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The Allocation of Talent and Financial Development, 1897 to 1936

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Abstract. We examine how the supply of talent affected financial development based on an experiment that abruptly changed the allocation of talent in historical China. Under the meritocratic civil examination system, government service was the main employment for the Chinese intellectuals. The abolition of this system in 1905 reduced the status and wealth attached to government service, which led the intellectuals to turn to modern banking as a high-status sector of employment. We find that regions where there were more candidates for the civil examination produced more financial professionals after 1905, which translated to a greater development of modern banking.

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Keywords: allocation of talent • human capital • modern banks • financial development • China • civil examination

1. Introduction

The relationship between finance and growth has been well recognized in the literature on financial development (Levine 1997). However, the fundamental roots of historical financial development received little empirical evidence. This question has been the subject of wide discussion from the perspectives of institutional environment (La Porta et al. 1997, 1998; Acemoglu et al. 2001; Levine 2005), technological advances (Lin et al. 2021), culture and religion (Stulz and Williamson 2003), and other historical endowments (Pascali 2016, D'Acunto 2017, D'Acunto et al. 2019), among others. In this paper, we attempt to examine the role of human capital, in particular the supply of its "upper tail," in financial development.

By providing distinct pecuniary rewards and prestige, the financial sector has attracted an increasing amount of talent (e.g., Philippon and Reshef 2012, D'Acunto and Frésard 2018, Ferreira and Nikolowa 2024). In both developed and developing economies, quite a few of the best students aim to major in business and finance and compete to enter banks or other financial institutions.[1] Just as Murphy et al. (1991, 1993) suggest, the occupational choice of such talent is primarily shaped by the rewards.[2] Meanwhile, they also propose an issue of reversal causality: the allocation of talent plays a pivotal role in affecting economic growth, as growth would be inhibited if talent was absorbed from the productive or innovative sectors into the rent-seeking ones. To what extent the influx of talent into the finance industry contributes to financial development, however, remains an empirical question. The main challenge in examining the effect of talent allocation on financial development lies in the reciprocal relation between the supply of talent and the demand (reward) for it from the financial sector.

We examine the effect of talent on financial development by making use of a historical experiment that abruptly changed the allocation of talent in late Qing China. From the seventh century onwards, China developed an imperial civil examination system (*keju*)—the earliest meritocratic institution in the world—to select officials. The examination was opened to people of all family backgrounds, and thus provided commoners the only institutionalized "ladder of success" in traditional China. Millions of candidates sat in the triennially held examinations, competing for academic qualifications in order to enter officialdom or, at least, attain "gentry"

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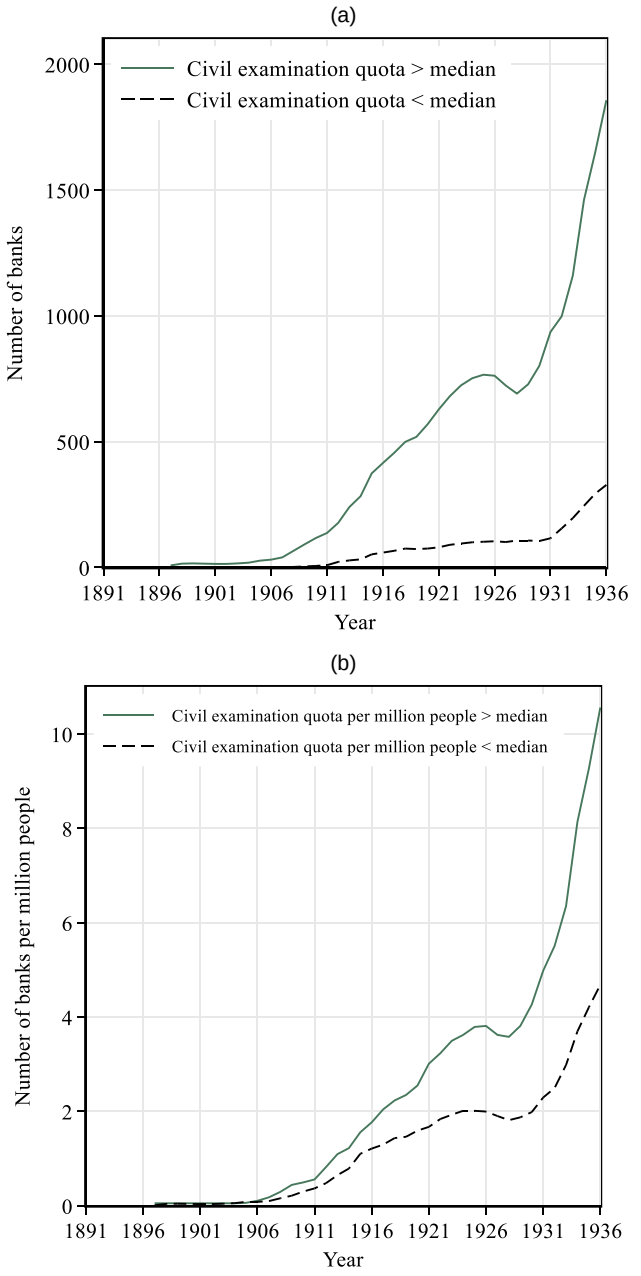
status. By passing the examinations, they became scholar-officials (*shi*), the elite who sat at the top of traditional Chinese society, being entitled to the highest political, economic, and cultural privileges (Elman 2000). By providing an established channel of upward mobility, the civil examination absorbed most if not all Chinese talent into the preparation for the exams, or, to borrow the term of Murphy et al. (1991), the "rent-seeking sector," at the expense of shrinking the human capital pool of the productive sectors. Therefore, the "misallocation" of talent under the civil examination system has been viewed as a reason behind China's stagnation in modern science and industrialization after the 14th century, a time when the civil examination became fully institutionalized (e.g., Needham 1969, Baumol 1990, Lin 1995, Mokyr 2016).

In September of 1905, the Qing dynasty abolished the civil examination system, as the system was denounced as responsible for China's military defeats by Western powers and Japan since 1842. The abolition exerted a shock on the Chinese learned class, frustrating their plans for career mobility along the scholar-to-official track. Although the learned elites' civil service ideal might have been undermined by the emergence of modern economic sectors after China's opening up to the West in 1842, the abolition of the civil examination system finally disillusioned them, forcing them to seek alternative outlets for wealth and status. Indeed, many of the educated elite deliberately developed modern industrial firms following the Western models (Bai 2019), whereas others sought a more radical way of political success by organizing revolutionary parties to overthrow the dynastic rule (Bai and Jia 2016), and the remaining others may have used their privileges as literati to become teachers, lawyers, and other knowledge-intensive professionals (Elman 2000).

Modern banking provided another (and more attractive) new path to success for the educated elite. Compared with businessmen, teachers, and other new professionals, bankers were the upper tail of the business elite, enjoying not only higher pecuniary rewards but also more prestigious work environments, social status, and political connections. Backed by their intellectual ability, liberal-arts training, and social capital, the educated men trained for the civil examination system were competent candidates for the modern financial elite of China. Indeed, many of them were employed by foreign banks as "compradors," a unique group of managers-cum-middlemen who helped connect foreign businesses to the Chinese market (Hao 1988). Some of them borrowed the institutions and management of Western finance and established Chinese modern banks from 1897 (the foundation of the first Chinese modern bank, the Imperial Bank of China (IBC)). Indeed, the growth of Chinese modern banking did not gain momentum until the first decade of the 20th century, a time coinciding with the abolition of the civil examination (Figure 1). Moreover, banking grew faster in regions which had more exam elites (and thus a greater shock

Figure 1. (Color online) Growth of Modern Banks in China



Notes. (a) Number of banks in higher- and lower-examination-quota regions. (b) Number of banks in higher- and lower-examination-quota regions (per million people). The figure shows the divergent development of modern banks between prefectures with higher civil examination quotas and those with lower quotas over time. The quota determined the upward mobility rate of prefectural elites to the gentry class and officialdom before the civil examination was abolished in 1905. Prefectures are divided into higher quota and lower quota by the median quota of the 281 sample prefectures. Panel (a) uses the original number of banks and quota. Panel (b) normalizes the number of banks and quota by prefectural population in 1880 (in millions). Modern banks refer to banks (and branches) founded and run by Chinese following the modern (Western) bank model.

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from the abolition of the examination) than it did in other regions.

To assess the extent to which modern banking was promoted by the supply shock of talent after the abolition of the civil examination, we employ a difference-in-differences strategy. The first difference captures the increased number of modern banks after the abolition of the civil examination in 1905. The second difference captures the spatial variation in the increased number of banks across prefectures that previously varied by civil examination quota. To ensure more chances of social mobility across regions, the Qing dynasty had assigned an exam quota to each prefecture. The quota granted to each prefecture was mainly based on prefectural size and historical performance in the examinations. Consequently, across the 281 prefectures in our sample, the quota varies between 2 and 422. By the 1720 s, the quotas had become fixed and changed little. Because the quotas capped the number of candidates who could eventually enter the gentry class and officialdom, such regional variation in the quotas directly shaped the odds of exam success. In regions with a higher quota, a larger share of talent would be more likely to be drawn to the civil examinations and, accordingly, to be released to the modern financial sector after the examination system was abolished.

Based on the records in historical gazetteers and government yearbooks, we collected information about 821 modern banks (and their 3,412 branches) between 1897 and 1936. We enumerate the banks across the 281 prefectures on an annual basis. The regression results show that the increase in modern banks after the abolition of the civil examination was significantly greater in prefectures with higher civil examination quotas. On average, doubling the size of the quota was associated with an increase of about two banks per prefecture per year after 1905. The quota has no effect on the number (and growth trend) of modern banks before the abolition of the civil examination, which provides a placebo to demonstrate that the quota effect on banking after 1905 is unlikely to have been driven by unobserved correlates of the civil examination.

To further confirm the effect of civil examination abolition on banking development, we conduct the following robustness checks. First, we control for possible factors that correlate with both the distribution of exam quotas and of banks. These include a prefecture's population (the main yardstick in exam quota allocation in the Qing dynasty), the distance to the coast, and prefectural land area. We interact each of them with the post-1904 time dummy, assuming that their effect on banking development might change upon the abolition of the civil examination. Second, to mitigate the concern that the effect of civil examination abolition on banking might be driven by modern economic growth, we control for the number of industrial firms, which allows us to consider the fact that industrialization was the main engine of modern growth while also generating the main financial needs in early 20th-century China. In addition, we also control for the number of telegraph stations—a major modern communications tool that facilitated banking expansion (Lin et al. 2021) and the number of treaty ports—the fountainheads of economic modernization in China. After the inclusion of these drivers of economic development, the coefficient of the exam quota on banks shrinks by about 40%, whilst the direct effect of the talent from the past civil examinations remains significant and substantial.

We then provide evidence on the talent flow to modern finance after the abolition of the civil examination. We measure the talent flow using the distribution of bankers between 1897 and 1936, based on the biographical records of bank board members and managers in the *Banking Yearbook* and the *Dictionary of Institutions and Peoples of Modern Banking in China*. The results show that prefectures with higher civil examination quotas produced significantly more bankers after the abolition of the examination, suggesting a reallocation of talent from civil service to finance.

The talent reallocation effect is further reinforced by students' choice of major after the civil examination was abolished. Based on the government statistics of vocational education in 1919 and 1934, we calculated the share of students who majored in business (and finance) and found that the share was significantly higher in prefectures where there had been higher civil examination quotas prior to 1905. Moreover, the effect of civil examination quotas on the share of business-major students is greater than its effect on the share of students of other modern (industrial) majors, suggesting that modern banking as a new profession for wealth and status attracted disproportionately more talent than other modern sectors did.

Given the "push" effect of the civil examination abolition, the remaining question is what "pull" factors directed talents to modern banking amongst a variety of modern occupational choices. In addition to the overall high compensation rate in modern banking, the local growth opportunity of banking may provide talents with additional incentives to take a finance job. Using the presence of banks before 1905 as a proxy for the higher financial needs (thus greater growth potential), we find that the effect of civil examination abolition on financial talent growth is significantly greater in prefectures with higher growth potential in finance. Another pull factor is the proximity to foreign banks. This is because modern Chinese banks were developed according to Western models, and the proximity to foreign banks determined the chance and cost of learning modern finance from the West (Cheng 2003). Using the distance to the nearest foreign bank as a proxy for the geographic spillover of modern finance, we find that

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the effect of civil examination abolition on the number of modern Chinese bankers after 1905 is significantly greater in or near the prefectures in which a foreign bank was headquartered.

The above findings indicate the importance of talent allocation for the rise of modern finance and, in a broader sense, for modern economic growth (Baumol 1990, Murphy et al. 1991). By focusing on modern banking development in China, our study is consistent with the findings of Bai (2019) in that the talents released from the traditional civil service system promoted the adoption of modern (Western) technologies and thus industrial development in China. Moreover, we find that the talent influx into modern banking did not limit industrial development. Instead, it reduced the access cost to external finance and consequently promoted industrial development, especially in sectors with higher financial needs. This also reminds us of the findings of Braggion et al. (2020) on the importance of bank loans in sustaining firm operation and social order in early 20th-century China.

Our study also speaks to the literature on the economic impacts of talent allocation in other contexts. Notably, the economic rise of Western Europe since the 15th century benefited from the reallocation of human capital from religious to secular sectors upon the Protestant Reformation (Cantoni et al. 2018), and further from the Enlightenment movement that inspired learned elites to study industrial technologies and useful knowledge (Mokyr 2016). Likewise, in contemporary times, Hsieh et al. (2019) find that the improved allocation of talent (to the high-skilled professions) significantly contributed to U.S. economic growth between 1960 and 2010.

The rest of the paper is organized as follows. Section 2 offers the historical background of the civil examination and modern financial development in late 19th- to early 20th-century China. Section 3 introduces the empirical strategy and data. Our main results on the effect of civil examination abolition on banking development are presented and discussed in Section 4. To understand the channels of human capital reallocation further, Section 5 conducts further tests on the relation between civil examination quota and the distributions of bankers and business-major students, and on the role of local financial development in channeling educated elites to modern banking. Section 6 provides evidence of the positive impacts of talent reallocation on the development of industrial firms that were dependent on external finance. Concluding remarks are offered in Section 7.

2. Historical Background

2.1. The Intellectual Foundation of Modern Finance

Upon opening up in 1842, China was introduced to modern finance. After the British established a branch of the Oriental Bank in Hong Kong in 1845, modern foreign banks gradually expanded their business in China and served a growing international trade and commerce (Cheng 2003). The year 1897 witnessed the birth of the first Chinese modern bank, the IBC. By 1936, the number of Chinese banks had reached 259, with 1,926 branches in 207 (72%) Chinese cities. Different from the traditional Chinese money houses that provided small loans and other informal financial services locally, modern banks were much more professional and institutionalized in management, assembled more shareholders and capital, and operated on a greater geographic and economic scale (Sheehan 2003).

Accordingly, modern banking had distinct requirements for human resources. For example, unlike the apprenticeship in money houses, modern banks relied on the market of professionals and had a formal human resource management system. They recruited managers and staff through examinations, and required the candidates to have a broad intellectual horizon (Ji 2016). In the context of late 19th- to early 20th-century China, a qualified candidate had to master not only the knowledge of modern finance and business but also foreign languages, laws, mathematics, and geography, among others. Equally important was a grounding in Chinese culture while having an international outlook. For example, in the recruitment examination for the Bank of Communications in 1936, the exam questions included Chinese, English, bookkeeping, and algebra, and required candidates to write an essay on current important economic issues (Liu 2016).

China had in fact prepared a human capital pool for modern economic transition. Thanks to the millennium-long civil examination system, China had developed a nationwide school system. The schools were run by the county and prefectural governments and were connected to the civil examination. Intended to select qualified officials for the empire, the examination was open to all social strata and thus provided commoners a primary way for upward mobility. In imperial China, becoming a scholar-official was the common dream of students. Therefore, the civil examination fostered a literati with a respect for learning (Chen et al. 2020). It was not uncommon in late imperial China that students attended schools from very young ages (usually about six), prepared for the examinations, and took them multiple times in the event of failure.[3]

In order to pass the highly competitive examinations, candidates had to master a wide range of knowledge pertaining to statecraft. First and foremost were the Confucian classics, which collected moral, philosophical, and other humanistic works of great Confucian scholars from ancient times. To consolidate the orthodoxy of Confucianism, the imperial authorities had continuously promoted Confucian classics as the major examination curricula from the 10th century onward.

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In addition, to meet the various administrative needs of government, the examination also tested students on practical knowledge; this included mathematics, geography, agriculture, medicine, and also economy and public finance (Elman 2000).

This group of literati provided a human resource pool for China's modern transition in the late 19th century. However, the highly institutionalized civil examination system offered overwhelming rewards to the degree holders. On average, the income of the degree holders was up to 16 times higher than that of commoners in the Qing dynasty (Chang 1955, 1962). For this reason, Chinese talent before the 20th century had been absorbed into the realm of civil service.[4] This human capital structure remained in place until 1905.

2.2. The Reallocation of Talent to Modern Finance

The Confucian regime faced unprecedented challenges after China was defeated by Britain in the First Opium War (1839–1842). After the War, China was forced to open up to Western powers. Shocked by the military and industrial superiority of the West, Chinese elites sought ways of modernization to solve the dynastic crisis. Some elites, known as the "Westernization school," embraced Western learning and appealed to the emperor to modernize China's education system. They attributed China's military failure to the fossilized civil examination. For example, in his essay *Bian keju yi* (On the reformation of the civil examination), the Qing official Feng Guifen (1809–1874) argued that the "stereotyped writing" expected for the examination format made intelligent people put huge efforts into addressing issues of no use (Feng 2002). Later, China's defeat in the First Sino-Japanese War (1895) and the invasion of the Eight-Nation Alliance (1900) further solidified the Qing elite's determination to reform. Finally, in September of 1905, the Qing court abolished the civil examination and began to modernize the traditional education system following the Western model. Meanwhile, the Qing government did not provide an alternative system of civil servant recruitment, but expected pupils to study in the modern educational system and to pursue multiple, modern professions (Elman 2000, Bai and Jia 2016).

Given that the abolition of the civil examination had "pushed" the learned class to the market, what factors "pulled" them to modern banking in particular? First, modern banking was a leading sector with high income and prestige in late 19th- to early 20th-century China. Even a simple employee of a Chinese commercial bank could receive a salary (50 yuan) that was more than double that of a teacher in a modern school. Needless to say, a bank manager received far better remuneration: a monthly salary up to 200 yuan, along with a year-end bonus, annual leave, and other benefits. Equally attractive were the high prestige and social status of the financial elite. Besides the decent office and city life, bankers received high regard and respect in business circles and maintained a close connection with the government (Li 2012).

Moreover, modern finance in China had gained momentum, thanks to the sustained commercialization and industrialization since the late 19th century. For example, 2,509 industrial firms were established in more than half of Chinese cities from 1905 to 1927. This generated an increasing demand for external finance. Meanwhile, modern technology and communication infrastructure (e.g., telegraph and railway lines) had also been constructed, which facilitated the expansion of banking networks (Lin et al. 2021). These modern forces and opportunities incentivized the learned elite, whose members were frustrated (but liberated) by the abolition of the civil examination, to pursue a new "ladder of success" into the financial elite. Indeed, many well-known Chinese bankers in the early 20th century had a traditional education. For example, Chang Kia-Ngau (1889–1979), a prominent manager of the Bank of China in the 1910s, received his early education in a traditional Chinese school and obtained the *shengyuan* degree in 1904 (Peng 2007).

Second, the supply of talent for modern banking was also shaped by such learning opportunities. This is especially true for the early development of Chinese modern banks that basically followed the Western model. Foreign banks provided interested Chinese the best places to acquire and practice the new financial knowledge. Taking advantage of their experience and networks in foreign banks, these bankers went on to start their own ventures. Consequently, Chinese modern banks emerged in or near the cities in which foreign banks were headquartered, such as Shanghai and Tianjin. In contrast, in many inland regions where local elites had little chance to access foreign banking, Chinese modern finance developed much later and more slowly.

3. Empirical Setup

Our sample covers 281 prefectures in China proper.[5] The sample period begins in 1897 when the first Chinese modern bank was established and ends in 1936, on the eve of the Japanese invasion that effectively interrupted the financial development of China. This time span covers the abolition of the civil examination in 1905; the eight years before the abolition will be referenced in the following difference-in-differences analyses.

Our dependent variable, financial development, is measured by the number of modern banks (and branches) in each prefecture on an annual basis. Given the predominance of banking in the financial industry during the late 19th and early 20th centuries, the

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number of banks could largely reflect the level of financial development at the time. We manually collected the data on modern banks from gazetteers (*fangzhi*), a kind of encyclopedic book focused on an administrative unit (e.g., county, prefecture, province) and compiled by the relevant government. We use gazetteers published between 1933 and 2018, some of which are reprints of earlier works. We supplemented the data by identifying banks that were missing in the gazetteers from the *Banking Yearbooks* (1934–1937) and historical archives, which are specified in the supplementary materials of Lin et al. (2021).

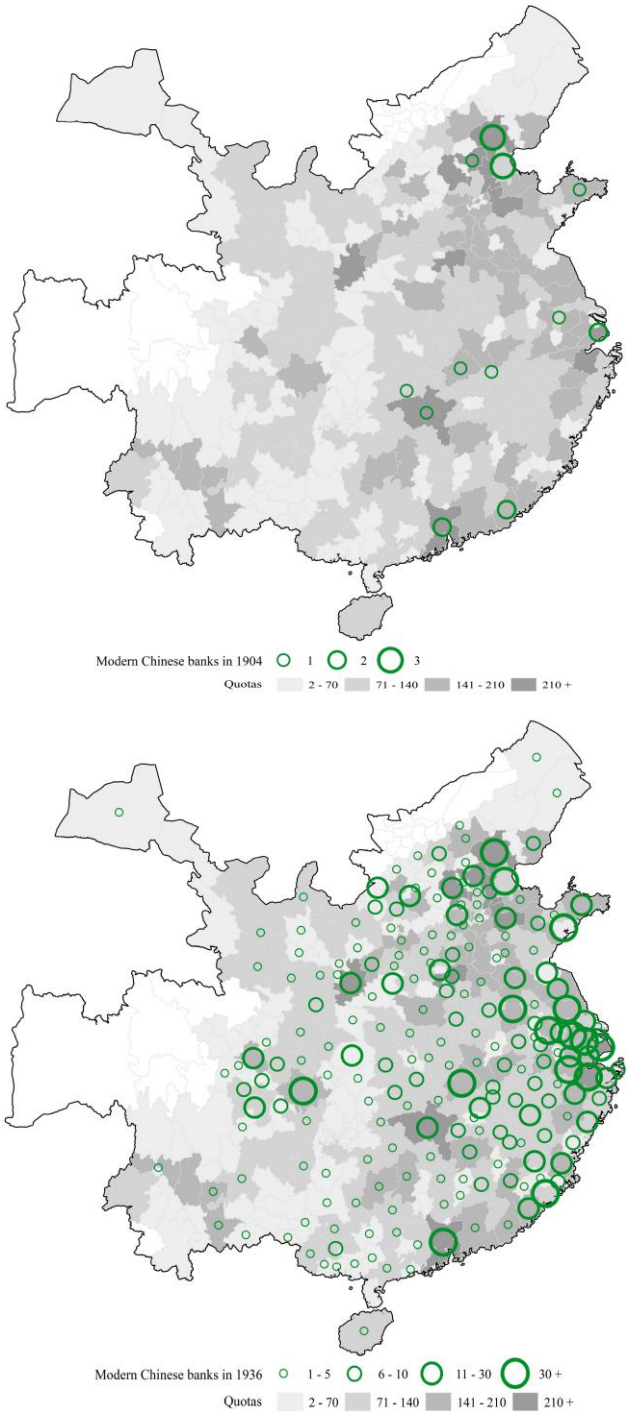
To identify the effect of the reallocation of talent on banking development, we employ a difference-in-differences approach. The first difference compares the civil examination period (1897–1904) to the postexamination period (1905–1936), and captures the extent to which the number of banks increased after the abolition of the civil examination. The second difference compares prefectures that varied in the extent of the allocation of talent to the civil examination before 1905. If banking development benefited from the release of talent from the civil examination after 1905, we should expect that in prefectures where more talent was attached to the civil examination, there would be more banks established after 1905. The question, then, is what determined the cross-prefectural variation in the extent of talent allocation to the civil examination. As we will argue below, the allocation was shaped by the civil examination quotas that were directly assigned by the imperial court to each prefecture.

3.1. The Allocation of Civil Examination Quotas in the Qing Dynasty

To balance the chance of exam success (and thus social mobility) across regions, the imperial authorities assigned an admission quota to each prefecture.[6] By doing so, the emperors effectively agglomerated (and controlled) the elites from all sides of the empire. The quotas were differentiated across prefectures according to the regional variations in human capital endowment. Specifically, the quota assigned to a prefecture was primarily based on this prefecture's educational level and examination performance in the past while taking into account its population size (Chang 1955, Elman 2000). The official document, *Imperial Works on Education Affairs of the Qing Dynasty*, clearly stated that a higher quota was assigned to prefectures that "prospered in education and culture" (Suo 2000, p. 296). As a result, the quota varied drastically across prefectures, as shown in Figure 2.

The quota capped the number of candidates who could eventually enter the gentry and officialdom in

Figure 2. (Color online) Distributions of Civil Examination Quotas and Modern Banks in the Sample Prefectures



Notes. The two maps show the change in the number and geographical distribution of modern Chinese banks before and after the civil examination abolition in 1905. Although the total number of banks increased remarkably after 1905, prefectures with higher civil examination quotas saw more banks established. The data are at the prefectural level. There are 281 prefectures in the sample; these basically cover "China proper" of the Qing dynasty in 1911 and exclude frontier regions where the data are not available.

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each prefecture. Therefore, in prefectures with higher quotas, more educated people would be attracted to compete for the examinations relative to other prefectures with lower quotas. Therefore, we expect that after the abolition of the civil examination, prefectures with higher quotas would release more members of the educated elite to the modern sectors, including banking.[7]

The distribution of quotas had become fixed in circa 1720 and remained stable until the abolition of the system in 1905.[8] The figures for the quotas are obtained from the *Qing Hui Dian* (Imperially Established Institutes and Laws of the Great Qing Dynasty) (Kun 1862). Figure 2 shows the positive relationship between the civil examination quota and banking development after 1905. Before the abolition of the civil examination (1904), only a few big cities had modern Chinese banks. After the abolition of the civil examination (1936), modern Chinese banks expanded to a majority of prefectures; more importantly, prefectures that previously had high examination quotas now had more banks.

3.2. Measuring the Modern Transition of Human Capital

To document the "reallocation" of talent from the civil service to the modern banking sector after 1905, we employ two variables pertaining to modern financial human capital at the prefecture level. One is the number of Chinese bankers, and the other is the number of students majoring in business (and finance).

To measure the distribution of Chinese bankers, we made use of two sources. The first is the *Banking Yearbook* of 1936, which lists the incumbent board members, supervisors, executives, and managers of all banks in 1936. We hand-collected each banker's biography and identified their home prefectures. There were 874 bankers who came from 129 prefectures. Although the data from the *Banking Yearbook* cover all bankers of 1936, they has only cross-sectional variations. To observe the change in the number of bankers over the abolition of civil examination, we explored another source, that is, *Jindai Zhongguo Yinhangye Jigou Renming Dacidian* (*Dictionary of Institutions and Peoples of Modern Banking in Modern China*) edited by Jiang (2014). From the bankers' biographies we identified their home prefectures and periods of employment in banks between 1897 and 1936. These panel data allow us to conduct the difference-in-difference estimation on the effect of civil examination abolition. However, the *Dictionary* does not include all bankers but selectively records those renowned at the time.[9]

For the purpose of cross-checking, we use both the cross-sectional data of the 1936 *Banking Yearbook* and the panel data of the *Dictionary* to measure financial talent. If the abolition of the civil examination indeed prompted the learned class to seek new opportunities in modern banking, we should expect that prefectures with higher quotas would produce more bankers after 1905.

Besides the bankers, we also use the number of students who chose to study in a business school as an alternative measure of talent flow in finance. If there was a human capital transition (from traditional civil examination candidates to modern finance), we should expect that prefectures with higher examination quotas would have more candidates in the discipline of banking and finance after 1905. We obtained these data from the government statistics on education of 1919 and 1934 (see Ministry of Education 1919, 1935). These statistics list all the schools (by discipline) and their enrollments. We count the vocational schools that specialized in business studies (including banking and finance) and the number of students in these schools at the prefecture level. For comparison, we also count the students of other vocational schools specialized in the teaching of industrial and agricultural knowledge. Table 1 shows the summary statistics of all variables.

4. The Effect of the Abolition of the Civil Examination on Banking Development

4.1. Baseline Results

According to the empirical strategy outlined in Section 3, we examine the extent to which the abolition of the civil examination affected modern banking development in Equation (1):

$$Banks_{it} = \alpha + \beta \times CivilExamQuota_i \times Post_t + \gamma_1 \times \mathbf{X}_i \times Post_t + prefecture_i + year_t + \varepsilon_{it}, \quad (1)$$

where $Banks_{it}$ denotes the number of modern banks (and branches) in prefecture i in the year t between 1897 and 1936. $CivilExamQuota_i$ denotes the figure for the civil examination quota that the Qing emperors assigned to each prefecture before 1905. To attenuate extreme values in the quota, we take the natural logarithm of each quota figure. $Post_t$ is a time dummy that equals one for years after the abolition of the civil examination (1905–1936) and zero for years before then (1897–1904). The coefficient β of the $Post_t \times CivilExamQuota_i$ captures the difference-in-differences in the number of banks arising from the abolition shock and the quota distribution. If talent was "reallocated" into modern banking from civil service after the abolition of the civil examinations, we should expect β to be significantly positive.

The prefectural fixed effects ($prefecture_i$) absorb all the time-invariant prefectural effects on banks, whereas the year fixed effects ($year_t$) control for all the annual shocks common to all prefectures. In addition, we control for the interaction terms between $Post_t$ and a set of baseline correlates of both quotas and banks, denoted by the vector $\mathbf{X}_i$, which allows for the impact of these

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Table 1. Summary Statistics

Variable	Obs.	Mean	S.D.	Min	Max
Panel A. Panel variables (1897–1936)					
Number of banks	11,240	2.32	9.43	0	258
Number of Chinese banks	11,240	1.98	7.88	0	229
Industrial firms	11,240	0.35	2.70	0	119
Telegraph	11,240	1.94	1.94	0	12
Treaty ports	11,240	0.16	0.50	0	6
Number of bankers, 1897–1936	11,240	0.54	2.68	0	61
Panel B. Cross-sectional variables					
Civil examination quota	281	90.01	64.19	2	422
Population in 1880 (in 1,000 people)	281	1,235.86	1,211.75	27	6,390.53
Distance to coast (in km)	281	488.20	374.86	0.38	2,181.95
Land area (in 1,000 km^2)	281	13.91	12.58	0.26	131.19
Number of bankers in 1936	281	3.11	10.24	0	111
% of students majoring in business in 1919	281	11.70	26.41	0	100
% of students majoring in chemistry in 1919	281	0.88	5.92	0	51.87
% of students majoring in civil engineering in 1919	281	0.97	7.76	0	100
% of students majoring in textile in 1919	281	3.84	13.26	0	100
% of students majoring in industrial arts in 1919	281	0.33	3.34	0	50.78
% of students majoring in other industries in 1919	281	1.14	8.19	0	100
% of students majoring in all industrial majors in 1919	281	7.16	19.31	0	100
% of students majoring in business in 1934	281	4.83	17.30	0	100
% of students majoring in chemistry in 1934	281	2.01	11.04	0	100
% of students majoring in civil engineering in 1934	281	2.66	10.34	0	100
% of students majoring in textile in 1934	281	6.34	19.07	0	100
% of students majoring in industrial arts in 1934	281	2.38	11.13	0	100
% of students majoring in other industries in 1934	281	0.24	3.03	0	50
% of students majoring in all industrial majors in 1934	281	13.62	29.30	0	100
Existing banks before 1905	281	0.35	0.48	0	1
Distance to foreign bank in 1904 (in km)	281	426.63	334.44	0	1,607.85
Panel C. Prefectural-industry-level variables					
Number of industrial firms	2,772	6.73	54.95	0	1,559
Total output (in 1,000 yuan)	2,772	466.06	5,614.03	0	243,727.80
Debt ratio	2,772	54.08	12.82	30.82	76.50

correlates of the quota on banks to change after the abolition of civil examination. They are introduced below.

First, given that the quota allocation took into account population size, and population size may affect market or economic scale in ways that are important for financial development, we control for prefectural population in 1880. We choose the year 1880 in order to avoid the feedback effect from civil examination abolition or banking development while considering data availability. The population data are obtained from Cao (2000). Second, we control for a prefecture's shortest distance to the coast, as both the civil examination quota and the level of banking development were distinctly higher in coastal areas. Third, we control for the prefectural land area because Chinese prefectures varied drastically in land size; land size may be associated with the size of the quota (for example, by hosting more counties) and also the landscape for bank branch expansion. Distance to coast and land area are calculated on the basis of the data and maps in CHGIS (2016). More (time-varying) covariates will be introduced where appropriate for specific purposes of robustness in the following regression analyses.

The baseline results from ordinary least squares (OLS) estimation are reported in Table 2.[10] To provide a benchmark, we begin by regressing all modern banks (including foreign banks and Chinese banks) on the interaction term between the civil examination quota and the post-1904 time dummy (column 1). The interaction term has a significant and positive coefficient (2.355). Its marginal effect is substantial: doubling the size of the quota before 1905 would increase the number of banks by 2.355 after 1905; this implies that the number of banks per prefecture per year would double when evaluated by the sample mean (2.32 banks). The effect of the abolition of the civil examination on banks remains significant when we control for the interaction terms between the post-1904 time dummy and population size, distance to coast, and land size (column 2).

We next examine whether the abolition of the civil examination mainly promoted the development of modern Chinese banks (columns 3 and 4 of Table 2). This approach is based on the assumption that (1) from

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Table 2. The Abolition of the Civil Examination and Modern Banking Development

	Number of banks		Number of Chinese banks	
	1	2	3	4
Civil examination quota (log) × Post	2.355***	1.831**	2.112***	1.668**
	(0.600)	(0.758)	(0.518)	(0.658)
Population in 1880 (log) × Post		0.921***		0.818***
		(0.298)		(0.266)
Distance to coast (log) × Post		−0.640**		−0.523**
		(0.281)		(0.237)
Land area (log) × Post		−0.784		−0.734
		(0.709)		(0.611)
Year FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Adj. R^2	0.579	0.584	0.507	0.511
Observations	11,240	11,240	11,240	11,240

Notes. The dependent variable in columns 1 and 2 is the number of foreign banks and modern Chinese banks (including branches) in each prefecture in each year. The dependent variable in columns 3 and 4 is the number of modern Chinese banks (and branches) in each prefecture in each year. The main explanatory variable is the interaction term between the log number of civil examination quotas before 1905 and the postabolition time dummy that equals to one for years after 1904 and zero for years before 1905. The sample period is from 1897 to 1936. Standard errors are clustered at the prefecture level and are reported in parentheses. FE, fixed effect.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

1897, the newly emerged modern banks were dominated by Chinese banks rather than foreign banks (Online Appendix Figure A1), and (2) people drawn from the Chinese learned elite might dedicate more time and effort to opening new Chinese banks because foreign banks were established and controlled by foreigners. We find that the effect of the civil examination abolition on banking development is mainly driven by the increase in Chinese banks. Not only does the coefficient of the examination quota remain significantly positive, but the magnitude of the coefficient is very close to that of all (Chinese and foreign) banks. For this reason, we will focus on the development of modern Chinese banks in the remaining analyses.

In correspondence to the logarithm measure of the examination quota, we also employ the logarithm of the number of banks. To address the zero values, we plus 1 to the number of banks and, alternatively, use the inverse hyperbolic sine of the number of banks. The results after these transformations are consistent with those of the original level measurement of banks, which are reported in Online Appendix Table A1.

4.2. The Pretrend

Under our difference-in-differences setting, the effect of the civil examination abolition on banks is premised on the assumption that the examination quota had no effect on banks until 1905. If it were unobserved correlates of the quota that caused banking development, we should expect that banks would have experienced greater growth before 1905 in prefectures with higher quotas. To test this possibility, we regress the number of banks on the interaction terms between the civil examination quota and a full set of year dummies between 1899 and 1911 (1904 is omitted as the reference year), that is, a balanced and homogenous short period around the abolition of the civil examination. We also control for population in 1880, distance to coast, and land area (all interacted with year dummies) and the prefectural and year fixed effects.

As shown in Figure 3, the civil examination quota had no effect on the number of banks before the abolition of the civil examination. The coefficients of the quota are all close to zero and do not exhibit any increasing trend. This suggests that, before the examination was abolished, elites did not sort into banking careers disproportionally more in high-quota prefectures, ceteris paribus.

We also examine the pretrend issue more formally in Table 3 following the method of He and Wang (2017). On the basis of Equation (1), we additionally include the interaction terms between the pretrend year dummies (pre-1901, 1902, and 1903) and the civil examination quota and omit the year 1904 as the reference. The results show that the number of banks did not increase in the higher-quota regions until after the abolition of the civil examination (columns 1 and 2). The quota effect becomes significantly positive after the abolition and, in terms of magnitude, remains comparable to the effect without controlling the pretrend. Further, we include the post-trend in columns 3 and 4 by interacting the civil examination quota with the year dummies of 1905 to 1909. Again, the quota effect did not change to be positive and significant until after the abolition of the examination.

4.3. Alternative Measures and Samples

The positive effect of the abolition of the civil examination remains robust when we use alternative measures

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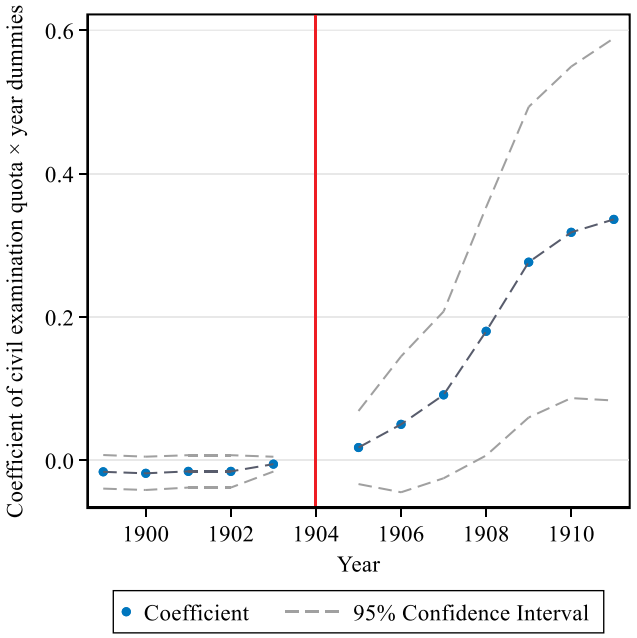
Figure 3. (Color online) The Effect of the Civil Examination Quota on Modern Chinese Banks by Year



Notes. This figure shows the pre- and postabolition trend in the effect of the civil examination quota on banking. The coefficients (with 95% confidence intervals) are obtained from regressing the number of banks on the interaction terms between the log number of civil examination quotas and the year dummies between 1899 and 1911, conditional on the prefectural and year fixed effects and the interactive effects between the year dummies and the baseline prefectural factors (log population in 1880, log distance to coast, and log prefectural land area). The year 1904 is the reference.

of banking development. We present these results in Online Appendix Table A2. First, the civil examination quota has a significantly positive effect on the growth of modern Chinese banks (column 1). We define the growth as the annual difference in the number of banks (and their branches) in each prefecture.[11] Second, we only count the presence of banks regardless of the number of branches in a prefecture. That is, whenever a bank, either a headquarters, a branch, or more than one branch of that bank, opened in a prefecture, we count this as one bank. We find that the effect of the civil examination quota on bank presence remains significant and positive (column 2). Third, we separate the number of bank headquarters and the number of bank branches in each prefecture (columns 3 and 4), and find that the civil examination quota has a significantly positive impact on both measures after 1905. The results in columns 2–4 suggest that the release of talent from the civil examination promoted both the foundation of new banks and expansion of their branching networks.

As both the number of banks and the civil examination quotas varied within a prefecture, that is, across the counties, we also perform the county-level regressions following the same difference-in-differences strategy used in Equation (1). The county-level analysis allows us to control for the prefectural effect over years by fully interacting prefectural dummies and year dummies (prefecture-year fixed effects). This can rule out the effects of unobserved time-varying prefectural factors on banking development. However, the measurement of the civil examination quota at the county level is not as accurate as that at the prefectural level. Beyond the county fixed quota, there was a prefectural quota for candidates from different counties to compete and share in each examination year. Given that the shares of this quota among counties are unobservable, we have to omit it in measuring the county-level quota. For this reason, we treat the county-level results as suggestive and report them in Online Appendix Table A3. The civil examination quota has a significantly positive impact on the number and growth of modern Chinese banks at the county level.

4.4. The Confounding Modernization Effect

The abolition of the civil examination propelled talent not only into banking but also into other modern sectors. First and foremost were modern industrial firms, which had been the focus of the "Westernization movement" initiated by Qing officials since the 1840s. Industrialization was accelerated by the abolition of the civil examination, as documented in Bai (2019); in regions with higher exam quotas, there were also more industrial firms (defined by the adoption of steam or electric power) established after 1905. Meanwhile, industrial firms also generated a high demand for external finance (Rawski 1989). This raises the concern as to whether the effect of civil examination abolition on banking development was driven by industrialization. To test this, we further control for the number of industrial firms established in each prefecture in the previous year. The number of industrial firms is obtained from Du (2014, 2019).

The results are reported in column 1 of Table 4. As expected, the number of industrial firms has a positive relation with the number of banks. The coefficient of the civil examination quota drops from 1.668 (column 4 of Table 2) to the current 1.121, suggesting that the firms absorb 33% of the quota effect on banks. Nonetheless, the direct effect of the civil examination abolition on banks, which is now net of the effect of industrial firms, remains significant and positive.[12] Of course, these estimates should be viewed as suggestive rather than conclusive, because they might be biased by the endogenous relation between industrial firms and banks.

Besides industrial firms, Chinese elites also endeavored to develop other modern technologies in China. For modern banking development, fast communications are a necessary condition. The introduction of the telegraph to China from the late 19th century onward is

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Table 3. The Abolition of the Civil Examination and Modern Banking Development: Testing the Pretrend

	Number of Chinese banks			
	1	2	3	4
Civil examination quota (log) × Pre-1901	−0.028	−0.016	−0.028	−0.016
	(0.019)	(0.012)	(0.019)	(0.012)
Civil examination quota (log) × 1901	−0.025	−0.016	−0.025	−0.016
	(0.017)	(0.011)	(0.017)	(0.011)
Civil examination quota (log) × 1902	−0.025	−0.016	−0.025	−0.016
	(0.017)	(0.011)	(0.017)	(0.011)
Civil examination quota (log) × 1903	−0.015*	−0.005	−0.015*	−0.005
	(0.009)	(0.005)	(0.009)	(0.005)
Civil examination quota (log) × Post-1904	2.090***	1.656**		
	(0.511)	(0.656)		
Civil examination quota (log) × 1905			0.044*	0.018
			(0.026)	(0.026)
Civil examination quota (log) × 1906			0.064	0.050
			(0.041)	(0.048)
Civil examination quota (log) × 1907			0.096**	0.091
			(0.046)	(0.059)
Civil examination quota (log) × 1908			0.215***	0.180**
			(0.077)	(0.088)
Civil examination quota (log) × 1909			0.304***	0.276**
			(0.091)	(0.110)
Civil examination quota (log) × Post-1909			2.451***	1.940**
			(0.596)	(0.768)
Controls × Year dummies		Yes		Yes
Year FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Adj. R^2	0.507	0.511	0.515	0.522
Observations	11,240	11,240	11,240	11,240

Notes. The dependent variable is the number of modern Chinese banks (including branches) in each prefecture in each year from 1897 to 1936. The controls include log population in 1880, log distance to the coast, and log prefectural land area. The pretrend is captured by the interaction terms between civil examination quotas and the year dummies from 1897 to 1903, omitting 1904 as the reference year. Columns 3 and 4 further include the posttrend (1905–1909) for robustness. Controls are the same as those of Table 2. Standard errors are clustered at the prefecture level and are reported in parentheses.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

Table 4. The Abolition of the Civil Examination and Modern Banking Development: Additional Controls

	Number of Chinese banks			
	1	2	3	4
Civil examination quota (log) × Post	1.121***	1.605**	1.576**	0.992***
	(0.303)	(0.656)	(0.654)	(0.293)
Industrial firms	1.758***			1.746***
	(0.343)			(0.355)
Telegraph		0.631***		0.613***
		(0.216)		(0.214)
Treaty ports			5.007***	3.828***
			(1.127)	(1.217)
Controls × Post	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Adj. R^2	0.684	0.515	0.520	0.693
Observations	11,240	11,240	11,240	11,240

Notes. We examine whether the positive effect of the civil examination quota on banking is driven by the development of other modern sectors (industrial firms, Telegraph, and treaty ports). The dependent variable is the number of modern Chinese banks (and branches) at each prefecture in each year. Industrial firms are measured by the number of industrial firms established in each prefecture in the previous year. Telegraph is measured by the number of telegraph stations in each prefecture in the previous year. Treaty ports refer to the number of treaty ports in the prefecture in the previous year. Controls are the same as those of Table 2. The sample period is from 1897 to 1936. Standard errors are clustered at the prefecture level and are reported in parentheses.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

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found to have facilitated the expansion of modern banking (Lin et al. 2021). To examine the extent to which the effect of the civil examination abolition on banks was driven by the growth of the telegraph system (which might be correlated with the distribution of the civil examination quotas), we control for the number of telegraph stations in each prefecture in the previous year (column 2 of Table 4). This mitigates only a small portion of the civil examination effect on banking, as the coefficient of the examination quota slightly decreases (from about 1.7 to 1.6).

Chinese modern banks originated from (and continued to be concentrated in) the treaty ports. Following upon a series of treaties between China and Western powers since 1842, a total of 54 treaty ports had been opened along the coast and the Yangtze River by the 1930s. By connecting China to foreign trade, technology, and culture, treaty ports functioned as the bridgeheads of China's modernization. As a result, treaty ports assembled Chinese elites who embraced Western learning and new business ventures, especially after the abolition of the civil examination. To rule out the possibility that the effect of the civil examination abolition on banking development was also driven by the treaty ports, we control for the number of treaty ports opened in each prefecture in each previous year (column 3 of Table 4). There is no doubt that treaty ports have a strong correlation with the distribution of modern banks, but they do not override the effect of the civil examination abolition on banking development.[13]

Given that the above three variables respectively capture different dimensions of China's modernization, we control for them simultaneously to examine the extent to which the effect of the civil examination abolition on banks was mitigated (column 4, Table 4). Doing so reduces the effect of the civil examination quota from 1.668 to 0.992, a 41% decrease. However, the effect of the civil examination quota still remains significant and positive. These findings suggest that the abolition of the civil examination had a direct human capital effect on banking development.

5. Evidence on the Allocation of Talent to Modern Finance

This section examines whether the positive effect of the civil examination abolition on banking development works through the "reallocation" of talent from the civil service to modern banking. To test this, we collect data on the distribution of Chinese bankers and the students who majored in business and finance, and provide evidence on the impact of the distribution of the civil examination quota before 1905 on the distribution of modern financial elites thereafter.

5.1. Bankers

If the abolition of the civil examination pushed the learned class to seek a new profession in banking, we should expect that more bankers originated from prefectures where there were higher civil examination quotas. We test this using the number of bankers as described in Subsection 3.2. First, we examine the effect of the civil examination quota on the number of bankers at the cross-sectional level (the 281 prefectures) using the data in the *Banking Yearbook* of 1936. The results are presented in Table 5 (columns 1 and 2). After controlling for population size, distance to coast, and land area, the correlation between the civil examination quota before 1905 and the number of bankers 30 years later remains highly positive and statistically significant. Doubling the quota is associated with a 2.6 increase in the number of bankers after the abolition of civil examination.

Table 5. Evidence on Talent Reallocation: Civil Examination and Number of Bankers

	Number of bankers in 1936		Number of bankers, 1897–1936	
	1	2	3	4
Civil examination quota (log)	2.621***	2.647***		
	(0.604)	(0.845)		
Civil examination quota (log) × Post			0.552***	0.660***
			(0.135)	(0.215)
Controls		Yes		
Controls × Post				Yes
Year and prefecture FE			Yes	Yes
Adj. R^2	0.058	0.143	0.610	0.621
Observations	281	281	11,240	11,240

Notes. Bankers include board members, top executives, and managers of Chinese modern banks. Columns 1 and 2 report the cross-sectional estimates of the number of bankers in each prefecture (place of origin) in 1936 based on the *Banking Yearbook* of 1936. Columns 3 and 4 report the panel data estimates of the number of bankers in each prefecture (place of origin) in each year between 1897 and 1936, based on records of notable bankers in Jiang (2014). The controls include log population in 1880, log distance to coast, and log prefectural land area. Standard errors (in parentheses) are heteroscedasticity-robust in column 1 and 2 and are clustered at the prefecture level in column 3 and 4.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

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Second, following the same difference-in-differences approach specified in Equation (1), we assess the impact of the civil examination abolition on the number of notable bankers using the panel data sourced from Jiang's (2014) *Dictionary of Institutions and Peoples of Modern Banking in Modern China*. The results show that prefectures with higher civil examination quotas saw a greater increase in the number of bankers after the abolition of the civil examination, relative to the prefectures with lower civil examination quotas (columns 3 and 4 of Table 5). In terms of magnitude, doubling the quota increases the number of bankers by 0.66 (per prefecture per year) after the abolition of the civil examination, which is equivalent to a 122% increase when evaluated by the sample mean (0.54 bankers per prefecture per year).

5.2. Students Majoring in Business and Finance

As a highly selective elite group, bankers may not fully reflect a prefecture's human capital transition toward modern finance. An alternative measure for the degree of transition is the number of students who chose finance-related majors. As a new modern sector in the early 20th century, banking recruited talented people who were equipped with a knowledge of modern business and finance (as we discussed in Section 2). If the abolition of the civil examination spurred a human capital transition to modern finance, we should expect more students to study business and finance in regions with higher civil examination quotas.

Using the data on school enrolment in Subsection 3.2, we regress the number of students in the business schools after the abolition of the civil examination (in 1919 and 1934) on the civil examination quota at the prefectural level.[14] To rule out the effect of the growth of modern human capital, we use the percentage of business-major students in all vocational school students in each prefecture as the outcome variable. The vocational schools were developed by the governments to teach new industrial, business, and agricultural knowledge after the civil examination system was abolished. The results show that the percentage of business-major students is significantly greater in prefectures that had ever had higher civil examination quotas (column 1 of Table 6).

To further confirm that the increase of financial talent after the civil examination abolition is not driven by the concurrent increase of other modern human capital, we performed falsification tests using the share of students majoring in industrial subjects as the outcome variable. The education statistics of 1919 and 1934 provide records of student enrollments in different industrial majors. We classified these majors into five disciplines: chemistry, civil engineering, textile, industrial arts, and other miscellaneous industrial subjects (columns 2–6 of Table 6). We also aggregate all industrial-major

Table 6. Evidence on Talent Reallocation: Civil Examination and the Share of Business-Major Students

	Dependent variable is the percentage of students in each of the following majors in all vocational school students						
	Business	Chemistry	Civil engineering	Textile	Industrial arts	Other industrial majors	All industrial majors (sum of columns 2–6)
	1	2	3	4	5	6	7
Panel A. 1919 education statistics							
Civil examination quota (log)	7.576***	1.122	0.316	1.504**	0.248*	1.128	4.318***
	(2.032)	(0.690)	(0.479)	(0.703)	(0.144)	(0.777)	(1.289)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.090	0.024	0.005	0.033	−0.004	0.007	0.087
Observations	281	281	281	281	281	281	281
Mean of dependent variable	11.7	0.88	0.97	3.84	0.33	1.14	7.16
Panel B. 1934 education statistics							
Civil examination quota (log)	5.139***	1.012**	1.218**	2.816**	0.615	0.060	5.720***
	(1.514)	(0.417)	(0.520)	(1.234)	(0.395)	(0.062)	(1.604)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.066	−0.001	0.051	0.094	0.014	0.008	0.142
Observations	281	281	281	281	281	281	281
Mean of dependent variable	4.83	2.01	2.66	6.34	2.38	0.24	13.62

Notes. In this table, we examine the effect of civil examination quota on the share of business-major students in all vocational school students, in comparison with the share of industrial-major students in 1919 (panel A) and 1934 (panel B), respectively. The vocational schools include the industrial, business, and agricultural schools. In column 6, "Other industrial majors" include all the other industrial majors that had few students at the time (for example, automation, electrical engineering, and iron foundry engineering). Column 7 aggregates all industrial-major students as the numerator. Controls include log population in 1880, log distance to coast, and log prefectural land area. Robust standard errors are reported in parentheses.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

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students and calculate their share in all vocational school students in column 7. We find that the civil examination quota also positively affects the share of industrial students (especially those majoring in textile) after the civil examination era, which coincides with the fact that China's early industrialization also provided a new outlet for the old educated elite (Bai 2019). However, compared with its effect on the share of business-major students, the effect of the civil examination quota on industrial students is smaller in both the magnitude and level of statistical significance (Table 6). In addition, the quota effect on business students remains significant and positive even after we control for the share of industrial students (Online Appendix Table A5).

These results indicate that financial talent grew independently of other modern human capital as a response to the abolition of the civil examination. Moreover, talent flow to modern finance is disproportionately higher than to the other modern (industrial) sectors, which coincides with the distinctly high payoff and prestige in the modern financial sector as delineated in Section 2.

5.3. Conditions of Talent Transition

Given that they had a variety of choices of modern professions, why and how were these talented students channeled into the modern finance sector after the abolition of the civil examination? The high reward from modern finance is a necessary "pull" force. On this basis, we argue that regions with higher growth potential in finance would attract more old examination elites to the new banking sector.

To test this, we use the presence of banks before 1905 to indicate a potentially higher financial need (and hence greater growth opportunity) in a prefecture and compare it to prefectures without any banks. We use the dummy, instead of the number measure, simply because of the sporadic distribution of banks before the civil examination ended (only 99 prefectures had banks before 1905, and 72% of them had fewer than five banks). Then we interact this dummy variable of pre-1905 banking presence with the civil examination quota and the post-1904 dummy to examine whether the effect of examination abolition on financial talent growth is greater in prefectures that had relatively higher growth potential in finance. Following Table 5, we use both the cross-sectional variations of bankers in 1936 and their panel variations from 1897 to 1936 as the outcome variables. The results show that the effect of examination abolition on the number of bankers in prefectures with banks more than doubles that in prefectures without a bank (see Table 7).

Another "pull" force pertains to the learning cost of modern finance. Specifically, in the genesis of Chinese modern finance, Chinese elites were nurtured by foreign banks before they adopted the Western financial model to China's financial market. For instance, the

Table 7. Channeling Talent: The Effect of Local Financial Institutions Before 1905

	1	2
Panel A. Number of bankers in 1936		
Civil examination quota (log)	0.798***	1.366*
	(0.301)	(0.759)
Civil examination quota (log) × Having banks before 1905	4.901**	3.857**
	(1.931)	(1.802)
Having banks before 1905	Yes	Yes
Controls		Yes
Adj. R^2	0.108	0.173
Observations	281	281
Panel B. Number of bankers, 1897–1936		
Civil examination quota (log) × Post	0.181**	0.414**
	(0.077)	(0.185)
Civil examination quota (log) × Post × Having banks before 1905	0.933**	0.680*
	(0.396)	(0.372)
Having banks before 1905 × Post	Yes	Yes
Controls × Post		Yes
Year and prefecture FEs	Yes	Yes
Adj. R^2	0.615	0.625
Observations	11,240	11,240

Notes. This table shows that prefectures where there were banks before 1905 produced more bankers after the abolition of the civil examination. The dependent variables and controls are the same as those in Table 5. Panel A uses the cross-sectional distribution of bankers based on the *Banking Yearbook* of 1936. Panel B uses the panel data of bankers based on Jiang (2014). Having banks before 1905 indicates whether there were banks in a prefecture before 1905. Standard errors (in parentheses) are heteroscedasticity-robust in panel A and are clustered at the prefecture level in panel B.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

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early Chinese modern banks completely mimicked foreign banks in their management and operation. We thus hypothesize that talented students in prefectures with, or near, foreign banks would have had more resources and chances to learn modern finance, and thus be more likely to develop Chinese modern banks. As a result, the effect of the civil examination abolition on modern Chinese banking might be conditional on the proximity to foreign banks.

To test this, we measure the accessibility to modern finance using a prefecture's shortest distance from the prefectural capital to the nearest foreign bank (headquarters or branch), and examine its interactive effect with the civil examination quota on the number of Chinese bankers after 1905. We confine the foreign banks to the pre-1905 period to mitigate the feedback effect of financial talent growth. There were 16 prefectures that had foreign banks before 1905. The results are reported in Table 8. In prefectures where there are foreign banks, the effect of the civil examination abolition on the number of bankers is the most pronounced. Taking the panel data estimate as an example, doubling the quota would increase the number of bankers by 2.4 per prefecture per year (column 2). This effect decreases in prefectures that are farther from foreign banks, as evidenced by the significantly negative coefficient (−0.32) of the triple interaction term between the civil examination quota, post-1904 time dummy, and the distance to a foreign bank. In terms of magnitude, a 100% (about 427-km) increase in the distance from the nearest foreign bank would reduce the number of Chinese bankers by 0.32 (or 60% of the sample mean), depending on the size of the civil examination quota.

6. The Real Impact of Talent Inflow into Finance

A remaining issue pertains to whether the influx of talent into financial businesses would thwart the development of the real economy, chiefly industrialization, in early 20th-century China. This is unlikely the case, in view of the fact that the abolition of the civil examination also pushed talent toward developing modern industrial firms (Bai 2019). Moreover, industrial development relies on access to external finance (Rajan and Zingales 1998). This was especially true in modern China, when the rise of modern banking relaxed the financial constraint to which industrial firms were subject (Cheng 2003).[15] Modern banks provided not only large-scale capital but also professional human resources that mitigated information asymmetry and transaction costs between the financial and real sectors, hence facilitating firms' access to external finance. Therefore, the increasing talent in modern finance should have a positive impact on industrial firms, in particular those having greater financial needs. To test this, we examine whether industrial firms with a higher financial dependence developed disproportionately better in prefectures that had ever had higher civil examination quotas.

We collected data on industrial firms from the industrial survey conducted by the Chinese Research Institute of Economic Statistics (Zhongguo Jingji Tongji

Table 8. Channeling Talent: Learning from Foreign Banks

	Number of Chinese bankers in 1936	Number of Chinese bankers, 1897–1936
	1	2
Civil examination quota (log)	11.521***	
	(4.097)	
Civil examination quota (log) × Distance to foreign bank in 1904 (log)	−1.629**	
	(0.647)	
Civil examination quota (log) × Post		2.419***
		(0.840)
Civil examination quota (log) × Post × Distance to foreign bank in 1904 (log)		−0.323**
		(0.129)
Distance to foreign bank in 1904	Yes	
Distance to foreign bank in 1904 × Post		Yes
Controls	Yes	
Controls × Post		Yes
Year and prefecture FE		Yes
Adj. R^2	0.231	0.630
Observations	281	11,240

Notes. This table shows that the proximity to foreign banks increased access to knowledge of modern finance (and reduced the learning cost to acquire such knowledge), and thus directed more men of talent to the banking sector after the abolition of the civil examination. Proximity to foreign banks is measured by a prefecture's shortest (great circle) distance to the nearest foreign bank (headquarters or branch) in 1904 (in log). Standard errors (in parentheses) are heteroscedasticity-robust in column 1 and are clustered at the prefecture level in column 2.

*, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

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Yanjiusuo) in 1933 (see Liu 1937). The survey covers 18,712 firms in 258 prefectures. The information includes the location, sector, capital, and output value of the firms. The firms are divided into 292 industrial sectors based on a four-digit classification. To simplify the analysis, we combine them into 11 major industries based on the classifications used in the economic statistics of the Republican government of China (Chen 1961). We use the number of firms and their total output (in yuan) in each industrial sector and in each prefecture to measure industrial development.

To measure the level of financial dependence of each industry, we use its debt ratio, that is, the average debt-to-asset ratio of the firms in each industrial sector. In the absence of debt data in the aforementioned 1933 survey, we refer to the debt ratio in another survey of 121 firms across 12 industries. This survey was conducted by the Statistics Division of the Ministry of Economic Affairs, Republic of China, in 1940 and 1941 (Chen 1961). To check the robustness of this survey, we also refer to the debt ratio from the financial reports of 23 firms in six industries in 1920 to 1940, which we hand-collected from various sources.[16] Both sets of data indicate a consistent ranking of the debt ratio by industry. For instance, the most financially dependent is the textile industry, where the average debt-to-capital ratio is up to 77%, followed by the machine building industry with a rate of 68%. Relatively speaking, stone and metal production, for example, has a much lower debt ratio (below 40%) (see Online Appendix Table A6 for the debt ratio by industry). The ranking is also consistent with historical narratives on the pressing need for external finance in the textile, mill, and machinery industries in early 20th-century China (Cheng 2003).

To examine whether the 1905 reallocation of talent, which had brought about modern banking development, further affected industrial development by channeling more external finance to firms in need, we regress the total number or output of firms in each prefecture-industry on the interaction term between the civil examination quota in each prefecture and the debt ratio in each industry. The prefecture-industry-level regression allows us to control for industrial and prefectural fixed effects, thus absorbing the effects of unobserved time-invariant correlates of firm growth at the industrial and prefectural levels. Meanwhile, the main effect of prefectural quota and industrial debt ratio is absorbed by the fixed effects. The results show a significant and positive coefficient of the interaction terms between the quota and debt ratio (columns 1 and 2, Table 9). This indicates that firms in higher need of external finance would grow faster and become more productive in regions where there had ever been more talent trapped in the civil examinations (we assume more talent was released to financial sectors in higher-quota regions after 1905).

The above measure of financial dependence is built on the average debt ratio of 121 firms in the 1940s. The concern is that the debt ratio of this small sample is not sufficiently representative to infer the financial dependence of the 18,712 firms in our dependent variable. To address this concern, we use a dummy variable to simply distinguish those firms with a high degree of financial dependence from those with a low degree. Based on banks' lending records and historical narratives,[17] we define four industries to be more financially dependent: textile, machine building, timber and construction, and food and beverage. They are also the top four industries in the debt ratio ranking of the 1940s firm survey (Online Appendix Table A6). We interact this dummy with the civil examination quota to predict the number of firms and their output in columns 3 and 4 of Table 9. The results are consistent with that using the debt ratio measure: the civil examination quota has a

Table 9. Talent Allocation and the Development of Financially Dependent Industries

	Number of firms	Total output (log)	Number of firms	Total output (log)
	1	2	3	4
Civil examination quota (log) × Financial dependence level (debt ratio)	0.538***	0.014***		
	(0.156)	(0.003)		
Civil examination quota (log) × Financial dependence dummy			11.101***	0.350***
			(3.393)	(0.068)
Industry FE	Yes	Yes	Yes	Yes
Prefecture FE	Yes	Yes	Yes	Yes
Adj. R^2	0.248	0.568	0.242	0.567
Observations	2,772	2,772	2,772	2,772

Notes. We examine whether the civil examination quota affects industrial development disproportionately across industrial sectors that vary in their level of financial dependence. The regression is cross-sectional at the prefecture-industry level (252 prefectures across 11 industrial sectors) in 1933. Industrial development is measured by the total number of industrial firms or total industrial output (in 1,000 yuan and log) in each prefecture in each industry. The level of financial dependence is proxied by the average debt ratio (debt to asset) of each industry, and alternatively by a dummy for the industries with a high degree of financial dependence (textile, machine building, timber and construction, and food and beverage). Standard errors are clustered at the prefecture level and are reported in parentheses.

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greater impact on firm number and output in industries with a higher degree of financial dependence.[18] In such industries, an additional exam quota would bring about 11 more firms than it would in the sectors with a lower degree of financial dependence (column 3). These results suggest that the talent released from the civil examination to modern banking did not crowd out industrial development, but promoted it by increasing access to external finance.

7. Conclusion

The above empirical findings indicate the importance of the supply of talent in modern financial development. This importance was manifested in the early development of modern banking in the late 19th and early 20th centuries. This illuminates the close relationship between the supply of talent and the financial industry, and the high compensation rate in this sector until the present. We disentangle the reverse causality between the supply of talent and financial development by exploring a unique historical experiment in early 20th-century China, where the millennium-long civil examination system was suddenly abolished in 1905. This abruptly changed the allocation of talent; men who had been keen for success in the civil examinations had to seek alternative chances for wealth and social status. This increased the momentum of the transfer of talent from civil service to finance.

By analyzing a panel data of 281 prefectures over 40 years (1897–1936), we find that the increase in the number of modern banks after the abolition of the civil examination was significantly greater in prefectures where there had been higher civil examination quotas than in other regions. This is in part due to the effect of the modernization of human capital, in that there were more students who chose to study in a business school and finally became a member of the financial elite (banker) in prefectures that previously had high examination quotas. Not all such talent was channeled to modern finance after the abolition of the civil examination; those who came from regions that had higher financial growth potential and easier contact with Western finance were more likely to succeed in this new sector and thus contribute to the rise of modern banking in China. Finally, by increasing access to external financing, the development of modern banking was instrumental to industrial growth in early 20th-century China.

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Endnotes

[1] As Sendhil Mullainathan points out in his *New York Times* article (Mullainathan 2015), nearly one-fifth of Harvard graduates took a job in finance in 2014; this raises concern about the social return (or cost) of the increasing concentration of talent in financial professions.

[2] See also Baumol (1990) and Acemoglu (1995).

[3] There were three levels of examinations that corresponded to three academic degrees. The lowest (entry) level was the prefectural examination, in which the successful candidates would be conferred the title of *shengyuan*. This was the passport to enter the gentry or *shi* class. Only *shengyuan* were eligible to compete for the next level, the provincial exam; success in the provincial examination led to conferral of the title of *juren* (recommended men). A *juren* was qualified to serve in the government but was not guaranteed an official post, unless they finally obtained the highest *jinshi* degree at the national or palace exam (Elman 2000).

[4] For example, even though modern schools that adopted a Western-style curriculum in science and engineering had been set up in some Chinese cities during the late 19th century, their students still aimed to participate in the civil examination, because it was still the most widely accepted and reliable channel of success. These students usually skipped classes so as to prepare for the civil examination (Franke 1960).

[5] China proper refers to the territory under the regular county-province administration; it included 18 provinces in the Qing dynasty, excluding the frontier regions that were dominated by non-Han Chinese and under alternate forms of administration (Figure 2).

[6] A prefecture was an administrative unit under the province and above the county. The central government assigned a fixed quota to each county, and meanwhile assigned each prefecture a fixed quota that was shared (and thus competed for) among the counties within this prefecture. Therefore, the quota was bounded at the prefecture level.

[7] Another possibility is that in regions with lower quotas, students also studied hard to compete for the precious mobility opportunity. Consequently, the lower quota may not necessarily predict a smaller supply of talent to the modern economic sectors after the end of the civil examination. However, this may not be a serious concern in view of the fact that the new human capital mainly came from the higher-quota regions (see, for example, Gao 2018, Bai 2019, and the evidence in Table 6 that we introduce in Section 5).

[8] The only exception is that the emperor awarded some additional quotas to the prefectures that contributed to the suppression of the Taiping rebellion (1850–1864). We use the quotas before the Taiping rebellion to avoid the possible endogenous increase in quotas among these rewarded prefectures; however, the results remain consistent if we take into account the additional quotas awarded after the rebellion.

[9] The Dictionary lists 1,028 bankers who were born between 1770 and 1922, of whom 901 have information on birthplace. After excluding those who were not employed in modern banks or whose employment periods were not in the sample period of 1897–1936, we have 451 bankers in the sample.

[10] We use the OLS estimation because the interaction terms cannot be interpreted easily in nonlinear models according to Ai and Norton (2003) and Wooldridge (2023), and we acknowledge the potential biases in using OLS.

[11] An alternate is the log growth of banks, that is, log ($bank_t$/$bank_{t-1}$). We do not use this measure simply because there are a considerable number of prefectures without any banks ($bank_{t-1} = 0$).

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[12] We use the original number of industrial firms in accordance with the number measure of the banks. To attenuate the impact of skewed distribution and extreme values on the number of industrial firms, we also use the logarithm of the number of industrial firms and obtain results consistent with those of the level measure (see Online Appendix Table A4).

[13] The number of telegraph stations in each prefecture is small and in a count-variable nature. For instance, 70% of prefectures have fewer than three telegraph stations. Likewise, in the treaty port prefectures, a majority of them have only one port, with some exceptional cases that have two to six ports. For these reasons, we do not take the logarithm of these two variables as we did for examination quotas.

[14] As the business schools did not exist before 1905, we cannot perform the difference-in-differences estimation of the civil examination quota effect here.

[15] A major constraint on developing modern industry in China was capital. Traditional commercial credit and clan finance, both of which operated on a small scale, could hardly support mechanized production. From the very beginning of China's industrialization, banks played a pivotal role in financing industrial firms. From the available accounting reports of banks, we find that over half of bank loans went to industrial firms in the 1920s (Cheng 2003).

[16] The sources are Institute of Economics, Chinese Academy of Social Sciences (2018); Institute of Economics, Shanghai Academy of Social Sciences (1981); and Zhao (2010).

[17] We obtained lending records from four major banks between 1919 and 1934: Jincheng Bank, Zhejiang Xingye Bank, Shanghai Shangye Chuxu Bank, and Bank of China. See also Cheng (2003) for more narratives on the financially dependent industries in early 20th-century China.

[18] Results remain robust if we use only the top two or three industries in the debt ratio ranking, or those above the median debt ratio, to define the high financial dependence dummy.

References

Acemoglu D (1995) Reward structures and the allocation of talent. *Eur. Econom. Rev.* 39(1):17–33.

Acemoglu D, Johnson S, Robinson JA (2001) The colonial origins of comparative development: An empirical investigation. *Amer. Econom. Rev.* 91(5):1369–1401.

Ai C, Norton EC (2003) Interaction terms in logit and probit models. *Econom. Lett.* 80(1):123–129.

Bai Y (2019) Farewell to Confucianism: The modernizing effect of dismantling China's imperial examination system. *J. Development Econom.* 141:102382.

Bai Y, Jia R (2016) Elite recruitment and political stability: The impact of the abolition of China's civil service exam. *Econometrica* 84(2):677–733.

Baumol WJ (1990) Entrepreneurship: Productive, unproductive, and destructive. *J. Political Econom.* 98(5):893–921.

Braggion F, Manconi A, Zhu H (2020) Credit and social unrest: Evidence from 1930s China. *J. Financial Econom.* 138(2):295–315.

Cantoni D, Dittmar J, Yuchtman N (2018) Religious competition and reallocation: The political economy of secularization in the Protestant Reformation. *Quart. J. Econom.* 133(4):2037–2096.

Cao S (2000) *Zhongguo Renkou Shi: Qing Shiqi* (Population History of China: Qing Dynasty) (Fudan Daxue Chubanshe, Shanghai, China).

Chang CL (1955) *The Chinese Gentry: Studies on Their Role in Nineteenth-Century Chinese Society*, vol. 3 (University of Washington Press, Seattle).

Chang CL (1962) *The Income of the Chinese Gentry. A Sequel to the Chinese Gentry. Studies on Their Role in Nineteenth-Century Chinese Society* (University of Washington Press, Seattle).

Chen Z (1961) *Zhongguo Jindai Gongyeshi Ziliao, Disi Ji* (Materials on the Industrial History of Modern China, the Fourth Volume) (Sanlian Shudian, Beijing).

Chen T, Kung JKS, Ma C (2020) Long live Keju! The persistent effects of China's civil examination system. *Econom. J.* 130(631):2030–2064.

Cheng L (2003) *Banking in Modern China: Entrepreneurs, Professional Managers, and the Development of Chinese Banks, 1897–1937* (Cambridge University Press, Cambridge, UK).

CHGIS (2016) CHGIS, Version: 6 (China Historical Geographic Information System) (Fairbank Center for Chinese Studies of Harvard University and the Center for Historical Geographical Studies at Fudan University).

D'Acunto F (2017) From financial history to history & finance. Preprint, submitted July 15, http://dx.doi.org/10.2139/ssrn.3216109.

D'Acunto F, Frésard L (2018) Finance, talent allocation, and growth. Preprint, submitted September 19, http://dx.doi.org/10.2139/ssrn.3102825.

D'Acunto F, Prokopczuk M, Weber M (2019) Historical antisemitism, ethnic specialization, and financial development. *Rev. Econom. Stud.* 86(3):1170–1206.

Du X (2014) *Minzu Ziben Zhuyi yu Jiu Zhongguo Zhengfu, 1840–1937* (National Capitalism and the Former Chinese Government, 1840–1937) (Shanghai Renmin Chubanshe, Shanghai, China).

Du X (2019) *Zhongguo de Minzu Ziben Zhuyi (1927–1937)* (National Capitalism in China (1927–1937)) (Shanghai University of Finance and Economics Press, Shanghai, China).

Elman BA (2000) *A Cultural History of Civil Examinations in Late Imperial China* (University of California Press, Berkeley).

Feng G (2002) *Jiaobinlu Kangyi* (Straightforward opinions from Jiaobin Studio; reprint of 1861 edition) (Shanghai Ancient Books Publishing House, Shanghai, China).

Ferreira D, Nikolowa R (2024) Prestige, promotion, and pay. *J. Finance* 79(1):505–540.

Franke W (1960) *The Reform and Abolition of the Traditional Chinese Examination System* (Brill, Leiden, Netherlands).

Gao P (2018) Local elites and public good provision: Evidence from the rise of public education in the early 20th century China. Preprint, submitted October 27, http://dx.doi.org/10.2139/ssrn.3260504.

Hao Y (1988) *Shijiu Shiji de Zhongguo Maiban: Dongxi Fang Qiaoliang* (Chinese Compradors of the 19th Century: The Bridge Between East and West) (Shanghai Institute of Social Sciences, Shanghai, China).

He G, Wang S (2017) Do college graduates serving as village officials help rural China? *Amer. Econom. J. Appl. Econom.* 9(4):186–215.

Hsieh CT, Hurst E, Jones CI, Klenow PJ (2019) The allocation of talent and US economic growth. *Econometrica* 87(5):1439–1474.

Institute of Economics, Chinese Academy of Social Sciences (2018) *Zhongguo Zibenzhuyi Gongshangye Shiliao Congkan* (Collections of Historical Materials on the Capitalist Industry and Commerce in China) (Kexue Chubanshe, Beijing).

Institute of Economics, Shanghai Academy of Social Sciences (1981) *Liuhongsheng Qiye Shiliao, Shang: 1991–1993* (Historical Materials of Liu Hongsheng's Enterprises: 1991–1993) (Shanghai Renmin Chubanshe, Shanghai, China).

Ji Z (2016) *A History of Modern Shanghai Banking: The Rise and Decline of China's Financial Capitalism* (Routledge, London).

Jiang J (2014) *Jindai Zhongguo Yinhangye Jigou Renming Dacidian* (Dictionary of Institutions and Peoples of Banking in Modern China) (Shanghai Gugi Chubanshe, Shanghai, China).

Kun G (1862) *Qing Hui Dian* (Imperially Established Institutes and Laws of the Great Qing Dynasty) (The Commercial Press, Shanghai, China).

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny RW (1997) Legal determinants of external finance. *J. Finance* 52(3):1131–1150.

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny RW (1998) Law and finance. *J. Political Econom.* 106(6):1113–1155.

Levine R (1997) Financial development and economic growth: Views and agenda. *J. Econom. Literature* 35(2):688–726.

Levine R (2005) Law, endowments, and property rights. *J. Econom. Perspect.* 19(3):61–88.

Li Y (2012) Yinhangjia, Zhengzhijia, yihuo qita? Jindai Zhongguo Yinhangjia de Duomian Rensheng Tanxi (Bankers, politicians, or others? An analysis of the multifaceted life of modern Chinese bankers). Liao D, ed. *Jindai Renwu Yanjiu* (Modern Character Studies) (Shanghai Renmin Chubanshe, Shanghai, China), 102–112.

Lin JY (1995) The Needham puzzle: Why the Industrial Revolution did not originate in China. *Econom. Development Cultural Change* 43(2):269–292.

Lin C, Ma C, Sun Y, Xu Y (2021) The telegraph and modern banking development, 1881–1936. *J. Financial Econom.* 141(2):730–749.

Liu D (1937) *Zhongguo Gongye Diaocha Baogao* (Report on China's Industrial Survey) (Zhongguo Jingji Tongji Yanjiusuo, Nanjing, China).

Liu P (2016) *Minguo Yinhang Lianxisheng Jishi* (Interns at Banks in Republican China) (Shanghai Far East Press, Shanghai, China).

Ministry of Education (1919) *Minguo Banian Quanguo Zhongxue, Shifan, Shiye Xuexiao Yilanbiao* (Directory of National Middle Schools, Normal Schools, and Vocational Schools in the Eighth Year of the Republic of China) (Jiaoyu bu putong jiaoyu si, Beijing).

Ministry of Education (1935) *Zhonghua Minguo Ershisan Niandu Quanguo Zhiye Jiaoyu Gaikuang* (Overview of Vocational Education in the Twenty-third Year of the Republic of China) (Ministry of Education, Nanjing, China).

Mokyr J (2016) *A Culture of Growth: The Origins of the Modern Economy* (Princeton University Press, Princeton, NJ).

Mullainathan S (2015) Why a Harvard professor has mixed feelings when students take jobs in finance. *New York Times* (April 10), https://www.nytimes.com/2015/04/12/upshot/why-a-harvard-professor-has-mixed-feelings-when-students-take-jobs-in-finance.html.

Murphy KM, Shleifer A, Vishny RW (1991) The allocation of talent: Implications for growth. *Quart. J. Econom.* 106(2):503–530.

Murphy KM, Shleifer A, Vishny RW (1993) Why is rent-seeking so costly to growth? *Amer. Econom. Rev.* 83(2):409–414.

Needham J (1969) *The Grand Titration: Science and Society in East and West* (Allen & Unwin, London).

Pascali L (2016) Banks and development: Jewish communities in the Italian Renaissance and current economic performance. *Rev. Econom. Statist.* 98(1):140–158.

Peng Y (2007) *The Chinese Banking Industry: Lessons from History for Today's Challenges* (Routledge, London).

Philippon T, Reshef A (2012) Wages and human capital in the US finance industry: 1909–2006. *Quart. J. Econom.* 127(4):1551–1609.

Rajan RG, Zingales L (1998) Financial dependence and growth. *Amer. Econom. Rev.* 88(3):559–586.

Rawski TG (1989) *Economic Growth in Prewar China* (University of California Press, Berkeley).

Sheehan B (2003) *Trust in Troubled Times: Money, Banks, and State-Society Relations in Republican Tianjin* (Harvard University Press, Cambridge, MA).

Stulz RM, Williamson R (2003) Culture, openness, and finance. *J. Financial Econom.* 70(3):313–349.

Suo E (2000) *Qinding Xuezheng Quanshu* (Imperial Works on Education Affairs of the Qing Dynasty; reprint of 1774 edition) (Hainan Chubanshe, Haikou, China).

Wooldridge JM (2023) Simple approaches to nonlinear difference-in-differences with panel data. *Econom. J.* 26(3):C31–C66.

Zhao J (2010) *"Yongjiuhuang" Tuanti Dang'an Huibian* (Collected Archives of the "Yongjiuhuang" Group) (Tianjin Renmin Chubanshe, Tianjin, China).

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