Education and the Democratic Revolution in China in the Early 1900s *

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Abstract

The 1911 Revolution was the first democratic revolution in Chinese history. It overthrew monarchical rule and established the first republican government in China. This paper explores the impact of the 1911 Revolution and the subsequent establishment of a republic on the modernization of China's education system. Employing a panel data set across 1759 counties and exploring the variations in revolutionary participation, I demonstrate that the revolution significantly contributed to the advancement of modern education. Counties that actively supported the revolution through violent actions between 1911 and 1912 established a greater number of modern educational facilities and enrolled more students in the post-revolution period. After the revolution, these counties had, on average, 0.15 more middle schools, 23 more middle school enrollments, 3 more higher primary schools, and 129 more higher primary school enrollments, 18 more lower primary schools, and 749 more students enrolled in lower primary schools compared to counties that did not participate. Estimates based on the military station instrumental variable align with the baseline results. Mechanisms may include expanded education funding, higher intensity of revolutionary organization, and more effective local control. Counties that established military governments during the revolution experienced faster expansion of modern schooling than counties that engaged in violent participation without establishing such governments or those that participated peacefully. Counties whose mayors had been appointed under the imperial government but supported the revolution also experienced faster growth in modern education.

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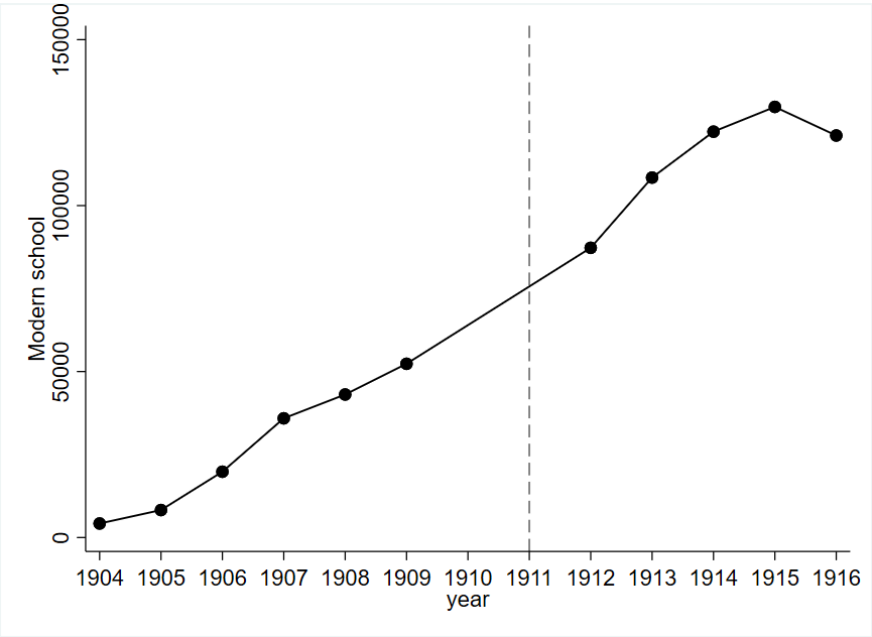
1 Introduction

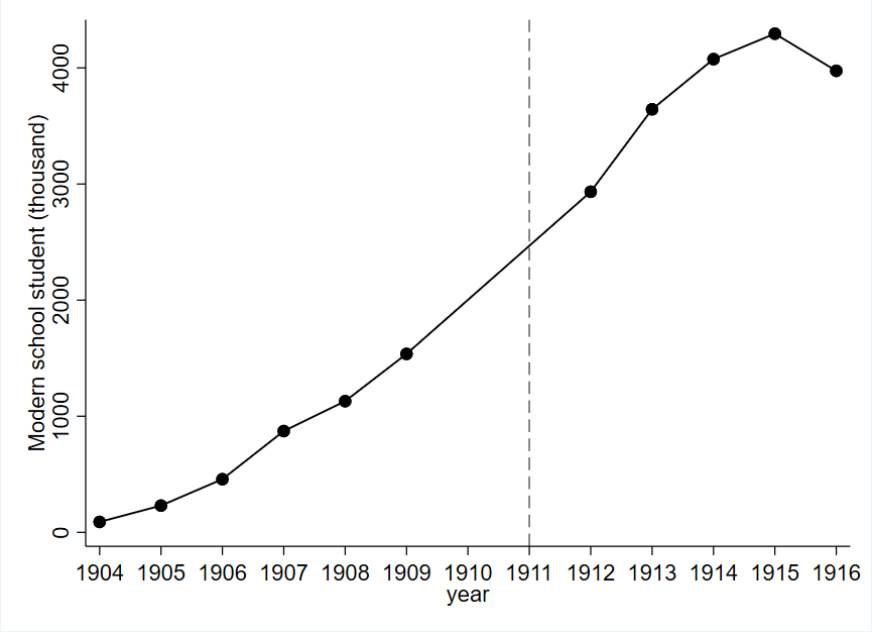
Modernization has never been an easy process for any nation. The traditional ruling elites often resist and obstruct modernization, while the common people may fear it. Conflicts between traditional and emerging elite have escalated into civil wars, the outcomes of which will determine a country's destiny. The Glorious Revolution, for instance, laid the foundation for democratic governance in Great Britain (North and Weingast 1989; Cox 2012). The Storming of the Bastille led to the overthrow of the monarchy, as royal and aristocratic power was gradually replaced by modern institutions (De Tocqueville 1998; Acemoglu, Cantoni, Johnson, and Robinson 2011; Doyle 2018). The triumph at the Battle of Toba–Fushimi enabled Emperor Meiji and his pro-modernization elites to seize control of the state, accelerating the implementation of modernization policies (Beasley 1972; Jansen 2002). Likewise, the victory in the Turkish War of Independence elevated Mustafa Kemal Atatürk to national hero status, empowering him to abolish religious schools and lay the foundations of a secular republic (Ahmad 1993; Zürcher 2014).

Like Diogenes Laertius once said, "*The foundation of every state is the education of its youth*". To build a modern state, the light of modern education must first be kindled. My question is: Can revolution serve as a catalyst for educational modernization? While the existing literature highlights the role of revolutions in driving long-term development (North and Weingast 1989; Acemoglu, Cantoni, Johnson, and Robinson 2011; Finley, Franck, and Johnson 2021; Chambru, Henry, and Marx 2024) and the expansion of mass education in nation-building (Ramirez and Boli 1987; Lindert 2004), little is known about the impact of democratic revolutions on modern education in the Chinese context. In 1912, the 2,132 years of Chinese monarchical rule was ended by a nationwide democratic revolution. Among its most important legacies was the expansion of a modern education system. Although historians have extensively discussed educational modernization in early Republican China (Gao 2019; Yan 2020), no quantitative studies have estimated the causal effects of revolutionary participation on the development of modern schooling. This paper addresses this gap by analyzing how revolution and state-building fostered the local development of modern education as a public good in early twentieth-century China, and by explaining the potential mechanisms that drove this transformation.

Traditional Chinese education was centered on Confucian classics, emphasizing loyalty and obedience. In the early 20th century, the imperial government recognized that this system could no longer produce the capable elites needed to meet the growing challenges of global change. Consequently, the monarchy abolished the 1,300-year-old civil service examination based on Confucian teachings and initiated the construction of a Western-style



(a) The number of modern schools.



(b) The number of modern school enrollment.

Figure 1: Modern school and enrollment (national level)

Notes: Sources: charts of education statistics (1909 and 1916).

modern educational system. As shown in Figure 2, the number of modern (Western-style) schools in China rose rapidly from zero to more than 50,000, and total enrollment increased to approximately 1.5 million students under imperial rule prior to the 1911 Revolution.

Despite the imperial government's determination to establishing a modern system of

mass education, the development of modern education encountered several impediments. First, the Confucian canon remained central to school education due to its significant role in reinforcing monarchical absolutism. Although the 1911 Revolution led to the removal of Confucian classics from the elementary curriculum, they were swiftly reinstated as mandatory subjects in 1915 when Yuan Shikai declared himself emperor and replaced the Republic of China with the Empire of China (Yan 2020). Second, despite ambitions for mass elementary schooling, constrained education budgets prioritized higher education, leaving counties to self-fund school construction (Jiang 2015). While some local elites were enthusiastic about establishing new schools, peasants resisted due to increased tax burdens, with some even burning the schools (Hao, Liu, Weng, and Zhou 2022). A great many conservative elites and culturally traditionalist citizens also disdained modern education and preferred to send their children to traditional private schools (Jiang 2015; Yan 2020).

This study examines how the modernization of local education was carried forward given these obstacles and the role the Revolution played in that process. County-level data on schools and student enrollments come from nationwide government surveys administered by both the imperial and republican governments, covering the pre- and post-1911 Revolution periods. For revolutionary participation, I distinguish counties that witnessed uprisings during the 1911 Revolution from those that did not. Using these data, the paper employs multiple panel data methods to estimate the county-level educational consequences of revolutionary participation, comparing counties that actively supported the revolution with those that did not while conditioning on pre-revolution characteristics. Results from Difference-in-Difference show that counties that supported revolution violently established significantly more modern schools and enrolled more students in both primary and middle schools after the revolution. For instance, revolutionary counties had, on average, 0.15 more middle schools, 23 more middle school enrollments, 3 more higher primary schools, 129 more higher primary school enrollments, 18 more lower primary schools, and 749 more lower primary school enrollments than their non-revolutionary counterparts. Event study analysis shows similar strong relationship.

I also perform two-stage least squares (2SLS) estimation using the presence of a traditional military garrison as an instrumental variable to address the concern that there may still be unobserved, time-varying factors such as local economic conditions, political ideology or informal elite networks that simultaneously influence both a county's likelihood of participating in the revolution and its investment in modern education. Because many leaders and participants in the revolution had military backgrounds, uprisings were more likely to occur in counties where the New Army was stationed. However, because county-level stationing data for the New Army are unavailable, I use the locations of traditional Green Standard

Army (lüying) garrisons as a proxy. Since garrison location did not depend on the type of force, many New Army units continued to be stationed in counties that hosted the traditional garrisons. The F-statistics of this instrument are above 20, so there is no problem with instrument strength. Correlation between the location of military garrisons and the error term in the first stage equation is unlikely because the garrison locations were chosen based on the counties' terrain and geographical importance, for which I control with a measure of the importance of transportation. Moreover, because these decisions were made centuries before the development of modern education, they are unlikely to have directly affected it. The results from the two-stage least squares (2SLS) estimation confirm the baseline results with larger coefficients. Results from the PSM–DID and the placebo tests are also consistent with the baseline findings.

Why would revolutionary activity affect education? This paper provides several plausible mechanisms. First, I find that counties that supported the revolution violently received significantly higher educational funding after 1911. Although I cannot disaggregate funding sources, much of the revenue appears to have been raised locally, suggesting greater local state capacity. Second, counties with a stronger pre-revolutionary presence of revolutionary organizations experienced faster growth in modern education and higher funding than counties with fewer such organizations, consistent with local elite mobilization facilitating more rapid policy implementation. For example, members of local revolutionary organizations enthusiastically promoted modern education, raised and donated funds for its development, and established schools. Third, the intensity of revolutionary participation shaped educational outcomes. Counties that established military governments during the revolution experienced faster expansion of modern schooling than counties that engaged in violent participation without establishing such governments or those that participated peacefully. Different levels of participation intensity often lead to different degrees of local control, which may, in turn, have affected educational outcomes. Fourth, this paper finds that between 1911 and 1916, 95 percent of counties experienced a change in the county mayor. However, counties without such turnover saw faster development of modern education. Moreover, the counties that did not experience mayor turnover were often those that had participated in the revolution violently. These patterns suggest that higher local political stability, more effective local control, and good relations with the new regime may have had a positive effect on modern education.

This paper contributes to several strands of literature. First, it speaks to the growing body of research on the social and institutional legacies of revolutionary and state-building movements, offering new evidence from an underexplored historical context (Beasley 1972; North and Weingast 1989; Ahmad 1993; De Tocqueville 1998; Jansen 2002; Acemoglu, Can-

toni, Johnson, and Robinson 2011; Zürcher 2014; Doyle 2018; Finley, Franck, and Johnson 2021; Chambru, Henry, and Marx 2024). To the best of my knowledge, this paper is the first to quantitatively elucidate how revolutionary participation shaped educational modernization at the local level. It relates to the literature on human capital investment and the development of mass education in Meiji Japan (Jansen 2002; Duke 2009) and Atatürk's Turkey (Ahmad 1993; Zürcher 2014) during their modernization processes. It also adds to the literature on state capacity by demonstrating that regime change influenced local educational public good provision in early-1900s China, advancing our understanding of "war made the states" (Tilly 1985; Besley and Persson 2010; Dincecco and Prado 2012). This paper shows that state capacity arises when elites who share a common vision and are willing to implement state policies effectively control power, coercive force, and resources.

Second, this paper speaks to a literature on the state's motivations for providing eductaional public goods. Some research argue that the primary purpose of state provision of mass education is to strengthen citizens' obedience. For example, it has been argued that China's civil service examination system served as an institutional mechanism for power-sharing between the central government and local elites, thereby promoting political stability (Kuhn 1970; Bai and Jia 2016). A new study also argues that the spread of primary schooling in the West was motivated mainly by state's interest of social control, not democratic ideals (Paglayan 2024). Whereas this research finds that elites' motivation to provide mass education did not stem from fear of the people, it instead reflected a commitment to enlightening the populace or securing their own avenues of social mobility.

Third, this study contributes to our understanding of the processes of modernization and cultural transformation. The findings of this paper accord with existing research indicating that cultural change was a slow, top-down diffusion from the educated elite to ordinary people (Mokyr 2016), and that greater environmental turbulence diminishes cultural persistence (Giuliano and Nunn 2021), also that shifts in political power would give rise to a new cultural configuration (Acemoglu and Robinson 2025). This paper contributes to the literature by showing that major political transformations can accelerate the turnover from old to new cultural norms, as evidenced from the perspective of education.

Finally, historians have long documented that the 1911 Revolution ranks among the most important events in Chinese history (Zhang and Lin 1980; Fairbank 1987; Spence 1990; Zarrow 2006; Bergère 2014). Despite its significance, little quantitative research has examined its impact on Chinese society. This paper engages with several strands of historical narrative which will be discussed in section 2. My analyses seek to provide quantitative evidence that the 1911 Revolution had not only long-run political consequences as described by historical literature, but also short-run social effects.

2 Context and Historical Narratives

As background to my analysis, I describe the historical context of 1911 revolution, the Republic of China, the revolutionaries, and the development of modern education in monarchical China and republic China. I also provide historical narratives about the importance of revolution in modernizing education.

2.1 Context

2.1.1 The 1911 Revolution

For 2,132 years, China was under monarchical rule. Dynasties rose and fell, with either an emperor or many warlords ruling all or part of China. Starting in October 1911, revolutionaries launched uprisings across the country that began to alter this pattern. They ultimately took control of almost all of the China and established a republic in Nanjing, on January 1st, 1912. Sun Yat-sen was elected Provisional President, and then, on February 12, 1912, the six-year-old Xuantong Emperor announced his abdication, marking the end of the Qing Dynasty's 268-year rule of China and the conclusion of China's imperial history. The emperor's rule became a less favorable option for the Chinese people after this. Even though Yuan Shikai was restored to the throne in 1915, the Protect the Republic Movement was immediately launched everywhere to oppose him. He had to abdicate after only four months. After that, China entered a chaotic era marked by warfare among warlords supported by different foreign powers. It wasn't until 1928 that China was re-united by the Kuomintang.

The revolution was primarily triggered by two events. First, on May 8, 1911, the Qing government organized the first cabinet in response to the Chinese people's demand for a modern political institution. However, people soon discovered that the cabinet members were unwilling to share power with the Constitutional Reformers and the people in general because seven of the thirteen cabinet members were actually drawn from the imperial family. The Constitutional Reformers originally opposed the overthrow of imperial rule and aimed to establish a constitutional monarchy in China similar to that of Britain. The experience with the cabinet led them to recognize the infeasibility of constitutional monarchical reforms, and many of the reformers began shifting their support toward more radical revolutionary ideologies. Second, on May 9, 1911, the Qing government announced that a privately funded railway must be nationalized, infuriating citizens who had invested money in railroad construction in four provinces. In response, citizens launched the Railway Protection Movement, resisting nationalization through enrollment strikes, business closures, and tax boycotts.

After the outbreak of the Railroad Protection Movement, most of the Hubei Province's New Army was transferred to Sichuan Province to suppress the revolts. The New Armies were a product of the Self-Strengthening Movement. These armies were modern Chinese armies, with officers often trained in the United States, Japan, or Europe, employing foreign instructors and using Western-style manners to train soldiers. Many of the lower and middle-ranking officers in the Hubei New Army were revolutionaries.

After the departure of the army from Hubei, the representatives of the New Army and members of the revolutionary organizations organized a meeting and decided to start a revolution. On October 10th, 1911, the first firefight took place in Wuchang, the capital city of Hubei Province. The rebel soldiers first captured the armory and then the governor's house. The Governor fled. On October 11th, all of Wuchang was occupied by the revolutionaries. They set up a military government and proclaimed it by telegram to all of China. Following this, revolutionaries in many counties across China followed the example of Hubei Province and attacked the local imperial army and officials. Yuan Shikai was appointed to lead the suppression of the revolution. His army fought revolutionaries in many counties throughout China. The revolution did not end until February 1912, when the emperor of the Qing dynasty announced his abdication.

The end of war and the founding of the Republic of China was the result of cooperation between the Beiyang New Army and the Revolutionary forces. Peace negotiations had begun between Yuan Shikai and the revolutionaries in the December of 1911. They struck a deal that if Yuan Shikai could get the emperor to abdicate, the revolutionaries would support him as President of the republic. Sun Yat-Sen was the true leader of the Chinese Revolution. He had organized major uprisings in an effort to overthrow the imperial government since 1895. Though these attempts failed, they inspired many to become revolutionaries. However, to gain Yuan's help, he had to agree that Yuan would become president. Later, Yuan was accused of assassinating the revolutionaries' candidate for prime minister. China then became politically divided between north and south. The Beiyang government in the north and the revolutionaries in the south started to fight, and China then entered into a chaotic era of warlordism. While the war brought widespread destruction, warlords also saw the value in cultivating an elite class that can work for them. To increase the number of local elites in their territory, many actively promoted modern education.

2.1.2 Who participated in the revolution

At the end of the Qing Dynasty, someone became a revolutionary for several possible reasons. First, was the resentment toward foreign rule. Over 95 percent of China's population

were Han Chinese, while the ruling class of Manchus, made up only about 1%. The Manchu Chinese were originally nomads from the north. They had seized control of China through military conquest, relying on their powerful cavalry. Given their small numbers, they maintained dominance through strict control, often using force and harsh policies to suppress dissent among the people they ruled. This fueled deep ethnic tensions between the Han Chinese and the ruling Manchu elite. When the imperial government's rule was failing, nationalism quickly became a powerful tool in mobilizing people to join revolutionary movements. As Li 2024 documented, historical repression and resistance intensified anti-Manchu sentiment when revolutionary newspapers spread propaganda highlighting them. In turn, this made more people from the Han ethnic group join the revolutionary organizations. Also, the New Army, a key supporter of the revolution, had very few Manchu members and was composed almost entirely of Han Chinese. This made them more prone to the idea of overthrowing the imperial government. Additionally, China's secret societies were inherently driven by Han nationalism, which aligned with their core propaganda "Overthrow the Qing Dynasty and restore the Ming Dynasty" (The Ming Dynasty was ruled by the Han Chinese). As a result, they joined the revolution, even though their interest in establishing a democratic government was not as significant as their passion for nationalism. As stated in the political manifesto of the Allied League (also known as "Tongmenghui"), China's first political party, founded by Sun Yat-sen in Tokyo in 1905: "Expel the Manchus, restore China (to the Han people), establish a republic, and equalize land rights." These ideals of nationalism and republicanism united Han elites from political, economic, military, and cultural spheres, bringing together people from all social backgrounds in a bottom-up revolution.

Second, the revolution was driven by the dream to form a democratic republic. As the imperial government faced continuous defeats in wars with foreign countries, more and more Chinese elites started to believe that Western political systems were more advanced than imperial governance. Some became constitutional reformers, promoting a British style constitutional monarchy. Others advocated for a more radical movement resembling the French Revolution that completely eliminated imperial authority and established a democratic republic. The radical revolutionaries were the victims of brutal repression for organizing uprisings and propagating the idea of democracy. Most captured revolutionaries were executed, including the Seventy-Two Martyrs of the Yellow Flower Hills Uprising. After failed uprisings, the revolutionary leaders had to escape overseas, taking refuge in countries such as the United States, Japan, and the Philippines, where they formed revolutionary organizations. Many Chinese students studying abroad became part of the organizations and brought revolutionary thoughts back to their hometown. Some revolutionaries secretly returned to China

and led uprisings despite the danger of being captured and executed. They organized uprisings along the southeast coast and in southern China, seeking armed support from secret societies and the New Army.

Third, revolution was stimulated by the abrupt closure of the elite recruitment system. While the imperial government was reluctant to implement broad political reforms, it was interested in Western technology and education. After suffering repeated defeats in foreign wars, the government leaders blamed China's weakness on an outdated education system. As a result, in 1905 the imperial civil service examination system that had existed for over 1,300 years was abruptly abolished. For generations, the imperial examination had been the primary means for local elites to attain official positions. Its removal created uncertainty in the selection process for government appointments, leaving many educated elites without a clear path to power. Bai and Jia 2016 have shown that revolutionary activity became significantly stronger in prefectures where the imperial examination system had been most influential after the prior abolition of the examination system. Kuhn 1970 argued that the Manchu rulers, despite making up only 1% of the population, had maintained control over China by sharing power with the local landowning class through the examination system. By passing the exams and becoming officials, these landowners could protect their property using government force. In return, they chose to be loyal to the emperor. However, once the system was abolished, local elites lost their way to become government officials. Many then turned to revolutionary organizations as an alternative path to influence and power.

2.1.3 Modern education: proponents and opponents

China's modern schools originated from the Self-Strengthening Movement from 1861 to 1895 and western missionaries. After the Opium wars, the imperial government recognized the necessity of learning from the West and began establishing Western-style educational institutions. At the same time, missionaries and some local elites who recognized the value of Western-style education also began establishing private modern schools.

The first to receive modern education were China's elite classes. With the support of Prince Gong and other leaders of the Self-Strengthening Movement, the first Chinese modern school, the capital school of combined learning, was established in Beijing in 1862. The school offered courses in foreign languages, astronomy, mathematics, physics, chemistry, medicine, machinery manufacturing, Western history and geography, and international law. In 1872, the first group of Chinese enrollment was selected and sent to study in the United States. These students later became government officials, military leaders, bankers, businessmen, scientists, and educators after coming back to China. For example, Guoan Tang returned

to China as a Yale graduate and was appointed as the head of the Imperial University of Peking. Most high-ranked officials in the Qing government believed that China's defeat in the Opium Wars was due to a lack of advanced Western technology and factories. At the time, they did not see Western political institutions as inherently superior. They believed that simply acquiring Western technology would be enough to make China catch up to the international world. However, after losing the war to Japan in 1895, China's ruling class realized that China should follow Japan's example in the Meiji Restoration and learn from Western political systems and ideologies.

The defeat led to reformers successfully persuading the Empress Dowager to implement large-scale educational reforms. In 1904, the Qing Dynasty established the modern education system known as the "Gui Mao Academic System." This system stipulated that students would receive kindergarten education, five years of lower primary school education, four years of higher primary school education, and five years of middle school education before entering university preparatory school, university, and graduate school. As shown in Appendix Table A.1, the traditional curriculum for Chinese schools prepared enrollment for the different levels of civil service exam and Confucius teachings[1]. After all, education was a privilege of elite class at the time, and the ultimate goal of education was to pass the civil service exam and become a government official. By contrast, the modern schools had science, music, and gymnastic classes. The curriculum had already become quite similar to that of schools today.

In 1905, China abolished its 1,300-year-old imperial civil service examination institution, and the imperial government established the Ministry of Education. It was the first central administrative institution for education in Chinese history. The ministry encouraged local authorities to establish modern educational institutions. Local elites believed that the imperial government might now favor official candidates with a modern educational back-

[1]Confucius (c.551 – c.479 BCE) was the most influential sage and philosopher in Chinese history. The policy of "Banning a hundred schools of thought and venerating only Confucianism" solidified Confucianism as the foundation of Chinese governance and philosophy in the West Han dynasty (202 BC – 9 AD). After the Han dynasty, most imperial governments continued to adopt Confucian teachings as their state philosophy. Confucius once said: "A monarch should act like a monarch. A minister should act like a minister. A father should act like a father. A son should act like a son." That shows his idea of obedience. Later, due to the integration of Confucian thought with state governance and the imperial civil service examination system, Confucius's teachings were misinterpreted as advocating extreme loyalty to the ruler. Absolute loyalty to the emperor and one's parents gradually become unquestionable. A famous saying from ancient China illustrates this principle: "If a lord commands his subject to die, the subject must obey; if a father orders his son to perish, the son must comply." After thousands of years of Confucian indoctrination, most Chinese people came to view democracy as a dangerous idea, as it implied disloyalty to the emperor. The elite class was especially influenced by Confucius and other Confucian sages, as they had to pass the civil service examination to become government officials. And the examination's primary focus was on Confucian classics.

Table 1: Enrollment of modern education

Regime	Year	Number of students	Percent	Growth rate
Qing Dynasty	1903	4,876	0.0015%	—
	1904	90,002	0.0277%	1745.82%
	1905	230,776	0.0711%	156.41%
	1906	457,842	0.1411%	98.39%
	1907	872,279	0.2688%	90.52%
	1908	1,129,940	0.3483%	29.54%
	1909	1,536,906	0.4737%	36.02%
The Republic of China	1912	2,933,387	0.9042%	90.86%
	1913	3,643,206	1.1230%	24.20%
	1914	4,075,388	1.4412%	11.86%
	1915	4,294,251	1.3237%	5.37%
	1916	3,974,454	1.2251%	-7.45%

Note: Percentages are calculated using the 1912 population as the denominator.

ground, so they were enthusiastic about this initiative. However, funding for these modern schools came from increased surcharges imposed by local elites, which led to resentment among farmers. Enraged, farmers frequently vandalized and burned down the schools. In prefectures where the passers-to-candidates ratio for the imperial examination was higher, more anti-elite protests took place after 1905 (Hao, Liu, Weng, and Zhou 2022).

Starting in 1906, the imperial government started to establish education promotion offices in each county. The purpose of these offices was to manage education throughout the county and promote modern elementary education. They were also responsible for raising county-level educational funds. The methods they used included increasing education taxes, soliciting donations from society, and charging tuition fees. Since most private schools still followed traditional Confucian education, the education promotion offices encouraged them to transform into modern schools by changing the learning system, revising the curriculum, and providing training for teachers. The offices also sent clerks to each village to register the number of school-age children and persuade their parents to send them to modern schools. Starting in 1907, the Ministry conducted nationwide surveys to collect statistical data on modern schools, and special schools were established for women. These efforts yielded substantial returns. As shown in Table 1, the number of students enrolled in modern schools rose from 4,876 in 1903 to more than 1.5 million by 1909 within just seven years.

These achievements were actually hard-won, given the strong resistance of local traditional elites to modern schooling. During this period, China's common educated elites still venerated Confucius. The local teachers viewed modern education as a threat to their professional standing and livelihoods. Parents feared that enrollment in modern schools would

expose their children to revolutionaries and "dangerous ideas" and thereby subject the family to political risk. And their concerns were not unfounded. The families of rebels were likewise subject to state sanctions, including confiscation of property, exile, and even execution. Even though the development of modern education was ordered by the government, the conservative defeat and subsequent persecution of Beijing reformers in 1898 fostered skepticism among local elites regarding the policy's continuity. Who could be certain that a future government would not once again judge modern education a mistake? Hence modern education, like other new developments, was initially not accepted by the whole Chinese society. For instance, in 1908 new elites founded a modern school in Changfeng County, drawing resistance from the traditional elites. Conservatives even composed children's rhymes to disparage the scholars who established modern schools:

"Unskilled scholars run amok,
agitating to found new-style schools;
They lead the young astray,
eroding morals and proper norms."

Following the founding of the Republic of China, the Ministry of Education was restructured under the republican government, which also vigorously promoted modern education. During the period between 1912 and September 1913, the Minister of Education, Yuanpei Cai, led an educational reform that aimed to elevate both general education and industrial education and foster the modernization of the Chinese education system. This reform paved the way for the development of a more comprehensive and modern educational system. Cai prescribes that all Chinese schools should follow the Western academic system. Under his reform, the transformation of old educational institutions into new schools has been greatly accelerated. In 1912, the Ministry of Education of the Provisional Government of the Republic of China issued the "School System Order". This Order established the compulsory education system for the first time in China. The system required all citizens to have at least four years of primary education. After completing primary education, citizens could decide for themselves whether to participate in higher primary schools and middle schools. The central government required county governments to allocate funds to primary schools to support compulsory education. Due to the lack of county financial funds, compulsory education was not completely free, but the government kept tuition down through subsidies. For instance, the tuition of the public 24th primary school is 6 silver yuan a year in 1915. The tuition was so low that it was impossible to pay teachers' salaries. However, a government grant of 2,172 Silver Yuan, plus the school's income of 1,000 Silver Yuan, kept the

school running. In 1915, the monthly rent for a small tile-roofed house was approximately 3 silver dollars, while an assistant professor at Peking University earned a monthly salary of about 18 silver dollars. In 1919, the monthly wages of workers in Shanghai ranged from 3 to 60 silver dollars perry1993shanghai. The Republic's determination to promote modern education was beyond question. Due to a shortage of school buildings, many Buddhist and Daoist temples were requisitioned and repurposed as educational facilities. This was called the Temple Destruction Movement in 1912. Wang and Zhang 2023 documented that the Temple Destruction Movement accounted for nearly 70% of the facilities used in the construction of modern schools in China during the early 20th century.

On the supply side, the collapse of the Qing dynasty and the rise of the Republic reduced the influence of traditional Confucian institutions and allowed for the rapid diffusion of reformist ideas, particularly in counties with strong revolutionary organizations. Local elites in these areas, having aligned with the republican cause, were more likely to support state-led education reform and to establish modern schools as symbols of progress and civic virtue. They also did so to reinstitutionalize their elite status (Gao 2018). On the demand side, revolutionary participation may have altered citizens' perceptions of state legitimacy and the value of modern schooling, especially as modern education became associated with access to government and military careers in the new republic. The prospect of higher economic returns may also have been a key reason why ordinary people turned to modern education (Yuchtman 2017). Employees of the Tianjin–Pukou Railroad with traditional Confucian education were more likely to be placed in clerical positions, whereas those with Western-style modern education, particularly those with a university background, were more likely to obtain managerial or technical jobs, which offered higher salaries. Yan 2020 also finds that modern education led to higher wages, primarily through enhanced labor skills. The Republic then published the Civil Service Examination Act in 1912, which required civil servants to pass examinations covering subjects such as economics, law, and science and technology before being appointed to official positions. In order to succeed in these examinations, China's elites increasingly turned to modern education.

My questions is: what role did revolution play in this process of modernization? Apparently, revolutionaries were among the most committed modernizers. So upon attaining effective local power through revolution, in what ways did they influence educational outcomes? To quantitatively examine how the revolution and the establishment of the Republic fostered the development of modern education, I draw on county-level data compiled from multiple historical sources. The following section details the sources, construction, and key characteristics of the dataset.

3 Data and Descriptive Statistics

My database comprises data from 1759 counties in 21 provinces in 1907, 1908, 1909, 1913, 1915, and 1916. China had three levels of local administration: province, prefecture, and county. The county was the smallest imperial administration while the province was the largest. A Chinese county is a political unit with its own county governor (mayor). The county governor had power over finance, police and all administrative matters of a county. He took orders from the prefecture mayor and provincial governor. Unlike U.S. counties, a Chinese county constitute a lower-level administrative unit than the city, while in the United States, cities are typically situated within and governed by counties.

Revolutionary Participation The data on the 1911 Revolution are from Wang 2011. In "Xinhai Revolution Historical Atlas", he provides maps of county-level revolution locations in each province. The definition of "participation" is: if a county has an armed revolutionary force and the force was used to fight with the imperial official and army in that county, then the county was labeled "participated the revolution through violence". In other words, if revolutionaries staged an uprising in a county during the revolution, that county is coded as having "participated". Figure 2 shows the geographic distribution of the 1911 Revolutionary participation. Approximately 13.7% of the counties participated in this revolution through force.

Some counties not only participated in the revolution through armed fighting but also established military governments afterward. The creation of such governments indicates that these counties possessed greater military power after the revolution, and thus had a stronger capacity to collect taxes and enforce policies. There were counties that participated in the revolution without resorting to violence. In these cases, county leaders chose to support the revolutionaries, making armed conflict unnecessary. Also, there were counties that were loyal to the emperor and chose to fight with the revolutionaries. These counties may not have had any revolutionary forces. Instead of experiencing an internal uprising, they were taken by revolutionary armies through force. These counties are illustrated in Figure 2.

Revolutionary organization An alternative measurement of local revolutionary power is the number of revolutionary organization in each county. The data are also provided by Wang 2011. Revolutionary organization is an indication of the strength of revolutionary forces in each county. Revolutionary organizations not only organize uprisings, but also serve as a driving force for modern education. Figure 3 shows the distribution of revolutionary organizations across counties.

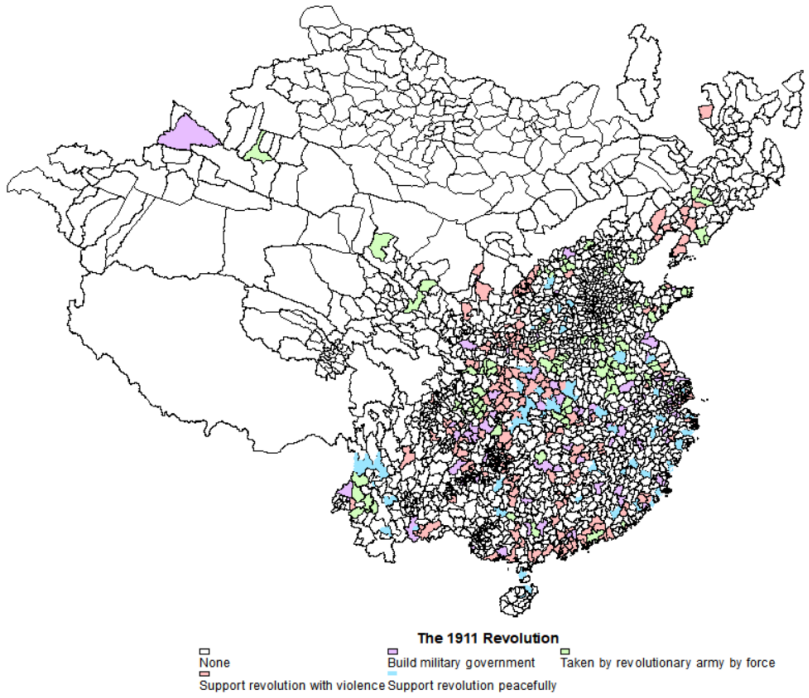


Figure 2: The Distribution of Revolutionary Counties and Those Loyal to the Emperor.

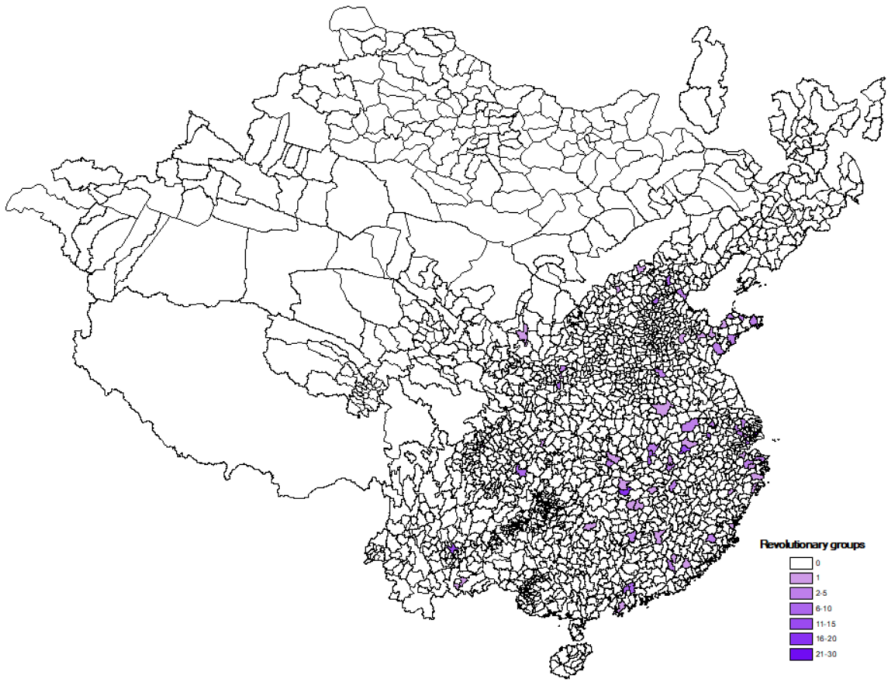


Figure 3: The Distribution of Revolutionary Groups.

Modern education The data on the number of school and enrollment are from the

national administrative statistics on education compiled by the Qing Dynasty in 1907, 1908, and 1909 and the Republic of China in 1913, 1915, and 1916. 1909 and 1913 census years are two years from the time of the 1911 Revolution. The statistics cover the number of schools and enrollment in high schools, higher primary schools, and primary schools. Primary school includes grades 1 to 4, and higher primary school includes grades 5 to 7. Table 2 provides descriptive statistics for these variables. Figure 2 shows the number of modern schools and modern school enrollment nationwide from 1904 to 1916. It is evident that the development of modern education followed a steady upward trajectory. The drop off in the number of modern schools and students observed in 1916 was likely driven by the combined effects of World War I (1914–1919) and ongoing civil conflict between warlords in China. Because of these reasons, the rapid growth trend in modern education had come to a halt.

Figure 4 compares the average number of modern schools and enrollment before and after 1911 between counties that participated in the revolution through armed action and those that did not. The number of middle schools and students enrolled declined after 1915 in both the treatment and control groups, which may have been influenced by the global economic downturn triggered by World War I and the Chinese civil war among warlords. The pre-treatment trends for middle schools and higher primary schools appear to be relatively similar between the treatment and control groups. However, for lower primary schools and enrollment enrollment, there was some widening in the gap between the treatment and control groups between 1907 and 1909. After 1913, however, the gaps were substantially larger than the predicted gaps had the pre-1913 trends continued.

Controls I include control variables for different classifications of counties that might have varied with respect to how they treated education before and after the revolution. Treaty ports are represented by dummy variables that equal one if county i had a treaty port in year t, and zero otherwise. Chong, Fan, Pi, and Nan are administrative labels assigned to counties to assist the government in matching local conditions with officials of appropriate capabilities. Chong indicates importance in transportation; Fan denotes commercial significance; Pi refers to difficulties in tax collection; and Nan signifies high levels of criminal activity.

Table 3 provides descriptive statistics of relevant measures that provide comparisons of unconditional means of revolutionary and nonrevolutionary counties before and after the revolution. In columns (1) - (4), I report the summary statistics for the full sample, revolutionary counties, nonrevolutionary counties, and the difference of means between the two for different variables before the 1911 Revolution. In columns (5) - (8) are the summary statistics after the 1911 Revolution. The standard deviations are presented in parentheses. The

Table 2: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Revolutionary participation	9437	.134	.34	0	1
Revolutionary organization	9437	.132	1.136	0	28
Middle school	9433	.123	.415	0	7
Middle school enrollment	9433	13.702	65.026	0	1571
Higher primary school	9333	2.816	7.255	0	432
Higher primary school enrollment	9333	132.199	237.172	0	4636
Lower primary school	9337	44.071	68.433	0	1191
Lower primary school enrollment	9337	1283.06	2112.53	0	30252
Education budget	9316	11239.108	32785.708	0	1533742
Treaty port	9437	.036	.187	0	1
Important in transportation	9437	.315	.465	0	1
Important in bussiness	9437	.37	.483	0	1
Difficult to gather taxes in	9437	.178	.383	0	1
High in crimes	9437	.378	.485	0	1
Military station	9440	.287	.442	0	1
Secret society	9437	.149	.519	0	7

Notes: This table reports summary statistics for the sample used in the analysis. 1Minhou County and Changsha County each had seven middle schools, the highest number among all counties. Minhou County had 885 middle school enrollment, while Changsha County had 721. Minhou County was formed through the merger of Min County and Houguan County in 1913. (2) Data for Guizhou Province in 1916 is unavailable due to continuous wars among local warlords. (3) Guangrao county in Shandong province has the highest educational budget.

p-value of the difference of means t-tests are presented in brackets below the difference. The comparisons in Table 3 show that revolutionary regions exhibited somewhat higher levels of modern education before the revolution. Following the revolution, the educational disparities widened by several orders of magnitude between treatment and control group, implying that the revolution may have accelerated the expansion of modern education. At the same time, revolutionary counties also enjoyed better transportation and economic conditions, factors that may have contributed to educational development and therefore need to be included as controls in the empirical analysis.

Table 3: Descriptive statistics of Revolutionary (Treatment) and Non-Revolutionary (Control) Counties Before and After the 1911 Revolution

	Before the 1911 Revolution				After the 1911 Revolution			
	Full Sample	Participation		Difference	Full Sample	Participation		Difference
		Treatment	Control	(2)-(3)		Treatment	Control	(7)-(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Panel A. Modern Education							
Middle schools	.087	.157	.075	.082	.161	.422	.122	.300
	(.333)	(.018)	(.005)	[0.000]	(.485)	(.035)	(.006)	[0.000]
Middle school enrollment	5.754	13.568	4.451	9.117	22.290	61.887	16.331	45.556
	(27.900)	(1.992)	(.320)	[0.000]	(88.409)	(6.427)	(1.130)	[0.000]
Higher primary schools	1.274	1.375	1.257	.118	4.520	8.684	3.881	4.803
	(7.104)	(.047)	(.118)	[0.341]	(7.034)	(.433)	(.098)	[0.000]
Higher primary school enrollment	53.141	78.491	48.910	29.580	219.580	408.024	190.608	217.416
	(61.267)	(3.190)	(.854)	[0.000]	(315.745)	(20.542)	(4.280)	[0.000]
Lower primary schools	20.804	23.84	20.297	3.550	69.785	96.389	65.696	30.694
	(34.590)	(1.273)	(.535)	[0.000]	(85.306)	(4.844)	(1.263)	[0.000]
Lower primary school enrollment	505.226	711.041	470.907	240.134	2142.831	3276.511	1968.532	1307.979
	(926.489)	(42.114)	(13.675)	[0.000]	(2653.098)	(157.315)	(38.331)	[0.000]
Educational funding	6415.641	12609.7	5387.238	7222.459	16560.69	33432.67	13963.99	19468.68
	(11182.09)	(788.225)	(126.107)	[0.000]	(45478.39)	(3060.293)	(621.9672)	[0.000]
	Panel B. Control Variables							
Treaty ports	.035	.106	.023	.082	.038	.114	.026	.088
	(.184)	(.011)	(.002)	[0.000]	(.190)	(.013)	(.002)	[0.000]
Important in transportation	.318	.354	.312	.042	.312	.376	.302	.073
	(.465)	(.018)	(.007)	[0.013]	(.463)	(.019)	(.007)	[0.000]
Important in bussiness	.378	.5	.357	.142	.361	.510	.337	.172
	(.484)	(.018)	(.007)	[0.000]	(.480)	(.020)	(.007)	[0.000]
Difficult to gather taxes in	.177	.242	.166	.076	.180	.269	.166	.103
	(.381)	(.016)	(.005)	[0.000]	(.384)	(.018)	(.005)	[0.000]
High in crimes	.388	.270	.167	.103	.367	.517	.344	.173
	(.487)	(.018)	(.005)	[0.000]	(.482)	(.020)	(.007)	[0.000]
County observation	4,903	701	4,202		4,435	593	3,940	

Notes: Standard errors are in parentheses below the entries in columns 1 through 3 and 5 through 7. P-values are in parentheses below entries in columns 4 and 8.

4 Estimation and Results

4.1 Baseline estimation

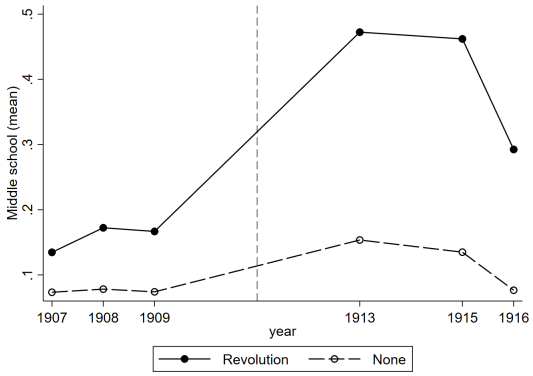
To start, I estimate a standard two way fixed effect model. The idea is to estimate the effect of revolution on modern education by comparing the relative change in the number of schools and enrollment after the 1911 revolution between counties with and without revolution activities. I specify the difference-in-difference estimation as follows:

$$Education_{i,t} = \alpha_0 + \alpha_1 Revolution_i * Post_t + \delta X_i * Post_t + \eta_i + \gamma_t + \epsilon_{i,t} \quad (1)$$

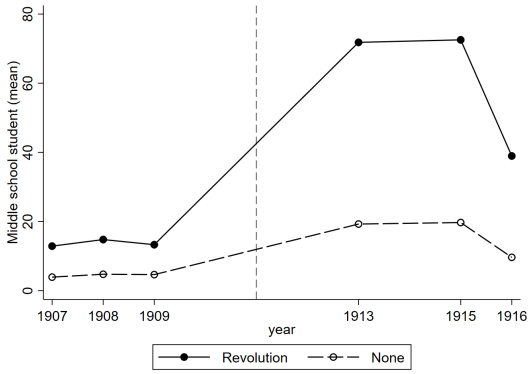
where $Education_{i,t}$ can be the number of modern schools or the number of enrollment recorded by the Qing government and the Republic of China in county i and year t. $Revolution_i$ is a dummy variable that equals one if a county participated in the 1911 revolution and zero otherwise. It can also be the number of revolutionary organizations as an alternative measurement of local revolutionary power. $Post_t$ is a time dummy variable that equals one for the years after the revolution and zero otherwise. X_i is a vector of time-invariant county characteristics, which includes whether a county has a treaty port, whether a county is important in transportation (Chong), whether a county is important in business (Fan), whether a county is difficult to collect taxes (Pi), and whether a county's crime rate is high (Nan). These are interacted with the *Post* variable to control for the impact of these features might have had on schooling after the revolution. η_i and γ_t are vectors of county and year fixed effects to control for all time-invariant differences between counties and changes over time that affect all counties similarly. $\epsilon_{i,t}$ is an error term.

The coefficient of interest in Equation (1) is α_1, the estimated impact of the 1911 revolution on the number of modern schools and enrollment. The coefficient is expected to be positive, which suggests a larger increase in the number of schools and enrollment in the counties that participated in the revolution through armed force than the counties that did not.

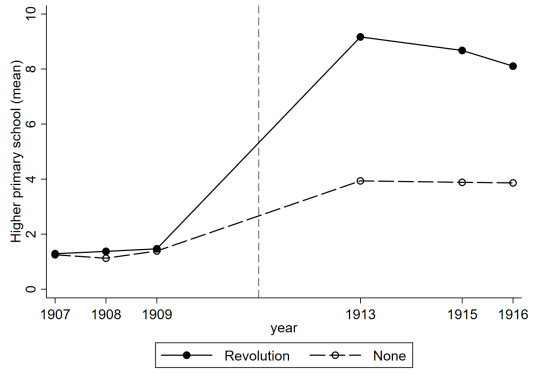
Table 4 reports the baseline results of the DID estimation. Column (1) and Column (2) show that the number of middle schools was 0.153 higher and the number of middle school enrollment was 22.96 higher in counties that participated in the revolution compared to counties that did not participate. Column (3) and Column (4) show that the number of higher primary schools in revolutionary counties was 3.614 higher, and the number of higher primary school enrollment was 129.77 more than in counties that did not participate in the revolution. Column (5) and Column (6) show that the number of lower primary schools



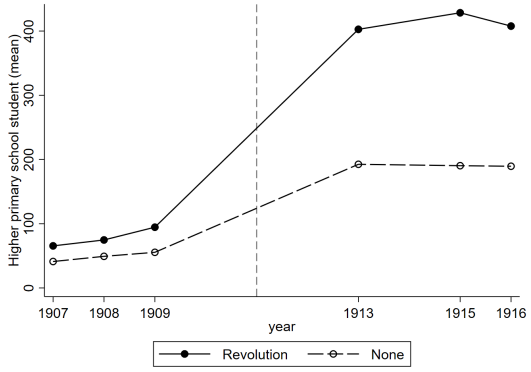
(a) middle school



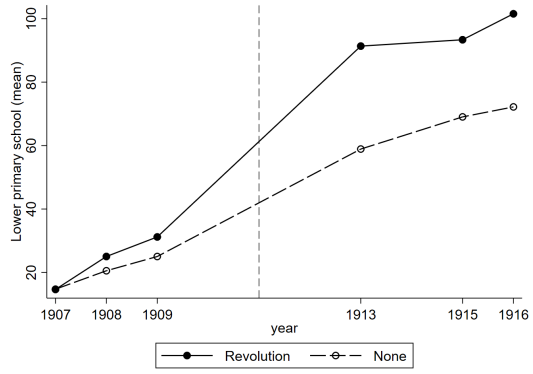
(b) middle school enrollment



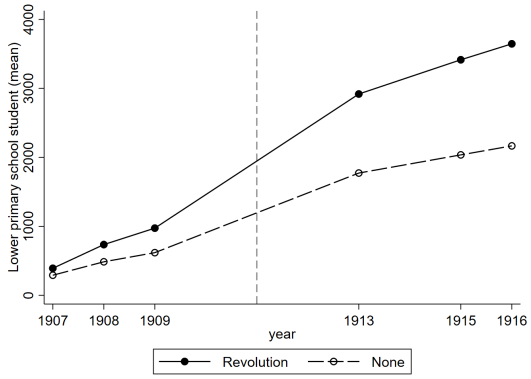
(c) higher primary school



(d) higher primary school enrollment



(e) lower primary school



(f) lower primary school enrollment

Figure 4: Modern schools and enrollment by year and revolution participation (county-level)

Notes: These figures show the average numbers of different types of schools and enrollment in counties that participated in the revolution and those that did not.

Table 4: Difference-in-Difference Regression Results of the Impact of Revolutionary Violence on the Number of Schools and the Number of enrollment

	Modern education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
Revolution * Post	0.153***	22.96***	3.614***	129.7***	18.97**	749.8***
	(0.0393)	(6.443)	(0.661)	(27.87)	(6.915)	(205.2)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observation	9355	9355	9225	9225	9229	9229

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

was 18.97 higher, and the number of lower primary school enrollment was 749.8 more in revolutionary counties relative to the control group.

Table 5 reports the results using another measure of revolution: the number of revolutionary organizations. The revolutionary organization coefficient in Column (1) indicates that the effect of revolutionary organizations on the number of middle schools is positive but statistically insignificant. Column (2) shows that the presence of an additional revolutionary group is associated with approximately 19 more middle school enrollment in a county, on average. Columns (3) and (4) suggest that an additional revolutionary group corresponds to about one more higher primary school and 61 more higher primary school enrollment, respectively. Finally, Columns (5) and (6) show that an additional revolutionary group is associated with approximately seven more lower primary schools and 442 more lower primary school enrollment in a county. The data used for baseline regression have varying sample sizes across years and contain many missing values. Appendix Table A.2 shows that, after excluding missing observations and enforcing a balanced panel with equal sample sizes each year, the estimates are essentially unchanged relative to the baseline Difference-in-Difference regression.

4.2 Event-study

To understand the dynamic impact of revolution on the development of modern education and to examine the pre-trends while controlling for other correlates, I estimate this equation:

$$Education_{i,t} = \sum_{t=1907}^{1908} \beta_t Revolution_i \times Year_t + \sum_{t=1913}^{1916} \theta_t Revolution_i \times Year_t + \delta X_i \times Post_t + \eta_i + \gamma_t + \epsilon_{i,t} \quad (2)$$

The event study analysis replaces the Revolution*Post variable with interactions of the Revolution variable with the year dummies for 1907, 1908 before the Revolution and 1913, 1915, and 1916 after the Revolution, and uses 1909 as the comparison year. All variables have the same definitions as in equation 1. The 1907 and 1908 interactions with the Revolution variable show differences between revolutionary and non-revolutionary counties prior to the Revolution and thus can be used to describe pre-trends. The interactions between Revolution and the 1913, 1915, and 1916 year dummies document the path of difference after the Revolution.

The event study results in Table 6 show that counties that participated in the revolution through force did not have statistically significantly higher levels of modern schools or enrollment enrollment before the 1911 Revolution. Figure 5 provides visual confirmation that there were no differences in the trends for revolutionary and non-revolutionary counties before the Revolution. Therefore, the parallel trends assumption is satisfied.

The results in Table 5 and Figure 5 show that by 1913 the Revolutionary counties had added 0.184 more middle schools, 4.247 more higher primary schools, and 21.3 more lower primary schools than non-Revolutionary counties. These changes are substantial when compared to the mean level of the number of schools in non-Revolutionary counties after the Revolution listed in column 7 of Table 3 of 0.12 middle schools, 3.9 higher primary schools, and 66 lower primary schools. In 1915 and 1916 the differences from 1909 in the changes in the number of Revolutionary and non-Revolutionary schools from 1909 were not quite as large but were still substantial.

The relative rise in the number of students enrolled was also substantial. By 1913 Revolutionary counties had increased the number of students enrolled relative to the non-Revolutionary counties by 32 more in middle schools, 121 more in higher primary schools, and 525 more in lower primary schools. These were sizeable changes when compared to mean level of the numbers of enrollment being taught after the Revolution in column 7 of Table 3 were 16 in middle schools, 191 in higher primary, and 1969 in lower primary. In

Table 5: Event Study Results of the Impact of Revolutionary Violence on the Number of Schools and the Number of enrollment

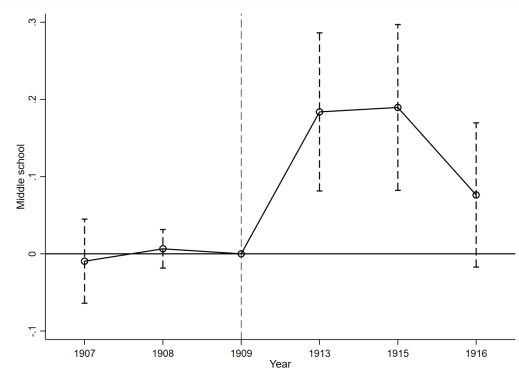
	Modern education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
1907*Revolutionary participation	-0.010	2.119	-0.003	-15.296**	0.780	-96.135
	(0.028)	(2.731)	(0.369)	(5.343)	(2.145)	(59.308)
1908*Revolutionary participation	0.006	2.092	0.181	-13.178***	-1.523	-100.614*
	(0.013)	(1.192)	(0.308)	(3.899)	(1.376)	(40.538)
1913*Revolutionary participation	0.184***	32.145***	4.247***	120.867***	21.328**	524.769**
	(0.052)	(7.991)	(0.766)	(26.826)	(7.365)	(179.520)
1915*Revolutionary participation	0.190***	29.578**	3.603***	132.965***	17.726*	817.657***
	(0.055)	(9.710)	(0.778)	(31.974)	(7.097)	(226.983)
1916*Revolutionary participation	0.076	6.774	2.981***	109.835***	18.659*	924.302***
	(0.048)	(6.711)	(0.726)	(29.091)	(7.861)	(253.426)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observations	9355	9355	9225	9225	9229	9229

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

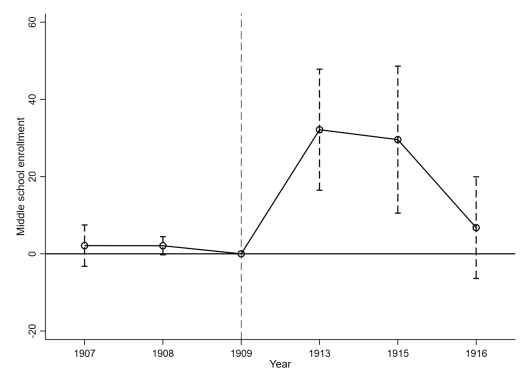
1915 and 1916 the differences from 1909 in the change for the number of Revolutionary and non-Revolutionary enrollment was even higher for lower primary schools but lower and still substantial for the middle and higher primary schools. The data used for baseline regression have varying sample sizes across years and contain many missing values. Appendix Table A.3 shows that, after excluding missing observations and enforcing a balanced panel with equal sample sizes each year, the estimates are essentially unchanged relative to the baseline event-study regression.

4.3 Robustness check

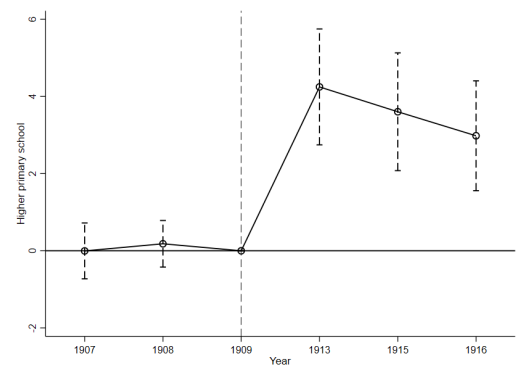
Instrumental variable There may be concerns with endogeneity of the revolution. Therefore, I explored the use of an instrumental variable to try to reduce the problem of endogeneity. The instrument is an indicator equal to 1 if a county hosted at least one traditional military garrison of the Green Standard Army (lüying), and 0 otherwise. A total of 559 counties had military bases, accounting for 31.8% of the total number of counties. The Green



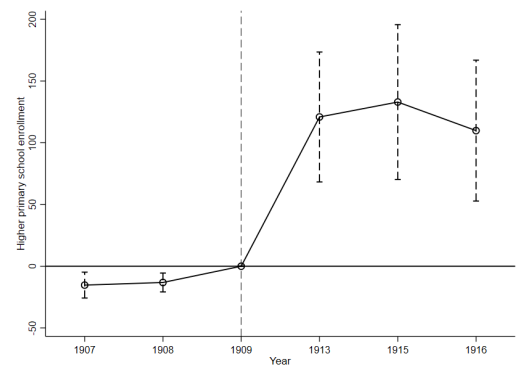
(a) middle school



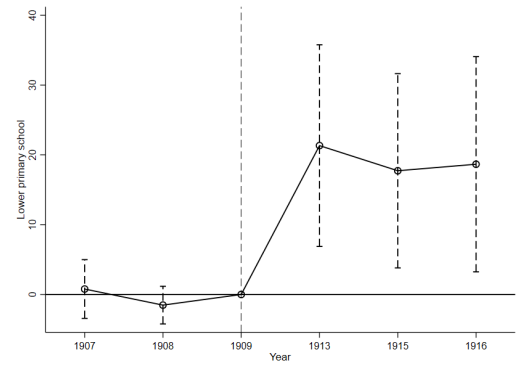
(b) middle school enrollment



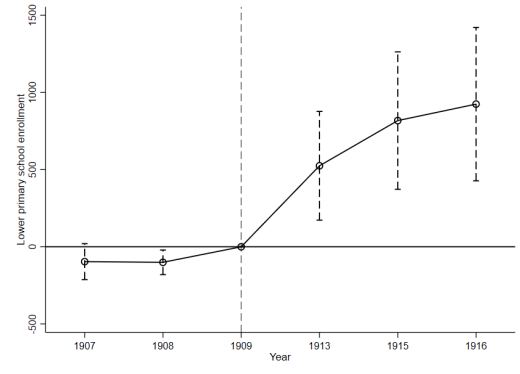
(c) higher primary school



(d) higher primary school enrollment



(e) lower primary school



(f) lower primary school enrollment

Figure 5: Event study Results of the Impact of Revolutionary Violence on the Number of Schools and the Number of enrollment

Standard Army constituted the Qing dynasty's regular forces. It was the principal garrison and was predominantly composed of people of Han ethnicity. The locations of garrison sites were chosen on the basis of military strategy. As the Kangxi Da Qing Huidian notes, "officials and troops are stationed at all strategically vital locations, with troop numbers scaled to local terrain." Hence, whether a county had such a garrison is therefore closely tied to terrain and military strategy; therefore, they would not be expected to have a direct connection to the development of modern education. The 1911 Revolution was, to a large extent, an uprising of the New Army. New Army units were frequently quartered in existing Green Standard compounds. Where a Green Standard garrison existed, local commanders were more likely to receive orders to raise New Army formations and were consequently more likely to support the Revolution. There may be a concern that counties with more developed transportation networks were more likely to host military garrisons and, through greater exposure to foreign influence, to develop modern education. This problem is corrected by the presence of the dummy variable that captures the Qing government's designation of the county as "important for transportation".

Table 6 shows the coefficients of Revolution*Post and information related to the first-stage equation with the Military station dummy*Post coefficient and the F-statistic related to the strength of the instrument. These F-statistics are all greater than 20, which implies not problems with instrument strength. When instrumenting the revolution with the military station dummy, the estimated effects on modern education become substantially larger compared to the baseline DID estimates in Table 4. Specifically, the coefficient for the number of middle schools increases from 0.153 to 0.703, roughly 4.6 times larger. For the number of middle school enrollment, the estimate rises from 22.96 to 206.38, nearly a ninefold increase. The effect on the number of higher primary schools grows from 3.61 to 16.72, about 4.6 times larger, and the coefficient for the number of higher primary school enrollment increases from 129.7 to 591.0, also about 4.6 times larger. Similarly, the coefficient for the number of lower primary schools increases from 18.97 to 88.87 ,around 4.7 times larger. The coefficient for the number of lower primary school enrollment rises from 749.8 to 4303.9, nearly a 5.7-fold increase. Only three of the IV coefficients, however, are statistically significant.

PSM-DID A major concern of using Difference-in-Difference method is that the parallel trend assumption may not hold. Counties that participated in the revolution through armed action may differ systematically from those that did not in terms of socio-economic conditions. To address this concern, I use a PSM-DID approach (Propensity score matching - Difference in Difference), (Heckman, Ichimura, and Todd 1997; Heckman, Ichimura,

Table 6: Impacts of revolution: Two Stage Least Squares Results with the Military station IV

	Modern education: IV1: Military station dummy					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
Revolution*Post	0.703*	206.378***	16.719**	591.027**	88.871*	4303.908**
	(0.285)	(60.010)	(5.236)	(185.762)	(44.741)	(1515.276)
	First stage					
Military station dummy*Post	0.097***	0.097***	0.099***	0.099***	0.099***	0.099***
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
F-statistics	21.507	21.507	22.047	22.047	22.134	22.134
Year fixed effect	yes	yes	yes	yes	yes	yes
County fixed effect	yes	yes	yes	yes	yes	yes
Baseline controls*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
N	9355	9355	9225	9225	9229	9229

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. The F-statistics reported are the Kleibergen-Paap rk Wald F statistics. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

and Todd 1998) . By implementing PSM before applying DID, the method ensures that comparisons are made between counties that are more comparable in observable characteristics. The matching method is period by period matching which avoids the problems of time mismatch and self-matching. The covariates are county characteristics. Treaty ports are represented by dummy variables that equal one if county i has a treaty port in year t, and zero otherwise. Chong, Fan, Pi, and Nan are administrative labels historically assigned to counties to help the imperial government align local conditions with officials of appropriate capabilities. Chong indicates importance in transportation; Fan denotes commercial significance; Pi refers to difficulties in tax collection; and Nan signifies high levels of criminal activity. These covariates meet the standards proposed by Smith and Todd 2005, as they influence both a county's likelihood of participating in the revolution and its level of modern education. Moreover, they are pretreatment variables established nearly a century before the revolution and remained stable over time. Appendix Figure A.2. shows that, after matching, the absolute standardized bias (%bias) for all covariates falls below 10%

Table 7: Impacts of revolution: Results from PSM-DID

	(1) Middle Schools	(2) Middle School enrollment	(3) Higher Primary Schools	(4) Higher Primary School enrollment	(5) Lower Primary Schools	(6) Lower Primary School enrollment
Revolution * Post	0.161***	23.73***	3.509***	122.1***	17.49**	683.2***
	(0.0393)	(6.410)	(0.664)	(27.73)	(6.746)	(198.6)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Baseline controls*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
N	9146	9146	9015	9015	9016	9016

Note: Controls: Treaty ports are represented by dummy variables that equal one if county i has a treaty port in year t, and zero otherwise. Chong, Fan, Pi, and Nan are administrative labels assigned to counties to assist the government in matching local conditions with officials of appropriate capabilities. Chong indicates importance in transportation; Fan denotes commercial significance; Pi refers to difficulties in tax collection; and Nan signifies high levels of criminal activity.

and is substantially reduced compared to the pre-matching values. This indicates that the treated and control groups are well balanced in terms of their socio-economic characteristics post-matching, satisfying the key assumption of covariate similarity underlying the propensity score matching method. Table 7 shows the average treatment effects on treated (ATT) estimated by PSM-DID approach. The results are still robust and statistically significant.

Placebo test I also estimate a placebo difference-in-differences that treats 1908 as a pseudo revolutionary year and restricts the sample to 1907–1909, which lies entirely before the 1911 revolution. The specification includes county and year fixed effects, with standard errors clustered at the county level. The coefficient of interest is the interaction $Revolution_i \times Post1908_t$. As shown in Table 8, across all education outcomes, including middle schools, middle school enrollment, higher primary schools, higher-primary enrollment, lower primary schools, lower-primary enrollment, and educational funding, the placebo DID estimates are small and statistically insignificant. This absence of pre-1911 effects supports the identifying assumption and reduces concerns that the main results are driven by pre-existing differential trends or anticipatory behavior.

Table 8: Placebo test

	Modern education						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment	Educational Funding
Revolution $\times Post1908$	0.004	-1.449	0.139	7.239	0.000	29.929	730.093
	(0.022)	(2.040)	(0.328)	(3.820)	(1.144)	(37.214)	(751.855)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06	11239.41
Observation	4861	4861	4859	4859	4863	4863	4844

Note: Sample limited to 1907–1909 (before the 1911 Revolution). Treated indicates counties that participated in the 1911 revolution; Post 1908 = 1{year $\geq$ 1908}. All regressions include county and year fixed effects. standard errors clustered by county. Coefficients on Revolution $\times$ Post 1908 are not statistically different from zero. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5 Mechanism

5.1 Educational funding

Differences in funding were the direct cause of disparities in the development of modern education across counties. During this period, county-level educational expenditures were typically financed through local surtaxes, rental income from educational properties, donations from local elites, and tuition fees, while the central government exerted only limited influence over primary education funding in the county level. Approximately 60% of funding comes from county-level surtaxes, and 17% from revenues generated by collective endowment land (Gao 2018; Gao 2019). In this study, I use county-level data on educational funding for the years 1907, 1908, 1909, 1913, 1915, and 1916. The sources of these funds cannot be distinguished. In Table 9, I find that counties that launched uprisings during the revolution later raised higher levels of educational funding (Column (1) and (2)). On average, the difference between the treatment and control groups was about 8,000 silver yuan. Regardless of the specific channels through which funding increased, this pattern indicates stronger local support for modern education. One possible explanation is that local governments participating in the uprisings gained greater military and political power, enabling them to collect more local surtaxes. Another possibility is that revolutionary officials, once in power, were more enthusiastic about investing in modern education than traditional officials who

Table 9: Mechanism: Educational funding

	Educational funding			
	(1)	(2)	(3)	(4)
	OLS	2SLS	OLS	OLS
Revolution $\times Post$	8356.4**	25512.7		6443.7*
	(3182.2)	(13030.2)		(3159.7)
Organization $\times Post$			4275.3**	4006.1**
			(1418.1)	(1416.3)
		First Stage		
Station $\times Post$		0.0912***		
		(0.0208)		
F-statistics		19.183		
Year fixed effects	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes
Baseline controls*Post	yes	yes	yes	yes
Observations	9208	9208	9208	9028

Note: The dependent variables in Columns (1) - (4) are educational funding at the county level. Column (1) reports OLS regression results from a difference-in-differences model. Column (2) presents the IV estimation results. For control variables, Chong, Fan, Pi, and Nan are administrative labels assigned to counties to assist the government in matching local conditions with officials of appropriate capabilities. Chong indicates importance in transportation; Fan denotes commercial significance; Pi refers to difficulties in tax collection; and Nan signifies high levels of criminal activity.

had remained in office since the imperial period. Because many mayors appointed under the Qing Empire retained their positions after the founding of the Republic, this shift in enthusiasm could have had a direct fiscal impact. Revolutionary mayors may also have endowed additional land and property to educational departments, generating more rental income. Moreover, local elites could have increased their donations to new schools, as attending modern schools became a pathway to building connections with revolutionary leaders and securing future positions in government or modern enterprises. Tuition fees, however, were relatively low during this period and thus unlikely to have contributed significantly to the increase in educational funding.

Revolutionary organizations also help in raising funds. As shown in Table 9, one more revolutionary organization was associated with approximately 4000 more silver yuan of county-level educational funding (Column (3) and (4)). Since many members of revolutionary organizations were local elites and well connected, they may have helped with donations and fundraising.

Table 10: Mechanism: Difference-in-Difference Regression Results of the Impact of the Number of Revolutionary Organization on the Number of Schools and the Number of students

	Modern education (DID)					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
Organization $\times Post$	0.0278	19.24***	1.182***	61.22***	7.425	442.8***
	(0.0214)	(4.010)	(0.195)	(9.154)	(4.450)	(119.6)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observation	9355	9355	9225	9225	9229	9229

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

5.2 Revolutionaries and revolutionary organizations

Another possible explanation is the increased support from local revolutionaries and revolutionary organizations. Under the imperial government, these groups were forced to operate discreetly. However, in the new Republic, they developed cooperative relationships with local authorities. Their contribution to the development of modern education should not be underestimated. They could raise funds, establish new schools, donate property, and persuade local families to send their children to modern schools. As shown in Table 10 and Table 11, counties with more revolutionary organizations tended to have more modern schools and higher enrollment after the revolution, though we find no effect for middle schools or lower primary enrollment.

5.3 Local control: Revolutionary intensity

In this paper, the treatment group refers to counties that supported the Revolution through violent uprisings. However, some counties supported the revolutionary cause in relatively peaceful ways. For example, local leaders in these counties might have simply sent telegrams to provincial or national authorities declaring, "We support the Revolution," as a symbolic gesture of cooperation with the revolutionary armies. In contrast, some counties remained

Table 11: Machanism: Event Study Results For the Impact of the Number of Revolutionary Organization on the Number of Schools and the Number of students

	Modern education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
1907 $\times Organizations$	0.028	3.957	0.032	-0.865	-0.865	-31.395
	(0.036)	(4.268)	(0.048)	(1.521)	(0.772)	(33.533)
1908 $\times Organizations$	0.017	0.163	0.011	-4.238	-1.422*	-57.802*
	(0.018)	(1.207)	(0.050)	(2.501)	(0.690)	(28.010)
1913 $\times Organizations$	0.063	25.587***	1.319***	57.590***	6.651	357.000**
	(0.070)	(3.749)	(0.218)	(11.110)	(4.028)	(116.423)
1915 $\times Organizations$	0.051	24.575**	1.247***	63.985***	6.587	433.227***
	(0.028)	(7.748)	(0.216)	(10.824)	(4.707)	(122.692)
1916 $\times Organizations$	0.011	10.967	1.017***	57.373***	6.777	454.284***
	(0.040)	(8.916)	(0.205)	(13.626)	(4.509)	(126.685)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observations	9355	9355	9225	9225	9229	9229

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

passive or even resisted the revolutionaries. Some counties not only witnessed uprisings but also subsequently established military governments, indicating a higher degree of control over local affairs.

As shown in Table 12, counties that built military government experienced increases across all school types as well as in education funding. Counties that violently participated in the revolution but did not establish military governments experienced slower yet still significant growth in modern education, but no significant increase in educational funding. By contrast, counties that supported the revolution peacefully show no statistically significant gains in middle schools, higher primary schools, or educational funding, though they exhibit faster growth in lower primary schooling. Construction of lower primary schools was the least demanding: in most cases it involved consolidating existing sishu (private tutorial schools) or introducing Western-style curricula into them. While greater intensity of participation translated into higher educational funding, in turn enabling the construction

Table 12: Mechanism: Violent versus peaceful participation

	Modern education						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment	Educational Funding
Built miliatary government $\times Post$	0.335***	70.649***	6.296***	254.181***	36.440**	1775.690***	15631.331***
	(0.097)	(17.885)	(1.262)	(58.747)	(13.312)	(473.512)	(4629.640)
Violent participation $\times Post$	0.092*	5.970	2.786***	87.256**	14.963*	452.998*	5589.859
	(0.037)	(4.396)	(0.695)	(29.107)	(7.549)	(207.847)	(3771.495)
Peaceful participation $\times Post$	0.069	20.088	2.728	70.940	27.728*	872.794*	543.934
	(0.090)	(13.535)	(1.885)	(59.722)	(11.412)	(416.217)	(2514.454)
Year fixed effects	yes	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes	yes
Control variables $\times Post$	yes	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06	11239.41
Observation	9355	9355	9225	9225	9229	9229	9208

Note: Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

of middle schools and higher primary schools. The difference between violent and peaceful participation suggests that rapid and profound institutional change occurred primarily in places where revolutionary elites seized local power more completely.

5.4 Local control: Imperial power versus revolutionary power

During the 1911 Revolution, China was split between two power centers: the northern provinces loyal to the Qing court and Yuan Shikai's Beiyang (Northern ocean) Army, and the southern revolutionary forces aligned with Sun Yat-sen. In 1912, Yuan Shikai persuaded the emperor to abdicate and became provisional president with the support of the southern revolutionaries. When Yuan refused to share power and moved toward dictatorship, the southern revolutionaries launched an uprising but were swiftly defeated within about a month. Sun Yat-sen fled to Japan, and the Kuomintang was dissolved. In December 1915, Yuan Shikai proclaimed himself emperor, precipitating the Protect the Republic War. Local warlords raised forces in rebellion, and the ensuing disorder abated only with Yuan's death in July 1916.

Between 1912 and 1916, China was nominally unified as the Republic of China, yet in practice it was fragmented, with different regions under the control of competing military forces. In addition, various warlords operated under the support of different foreign powers. Generally speaking, the counties that launched uprising during the revolution were more under control of the southern military forces influenced by Sun Yat-sen. Baseline regressions

Table 13: Mechanism: Revolution and the consequent mayor change

	Mayor change	
	(1)	(2)
Revolution	-0.0816***	-0.0594**
	(0.0189)	(0.0192)
Province fixed effect	yes	yes
Controls	no	yes
Mean	0.950	0.950
Observation	1388	1388

Note: Mayor change is an indicator equal to one if the name of the county mayor appointed by the emperor in 1911 differs from the name of the mayor in 1916. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

show that counties participating in the revolution experienced faster growth in modern educational facilities and enrollment. However, in evaluating real local control, greater scrutiny of county leadership is needed. By 1916, roughly 95 percent of county mayors had been replaced. As shown in Table 13, counties that supported the revolution militarily experienced about 6% fewer mayor changes. The data for the name and the location of county mayors is from Campbell, Chen, et al. 2022. They constructed the individual-level political elites database for both the Qing Dynasty from 1900 to 1912[2] and the Beiyang government from 1912 to 1924[3]. This suggests that, even when a county mayor had been appointed by the imperial government, participation in the revolution helped secure his position under the Republic of China. Moreover, as shown in Table 14, counties that experienced a change of mayor between 1911 and 1916 had significantly fewer modern schools and lower enrollment than counties in which the mayor remained in office. A plausible explanation is that leadership continuity fostered local order and administrative capacity. Mayors appointed under the imperial government often possessed greater de facto authority, local knowledge, and control. Since they supported the revolution, they were also less likely to be removed by revolutionary forces and were more receptive to 'new' institutions, including modern schooling. Continuity thus combined both the capacity to exercise control and the willingness to implement reform, indicating an alignment of ideology and governance direction.

[2]China Government Employee Database–Qing (CGED-Q) . Website: https://shss.hkust.edu.hk/lee-campbell-group/projects/china-government-employee-database-qing-cged-q/.

[3]China Government Employee Dataset–Beiyang/Republic of China (CGED-BY/ROC). Website: https://shss.hkust.edu.hk/lee-campbell-group/projects/china-government-employee-dataset-republic-of-china-cged-roc/.

Table 14: Mechanism: Mayor change and modern education

	Modern education						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment	Educational Funding
Mayor change	-0.113**	-31.933***	-4.630***	-235.485***	-36.208***	-1942.257***	-24775.97**
	(0.044)	(8.159)	(0.704)	(32.263)	(9.257)	(297.090)	(8269.699)
Control variables	yes	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06	11239.41
Observation	1387	1387	1388	1388	1388	1388	1388

Note: Mayor change is an indicator equal to one if the name of the county mayor appointed by the emperor in 1911 differs from the name of the mayor in 1916. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6 Conclusion

The 1911 Revolution, the first democratic revolution in Chinese history, marked the end of over two thousand years of monarchical rule and led to the establishment of the Republic of China. Yet the revolution's societal impacts remain understudied in the field of economics, especially its influence on the development of Western-style modern education. Using unique data on modern education in China from 1902 to 1916, this paper examines the educational and political consequences of the 1911 Revolution. I find that armed participation in the revolution during 1911–1912 significantly increased the number of Western-style educational facilities and student enrollments in counties that violently supported the revolution.

There are four possible mechanism behind this story. First, an increase in the new education's financial budget in the counties that violently support the revolution might explain the increased number of schools and enrollment in modern educational facilities. Second, higher number of prior revolutionary organizations could also contribute to the development of modern education. Third, the violent nature of participation and the establishment of effective military control over local areas were important. Fourth, political stability likely also contributed to sustaining educational growth.

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A Appendix

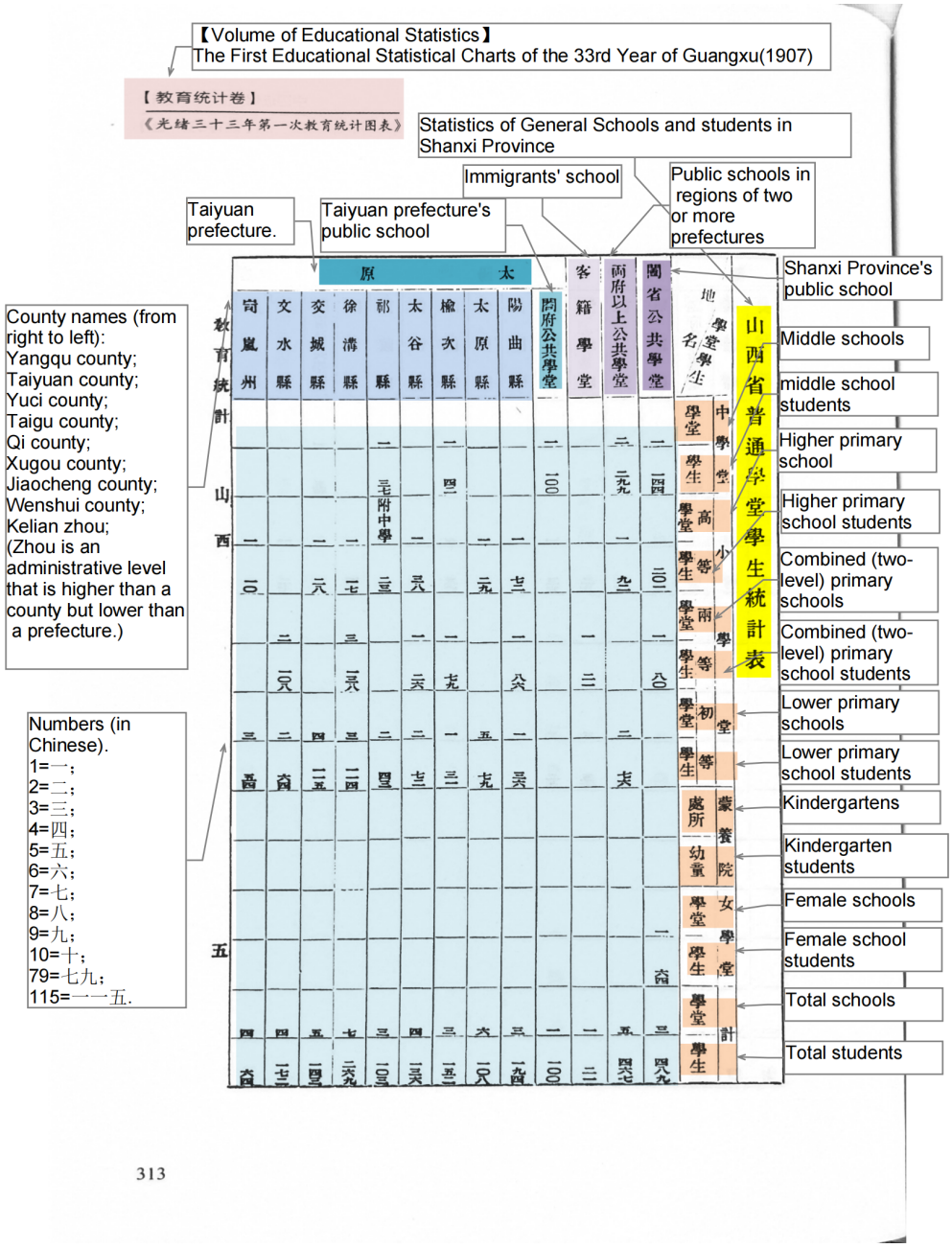


Figure A.1. (a) The data on modern education (before revolution). Notes: This figure gives an example of statistical records on general school and enrollment in Taiyuan prefecture, Shanxi Province, 1907. (1) This table should be read from right to left, top to bottom. (2) As shown in the figure, the higher the education level, the lower the number of school and enrollment. Each of the counties has a least one lower primary school. The school size of lower primary school is around 10 to 30 enrollment. Not every county has a middle school or a higher primary school. (3) The

combined (two-level) primary school is a combination of higher and lower primary schools. (4) I did not include provincial- and prefecture-level schools, such as prefecture's public school, immigrants' school, public schools in regions of two or more prefectures, and Province's public schools in my county-level estimation. Because it is very hard to identify the locations of those schools. I include these schools, however, in my provincial-level estimation. (5) There is typo in the figure. It shows than the number of higher primary school in Qi county as "affiliated middle school (it is a note, but leaves no space for the actual number)" whereas it should be one in this case.

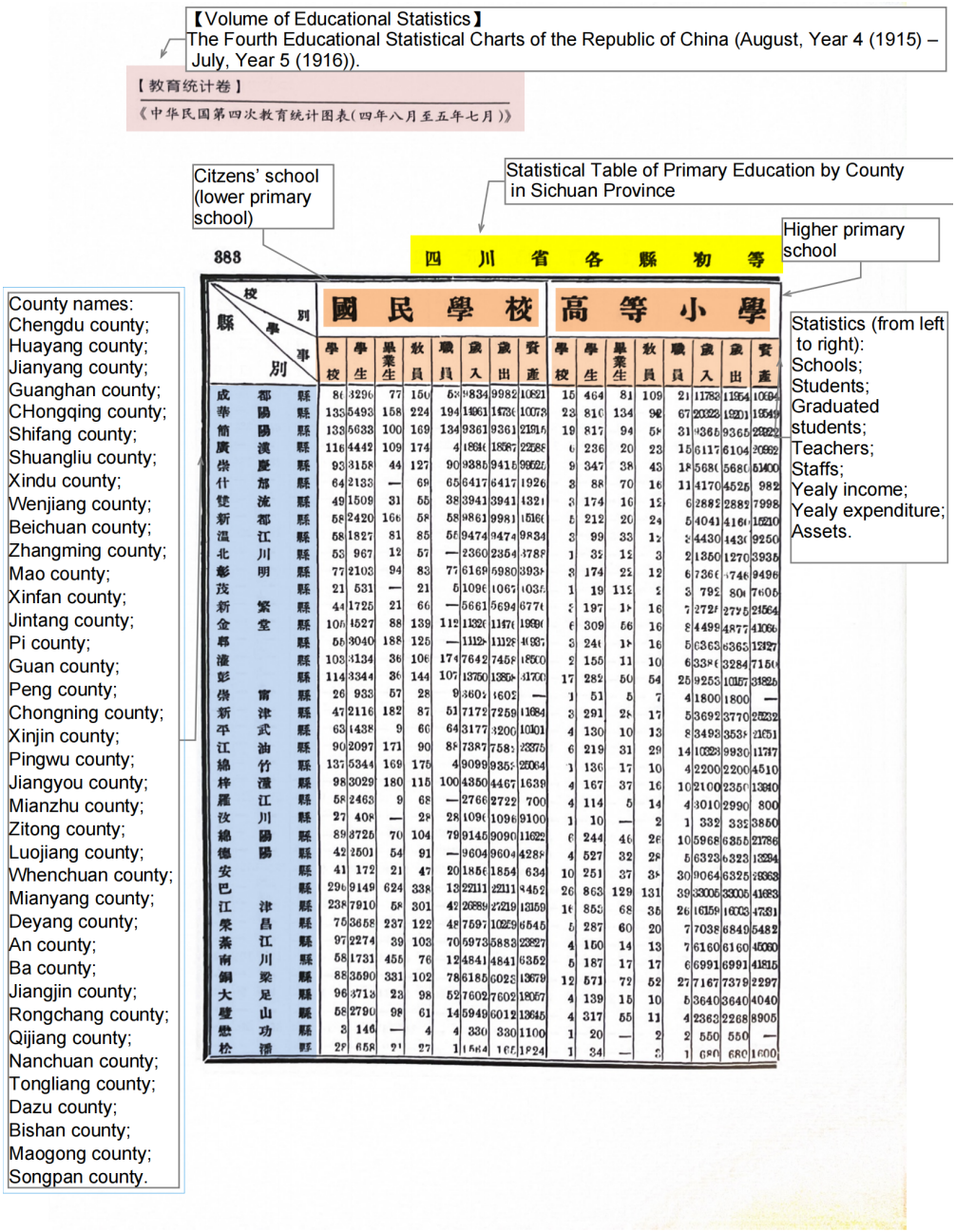


Figure A.1. (b) The data on modern education (after revolution). Notes: This figure gives an example of statistical records on general school and enrollment in Sichuan Province from August, 1915 to July, 1916.

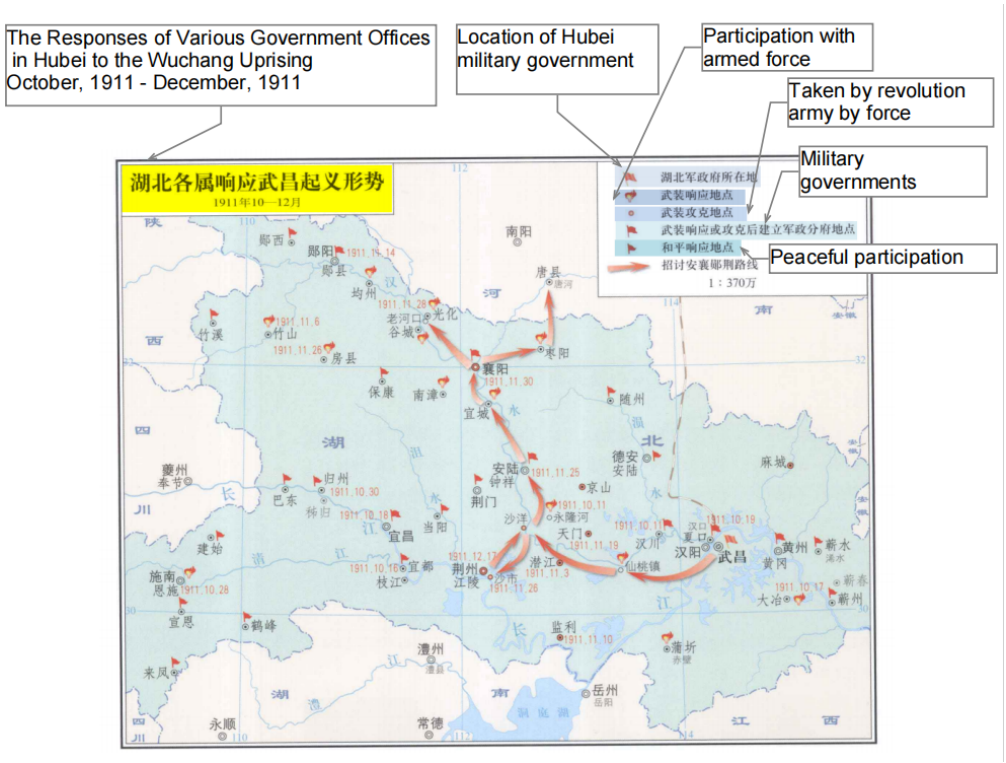


Figure A.1. (c) The data on revolution participation. Notes: This figure gives an example of the locations where revolutionaries launched uprisings in Hubei Province from October, 1911 to December, 1911.

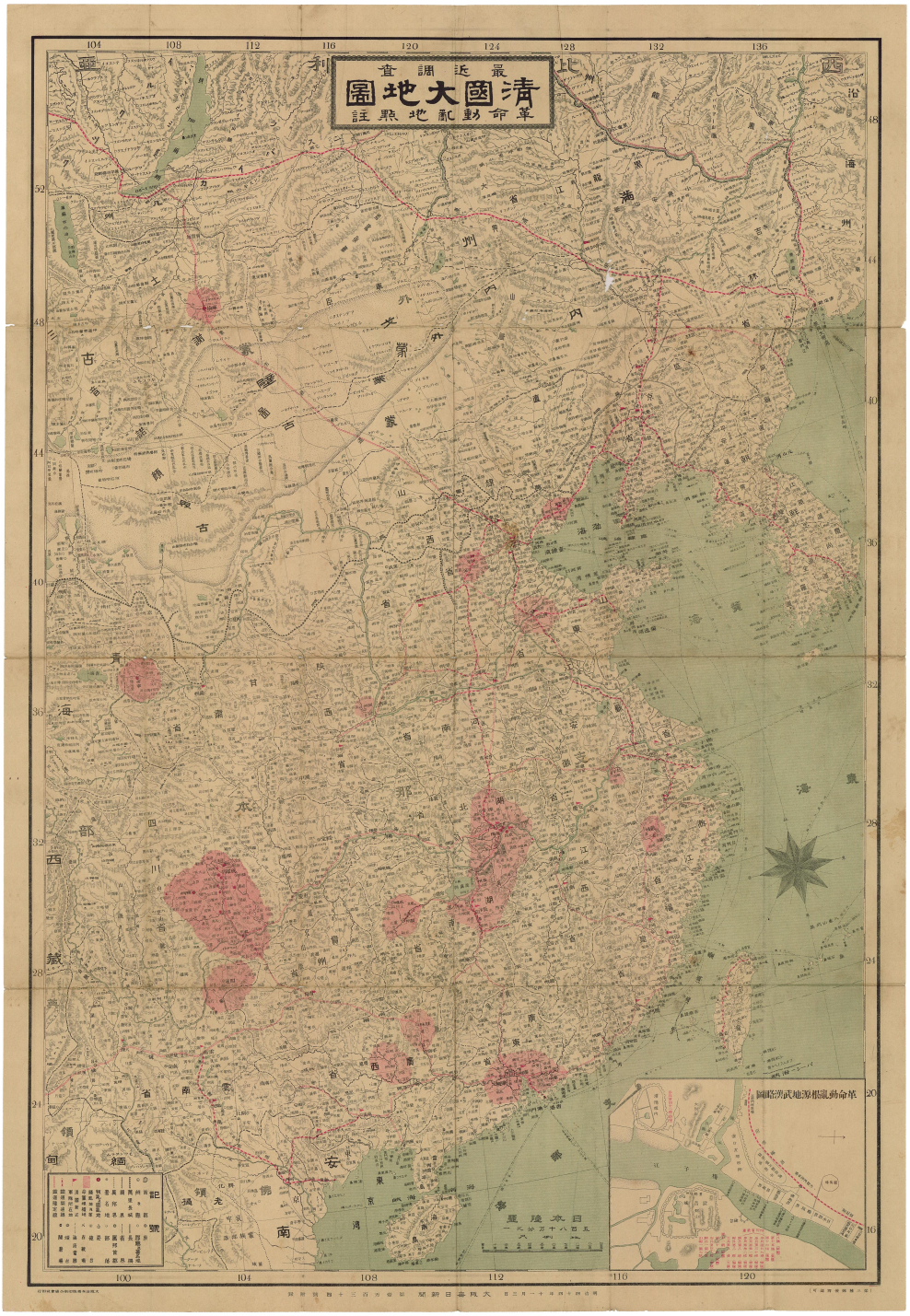
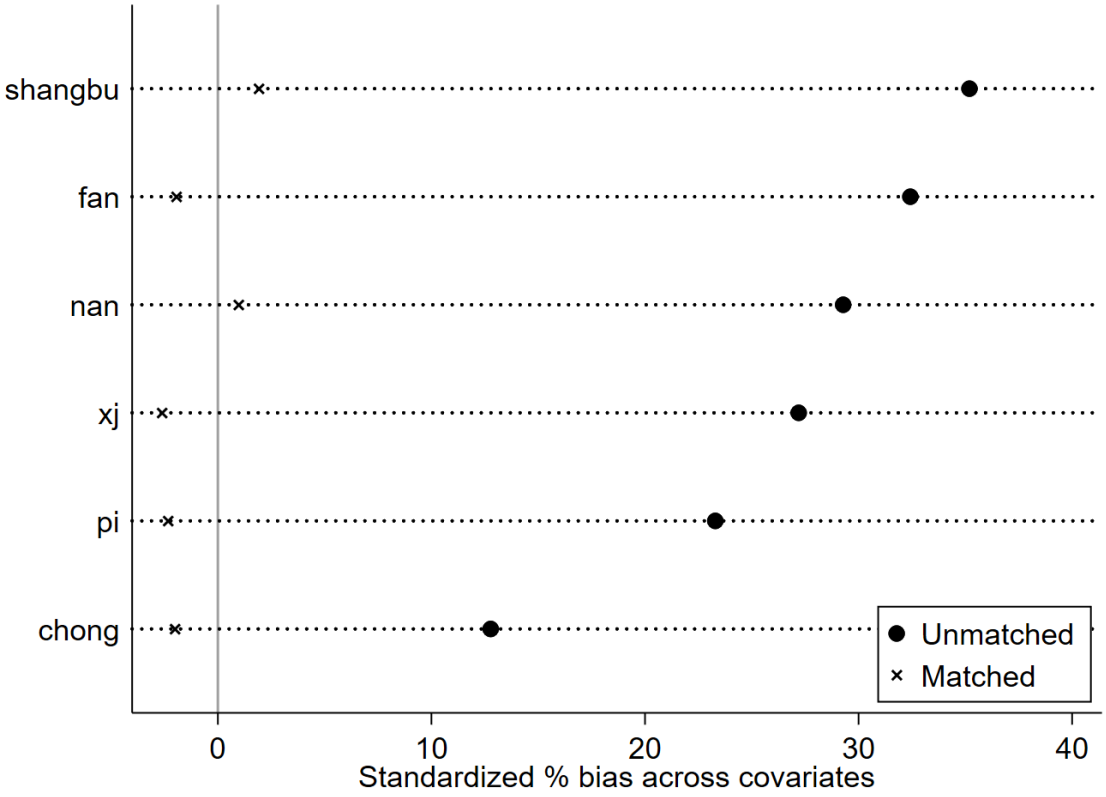


Figure A.1. (d) An alternative data on revolution participation. Notes: The data source is Japanese newspaper This figure gives an example of the locations where revolutionaries launched uprisings in Hubei Province from October, 1911 to December, 1911.



Appendix.A.2. Balance test (Propensity socre matching).

Table A.1. Curriculum for different types of schools

	Traditional schools (before 1904's educational reform)	Qing Dynasty (after 1904's educational reform)	The Republic of China (after 1912)
Lower primary school	Private beginner schools: How to read and write, Confucius classics (beginner level), poetry (beginner level), Chinese language, arithmetics (some schools)	Ethics, Confucius classics, Chinese language, arithmetic, history, geography, science,gymnastics,handicrafts, drawing	Ethics, Chinese language, arithmetic, handicrafts, drawing, singing, gymnastics, sewing(female only)
Higher primary school	Official local schools: How to prepare for the national civil service exam (higher level), Confucius classics, law, rites, Chinese philosophy, Chinese history, geography	Ethics, Confucius classics, Chinese language, arithmetic, Chinese history, geography, science,gymnastics,handicrafts, drawing	Ethics, Chinese language, arithmetic, Chinese history, geography,handicrafts, drawing, singing, gymnastics, agriculture (male), sewing(female only)
Middle school	Academys: How to prepare for the national civil service exam (higher level), Confucius classics, poetry, Chinese philosophy, Chinese history, geography	Ethics, Confucius classics, Chinese literature, foreign language (Japanese, English, German, French, Russian), Chinese history, geography, math, biology, pyhsics,chemical,law, bussiness, gymnastics,drawing	Ethics, Chinese language, foreign language, history,geography,math, biology, pyhsics,chemical, law, economics, handicrafts, drawing, singing, gymnastics, agriculture (male), housekeeping(female only), gardening (female only), sewing (female only)

Table A.2. Difference-in-Difference Regression Results of the Impact of Revolutionary Violence on the Number of Schools and the Number of enrollment

	Modern education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
Revolution * Post	0.166***	25.012**	3.659***	138.745***	18.554*	870.070***
	(0.045)	(7.719)	(0.783)	(33.347)	(7.682)	(241.972)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observation	7119	7119	7119	7119	7119	7119

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table A.3. Event Study Results of the Impact of Revolutionary Violence on the Number of Schools and the Number of enrollment

	Modern education					
	(1)	(2)	(3)	(4)	(5)	(6)
	Middle Schools	Middle School enrollment	Higher Primary Schools	Higher Primary School enrollment	Lower Primary Schools	Lower Primary School enrollment
1907*Revolutionary participation	-0.013	0.483	0.089	-13.149*	-0.863	-114.789
	(0.033)	(3.000)	(0.481)	(5.772)	(1.790)	(65.948)
1908*Revolutionary participation	-0.005	-0.254	0.321	-9.913*	-1.326	-86.531
	(0.014)	(0.964)	(0.424)	(4.108)	(1.580)	(45.197)
1913*Revolutionary participation	0.214**	39.046***	4.583***	144.945***	22.477**	752.701**
	(0.068)	(10.978)	(1.017)	(36.291)	(7.660)	(230.674)
1915*Revolutionary participation	0.192**	29.738**	3.689***	136.127***	15.295*	837.216***
	(0.060)	(10.820)	(0.898)	(35.409)	(7.579)	(246.672)
1916*Revolutionary participation	0.086	6.994	3.216***	114.453***	19.396*	957.247***
	(0.050)	(7.211)	(0.834)	(32.339)	(8.167)	(271.982)
Year fixed effects	yes	yes	yes	yes	yes	yes
County fixed effects	yes	yes	yes	yes	yes	yes
Control variables*Post	yes	yes	yes	yes	yes	yes
Mean	0.123	13.702	2.816	132.199	44.071	1283.06
Observations	7119	7119	7119	7119	7119	7119

Note: From column (1) to column (6), the dependent variables are the number of middle schools, the number of middle school enrollment, the number of higher primary schools, the number of higher primary school enrollment, the number of lower primary schools, and the number of lower primary school enrollment. Control variables include treaty ports and the Chong, Fan, Pi, and Nan administrative variables. Standard errors in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.