). This publication lists all nominations made by the President for the position of customhouse collector, as well as the reason why a new collector had to be nominated (death, removal, resignation or end of term). We searched these data for all instances in which a new collector was nominated due to the death of a previous collector. Figure A3 shows an example case in which a new collector ("T. Jefferson Jarrett") is nominated to replace a deceased collector ("Peter F. Cogbill") in the Petersburgh, VA customhouse.

Table 1 shows some basic information regarding the personnel structure and sources of revenue of customhouses, separately for the classified and the non-classified customhouses. Panel (a) focuses on statistics computed at the customhouse level (spanning 1874-1894), whereas Panel (b) focuses on the employee-level records (spanning 1871-1893). Revenue and expenses have a skewed distribution, with a few customhouses (in particular the New York customhouse) accounting for the majority of revenue and expenses.[32] Similarly, the distribution of the number employees is skewed: The median non-classified customhouse has about 10 employees, whereas the median classified customhouse has close to 200. Median wages are about 20% percent higher in the classified customhouses, and there is a smaller proportion of workers who made less than $900 a year. On average, 47% of the employees in non-classified customhouses and 34% in the classified customhouses who are listed in an Official Register were not listed in the following Register.[33] Our differences-in-difference identification strategy (described in detail below) enables us to take into account these differences in *levels*.

4 Empirical Strategy

In our main analysis, we estimate a differences-in-differences model, comparing the outcomes of classified customhouses to those of non-classified customhouses, before and after the passing of the Pendleton Act in 1883. We estimate:

$$y_{it} = \alpha_i + \alpha_t + \beta Classified \times After_{it} + X_{it} + \epsilon_{it} \tag{1}$$

where y_{it} is an outcome for customhouse i in year t. $Classified \times After_{it}$ takes a value of one for those customhouses that were required to hire using exams after 1883. As described above, the classified customs service was initially limited to those customhouses employing at least 50 employees by 1883. The list of classified customhouses remained the same throughout our pe-

[32] As discussed above, in some robustness checks we exclude the New York customhouse from the analysis.

[33] The Official Registers were published every two years, so this implies a 24% annual turnover rate.

riod of analysis (up to 1894).[34] Throughout the analysis, we focus on those customhouses that were already in operation by 1874 and that remained in operation throughout the period.[35] In some specifications, X_{it} include census region-year fixed effects. We cluster standard errors at the customhouse level.[36]

In addition to the simple difference-in-differences model, in some cases we also estimate event-study specifications in which we enable the effects of the reform to vary as a function of years since the reform took place. Specifically, we estimate:

$$y_{it} = \alpha_i + \alpha_t + \sum_t \beta_t Years\ Since\ Classification_{it} + X_{it} + \epsilon_{it} \quad (2)$$

A first concern with our estimation strategy is that the 50 employees cutoff might have been chosen so as to include or exclude certain custom houses. Alternatively, customhouses might have manipulated their number of employees in anticipation of the reform.[37] There are two pieces of evidence that suggest that this possibility is unlikely. First, the list of customhouses that had 50 or more employees was nearly the same in 1879 (with the exception of Chicago's omission) and exactly same in 1881 as in 1883. Hence, there are no customhouses that would have been part of the classified service by 1879 but managed to reduce their number of employees so as to remain within the unclassified service. Second, Figure 2 shows that there is no evidence of customhouses bunching right below the 50 employees cutoff. This figure shows the distribution of the number of employees across customhouses by 1883, focusing on those with at most 100 employees (so as to more easily visualize the distribution around the 50 employees cutoff).

As shown in Table 1, the very nature of the Pendleton act provisions implies that only the largest customhouses became part of the classified service. Hence, a second concern with our identification strategy is that the smaller customhouses might have been on a different time trend relative to the larger customhouses. We present a number of tests for the common trends assumption. Table 2 reports the F-test p-values corresponding to the hypothesis that all of the pre-1883 event study coefficients from equation 2 are equal to zero (Columns 1-4). Each row corresponds to each of the main outcomes that we use in the analysis, whereas each column corresponds to a different comparison group (based on a customhouse number of employees in 1883). Starting from customhouses with 10 employees or more in 1883 (column 3), we do not reject the hypothesis that all coefficients are zero for most outcomes. We use customhouses with 10 employees or more

[34] On November 2, 1894, the classification was extended to embrace ports having as many as twenty employees, now the following: Brownsville, Tex.; Buffalo, N.Y.; Cape Vincent, N.Y.; Cincinnati, Ohio; Cleveland, Ohio; Corpus Christi, Tex.; Eagle Pass, Tex.; Eastport, Me. ; El Paso, Tex.; Galveston, Tex.; Key West, Fla.; Los Angeles, Cal.; Marquette, Mich. ; New port News, Va.; Nogales, Ariz.; Ogdensburg, N. Y.; Oswego, N. Y.; Plattsburg, N.Y.; Portland, Oreg, ; Port Townsend, Wash.; St. Louis, Mo.; St. Paul, Minn.; Suspension Bridge, N. Y. However, the cutoff was rapidly further reduced in May of 1896 to customhouses having as many as five employees (13th report, page 101). After this extension, only 63 employees in the customs service remained outside of the classified service(13th report, page 80).

[35] We provide a list of the customhouses and their date of establishment in the Appendix.

[36] There are not enough customhouses for us to estimate a regression discontinuity model using the number of employees in 1883 as the running variable.

[37] Interestingly, the 50 employees cutoff was also used in the classified postal service.

by 1883 as the main comparison group in our analysis.[38] To further deal with potential differential trends based on a customhouse size, we estimate models in which we include interactions between a customhouse number of employees in 1883 and year dummies, thus allowing customhouses of different size to be on differential trends.

Finally, to further validate our empirical strategy, we estimate our baseline difference-in-differences specification but using alternative "placebo" cutoffs to determine whether a customhouse would be classified or not. We discuss a number of additional specification checks in the robustness section of the paper.

5 Results

5.1 Personnel Practices in Reformed Customhouses

The standard argument in favor of protecting the bureaucracy from political influence is that this protection will improve personnel practices along three main dimensions: i) reducing employees' turnover which, in turn, facilitates the accumulation of bureaucratic expertise; ii) improving the quality of employees by prioritizing skills over political connections; iii) reducing patronage-related "excess" hiring, thus deflating operational expenses. In this section, we focus on understanding whether reformed customhouses improved along the first two dimensions. We discuss the evidence on whether the reform reduced "excess hiring" in section 6.

Turnover. We start by asking if the reform resulted in reduced turnover among employees in the classified customhouses. As discussed in section 2, the reform did not give tenure to employees, but rather just prohibited politically motivated dismissals. Hence, it is not obvious ex-ante that the reform would have led to reduced turnover. On the one hand, patronage employees who under performed in their jobs might have been less likely to be fired relative to merit hires (who were less likely to enjoy the protection of a political boss). On the other hand, prohibiting politically motivated dismissals should have removed an important channel of turnover.

To formally test if the reform led to reduced turnover, we estimate:

$$Turnover_{ict} = \alpha_c + \alpha_t + \beta Classified \times After_{ct} + X_{ict} + \epsilon_{ict} \tag{3}$$

where $Turnover_{ict}$ is an indicator that takes a value of one if employee i in customhouse c who is listed in the Official Register of year t as working in customhouse c is no longer listed on the following one (Registers were collected every two years).[39]

Table 3 shows that the average employee was more likely to stay longer after reformed customhouses switched to merit-based appointments. The reduction in turnover is large: employees in reformed customhouses were 12 percentage points less likely to be out of their jobs by the next

[38] There is a trade off between choosing a control group that is close to 50 with respect to its number of 1883 employees and sample size.

[39] Since our data on personnel records covers the 1871 to 1893 period, 1891 is the last year for which we are able to whether employees had left their job by the following Register.

register, relative to a control group mean of about 47%.[40] This finding suggests that employees in reformed customhouses had a longer time horizon over which they could accumulate bureaucratic expertise.

If the reduced turnover that we document was due to the reform, we should observe that the effects are concentrated among individuals who worked in positions non-exempted from exams (since these are the positions that enjoyed protection from politically motivated dismissal). Column 2 presents evidence consistent with this prediction. In this column, we report the interaction between working in a position subject to exams and working in a classified customhouse in the post-reform period. This interaction is negative and statistically significant: there is an additional decline of 7.8 percentage points in the likelihood of turnover among individuals in classified customhouses who were employed in positions subject to exams.

As discussed in section 2, collectors, who were nominated by the President and confirmed by the Senate, had the ability to hire and remove employees. Hence, if the reduced turnover that we observe is due to some employees being protected from political influence, we should see the largest effects on those years in which there was a change in political leadership at the Federal level. Figure 3 shows graphical evidence suggesting that the reform led to reduced turnover, and especially so in those years in which the Presidency went from a Republican to a Democrat or vice versa. The y-axis in this figure shows the proportion of employees who are listed in the Official Register of year t who will no longer be listed on the following Register. The vertical dashed lines mark years in which the Presidency changed party hands.[41]

To more formally test this hypothesis, we interact the $Classified_{ct}$ indicator with a variable that takes a value of one in 1885 (when the presidency went from Chester Arthur (R) to Grover Cleveland (D)) and in 1889 (when it went from Cleveland (D) to Benjamin Harrison (R))).[42] Column 3 of Table 3 shows that the declines in the likelihood of turnover in classified customhouses are particularly pronounced in those years in which the presidency switches party hands: the interaction is negative and close to 20 percentage points. In contrast, the main effect is close to zero and statistically insignificant, suggesting that the reform did not affect turnover in years in which there were no party transitions.

Employees' professional background. Classified customhouses had to hire some of their employees on the basis of the results of open and competitive exams. We expect this change to lead to an improvement in the professional background of employees if, in the pre-reform period, customhouses traded off expertise with political loyalty when screening employees. In addition, reducing politically motivated dismissals might have also led to an improvement in the pool of applicants by increasing the appeal of a career in government.

To test whether this was indeed the case, we use the data in which we link the personnel records

[40] For comparison, the annual turnover rate in the US federal government was 16% in 2019 https://www.bls.gov/news.release/jolts.t16.htm. A turnover rate of 47% over a two years period implies an annualized turnover rate of about 28%.

[41] Unfortunately, we do not observe any party transitions in the pre-reform years for which we have data (1873-1883).

[42] The Registers capture the stock of employees by June 30.

of the customhouses to earlier censuses of population.[43] We estimate:

$$y_{ict} = \alpha_c + \alpha_t + \beta Classified \times After_{ct} + X_{ict} + \epsilon_{ict} \tag{4}$$

where y_{ict} is a characteristic of employee i, in customhouse c in year t. $Classified_{ct}$ takes a value of 1 if customhouse c was part of the classified service by year t. In all cases, we focus on the last census year for which we observe person's i characteristics prior to register year t.

Each of the panels of Table **??** focuses on the occupational background of customhouse employees.[44] In panel (a), we focus on the probability that an employee is listed as having a professional occupation in the census. Column 1 looks at the stock of employees in the customhouse in a given register year. This stock reflects a combination of employees appointed prior to the reform, and those hired after, in exempted and non-exempted positions.[45] When focusing on the stock of employees, we observe a small increase in the likelihood that an employee would have held a professional occupation, which is significant at the 10%.

In column 2, we instead focus on the flow of newly hired employees. This flow reflects a combination of workers hired in positions subject to exams and in positions that did not require one. Here, we see a larger increase of 6.7 percentage points in the likelihood of holding a professional occupation, which is significant at the 5 % level. In columns 3 and 4, we continue to focus on new hires but further distinguish employees based on whether they were hired in positions that required an exam versus those that did not. When focusing on employees hired in positions not requiring an exam (Column 3), we see a small and statistically insignificant increase in the likelihood that an employee would have held a professional occupation. Consistent with the effects of the reform operating through the exams selecting more qualified employees than the discretionary hires, we find the strongest effects among newly hired employees in positions that were not exempted from exams (Column 4). Specifically, newly appointed employees in positions non exempted from exams are 9.4 percentage points more likely to have held a professional occupation in an earlier census.

Panel (b) show that the increase in the likelihood of hiring employees with a previous professional occupation is driven by a decline in the likelihood of appointing employees who listed either no or an unskilled occupation in an earlier census. Similar to the pattern in panel (a), we find a relatively small decline when focusing on the stock of employees (column (1)), but a larger decline when considering new hires in jobs subjects to exams. In this case, we also find a negative coefficient among new hires on exempted jobs, although the effect is statistically insignificant. Overall, these results suggest that classified customhouses became more conducive to the accumulation of

[43] Since we can only observe previous occupations for those employees that we can successfully link to the census, the sample size is smaller than in the previous exercise. We provide further details on linking in Online Appendix Section A.1.

[44] Unfortunately, US censuses prior to 1940 do not include any information on a person's income or years of schooling. Hence, we cannot directly assess if the reform brought more highly educated workers into the customs service workforce.

[45] Employees hired prior to the reform in non-exempted were nevertheless also protected from political dismissal. This importation of patronage appointments into the classified system is often referred to as "blanketing in".

professional expertise among their employees.

5.2 Cost-effectiveness in Collecting Revenue

As discussed in section 2, proponents of civil service reform argued that the higher "cost to collect" in the US relative to other countries was primarily due to its lack of workforce hired on the basis of merit. The previous subsection shows that employees in classified customhouses were more likely to stay longer and had stronger professional backgrounds. In this subsection, we use the data on receipts and expenses to ask if such changes resulted in improvements in the cost-effectiveness with which classified customhouses collected revenue.

Figure 4 shows average yearly log expenses (panel (a)), log receipts (panel (b)) and log receipts over expenses (panel (c)) in classified and non-classified customhouses from 1874 to 1893. Panels (b) and (c) include receipts from all sources.

Table 5 shows the results of estimating equation 1 using the same outcome variables as in Figure 4. Panel (a) shows that there is no statistically significant effect of the reform on customhouse expenses. When we focus on the sample of customhouses that had at least 10 employees by 1883 as the comparison group, the effect size is very close to zero and statistically insignificant when we not include region-time fixed effects, and negative but statistically insignificant when we include them.

The point estimates when looking at a customhouse total receipts are more sensitive to the different comparison groups, but also show no statistically significant evidence of an improvement in classified customhouses (panel (b)). Focusing again on the results that use a control group of customhouses with at least 10 employees by 1883, the effect on revenue is small and insignificant when not including region-time fixed effects, and actually *negative* (but also statistically insignificant) when including them.

Finally, Panel (c) focuses on log receipts over expenses. Again, we see a small and positive point estimate that is statistically insignificant when not including region-time fixed effects, and a negative point estimate when including them.

Figure 5 shows event-study estimates corresponding to estimating equation 2 and using the same outcome variables as above. The omitted category in these figures are customhouses in 1874, the first year in our data. The event study results confirm the pattern of limited effects documented above: none of the pre-reform or post-reform event study coefficients are statistically different from zero. Indeed, the event-study coefficients do not seem to show a pattern that would be consistent with an improvement: they are sometimes positive and sometimes negative, both in the pre- and in the post-reform periods.

6 Mechanisms

Employees in classified customhouses were more likely to work for longer periods of time and had stronger professional backgrounds. Yet, this professionalization did not translate into measurable

improvements in the cost-effectiveness with which the classified customhouses collected revenue. In this section, we investigate possible reasons that might explain this lack of improvement in cost-effectiveness.

Distortions in customhouses personnel structure. The first hypothesis we investigate is that the reform might have led to distortions in the organization of customhouses, as collectors attempted to retain discretion in hiring. In classified customhouses, employees paid at a rate of less than $900 a year were exempted from examinations and could be hired through traditional patronage methods. To the extent that classified customhouses wanted to retain discretion in hiring, we should observe an increase in the proportion of workers below this salary cutoff in classified customhouses after the reform.

Figure 6 shows evidence consistent with this prediction. The figure shows the proportion of employees making below $900 a year in classified and non-classified customhouses, before and after the reform. Panel (a) focuses on the stock of employees, whereas panel (b) focuses on the flow of new hires. From this figure, it is evident that there is a sharp increase in the proportion of the employees below the classification threshold, and that this increase is particularly pronounced among newly hired employees (panel (a) versus panel (b)).

Table 6 formally tests the hypothesis that the reform might have prompted a change in the employee mix with the goal of retaining discretion in hiring. The odd columns focus on the stock of employees, whereas the even columns focus on the flow of newly hired employees. Columns (1) and (2) focus on the likelihood that an employee would be employed in any position that was exempted from exams. Both columns show a very large increase in the proportion of employees in exempted positions: employees are 18 percentage points more likely to be in an exempted position, and 26 percentage points more likely when focusing on new hires. In the pre-reform period, less than 15% of the employees in classified customhouses worked in positions that would keep not requiring exams post 1883.

Columns (3) to (6) further splits positions exempted from exams into two groups: Those that are exempted because they were reserved for political appointees (such as the collector) and their direct assistants, and those exempted due to being below the $900 salary cutoff. The reform permitted only a limited number of political appointees, but did not impose any limits on the number of employees that could earn below the salary cutoff.[46] Indeed, we see that the increase in the proportion of employees in exempted positions comes exclusively from an increase in the proportion of employees below the salary cutoff, with very limited change in the proportion of employees in other positions exempted from exams.

Two pieces of evidence suggest that this distortion might have led to a worsening of reformed customhouses cost-efficiency. First, Table 7 shows that the reform led to an actual *reduction* in the number of employees in positions subject to the exam. Column (1) focuses on the total number

[46] In addition to the collector, the following occupations were filled by political appointees and the staff of the appointee's choice: deputy collectors who do not also act as inspectors, examiners, or clerks; cashier of the collector; assistant cashier of the collector; auditor of the collector; chief acting disbursing officer; deputy naval officers; deputy surveyors; one private secretary or one confidential clerk. These positions were exempted from exams.

of employees in a customhouse, whereas columns (2) and (3) distinguish between those in non-exempted and exempted positions. Column (2) show that classified customhouses ended up with actually fewer employees in the more technical positions -such as clerks, examiners or inspectors- that were subject to exams, but saw a very large increase in the number of workers in exempted positions (Column 3). The fact that the reform did not lead to an overall reduction in the number of employees is not entirely surprising: Customhouses' budget depended on an appropriation of Congress and the reform did not change this appropriation (Schmeckebier, 1924).[47] Hence, customhouses had an incentive to reallocate any savings from a reduction in patronage appointments in positions subject to exams towards patronage appointments in exempted positions.

Second, employees hired in positions paying less than $900 were, not surprisingly, worse in terms of their professional background than employees hired for higher paying positions.[48] Table 8 shows the association between being an employee in these positions and measures of professional background. Employees in these positions were: 2.8 percentage points less likely to have been employed in a professional occupation and 9 percentage points more likely to have held an unskilled occupation relative to other customs service employees, had occupational scores that were 4 percent lower and were 2.4 percentage points less likely to be literate. Since the reform increased the proportion of new hires paid below the cutoff by 28.7 percentage points, this explains an 0.8 percentage points lower proportion of new hires with a professional occupation. Hence, increasing the number of employees making below the $900 implied an inflow of employees with relatively worse professional background in the reformed customhouses.

Overall, these findings suggest that the professionalization of reformed customhouses was in part outdone by a distortion on the customhouse personnel structure, which in turn might explain why the improvements in cost-efficiency were not as pronounced. On the one hand, employees hired on the basis of exams had stronger professional backgrounds. However, the reform led to an increase in the number of workers in low-paying positions, as well as to a reduction in the number of workers in non-exempted positions.

The Role of Collectors. As described above, each customhouse was administered by a "collector of customs". The reform did not introduce any changes with respect to how collectors were selected and appointed: collectors remained to be political appointees, nominated by the President and confirmed by the Senate.

This lack of change is important for two reasons. First, the fact that collectors remained to be political appointees likely facilitated the distortions documented above. Second, if the performance of customhouses depended to a large extent on the characteristics of the person at the top of the hierarchy, then the lack of change in how collectors were selected might have contributed to the reform's limited effects on cost-effectiveness. In fact, civil service reforms in US states and

[47] The annual appropriation was set in $5,500,000 in 1871. Customhouses were also allowed to keep the receipts that they collected as "fines, penalties and forfeitures" and "labor, drayage and storage" to pay for their operating expenses (Schmeckebier, 1924).

[48] This result is consistent with the findings in Dal Bó *et al.* (2013), which shows that increasing the offered wages for public employees leads to an improvement in the applicant pool.

cities that kept political discretion for the top positions of the bureaucracy were associated with weaker institutional changes (Ornaghi (2016) and Ujhelyi (2014)).

While we cannot directly test if the lack of improvements in cost-effectiveness was partly due to the lack of change in how collectors were selected, we can test a necessary condition for this hypothesis to be true: Namely, that collectors should matter for the outcomes of customhouses. To assess whether this is the case, we study the link between collectors and the outcomes of a customhouse. Because of the potential endogeneity of who gets appointed as a collector in a given customhouse in a given year, we use 42 deaths of collectors while in office as a shock to a customhouse leadership, a similar strategy as in Jones & Olken (2005) and Besley *et al.* (2011).[49] The test asks whether the change in outcomes of customhouses around the collectors' death is unusual given the change in outcomes witnessed in that customhouse in other years. Specifically, we employ the Wald test first proposed by Jones & Olken (2005). We explain the specification we use and then explain how these estimates feed into the Wald test. We estimate:

$$y_{ct} = \alpha_c + \alpha_t + \beta_z PRE_z + \gamma_z POST_z + \epsilon_{ct} \tag{5}$$

where y_{ct} is an outcome for customhouse c in year t and z indexes collectors' deaths. Year and customhouse fixed effects are included through α_t and α_c respectively. For each collector death z, there is a separate set of dummies PRE_z and $POST_z$. PRE_z is a dummy equal to 1 in the T years prior to collector z's death in that collector's customhouse. $POST_z$ is a dummy equal to 1 in the T years after leader z's death. In the baseline, we use $T = 3$ and test for sensitivity for other time periods. The procedure estimates a separate coefficients β_z and γ_z for each death.

Under the null hypothesis that the identity of collectors does not matter for outcomes, we have

$$\overline{POST_z} - \overline{PRE_z} \sim N(0, \frac{2\sigma^2_{\epsilon i}}{T})$$

$$\overline{PRE_z} = \frac{1}{T}\sum_t Y_{zt}^{PRE}$$

$$\overline{POST_z} = \frac{1}{T}\sum_t Y_{zt}^{POST}$$

Where the variance $\sigma^2_{\epsilon i}$ is customhouse specific. We construct a chi-squared test of the equality of the mean of the outcome variable in the PRE and the POST period for all the random transitions, using the Wald statistic:

$$W = \frac{1}{N_z}\sum_{z=1}^{N_z} \frac{(\overline{POST_z} - \overline{PRE_z})^2}{\frac{2\sigma^2_{\epsilon i}}{3}} \tag{6}$$

[49] An alternative strategy would be to estimate collector fixed effects. However, this strategy is not feasible in this context since we do not observe instances in which the same collector is assigned to more than one customhouse. As a comparison Jones & Olken (2005) and Besley *et al.* (2011) had 57 and 122 deaths respectively.

7 Conclusions

Meritocratic civil services remain an elusive goal for many developing countries despite several attempts of reform (Schuster, 2017). The historical experience of the US in its transition towards a professional bureaucracy offers a window to understand some of the challenges involved in this transition and how they were ultimately dealt with.

This paper focused on the consequences of the Pendleton Act of 1883, which introduced open and competitive exams for the appointment of certain Federal employees. Specifically, we studied the degree to which moving towards merit-based hiring improved the functioning of US customhouses. Our identification strategy exploited the fact that only customhouses that had 50 or more employees by 1883 had to hire their employees through competitive exams, enabling us to compare the functioning of reformed customhouses to those that did not have to adhere to the merit reform. Our results show that the reform led to improvements in personnel practices: employees were more likely to stay longer in their positions, and had stronger professional backgrounds. However, we find limited evidence that the reform resulted in gains in the cost-efficiency with which customhouses collected revenue. We argue that part of the explanation for the lack of efficiency improvements is that the reform led customhouses to change their structure so as to retain discretion in hiring, thus ultimately undermining the effects of the reform.

References

ABRAMITZKY, RAN, BOUSTAN, LEAH PLATT, ERIKSSON, KATHERINE, FEIGENBAUM, JAMES J., & PÉREZ, SANTIAGO. 2019. *Automated Linking of Historical Data*. Tech. rept. NBER WP 25825.

ARON, CINDY SONDIK. 1987. *Ladies and gentlemen of the civil service: Middle-class workers in Victorian America*. Oxford University Press.

BESLEY, TIMOTHY, MONTALVO, JOSE G, & REYNAL-QUEROL, MARTA. 2011. Do educated leaders matter? *The Economic Journal*, **121**(554), F205–227.

BEST, MICHAEL CARLOS, HJORT, JONAS, & SZAKONYI, DAVID. 2017. *Individuals and organizations as sources of state effectiveness*. Tech. rept. National Bureau of Economic Research.

BOSTASHVILI, D., & UJHELYI, GERGELY. 2019. Political Budget Cycles and the Civil Service: Evidence from Highway Spending in US States. *Journal of Public Economics*, **175**(C), 17–28.

BRASSIOLO, PABLO, ESTRADA, RICARDO, & FAJARDO, GUSTAVO. 2020. My (Running) Mate, the Mayor: Political Ties and Access to Public Jobs in Ecuador.

BRIERLEY, SARAH. 2019. Combining patronage and merit in public sector recruitment. *Journal of Politics*.

BROWN, W. 1882. *Civil-service Reform in the New York Custom-house*. Publications of the Civil-Service Reform Association. G.P. Putnam's Sons.

COMMISSION, UNITED STATES CIVIL SERVICE. 1884. *Report of the United States Civil-Service Commission*. US Government Printing Office.

COMMISSION, UNITED STATES CIVIL SERVICE. 1885. *Report of the United States Civil-Service Commission*. US Government Printing Office.

COMMISSION, UNITED STATES CIVIL SERVICE. 1886. *Report of the United States Civil-Service Commission*. US Government Printing Office.

COMMISSION, UNITED STATES CIVIL SERVICE. 1897. *Report of the United States Civil-Service Commission*. US Government Printing Office.

DAHLSTRÖM, CARL, LAPUENTE, VICTOR, & TEORELL, JAN. 2012. The merit of meritocratization: Politics, bureaucracy, and the institutional deterrents of corruption. *Political Research Quarterly*, **65**(3), 656–668.

DAL BÓ, ERNESTO, FINAN, FREDERICO, & ROSSI, MARTÍN A. 2013. Strengthening state capabilities: The role of financial incentives in the call to public service. *The Quarterly Journal of Economics*, **128**(3), 1169–1218.

DEPARTMENT OF THE INTERIOR. 1871-1893. *Official Register of the United States*. US Government Printing Office.

DESERRANNO, ERIKA. 2019. Financial incentives as signals: experimental evidence from the recruitment of village promoters in Uganda. *American Economic Journal: Applied Economics*, **11**(1), 277–317.

FINAN, FREDERICO, OLKEN, BENJAMIN A, & PANDE, ROHINI. 2017. The personnel economics of the developing state. *Pages 467–514 of: Handbook of Economic Field Experiments*, vol. 2. Elsevier.

FISH, CARL RUSSELL. 1905. *The civil service and the patronage*. Vol. 11. Longmans, Green, and Company.

FOLKE, OLLE, HIRANO, SHIGEO, & SNYDER, JAMES M. 2011. Patronage and elections in US states. *American Political Science Review*, **105**(3), 567–585.

FOLKE, OLLE, HIRANO, SHIGEO, SNYDER, JAMES M., & TING, MICHAEL. 2013. Elections and Reform: The Adoption of Civil Service Systems in the U.S. States. *Journal of Theoretical Politics*, **25**(3), 363–387.

GRINDLE, MERILEE S. 2012. *Jobs for the Boys*. Harvard University Press.

HOOGENBOOM, ARI. 1959. The Pendleton Act and the civil service. *The American Historical Review*, **64**(2), 301–318.

HOOGENBOOM, ARI ARTHUR. 1968. *Outlawing the spoils: a history of the civil service reform movement, 1865-1883*. Vol. 50. University of Illinois Press.

HOUSE, UNITED STATES. CONGRESS., & OF THE TREASURY, UNITED STATES. DEPARTMENT. 1877. *Commissions to Examine Certain Custom-houses of the United States. Letter from the Secretary of the Treasury, Transmitting, the Report of Certain Commissioners Appointed to Examine Custom-houses, and Recommending Appropriations for Their Pay. October 25, 1877. – Referred to the Committee of Ways and Means and Ordered to be Printed*. Ex. doc.

JOHNSON, RONALD N, & LIBECAP, GARY D. 1994a. Patronage to merit and control of the federal government labor force. *Explorations in Economic History*, **31**(1), 91–119.

JOHNSON, RONALD N, & LIBECAP, GARY D. 1994b. The" Problem of Bureaucracy". *Pages 1–11 of: The federal civil service system and the problem of bureaucracy*. University of Chicago Press.

JONES, BENJAMIN F, & OLKEN, BENJAMIN A. 2005. Do leaders matter? National leadership and growth since World War II. *The Quarterly Journal of Economics*, **120**(3), 835–864.

LIBECAP, GARY D, & JOHNSON, RONALD N. 2007. *The Federal Civil Service System and the Problem of Bureaucracy: The Economics and Politics of Institutional Change*. University of Chicago Press.

MEYER-SAHLING, JAN-HINRIK. 2006. The institutionalization of political discretion in post-communist civil service systems: The case of Hungary. *Public Administration*, **84**(3), 693–715.

MEYER-SAHLING, JAN-HINRIK, MIKKELSEN, KIM SASS, & SCHUSTER, CHRISTIAN. 2018. Civil service management and corruption: What we know and what we don't. *Public Administration*, **96**(2), 276–285.

NEWCOMER, LEE. 1937. CHESTER A. ARTHUR: THE FACTORS INVOLVED IN HIS REMOVAL FROM THE NEW YORK CUSTOMHOUSE. *New York History*, **18**(4), 401–410.

ORNAGHI, ARIANNA. 2016. Civil service reforms: Evidence from US police departments. *Job Market Paper*.

PARRILLO, NICHOLAS R. 2013. *Against the Profit Motive: The Salary Revolution in American Government, 1780-1940*. Yale University Press.

RAUCH, JAMES E, & EVANS, PETER B. 2000. Bureaucratic structure and bureaucratic performance in less developed countries. *Journal of public economics*, **75**(1), 49–71.

RAUCH, JAMES E, *et al.* . 1995. Bureaucracy, Infrastructure, and Economic Growth: Evidence from US Cities during the Progressive Era. *American Economic Review*, **85**(4), 968–979.

ROGERS, EMMA. 1921. *Chester A. Arthur: Man and President*. University of Wisconsin–Madison.

SCHMECKEBIER, LAURENCE FREDERICK. 1924. *The Customs Service: Its History, Activities and Organization*. Johns Hopkins Press.

SCHUSTER, CHRISTIAN. 2017. Legal reform need not come first: Merit-based civil service management in law and practice. *Public Administration*, **95**(3), 571–588.

SENATE, UNITED STATES. 1875. *Journal of the Executive Proceedings of the Senate of the United States of America*. Green.

SKOWRONEK, STEPHEN, *et al.* . 1982. *Building a new American state: The expansion of national administrative capacities, 1877-1920*. Cambridge University Press.

TESO, EDOARDO, COLONNELLI, EMANUELE, & PREM, MOUNU. 2019. Patronage and Selection in Public Sector Organizations.

THERIAULT, SEAN M. 2003. Patronage, the Pendleton Act, and the Power of the People. *The Journal of Politics*, **65**(1), 50–68.

UJHELYI, GERGELY. 2014. Civil service rules and policy choices: evidence from US state governments. *American Economic Journal: Economic Policy*, **6**(2), 338–80.

UNITED STATES CIVIL SERVICE COMMISSION. 1883. *Report of the United States Civil-Service Commission*. US Government Printing Office.

UNITED STATES CIVIL SERVICE COMMISSION. 1893. *Report of the United States Civil-Service Commission*. US Government Printing Office.

US CIVIL SERVICE COMMISSION. 1884. *First annual report*.

US CONGRESS. 1874-1893. Annual Report of the Secretary of the Treasury on the State of the Finances.

VAN RIPER, PAUL P. 1976. *History of the United States civil service*. Greenwood Press.

WEBB, STEVEN BENJAMIN. 2008. *Public sector reform: What works and why? An IEG evaluation of World Bank support*. The World Bank.

WEBER, MAX. 1978. *Economy and society: An outline of interpretive sociology*. Vol. 1. Univ of California Press.

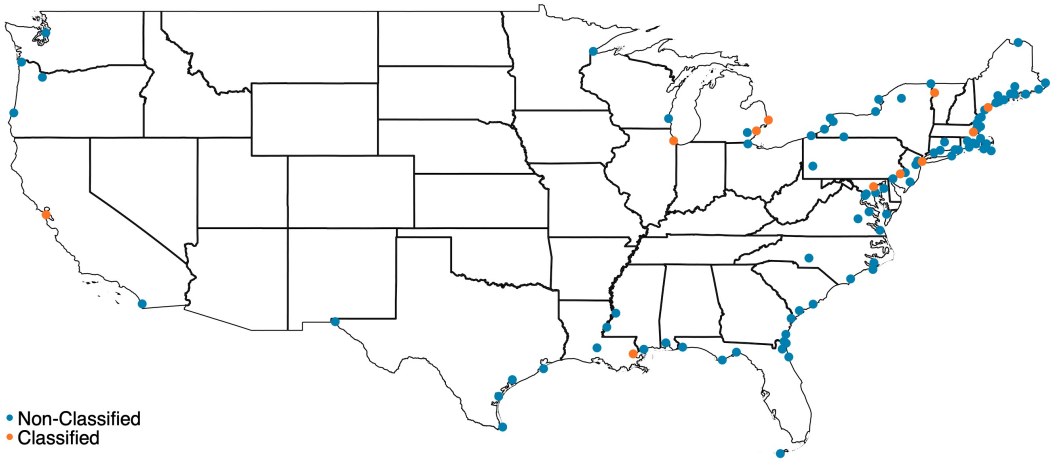
WILSON, JAMES Q. 2019. *Bureaucracy: What government agencies do and why they do it*. Basic Books.

XU, GUO. 2018. The costs of patronage: Evidence from the british empire. *American Economic Review*, **108**(11), 3170–98.

XU, GUO, BERTRAND, MARIANNE, & BURGESS, ROBIN. 2018. *Social Proximity and Bureaucrat Performance: Evidence from India*. Tech. rept. National Bureau of Economic Research.

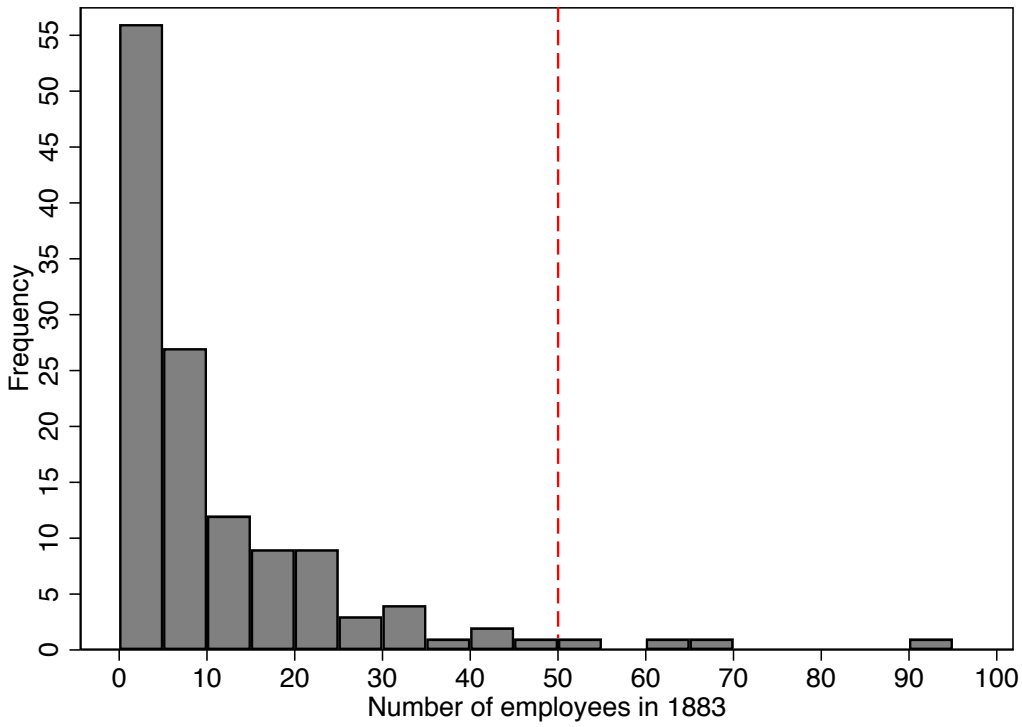
Figures

FIGURE 1: LOCATION OF US CUSTOM HOUSES



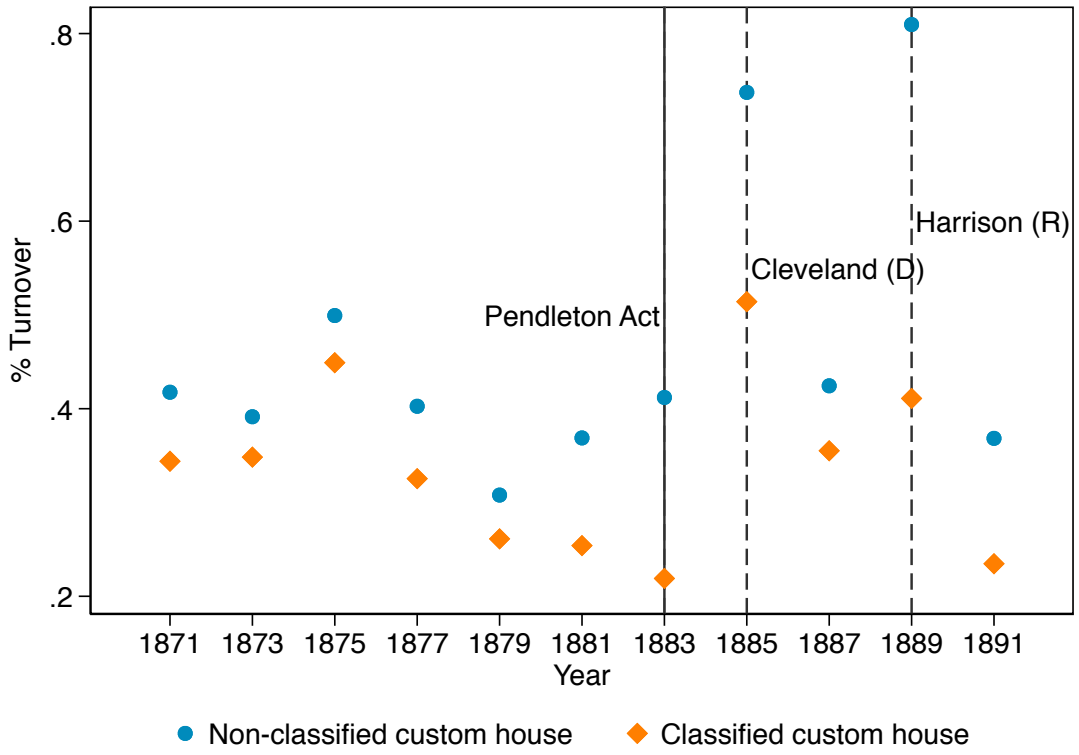
Notes: This map shows the location of the US customhouses that were in operation by 1874.

FIGURE 2: DISTRIBUTION OF THE NUMBER OF EMPLOYEES IN 1883



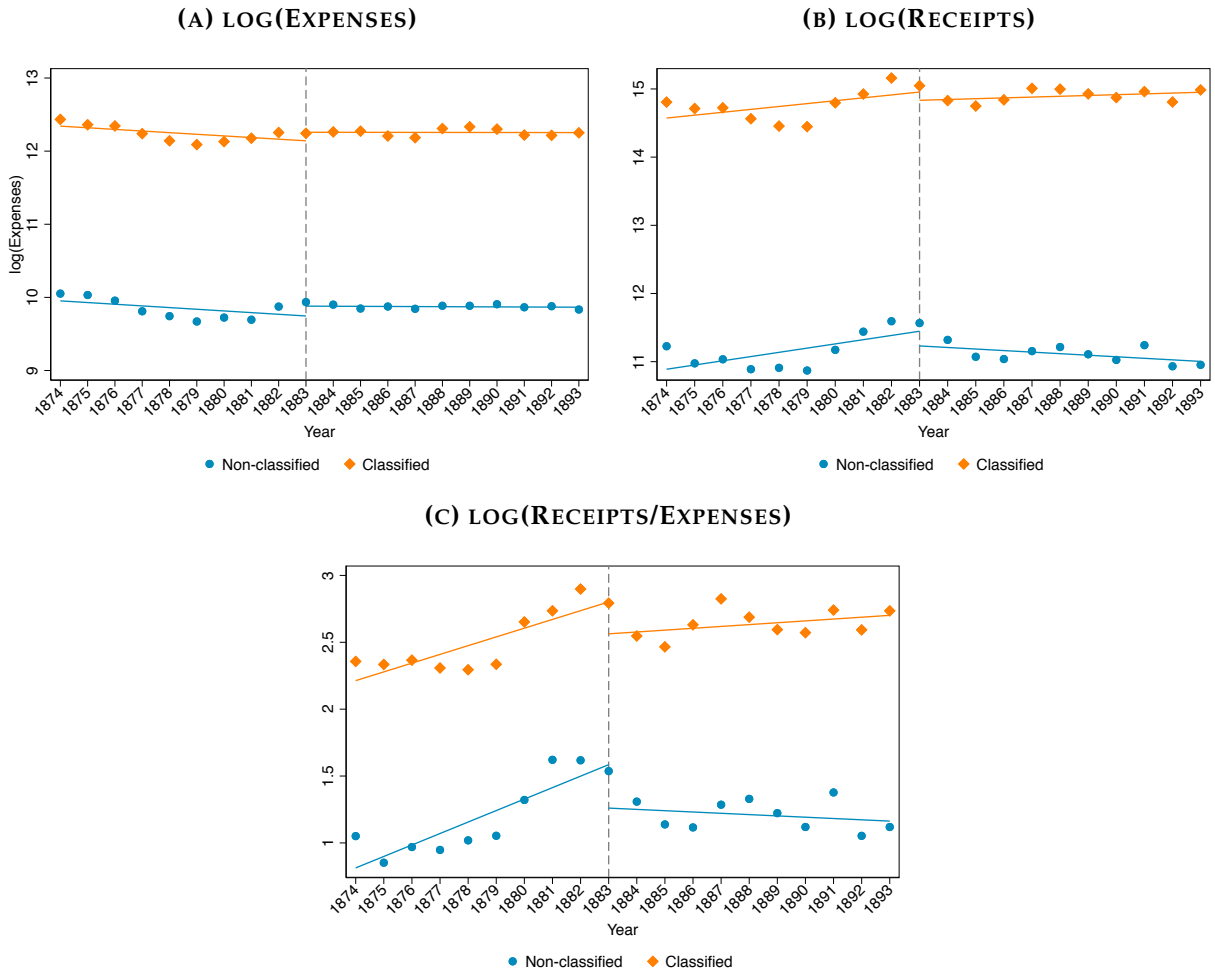
Notes: This histogram shows the empirical distribution of the number of employees across customhouses in 1883. The vertical dashed line corresponds to the cutoff over which customhouses would need to hire some of their employees on the basis of competitive exams. The histogram is restricted to customhouses with at most 100 employees in 1883. Customhouses are grouped in bins of 5 employees (1-5, 6-10, etc.).

FIGURE 3: PROBABILITY OF TURNOVER



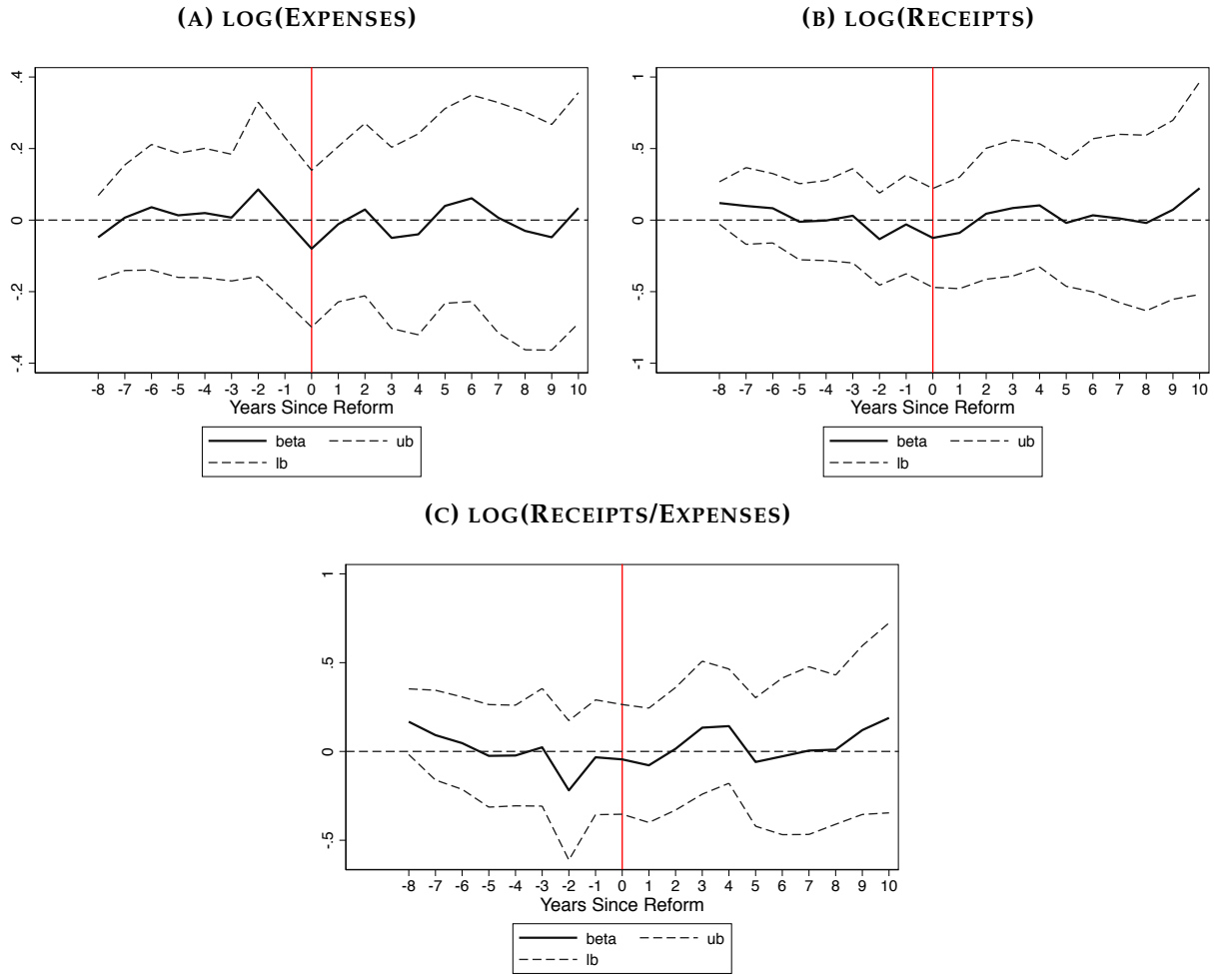
Notes: The y-axis shows the proportion of employees listed in the Official Register of year t as working in customhouse c who will no longer be listed on the following Register (in year $t + 2$). The dashed vertical lines correspond to years in which the Presidency went from a Republican to a Democrat or vice versa.

FIGURE 4: EXPENSES AND RECEIPTS, 1874-1894



Notes: This figure uses the data on receipts and expenses from the Annual Reports of the Secretary of the Treasury (US Congress, 1874-1893) . The figure shows yearly average log receipts (panel (a)), log expenses (panel (b)) and log of receipts over expenses (panel (c)), separately for classified and non-classified customhouses from 1874 to 1893.

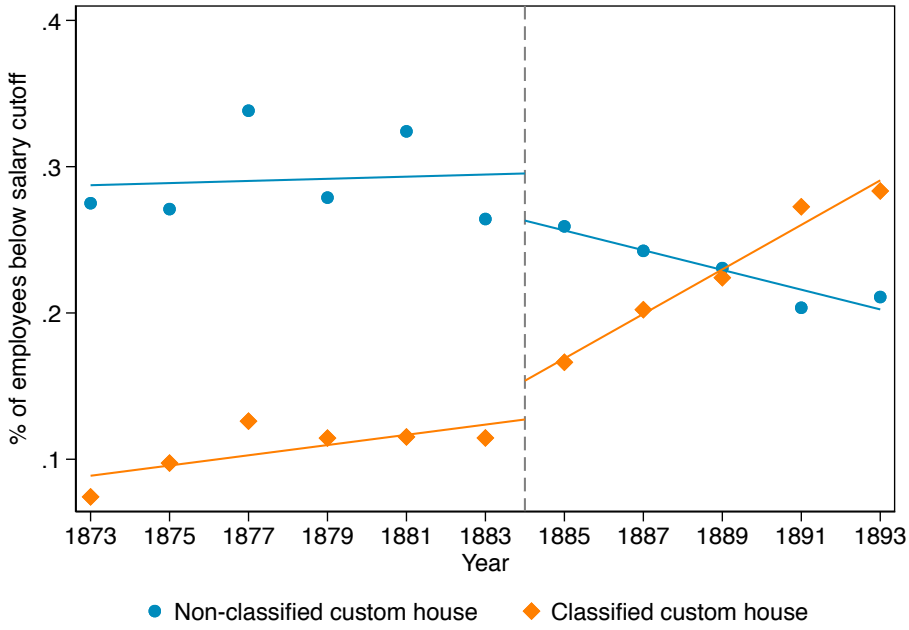
FIGURE 5: EFFECTS OF CIVIL SERVICE REFORM ON RECEIPTS AND EXPENSES, EVENT STUDY REGRESSIONS



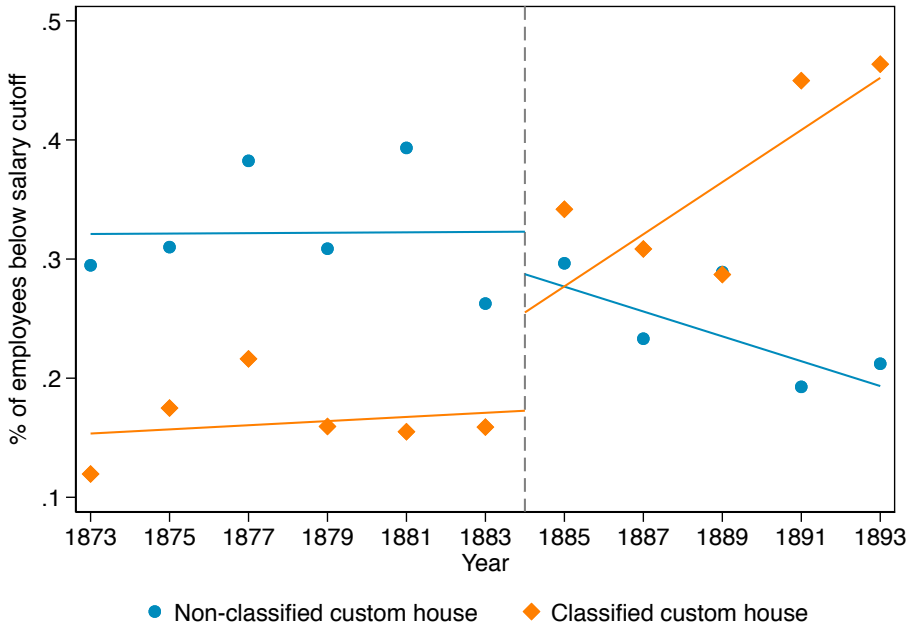
Notes: This figure uses the data on receipts and expenses from the Annual Reports of the Secretary of the Treasury (US Congress, 1874-1893) . The figure shows event-study coefficients corresponding to estimating equation 2 in the main body of the paper.

FIGURE 6: SHARE OF EMPLOYEES BELOW THE EXAM CUTOFF

(A) STOCK OF EMPLOYEES



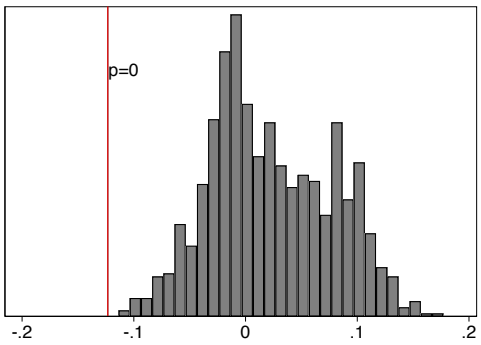
(B) FLOW OF NEWLY-HIRED EMPLOYEES



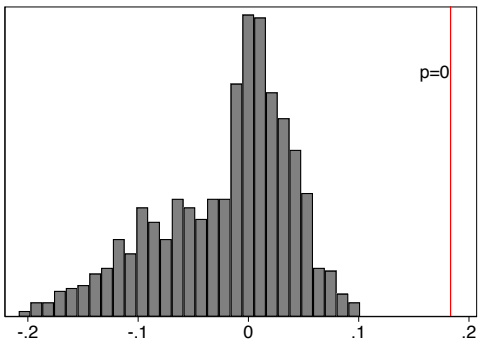
Notes: The y-axis shows the proportion of employees listed in the Official Register of year t who made less than \$900 a year (the cutoff above which employees were subject to exams in classified customhouses). Panel (a) focuses on the stock of employees in year t, whereas panel (b) focuses on the flow of newly hired employees in year t.

FIGURE 7: PERSONNEL PRACTICES, RANDOMIZATION INFERENCE

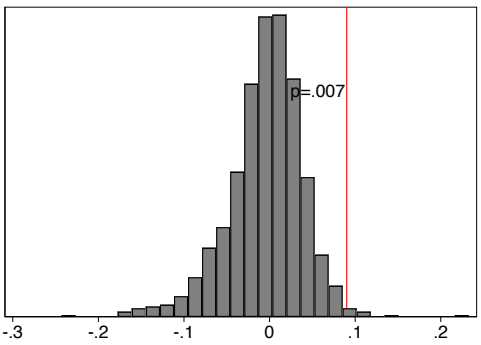
(A) TURNOVER



(B) EXEMPTED OCCUPATION



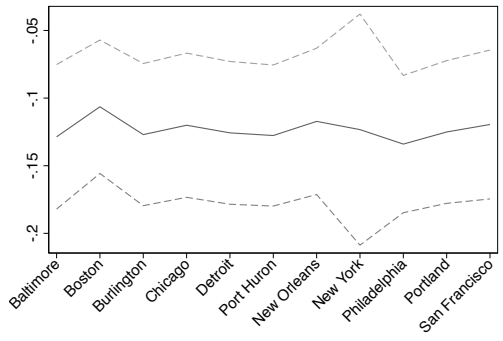
(C) PROFESSIONAL OCCUPATION



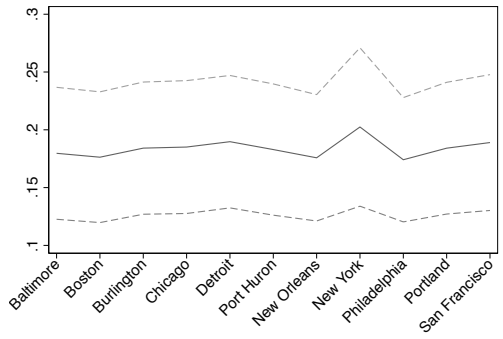
Notes: These figures show the empirical distribution of estimated effects when we implement a randomization inference approach. in this exercise, we randomly select eleven customhouses and estimate the "effects" of the reform using our baseline differences-in-differences setup. The vertical red line corresponds to our estimated effect when we use the actual set of customhouses that were added to the classified civil service. The specification and outcome in Panel (a) correspond to those in column 1 of Table 3. The specification and outcome in Panel (b) correspond to those in column 1 of Table 6. The specification and outcome in Panel (c) correspond to those in Panel (a), column (4) of Table 4.

FIGURE 8: PERSONNEL PRACTICES, EXCLUDING ONE CUSTOMHOUSE AT A TIME

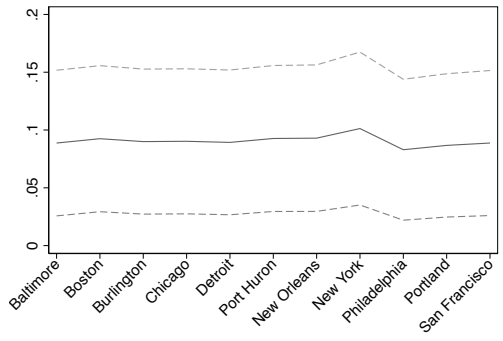
(A) TURNOVER



(B) EXEMPTED OCCUPATION



(C) PROFESSIONAL OCCUPATION



Notes: These figures show the sensitivity of the results to excluding one classified customhouse at at time. The y-axis shows our baseline difference-in-difference estimates around a 95% confidence interval when estimated excluding each of the classified customhouses indicated in the x-axis. The specification and outcome in Panel (a) correspond to those in column 1 of Table 3. The specification and outcome in Panel (b) correspond to those in column 1 of Table 6. The specification and outcome in Panel (c) correspond to those in Panel (a), column (4) of Table 4.

TABLE 1: SUMMARY STATISTICS

	All Non-Classified			Non-Classified (10+ emp.)			Classified		
	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. Customhouse-level statistics									
Total Expenses (000s)	14.66	8.55	15.16	22.94	18.52	16.68	458.58	239.60	718.29
Receipts (000s)	115.08	23.79	231.35	193.56	63.71	292.53	16172.67	2800.06	36472.89
Number of Employees	14.06	10.00	15.02	21.06	18.00	17.74	331.21	194.00	468.05
# Observations	1520	.	.	800	.	.	220	.	.
# Custom houses	76	.	.	40	.	.	11	.	.
B. Employee-level statistics									
Annual compensation	1116.51	1095.00	798.33	1158.76	1095.00	749.66	1356.78	1277.50	679.44
% with compensation <900	0.31	0.00	0.46	0.26	0.00	0.44	0.17	0.00	0.37
Turnover rate	0.47	0.00	0.50	0.47	0.00	0.50	0.34	0.00	0.47
# Observations	12190	.	.	8843	.	.	36700	.	.

Notes: This table shows summary statistics corresponding to the two main data sets that we use throughout the analysis. Panel (a) presents customhouse-level statistics from the "Annual report of the Secretary of the Treasury on the state of the finances" (US Congress, 1874-1893). An observation in this panel corresponds to a customhouse-year. These data cover the 1874-1893 period and are annual. Panel (b) is based on the customhouse personnel records collected from the "Official Registers of the United States" (Department of the Interior, 1871-1893). An observation in this panel corresponds to an employee-year. These data cover the 1871-1893 period and are biennial. Columns (1) to (3) show statistics corresponding to the full set of non-classified customhouses. Columns (3) to (6) show statistics for non-classified customhouses that had 10 or more employees by 1883. Columns (7) to (9) show statistics for the the classified customhouses (that is, those that required exams to some of their employees after 1883).

TABLE 2: F-TESTS FOR EVENT STUDY REGRESSION COEFFICIENTS

(A) CUSTOMHOUSE-LEVEL RESULTS

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	mean	p-value	mean	p-value	mean	p-value	mean	p-value
log(Receipts/Expenses)	.0514	.0314	.0397	.0228	-.0420	.3997	.0028	.0560
log(Receipts)	.0793	.1101	.0784	.1120	-.0399	.3704	-.0690	.2490
log(Expenses)	.0278	.1121	.0387	.1112	.0020	.5504	-.0718	.2304
Comparison group	All	All	5+	5+	10+	10+	20+	20+
Observations	1740	1740	1580	1580	940	940	640	640

(B) EMPLOYEE-LEVEL RESULTS

Notes: This table reports p-values for the hypothesis that all the pre-1883 coefficients on the event-study specification are equal to zero. Each row corresponds to a different outcome variable and each column corresponds to a different estimation sample. Panel (a) focuses on outcomes measured at the customhouse level using data on receipts and expenses from the Annual Reports of Secretary of the Treasury. Panel (b) focuses on employee-level outcomes using data from the Official Registers of the United States.

TABLE 3: TURNOVER

	(1)	(2)	(3)
Classified X After	-0.123***	-0.0752	-0.0539
	(0.0268)	(0.0457)	(0.0356)
Classified X After X Exam		-0.0772**	
		(0.0378)	
Classified X After X Party Turnover			-0.177**
			(0.0706)
Customhouse FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	41252	41252	41252
Mean of dep. var.	0.473	0.473	0.473

Notes: The dependent variable in columns 1 to 3 is an indicator that takes a value of one if employee i in customhouse c who is listed in the Official Register of year t as working in customhouse c is not listed on the following Register of year $t+2$ (the Registers were published every two years). $Classified \times After$ takes a value of one for customhouses that were part of the classified customs service after 1883. $Classified \times After \times Exam$ adds an interaction term that takes a value of one for employees working in positions that were non-exempted from examinations. $Classified \times After \times Partyturnover$ adds an interaction terms for years in which the Presidency went from a Republican to a Democrat or vice versa. Standard errors are clustered at the customhouse level.

TABLE 4: PROFESSIONAL BACKGROUND OF CUSTOMHOUSE EMPLOYEES

(A) PROFESSIONAL OCCUPATION IN CENSUS

	(1)	(2)	(3)	(4)
Classified X After	0.0285	0.0644**	0.0395	0.0901***
	(0.0173)	(0.0269)	(0.0431)	(0.0319)
Customhouse FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7681	2775	929	1846
Sample	All	New hires	New hires, no exam	New hires, exam

(B) UNSKILLED OR NO OCCUPATION IN CENSUS

	(1)	(2)	(3)	(4)
Classified X After	-0.0317	-0.0766*	-0.0511	-0.102**
	(0.0318)	(0.0453)	(0.0744)	(0.0475)
Customhouse FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	7681	2775	929	1846
Sample	All	New hires	New hires, no exam	New hires, exam

Notes: This table uses the data linking the Official Registers to earlier population censuses. An observation corresponds to an employee-year. The sample in column (1) of each of the panels includes the stock of employees in customhouse c in year t. The sample in column (2) focuses instead on newly hired employees in year t (i.e. those employees that are listed on the register of year t but who were not listed in year $t-2$). Columns (3) and (4) further split new hires based on whether they work in a position exempted (column (3)) or non-exempted from examinations (column (4)). Panel (a) focuses on the likelihood that an employee is listed as holding a professional or technical occupation in the census. Panel (b) focuses on the likelihood than an employee is listed as having an unskilled or no occupation in the census.

TABLE 5: EFFECTS OF CIVIL SERVICE REFORM ON EXPENSES AND REVENUE, DIFFERENCE-IN-DIFFERENCES ESTIMATES

(A) LOG(EXPENSES)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Classified X After	0.0141	-0.0540	0.0500	-0.00689	-0.00515	-0.0844	0.0401	-0.0358
	(0.0723)	(0.0693)	(0.0724)	(0.0636)	(0.0810)	(0.0608)	(0.101)	(0.0714)
Region X Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Comparison group	All	All	5+	5+	10+	10+	20+	20+
Observations	1720	1720	1520	1520	920	920	580	580

(B) LOG(RECEIPTS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Classified X After	-0.000742	-0.184	0.125	-0.0317	0.0417	-0.144	0.199	0.0575
	(0.172)	(0.182)	(0.174)	(0.170)	(0.188)	(0.177)	(0.208)	(0.174)
Region X Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Comparison group	All	All	5+	5+	10+	10+	20+	20+
Observations	1720	1720	1520	1520	920	920	580	580

(C) LOG(RECEIPTS/EXPENSES)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Classified X After	-0.0148	-0.130	0.0746	-0.0248	0.0468	-0.0596	0.159	0.0932
	(0.136)	(0.146)	(0.137)	(0.141)	(0.138)	(0.141)	(0.142)	(0.135)
Region X Time FE	No	Yes	No	Yes	No	Yes	No	Yes
Comparison group	All	All	5+	5+	10+	10+	20+	20+
Observations	1720	1720	1520	1520	920	920	580	580

Notes: The dependent variable in Panel A, Panel B and Panel C are respectively the log of total expenses, the log of total receipts, and the natural log of the ratio between the total receipts and expenses. Specification defines in equation 1. $Classified \times After$ takes a value of one for customhouses that were part of the classified customs service after 1883. Odd columns include Year FE and Customhouse FE. Even columns also include $Region \times TimeFE$. Columns (1) and (2) includes in the sample all non-classified customhouses. Column (3) to (8) varies the size of the customhouse as assessed by 1883 that is included in the sample: (3) and (4) customhouses that had 5 or more employees, (5) and 6) customhouses that had 10 or more employees, (7) and (8) customhouses that had 20 or more employees. Standard errors are clustered at the customhouse level.

TABLE 6: PROPORTION OF EMPLOYEES IN POSITIONS EXEMPTED FROM EXAMS

	No Exam		Leadership		Below salary cutoff	
	(1)	(2)	(3)	(4)	(5)	(6)
Classified X After	0.183***	0.260***	0.00436	-0.0228	0.179***	0.283***
	(0.0288)	(0.0313)	(0.0155)	(0.0172)	(0.0297)	(0.0306)
Customhouse FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	44811	15235	44811	15235	44811	15235
Sample	All	New hires	All	New hires	All	New hires

Notes: An observation corresponds to an employee-year. The odd columns focus on the stock of employees in year t, whereas the even columns focus on the flow of newly hired employees in year t. The dependent variable in columns 1 and 2 is an indicator that takes a value of one if an employee works in a position exempted from exams. Columns (3) to (6) further split exempted positions into those that are above the classification cutoff (columns (3) and (4)), and those that are below the classification cutoff (columns (5) and (6)). $Classified \times After$ takes a value of one for customhouses that were made part of the classified system after 1883. The sample in column 1 includes all customhouse' employees. Standard errors are clustered at the customhouse level.

TABLE 7: NUMBER OF EMPLOYEES

	Total	Subject to Exam	Non Subject to Exam
	(1)	(2)	(3)
Classified X After	0.0860	-0.260**	0.619***
	(0.0921)	(0.119)	(0.158)
Customhouse FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	576	560	575

Notes: An observation corresponds to customhouse-year. The dependent variable in column 1 is the log number of employees in customhouse c in year t. The dependent variable in column 2 is the log number of employees in non-exempted positions and in column 3 is the log number of employees in exempted positions. $Classified \times After$ takes a value of one for customhouses that were made part of the classified system after 1883. Standard errors are clustered at the customhouse level.

TABLE 8: EMPLOYEES PAID BELOW THE EXAM CUTOFF HAD WEAKER PROFESSIONAL BACKGROUNDS

	(1)	(2)	(3)	(4)
	Professional Occ.	Unskilled	log(Occscore)	Literate
Below Exam Cutoff	-0.0266**	0.0945***	-0.0479	-0.0190
	(0.0109)	(0.0193)	(0.0806)	(0.0129)
Customhouse FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	2735	2735	2735	2735

Notes: This table uses the data linking the Official Registers to earlier population censuses. An observation corresponds to an employee-year. Standard errors are clustered at the customhouse level.

TABLE 9: PLACEBO, PERSONNEL PRACTICES

(A) 20+ EMPLOYEES

	(1) Turnover	(2) Exempted Occ.	(3) Professional Occ.
Placebo Classified X After	0.0249	0.0345	0.00781
	(0.0349)	(0.0531)	(0.0778)
Customhouse FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8438	8941	470

(B) 30+ EMPLOYEES

	(1) Turnover	(2) Exempted Occ.	(3) Professional Occ.
Placebo Classified X After	0.00360	0.0450	-0.0707
	(0.0301)	(0.0510)	(0.0604)
Customhouse FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8438	8941	470

(C) 40+ EMPLOYEES

	(1) Turnover	(2) Exempted Occ.	(3) Professional Occ.
Placebo Classified X After	-0.00701	-0.0199	0.0237
	(0.0227)	(0.0651)	(0.0838)
Customhouse FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	8438	8941	470

Notes: This table uses the data linking the Official Registers to earlier population censuses. An observation corresponds to an employee-year. Standard errors are clustered at the customhouse level.

A Appendix

A.1 Linking the Official Registers to the Census

In our baseline approach, we link individuals using information on their names and place of birth. Unlike census-to-census links, we lack precise information on an individual's age that could be use to disambiguate between matches with similar names and places of birth.[50] In addition, we also lack direct information on an individual's gender (other than the information contained in names). As a result of this limitation, we are only able to uniquely identify individuals who are unique based on their combination of place of birth and full name.

Given that we have less identifying information than is available in census-to-census linking, we need to adjust our linking approach accordingly. Our linking algorithm has the following steps:

1. Clean names in the Registers and the Census to remove any non-alphabetic characters and account for common misspellings and nicknames (e.g. so that Ben and Benjamin would be considered the same name).

2. For each individual in the Register, search for a potential match in the Census. Potential matches are individuals who:

   (a) Report the same place of birth (states for the US born, country for foreigners). We exclude observations in the official registers which lack information on birthplace.

   (b) Have a reported age in the census such that they would have been between 18 and 65 years old at the time of the Register (for instance, when linking the 1881 register to the 1850 census we look for people aged 0 to 35 in 1850).

   (c) Have a first name and a last name within a Jaro-Winkler distance of c_1, where $c_1 \in [0, 1]$. The Jaro-Winkler distance is a string distance measure such that a value of zero corresponds to two identical strings and a value of one corresponds to two strings with no common characters. We allow for non-identical strings to be considered a match to deal with transcription errors in the Census and for OCR errors in our digitization of the Official Registers. Intuitively, the lower the value of c_1 the lower the number of cases we will match someone to an incorrect individual.

   (d) There is no other potential link with a first name and a last name within a Jaro-Winkler distance of c_2, where $c_2 \in (c_1, 1]$. That is, we impose that, if the closest individual is within a Jaro-Winkler distance of c_1, the second closest potential match needs to be at a distance of at least c_2 with $c_2 > c_1$. For a given value of c_1, a higher value of c_2 represents a more conservative choice.

[50] We can however use the fact that individuals are not expected to work at very young and very old ages, which helps with disambiguation in some cases. Specifically, we assume that individuals working in the federal government are between the ages of 18 and 65.

Figure A4 shows the proportion of individuals that we match to at least one census (and to at least 2, 3 and 4, respectively) by register year when using our baseline choice of parameters. In this figure, we focus on matches to censuses conducted before each register year. On average, we are able to find at least one match for about 20% of the customhouse employees. We expect a lower proportion of individuals in later register years to be matched to at least one adult observation, as the last census we include is 1880 and some employees would have been less than 18 years old by this year (particularly those employed in later years).

Representativeness of linked data. In our main analysis using linked data, we assess how the characteristics of customhouse employees changed with the passing of the Pendleton Act. Our sample in this analysis includes *only* employees of the US customs service who were successfully linked to at least one observation in the census. Specifically, we compare the characteristics of bureaucrats in classified customhouses to those in non-classified customhouses, before and after the implementation of the reforms. Hence, for our analysis to be biased by selection it would need to be the case that selection into linkage changed *differentially* for individuals in classified customhouses after the reforms. This is unlikely because our linking procedure is exactly the same throughout all sample years and across customhouses.

To further alleviate this concern, we estimate our main difference-in-differences specification but using as outcome variables: (1) the total number of census to which we link an employee, or (2) and indicator that takes a value of one if the employee is linked to at least one observation in the census. Figure A5 shows that, while employees in non-classified customhouses are more likely to be matched throughout the period of analysis, there is no evidence that such difference became larger or smaller after the reform. Indeed, Table A1 in the Online Appendix shows that there is no correlation between the reform and the likelihood of matching an individual to a census. Hence, it is very unlikely that the change in the professional background of employees that we document is due to biases in linking.

A.2 Further details on data construction

A.3 Definitions for custom houses' revenue variables

The following are the detailed definitions of the different types of revenues received by custom houses that are presented in the Annual Reports of the Secretary of the Treasury on the state of the finances.

Fines: There are two distinct sources of fines that may be imposed by and collected by customs officers. The first are the collection of fines under navigation laws and steamboat inspection laws, which are punishable by penalties provided by law and collected by customs officers for minor infractions and by fine or imprisonment imposed by a United States district court for major offenses (The Customs Service History). The second source is the imposition of fines upon illegal importations in the mails, which are handled by the Entry Division of the Office of the Collector, wherein the Entry Division is responsible for all matters relating to the entry of merchandise (The Customs

Service History). The authorities responsible for imposing these penalties are the customs officers of the Office of the Collector, the Commissioner of Navigation, and the officers of the Steamboat Inspection Service.

Steamboat fees: The Steamboat Act of 1852 extended the duties of collectors of customs to the field of domestic navigation and determined that custom houses were "[...] required to enforce the provisions of the act against all steamers arriving in or departing from their districts. The fees for inspection and for issuing licenses to officers of vessels were collected by the inspectors and paid over to the collectors, to whom each inspector made a semi-annual report of his official acts and doings" (The Customs Service History). Steamboat fees show up as a source of revenue for the last time in 1887.

Marine hospital tax: There are two types of dues paid as part of the Public Health Service (previously Marine Hospital Service). The first is comprised of two sources, one from the fact that all "ships arriving from a foreign port should pay the collector twenty cents a month for every seaman employed" and another defined as hospital charges which were for "foreign seamen given treatment in the marine hospitals operated by the Public Health Service" (The Customs Service History). The second are quarantine charges which are for the "disinfection of vessels or merchandise or for the subsistence and other charges on account of passengers or members of crews detained in quarantine" (The Customs Service History). All the charges related to the marine hospital tax were collected by customs officers of the Office of the Collector. Marine hospital taxes show up as a source of revenue for the last time in 1887.

Emolument fees: As described in The Customs Service History, collectors of customs were allowed, under the provisions of the law, to receive compensations in way of emoluments (that is, fees that arise from the office of collector), for example "blank manifests and clearances".

Services of US officers: Jointly with "other collections that pertain to the account for expenses of collecting the revenue from customs" (Treasury Decisions under Tariffs and Internal Revenues, 1898), any officer in the customs service is allowed to charge for services rendered, such as the ones described for collectors of customs under Section 2654 of the Revised Statutes of the United States of 1878.

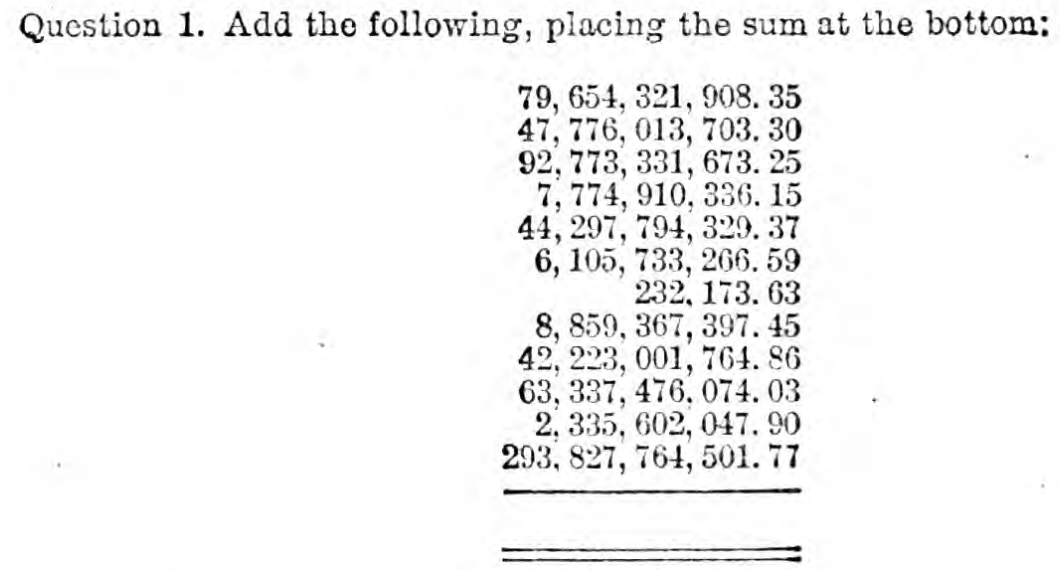
Labor, drayage and storage: Drayage fees are collected by customs officers as charges for transfers of packages from the wharf to appraisers' stores on appraisement entries or on defective invoices, and for merchandise sent into general order to bonded warehouses (Treasury Decisions under Tariffs and Internal Revenues, 1898). Storage fees are collected for merchandise kept at bonded warehouses that have not yet payed import or export duties (Treasury Decisions under Tariffs and Internal Revenues, 1898).

Weighing fees: Under section 2920 of the Revised Statutes of the United States, custom houses were authorized to charge for weighing merchandise at the time of original entry, in addition to the usual *ad valorem* and specific duties collected (Treasury Decisions under Tariffs and Internal Revenues, 1898). Charges for weighing are the responsibility of the Office of the Surveyor.

Receipts: The total receipts reported by custom houses include tonnage taxes, light money, pro-

ceeds of goods seized and sold, as well as all revenues from duties collected. The tonnage tax is given by "two cents a ton, but not exceeding ten cents a ton in any one year is imposed on each vessel entered from any foreign port in North America,' Central America, the West Indies, Bahama and Bermuda Islands, the coast of South America bordering on the Caribbean Sea, and Newfoundland. On vessels entering from any other foreign port the tax is six cents a ton, but not exceeding thirty cents in any one year" (The Customs Service History). Additionally, "penalty taxes of fifty cents a ton and light money of fifty cents a ton are levied on foreign vessels not entitled by law or treaty to equality of treatment in respect of these charges with vessels of the United States" (The Customs Service History). Computation and collection of the tonnage tax and light money as well as the liquidation of seized goods are done under the Office of the Comptroller, while the collection of duties is done by the Office of the collector.

FIGURE A1: EXAMPLE QUESTION, ARITHMETICS EXAM

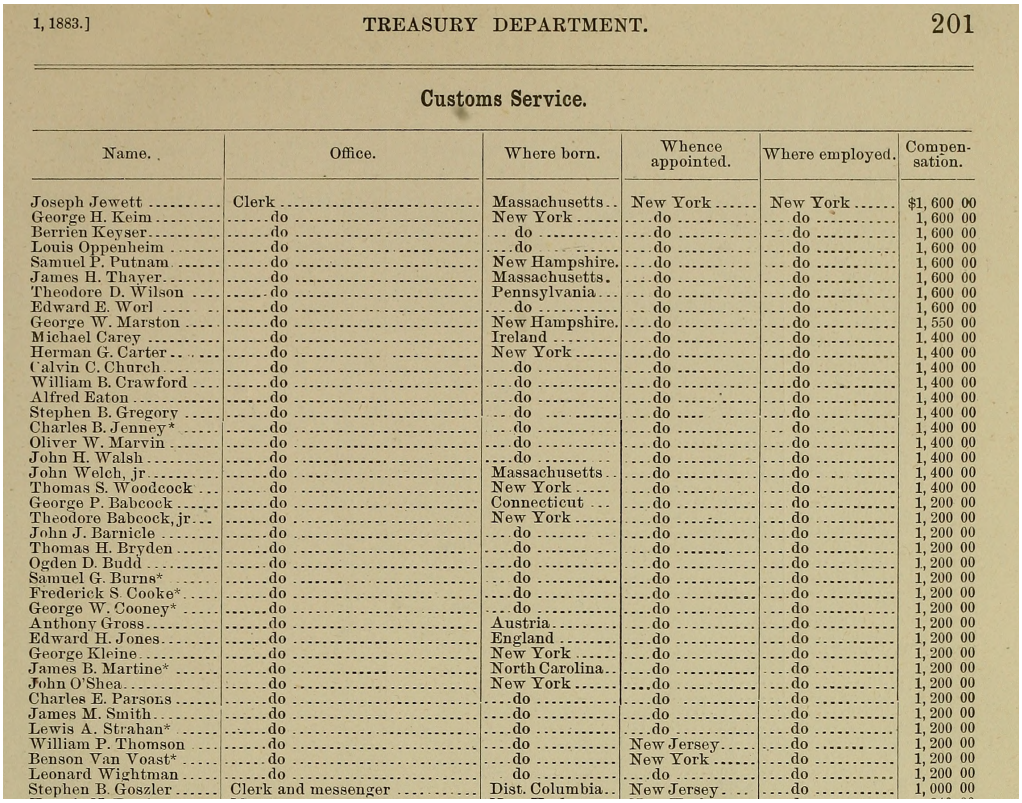


Question 1. Add the following, placing the sum at the bottom:

79, 654, 321, 908. 35
47, 776, 013, 703. 30
92, 773, 331, 673. 25
7, 774, 910, 336. 15
44, 297, 794, 329. 37
6, 105, 733, 266. 59
232, 173. 63
8, 859, 367, 397. 45
42, 223, 001, 764. 86
63, 337, 476, 074. 03
2, 335, 602, 047. 90
293, 827, 764, 501. 77

Notes:

FIGURE A2: EXAMPLE PAGE, OFFICIAL REGISTERS OF THE UNITED STATES



1, 1883.] TREASURY DEPARTMENT. 201

Customs Service.

Name.	Office.	Where born.	Whence appointed.	Where employed.	Compensation.
Joseph Jewett	Clerk	Massachusetts	New York	New York	$1,600 00
George H. Keim	do	New York	do	do	1,600 00
Berrien Keyser	do	do	do	do	1,600 00
Louis Oppenheim	do	do	do	do	1,600 00
Samuel P. Putnam	do	New Hampshire.	do	do	1,600 00
James H. Thayer	do	Massachusetts.	do	do	1,600 00
Theodore D. Wilson	do	Pennsylvania	do	do	1,600 00
Edward E. Worl	do	do	do	do	1,600 00
George W. Marston	do	New Hampshire.	do	do	1,550 00
Michael Carey	do	Ireland	do	do	1,400 00
Herman G. Carter	do	New York	do	do	1,400 00
Calvin C. Church	do	do	do	do	1,400 00
William B. Crawford	do	do	do	do	1,400 00
Alfred Eaton	do	do	do	do	1,400 00
Stephen B. Gregory	do	do	do	do	1,400 00
Charles B. Jenney*	do	do	do	do	1,400 00
Oliver W. Marvin	do	do	do	do	1,400 00
John H. Walsh	do	do	do	do	1,400 00
John Welch, jr	do	Massachusetts	do	do	1,400 00
Thomas S. Woodcock	do	New York	do	do	1,400 00
George P. Babcock	do	Connecticut	do	do	1,200 00
Theodore Babcock, jr	do	New York	do	do	1,200 00
John J. Barnicle	do	do	do	do	1,200 00
Thomas H. Bryden	do	do	do	do	1,200 00
Ogden D. Budd	do	do	do	do	1,200 00
Samuel G. Burns*	do	do	do	do	1,200 00
Frederick S. Cooke*	do	do	do	do	1,200 00
George W. Cooney*	do	do	do	do	1,200 00
Anthony Gross	do	Austria	do	do	1,200 00
Edward H. Jones	do	England	do	do	1,200 00
George Kleine	do	New York	do	do	1,200 00
James B. Martine*	do	North Carolina	do	do	1,200 00
John O'Shea	do	New York	do	do	1,200 00
Charles E. Parsons	do	do	do	do	1,200 00
James M. Smith	do	do	do	do	1,200 00
Lewis A. Strahan*	do	do	do	do	1,200 00
William P. Thomson	do	do	New Jersey	do	1,200 00
Benson Van Voast*	do	do	New York	do	1,200 00
Leonard Wightman	do	do	do	do	1,200 00
Stephen B. Goszler	Clerk and messenger	Dist. Columbia	New Jersey	do	1,000 00

FIGURE A3: EXAMPLE OF A COLLECTOR WHO DIED WHILE IN OFFICE

DEC. 19, 1889.] EXECUTIVE JOURNAL. 245

To the Senate of the United States:

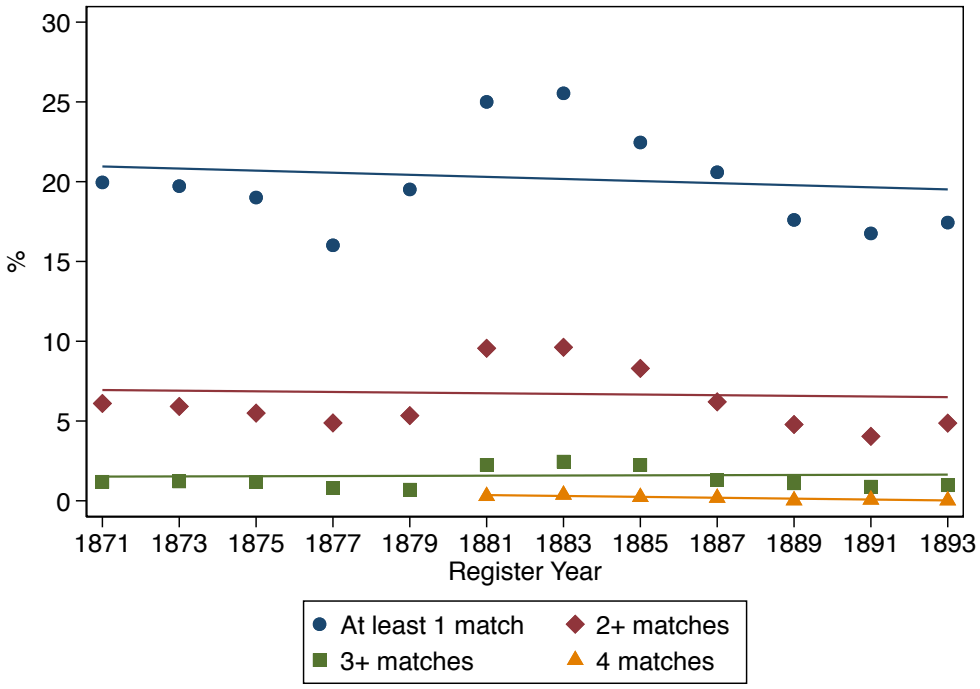
I nominate T. Jefferson Jarrett, of Virginia, to be collector of customs for the district of Petersburgh, in the State of Virginia, to succeed Peter F. Cogbill, deceased.

Mr. Jarrett was temporarily commissioned during the recess of the Senate, June 13, 1889.

BENJ. HARRISON.

EXECUTIVE MANSION, *December 19, 1889.*

FIGURE A4: MATCH RATE BY REGISTER YEAR



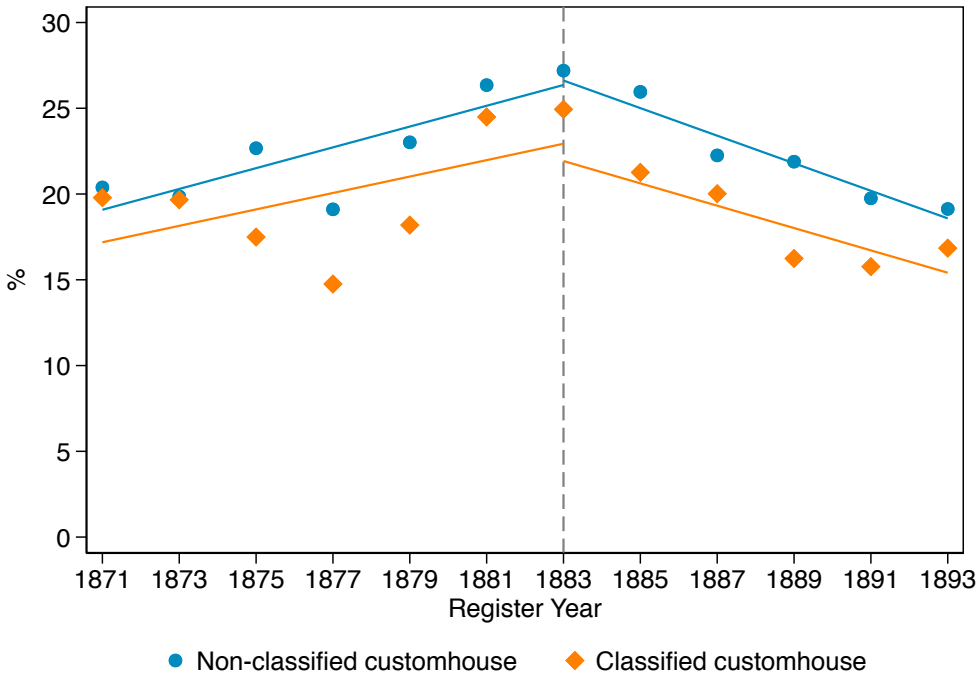
Notes: This figure shows the percent of customhouse employees that are matched to at least 1, 2, 3 or 4 censuses, by register year.

TABLE A1: NO EFFECTS OF THE REFORM ON PROBABILITY OF MATCHING

	(1) At least 1 match	(2) N. of matches
Classified X After	-0.0112 (0.0215)	-0.00320 (0.0300)
Customhouse FE	Yes	Yes
Year FE	Yes	Yes
Observations	41764	41764

Notes: The dependent variable in column (1) is an indicator that takes a value of one if a customhouse employee is successfully matched to an observation in the census. The dependent variables in column (2) is instead the total number of censuses to which a customhouse employee is matched to.

FIGURE A5: MATCH RATE BY REGISTER YEAR AND CLASSIFICATION STATUS



Notes: This figure shows the percent of customhouse employees that are matched to at least one observation in the census, by register year and depending on whether the individual worker in a classified or a non-classified customhouse.