

The Problem of Small Change and China's 1935 Fiat Money

Reform

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Abstract

This paper examines China's delayed effort to stabilize small-denomination coinage, a cornerstone of modern monetary systems, which culminated in the fiat currency reform of 1935–1936. While England (1816) and the United States (1853) had already institutionalized modern token coinage, China only approximated its principles in the 1914 National Coinage Act and fully implemented them during the reforms of 1935–1936. We argue that the core constraint was epistemic, not technical, as officials long lacked a clear understanding of modern monetary principles. By reframing the 1935–1936 reform as China's first comprehensive adoption of a token coinage regime, analyzed through Carlo Cipolla's framework, we highlight small-denomination coinage as central to its monetary modernization.

Keywords: standard formula; token coinage; Chinese monetary history; Chinese currency reform of November 1935, Carlo M. Cipolla

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1. Introduction

The central question of this paper is not whether China in the late Qing and Republican periods should have adopted a gold or silver standard, but why the institutionalization of a stable small-denomination coinage regime was delayed for so long. The recurrent instability of copper–silver relations underscored a deeper structural deficiency: China lacked the institutional and theoretical framework that Carlo Cipolla later identified as the “standard formula.”

In Europe, the standard formula had been institutionalized by the early nineteenth century. England in 1816 and the United States in 1853 adopted token coinage as part of their gold standard, creating the institutional preconditions for modern fiat money. In China, the logic of the standard formula appeared in the National Coinage Act of 1914, but its full implementation did not occur until the fiat currency reform of 1935—a delay of roughly a century.

Much of the existing scholarship interprets China’s 1935 currency reform as the abandonment of its centuries-old silver standard. This framing echoes contemporaries such as Wei Wen-pin, who described reform primarily as a debate over metallic standards. Yet such a perspective overlooks a deeper set of unresolved issues. By shifting attention from the “gold versus silver” debate to the institutionalization of token coinage, this paper repositions the reform as a fundamental step in monetary modernization.

As Benjamin Cohen (1998) has shown for the West, the consolidation of territorial currencies in the nineteenth century required nation-states to unify domestic money and restrict the circulation of foreign currencies. China’s monetary history cannot be

understood solely through this lens of nation-state unification, since multiple monies continued to coexist well into the twentieth century. Akinobu Kuroda, in particular, stresses the persistence of this “plurality of monies” in East Asia, highlighting how markets adapted to parallel monetary systems without integration into a single unit. His perspective highlights how markets adapted to the coexistence of multiple monies, each with its own sphere of use, yet without full integration into a single standard. Our analysis complements rather than contradicts this view. While Kuroda underscores the endurance of monetary diversity, we highlight November 1935 as the turning point when the government implemented the full institutional framework of token coinage, later articulated by Cipolla as the standard formula.

This paper makes two contributions. Conceptually, it places the institutionalization of small-denomination coinage at the heart of China’s monetary modernization. Historically, it reframes the 1935 reform not as a simple retreat from silver, but as China’s first full application of Cipolla’s standard formula—a belated yet decisive convergence with international monetary practice.

The paper proceeds as follows. Section 2 introduces Cipolla’s standard formula and its adoption in Western economies. Section 3 discusses China’s pre-1935 struggles with small change and early reform failures. Section 4 analyzes the 1935 fiat currency reform as the first complete implementation of the standard formula. Section 5 rethinks China’s monetary modernization in theoretical and global perspective. Section 6 concludes.

2. Cipolla’s Standard Formula and Its Global Adoption

2.1 The Four Elements of the Formula

The *standard formula*, as articulated by Cipolla (1956, p. 27), serves to uphold a stable system of fractional currency (small-denomination coins) and comprises the following elements.

- (1) Small coins are issued on government accounts.
- (2) Small coins have a monetary value higher than their commodity value.¹
- (3) The quantity of small coins in circulation is limited.
- (4) Small coins' convertibility with unit money is guaranteed.

It may also be noted that small coins are legal tender only for payments below a specified limit.

The formula addresses the problem of small change in two ways. First, it prevents the recurrent shortages of small coins that many societies experienced prior to its adoption. Second, it maintains stable exchange relations between small coins and larger denominations. Why, then, is the standard formula capable of preventing shortages and ensuring stable exchange relations?

To begin, consider the second element, whereby small coins circulate as token money.² The second element is designed to prevent small coins from disappearing. Its logic is as follows. Imagine a society that uses two metals, gold and silver, for coinage purposes, with small coins made of silver. Suppose that the small coins have a metallic value equal to their monetary value, that is, full-bodied money. If the market price of gold relative to silver increases, the authorities would be compelled to raise the legal gold–silver ratio—that is, the rate of exchange between large coins and small coins—

¹ This means fiduciary coins in the definition of Carothers (1930, p. 3) or token coins in common usage.

² Following Cipolla (1956, p. 29), we define *token money* as money whose value is significantly larger than the value of the stuff it is composed of. Analogously, *full-bodied money* is money whose value is not significantly higher than the stuff it is composed of.

otherwise the large coins would disappear from circulation through arbitrage. An analogous scenario would arise if the market price of gold relative to silver decreases. As long as the relative prices of gold and silver continue to fluctuate, the authorities must either adjust the legal ratio continuously or tolerate one of the two types of coins disappearing from circulation. Neither option constitutes a satisfactory or stable monetary system.

Moreover, seigniorage would be nearly zero if the monetary authorities required the metallic content of small coins to equal their nominal value, thereby eliminating the incentive to mint them. Since the unit cost of producing small-denomination coins is higher than that of larger ones, their supply would contract even further, and society would face recurrent shortages of small coins. The solution offered by the standard formula is to make small coins circulate as token money.

The first, third, and fourth elements of the standard formula are mutually interdependent and indispensable, jointly sustaining a stable exchange relation between small and large coins. The quantity of small coins in circulation is automatically regulated (element 3) when the government monopolizes the coinage of small coins (element 1) and guarantees their convertibility with large coins (element 4) (Cipolla, 1956, p. 31). It works as follows. First, the government's monopoly over coinage controls the number of small coins in circulation. Second, convertibility ensures that small coins can always be exchanged for large coins, and vice versa. In this way, the demand for small transactions determines how many small coins remain in circulation, while any excess is absorbed through conversion into large coins.³ In short,

³ Laughlin (1900, pp. 113–130) offers a clear and detailed explanation of the operating principles of token money.

small coins should be restricted in quantity to meet only the needs of daily petty business (Cipolla, 1956, pp. 30-31).

2.2 Western Experiences

For Angela Redish, the standard formula created the conditions for the emergence of the nineteenth-century gold standard. In her words, a single gold standard with a gold coinage complemented by a token silver coinage “enables coins of a variety of denominations, in convenient sizes, to circulate at par and that the relative values of coins were expected to remain fixed” (Redish, 1990, p. 789). The formula took centuries for Western societies to develop. Cipolla (1956) suggests that the formula was not applied in England until 1816 and in the United States until the silver reform of 1853. The application of the formula in these two landmark episodes set the foundation for the successful functioning of the modern monetary system. Sargent and Velde (2002, p. 13) note that in England Sir Henry Slingsby had already proposed a version of the formula as early as 1661. The same logic was later elaborated in John Stuart Mill’s *Principles of Political Economy* (1857) and in Laughlin’s (1900, p. 113) account of the principles of token money.

What these experiences reveal is that token coinage was not a minor adjunct to metallic standards but a constitutive element of the modern regime. England’s adoption of the gold standard in 1816, as Frank Fetter and Derek Gregory (1973, p. 16) observed, was decided “largely on the basis of details of small coin convenience, and not on larger issues of economic policy.” Similarly, Carothers (1930, p. 61) explains that the adoption of a double standard in the United States in 1792 stemmed from the absence of any other system that could provide a fractional silver currency while at the same time creating a gold currency for major transactions. China was not the only

latecomer. As Carothers (1930, pp. 17–36) further describes, even the colonies in North America lacked a clear understanding of the monetary science embodied in the formula. Before the Coinage Act of 1792, they too experienced a prolonged period of confusion, as there was no standard monetary unit by which other coins could be measured. In short, the lesson of Western monetary history is that fiat money and token coinage formed the indispensable infrastructure of modern currency systems, rather than being mere by-products of the gold standard.

Yet while these Western economies had gradually mastered the principles of token coinage by the mid-nineteenth century, China did not arrive at a comparable understanding until much later, with significant consequences for its monetary stability.

3. China's Pre-1935 Struggles with Small Change

3.1 Qing Monetary Dualism and the Copper-Silver Instability

Since the mid-Ming dynasty, China employed copper cash counted by tale for small transactions, while silver, measured by weight, was used for high-value transactions.⁴ The exchange ratio between copper cash and silver fluctuated constantly, and the government consistently lacked the capacity to resolve this issue (Wang, 2015).

Figure 1 shows the number of standard copper coins equivalent to one tael of silver between 1723 and 1806, based on data from Chen (1966). The Qing government officially declared that 1,000 standard copper coins were to equal one tael of silver. However, as the figure illustrates, one tael of silver rarely equaled exactly 1,000 coins.

⁴ In this paper, copper cash refers to the small-denomination round copper-alloy coins with a square hole, which from the Ming dynasty onward were officially termed standard copper coins.

The value of standard copper coins relative to silver fluctuated over time, experiencing periods of both appreciation and depreciation.

Figure 2, based on Wu (2019a), takes the period from 1821 to 1850 and shows that the exchange rate between standard copper coins and silver tael fluctuated even more dramatically during this period.

As late as the Republican era, the instability persisted. Figure 3 plots the market price of copper coins from 1912 to 1926. The numbers represent the number of copper coins exchanged for one silver dollar.⁵ The figure shows that the relationship between copper coins and silver dollars was never fixed, and after 1920, the market value of copper coins even declined rapidly.

In sum, fluctuations in the silver-copper ratio posed a persistent problem throughout the Qing dynasty and beyond, and were even regarded as a major cause of the dynasty's fiscal and economic difficulties (Wang, 2015; Lin, 2006).

As Cipolla (1956), Redish (1990), and Sargent and Velde (2002) note, implementation of the standard formula necessitates the overcoming of three specific constraints. With regard to the *states of knowledge constraint*, token coins were not alien to China. Copper cash had long circulated at a face value above their metallic worth, familiar to both state and society (Shi, 2012). Yet modern monetary science was imperfectly absorbed. Lu Zongyu's (陸宗輿) *Lectures on the Study of Money* (1906) recognized limited issuance and token nature of subsidiary coinage, but omitted explicit

⁵ The term silver dollar refers to the *yuan*, the machine-struck silver coins that circulated widely in China from the late Qing through the Republican era.

convertibility between subsidiary coins and unit money and the legal tender status of subsidiary coins within limited payments. Yang Duanliu's (楊端六) *Talks on Money* (1923) went further astray, insisting subsidiary coins could be full-bodied and freely minted. Shen Zaochi's (沈藻墀) *The ABC of the Science of Money* (1931) mentioned legal tender limits but offered no systematic account. None presented the complete logic of Cipolla's standard formula

Institutional immaturity, as Redish (1990) defines, refers to the absence of a guarantee of convertibility between denominations. More broadly, it reflects the state's failure to control coinage over the whole territory. In Qing China, provincial mints remained vital revenue sources, and by the late nineteenth century provinces such as Fengtien (奉天), Kirin (吉林), and Kiangsu (江蘇) issued silver coins independently, frustrating reform plans like those of Jenks (Koo, 2005). Foreign coins from Spain, Mexico, Britain, the U.S., and Japan also circulated widely, echoing medieval Europe's fragmented monetary sovereignty. Convertibility further broke down when provincial mints over-issued profitable 0.2-dollar coins, which depreciated against 1-dollar pieces. As a result, the fixed exchange ratios required by Cipolla's standard formula could not be sustained.

Overcoming the *technology constraint* was crucial because token coins can only circulate at face value when counterfeiting is prohibitively costly.⁶ In China this barrier persisted for centuries. As Lin (1993, p. 388) notes, from the 3rd or 4th century BCE until the late nineteenth century, coins were cast in molds, a method convenient for illicit private minting and difficult for the state to control. The situation changed dramatically in 1887, when Viceroy Chang Chih-tung imported minting machinery

⁶ Supporting Information 1 provides the simple yet intuitive model of Redish (1990), illustrating why technological progress is an essential condition for the feasibility of the standard formula.

from Ralph Heaton & Sons of Birmingham. The new Kwangtung (廣東) Mint, opened in 1889 with ninety presses, produced standardized machine-struck coins of uniform weight and design. These coins greatly raised the cost of counterfeiting and marked the resolution of the technology constraint within Cipolla's standard formula.

3.2 Early Reform Attempts and Failures

An instructive case of early reform failure is Chang Chih-tung's silver coinage experiment. It illustrates how late Qing officials, even when equipped with modern technology, lacked the conceptual framework necessary for a stable subsidiary currency system. Rather than adopting the standard formula, Chang approached coinage from a political perspective—seeking to assert national standing and displace foreign silver coins, without addressing the structural requirements, such as convertibility and limited issuance, that token coinage demanded.

In his memorial, Chang argued that “the principles governing the coinage of cash and of silver are the same — that is, they should both be made at our own mints and by our own methods, so that we may maintain our national standing.” This rationale reveals a focus on sovereignty rather than monetary science. The Kwangtung Mint, opened in 1890, produced China's first machine-struck silver coins. The standard silver coin was fixed at 72/100 Treasury tael in weight and 900 fine, with subsidiary silver pieces of 50, 20, 10, and 5 cents ranging from 860 to 800 fine, and supplemented by one-cent copper coins. Yet critical safeguards were absent: no limitation was placed on the circulation of fractional coins, no guarantee of convertibility between denominations, and no clear definition of a standard currency unit.

In 1895, as Viceroy of Hupeh (湖北) and Hunan (湖南), Chang issued an official decree fixing the newly minted silver dollar at 1,000 copper coins. Such proclamations could not sustain fixed exchange relations, and the order soon became a dead letter. Subsequent provincial imitation only worsened the problem, as excessive minting of fractional silver led to depreciation (Wei, 1914, pp. 50–51). Frank King (1965) praised the introduction of modern minting machinery in Qing coinage, yet David Faure (1989) observed that the uncoordinated proliferation of provincial issues deepened monetary instability, underscoring the dangers of reform without sound theoretical guidance.

Cheng Kuan-ying (鄭觀應, 1842–1922) was a figure of considerable influence in late Qing China. A forerunner of reformist thought and an Enlightenment thinker, he combined the roles of industrialist, educator, literary scholar, philanthropist, and patriot (Yi, 1998). His celebrated book *Warnings to a Prosperous Age* (盛世危言), first published in 1893 and expanded in 1900, became one of the most widely reprinted works in modern Chinese history. It inspired leading reformers such as Kang Youwei (康有為), Liang Qichao (梁啟超), Sun Yat-sen (孫逸仙), and even Mao Zedong (毛澤東), while earning praise from Chang Chih-tung (張之洞).

In Volume Five, Cheng turned to coinage, proposing the minting of silver coins at major customs ports, modeled so precisely on foreign coins in both weight and fineness that they would be indistinguishable. Yet this suggestion revealed his ignorance of monetary principles. He neglected the need for a standard currency unit and he also did not address the issue of using small and large denomination coins for different types of transactions. His proposal reflected more a desire to expel foreign influence than any real understanding of currency systems.

Liang Qichao was an active participant in the Hundred Days' Reform of 1898 (戊戌變法), the short-lived attempt at political reforms brutally suppressed by Empress Dowager Cixi (慈禧太后). His memoir, *Record of the 1898 Coup d'État* (戊戌政變記), records the Guangxu Emperor's (光緒皇帝) edicts, though none addressed monetary reform. After the fall of the Qing, Liang continued to play a public role. He served as President of the Currency System Bureau in 1914 and briefly as Minister of Finance in 1917, positions that demonstrated his prominence as one of China's most influential intellectuals. Yet his comments on Jeremiah Jenks' 1903 plan revealed striking ignorance of token coinage. Liang strongly criticized the proposed 32-to-1 gold-silver coinage ratio, mistakenly treating the scheme as a bimetallic standard obligating the government to exchange the two metals at that rate. He even invoked Gresham's Law to argue that such a policy would invite arbitrage, showing his influence but also his deep misunderstanding of monetary science. The episode reveals that even China's most progressive thinkers at the turn of the century misunderstood the essential principles of token coinage.

3.3 Foreign Advisers and the Missed Opportunity

The China government in 1903 invited Professor Jeremiah W. Jenks from Cornell University to suggest reforms for its currency. In 1904, Jenks visited China with a proposal (*Memoranda on a New Monetary System for China*). After spending a few months researching and interviewing Chinese officials, he updated his proposal (*Considerations on a New Monetary System for China*) before leaving China and returning to the United States.

Jenks proposed a gold exchange standard for China and suggested a standard gold unit equivalent to 0.8395 grams of gold that would be equal to US\$0.55 or 55 cents. The

standard Chinese dollar should be coined in silver instead of gold. Jenks considered four types of coins for this system. The first type is silver coins, which would serve as the standard currency unit (called one dollar). The other types include subsidiary silver coins, nickel coins, and copper coins. Supporting Information 2 lists the outlines of Jenks' plan and explains its key parameters and design.

Regarding the methods of fixing values of subsidiary and minor coins (Jenks, 1904, pp. 13–14, replicated in Supporting Information 2), Jenks' plan was a straightforward application of the standard formula. Specifically, his point (a) matches the second point in the standard formula mentioned in the main text, point (b) corresponds to Cipolla's third point, points (c) and (d) are the same as Cipolla's fourth point, and point (e) aligns with Cipolla's additional notes about legal tender status. Jenks had not missed Cipolla's first point: small coins are issued on government accounts. In 1903 the China government did not have a unified fiscal system, as provincial viceroys controlled coinage. Jenks therefore emphasized central supervision of mints, insisting on one uniform system and rigid control over coinage and imports of foreign coins and bullion.

Jenks' proposal drew criticism in China, because officials and intellectuals misunderstood international finance and the standard formula. Liang's objections have already been noted. Chang Chih-tung opposed the scheme as an imperialist device, fearing it would let foreigners profit from debt payments and even gain control over China's fiscal and financial system.

Gerald Vissering, assisted by W. A. Roest, came to China in 1912 and proposed the adoption of a gold exchange standard. His two-volume recommendations, published as *On Chinese Currency: Preliminary Remarks about the Monetary Reforms in China*

(1912), represented a clear application of the standard formula. Vissering suggested a transition period during which the gold exchange standard and the existing silver standard would coexist, but emphasized that success required a strong central authority capable of suppressing counterfeiting and blocking the import of foreign counterfeit coins. He advised beginning reform by introducing a *fictitious* currency unit with a fixed gold value. This unit would contain 0.3644883 grams of fine gold, while the standard silver coin, at a gold–silver ratio (coinage ratio) of 21 to 1, would contain 7.6542543 grams of fine silver. Subsidiary coins were also specified with higher alloys, and the fixed gold value of the standard silver and subsidiary coins should be maintained.

Nearly two decades later, in 1929, Professor Edwin W. Kemmerer proposed another reform plan. His scheme introduced a gold standard unit called the *sun* (after Sun, Yat-sen), valued at US\$0.40 but without actual gold circulation. Fiduciary silver *sun* coins, subsidiary silver, nickel, and copper pieces were all designed according to the standard formula, to be kept at par by convertibility into the *sun* (Young, 1971, p. 179). Yet, like Vissering’s proposal, Kemmerer’s plan was never implemented.

3.4 The 1914 National Coinage Act as an Unfinished Experiment

In the National Coinage Act (國幣條例), promulgated by Presidential Mandate (教令) on February 27, 1914, the full set of elements of the standard formula first appeared in a Chinese official document. Compared to the 1910 National Currency Regulations, the 1914 National Coinage Act made further progress toward the standard formula. The 1910 National Currency Regulations lacked a fully developed concept of token coins. In particular, the subsidiary silver coins used for small transactions had a

nominal value that was close to their intrinsic metallic value. As a result, any rise in the price of silver could lead to the melting down of these small-denomination coins.

The preceding attempt at reform, the National Currency Regulations of May 1910 (幣制則例), was the first to define a standard currency unit explicitly. It introduced a silver *yuan* (圓) of 26.856 grams in gross weight, 900 fine, and envisaged subsidiary coins in silver, nickel, and copper, while also declaring that minting rights would be centralized under the Board of Finance (度支部) and provincial coinage abolished. Yet key features of the standard formula were still absent. The regulations did not address how to secure fixed convertibility among denominations, nor did they resolve the problem of foreign coins then in wide circulation. Due to the outbreak of the 1911 Xinhai Revolution (辛亥革命), which led to the founding of the Republic, the silver coins were never put into circulation.

Supporting Information 3 contains the full text of China's National Coinage Act of 1914. The English translation is taken from Wei (1914, pp. 139-141). The Act suggests a silver standard. The standard currency unit shall contain 23.97795048 grams of pure silver, and the unit shall be called *yuan* (圓). The Act shall authorize free coinage of silver, allowing individuals to bring silver bullion to the mint to be coined into legal tender with a small fee. Subsidiary coins made of silver, nickel, and copper with a monetary value higher than the metallic value, shall be provided. The exchange rates of coins shall be fixed nationwide, public or private. The standard silver coin shall have unlimited legal tender, but there shall be limitations on the legal tender status of small coins.

The 1914 National Coinage Act made significant strides toward standardizing China's currency system, but its full implementation was hampered by internal political turmoil, creating a complex monetary environment. Despite the official adoption of the silver *yuan*, both it and silver taels continued to function as two parallel units of account. Regional authorities continued the issuance of subsidiary coins, leading to market instability. Paper currency issued by domestic and foreign banks further complicated the monetary landscape.

Given that the standard formula was first applied in England in 1816, it took about one hundred years for the idea to reach China in 1914. As we will show next, the Chinese government required another twenty years to translate the theory into reality.

4. The 1935 Fiat Currency Reform: China's First Full Implementation

4.1 The Decree of November 1935 and Its Rationale

Sargent and Velde (1997), in their study of small coins in Mediterranean Europe, observe that the evolution of doctrines on small change was integral to the process by which a managed fiat currency system came to be understood and implemented. In their words, "a token coin is like a government or privately supplied paper bank note," and after much theorizing and experimenting, most governments eventually monopolized the issuance of bank notes and token coins. Few statements better anticipate the reasoning behind China's eventual adoption of Cipolla's standard formula in 1935.

Assisted by American advisers, the Chinese government in November 1935 established a fiat money system, which for the first time applied Cipolla's standard formula. This transformation, however, did not happen overnight but unfolded through several steps.

In January 1931 the nation adopted Customs Gold Unit (海關金單位) for the collection of import duties. The unit tael was abolished in 1933, and silver dollars became the unit of account. This first step unified the unit of account, but did not change China's chaotic currency system.

By March 1935 the government assumed control of the Bank of China and Bank of Communications. It centralized control over silver and foreign currencies. By 1927, aside from the Bank of China and the Bank of Communications, at least twenty-eight commercial banks and eleven provincial banks were issuing currency (Shiroyama, 2008, p. 168). This second step enhanced the power and control of the central government.

The third step was the currency reform of November 3, 1935. This reform allowed China to further nationalize silver. It was based on stability of exchange, as it stabilized the nation's exchange rate by fixing the fiat currency to foreign currency. Reserves abroad were established for stabilization purpose. The shift to a managed currency system marked the first time in China's history that the government fully controlled the money supply. It strengthened the government's position in the monetary and financial systems.

The plans for reform were worked out by China's financial advisers Oliver C. Lockhard, F. B. Lynch, and Arthur N. Young under close cooperation with H. H. Kung (孔祥熙, Minister of Finance) and T. V. Soong (宋子文). According to Young (1971, pp. 230–237), the reform plans called for fixing the currency to foreign exchange at a rate that would not overvalue it, centralizing note issuance in the Central Bank, and nationalizing silver stocks from banks and the public to provide foreign exchange reserves. Subsidiary

nickel and copper coins were to replace the chaotic assortment of minor currencies, while fiscal stabilization and the settlement of arrears were expected to support the reform. The decree further created a Currency Reserve Board to supervise note issue and required all holders of silver to surrender it to the Board or designated banks. Yet nationalizing silver proved difficult, particularly because foreign banks in China retained juridical independence from the Chinese government.

Supporting Information 4 provides the full text of the Currency Reform Decree issued on 3 November 1935 (法幣政策公告), the foundational document of China's fiat money reform. This decree, which contains six articles in total and is translated by Young (1971, pp. 484–485), sets out the principles of the reform in clear and binding terms.

Article 1 declared that, beginning 4 November, banknotes issued by the Central Bank of China, the Bank of China, and the Bank of Communications would be full legal tender for the payment of all public and private obligations. At the same time, the use of silver dollars and bullion as currency was prohibited, with contraventions subject to confiscation and penalties.

Article 2 allowed the notes of other licensed banks to remain in circulation but froze them at their outstanding level on 3 November 1935. No new issuance was permitted, and existing notes were to be gradually retired and exchanged for Central Bank notes, with the associated reserves transferred to the new monetary authority.

Article 3 established a Currency Reserve Board to supervise the issue and retirement of notes and to hold the reserves against them.

Article 4 required all banks, firms, and individuals to surrender silver dollars and bullion to the Currency Reserve Board or designated banks in exchange for legal tender notes, thus nationalizing the country's silver stock.

Article 5 stipulated that contracts expressed in silver were to be discharged in legal tender notes at their nominal amount, further severing the link to bullion.

Article 6 committed the three government banks to buy and sell foreign exchange without limit to stabilize the Chinese dollar's exchange value.

Together, these measures demonstrate the decisive move from a silver-based monetary order to a managed fiat currency system.

4.2 Subsidiary Coinage Regulations of 1936

The fiat currency policy of November 1935 did not amount to a full implementation of the standard formula in China. At its inception, the fiat currency policy merely reformed the monetary standard, yet did not address the issue of subsidiary coinage. In vast inland regions of China, small-denomination transactions continued to rely primarily on fractional silver coins and copper coins as the main media of exchange. Without establishing a fixed relationship between small-denomination currency and fiat money, the standard formula cannot be considered fully implemented.

Copper coins remained as the chief basis for smaller transactions immediately after November 1935. In the early phase of the policy, many regions in China experienced a shortage of subsidiary coins, which impeded everyday transactions. According to Cho

(1986, pp. 332-335), the Wuhan (武漢) area saw soaring prices and a scarcity of copper coins. Nanking (南京) experienced a similar situation with a sudden surge in both the price of copper coins and general commodities. It was only with the promulgation of the Subsidiary Coinage Regulations (輔幣條例) two months later that the monetary reform could be deemed complete. With the establishment of the subsidiary coinage system, the key components of the standard formula were finally implemented in full, marking China's entry into a modern monetary regime.

We now take a closer look at the final step, the Subsidiary Coinage Regulations of January 11, 1936. The regulations conceived two types of subsidiary coins: nickel coins and copper coins. Pure nickel coins were of 20, 10, and 5 cents, weighing 6, 4.5, and 3 grams, respectively. Copper coins were of 1 and 1/2 cents, weighing 6.5 and 3.5 grams and consisting of 95% copper and 5% tin-zinc alloy. The subsidiary coins were issued starting in February 1936. In 1936-1937 subsidiary coins which were pegged firmly to the new currency were rapidly introduced (Young, 1971, p. 166).⁷

Only now can we say that the standard formula had taken root in China. The standard currency unit was unified geographically, contrasting the previous multiplicity of currency units in different provinces of China. The reform made the various nickel and copper coins to the position of subsidiary coins. The exchange rates between the legal tender notes and these subsidiary coins became definitively fixed. Previous variations in the exchange rates of subsidiary coins, which were confusing and disturbing, had practically ended, and the legal currency was now the sole unit of account (Lin, 1936, p. 84). By bringing subsidiary coins under the supervision of the Currency Reserve

⁷ The production of subsidiary coins continued until the outbreak of war with Japan in July 1937.

Board, the government ensured that their issuance could be adjusted according to the needs of business, thereby reinforcing the fixed relationship between small coins and fiat money required by the standard formula.

Supporting Information 4 contains the full text of the Subsidiary Coinage Regulations (輔幣條例), promulgated on January 11, 1936. This statute marked the final step in China's adoption of a modern token coinage regime. The regulations align closely with the four elements of Cipolla's standard formula.

First, government monopoly of issuance was guaranteed in Article 1, which vested the exclusive right to mint subsidiary coins in the Central Mint and placed their issuance under the Central Bank. This eliminated the earlier patchwork of provincial mints and directly reflects the principle that token coins must be produced on government account.

Second, the coins were overvalued relative to their intrinsic content. Article 2 prescribed nickel and copper coins whose metallic value was intentionally set below their face value. By ensuring that token coins were fiduciary in nature, this provision fulfilled the requirement that face value exceed metallic value.

Third, quantitative limits were introduced through Article 5. Nickel coins were legal tender only up to 20 yuan per transaction, and copper coins up to 5 yuan. Such restrictions prevented an excess circulation of low-value coins and preserved their exchange parity, echoing Cipolla's emphasis on limited supply.

Fourth, convertibility was explicitly established in Article 3, which fixed the exchange rates between subsidiary coins and the unit of account. This guaranteed that small coins circulated at par with fiat money. Articles 6 and 7 further reinforced this principle by mandating the withdrawal and reminting of old coins and by allowing worn pieces to be exchanged for new ones at the Central Bank, while Article 8 prescribed legal penalties against anyone counterfeiting subsidiary coins or otherwise undermining their credibility, thereby reinforcing public confidence in the new token coinage.

Taken together, these measures established in China—for the first time—the complete institutional package envisioned by Cipolla. Subsidiary coins were monopolized by the state, issued at face values above cost, strictly limited in circulation, and anchored to the new fiat unit, thereby closing the gap left by the 1935 decree. **Table 1** summarizes how the 1936 Subsidiary Coinage Regulations embodied Cipolla’s standard formula.

4.3 From Silver Standard to Managed Fiat System

Fapi (法幣), or legal tender notes, became the unit of account starting in November 1935. Since neither a gold parity nor a silver parity existed, a nominal anchor was needed for the new currency. Foreign exchange was the nominal anchor, and its role became especially important, as the following extract of the decree indicates: “For the purpose of keeping the exchange value of the Chinese dollar stable at its present level, the Central Bank of China, the Bank of China, and the Bank of Communications shall buy and sell foreign exchange in unlimited quantities” (see Supporting Information 4).⁸

⁸ This was not long before it was realized that the government was trying to keep the currency stable in terms of two currencies (US dollar and British sterling). As a solution, the Central Bank of China widened the spread between the selling and buying rates for both currencies to prevent arbitrage dealings through the Central Bank (Young, 1971, p. 250).

The fixed foreign exchange rate in a managed currency system, in other words, replaced the function of a standard currency unit under the silver standard. This was also the perception of the general public at that time. Lin (1936, p. 79) names it a *managed foreign exchange standard*. Shiroyama (2008, p. 188) documents that the reason that people accepted the banknotes as legitimate currency was because the value of the new notes was guaranteed with foreign exchange instead of silver. General manager of Shanghai Commercial and Savings Bank, Chen Guangfu (陳光甫), reportedly said: “The most important function of a managed currency is to enable one to exchange a legal tender note for either cash or foreign exchange.” Currency convertibility became the key principle of the new monetary system. Nationalist government officials were quite aware of the public’s doubts about their commitment to sound monetary management. For them, maintaining stable convertibility of the fiat currency to the exchange rate was thus a crucial element in enhancing public trust in the new currency.⁹

By early 1936, the managed fiat system was not only operating in practice but together with the standard formula, also being codified in Chinese monetary scholarship. In his textbook *Science of Money* (1936), Chao Lan-ping (趙蘭坪), a Chinese economist who held professorships at Jinan University (暨南大學), National Central University (中央大學), and the Central Political Institute (中央政治學校), explained subsidiary coinage as a limited legal tender, issued solely by the state and subject to unlimited redemption at the treasury. Focusing was on small change, his logic echoed the broader monetary

⁹ Due to widespread public distrust in unbacked issuance of paper currency, the Ministry of Finance issued a special document titled “Explanation of the New Currency System” (新貨幣制度說明書) on November 18, 1935. Section IV asserted that the new monetary regime was by no means an abandonment of the silver standard. It claimed that a fixed ratio between fapi (legal tender notes) and silver was still maintained - specifically, that one yuan of fapi could be exchanged for 23.493448 grams of pure silver. However, this statement deliberately obscured a critical fact that in reality, one yuan of fapi could not be redeemed for 23.493448 grams of silver from the government.

transformation of 1935: stability derived not from metallic content but from institutional guarantees of convertibility and controlled issuance. The fact that such reasoning appeared in a university textbook within months of the fiat reform illustrates how quickly the epistemic foundation of the new system was internalized. This intellectual endorsement reinforced public confidence in the managed fiat regime, complementing the official reliance on foreign exchange reserves as the new nominal anchor.

4.4 Outcomes and Short-term Success

The monetary reform of November 1935, together with the Subsidiary Coinage Regulations of 1936, ushered in a remarkable twenty-month period of progress that lasted until the outbreak of war with Japan in July 1937.

Figure 4 plots China's monthly foreign exchange rate between 1928 and 1936, expressed in US\$ per 100 Chinese dollars. It reflects a fixed exchange rate of US\$30 per 100 Chinese dollars since November 1935. In his memoirs, *Cycle of Cathay*, financial advisor Arthur Young proudly claims that China for the first time in its history had a stable exchange rate. That is not without reason.

Figure 5 plots monthly Shanghai WPI, Tientsin WPI, exports, and imports. In the early 1930s and before the currency reform, all sections of China's economy had been experiencing a deepening crisis. The wholesale price level in Shanghai in October 1935 was about 27% below that in September 1931. Tientsin WPI also fell by about 24%. Both exports and imports shrunk at an annualized rate of about 23% during the same period. The number of China's modern banks that failed rose from 3 in 1931 to 6 in 1933 and 8 in 1934 and then jumped to 20 in 1935. The number of native banks, which

had much less capital and poorer organization than modern banks, were estimated to have dropped by a half between 1926-1935 (Wang, 1978).

Economic indicators in the twenty months from November 1935 to June 1937 (before the outbreak of war against Japan) all pointed to an economic revival that ran in sharp contrast to what occurred prior to the reform. Between October 1935 and December 1936, Shanghai WPI grew at an 18% annualized rate. Tientsin WPI saw a similar rising trend. A part of the rise was due to higher prices throughout the world, while another part of it was the intention of the China government to reflate prices toward previous levels (Young, 1997, p. 83).

Foreign trade also grew rapidly following the reform. Both exports and imports increased at about a 30% annualized rate during the same period. The number of China's modern banks that failed dropped from 20 in 1935 to 8 in 1936 and to 5 in 1937. Wu (2019b, p. 167) acutely observed that from the implementation of the 1935 currency reform to the outbreak of the War of Resistance against Japan, China's national economy exhibited an upward trend, characterized by stable foreign exchange rates, recovering prices, improved financial stability, rising levels of industrial and agricultural production, and a relative decline in trade deficits—all developments that were to some extent related to the implementation of the currency reform.

5. Rethinking China's Monetary Modernization

5.1 Beyond the Gold-Silver Debate

Wei, Wen Pin (魏文彬), who held a Ph.D. from Columbia University, traces the various currency reform proposals to China made from the nation's modern movement (1895) to around 1912 (Wei, 1914).

Young (1971, Chapters 9-10), Shiroyama (2008, Chapter 7), and Lin (1936, Chapter 4) discuss China's currency reform of November 1935. In addition to these works, economic historians including Cho (1986), Lee (1987), and Ho and Lai (2013) often interpret the 1935 reform as China's abandonment of its centuries-old silver standard. This perspective echoes Wei (1914) in framing China's pursuit of monetary modernization primarily as the question of choosing the right standard system—whether to remain on silver or to move to gold. In our view, however, such an interpretation overlooks a deeper set of unresolved issues at the heart of China's currency reform.

Although lacking a formal structure, China's monetary system before November 1935 can be more accurately described as a form of "parallel bimetallism." Silver bullion and copper coinage functioned in distinct spheres. Silver facilitated high-value transactions such as wholesale trade, long-distance commerce, and tax payments, while copper coins were primarily used in everyday retail exchanges. This "parallel bimetallism" system had its inherent flaws, particularly because the exchange rate between the two metals was not stable.

Building on this understanding of a parallel system's weaknesses, Sargent and Velde (1997) provide valuable insights. They highlight that the real issue was not merely a choice between a gold or silver standard, but rather how to stabilize the exchange relationship between large- and small-denomination currencies. Sargent and Velde (1997, p. 61) offer their own view: "Indeed, when England implements the standard formula in 1816, it applies it to all of its silver coinage, thus establishing the first full-

fledged implementation of the gold standard. Thus, in the 19th century, debate over the standard formula was to be a debate between the gold standard and bimetallism.”

To address the instability of parallel bimetallism, there were essentially three approaches: moving to a single-metal standard (mono-metallism), adopting a “limping standard” where one metal became subsidiary, or eventually embracing a fiat currency system. For example, France adopted a limping standard in the late 19th century, maintaining silver as a subsidiary currency. The United Kingdom shifted to the gold standard in 1816, and many modern nations now rely on a fiat currency system, where the currency value is not backed by a physical commodity but by government decree.

With Sargent and Velde’s perspective in mind, we can now reinterpret China’s November 1935 monetary reform. In this paper we adopt a similar perspective by interpreting China’s monetary reform in November 1935 as an attempt to address the shortcomings of a parallel metallic standard. The choice China made in November 1935 was neither the gold standard nor the silver standard, but rather a fiat currency system.

5.2 The Knowledge Constraint

China’s delay in adopting the standard formula was not due to technology but to knowledge. The machines arrived in 1887; the theory arrived only in 1936 with Chao Lan-ping.

Chang Chih-tung ordered coining machinery from London in 1887. According to Wei (1914, p. 46), “a contract was entered into with Messrs. Ralph Heaton and Sons of Birmingham for the supply of a complete plant of coining machinery with all modern

improvements for the production of silver and copper coins.” With the help of imported coining machinery, one crucial technology constraint that prevented the adoption of the standard formula was relaxed. The binding constraint became various states of knowledge, especially the lack of knowledge concerning the economic science of coinage.

The limits of late Qing monetary thinking become particularly evident in Chang Chih-tung’s silver coinage experiment. Despite his access to modern minting machinery, Chang failed to incorporate the theoretical safeguards necessary for a stable subsidiary currency regime. Several elements of the standard formulas were missing. First, no explicit limitation on fractional coins in circulation was imposed. Second, convertibility among the fractional silver coins and between the standard and fractional silver coins was not guaranteed. Third, Chang’s experiment did not even define a standard currency unit - namely, silver parity. The primary motivation behind Chang’s minting of silver coins was political. He aimed to replace the widely circulated foreign silver coins in China with domestically produced Chinese silver coins. Fourth, but probably less a question, there was no legal tender limitation on the fractional coins.

The intellectual shortcomings of late Qing reformist thinkers were no less striking than those of officials. Even leading figures who shaped China’s modern political discourse displayed deep misunderstandings of token coinage.

A telling illustration of this epistemic gap can be found in the writings of Liang Qichao. As one of the most progressive intellectuals of his generation, Liang was deeply engaged in debates over China’s monetary future and even held high official positions in currency administration. Yet his comments on Jenks’ reform plan revealed that he

too misunderstood the essential logic of token coinage. The significance of this episode lies less in the technical details—already noted earlier—than in what it symbolizes: even China's leading reformist thinker failed to internalize the principles that underpinned Cipolla's standard formula.

The epistemic gap that had long hindered China's adoption of modern subsidiary coinage principles was only closed in 1936, when Chao Lan-ping published his *Science of Money* (貨幣學). For the first time in a Chinese university textbook, the essential elements of Cipolla's standard formula were systematically articulated. Chao explained that since the intrinsic value of subsidiary coins is lower than their money value, the public is prohibited from requesting their minting. The right of coinage is exclusively held by the state—a system known as limited coinage. Given this restriction, the supply of subsidiary currency is necessarily limited. Moreover, because the intrinsic value of these coins is below their nominal value, any uncontrolled issuance would prevent their face value from maintaining the legal ratio with the standard unit; their face value would then fall toward the intrinsic value.

He further emphasized that in order to maintain the money value of subsidiary coins, restrictions on their circulation must also be imposed. Subsidiary coins are therefore legal tender only up to a fixed statutory limit: within that limit they are accepted without objection, but beyond it one may lawfully refuse them. Finally, since the minting and issuance of subsidiary coins are exclusively monopolized by the state, the treasury must assume the responsibility of unlimited conversion into standard money. In times of excess, subsidiary coins would naturally flow back for redemption; in times of shortage, they would flow out again.

Supporting Information 5 reproduces the original Chinese text and images of this 1936 edition, illustrating how the principles of the standard formula were finally codified in Chinese monetary scholarship.

5.3 China in Global Perspective

Our argument echoes Akinobu Kuroda in two important respects. First, we agree with his observation that, in pre-modern Asia, monetary plurality was not an exception but the rule. Rather than assuming that a single market should correspond to a single money, historical experience shows that the majority of people dealt with concurrent currencies. The coexistence of multiple monies was functional, not accidental: each type of money performed roles that others could not. China's case illustrates this broader East Asian pattern. Copper, silver, and various forms of local tokens coexisted, circulating in distinct transactional niches. Their relative values shifted constantly. What might look like chaos from a modern perspective often reflected a functional but unstable equilibrium.

Second, we also share Kuroda's view that the instability between large and small denominations could not be resolved by progress in technology alone. Economic historians such as Cipolla (1956), Sargent and Velde (2002), and Redish (1990) have stressed that small change was inherently difficult to stabilize, since minting costs were high and counterfeiting was pervasive. Kuroda emphasized that although mechanized minting could reduce costs and raise uniformity, it did not guarantee stable exchange relations. In countries like early twentieth-century China, new machinery did little to halt forgery or fix the fluctuating rate between subsidiary coins and the standard unit. This point directly resonates with our findings: China imported modern minting presses in the late nineteenth century, yet the copper–silver ratio continued to swing

widely. Without a theoretical framework to define and enforce token coinage, technical innovation alone proved insufficient.

Where we depart from Kuroda is in identifying the decisive barrier not in technological change or local market practices, but in knowledge. Pre-modern China lacked a clear understanding of the principles of token coinage—the need to restrict subsidiary issues, limit their legal-tender status, and guarantee convertibility into unit money. Kuroda interprets plurality and exchange-rate instability mainly from a micro perspective, emphasizing local adjustments in market demand. Our analysis instead stresses the macroeconomic dimension: the instability of the silver–copper ratio was an empire-wide phenomenon that undermined fiscal stability and postponed the institutionalization of Cipolla’s standard formula. This perspective situates China’s experience within global debates on monetary plurality while underscoring its eventual convergence on the institutionalization of token coinage.

6. Conclusion

We reaffirm our central argument: the 1935 currency reform should be recognized as China’s first full implementation of Cipolla’s standard formula, rather than as a mere abandonment of the silver standard.

From a conceptual perspective, we have highlighted the institutionalization of small-denomination coinage as central to monetary modernization. This reframing enriches our understanding of the evolution of modern monetary systems and highlights an often-overlooked cornerstone of monetary modernization.

Historically, our analysis has underscored China's relatively late adoption of the standard formula in the global trajectory of monetary modernization. We have sought to explain this delayed convergence by situating it within China's unique political and intellectual context, thereby offering an interpretation of its path to modern currency institutions.

Finally, for future research, we suggest that further research could explore comparative perspectives with other countries or apply institutional economics approaches to extend this analytical framework, offering a pathway for future studies.

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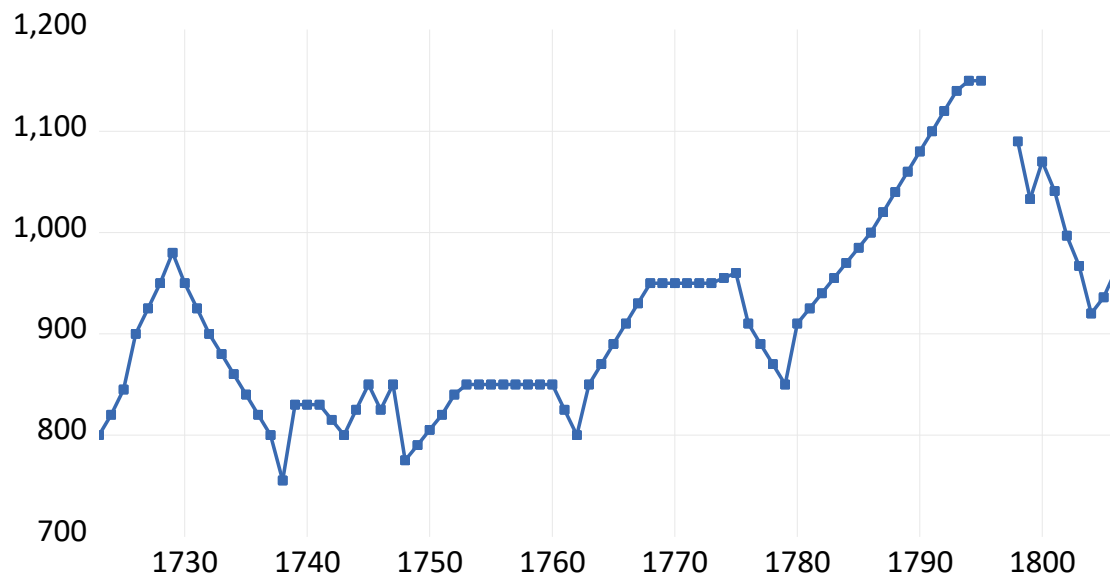
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Cipolla's Standard Formula Element	Corresponding Article (s)	Content
Government monopoly (issued on government account)	Article 1	Exclusive right to mint vested in Central Mint; issuance managed solely by the Central Bank.
Face value greater than metallic value (fiduciary nature)	Article 2	Nickel and copper subsidiary coins prescribed with metallic value intentionally below their face value.
Convertibility into standard unit money	Article 3, 6, 7	Article 3 fixed exchange rates between subsidiary coins and the yuan (e.g., five 20-cent nickels = 1 yuan). Articles 6–7 mandated withdrawal/reminting of old coins and allowed exchange of worn coins for new ones at the Central Bank.
Limited circulation / limited legal tender	Article 5	Nickel coins legal tender up to 20 yuan, copper coins up to 5 yuan per transaction (except for taxes and Central Bank exchange).
Safeguarding credibility	Article 8	Counterfeiting or undermining coin credibility punishable by law.

Source: Subsidiary Coinage Act (1936), discussed in Section 4 of the main text.

Note: The table shows how China's 1936 Subsidiary Coinage Act embodied Cipolla's standard formula through state monopoly, fiduciary value, fixed convertibility, limited legal tender, and credibility enforcement.

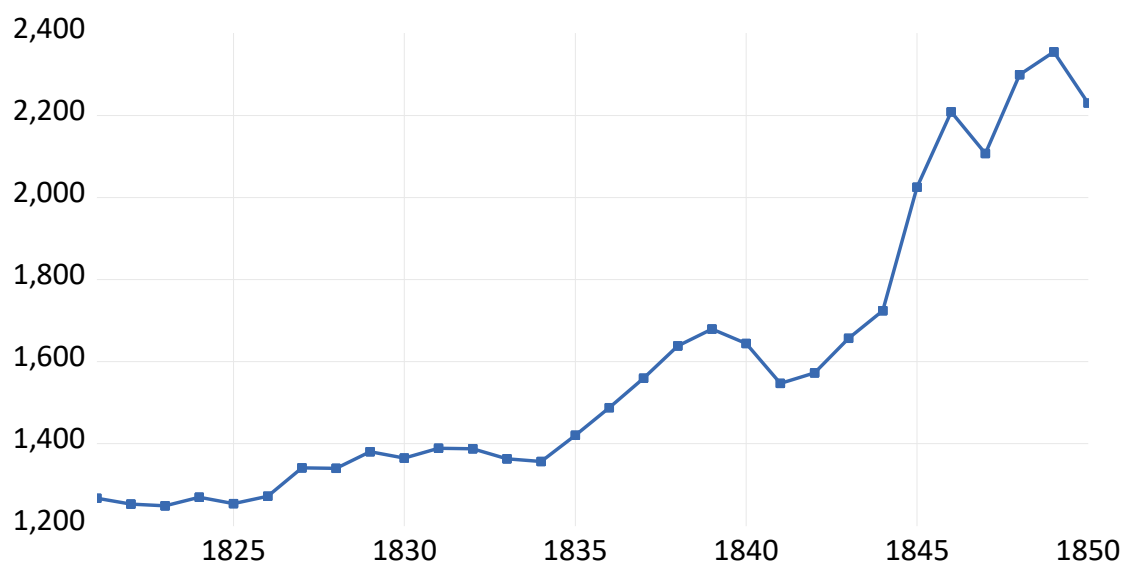
Table 1: Alignment of the 1936 Subsidiary Coinage Act with Cipolla's Standard Formula



Source: Chen (1966, p. 12).

Note: Number of standard copper coins equivalent to one tael of silver.

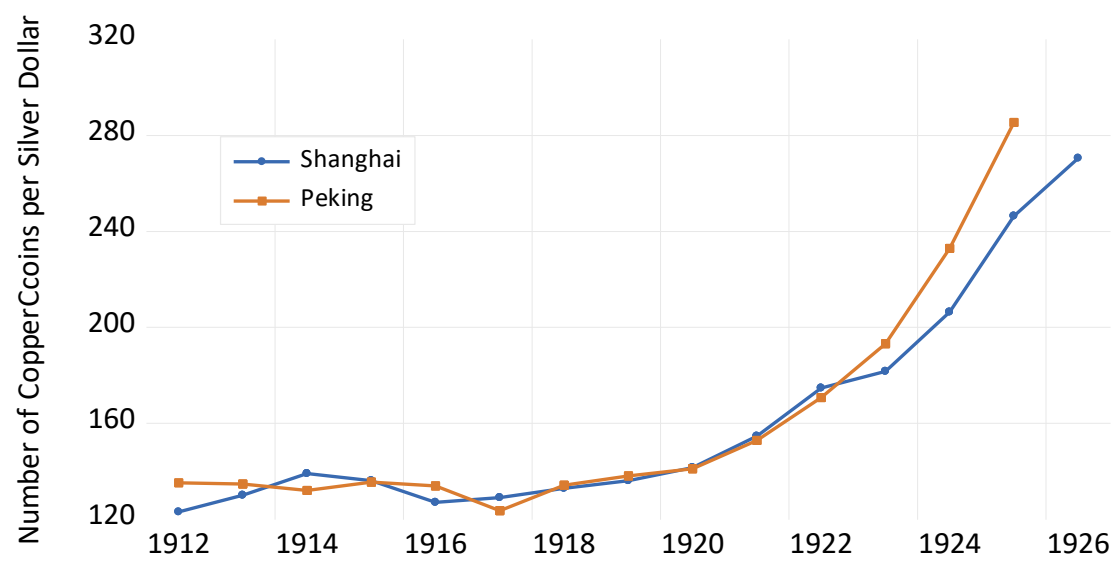
Figure 1: Standard Copper Coins per Tael of Silver, 1723-1806



Source: Wu (2019a, p. 4).

Note: Number of standard copper coins equivalent to one tael of silver.

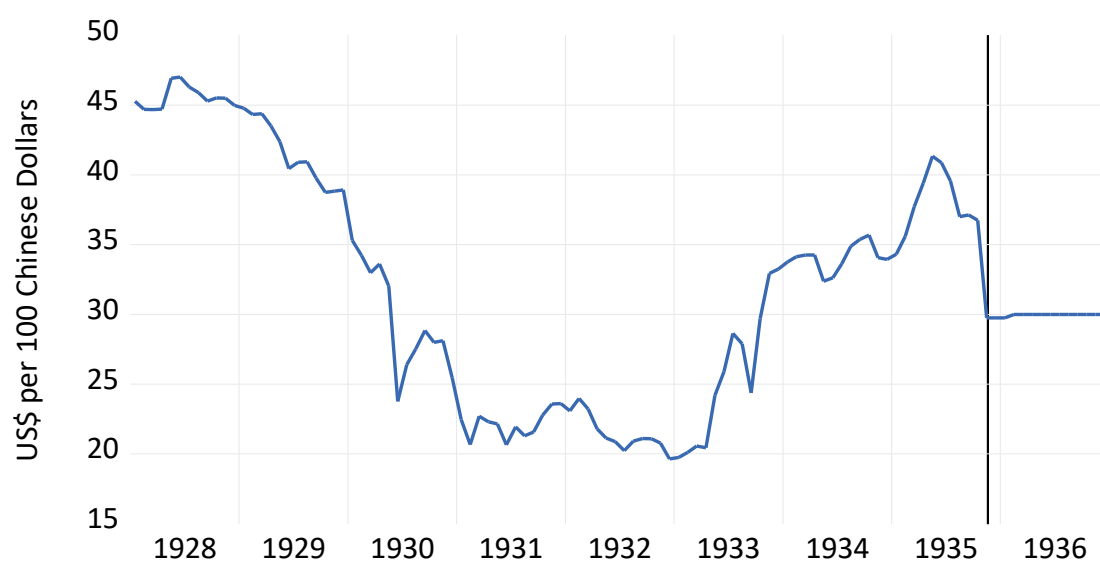
Figure 2: Standard Copper Coins per Tael of Silver, 1821-1850



Source: Cho (1986, pp. 152-152).

Note: Number of copper coins per silver dollar.

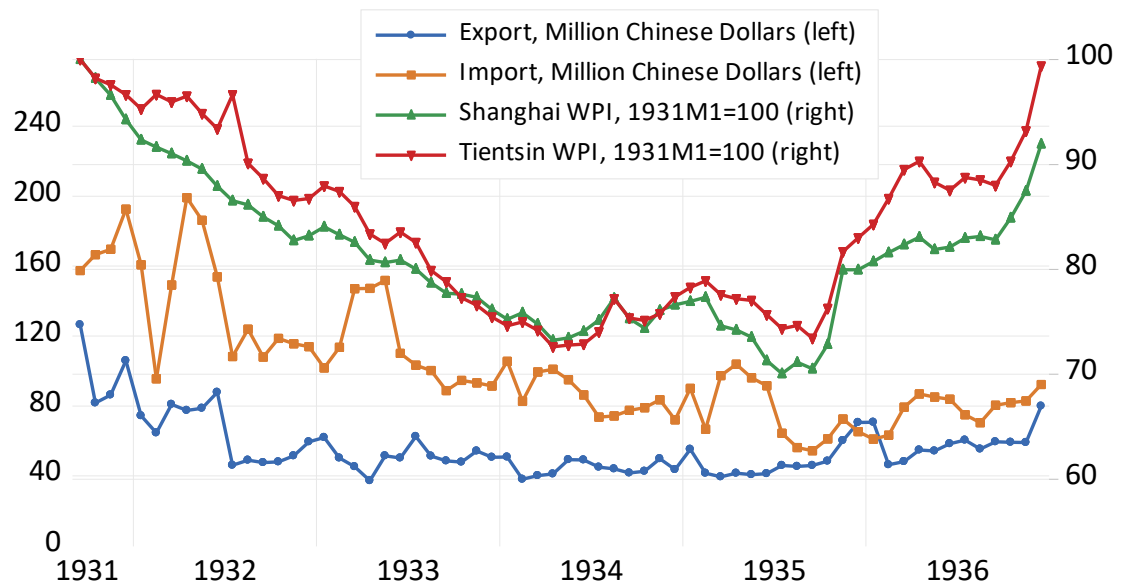
Figure 3: Market Prices of Copper Coins in Shanghai and Peking



Source: *Statistics Monthly* (統計月報), various issues.

Note: Expressed in US\$ per 100 Chinese dollars.

Figure 4: China's Monthly Foreign Exchange Rate between 1928 and 1936



Source: Ho, Lai, and Gau (2025).

Note: The left-hand axis is exports and imports; the right-hand side axis is wholesale price indices.

Figure 5: China's Monthly Exports, Imports, and Wholesale Price Indices between 1931 and 1936