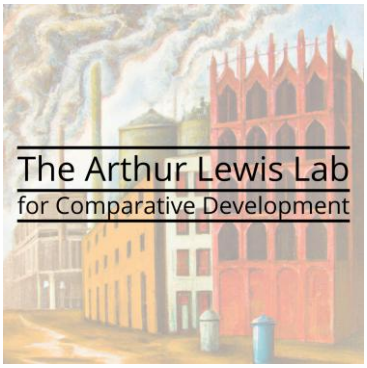


Lewis Lab Working Paper 2025-03

The Century of State Failure: A Fiscal History of China, 1850-1949

Hanhui Guan[a] K. Kivanç Karaman[b] Nuno Palma[c,d,e] Zhiyin Xu[a]

[a]Peking University
[b]Boğaziçi University
[c]University of Lisbon (ICS)
[d]The University of Manchester
[e]Centre for Economic Policy Research (CEPR)

Abstract

We examine the fiscal trajectory of the Chinese state from the late Qing period to the founding of the People's Republic of China. To do so, we construct the first continuous tax revenue and public debt series and interpret the trends in the context of the era's political and economic developments. Our findings indicate that China's state capacity remained low throughout this period, a pattern that reflects the central government's failure to monopolize control over violence. This persistent weakness had lasting consequences, not only shaping the political landscape but also hindering economic modernization.

JEL Codes: N15, N25, N45

Keywords: State Capacity, Fiscal Capacity, Public Debt, Taxation

The Century of State Failure: A Fiscal History of China, 1850-1949[1]

Hanhui Guan (Peking University)

K. Kivanç Karaman (Boğaziçi University)

Nuno Palma (University of Manchester, ICS-UL, and CEPR)

Zhiyin Xu (Peking University)

Abstract:

We examine the fiscal trajectory of the Chinese state from the late Qing period to the founding of the People's Republic of China. To do so, we construct the first continuous tax revenue and public debt series and interpret the trends in the context of the era's political and economic developments. Our findings indicate that China's state capacity remained low throughout this period, a pattern that reflects the central government's failure to monopolize control over violence. This persistent weakness had lasting consequences, not only shaping the political landscape but also hindering economic modernization.

JEL codes: N15, N25, N45.

Keywords: State Capacity; Fiscal Capacity; Public Debt; Taxation.

[1] We are grateful to Tim Besley, Jutta Bolt, Debin Ma, and Tianyang Xi for discussions. Pang Hao, Jiao Jianhua, Cai Jiahong, and Li Yurong provided excellent research assistance.

Political power grows out of the barrel of a gun.

Mao Zedong[2]

1. Introduction

The period from the mid-19th to the mid-20th century, also known as the "Century of Humiliation" (百年国耻), is considered as a low point in Chinese history. The period was characterized by widespread rebellions, forced treaties, foreign invasions, and civil war, resulting in millions of deaths and economic devastation. It shaped national consciousness to this day, reinforcing a strong emphasis on national unity and a deep aversion to political disorder and foreign interference. Despite its importance, empirical evidence on the political landscape for this period is scarce, making it difficult to develop a coherent understanding and place it within a comparative perspective.

To address this issue, we construct the first continuous series for several key public finance variables for China, relying on both archival records and secondary sources. Most prominently, we construct tax revenue series, the main empirical proxy for state capacity and a fundamental determinant of economic performance.[3] To better interpret the tax revenue series, we also adjust them for inflation and economic growth and compare them against the tax revenues of other states. Additionally, we construct domestic and international public debt series and their interest rates.

The tax revenue series we construct identify low and fluctuating fiscal capacity throughout this period. We find that from the 1850s to 1949, tax revenues consistently remained below 2.5% of GDP. This ratio was significantly lower than contemporary tax-to-GDP ratios of other major states, which varied between 5 to 10% in the 1850s and increased gradually to 20 to 30% by World War II. Another benchmark is provided in the subsequent era of Chinese history, when the Communist government rapidly increased the tax-to-GDP ratio to over 15% by the 1950s. As for pre-WWII public debt, the series we construct indicate that the government's ability to

[2] Mao (1991, pp. 547), originally said during the Communist Party emergency meeting in 1927.
[3] Besley and Persson (2011)

borrow was constrained by its fiscal weaknesses, preventing the emergence of a deep public debt market.

These unfavorable fiscal comparisons with other contemporary states and subsequent periods indicate that China's low state capacity stemmed from its particular institutional equilibrium. Notably, the evidence points to the feasibility of achieving significantly higher levels of taxation during this era. While China's vast territory and large population undoubtedly posed challenges to effective taxation, other states with large territories, such as the Russian Empire, the Ottoman Empire, and the United States, managed to achieve higher tax-to-GDP ratios. Furthermore, the Communist regime's subsequent rapid fiscal gains under similar material conditions also indicates that the pre-revolutionary Chinese government underperformed relative to its potential.

The tax revenue series we construct also allow us to develop a more detailed chronology of the fluctuations in state finances and offers insights into the underlying factors. Specifically, the tax series indicate stagnant fiscal capacity during the Late Qing period (1850-1912), a collapse during the fall of the Qing and the rise of local warlords (1912-1927), a recovery during the political recentralization under the Nanjing Government (1927-1936), and another collapse during the Japanese invasion and World War II (1937-1945).

This fiscal chronology lends support to the notion that at the core of institutional failure was the inability to effectively monopolize violence. The literature on historical political economy taxation identifies several potential constraints on a state's ability to collect taxes, including the inability to monitor economic activity and adverse effects of taxation on economic activity associated with the Laffer curve.[4] For pre-WWII China, however, both the tax revenue series that we construct, and available narrative accounts, indicate that the main constraint on taxation was the presence of local power brokers with military capacity that appropriated the taxes in their regions. Empirically, this constraint is manifested in the strong overlap between the fluctuations in the central government's capacity to suppress local power brokers and the fluctuations in tax revenues.

[4] Bates and Lien (1985), Kiser and Linton (2002), Stasavage (2011)

In comparative perspective, the experience of other late state-builders suggests that the Chinese state's failure to monopolize control over violence and taxation stemmed less from a lack of innovation and more from its inability to modernize by adopting state-building innovations pioneered in Europe. The first wave of state-building, extensively documented in the literature, took place in early modern Western Europe and was largely driven by interstate wars and the resulting military and bureaucratic innovations.[5]This first wave was followed by a second wave of state-building in peripheral parts of Europe and outside Europe, such as Russia in the 1700s, the Ottoman Empire in the 1800s, and Japan in the 1870s. For these late state-builders, the primary challenge was not to innovate but to adopt the innovations already developed by the first-wave states. Successful state-builders in this second wave typically began by building Western European style centralized armies, which then paved the way for subsequent reforms in bureaucracy and other social domains. These modernizing reforms often came at the cost of local elites, whose privileges were repressed to strengthen central authority.[6] States like Russia and the Ottoman Empire, which had relatively centralized administrations before the reforms, successfully leveraged them to push through the reform program. In contrast, Poland-Lithuania, which lacked a strong central authority and faced resistance from entrenched local elites, failed to implement the necessary reforms, ultimately leading to state collapse.[7]

What stands out for the Chinese modernization is its wavering, decentralized and incoherent nature. In Imperial China, the political equilibrium had been characterized by a strong central government, weak local elites, and a comparatively low level of tax burden on the economy.[8] Despite the initial advantage of this proto-centralized political system, in the 19th century, the Qing governments responded to rising domestic and foreign threats by decentralizing military and taxation rather than further centralization. This initial decentralized response placed China on a path-dependent trajectory, exacerbated by conflicts between conservative and reformist

[5] Dincecco (2011), Karaman and Pamuk (2013)
[6] Karaman and Pamuk (2010), Hosking (1997), Beasley (2000), Barkey (1994)
[7] Henriques et al. (2025)
[8] Ma (2013), Ko et al. (2018), Chen and Ma (2022).

factions within the central government which crippled reform efforts.[9] China's size also complicated the state-building process.[10] After the Qing's collapse in 1912, the military and taxation fragmented further into rival factions controlled by warlords. From 1927, building around a relative disciplined and coherent military apparatus, the Kuomintang (KMT), which could achieve a certain degree of recentralization, but these efforts prematurely collapsed by the Japanese invasion and World War II. It was only after World War II, under the Chinese Communist Party, that a monopoly on violence was established, which ultimately led to a substantial increase in fiscal revenues.

The reasons behind China's decentralized and erratic attempt at modernization lie beyond the scope of this article, but several explanations in the literature align with historical patterns. Before the 19th century, the Qing Dynasty experienced a period of relative prosperity and success, with limited interaction with Western developments and awareness of their transformative effects. Consequently, the abruptness with which domestic and foreign threats emerged appears to have caught the Qing system unprepared, making an effective centralized response difficult. The Imperial government's historical strategy of suppressing local elite autonomy, which favored centralized control for centuries, also proved counterproductive during 19th-century crises, as expanding cohesive military-administrative structures without reliable intermediaries proved to be difficult.[11] On the ideological front, the Qing elites exhibited ideological resistance to adopting Western military and bureaucratic innovations, due to deeply entrenched state traditions and limited familiarity with European advancements.[12] Although ideological resistance was also present in the Ottoman and Russian empires, their longer histories of engagement with European powers allowed them more time for gradual adaptation. Moreover, by the time the Qing attempted reforms, the balance of power had already shifted significantly in favor of European nations and later Japan. As such, foreign interventions weakened Chinese state autonomy, making reform efforts even more challenging to implement.

[9] Hao and Wang (1980)
[10] Koyama et al. (2018)
[11] Kuhn (1980), Rowe (2009).
[12] See Ma (2022) for a discussion of the role of ideology in state-building efforts in China.

The Chinese experience contributes to broader debates in the literature on state-formation and long run economic growth. Studies on European state-building argue that centuries of small-scale, indecisive wars among states of comparable capabilities allowed for continuous, gradual, and symmetric learning-by-doing in statecraft.[13] The Chinese evidence qualifies this view by suggesting a much more uneven impact, as by the 19th century the increase in the scale, decisiveness and destructiveness of warfare handicapped state-building as much as it incentivized it. The European experience has also motivated a bargaining theory of state-building, where rulers, landed elites, and commercial interests negotiated agreements exchanging taxation for political representation. Chinese evidence raises questions about the applicability of this framework to less developed economies, as in the absence of well-entrenched local elites and organized commercial interests politics degenerated into a military tournament between warlords that eventually concluded by elimination rather than a settlement.

Our findings also relate to the New Institutional Economics literature on the political roots of economic growth. While a first wave of studies in this literature emphasized political constraints on state predation[14], subsequent research highlighted the critical role of state capacity in delivering infrastructure and public goods essential for growth.[15] The evidence on China lends support to the argument that in the early stages of economic development the binding constraint is the state capacity. Our findings corroborate that China missed out on not only the first wave of state-building in early modern Western Europe but also the second wave in the European periphery and Japan in the 18th and 19th centuries. This growing divergence in state capacity and the resulting lack of public order helps explain the growing divergence in economic performance.

The rest of the paper proceeds as follows. Section 2 provides an overview of the major political and economic events from the late Qing Dynasty to the end of the Civil War and highlights the key debates surrounding these developments. Section 3 presents the tax revenue series and discusses their construction. Section 4 presents the value, frequency, and real interest rates of

[13] Tilly (1992), Scheidel (2019), Hoffman (2015)
[14] North and Weingast (1989), North (1990), Acemoglu et al. (2001).
[15] O'Brien (1989), Besley and Persson (2009), Besley and Persson (2011), Dincecco and Katz (2016), Vries (2015), Acemoglu and Robinson (2019)

both domestic and foreign public debt. Section 5 interprets the tax revenue and public debt series, using them to assess debates in the literature on Chinese state-building and modernization efforts. Section 6 concludes.

2. Historical background

This section provides a historical background of China's political and economic trajectory from mid-19th to mid-20th century. We divide this period into four subperiods: Late Qing period, Warlord period, Nanjing government, and the period from Japanese invasion to WWII.

The Late Qing Period

During the late Qing period, China faced mounting foreign pressure and internal challenges. The first critical juncture was the defeat in the First Opium War (1839–42). The Treaty of Nanking in 1842 and subsequent "unequal treaties" forced China to grant extraterritorial rights and relinquish tariff autonomy. China also faced Russian encroachment along its northwest frontier. In 1858, amid a joint Anglo-French invasion, China ceded territories north of the Amur River to Russia to avoid a two-front war. Internally, China faced significant threats such as the Taiping Rebellion (1850-1864), which caused massive social upheaval and loss of life, and the Boxer Rebellion (1899-1901), an anti-foreign and anti-Christian uprising that further weakened Qing authority and led to foreign intervention.

China responded to these challenges with a modernization program aimed at strengthening the state (Kuhn, 1980). However, from the outset, this program was complicated by its decentralizing aspects. On the fiscal front, before the 1850s, the central government had controlled how provincial and local tax revenues were allocated.[16] Following the Taiping Rebellion (1850–64), which devastated southern China, the Qing state decentralized fiscal and military control. Provincial administrators gained increased autonomy, including the authority to levy transit

[16] Imperial China went through different modalities of the fiscal state over time, but by the eighteenth century it was no longer had the capacity to count or mobilize its population, compromising the viability of operating a fiscal state (von Glahn 2020, p. 26).

taxes and provincial generals used the taxes to raise and fund their own armies (Shi and Xu, 2008; Halsey, 2015; Kuhn, 1980; Rowe, 1983). After the suppression of the rebellion, decentralization was partially reversed, but provinces retained significant fiscal and administrative autonomy. Moreover, in response to Western threats, some provincial officials were also assigned greater responsibilities in foreign affairs, including coordinating coastal defense and managing relations with Western powers (Chu and Liu, 1994).

In the following period, the reform efforts continued with the Self-Strengthening Movement (1861-1895), focused on military and industrial development. Major initiatives encompassed the construction of iron foundries, arsenals, and shipyards. The movement also established military academies and expanded key industries, including railways, telegraph networks, and steam navigation enterprises, to bolster infrastructure and defense capabilities. After the Boxer Rebellion (1899-1901), the Qing government introduced the New Policies (Xinzheng), which included establishing provincial assemblies, creating a Ministry of Education, and modernizing the military through institutions like the Baoding Military Academy.

The overall impact of the late-Qing reforms remains debated. The negative assessments criticize the reform program as a half-hearted effort with an underwhelming performance (Fairbank and Goldman, 1992; Ma, 2004). The more positive evaluations argue that it laid the foundation for modernization and future state-building. It is argued that tax revenues increased, primarily due to growth in non-agricultural tax sources (Zhang, 2023), laying the foundations of a military-fiscal state (Halsey, 2013). Provincial-led modernization efforts may have provided a foundation for subsequent industrialization (Rowe, 2009). These reforms are also credited with helping China preserve its sovereignty during the era of imperialism (Halsey, 2015). Nonetheless, economic and financial development during this era remained remarkably limited (Ma and de Jong 2019, Li and Yan 2022).

The Warlord era

The Warlord Era in China began following the collapse of centralized Qing rule and the subsequent weakening of republican structures established after the 1911 Revolution. Yuan Shikai's attempt to restore the monarchy after establishing the Republic of China in 1912 failed, and his death in 1916 led to further political fragmentation. Central authority weakened further, warlords seized local control, financing their armies through resource extraction and taxation. Foreign powers, including Japan, Britain, and France, fueled instability by supporting various warlords to secure their interests.

The Warlord Era is widely regarded as a period of political fragmentation, social unrest, and weakened central authority. The decentralized rule of warlords is often cited as a effective governance and administration. There are, however, also more positive assessments. It is argued that while regional warlords controlled traditional tax sources like the land tax, the central government capitalized on maritime customs revenue, nearly doubling it between 1912 and 1927. Moreover, political decentralization enabled state-building experiments in various regions. In Guangdong province, for example, warlord Chen Jitang utilized local autonomy to improve tax collection, expand public services, and implement more flexible governance structures (Remick, 2004). Additionally, Chinese borrowing from foreign markets gained credibility during this era, laying a foundation for future financial administration and economic policies (Ma, 2019).

The Nanjing Decade

The positive assessments of the Nanjing decade emphasize the policies adopted to build up the central state apparatus and increase fiscal revenues. The government modernized bureaucratic institutions such as the Chinese Maritime Customs Service and the Sino-Foreign Salt Inspectorate (Keller and Shiue, 2020; Strauss, 2008; van de Ven, 2014). The introduction of new levies, including the consolidated tax (*tongshui*) and income tax, alongside the recovery of tariff autonomy after 1928, allowed the government to revise import duties and bolster tax revenues. The abolition of the likin (internal transit tax) in 1931 and its replacement with a

consolidated tax on industrial goods streamlined taxation and reduced regional trade barriers. Unlike the warlord period, which struggled with domestic borrowing and relied heavily on foreign loans, the Nationalist government successfully issued bonds domestically until the outbreak of the Second Sino-Japanese War in 1937 (Yan, 2012; Ma, 2019). Additionally, at least from the 1920s, financial markets within China were highly integrated among major commercial hubs in north and central China, and the establishment of the Central Bank of China in 1928 helped unify currency policies and stabilize the economy (Brandt and Sargent, 1989; Lan, 2015, Palma and Zhao 2021). Further strengthening monetary control, the government replaced the silver standard with a fiat currency (*fabi*) in 1935, linking it to foreign reserves to mitigate silver price volatility (Friedman, 1992).

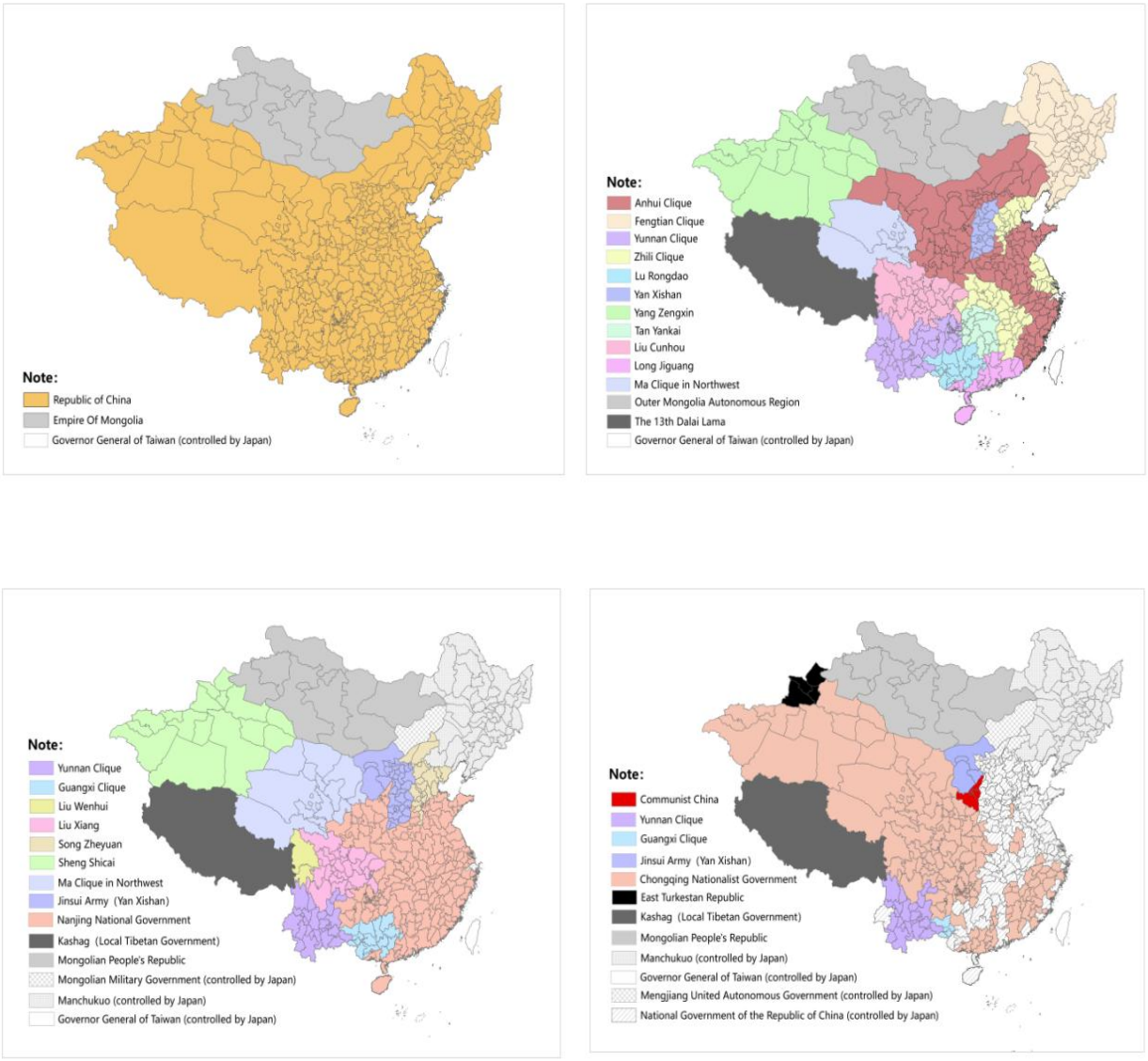
More critical assessments of the period contend that deep-seated political and fiscal challenges persisted. Regional warlords maintained considerable autonomy, undermining national governance and impeding efforts to consolidate state authority. Many military leaders prioritized personal enrichment over administrative efficiency, while systemic corruption and nepotism within the Nationalist government further advanced.

Japanese Invasion and WWII

The 1937 Japanese invasion of China marked a turning point. Foreshadowing the broader devastation of WWII, the invasion redefined warfare by erasing distinctions between military, economic, and civilian domains. Systematic bombings of cities, exemplified by the destruction of Shanghai and the atrocities of the Nanjing Massacre, dismantled industrial production and commerce. The occupation of Manchuria and other critical regions further devastated infrastructure, transport, and agriculture, leading to severe food shortages and economic collapse. This widespread destruction not only crippled China's economy but also severely weakened the Nationalist government's fiscal capacity by disrupting tax collection and trade. After the US entry, and the defeat of Japan in 1945, the power vacuum reignited the Chinese Civil War. By 1947, Communist forces gained momentum with decisive victories in Manchuria and northern regions and defeated KMT.

The establishment of the People's Republic of China in 1949 resulted in major changes. Politically, the Communists dismantled regional warlord rule and integrated military factions into the People's Liberation Army. Economically, the government consolidated control, nullified unequal treaties, and took command of customs revenue and foreign concessions, reinforcing fiscal sovereignty. Economic restructuring included land reforms that transferred property from landlords to peasants, securing rural support and significantly increasing government revenues, particularly in regions such as Jiangxi and Hunan.

Figure 1. The spheres of influence of various political regimes (1912, 1916, 1936, 1944)



Source: The base map information of administrative divisions comes from CHGIS (2016). The changes in the spheres of influence are based on the historical facts described in the *History of the Republic of China* (中华民国史) (2011). The division of warlords is drawn based on the historical facts described in Zhang and Li (1990). The event of China ceding the entire island of Taiwan and its affiliated islands, including the Pescadores, to Japan in 1895 is recorded in Hsu (1970).

Note: This map uses the prefectures of the Qing Dynasty to constitute the provinces of the Republic of China and marks them at the provincial level based on the factions to which the stationed military commanders belong. There may be some differences from the actual administrative divisions.

3. Fiscal capacity

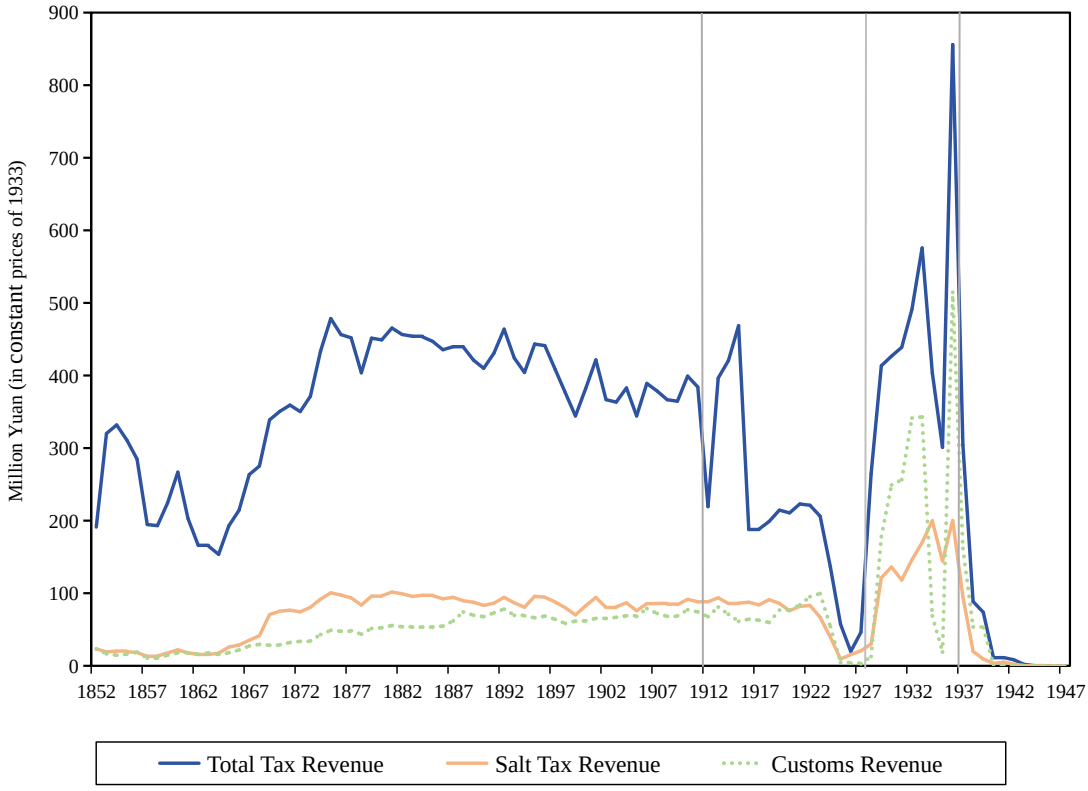
In this section we build evidence on China's fiscal capacity from the late Qing Dynasty to the early People's Republic of China. We first present an overview of the sources and construction of fiscal capacity series, leaving the details to the appendix. We then discuss how our empirical evidence aligns with debates in the literature about the evolution of fiscal capacity over time.

Figure 2 shows the real tax revenue series, as well as its two important subcategories, the salt tax and customs revenues.[17] Real revenues were calculated by adjusting nominal tax revenues for inflation using the consumer price index (CPI) by Lu and Peng (2005), with 1933 as the base year.

Several patterns stand out in the series. From 1864 to 1875, the real tax revenues more than doubled. This increase overlaps with the end of the Taiping Rebellion, suggesting the destructive effects of the Rebellion on fiscal administration. Salt taxes, which were collected in rural areas, increase more than customs revenues, also consistent with an improvement in domestic public order. From 1875 to 1912, the real tax revenues are relatively stable. This stagnation is noteworthy. The late Qing reform program does not appear to have resulted in any real gain in fiscal capacity.

[17] The original nominal tax revenue series was converted to real as follows. Before 1912, tax data was recorded in taels of Kuping silver, so a fixed exchange rate based on the silver content of each currency in 1933 was applied to standardize the data. After 1912, the silver yuan became the primary unit, and the recorded values were converted to US dollar equivalents using historical exchange rates, recalculated to their silver content, and finally standardized to 1933 silver yuan units.

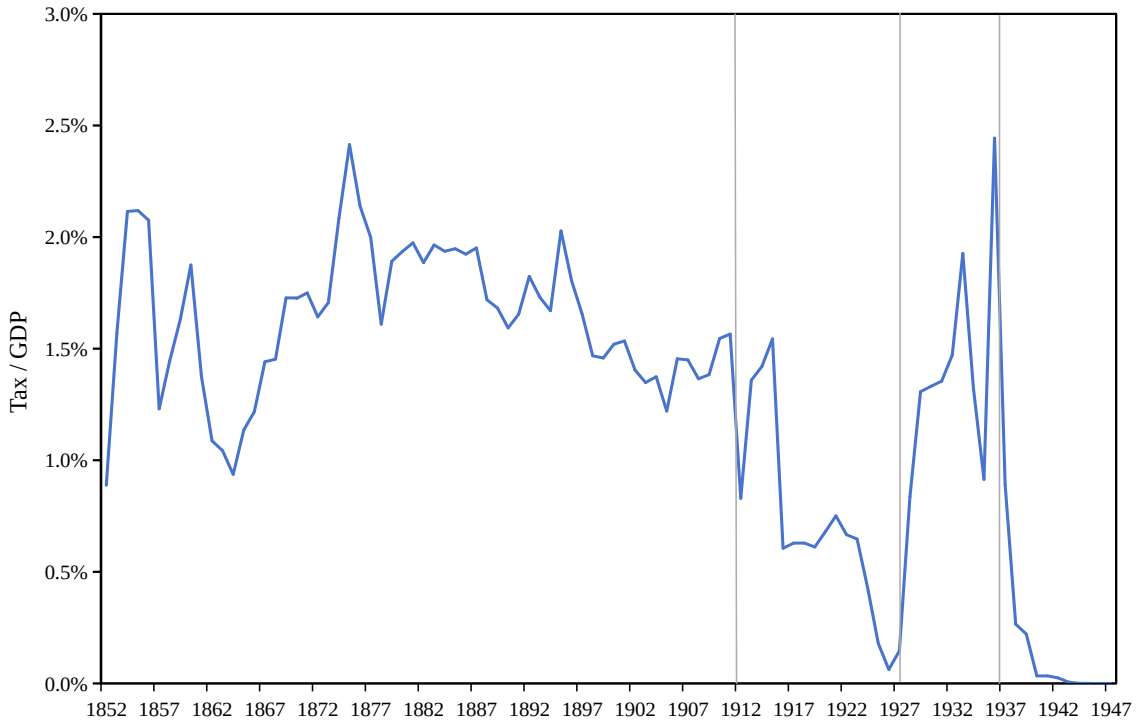
Figure 2. Real tax revenue of central government, 1852-1947 (in constant prices of 1933)



Source: The total tax, salt tax and customs revenues before 1911 is from Guan et al. (2023); The total tax, salt tax and customs revenues from 1912 to 1947 come from Jiang (1931); Qian (1934); Yang (1927, p. 128-133); Yang (1985); *Fiscal Yearbook* (财政年鉴) (1948, p. 130-138). The exchange rate of the US dollar comes from Hsiao L (1974, p. 190-192,196).

From 1912 to 1927, the Warlord Era, witnesses a dramatic collapse from about 400 million silver dollars in 1912-1916 to about 200 million silver dollars in 1917-1922 and to about 20 million silver dollars by 1926. This collapse overlaps with the fragmentation of central authority and the loss of centralized tax collection. During the following Nanjing Decade, 1927 to 1937, there was a recovery in fiscal revenues, reaching a maximum level of 870 million silver dollars at the end of the period. However, after the Japanese invasion in 1933, there are major ups and downs in customs revenue. Finally, with the full scale Japanese invasion starting 1937, the tax revenues collapse rapidly to negligible levels.

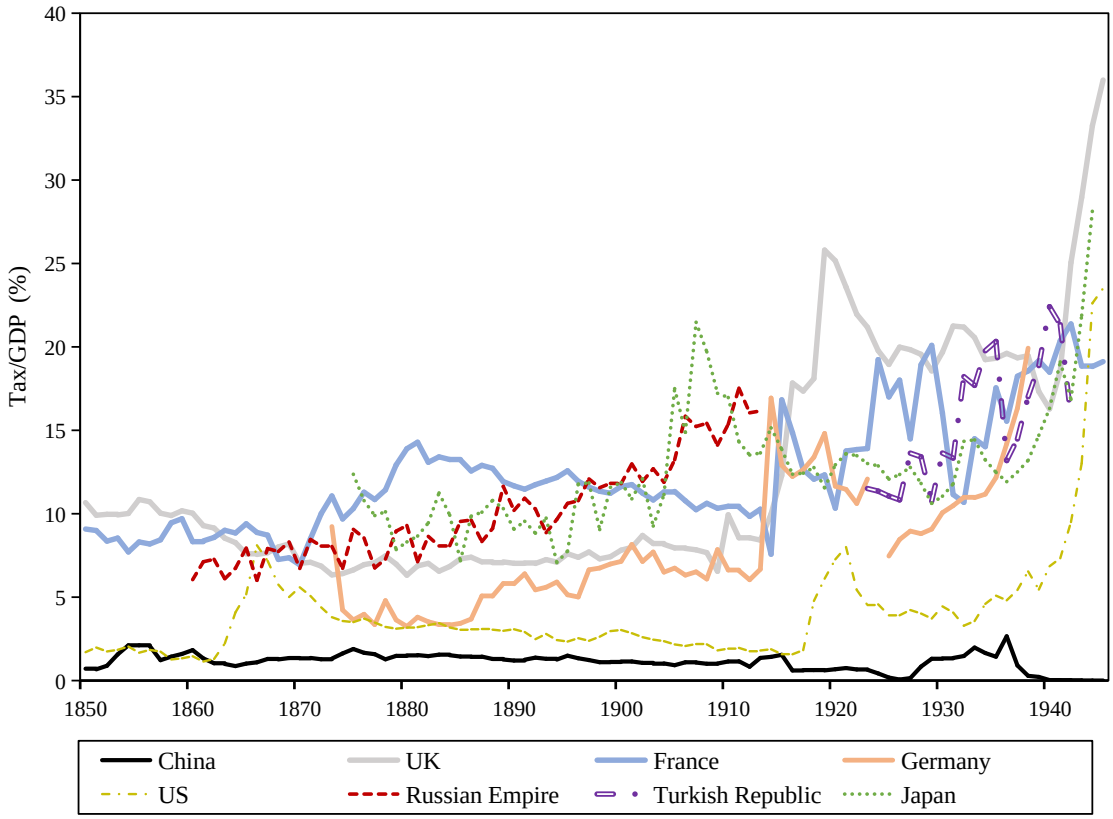
Figure 3. Ratio of tax revenue of central government to GDP, 1873-1947



Source: The source of tax revenue is the same as Figure A3 in Appendix II. The CPI of China comes from Lu and Peng (2005). Per capita real GDP before 1923 and in 1933 comes from Xu et al. (2017, Appendix E). Per capita real GDP from 1931 to 1936 comes from Yeh (1979). Per capita real GDP in 1933 and 1952 comes from Liu and Yeh (1965, p. 94). We connect the three sequences based on the values in 1933 and linearly interpolate the missing values. Population comes from Ge (2005).

Next, in Figure 3, we plot tax revenue to GDP ratio, calculated by dividing real tax revenues in Figure 2 by population and real per capita GDP. Overall, the timing of the fluctuations in tax to GDP ratio overlaps with the fluctuations in real tax revenue. However, because GDP tended to increase through this period, the tax to GDP ratio has a more negative trend than real tax revenue.

Figure 4. Ratio of tax revenue of central government to GDP for China and other states, 1850-1945



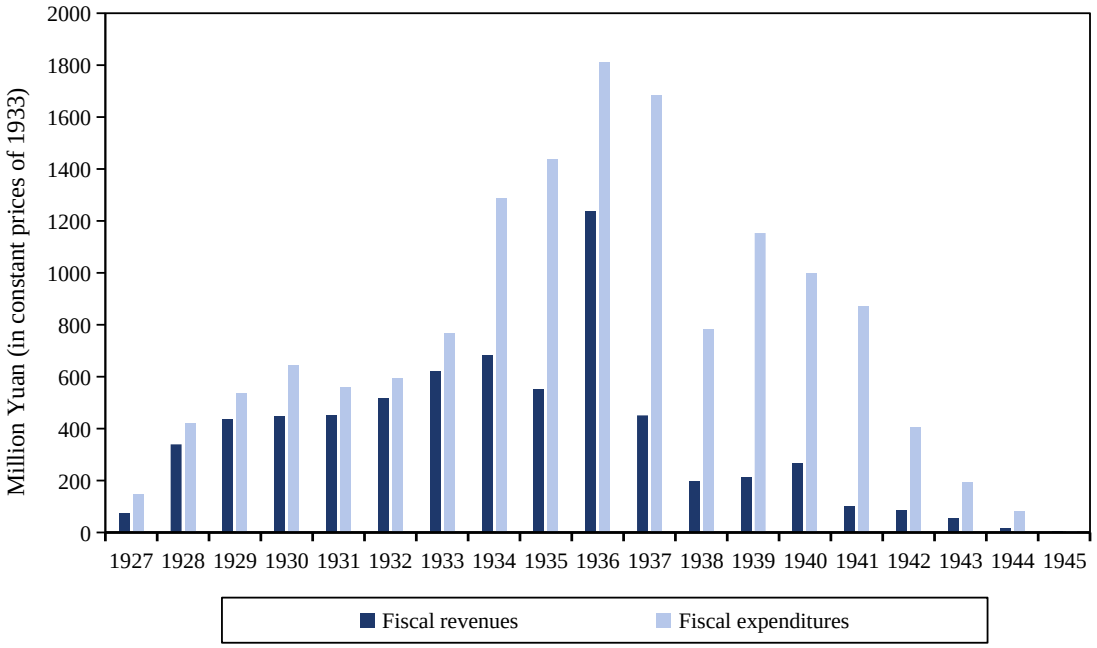
Source: The data for China comes from the same sources of figure 3. The data for France before 1870 and for Russia comes from Mitchell (2007). The data for France after 1870, for Germany from 1915 to 1923, and for the UK come from Global Financial Data (2009). The data for Germany in other years and for Japan comes from Jordà et al. (2016). The data for the US comes from Mitchell (2003). The data for Turkey comes from Turkish Statistical Institute (2023).
Note: The USA's central revenue around the early twentieth century, but it benefited from high local taxes and the slack existed to increase fiscal capacity when war justified it (e.g. the Civil War period in the nineteenth century and WWI as well as WWII.)

The tax-to-GDP ratio is also useful because it allows for comparing Chinese fiscal capacity to other states. Figure 4 shows Chinese tax to GDP ratio together with UK, France, Germany, US, Russian Empire (before 1914), Turkish Republic (after 1923) and Japan. The key observation from this comparison is China's relatively low tax-to-GDP ratio. For European states like France, Germany, and the UK, this ratio ranged from 5% to 15% before World War I, increasing to 10% to 25% after the war, while China's ratio remained below 2.5%.

A more informative comparison of Chinese state might be with other geographically large states and empires, such as the Russian Empire, the Ottoman Empire/Turkish Republic, and the United States rather than mid-sized European states. The reason is that China's lower ratio could be due to its vast geography, which made centralized tax collection more difficult, and hence the relative benchmark should be other large states that faced similar challenges. However, even in these comparisons, China's fiscal capacity stands out as being low. For the Russian Empire, the tax-to-GDP ratio grew from 5% in 1860 to about 15% by the onset of World War I. For the 19th century Ottoman Empire, the available rough estimates of the tax to GDP ratio show an increase from 3% to 10%. Its successor state, the Turkish Republic, saw the ratio further increase from 10% in 1923 to 15%-20% by World War II. As for the United States, the tax-to-GDP ratio is closer to China's, but as a federal state, U.S. tax revenue figures exclude state level tax revenues, and hence understating the true extent of fiscal capacity. Moreover, the U.S. generally faced fewer military threats compared to China. When the US did face threats, such as the Civil War and the World Wars, the U.S. tax revenues spikes to European levels.

Japan offers another interesting comparison. While Russian modernization began around 1700s and Ottoman modernization around 1800s, Japanese modernization only started in 1868 with Meiji restoration and hence overlapped with late Qing reforms. The tax revenue figures for Japan, starting in 1875, show that Meiji restoration succeeded in building fiscal capacity very rapidly, with tax GDP ratio fluctuating around 10% in the 19th century and doubling to 20% by the Russo-Japanese war in 1908. These gains also explain the military success of Japanese invasion of China despite its smaller population and economy.

Figure 5. Fiscal revenue and expenditure, 1927-1945



Source: The fiscal data comes from Yang (1985) and *Fiscal Yearbook* (财政年鉴) (1948). The CPI data comes from Lu and Peng (2005).

Finally, Figure 5 compares Chinese real tax revenues with expenditures for the critical period between 1927 and 1945. This comparison allows investigating the budget deficit and the financial strain on the government. The Figure shows that revenues and expenditure moved closely together, with relatively a small deficit from 1927 to 1933. However, following the Japanese invasion, expenditures significantly exceeded revenues. The government initially financed the deficit by securing funds from domestic banks, and after 1936, increasingly relied on inflationary financing.[18]

All in all, the evidence suggest that China's fiscal capacity remained low through the second half 19th and first half of 20th century. The late Qing reform efforts do not appear to have resulted in any discernible gains, and fiscal capacity collapsed in the following Warlord era. The Nanjing decade saw some recovery in fiscal capacity. However, the levels attained were not significantly higher than those of the late Qing.

[18] In the Appendix, we show currency issues, the price index, and the inflation rate during this period.

Putting Chinese figures in comparative context suggests its stunted fiscal capacity is not a foregone conclusion. Other major Asian states, such as the Ottomans, Japan, and Russia that implemented modernization programs appear to have closed the gap with Western Europe in terms of tax-to-GDP ratios. This pattern suggests that it is relatively easier for states to learn from each other and successfully adopt strategies for increasing their fiscal capacity compared to other areas of development, but this process does not take place in China.

Another notable point is that, while for other states episodes of war and civil conflict tend to be associated with gains in fiscal capacity, the opposite occurs in China. During the Taiping Rebellion, the Warlord period, and the later Japanese invasion, revenues collapsed rather than increased. One explanation for this pattern is the sheer scale of these conflicts. The Taiping Rebellion was devastating in scale, the Warlord era led to an almost complete collapse of the state authority, and the Japanese invasion resulted in the loss of core economic areas, making it difficult to leverage these conflicts for building fiscal capacity. A complementary explanation is that inherent qualities of the Imperial Chinese state tradition limited the ability to implement reforms and eliminate resistance to modernization, thereby reducing the effectiveness of the reform program.

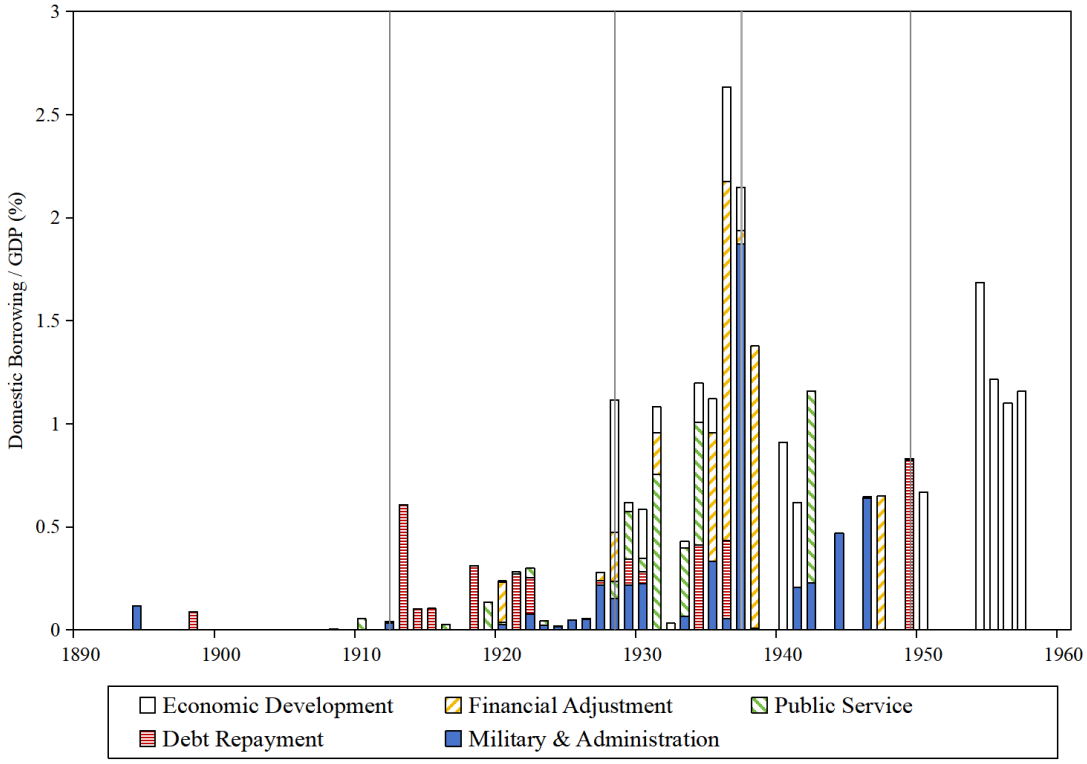
4. Domestic and foreign borrowing

This section analyzes the value, frequency, and real interest rates for both domestic and foreign public debt in China. The interpretation of debt figures is not straightforward, as they were influenced not only by market factors but also by non-market factors such as forced and politically motivated loans. However, the overall trends still align with China's political trajectory: during the warlord period, market constraints led to reduced borrowing and higher interest rates; under the Nanjing government, borrowing increased as interest rates declined; and ultimately, borrowing collapsed alongside government authority during World War II. These patterns corroborate the close connection between fiscal capacity and debt markets.

Domestic Borrowing

We begin by constructing and interpreting the annual domestic public borrowing series. Figure 6 presents annual domestic government borrowing, denominated in 1933 US dollars. The borrowing amounts include government bonds issued through formal bond issuance and short-term treasury bills, excluding short-term loans from various bank accounts, which effectively served as a mechanism to finance government revenue through currency issuance. For borrowing prior to 1933, debts in various metallic currencies and Beijing Banknotes were first converted into Customs Tael, adjusted for inflation to 1933 Customs Tael, and subsequently converted to 1933 US dollars using nominal exchange rates. Post-1933, borrowing in different currencies was converted to US dollars based on prevailing exchange rates and adjusted for inflation using the US CPI to obtain values in 1933 dollars. Debts denominated in grain were converted to US dollars using grain price data and applicable exchange rates.

Figure 6. Ratio of Domestic Borrowing to GDP (Central Government), 1894-1957



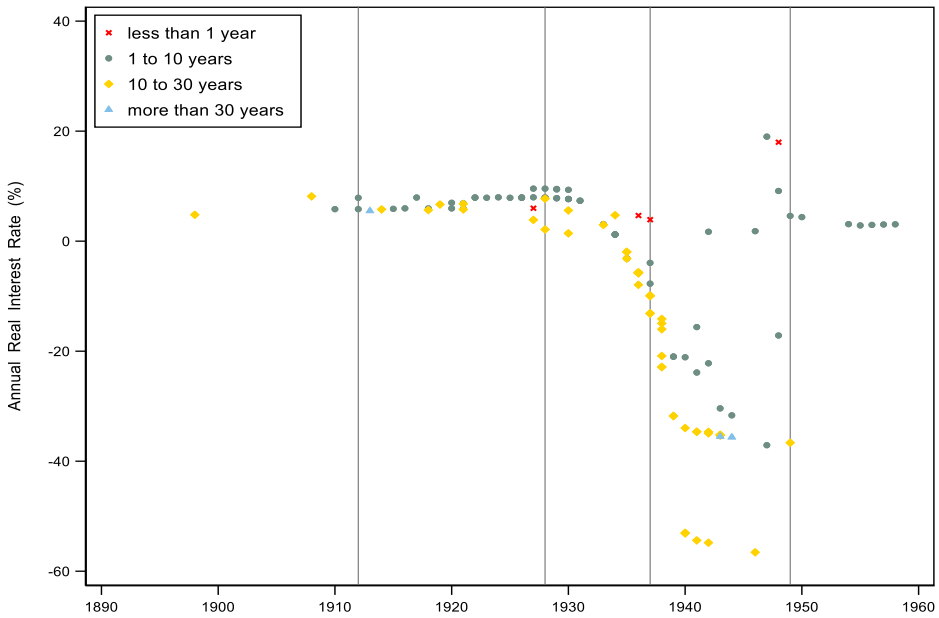
Source: The secondary data sources include Qian (1984), Dai (2017), Jia (1930), Wan (1948), Pan (2009, 2014), Liang and Zheng (2017), Pan and Liu (2016); The primary data sources include *Sichuan Province's Public Bonds* (四川省之公债) (1934); *Compilation of archival materials of the Republic of China* (中华民国史档案资料汇编) (1981; 1991; 1994). The method and data source for converting nominal values into 1933 US dollars can be found in the Appendix I.

Note: According to Qian (1955, p. 32-34), after the Sino-Japanese War began, "Apart from the National Salvation Bonds issued publicly in 1937, none of the other national bonds in national currency were issued publicly. They were merely pledged to banks as general reservation certificates, allowing the banks to advance funds to the Nationalist government." Therefore, we remove all domestic debts in legal tender from 1937-1945 except for the National Salvation Bonds. Additionally, many of the debts in 1936 were not new but rather substitution of previous defaulted debts. We exclude these samples from the figure.

Figure 6 indicates minimal public domestic borrowing during the Qing Dynasty. China's early attempts at issuing domestic bonds, such as the 1898 Zhaoxin stock and the 1911 patriotic bond, ended unsuccessfully. During the Warlord period, activity in the debt market increased, but the overall value of debt remained low, with the Ministry of Finance issuing 25 types of domestic bonds (Pan, 2007). This increase in debt issuance was driven by substantial fiscal deficits and an expanding financial market. Domestic borrowing grew significantly during the

Nanjing Nationalist Government era. Between May 1927 and July 1937, the Nationalist government issued 55 domestic bonds, amounting to 2559 million yuan in fiat currency, 4.2 million British pounds, and 2 million US dollars (Jiao, 2013). By 1936, prior to the full-scale outbreak of the war, domestic debt had peaked at approximately 280 million (in 1933 US dollars). However, following the outbreak of the Second Japanese War, the volume of domestic borrowing sharply declined, with no issuances in 1943 and 1945. After the war, borrowing improved slightly, but hyperinflation made it challenging to issue fiat bonds. In 1947, the Nanjing government secured over 200 million (in 1933 US dollars) through US dollar bonds and grain bonds, with interest rates reaching up to 20%. Subsequently, the domestic debt amount dropped to its lowest point once again. During the PRC period, the government adopted a cautious approach to issuing domestic bonds. Before the 1960s, only five government bonds were issued, each of which generated significant debt income.

Figure 7. Real interest rate of domestic debts (Central Government), 1898-1958



Source: The source of debt data is the same as Figure 6. The calculation method and data source of real interest rate can be found in Appendix I.

We next track the frequency and estimate the real interest rates for domestic borrowing. For

borrowing denominated in the domestic currency, we adjust for inflation to calculate real interest rates.[19] There were also domestic debts denominated in US dollars or UK pounds, which were also adjusted for exchange rate fluctuations.

Figure 7 illustrates the frequency and real interest rates for individual borrowing instances, demonstrating that domestic borrowing patterns were closely linked to political developments. During the Qing Dynasty, domestic debt issuance was minimal, with an average annual real interest rate below 10%. During the Warlord period, government borrowing of domestic debt gradually increased, accompanied by a significant rise in interest rates. Following the stock crisis of 1921, investor concerns over government default led to interest rates exceeding 20%. The establishment of the Nanjing National Government subsequently resulted in a decline in average interest rates. In the middle and later stages of the war, hyperinflation caused real interest rates to drop below zero, effectively indicating a default in the domestic bond market due to excessive currency issuance. After the war, hyperinflation and a loss of government credibility made it difficult to issue domestic bonds in fiat currency, forcing the government to raise interest rates and issue bonds in US dollars or grain. During the PRC period, with the reconstruction of state capacity and possibly nonmarket factors reduced the interest rates.

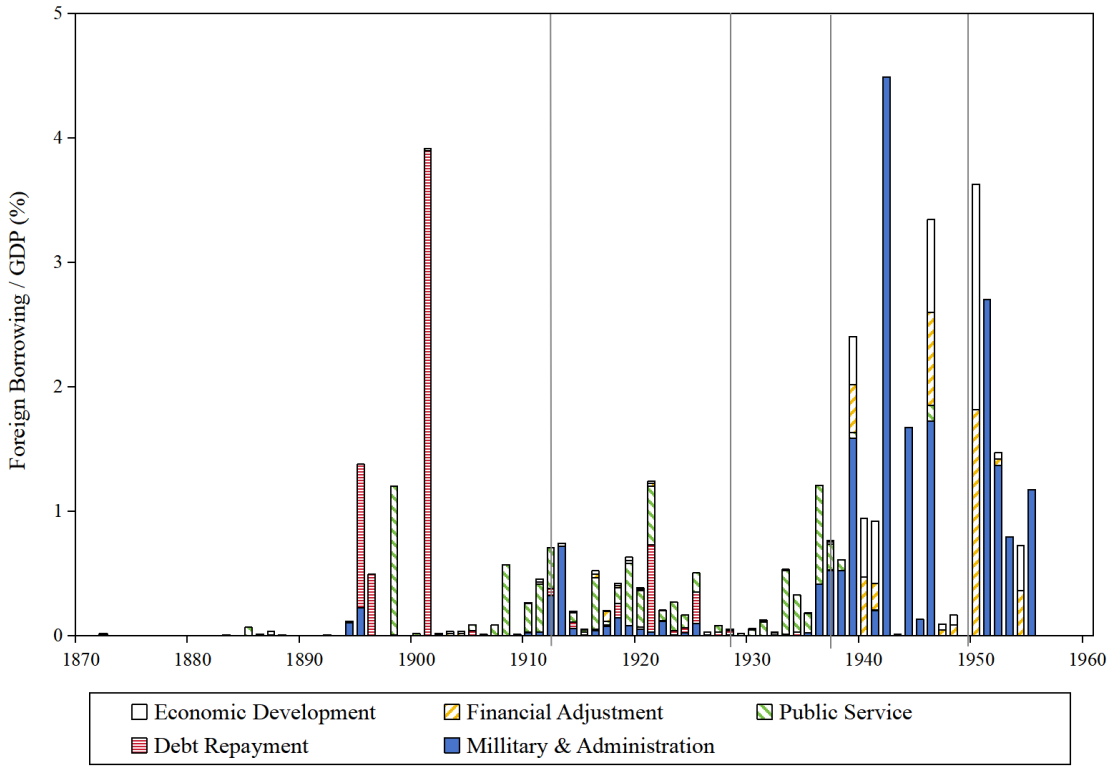
Foreign Borrowing

We next construct and review the evidence on foreign borrowing. Figure 8 illustrates the real value of annual foreign borrowing that we compiled. The primary challenge in constructing the real foreign borrowing series involved adjusting for the different currencies in which the debt was denominated, as well as accounting for inflation. To address this issue, we proceeded as follows: for foreign debts between 1857 and 1933, we converted the 14 different silver-based and 10 legal currencies into a standardized custom silver value. We then deflated these custom silver values to their equivalent in 1933 custom silver and converted them into 1933 US dollars at the applicable exchange rate. For foreign debts after 1933, we converted the debt amounts

[19] Let CPI_{CN} be the moving average of China's price index. The expected inflation rate on maturity date is: $\mathrm{E}(IR_{t+N}|\mathrm{t}, \mathrm{t}-1, \ldots, \mathrm{t}-\mathrm{N}) = (\ CPI_{CN,\ t} - CPI_{CN,\ t-N})/CPI_{CN,\ t-N}$. Hence, the real interest rate is $r_t^{Maturity=N} = i - \mathrm{E}(IR_{t+N}|\mathrm{t}, \mathrm{t}-1, \ldots, \mathrm{t}-\mathrm{N})$.

in other currencies to US dollars based on the nominal exchange rate, then adjusted for US inflation to express the debt amounts in 1933 US dollars.

Figure 8. Ratio of Foreign Borrowing to GDP (Central Government), 1872-1955



Source: The samples from 1857-1911 are from Xu (1962), *Historical Materials on Foreign Debt in the Qing Dynasty of China* (中国清代外债史资料) (1991) and *Historical Materials on Foreign Debt in the Qing Dynasty* (清代外债史资料) (1988) ; The samples from 1912-1927 are from Xu (1962) and *Compilation of archival materials of the Republic of China: Series 2-4* (中华民国档案资料汇编) (1981, 1991); The samples from 1928-1949 are from *Archives of Foreign Debt in the Republic of China* (民国外债档案资料) (1992) and *Compilation of archival materials of the Republic of China: Series 5* (中华民国档案资料汇编) (1994); The samples from 1950-1961 are from Shen (2014) and Xu (2006). The method and data source for converting nominal values into 1933 US dollars can be found in the Appendix I.

The resulting series allows for a detailed period-by-period investigation of foreign borrowing. Foreign borrowing began in the latter half of the 19th century for purposes such as railway construction, warfare, and reparations. These loans were generally small in value and were not publicly issued in the form of bonds. At the end of the 19th century, following the signing of the Treaty of Shimonoseki and the Boxer Protocol, the defeated Chinese government was compelled to pay substantial war reparations to more than ten countries. Due to severe financial difficulties, unpaid war reparations were retained in the form of foreign debt. For example, the

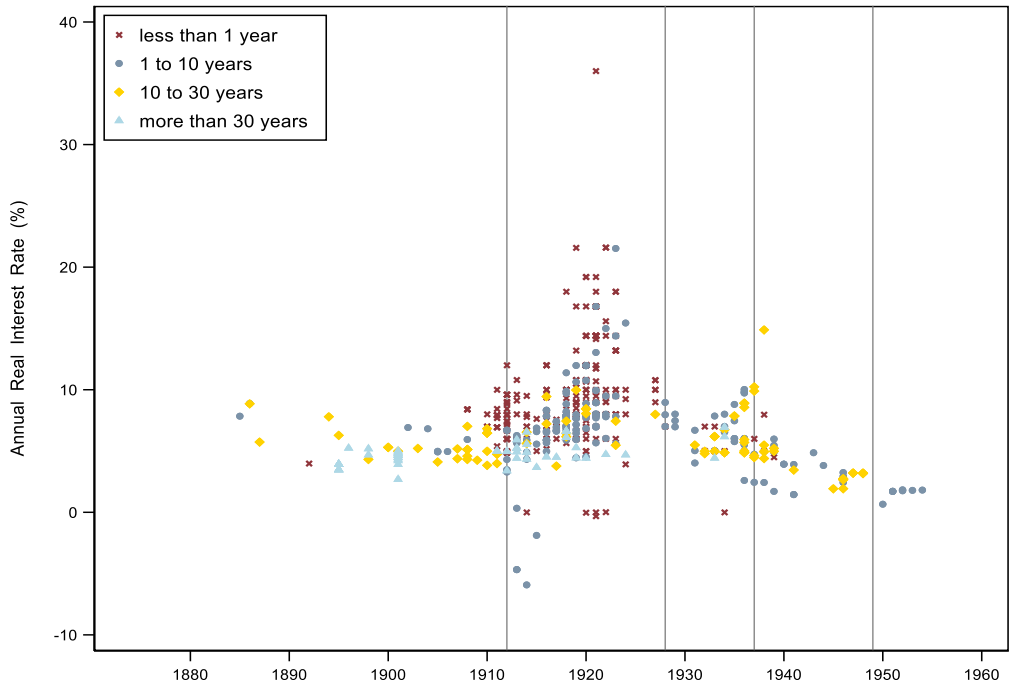
debt generated by the Boxer Indemnity in 1901 reached approximately 300 million (in 1933 US dollars). Overall, government borrowing in foreign markets during this time appears to have been limited. The borrowing spikes in Figure 8 do not represent market-based foreign borrowing or the government's capacity to borrow but rather reflect foreign-imposed debt.

After 1912, during the warlord period, both the central and local governments, constrained by weak fiscal capacity, relied heavily on foreign debt. Borrowing became more frequent, yet the inability to provide adequate guarantees limited them to securing only small loans. Hence, even though borrowing amounts rose significantly compared to the Qing era, though they remained modest in real terms.

Foreign borrowing increased gradually during the Nanjing period. After the Nationalist Government unified the country in 1928, foreign debt remained relatively low initially. The rapid growth after 1936 was partly due to improvements in domestic economic management and partly due to foreign support. On the domestic front, in December 1935, the central government reformed the legal currency, abolishing the silver standard system and issuing a new currency pegged to the US dollar. This reform helped China overcome the economic depression (Brandt and Sargent 1989, Friedman 1992). On the foreign front, during the Second Sino-Japanese War, from 1937, the Chinese government received financial support in the form politically motivated lending from foreign countries. From 1937 to 1945, there were only a few loans each year, but the amounts were often substantial. Examples include the "Sino-Soviet Barter Loan" in 1939, the "US 500 Million Loan" in 1942, and the "Sino-British Financial Aid Loan" in 1944. After the end of the Sino-Japanese War, only the United States provided a significant loan—the "Pacific Island War Material Transfer Loan"—to the Nanjing government, and foreign debt support was almost nonexistent thereafter.

After the establishment of the People's Republic of China, all foreign debts in the 1950s and 1960s originated from the Soviet Union. These foreign debts were relatively large and were mostly provided as military and economic assistance. Therefore, they were driven by political considerations rather than indicating the government's capacity to borrow in international markets.

Figure 9. Real interest rate of foreign debts (Central Government), 1885-1961.



Source: The source of debt data is the same as Figure 8. The exchange rates are from Global Financial Data (2009). Price index of India from 1861 to 1947 comes from Kumar et al. (1983, p. 903-904). Price indexes for other countries are from Jordà et al. (2016). The exchange rate between the creditor country's domestic currency and the currency used in the borrowing contract can be estimated based on the exchange rate between the currencies of each country and the US dollar. We calculate the 21 year moving average values of this exchange rate and the creditor country's price index. For details, see Appendix I.

We next construct the frequency and the real interest rate for individual foreign borrowing loans and summarize them in Figure 9.[20] In terms of frequency, foreign borrowing began with a few idiosyncratic loans in the 1860s, increasing throughout the late Qing period. The highest frequency of borrowing occurred during the warlord period, likely as a result of different local

[20] The real interest rate for each debt contract is estimated as follows. First, we calculate the 21-year moving average values of price index and exchange rate (current year, 10 years before and 10 years after). $ER_{contract}$ means the moving average of exchange rate between the lending country's domestic currency and the contract currency. The expected depreciation rate on maturity date is

$$\mathrm{E}(DR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) = \frac{ER_{contract,\ t}-ER_{contract,\ t-N}}{ER_{contract,\ t-N}}.$$

CPI_{lend} means the moving average of lending country's price index. Then the expected inflation rate on maturity date is

$$\mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) = \frac{CPI_{lend,\ t}-CPI_{lend,\ t-N}}{CPI_{lend,\ t-N}}.$$

Therefore, real interest rate is calculated as

$$r_t^{Maturity=N} = i - \mathrm{E}(DR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) - \mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}).$$

and national governments seeking funding independently. Borrowing frequency gradually declined following the Nanjing unification, and by the time of the Japanese invasion, it was reduced to a few politically motivated loans, a trend that persisted during the communist era.

Regarding interest rates, there is significant variance across individual loans. There is, however, a discernable increase during the fragmented warlord era, which is consistent with the heightened risk of government default associated with the collapse of state capacity. The interest rate decreased in the Nanjing government era. There were also low interest loans during World War, but these were primarily non-market foreign loans to provide fiscal support to the government. During the PRC period, loans provided by the Soviet Union were also largely a form of international aid. As a result, the average interest rate in this period reached the lowest level observed.

5. Discussion

This section evaluates the debates on four subperiods of Chinese modernization and state-building efforts discussed in Section 2 in the light of the empirical evidence that we constructed and presented in Sections 3 and 4.

The Late Qing Period

For the late Qing period, the tax revenue and debt series we constructed supports the argument that the reform program did not increase fiscal capacity. We find that the tax revenues remained stagnant in real terms and were on a downward trend as a share of GDP. We also find that domestic public borrowing was virtually nonexistent, while foreign debt primarily consisted of indemnities imposed by foreign powers. Consequently, the reforms implemented during this period seem not to have benefited the central treasury and this pattern helps explain the eventual collapse of the dynasty.

When placed in the broader historical context, the stagnation in central government revenues suggests that the decentralized approach taken by the Chinese government toward state-building proved ineffective. In most other cases of defensive modernization by major states, including 18th-century reforms in Russia, 19th-century reforms in the Ottoman Empire and Japan, as

well as the less successful reform programs of Iran under the Pahlavi and Egypt under Muhammad Ali, state capacity was built around the expansion of a centralized army and bureaucracy at the expense of provincial power structures, thereby following a centralization-oriented approach. What distinguished late Qing reforms was their inherently decentralized orientation. From their outset in mid-19th century, provincial strongmen were granted substantial autonomy over tax collection and the establishment of independent military forces, weakening central authority. While a comprehensive accounting of the provincial tax revenues is difficult to obtain, the available evidence suggests that the overall tax burden on economic activity increased, but most of the revenue was appropriated by provincial elites rather than being remitted to central government. This local appropriation failed to support centralized state-building and instead also laid the groundwork for greater political fragmentation in the subsequent period.

Taking the argument one step back, regarding why the Chinese state attempted a decentralized path to state-building, several explanations have been proposed. What set Chinese modernization program apart from other instances of defensive modernization is the abruptness, scale, and the relatively late date of the threat that triggered it. For the Qing, the 18th and early 19th centuries were characterized by relative peace and territorial expansion, until the sudden outbreak of the Opium War the Taiping Rebellion. It has been suggested that the abrupt nature of the threat, combined with the vast size of the country and the organizational challenges it posed, made the gradual development of a centralized military and tax structure difficult and compelled the government to adopt a decentralized response. Foreign intervention, particularly from Britain, France, and Japan, further crippled centralized state-building by maintaining their economic privileges including control over customs revenue and exclusive trade rights in treaty ports.

Another consequence of the sudden and late threat was the difficulty of ideological reorientation. States on the European periphery, such as the Ottoman Empire and Russia, had long interacted with European states, which familiarized them with the transformative changes occurring in Europe, the widening technological and institutional gap, and the pressing necessity for reform. In contrast, China's relative isolation until the 19th century left it largely unaware of these shifts and their profound implications. As a result, conservative factions within the Qing

government strongly resisted reforms that threatened their power, arguing against the necessity of altering China's institutions and practices (Hao and Wang, 1980). Elite resistance was compounded by broader societal discontent, as both the gentry and commoners harbored deep resentment toward missionary activities and foreign encroachment (Baark, 1997; Rowe, 2009). Beyond these structural factors, conjectural and leadership dynamics are argued to have influenced the trajectory of reform, as evidenced by the power struggle between Empress Dowager Cixi and the Guangxu Emperor over its scope and direction, which could have led to alternative paths. While the relative importance of these factors is difficult to pin down, what is certain is that the decentralized and limited reforms were not fiscally successful.

The Warlord Era

As for the next period, the Warlord Era, our findings once again point to a bleak fiscal picture. Central tax revenues as a percentage of GDP plummeted from 1.5% in 1911 to 0.6% by 1917 and further declined to a mere 0.1% by the mid-1920s, while bond markets remained weak. These trends align with the characterization of the period as one of increasing fiscal fragmentation, in which the Beijing government's nominal authority was progressively eroded by regional warlords who redirected resources to fund their military forces and consolidate local power.

As the Beijing government's authority declined, the Kuomintang (KMT) steadily consolidated power, exemplifying the state-building process through the monopolization of violence. The KMT's success was largely attributed to its highly disciplined and centralized military. The establishment of the Whampoa Military Academy in 1924 played a crucial role in training a cohesive officer corps that prioritized discipline and ideological coherence, sharply contrasting with the warlords' factionalized armies. This strategic military framework allowed the KMT to systematically subdue rival warlords, ultimately securing dominance following the Northern Expedition.

Hence, the period highlights a paradox: while fiscal and political disintegration weakened the Republican state, military competition inadvertently fostered institutional innovation. The KMT's integration of military modernization with centralized governance provided a viable model for restoring national stability. The era's chaos underscored the necessity of a unified

military-political structure—a lesson the KMT effectively leveraged to consolidate power.

The Nanjing Decade

The evidence on the Nanjing decade between 1927 and 1937 is consistent with the characterization of the period as further consolidation of a more centralized fiscal system at the cost of warlords. During this period, tax revenues saw notable growth, with the tax-to-GDP ratio rising from approximately 0.1% in the late 1920s to nearly 2.5% by 1936 on the eve of the Japanese invasion. This revenue, in turn, helped finance the expansion of the military and administrative structures (Eastman, 1974).

At the same time, our findings also confirm more critical observations regarding the gains in state capacity for this period. While the tax-to-GDP ratio increased, it only reached the peak levels attained during the late Qing dynasty. Furthermore, the rise in tax revenue relied heavily on customs duties, as depicted in Figure 2. Land taxes—once a principal revenue source — remained under the de facto control of provincial authorities and rural elites. The central government's attempts to consolidate control over land taxation, exemplified by the 1935 fiscal law delineating central and local financial responsibilities, yielded only limited success. The introduction of an income tax in 1936 faced significant challenges, including weak administrative capacity and widespread public resistance.

The rise in indirect tax revenues and urban taxes, coupled with stagnation in direct and rural taxation, supports the view that the Nanjing government had yet to establish full control over provincial power structures. This fragmentation mirrored the broader political landscape: although the regime had subdued warlords through military campaigns like the Central Plains War (1930), its grip on rural areas remained weak, with competing centers of power persisting. Weak provincial control heightened the risk of renewed fragmentation, while reliance on indirect taxes — especially customs tariffs — made the fiscal system susceptible to external economic shocks.

The Japanese Invasion and WWII

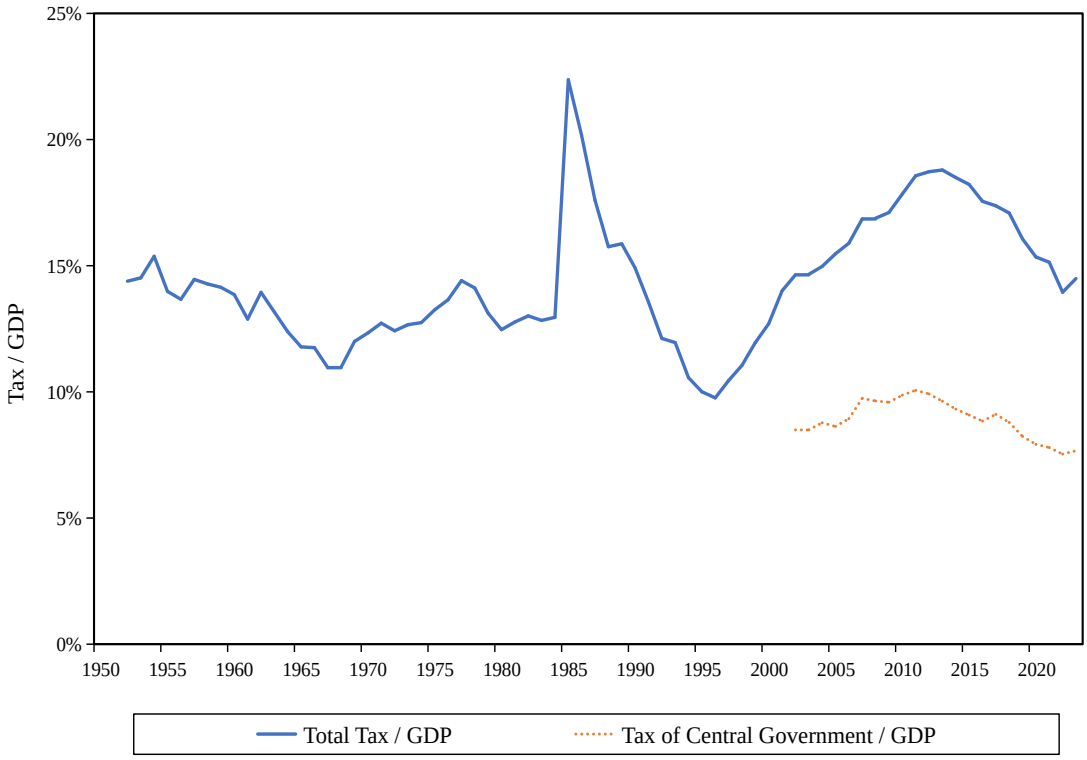
Our fiscal series indicate that official revenues collapsed rapidly during the Second Sino-Japanese War (1937–1945), declining to negligible levels. While a decline in revenue is expected during wartime, the complete fiscal collapse is especially notable. The public debt market also collapsed, with domestic borrowing increasingly relying on coerced lending and foreign aid disguised as borrowing.

The fiscal collapse can be attributed to structural vulnerabilities inherited from previous decades. The war severely undermined customs revenue and indirect taxes, which were primary sources of government income. The Japanese invasion of key economic hubs —such as Shanghai and Nanjing— disrupted trade and crippled customs revenue, while the blockade of ports and destruction of infrastructure further fragmented China's economy. Forced to retreat inland, the KMT government struggled to maintain administrative control, particularly in regions dominated by provincial warlords and rural elites who diverted local revenues for their own interests. By 1941, hyperinflation—driven by wartime deficits and currency mismanagement—eroded the real value of tax receipts, rendering fiscal policy increasingly ineffective. Consequently, much of the government's revenue came from unofficial and predatory exactions, exacerbating economic distress and further undermining public confidence.

The collapse of this fiscal model stands in contrast to the Communist Party's gradual rise and ultimate victory in the Chinese Civil War (1946–1949). From the outset, the Communist Party built up on its rural base areas and agricultural taxation system it established. Its land reforms, which redistributed wealth and abolished landlord-dominated tax structures, secured peasant support and allowed them to collect grain taxes directly from farmers, bypassing intermediaries. After eliminating warlords, consolidating state control, and centralizing fiscal authority, the Communist government significantly boosted tax revenues, reaching 15% of GDP by 1951 and maintaining that level in subsequent decades (Figure 10).[21]

[21] This data does not include implicit revenues obtained from the government's acquisition of land property rights. Public ownership of land is a source of additional implicit taxation. In China, the government obtains land-related revenues with tax-like characteristics, such as the increase in value generated when land is converted from its original use to a higher-value use (e.g., from agricultural land to commercial land). Because the government monopolizes land supply, it can acquire land usage rights at low prices and sell it at high prices. In the statistical

Figure 10. Ratio of tax revenue to GDP, 1950-2022



Source: National Bureau of Statistics of China (n.d.).

Note: Total Tax revenue is the sum of central and local tax revenues. The tax increase in 1985 was due to the implementation of corporate income tax. After the 1994 tax-sharing reform, the division of tax revenues between the central and local governments became gradually clearer. However, it was not until 2002 that a stable mechanism for independent statistics and reporting of central tax revenue was established.

indicators disclosed by the National Bureau of Statistics, apart from land taxes, property taxes, and land conveyance fees, there is no publicly available indicator to measure land value increment income. Land conveyance fees can be considered part of the land value increment income, referring to the fees charged by the government when transferring the right to use state-owned land to developers or enterprises. However, nominally, this revenue is not classified as tax revenue and can only be referred to as a potential form of taxation. Hence, the percentages in Figure 10 must be interpreted as a lower bound.

6. Conclusion

The evidence on China's century of state failure suggests that monopolization of violence lies at the foundation of state capacity, with fiscal, administrative, and legal dimensions of governance contingent upon its consolidation. We find that in the absence of such monopolization, China's fiscal revenues remained persistently below 2.5% of GDP—significantly lower than contemporary counterparts—while public debt markets remained feeble. Throughout this period limited gains in the government's ability to suppress provincial rivals led to corresponding albeit limited gains in fiscal capacity. It was only at the conclusion of the Civil War (1945–1949) that China managed to break free from this prolonged low-capacity trap through the effective centralization of coercion. These findings indicate that, during the early stages of modern state-building, the consolidation of coercive power served as the decisive factor.

Placed in broader comparative perspective, the Chinese experience suggests that the bargaining view of "first-wave" European state building does not generalize to later waves. In Western Europe, from the sixteenth to the eighteenth century, state-building was driven by negotiations between rulers and propertied elites, wherein taxation was exchanged for representation. However, this model depended on particular conditions: entrenched local elites, organizations autonomous from the state, burgeoning commercial capital, and protracted, inconclusive warfare. In contrast, China, like other second-generation state-builders, confronted different structural constraints: underdeveloped social classes, an absence of autonomous organizations, more decisive and destructive military technologies, and a shorter timeline for consolidation. Under these circumstances, successful state-building entailed adopting preexisting European military and administrative frameworks and imposing authority from the top down rather than negotiating it. In China's case, the late Qing decentralization and the government's hesitation to fully adopt these frameworks prolonged fragmentation, resulting in a century of state failure. Although the Kuomintang took steps to consolidate power in the 1920s, it was the Chinese Communist Party that ultimately built state capacity "out of the barrel of a gun". For contemporary fragile states, China's lost century serves as reminder that institutional mimicry is ineffective without first securing a monopoly on violence.

REFERENCES

Databases

CHGIS. *1911 Layers GBK Encoding, Harvard Dataverse, V1*, 2016. Available at https://doi.org/10.7910/DVN/0P89R9 (accessed September 10th, 2024).

Global Financial Data. *Global Financial Data*, 2009. Available at http://www.globalfinancial-data.com (accessed November 14th, 2024).

National Bureau of Statistics of China. *National Data*, n.d. Available at https://data.stats.gov.cn (accessed January 24th, 2025).

Turkish Statistical Institute. *Data Portal for Statistics*, 2023. Available at https://data.tuik.gov.tr (accessed December 16th, 2025).

Primary Sources

Bank of China in Chongqing. *Sichuan province's public bonds* (四川省之公债). Chongqing: Bank of China in Chongqing, 1934.

Institute of Fiscal Science. *Archives of Foreign Debt in the Republic of China* (民国外债档案资料). Beijing: Archives Publishing House, 1992.

Ministry of Finance of the People's Republic of China. *Historical Materials on Foreign Debt in the Qing Dynasty* (清代外债史资料). Beijing: Ministry of Finance of the People's Republic of China, Head Office of the People's Bank of China, 1988.

Ministry of Finance of the Republic of China. *Fiscal Yearbook* (财政年鉴). Nanjing: Department of Fiscal Yearbook Compilation, Ministry of Finance, 1948.

People's Bank of China. *Historical Materials on Foreign Debt in the Qing Dynasty of China* (中国清代外债史资料). Beijing: China Financial Publishing House, 1991.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第二辑). Vol. 2. Nanjing: Jiangsu People's Publishing House, 1981.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第四辑). Vol. 4. Nanjing: Jiangsu People's Publishing

House, 1991.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第五辑). Vol. 5. Nanjing: Phoenix Publishing House, 1995.

Secondary Sources

Acemoglu, Daron, Johnson, Simon and Robinson, James A. "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review*, 91(5), 1369–1401, 2001.

Acemoglu, Daron, and Robinson, James A. *The Narrow Corridor: States, Societies, and the Fate of Liberty*. New York: Penguin Press, 2019

Bates, R. H., and Lien, D. "A Note on Taxation, Development, and Representative Government." *Politics & Society*, 14 (1), 53-70, 1985.

Baark, Erik. *Lightning Wires: The Telegraph and China's Technological Modernization, 1860–1890*. Westport: Greenwood Press, 1997.

Barkey, Karen. *Bandits and bureaucrats: The Ottoman route to state centralization*. Cornell University Press, 1994.

Beasley, W.G. *The rise of modern Japan: political, economic and social change since 1850*. London: Weidenfeld & Nicolson, 2000.

Besley, Timothy, and Torsten Persson. "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review* 99 (4): 1218–1244, 2009.

Besley, T., and Persson, T. *Pillars of prosperity: The political economics of development clusters*. Princeton University Press, 2011.

Brandt, Loren, and Thomas J. Sargent. "Interpreting New Evidence about China and US Silver Purchases." *Journal of Monetary Economics* 23 (1): 31–51, 1989.

Chen, Shuo, and Ma, Debin. "States and Wars: China's Long March towards Unity and Its Consequences, 221 BC – 1911 AD." Working Paper No. 199, Oxford Economic and Social History, 2022.

Chinese Academy of Social Sciences. *History of the Republic of China* (中华民国史). Beijing: Zhong Hua Book Company, 2011.

Chu, Samuel, and Kwang-Ching Liu. *Li Hung-Chang and China's Early Modernization*. London: Routledge, 1994.

Dai, Xuewen. *From Commercial Funds to Patriotic Public Bonds: A Detailed Analysis of Early China's Domestic Public Bonds* (从息借商款到爱国公债：细说早期中国对内公债). Taipei: Shangzhou Publishing House, 2017.

Dincecco, Mark. "Fiscal centralization, limited government, and public revenues in Europe, 1650–1913." *The Journal of Economic History* 69: 1 (2009): 48-103

Dincecco, Mark, Gabriel Katz. "State Capacity and Long-Run Economic Performance." *The Economic Journal* 126 (590): 189–218, 2016

Eastman, Lloyd. *The Abortive Revolution: China Under Nationalist Rule, 1927–1937*. Cambridge: Harvard University Asia Center, 1974.

Fairbank, John King, and Merle Goldman. *China: A New History*. Cambridge: Harvard University Press, 1992.

Friedman, Milton. *A Program for Monetary Stability*. New York: Fordham University Press, 1992.

Ge, Jianhua. *Chinese Population History* (中国人口史). Shanghai: Fudan University Press, 2005.

Guan, Hanhui, Debin Ma, and Ruozhuo Zhai. "State Capacity in Imperial China—Quantifying a Millennium of Public Finance (997-1911 AD)." Working Paper, Oxford University, 2023.

Hao, Yen-Ping, and Wang, Erh-min. "Changing Chinese Views of Western relations, 1840–95." *The Cambridge History of China* 11, no. 2, 1980.

Halsey, Stephen R. "Money, Power, and the State: The Origins of the Military-Fiscal State in Modern China." *Journal of the Economic and Social History of the Orient* 56, no. 3 (2013): 392–432.

Halsey, Stephen R. *Quest for Power: European Imperialism and the Making of Chinese Statecraft*. Cambridge: Harvard University Press, 2015.

Hao, Yen-Ping, and Erh-min Wang. "Changing Chinese Views of Western relations, 1840–95." *The Cambridge History of China* 11 (2): 142-201, 1980.

Henriques, A., Karaman, K., Palma, N. (2025). State capacity and executive constraints in early modern Europe. *CEPR discussion paper*.

Hoffman, Philip T. *Why Did Europe Conquer the World?* Princeton: Princeton University Press, 2015.

Hosking, Geoffrey A. *Russia: people and empire, 1552-1917*. Harvard University Press, 1997.

Hsiao, Liang-lin. *China's Foreign Trade Statistics, 1864-1949*. Cambridge: Harvard University Asia Center, 1974.

Hsu, Immanuel C. Y. *The Rise of Modern China*. New York: Oxford University Press, 1970.

Li, Dan and Yan, Hongzhong. "Money and the Macro-economy". In: *The Cambridge Economic History of China* (eds. Debin Ma and Richard von Glahn). Cambridge University Press, 2022

Jia, Shiyi. *Treasury Bond and Finance* (国债与金融). Shanghai: Commercial Press, 1930.

Jiang, Hengyuan. *Chinese Tariff Historical Materials IV* (中国关税史料). Shanghai: Commercial Press, 1931.

Jiao, Jianhua. *General History of Chinese Finance: The Financial History of the Republic of China I* (中国财政通史：中华民国财政史上). Changsha: Hunan People's Publishing House, 2013.

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. "Macrofinancial History and the New Business Cycle Facts." *Working Paper, NBER Macroeconomics Annual 2016*, 2016.

Karaman, K. Kivanc, and Şevket Pamuk. "Different paths to the modern state in Europe: the interaction between warfare, economic structure, and political regime." *American Political Science Review* 107 (3): 603-626, 2013.

Karaman, K. Kivanç, and Şevket Pamuk. "Ottoman state finances in European perspective, 1500–1914." *The Journal of Economic History* 70 (3): 593-629, 2010.

Keller, Wolfgang, and Carol H. Shiue. "China's Foreign Trade and Investment, 1800-1950." CEPR Discussion Papers No. 27558, 2020.

Kiser, Edgar, and April Linton. "The Hinges of History: State Building and Revenue Extraction in Early Modern Europe". *American Sociological Review* 67(6): 889-910, 2002.

Ko, Chiu Yu, Mark Koyama, and Tuan-Hwee Sng. "Unified China and divided Europe." *International Economic Review* 59 (1): 285-327, 2018.

Koyama, M., Moriguchi, C., and Sng, T. H. "Geopolitics and Asia's Little Divergence: State building in China and Japan after 1850". *Journal of Economic Behavior & Organization*, 155, 178-204, 2018.

Kuhn, Philip A. *Rebellion and Its Enemies in Late Imperial China*. Cambridge: MA Harvard University Press, 1980.

Kumar, Dharma, Tapan Raychaudhuri, Irfan Habib, and Meghnad Desai. *The Cambridge Economic History of India Volume II*. Cambridge: Cambridge University Press, 1983.

Lan, Rixu. *Transformation of China's Modern Banking System: From the Late Qing Era to the 1930s*. Hongkong: Enrich Professional Publishing, 2015.

Liang, Hongzhi, and Quan'an Zheng. *Chaos and Confusion: A Study of Southwest Bills During The Republican Era* (混乱与迷惘：民国时期西南票据研究). Beijing: Science Press, 2017.

Liu, Ta-chung, and Kung-chia Yeh. *The Economy of the Chinese Mainland: National Income and Economic Development, 1933–1959*. Princeton: Princeton University Press, 1965.

Lu, Feng, and Kaixiang Peng. "China's Rice Prices (1644-2000)." *China Economic Quarterly*, no. 1 (2005): 427-460.

Ma, Debin. "Growth, Institutions and Knowledge: A Review and Reflection on the Historiography of 18th–20th century China." *Australian Economic History Review* 44 (3): 259-277, 2004.

Ma, Debin. "State Capacity and Great Divergence, the Case of Qing China (1644–1911)." *Eurasian Geography and Economics* 54, no. 5-6: 484-499, 2013.

Ma, Debin. "Financial Revolution in Republican China during 1900–37: A Survey and A New Interpretation." *Australian Economic History Review* 59, no. 3 (2019): 242-262.

Ma, Debin. Ideology and the Contours of Economic Change. In: Ma, D., von Glahn, R., eds., *The Cambridge Economic History of China*. Cambridge University Press, pp. 15-47, 2022.

Ma, Y., and de Jong, H. (2019). Unfolding the Turbulent Century: A Reconstruction of China's Historical National Accounts, 1840–1912. *Review of Income and Wealth*, 65, no. 1 (2019): 75-98.

Mao, Tsetung. *Anthology of Mao Tsetung*. Volume II, 2nd Edition (毛泽东选集第二卷第二版). Beijing: People Press, 1991.

Mitchell, Brian. *International Historical Statistics: The Americas, 1750-2000*. London: Palgrave Macmillan, 2003.

Mitchell, Brian. *International Historical Statistics: Europe, 1750-2005*. London: Palgrave Macmillan, 2007.

North, Douglass C. (1990*). Institutions, institutional change and economic performance*. Cambridge University Press, 1990.

North, Douglass C. and Weingast, Barry R. Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England. *The Journal of Economic History*, 49(4), 803–832, 1989.

O'Brien, Patrick. The Contributions of Warfare with Revolutionary and Napoleonic France to the Consolidation and Progress of the British Industrial Revolution. *The Economic History Review* 42 (1): 1–18, 1989

Palma, Nuno, and Liuyan Zhao. "The efficiency of the Chinese silver standard, 1920–1933." *The Journal of Economic History* 81, no. 3: 872-908, 2021.

Pan, Guoqi. *Research on Domestic Public Debt in Modern China* (近代中国国内公债研究). Beijing: Economic Science Press, 2007.

Pan, Guoqi. *Research On Local Government Bonds In Modern China: Taking Jiangsu, Zhejiang, and Shanghai As Examples* (近代中国地方公债研究：以江浙沪为例). Hangzhou: Zhejiang University Press, 2009.

Pan, Guoqi. *Research On Local Government Bonds In Modern China: A Study Centered On Anhui, Sichuan, Fujian, and Guangdong* (近代中国地方公债研究：以皖川闽粤为中心的考察). Beijing: Economic Science Press, 2014.

Pan, Guoqi, and Wen Liu. *Research On Treasury Bond of New China* (新中国国债研究). Beijing: Economic Science Press, 2016.

Qian, Jiaju. “China’s Finance in the Past Thirty Years (最近三十年的中国财政).” *The Eastern Miscellany*, no. 1: 109-124, 1934.

Qian, Jiaju. *History of Public Debt in Old China: 1894-1949* (旧中国公债史资料:1894-1949). Beijing: China Financial and Economic Publishing House, 1955.

Qian, Jiaju. *Historical Materials On Old Chinese Public Bonds* (旧中国公债史资料). Beijing: Zhonghua Book Company, 1984.

Remick, Elizabeth J. *Building Local States: China during the Republican and Post-Mao Eras.* Cambridge: Harvard University Asia Center, 2004.

Rowe, William T. "Hu Lin-i's Reform of the Grain Tribute System in Hupeh, 1855–1858." *Late Imperial China* 4 (10): 54, 1983.

Rowe, William T. *China's Last Empire: The Great Qing*. Cambridge: Belknap Press, 2009.

Stasavage, David. *States of Credit: Size, Power, and the Development of European Polities*. Princeton: Princeton University Press, 2011.

Scheidel, Walter. *Escape from Rome: The Failure of Empire and the Road to Prosperity*. Princeton: Princeton University Press, 2019.

Shen, Zhihua. *Selected Russian Archives: Sino Soviet Relations: Volumes 2-9* (俄罗斯解密档案选编：中苏关系卷). Shanghai: Orient Publishing Center, 2014.

Shi, Zhihong, and Yi Xu. *Late Qing Dynasty Finance* (晚清财政). Shanghai: Shanghai University of Finance and Economics Press, 2008.

Strauss, Julia. "Rethinking Institutional Capacity and Tax Regimes: The Case of the Sino-Foreign Salt Inspectorate in Republican China." In *Taxation and State-building in Developing Countries: Capacity and Consent*, edited by Deborah Brautigam, Odd-Helge Fjeldstad, and Mick Moore, 212-234. Cambridge: Cambridge University Press, 2008.

van de Ven, Hans. *Breaking with the Past: The Maritime Customs Service and the Global Origins of Modernity in China*. New York: Columbia University Press, 2014.

von Glahn, R. (2020). Modalities of the fiscal state in imperial China. *Journal of Chinese History*, 4 (1), 1-29.

Vries, Peer. *State, Economy and the Great Divergence: Great Britain and China, 1680s–1850s*. Bloomsbury Academic, 2015.

Wan, Bixuan. *Municipal Bonds* (地方公债). Shanghai: Da Dong Bookstore, 1948.

Xu, Yisheng. *Statistical Data on the History of Foreign Debt in Modern China* (中国近代外债史统计资料) . Beijing: Zhonghua Book Company, 1962.

Xu, Yi. *From Centennial Humiliation to National Revival* (从百年屈辱到民族复兴). Beijing: Economic Science Press, 2006.

Xu, Yi, Zhihong Shi, Bas van Leeuwen, Yuping Ni, Zhipeng Zhang, and Ye Ma. "Chinese National Income, ca. 1661–1933." *Australian Economic History Review*, no. 3 (2017): 368-393.

Yan, Hongzhong. *Monetary and Financial Systems of Modern China from 1600–1949: A study on Economic Performance and Modernization* (中国的货币金融体系:1600-1949:基于经济运行与经济近代化党的研究). Beijing: China People's University Press, 2012.

Yang, Rumei. *On the Fiscal Theory of the Republic of Chin*a (民国财政论). Shanghai: Commercial Press, 1927.

Yang, Yinpu. *Financial History of the Republic of China* (民国财政史). Beijing: China Financial and Economic Publishing House, 1985.

Yeh, Kung-chia. "China's National Income, 1931–36." In *Modern Chinese Economic History*, edited by Ching-ming Hou and Tsong-shian Yu, 95-128. Taipei: Academia Sinica, 1979.

Zhang, Bofeng, and Zongyi Li. *Beiyang Warlords* (北洋军阀). Wuhan: Wuhan Publishing House, 1990.

Zhang, Taisu. *The Ideological Foundations of Qing Taxation: Belief Systems, Politics, and Institutions*. Cambridge: Cambridge University Press, 2023.

APPENDIX I - DATA SOURCES

A. External Loans

i. Data Sources

The dataset of external loans is mainly collected and organized from government archives, supplemented by secondary information compiled by other historians. The first-hand archives record the background of the government's borrowing, instructions from the central government to borrowing departments, loan contracts, and subsequent repayment situations, among other information. Secondary source materials present information such as loan name, date, borrower, lender, loan amount, currency, interest rate, and maturity in the form of tables.

The samples from 1857-1911 are from *Statistical Data on the History of Foreign Debt in Modern China* (中国近代外债史统计资料) (Xu, 1962), *Historical Materials on Foreign Debt in the Qing Dynasty* (清代外债史资料) (1988) and *Historical Materials on Foreign Debt in the Qing Dynasty of China* (中国清代外债史资料) (1991); The samples from 1912-1927 are from *Statistical Data on the History of Foreign Debt in Modern China* (中国近代外债史统计资料) (Xu, 1962) and *Compilation of archival materials of the Republic of China: Series 2-4* (中华民国档案资料汇编) (1981, 1991); The samples from 1928-1949 are from *Archives of Foreign Debt in the Republic of China* (民国外债档案资料) (1992) and *Compilation of archival materials of the Republic of China: Series 5* (中华民国档案资料汇编) (1995); The samples from 1950-1961 are from *Selected Russian Archives: Sino Soviet Relations: Volumes 2-9* (俄罗斯档案选编：中苏关系卷) (Shen, 2014) and *From Centennial Humiliation to National Revival* (从百年屈辱到民族复兴) (Xu, 2006).

We ultimately obtained a total of 1365 samples, including 257 during the Qing Dynasty (1853-1911), 903 during the Beijing government period (1912-1927), 191 during the Nanjing National Government period (1928-1949), and 14 during the People's Republic of China period.

ii. Main Variables

The variables included in the database are:

1. The date of the loan

Most loans only indicate the year of borrowing.

2. Interest Rate

We collected the interest rates recorded in the contracts. They were recorded on annual, monthly or daily basis. We converted it into an annual interest rate.

3. Discount Rate

Sometimes lenders did not fully provide the loan but only paid a portion of it. We refer to the unpaid portion as the discount rate. If the discount is not mentioned in the contract, we assume that the lender provided all the loan recorded in the contract.

4. Maturity

It refers to a time period within which the Chinese government should complete the repayment process. It is measured in months.

5. Borrower

The borrower refers to the person who signs the contract. Some debts involve more than one borrower, in which case we prioritize the first person. The database contains the borrower's basic information, including name, province, organizations or departments, position, and official rank. We used the Nine-Grades Official System in Qing Dynasty to quantify the rank of officials. In this system, there are a total of eighteen grades, and different government posts (professional title) correspond to different grades (Professional Level). It shows the status of the borrower. When the borrower is the central government or a member of the royal family, we consider them to be grade above the first grade. The higher the level, the stronger the bargaining power during negotiations.

6. Handler

It refers to the intermediary for handling the debt. The information of the handler is basically consistent with that of the borrower

7. Creditor

There are mainly six types of foreign creditors: (1) banks; (2) syndicates; (3) industrial companies; (4) foreign businessmen; (5) government or government departments; (6) board of Trustees of Boxer Indemnity; (7) international organizations including churches, universities and Red Cross. The database records the country to which the lender belongs.

8. Collateral

Most of the debt is secured by taxes, while other debt is secured by fixed assets, shares or stocks of enterprises, income of enterprises or railways, government bond notes, and so on.

9. Purpose

The loan is mainly used for: (1) enterprise operation; (2) financial regulation; (3) social infrastructure construction, such as transportation, communication and water conservancy; (4) disaster relief or rehabilitation after the war; (5) education; (6) administrative costs; (7) military affairs; (8) repayment of loan or other debts; (9) war indemnity.

10. Extra Term

The signing of some debt contracts is accompanied by additional conditions. For example, China is not allowed to borrow from other countries; Creditor countries participate in customs management; Creditor countries must be given priority in getting repayments; Creditor countries have mining rights, port construction rights, railway rights, and so on.

11. Loan Amount

It includes the amount recorded in the contract and the actual amount received by the Chinese government. These amounts are denominated in different types of currencies.

iii. Calculation of Real Interest Rate

The Chinese government uses different types of currency when borrowing, and repayment

requires the currency indicated in the contract, which is the same currency as the borrowing. This means that the lending country needs to convert its own currency into the contract currency and lend it to China. When it matures, China will return the contract currency, and the lending country needs to convert the currency back into its own currency and calculate the real interest rate. In this process, the exchange rate between the lending country's domestic currency and the contract currency, as well as the lending country's inflation rate, are all influencing factors.

The price index of all the lending countries, except India, come from JST Database (Jordà, et al., 2016). Price index of India comes from The Cambridge Economic History of India Volume II (Kumar et al, 1983, pp.903-904). The exchange rates are from Global Financial Data (2009). Since Hong Kong adopted silver standard until 1935, we can consider Hong Kong dollar as a silver currency.

First, we calculate the 21-year moving average values of price index and exchange rate (current year, 10 years before and 10 years after). $ER_{contract}$ means the moving average of exchange rate between the lending country's domestic currency and the contract currency. Then the expected depreciation rate on maturity date is

$$\mathrm{E}(DR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) = \frac{ER_{contract,\ t}-ER_{contract,\ t-N}}{ER_{contract,\ t-N}}.$$

CPI_{lend} means the moving average of lending country's price index. Then the expected inflation rate on maturity date is

$$\mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) = \frac{CPI_{lend,\ t}-CPI_{lend,\ t-N}}{CPI_{lend,\ t-N}}.$$

Therefore, we can get the real interest rate

$$r_t^{Maturity=N} = i - \mathrm{E}(DR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) - \mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}).$$

iv. Conversion of Pricing Units

Foreign debt data and tax revenue data cover more than a century. China's political system has changed frequently in history, and different currencies are used under different systems. Even in the same system, there are different currency problems. For example, a variety of silver

monetary units were used in the late Qing Dynasty, silver yuan and legal tender were used in the period of the Republic of China, and the ruble of the former Soviet Union was used as the currency for the People's Republic of China's borrowing. We use the earliest method used by Shi (2017) in estimating China's historical national income from 1685 to 1933 and convert all these currencies into 1933 US dollars. For this purpose, the following methods and steps are adopted:

Firstly, the standardization of the name of monetary unit is considered. Thus, 14 kinds of valuation virtual silver (KuPing silver, GuiYuan silver, XingHua silver, GongFa silver, YangLi silver, JiPing silver, ShenPing silver, JingPing silver, GuanPing silver, TaiFu ticket, TaiFeng silver, milli silver, silver and silver yuan) and 10 kinds of foreign legal currencies (US dollar, British pound, Japanese yen, German dollar, Indian rupee, French franc, Dutch dollar, Canadian dollar, Russian ruble and Hong Kong dollar) are obtained.

For currency units between 1857 and 1933, all 14 virtual silver and 10 legal currencies after unified names need to be converted into Haikwan Tael. After deflating the inflation rate, it is converted into 1933 Haikwan Tael, and then converted into 1933 U.S. dollars at the exchange rate of 1933 Haikwan Tael to U.S. dollars. The exchange information between the 14 virtual silver and the GuanPing silver comes from Zhang (1931, pages 146-155) and Qian and Guo (2014, pages 195-196). Conversion ratio: 1 Haikwan Tael =1.016 KuPing silver =1.114 GuiYuan silver =1.051 XingHua silver =1.0532 GongFa silver =1.087 YangLi silver =1.0329 JiPing silver =1.0535 ShenPing silver =1 GuanPing silver =1.105 JingPing silver =1.5665 Silver Yuan =0.756 silver =1.9581 milli silver =1.4111 Foochow dollars=0.9878 TaiFeng silver. The exchange information between 10 foreign legal currencies and the Haikwan Tael comes from Hsiao (1974, pages 190-192) and Wu (1955, page 181). The exchange rate information of the Haikwan Tael in 1933 and the US dollar in 1933 comes from the *Five-Port Commerce Regulations* in 1843, the *Tianjin Treaty* in 1858 and Zheng (1984, pages 342-343). The exchange rate is 1 Haikwan Tael= 0.41048626 USD.

For currency units between 1933 and 1949, it is necessary to consider silver and foreign currency separately. First, we convert all the silver currencies and fiat currency into Haikwan

Tael according to the exchange ratio of silver currencies and Haikwan Tael. Thereafter, by adjusting for the inflation rate, we can derive the value denominated in the 1933 Haikwan Tael, which was finally converted into 1933 U.S. dollars. For debt denominated in 10 foreign currencies, they need to be converted into current U.S. dollars at the exchange rate and then deducted from the inflation rate estimated by the U.S. CPI to convert them into 1933 U.S. dollars. The exchange rate data of virtual silver during this period comes from Qian and Guo (2014, pages 195-196). The exchange rate data of the US dollar and other currencies (including silver yuan and Haikwan Tael) come from Hsiao (1974, pages 190-192, 196). The CPI index of the United States comes from the Bureau of Labor Statistics (n.d.).

From 1950 to 1961, the foreign debt during the People's Republic of China period were all denominated in rubles, which can be directly calculated at the nominal exchange rate between the ruble and the U.S. dollar and then adjusted to 1933 U.S. dollars based on U.S. CPI data. Data on the exchange rate between the ruble and the US dollar comes from Hsiao (1974, pages 190-192, 196). After the second currency reform of the Soviet Union in 1950, the exchange rate stabilized at 1 U.S. dollar equal to 4 rubles. The source of the US CPI index is the same as above.

B. Domestic Debts

i. Data Sources

The internal borrowing of the modern Chinese government can be mainly divided into three categories: government bonds issued through formal issuance of bonds, short-term treasury bills, and short-term loans from various bank accounts. Our data does not include the third category because it does not have the nature of public debt, but is a form of compensation for fiscal deficits through excessive issuance of currency. There are conceptual differences between government bonds and treasury bills in other country, but they were actually the same during the Republic of China era, both have the characteristics of being anonymous, collateralized or tradable, and having diverse denominations (Qian, 1934). This is because treasury bills emerged in China as a substitute for government bonds. After 1916, the central and local governments began to issue excessive domestic debt or forced loans, and the credibility of the government bond was damaged (Zhang and Li, 1990). The debt consolidation in 1921 did not reverse the low credibility of government bonds, and the government had to gradually replace them with treasury bills.

The samples of central government are from Historical materials on old Chinese public bonds (旧中国公债史资料) (Qian, 1984), From commercial funds to patriotic public bonds: A detailed analysis of early China's domestic public bonds (从息借商款到爱国公债：细说早期中国对内公债) (Dai, 2017), Treasury bond and finance (国债与金融) (Jia, 1930), and Compilation of archival materials of the Republic of China (中华民国史档案资料汇编) (1981; 1991; 1995). The samples of local government are from Municipal bonds (地方公债) (Wan, 1948), Research on local government bonds in modern China: Taking Jiangsu, Zhejiang, and Shanghai as examples (近代中国地方公债研究：以江浙沪为例) (Pan, 2009), Research on local government bonds in modern China: A study centered on Anhui, Sichuan, Fujian, and Guangdong (近代中国地方公债研究：以皖川闽粤为中心的考察) (Pan, 2014), Sichuan province's public bonds (四川省之公债) (1934), Chaos and confusion: A study of southwest bills during the republican era (混乱与迷惘：民国时期西南票据研究) (Liang and Zheng, 2017), and Research on treasury bond of New China (新中国国债研究) (Pan and Liu, 2016).

We ultimately obtained a total of 437 samples, including 14 during the Qing Dynasty

(1853-1911), 138 during the Beijing government period (1912-1927), 279 during the Nanjing National Government period (1928-1949), and 6 during the People's Republic of China period.

ii. Main Variables

The variables included in the database are:

1. The date of the loan

Most loans only indicate the year of borrowing.

2. Interest Rate

It refers to the interest rates recorded in the contracts. We converted it into an annual interest rate.

3. Discount Rate

Sometimes lenders did not fully provide the loan but only pay a portion of it. If the discount is not mentioned in the contract, we assume that the lender provided all the loan recorded in the contract.

4. Maturity

It refers to a time period within which the government should repay the money that is owing. It is measured in months.

5. Borrower

The borrower refer to the person who signs the contract. The database contains the borrower's basic information, including name, province, organizations or departments, position, and official rank.

6. Undertaking Organization

It refers to banks that raise funds in the secondary market.

7. Collateral

Most of the debt is secured by taxes, while other debt is secured by fixed assets, shares or stocks of enterprises, income of enterprises or railways, government bond notes, and so on.

8. Purpose

The loan is mainly used for: (1) enterprise operation; (2) financial regulation; (3) social infrastructure construction, such as transportation, communication and water conservancy; (4) disaster relief or rehabilitation after the war; (5) education; (6) administrative costs; (7) military affairs; (8) repayment of loan or other debts.

9. Extra Term

The signing of some debt contracts is accompanied by additional conditions. For example, China is not allowed to borrow from other countries; Creditor countries participate in customs management; Creditor countries must be given priority in getting repayments; Creditor countries have mining rights, port construction rights, railway rights, and so on.

10. Issuance Amount and Subscription Amount

These amounts are denominated in different types of currencies.

11. Principal Repayment Frequency

The number of times the principal is repaid annually.

12. Repayment Situation

It is divided into five situations: "timely repayment", "default", "unsuccessful issuance", "being replaced with other debts", and "unknown".

iii. Calculation of Real Interest Rate

Most domestic public bonds are denominated in the domestic currency and only need to consider the inflation rate of China. In this case, letting CPI_{CN} be the moving average of China's price index, the expected inflation rate on maturity date is

$$\mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}) = \frac{CPI_{CN,\ t}-CPI_{CN,\ t-N}}{CPI_{CN,\ t-N}}.$$

Therefore, we can get the real interest rate

$$r_t^{Maturity=N} = i - \mathrm{E}(IR_{t+N}|\mathrm{t},\mathrm{t}-1,\cdots,\mathrm{t}-\mathrm{N}).$$

Some debts are borrowed in US dollars or UK pounds, in which case the exchange rates

of US dollars and UK pounds need to be considered. For this situation, the calculation method of real interest rate is the same as that of external debt. The price index comes from Lu and Peng (2005).

iv. Conversion of Pricing Units

The units of the domestic debt include seven types of metallic currencies (Kuping Tael, Caoping Silver, Guiyuan Silver, Mace of Silver, Silver Tael, Silver Yuan, Gold), two types of foreign currencies (US Dollar, British Pound), and five types of paper currencies (Customs Gold Unit, Beijing Banknote, National Currency, Gold Yuan Coupon, Renminbi). Additionally, there are five debts denominated in grain. We converted all debts into 1933 USD.

1.Before 1933:

(1) Convert all metallic currencies and Beijing Banknotes into Haikwan Tael.

According to Zhang (1931, pp. 146-155) and Qian and Guo (2014, pp. 195-196): 1 Haikwan Tael = 1.016 Kuping Tael = 1.114 Guiyuan Silver = 1.9581 Caoping Silver = 1.5665 Silver Yuan = 0.756 Silver Tael = 15.665 Mace of Silver. Debts denominated in Beijing Banknotes were issued in 1912. The exchange rate between Beijing Banknotes and Silver Yuan was 1:1.

(2) Convert to 1933 Haikwan Tael using price indices.

(3) Convert to 1933 USD using the exchange rate of Haikwan Tael to US Dollar in 1933. According to Zheng (1984, pp. 342-343), in 1933, 1 Haikwan Tael= 0.41048626 USD.

2. After 1933:

(1) Convert all types of currencies to US Dollars according to exchange rates.

Exchange rate data is sourced from Hsiao (1974). Before 1935, 1 National Currency = 1 Silver Yuan. Before 1942, the exchange rate between Customs Gold Unit and US Dollar was fixed: 1 Customs Gold Unit = 0.4 USD. In 1948, 1 Gold Yuan Coupon = 0.24 USD. In 1949, the price of gold was 35.2 USD per ounce.

(2) Convert grain-denominated debts to US Dollars-denominated values using grain price data and exchange rates. Grain price data is from Zhang (1988).

(3) Adjust US Dollars for inflation to convert to 1933 US Dollars. The US CPI index is sourced from the Bureau of Labor Statistics (n.d.).

C. Taxation

i. Data Sources

The tax data in this paper only includes the tax revenue obtained by the central government and does not include local tax and budget revenue. The tax data covers the period from 1651 to 1947, excluding the period of the People's Republic of China. This is because after the establishment of the People's Republic of China, a fiscal system of unified collection and expenditure was adopted, with the central government comprehensively managing taxation and allocating resources according to local government financial needs. In this context, the tax revenue of the central government after 1949 is inconsistent with that of the Republican era and cannot be compared.

The total tax before 1911 is from *State Capacity in Imperial China- Quantifying a Millennium of Public Finance (997-1911 AD)* (Guan et al, 2023); The data from 1912 to 1926 come from Qian (1934), Yang (1927, pp.128-133), and Yang (1985, pp.8); The data from 1927 to 1936 come from *Financial History of the Republic of China* (民国财政史) (Yang, 1985, pp.47); The data from 1937 to 1945 come from *Fiscal Yearbook* (财政年鉴) (Ministry of Finance of the Nationalist Government, 1948, pp.130-138); The data from 1946 to 1947 come from *Financial History of the Republic of China* (民国财政史) (Yang, 1985, pp.189); The data after 1949 comes from National Bureau of Statistics of China (n.d.).

ii. Representative Tax Categories

During the Republic of China period, tariffs, salt taxes, and commodity taxes were the main sources of tax revenue for the central government. However, there is a lack of consistent statistical data on commodity taxes. Therefore, in addition to collecting the total tax revenue of the central government, we also collected data on tariffs and salt taxes.

For the tariff, the data before 1911 is from *State Capacity in Imperial China- Quantifying a Millennium of Public Finance (997-1911 AD)* (Guan et al, 2023); The data from 1912 to 1926

come from *Chinese Tariff Historical Materials (Volume IV) (中国关税史料)* (Jiang, 1931, pp. 9-13); The data from 1927 to 1936 come from *Financial History of the Republic of China* (民国财政史) (Yang, 1985, pp.47); The data from 1937 to 1945 come from *Fiscal Yearbook* (财政年鉴) (Ministry of Finance of the Nationalist Government, 1948, pp. 130-138); The data from 1946 to 1947 come from *Financial History of the Republic of China* (民国财政史) (Yang, 1985, pp.176).

For the salt tax, the data before 1911 is from State Capacity in Imperial China- Quantifying a Millennium of Public Finance (997-1911 AD) (Guan et al, 2023); The data from 1912 to 1926 come from China's Finance in the Past Thirty Years (最近三十年的中国财政)(Qian, 1934, pp.115); On the Fiscal Theory of the Republic of China (民国财政论) (Yang, 1927, pp. 128-133); Financial History of the Republic of China (民国财政史) (Yang, 1985, pp.8); The data from 1927 to 1936 come from Financial History of the Republic of China (民国财政史) (Yang, 1985, pp.47); The data from 1937 to 1945 come from Fiscal Yearbook (财政年鉴) (Ministry of Finance of the Nationalist Government, 1948, pp. 130-138); The data from 1946 to 1947 come from Financial History of the Republic of China (民国财政史) (Yang, 1985, pp.176).

iii. Conversion of Pricing Units

Before 1933, China used both silver yuan and silver taels as pricing units. In 1933, the central government announced the "Abolishing Tael for Silver Yuan", which means silver yuan became the only legal unit of valuation. In the data source, we found that tax data before 1912 was recorded in units of "Taels of Kuping Silver", while after 1912 it was recorded in units of "Silver Yuan". In order to make the data comparable, we need to convert all values to be priced in "silver yuan of 1933".

For the data before 1912, we multiply tax revenue in "Taels of Kuping Silver" with 1.541 to convert it to "silver yuan of 1933". This ratio is based on the silver content of 1933 silver yuan and Kuping silver, and the values are from Qian and Guo (2014, pp.197-198). According to their calculation, 1 Haikwan Tael = 1.01642395 taels of Kuping Silver = 1.5665 silver yuan.

For the data after 1912, we multiply tax revenues recorded in the literature by the exchange rate with US dollar, and then with the value of US dollar in grams of silver, which gives the tax revenue in grams of silver. Then we divide it by the grams of silver in a Silver Yuan of 1933 to convert the unit. The exchange rate of the US dollar comes from Hsiao L (1974, pp.190-192,196).

iv. Calculation of Real Taxes

After unifying the units, we obtained tax revenue denominated in 1933 silver yuan. But it is still a nominal variable. In order to match tax revenue with real GDP and calculate the ratio, we need to calculate real tax revenue. So we need Chinese inflation rates in terms of silver.

We chose the consumer price index in Peng and Lu (2005). According to their paper, the unit to calculate the price index was silver taels before 1911, silver yuan from 1911 to 1934, and fiat currency after 1935. The exchange rates and data linkage methods are presented in Tables 5 and 6 of Lu and Peng (2005). Their price indices are derived from the Tang Qiyu Index (before 1912), the Wertheim Index (1913-1921), and the Shanghai Wholesale Price Index (after 1922). The Tang Qiyu Index is based on the prices of 28 import and export commodities. The Wertheim index is based on the prices of 34 commodities in cities such as Shanghai, Tianjin, and Wujin. The Shanghai Wholesale Price Index is derived from the Compilation of Price Data before and after the Liberation of Shanghai. Therefore, this index can reflect the comprehensive purchasing power of the whole country.

Peng and Lu see 1913 as the bench year (1913=100). We converted the bench year to 1933 when we deflate the CPI from the nominal tax revenue.

D. Other Data

i. Issued Currency

Before 1935, China did not have legal tender and instead used silver as its primary currency. At that time, China adopted a free banking system, which allowed both Chinese and foreign banks to issue banknotes based on their own silver reserves. After the fiat currency reform in 1935, the Central Bank, Bank of China, Bank of Communications, and China Farmers' Bank formed an official banking group to jointly fulfill the functions of the central bank.

The official banking group issues fiat currency pegged to the value of the US dollar with foreign exchange reserves.

The Bank of China Monthly (中行月刊), published from July 1930 to November 1935, recorded the number of banknotes issued by major banks in China before 1935, and we add them up to the total amount of banknotes issued. *The Bank of China Monthly* also recorded the number of legal tender issued by official banking groups after 1935. This paper compared this data with the banknote issuance recorded by Arthur Young (2008, pp.281), and obtained the currency issuance from 1929 to 1948.

ii. Price Index

The price index not only helps to describe the level of inflation but also plays an important role in calculating the real values of various indicators. Due to the lack of statistics on general prices before the Republic of China, the existing price index for the late Qing Dynasty are mostly based on the grain prices. Lu and Peng (2005) analyzed different versions of price indices calculated based on import and export commodity price data and local retail price data, selected representative and authentic sequences for linkage, and obtained the long series of consumer price index. The data from 1867 to 1912 uses the Tang Qiyu Index, the data from 1913 to 1921 uses the Wertheim Index, and the data from 1922 to 1949 uses the Shanghai Wholesale Price Index.

In addition, Peng and Lu (2005) also linked the Yangtze River Delta rice price series compiled by Yeh (1992) with the Shanghai rice prices compiled by the Shanghai Social Bureau and *the Bank Weekly* to obtain a long-term grain price series. In this paper, we simultaneously plotted figures for both the grain price index and the consumer price index, and the results showed no significant difference between the two.

Due to severe hyperinflation in China after 1945, this paper re plots the price index by taking the logarithm.

iii. GDP & Industrial Output

Per capita real GDP before 1923 and in 1933 comes from Xu et al. (2017, Appendix E). Per capita real GDP from 1931 to 1936 comes from Yeh (1979). Per capita real GDP in 1933 and 1952 comes from Liu and Yeh (1965, p. 94). First, we calculate the total real GDP using the population data from *Chinese Population History* (中国人口史) (Ge, 2005). Then, we convert the unit of GDP data to Silver Yuan of 1933 according to the exchange rate and connect the three series based on the values for 1933. Finally, we linearly interpolate the missing values.

Arthur Young (1981. pp.347, 371) also provide some variables to describe the economic development and industrialization during the Republic of China, including industrial output value and gross value of output. We use these data to check the trend of GDP series.

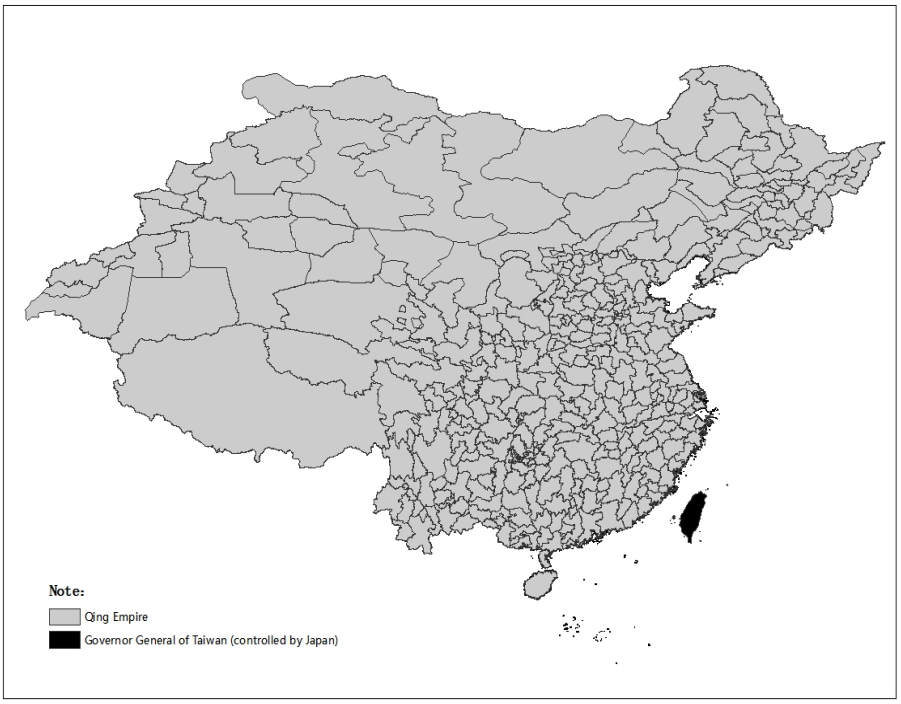
iv. Fiscal Revenue & Expenditure

This paper collects data on the central government's fiscal revenue and expenditure from 1927 to 1945 to describe the fiscal capacity of the Nationalist Government in Nanjing. This income and expenditure are both actual values, not budgeted data. The fiscal data comes from Yang (1985) and *Fiscal Yearbook* (财政年鉴) (1948).

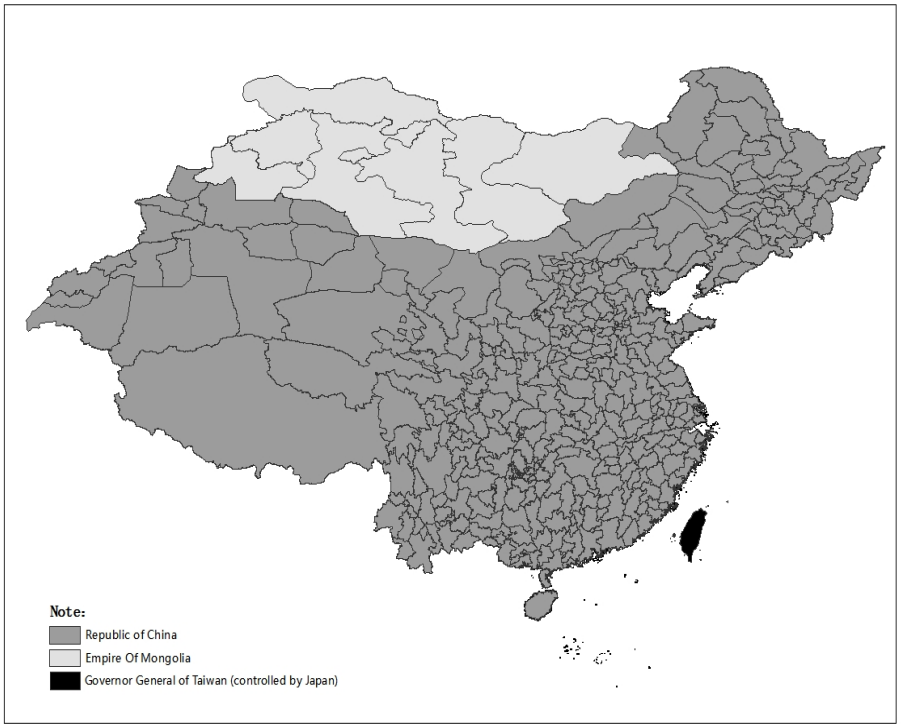
In literature, fiscal revenue and expenditure are recorded in the form of silver yuan. When making figure 5, we need to convert the data into real values based on the price index. We adopt the consumer price index of the whole country provided by Lu and Peng (2005), with 1933 as the bench year. By deflating price index, all values are converted to be denominated in silver yuan of 1933.

APPENDIX II- FIGURES

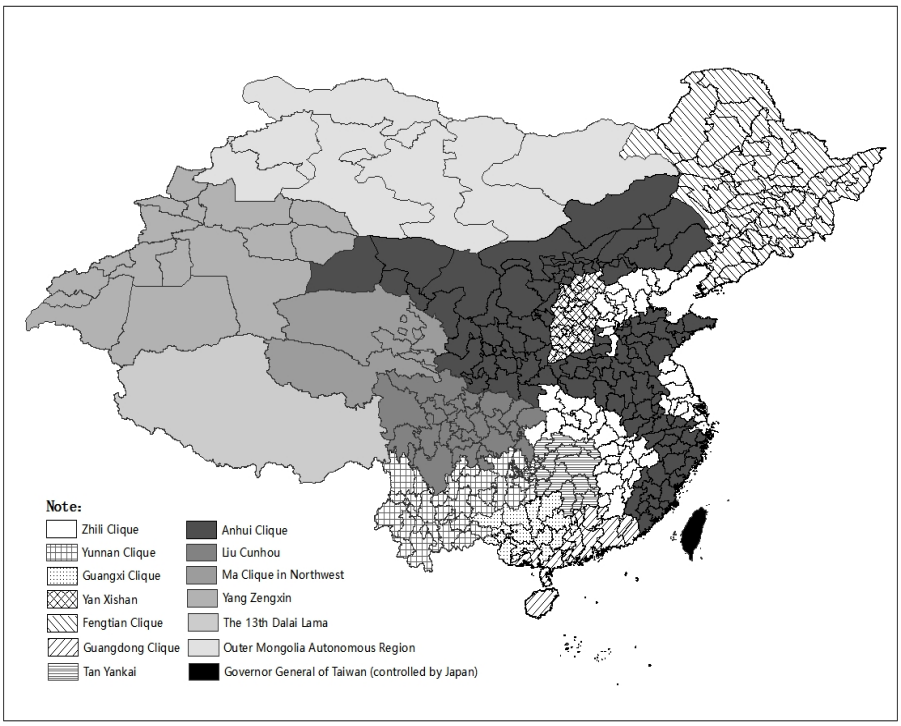
Figure A1. The spheres of influence of various political regimes,1900-1952.



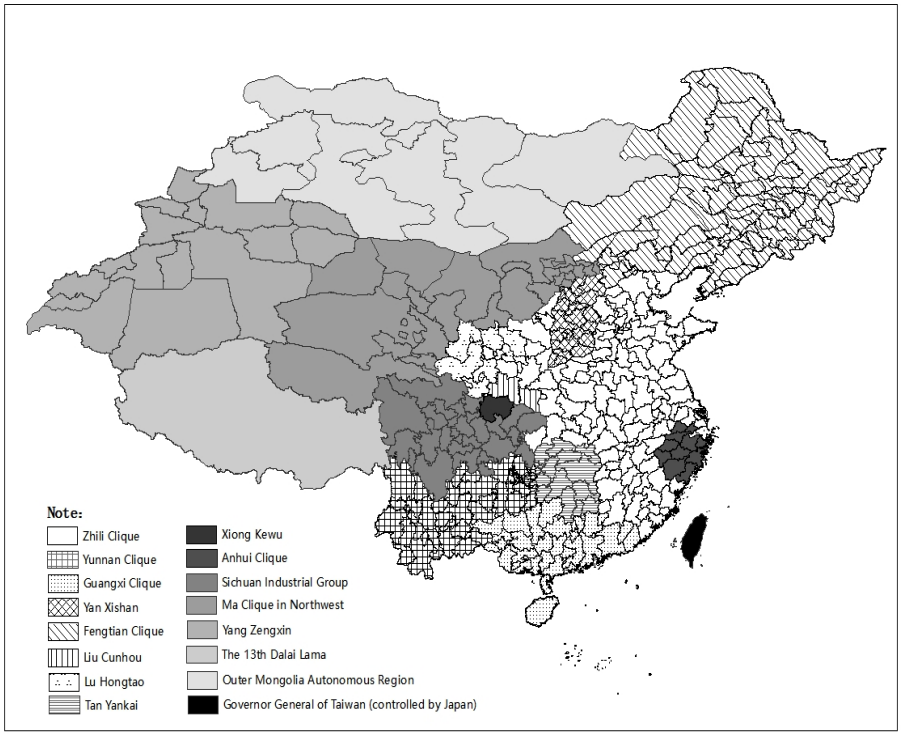
A. 1900 A. D.



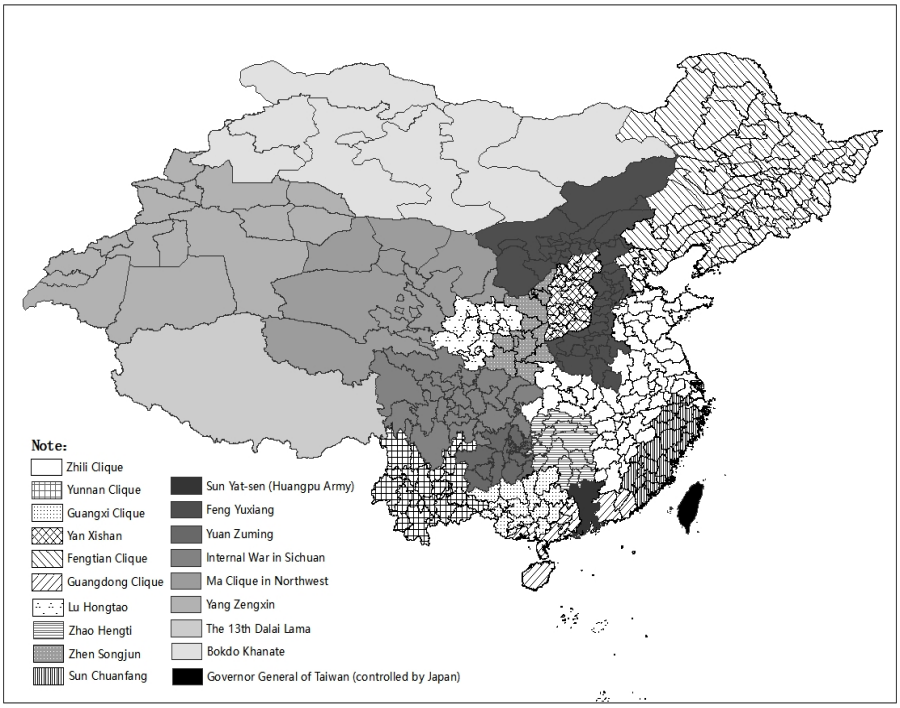
B. 1912 A. D.



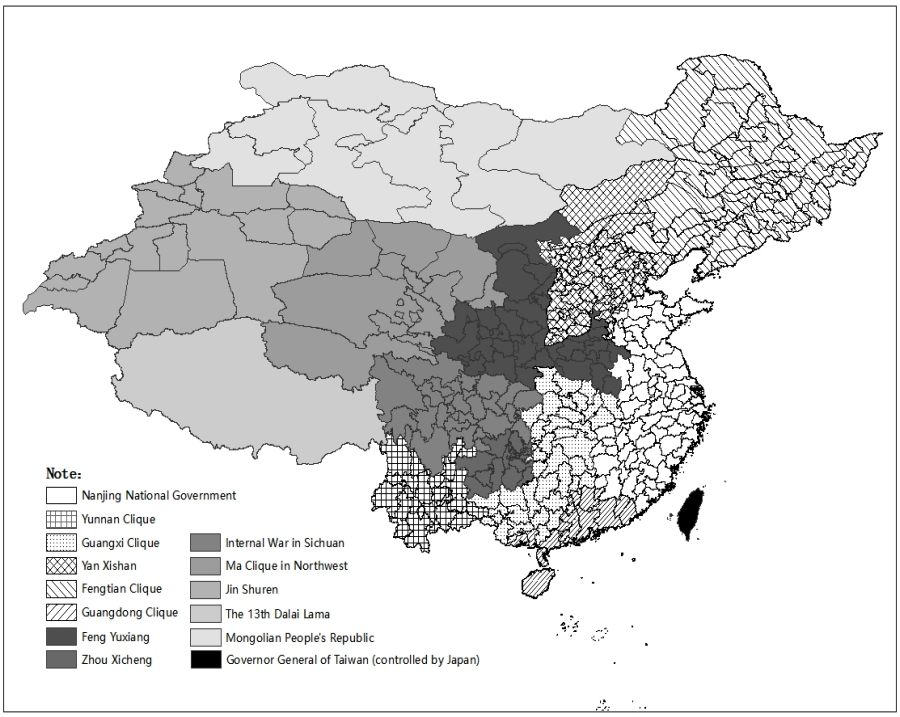
C. 1916 A. D.



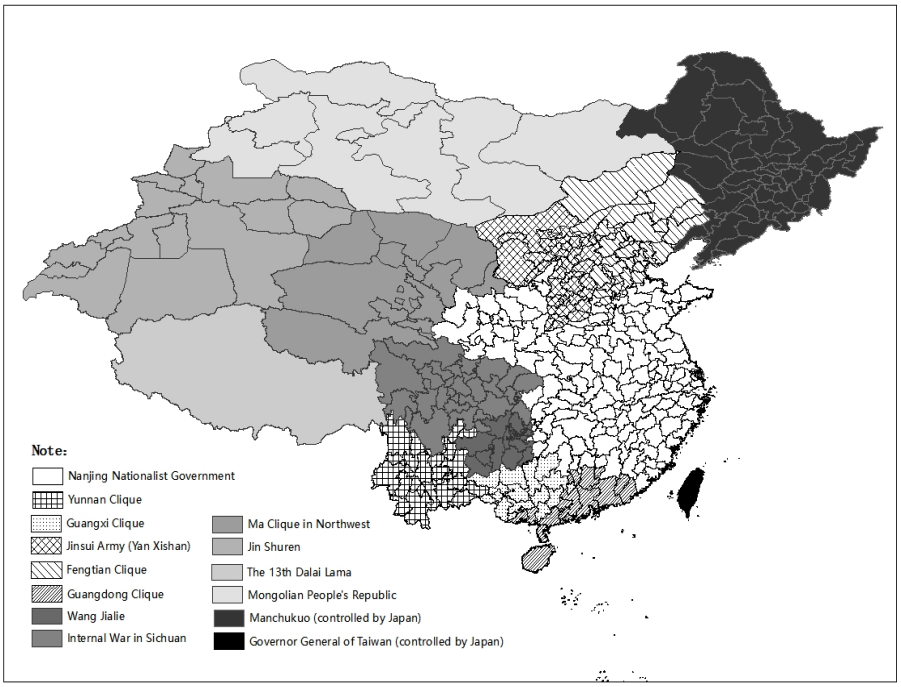
D. 1920 A. D.



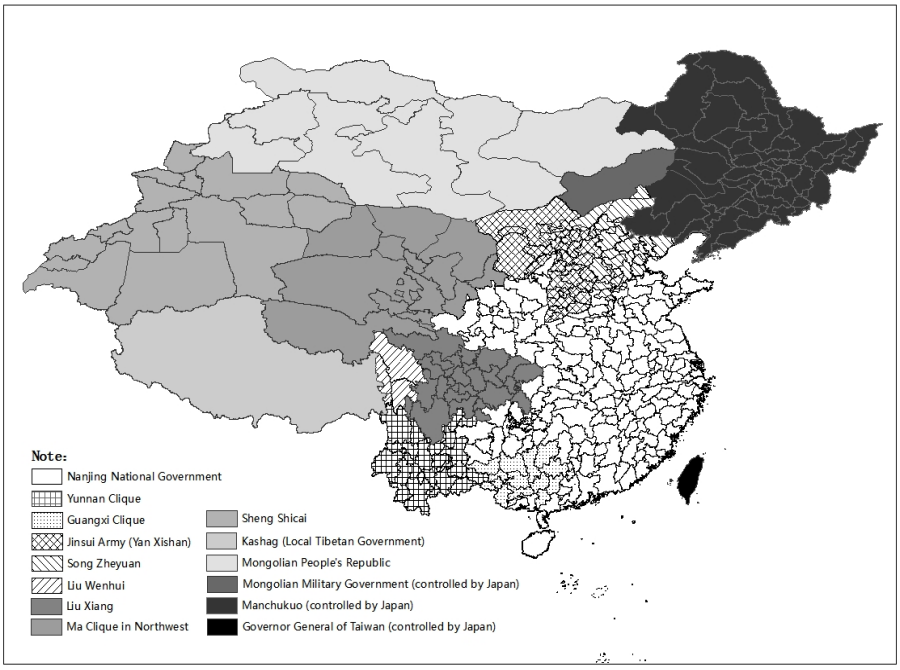
E. 1924 A. D.



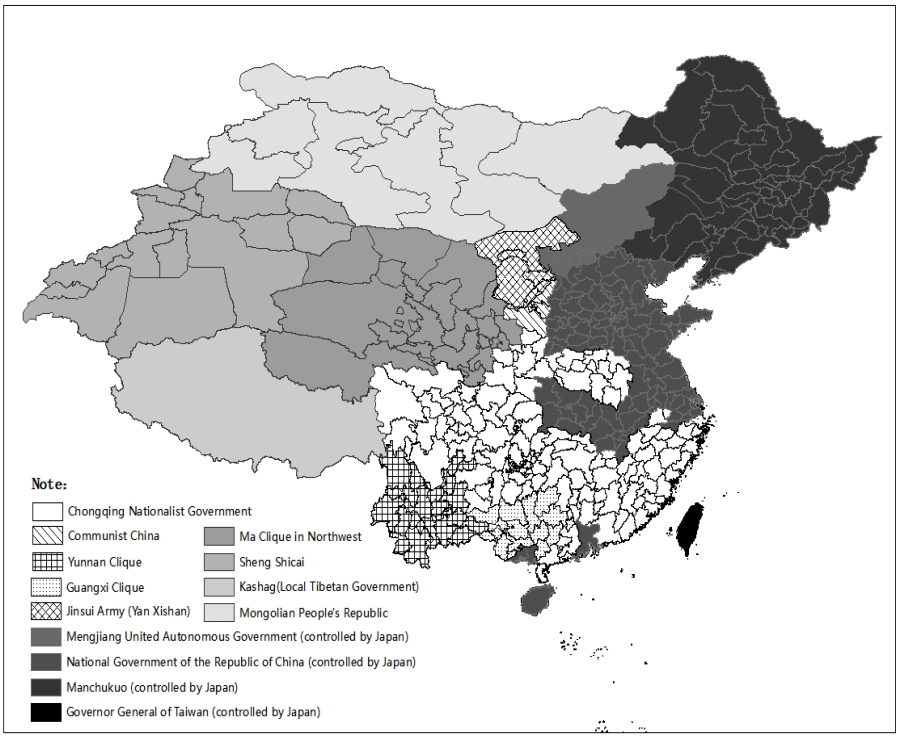
F. 1928 A. D.



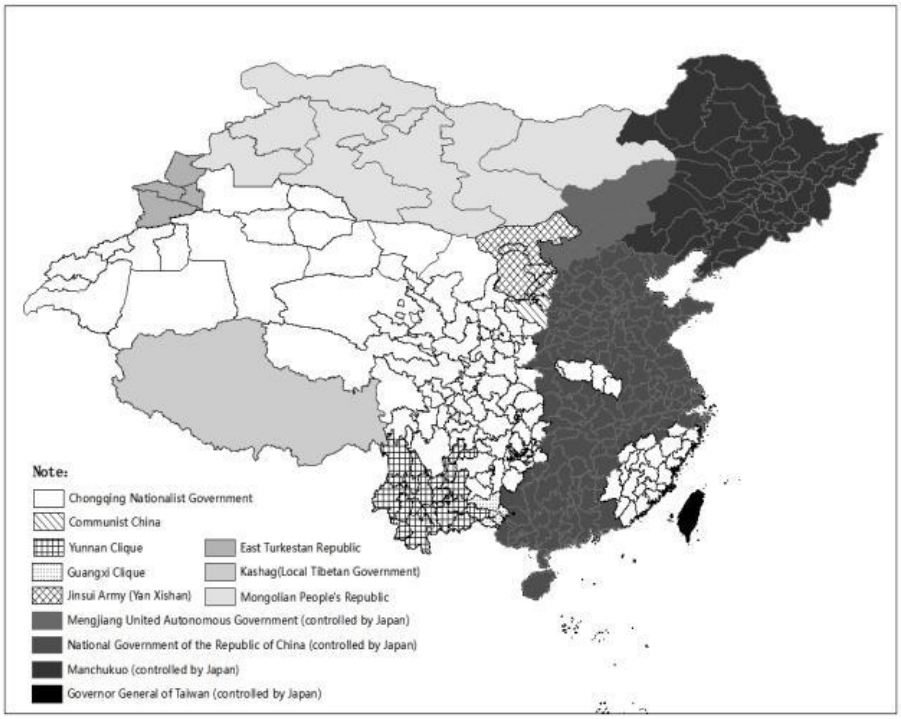
G. 1932 A. D.



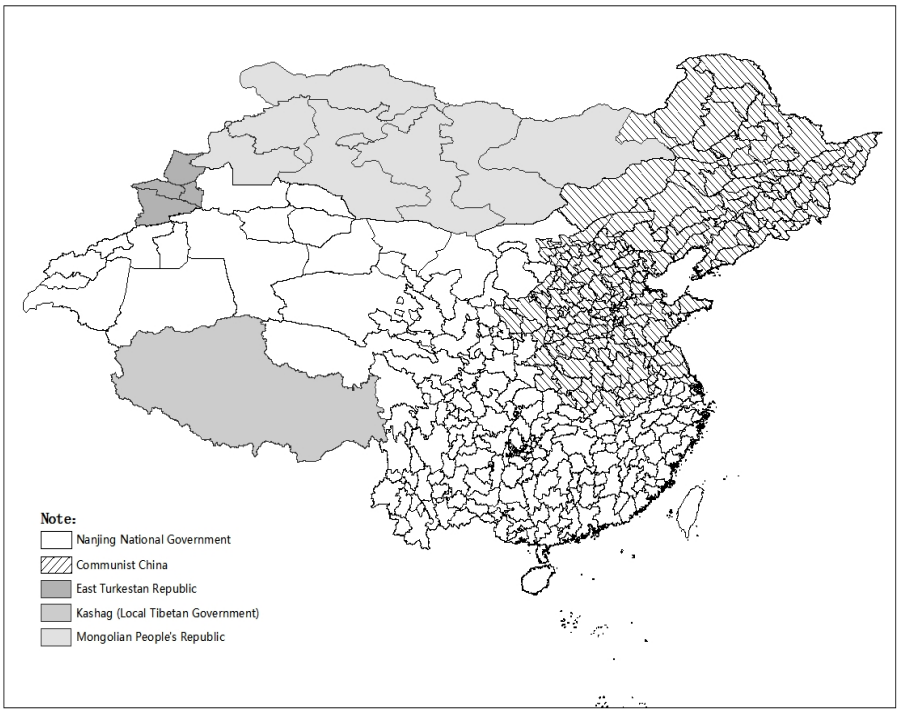
H. 1936 A. D



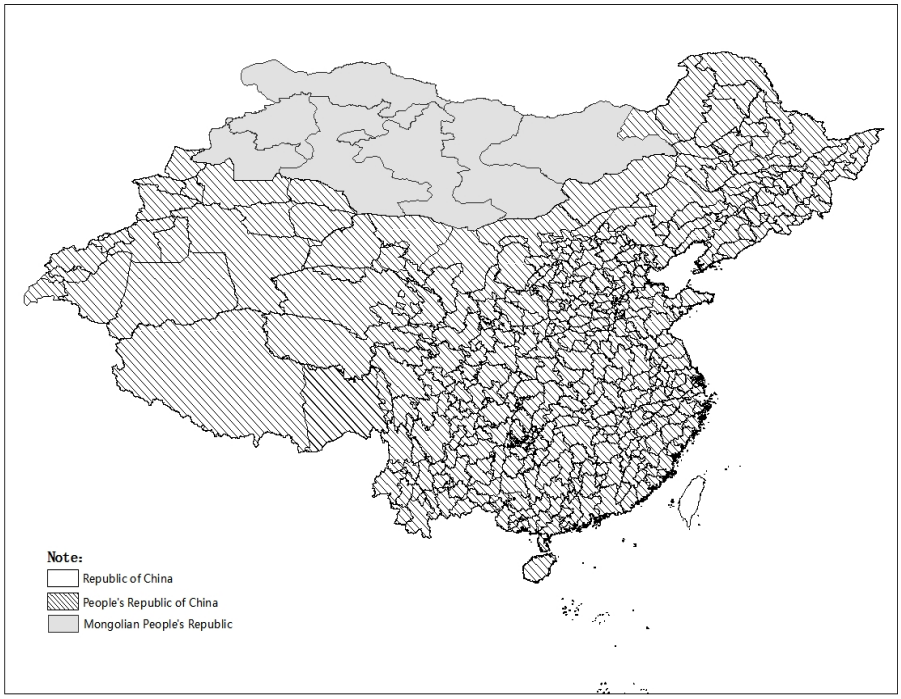
I. 1940 A. D.



J. 1944 A. D.



K. 1949 A. D.



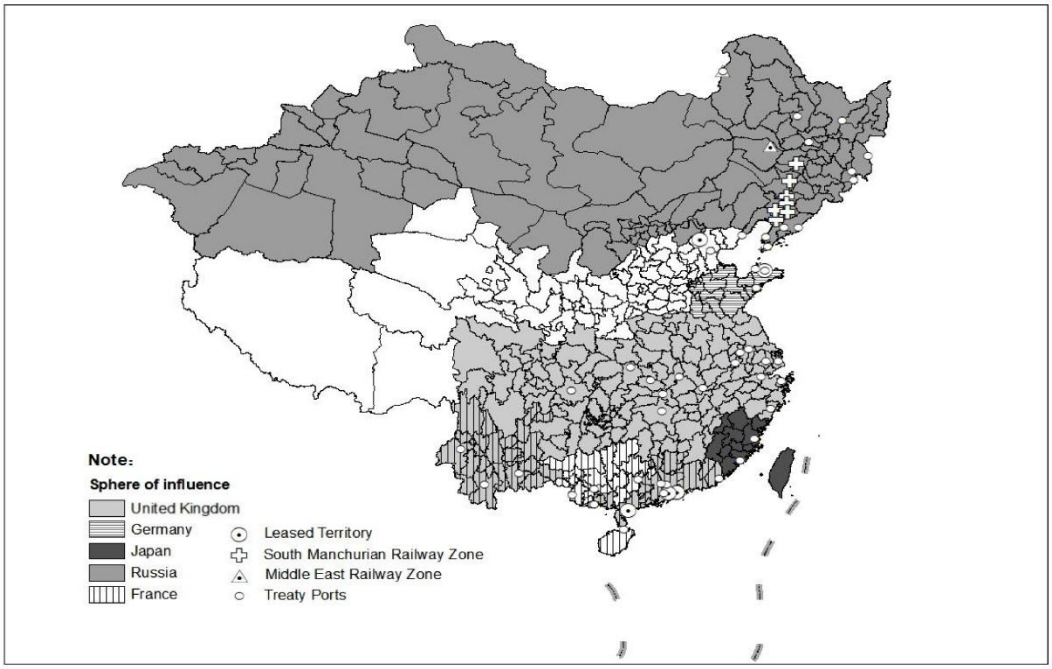
L. 1952 A. D.

Source: The base map information of administrative divisions comes from CHGIS, 2016, "1911 Layers GBK Encoding", https://doi.org/10.7910/DVN/0P89R9, Harvard Dataverse, V1. The changes in the spheres of influence are based on the historical facts described in *the History of the Republic of China* (中华民国史) (2011). The division of warlords is drawn based on the

historical facts described in *Beiyang Warlords*(北洋军阀) (Zhang and Li, 1990). The event of China ceding the entire island of Taiwan and its affiliated islands, including the Pescadores, to Japan in 1895 is recorded in *The Rise of Modern China* (Hsu, 1970). The map of 1949 was based on the "Map of the Situation of the Chinese People's Liberation Army Marching towards Jiangnan" published in the *Hong Kong People's Weekly* on May 4, 1949

Note：This map uses the prefectures of the Qing Dynasty to constitute the provinces of the Republic of China and marks them at the provincial level based on the factions to which the stationed military commanders belong. There may be some differences from the actual administrative divisions, so it can only be used as a reference.

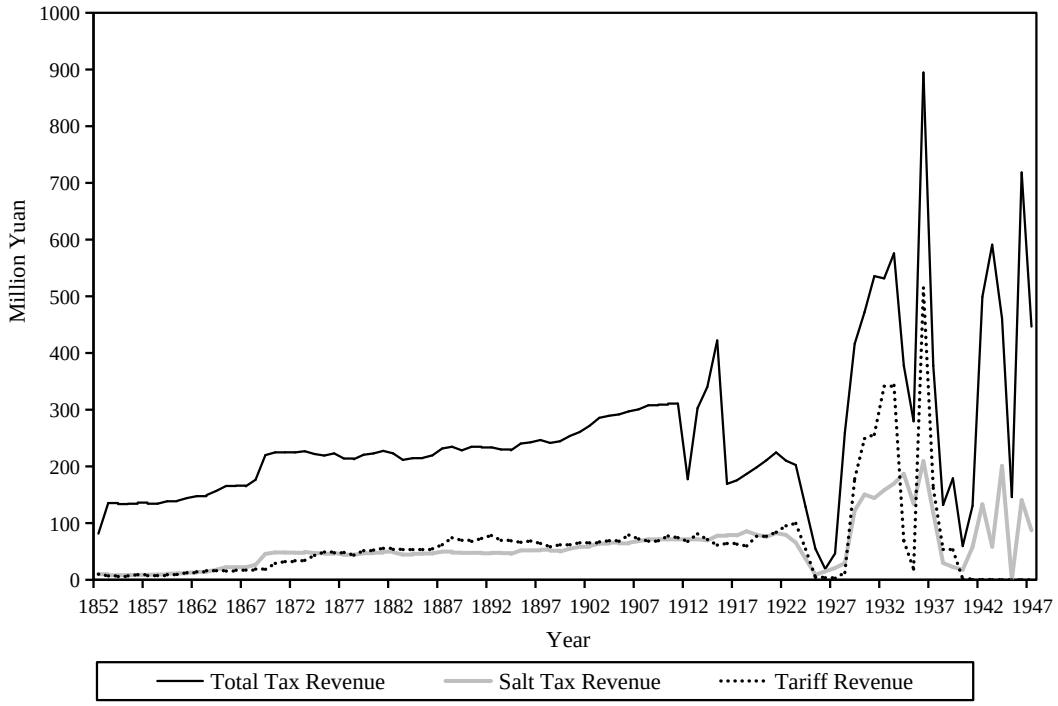
Figure A2. Foreign sphere of influence and colonies in China at the beginning of the 20th century.



Source: The base map information of administrative divisions comes from CHGIS, 2016, "1911 Layers GBK Encoding", https://doi.org/10.7910/DVN/0P89R9, Harvard Dataverse, V1. The information about the foreign sphere of influence in China is from *Atlas of Modern Chinese*

History (Zhang, 1987, pp. 63). The information about the colonies is from Long, Murrell and Yang (2019)

Figure A3. Nominal tax revenue of central government, 1852-1947.



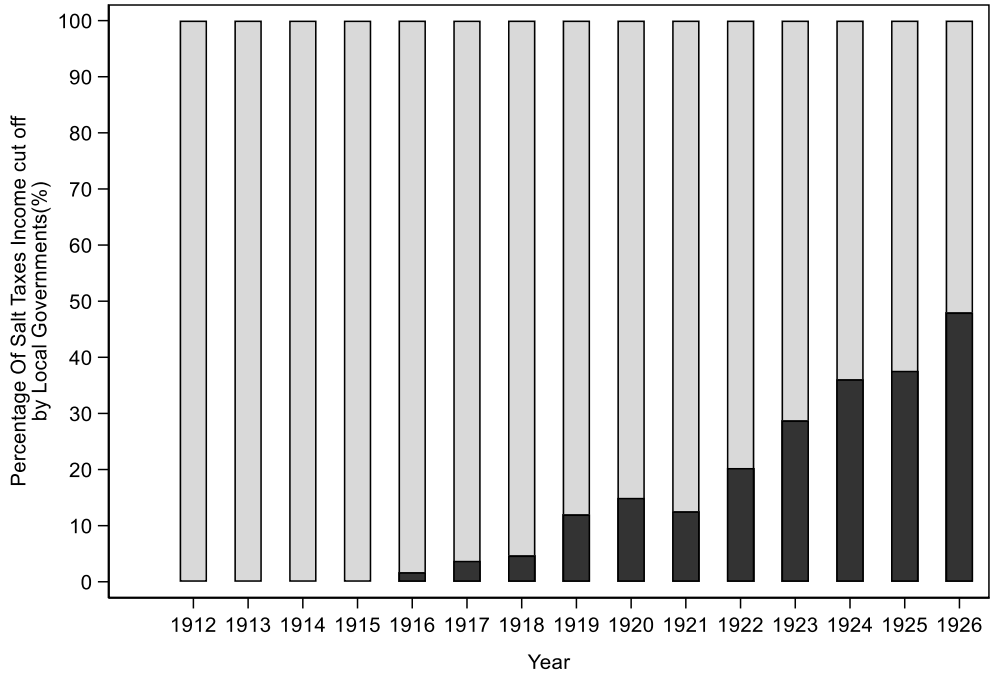
Note 1: The values in the figure are priced in 1933 silver yuan (yuan). The raw data before 1912 is priced in silver taels. We convert it to a value in 1933 silver yuan based on the exchange rate between silver taels and silver yuan in 1933. The raw data after 1912 is priced in silver yuan, and we convert it to a value in 1933 silver yuan based on the exchange rate between silver yuan and USD and the USD price in grams of silver over the years.

Note 2: The tax revenue in the figure is the income of the central government, excluding local taxes. Salt tax and tariffs were considered the main sources of taxation at that time.

Source: The total tax, salt tax and customs revenues before 1911 is from *State Capacity in Imperial China- Quantifying a Millennium of Public Finance (997-1911 AD)* (Guan et al, 2023); The total tax, salt tax and tariff revenues from 1912 to 1947 come from *Chinese Tariff Historical Materials (Volume IV)* (中国关税史料) (Jiang, 1931, pp. 9-13); *China's Finance in the Past Thirty Years* (最近三十年的中国财政)(Qian, 1934); *On the Fiscal Theory of the Republic of China* (民国财政论) (Yang, 1927, pp. 128-133); *Financial History of the Republic*

of China (民国财政史) (Yang, 1985); *Fiscal Yearbook* (财政年鉴) (Ministry of Finance of the Nationalist Government, 1948, pp. 130-138). The exchange rate of the US dollar comes from Hsiao (1974, pp.190-192,196).

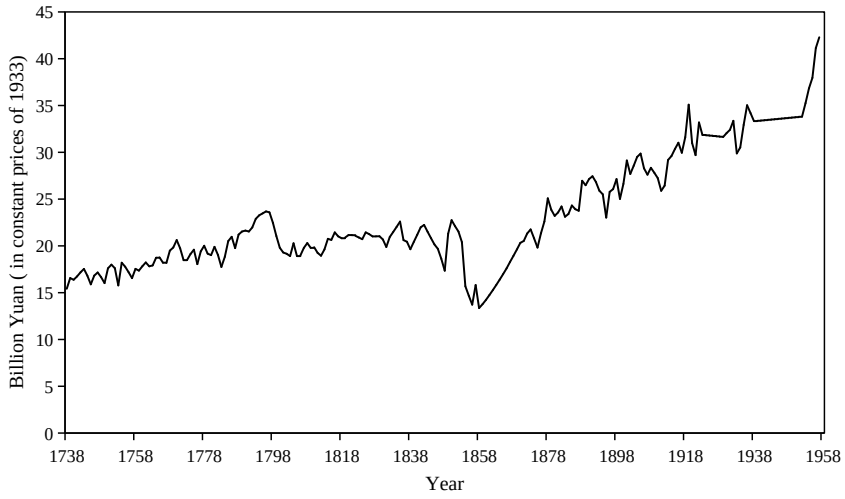
Figure A4. The percentage of salt tax withheld by provinces in the total salt tax revenue of the Beijing government, 1912-1926



Note: The dark part is the percentage of salt tax withheld by each province. The withholding of salt taxes by provinces only appeared in 1916-1926.

Source: The data comes from China's Finance in the Past Thirty Years (最近三十年的中国财政) (Qian, 1934); On the Fiscal Theory of the Republic of China (民国财政论) (Yang, 1927, pp. 128-133); Financial History of the Republic of China (民国财政史) (Yang, 1985)

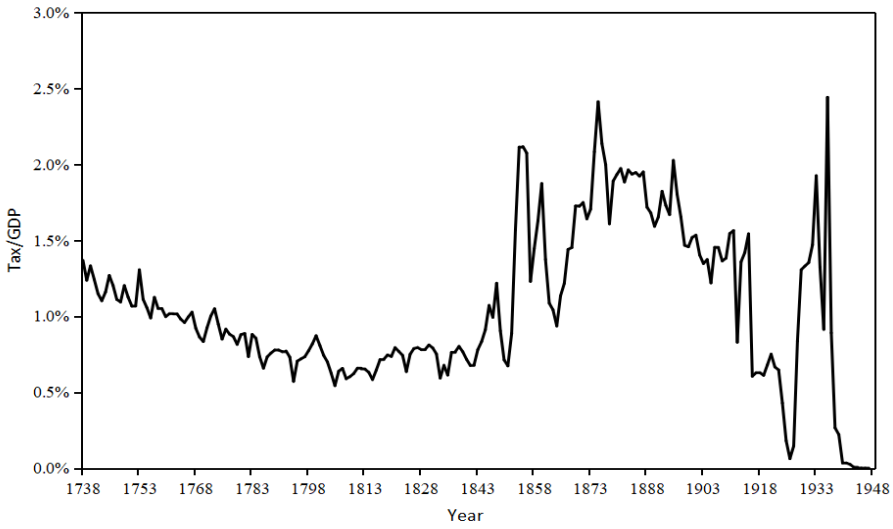
Figure A5. Real GDP, 1738-1958.



Source: Per capita real GDP before 1923 and in 1933 comes from Xu et al (2015, Appendix E). Per capita real GDP from 1931 to 1936 comes from Yeh (1979). Per capita real GDP in 1933 and after 1952 comes from Liu and Yeh (1963, pp.94). We connect the three series based on the values for 1933 and linearly interpolate the missing values. Population comes

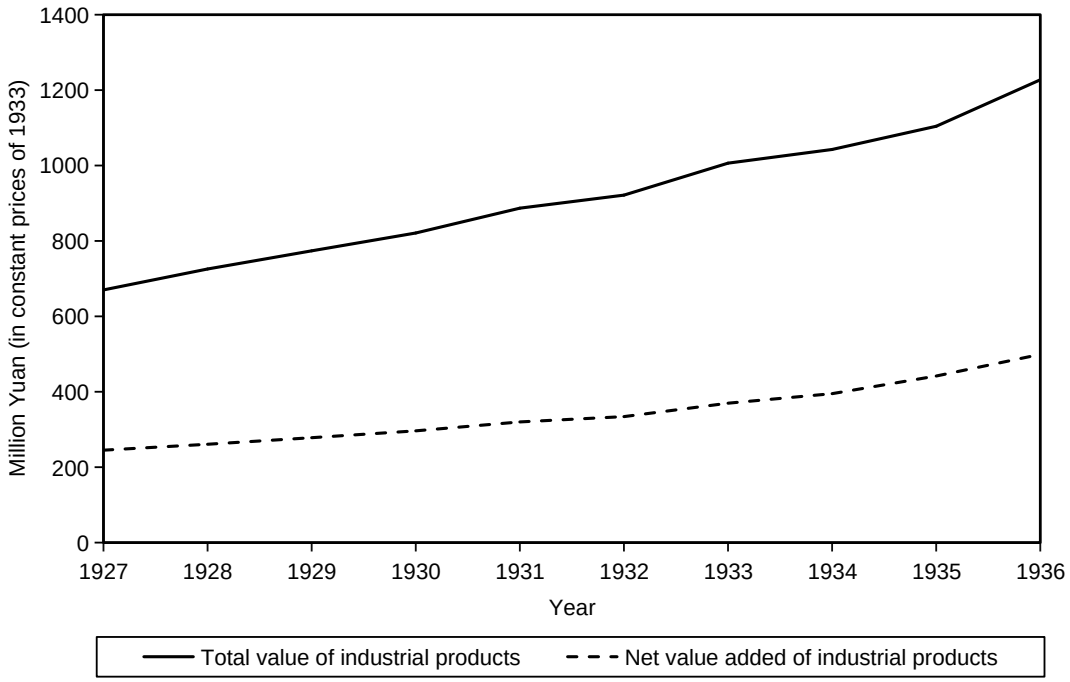
from *Chinese Population History* (中国人口史) (Ge, 2005). The raw data of GDP is estimated based on the demand side, using Beijing prices.

Figure A6. Ratio of tax revenue to GDP, 1738-1947.



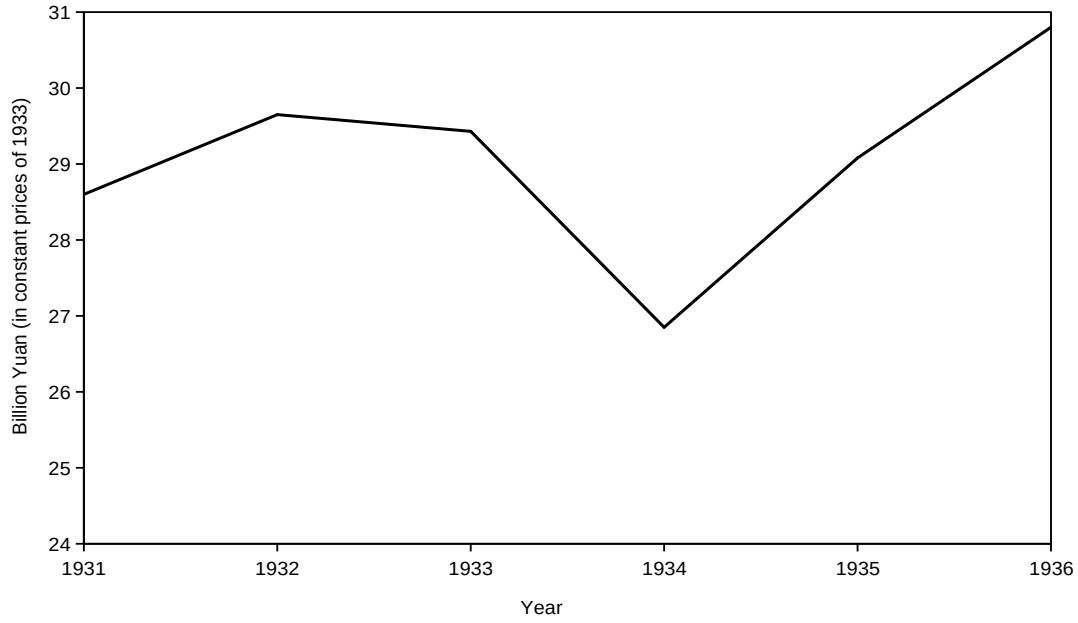
Source: The source of real tax revenue is the same as Figure A3. The source of real GDP is the same as Figure A5.

Figure A7. Industrial output value from 1927 to 1936 (including Manchukuo).



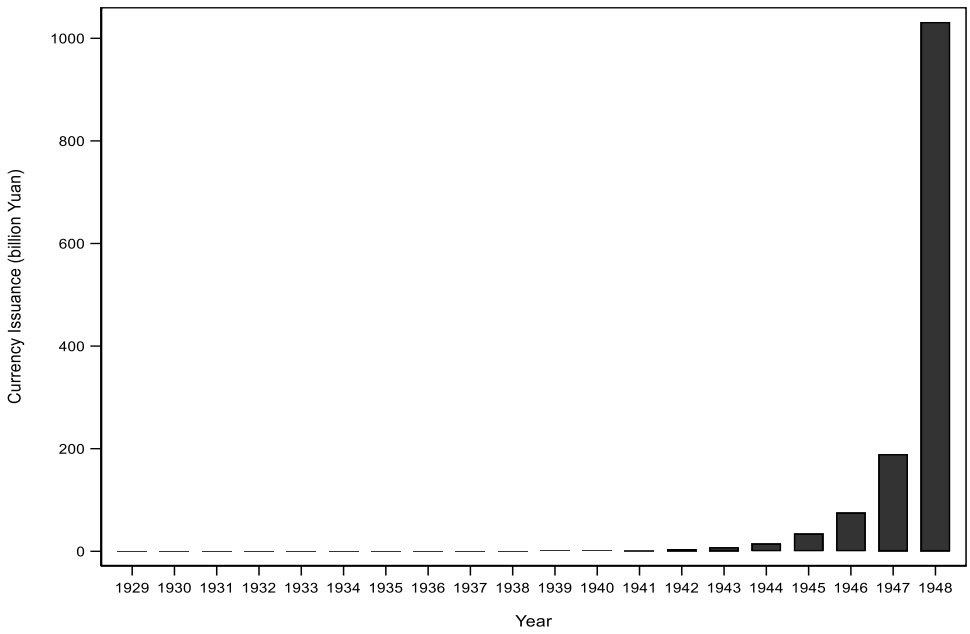
Source: We cite the data from *The Financial and Economic Situation of China from 1927 to 1937* (1927-1937 年中国财政经济情况) (Arthur Young, 1981, pp.347).

Figure A8. Gross value of output (including Manchukuo).



Source: We cite the data from *The Financial and Economic Situation of China from 1927 to 1937* (1927-1937 年中国财政经济情况) (Arthur Young, 1981, pp.371).

Figure A9. Annual currency issuance.

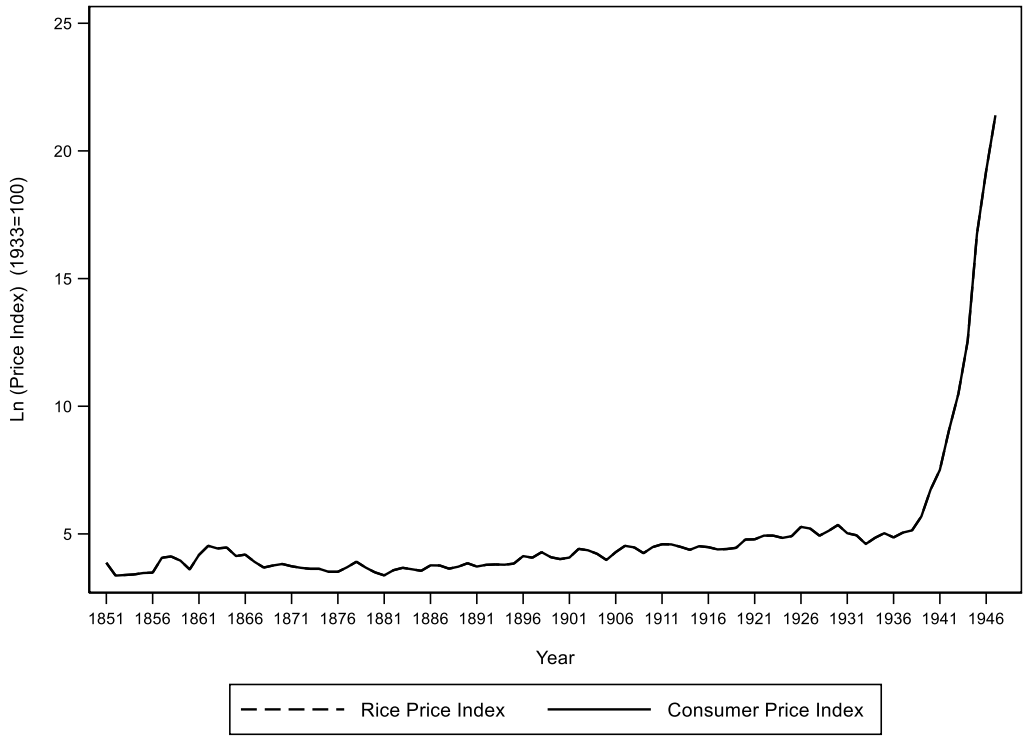


Source: *The Bank of China Monthly* (中行月刊), published from July 1930 to November 1935; Arthur Young (2008, pp.281).

Figure A10. Price index, 1851-1947.

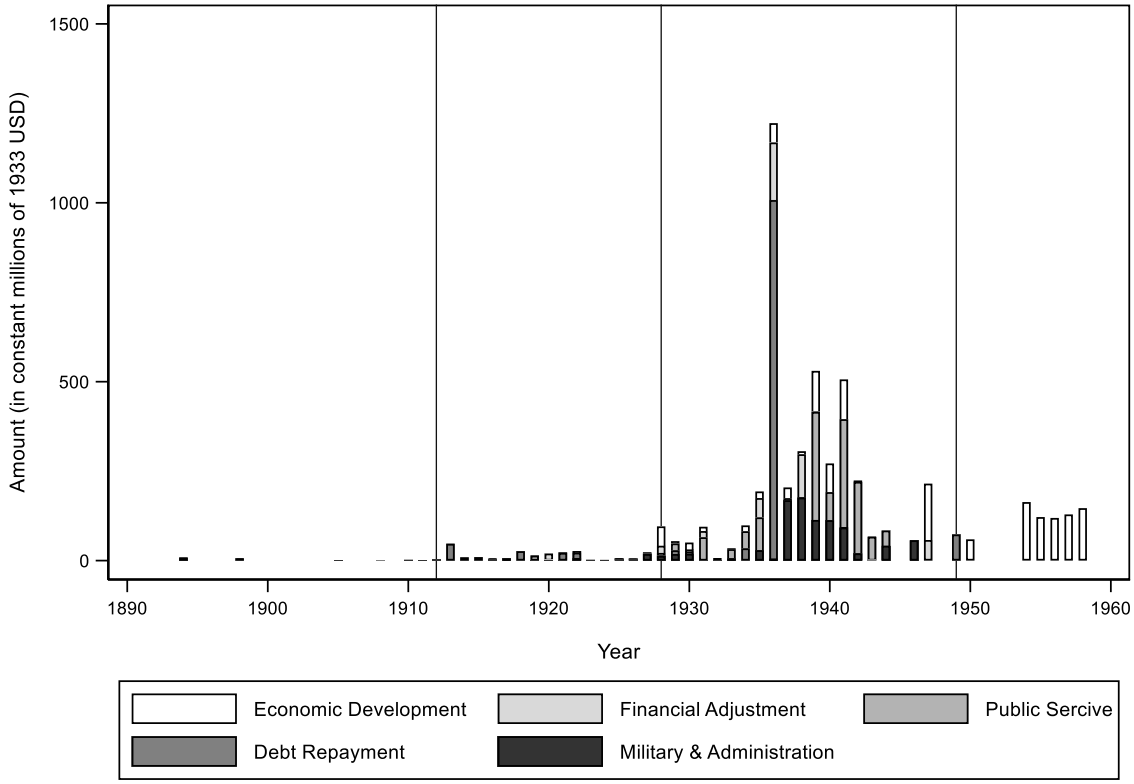
Source: Lu and Peng (2005).

Figure A11. Price index, 1851-1947 (Logarithmic values).



Source: Lu and Peng (2005).

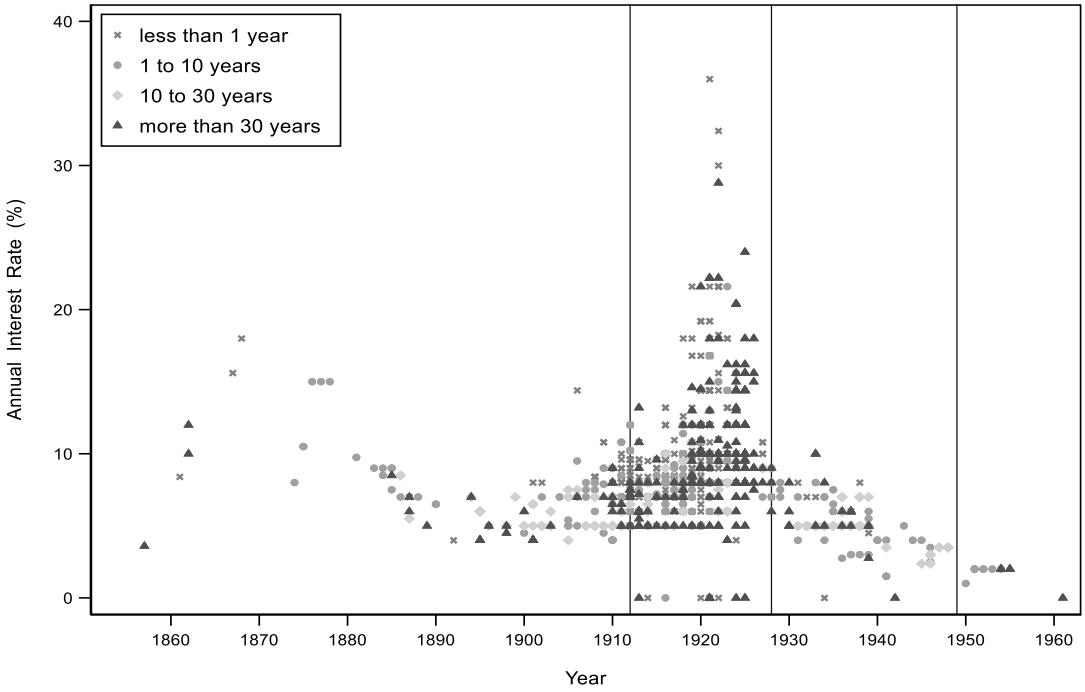
Figure A12. Annual domestic borrowing amount, 1894-1958.



Source: Historical materials on old Chinese public bonds (旧中国公债史资料) (Qian, 1984); From commercial funds to patriotic public bonds: A detailed analysis of early China's domestic public bonds (从息借商款到爱国公债：细说早期中国对内公债) (Dai, 2017); Treasury bond and finance (国债与金融) (Jia, 1930); Compilation of archival materials of the Republic of China (中华民国史档案资料汇编) (1981; 1991; 1995); Municipal bonds (地方公债) (Wan, 1948); Research on local government bonds in modern China: Taking Jiangsu, Zhejiang, and Shanghai as examples (近代中国地方公债研究：以江浙沪为例) (Pan, 2009); Research on local government bonds in modern China: A study centered on Anhui, Sichuan, Fujian, and Guangdong (近代中国地方公债研究：以皖川闽粤为中心的考察) (Pan, 2014); Sichuan province's public bonds (四川省之公债) (1934); Chaos and confusion: A study of southwest bills during the republican era (混乱与迷惘：民国时期西南票据研究) (Liang and Zheng, 2017); Research on treasury bond of New China (新中国国债研究) (Pan and Liu,

2016).The method and data source for converting nominal values into 1933 US dollars can be found in the Appendix I.

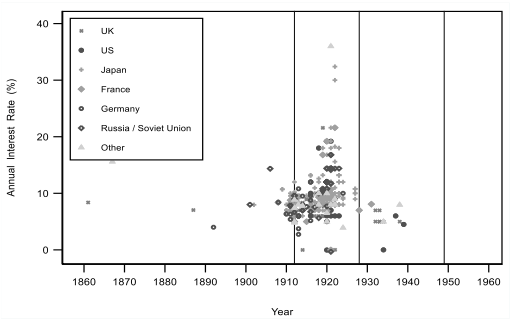
Figure A13. Nominal interest rate of external debts, 1853-1961.



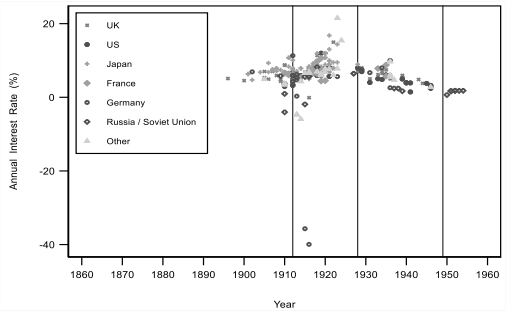
Source: The samples from 1857-1911 are from Statistical Data on the History of Foreign Debt in Modern China (中国近代外债史统计资料) (Xu Yisheng, 1962), Historical Materials on Foreign Debt in the Qing Dynasty (清代外债史资料) (1988) and Historical Materials on Foreign Debt in the Qing Dynasty of China (中国清代外债史资料) (1991); The samples from 1912-1927 are from Statistical Data on the History of Foreign Debt in Modern China (中国近代外债史统计资料) (Xu Yisheng, 1962) and Compilation of archival materials of the Republic of China: Series 2-4 (中华民国档案资料汇编) (1981, 1991); The samples from 1928-1949 are from Archives of Foreign Debt in the Republic of China (民国外债档案资料) (1992) and Compilation of archival materials of the Republic of China: Series 5 (中华民国档案资料汇编) (1995); The samples from 1950-1961 are from Selected Russian Archives: Sino Soviet

Relations: Volumes 2-9 (俄罗斯档案选编：中苏关系卷) (Shen Zhihua, 2014) and From Centennial Humiliation to National Revival (从百年屈辱到民族复兴) (Xu Yi, 2006). The source of debt data is the same as Figure A12.

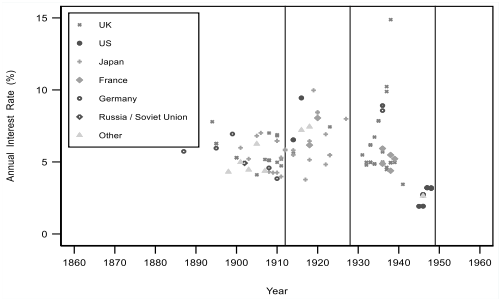
Figure A14. Real interest rate of external debts with different maturities.



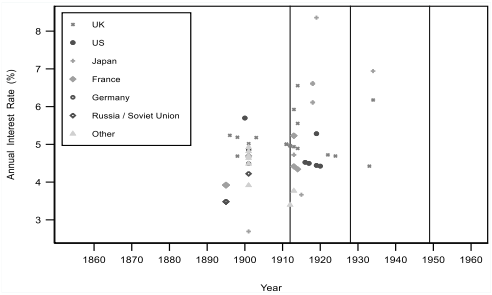
A. Less than 1 year



B. 1 to 10 years



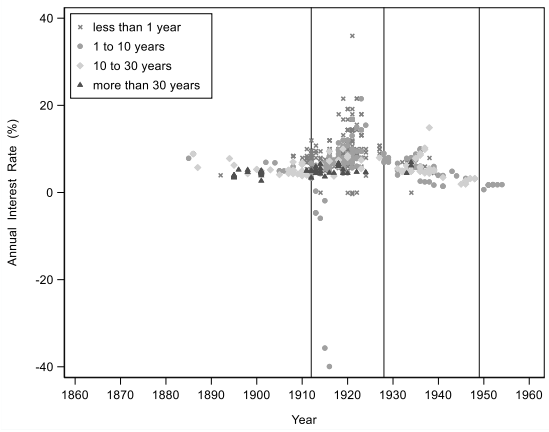
C. 10 to 30 years



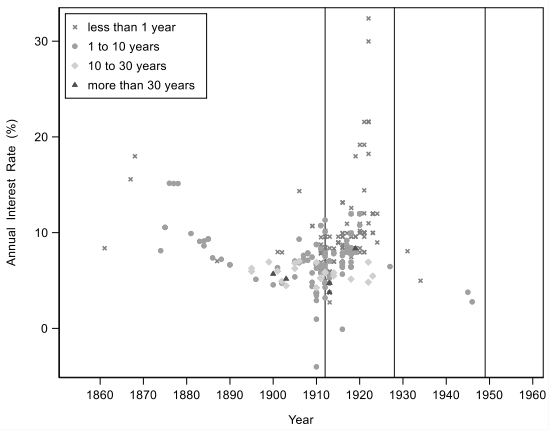
D. More than 30 years

Source: The source of debt data is the same as Figure A13. The calculation method and data source of real interest rate can be found in Appendix I.

Figure A15. Real interest rate of external debts borrowed by different governments.



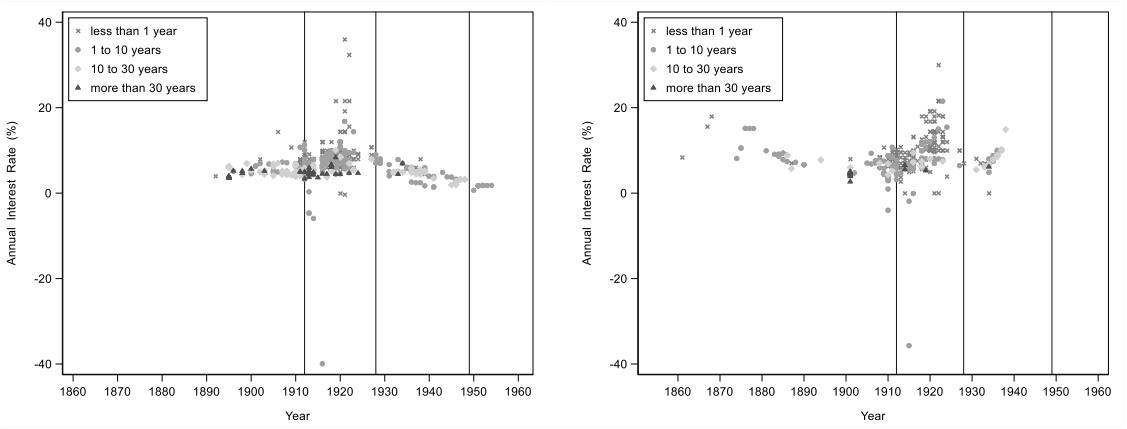
A. Borrowed by central government



B. Borrowed by local government

Source: The source of debt data is the same as Figure A13. The calculation method and data source of real interest rate can be found in Appendix I.

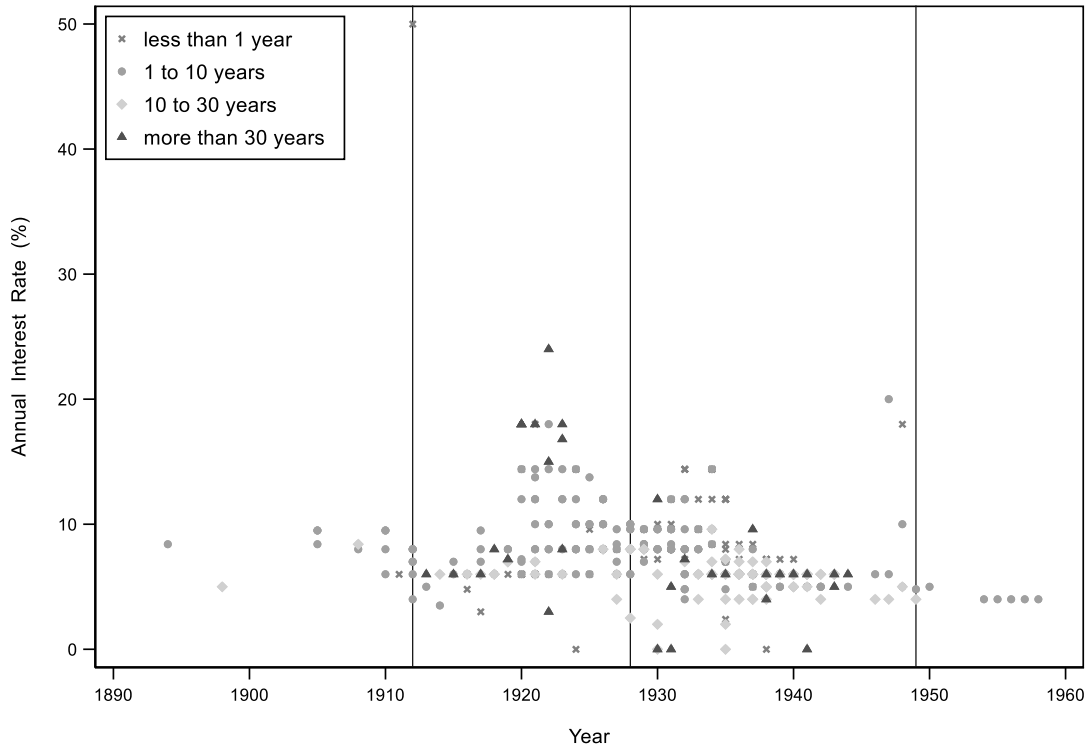
Figure A16. Real interest rate of external debts borrowed in different currencies.



A. Borrowed in foreign currency B. Borrowed in Chinese currency

Source: The source of debt data is the same as Figure A13. The calculation method and data source of real interest rate can be found in Appendix I.

Figure A17. Nominal interest rate of domestic debts, 1894-1958.



Source: The source of debt data is the same as Figure A12. The calculation method and data source of real interest rate can be found in Appendix I.

Appendix References

Databases

Bureau of Labor Statistics. *CPI Data*, n.d. Available at https://www.bls.gov/cpi/ (accessed December 15th, 2023).

CHGIS. *1911 Layers GBK Encoding, Harvard Dataverse, V1*, 2016. Available at https://doi.org/10.7910/DVN/0P89R9 (accessed September 10th, 2024).

Global Financial Data. *Global Financial Data*, 2009. Available at http://www.globalfinancialdata.com (accessed November 14th, 2024).

National Bureau of Statistics of China. *National Data*, n.d. Available at https://data.stats.gov.cn (accessed January 24th, 2025).

Primary Sources

Bank of China Economic Research Office. *Bank of China Monthly*. Bank of China Economic Research Office, 1930-1938.

Bank of China in Chongqing. *Sichuan province's public bonds* (四川省之公债). Chongqing: Bank of China in Chongqing, 1934.

Hong Kong People's Weekly, *Map of the Situation of the Chinese People's Liberation Army Marching towards Jiangnan* (中国人民解放军进军江南形势图). Hong Kong: Youli Printing Company, May 4, 1949.

Institute of Fiscal Science. *Archives of Foreign Debt in the Republic of China* (民国外债档案资料). Beijing: Archives Publishing House, 1992.

Ministry of Finance of the People's Republic of China. *Historical Materials on Foreign Debt in the Qing Dynasty* (清代外债史资料). Beijing: Ministry of Finance of the People's Republic of China, Head Office of the People's Bank of China, 1988.

Ministry of Finance of the Republic of China. *Fiscal Yearbook* (财政年鉴). Nanjing: Department of Fiscal Yearbook Compilation, Ministry of Finance, 1948.

People's Bank of China. *Historical Materials on Foreign Debt in the Qing Dynasty of China* (中国清代外债史资料). Beijing: China Financial Publishing House, 1991.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第二辑). Vol. 2. Nanjing: Jiangsu People's Publishing House, 1981.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第四辑). Vol. 4. Nanjing: Jiangsu People's Publishing House, 1991.

Second Historical Archives of China. *Compilation of Archival Materials of the Republic of China* (中华民国史档案资料汇编第五辑). Vol. 5. Nanjing: Phoenix Publishing House, 1995.

Secondary Sources

Chinese Academy of Social Sciences. *History of the Republic of China* (中华民国史). Beijing: Zhong Hua Book Company, 2011.

Dai, Xuewen. *From Commercial Funds to Patriotic Public Bonds: A Detailed Analysis of Early China's Domestic Public Bonds* (从息借商款到爱国公债：细说早期中国对内公债). Taipei: Shangzhou Publishing House, 2017.

Ge, Jianhua. *Chinese Population History* (中国人口史). Shanghai: Fudan University Press, 2005.

Guan, Hanhui., Debin Ma, and Ruozhuo Zhai. "State Capacity in Imperial China—Quantifying a Millennium of Public Finance (997-1911 AD)." Working Paper, Oxford University, 2023.

Hsiao, Liang-lin. *China's Foreign Trade Statistics, 1864-1949*. Cambridge: Harvard University Asia Center., 1974.

Hsu, Immanuel C. Y. *The Rise of Modern China*. New York: Oxford University Press, 1970.

Jia, Shiyi. *Treasury Bond and Finance* (国债与金融). Shanghai: Commercial Press, 1930.

Jiang, Hengyuan. *Chinese Tariff Historical Materials IV* (中国关税史料). Shanghai: Commercial Press, 1931.

Jordà, Òscar, Moritz Schularick, and Alan M. Taylor. "Macrofinancial History and the New Business Cycle Facts." Working Paper, NBER Macroeconomics Annual 2016, 2016.

Kumar, Dharma, Tapan Raychaudhuri, Irfan Habib, and Meghnad Desai. *The Cambridge Economic History of India Volume II*. Cambridge: Cambridge University Press, 1983.

Liang, Hongzhi, and Quan'an Zheng. *Chaos and Confusion: A Study of Southwest Bills During The Republican Era* (混乱与迷惘：民国时期西南票据研究). Beijing: Science Press, 2017.

Liu, Ta-chung, and Kung-chia Yeh. *The Economy of the Chinese Mainland: National Income and Economic Development, 1933–1959*. Princeton: Princeton University Press, 1965.

Long, Cheryl, Peter Murrell, and Li Yang. "Memories of Colonial Law: The Inheritance of Human Capital and the Location of Joint Ventures in Early-Reform China." China Economic Review, no. 58 (2019): 101284.

Lu, Feng, and Kaixiang Peng. "China's Rice Prices (1644-2000)." *China Economic Quarterly*, no. 1 (2005): 427-460.

Pan, Guoqi, and Wen Liu. *Research On Treasury Bond of New China* (新中国国债研究). Beijing: Economic Science Press, 2016.

Pan, Guoqi. *Research On Local Government Bonds In Modern China: A Study Centered On Anhui, Sichuan, Fujian, and Guangdong* (近代中国地方公债研究：以皖川闽粤为中心的考察). Beijing: Economic Science Press, 2014.

Pan, Guoqi. *Research On Local Government Bonds In Modern China: Taking Jiangsu, Zhejiang, and Shanghai As Examples* (近代中国地方公债研究：以江浙沪为例). Hangzhou: Zhejiang University Press, 2009.

Qian, Jiaju and Yangang Guo. The Evolution History of Chinese Currency (中国货币演变史). Shanghai: Shanghai People's Publishing House, 2014.

Qian, Jiaju. "China's Finance in the Past Thirty Years (最近三十年的中国财政)." *The Eastern Miscellany*, no. 1 (1934): 109-124.

Qian, Jiaju. *Historical Materials On Old Chinese Public Bonds* (旧中国公债史资料). Beijing: Zhonghua Book Company, 1984.

Shen, Zhihua. *Selected Russian Archives: Sino Soviet Relations: Volumes 2-9* (俄罗斯解密档案选编：中苏关系卷). Shanghai: Orient Publishing Center, 2014.

Shi, Zhihong. *The Development and Non Development of Agriculture in the Qing Dynasty, 1661-1911* (清代农业的发展和不发展 1661-1911 年). Beijing: Social Sciences Literature Publishing House.

Wan, Bixuan. *Municipal Bonds* (地方公债). Shanghai: Da Dong Bookstore, 1948.

Wu, Chengming. *Imperialism's Investment in Old China* (帝国主义在旧中国的投资). Beijing: People's Publishing House, 1955

Xu, Yi, Zhihong Shi, Bas van Leeuwen, Yuping Ni, Zhipeng Zhang, and Ye Ma. "Chinese National Income, ca. 1661–1933." *Australian Economic History Review,* no. 3 (2017): 368-393.

Xu, Yi. *From Centennial Humiliation to National Revival* (从百年屈辱到民族复兴). Beijing: Economic Science Press, 2006.

Xu, Yisheng. *Statistical Data on the History of Foreign Debt in Modern China* (中国近代外债史统计资料) . Beijing: Zhonghua Book Company, 1962.

Yang, Rumei. *On the Fiscal Theory of the Republic of Chin*a (民国财政论). Shanghai: Commercial Press, 1927.

Yang, Yinpu. *Financial History of the Republic of China* (民国财政史). Beijing: China Financial and Economic Publishing House, 1985.

Yeh, Kung-chia. "China's National Income, 1931–36." In *Modern Chinese Economic History*, edited by Ching-ming Hou and Tsong-shian Yu, 95-128. Taipei: Academia Sinica, 1979.

Yeh-Chien Wang. "Secular Trends of Rice Prices in the Yangzi Delta 1638—1935." In *Chinese History in Economic Perspective* edited by Thomas G. Rawski, and Lillian M. Li, 35-68. California: University of California Press, 2018.

Young, A. *China's Wartime Finance and Inflation* (中国的战时财政和通货膨胀). Guangzhou: World Economic Research Office of Guangdong Academy of Social Sciences, 2008.

Young, A. *The Financial and Economic Situation of China from 1927 to 1937* (一九二七至一九三七年中国财政经济情况). Beijing: China Social Sciences Press, 1981

Zhang, Bofeng, and Zongyi Li. *Beiyang Warlords* (北洋军阀). Wuhan: Wuhan Publishing House, 1990.

Zhang, Haipeng. Atlas of Modern Chinese History Manuscripts (中国近代史稿地图集). Beijing: People's Publishing House, 1987.

Zhang, Jiaxiang. *Currency System and Exchange in China* (中国之币制与汇兑). Shanghai: Commercial Press, 1931.

Zhang, Youyi. "Case Study on the Lease Relationship in Modern Huizhou (近代徽州租佃关系案例研究)." *Research on Chinese Economic History*, no. 1 (1988): 161.

Zheng, Youkui. *China's Foreign Trade and Industrial Development from 1840 to 1948* (1840-1948 中国的对外贸易和工业发展). Shanghai: Shanghai Social Sciences Press, 1984.