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Concurrent but non-integrable currency circuits: complementary relationships among monies in modern China and other regions

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I

'One hundred cash are not 100, and 1,000 are not 1,000, but some other and totally uncertain number, to be ascertained only by experience', wrote J. Edkins in 1889.[1] However, to him this was just an example of 'prominent annoyances' in using money. Thus he had no reason to hesitate to describe the monetary situation of contemporary China as chaotic and eccentric. Chaos was the most common term used by foreign observers to describe monetary usage in late imperial and early republican China. According to the modern viewpoint of taking for granted a stable denomination in terms of a single currency, Edkins' lament sounds quite natural. It was a logical consequence of this that all foreigners wanted the Chinese government to establish a unified monetary system to reduce their transaction costs.[2] However, Edkins also had to admit that the Chinese people appeared to feel no burden from it, and that serious complaints came only from foreigners.[3] Though the chaotic situation appeared irrational to those accustomed to the certainty of a regulated monetary system, to the experienced, the fluctuating monetary system might work more effectively than the less-experienced could imagine.

Sharing Edkins' lament, H. B. Morse, Commissioner of Customs and Statistical Secretary, Inspectorate-General of Customs, China, was more analytical in describing the monetary structure of China. He noticed the multiplicity behind the complicated situation in the following terms: 'In China the currency is at the top a weight pure and simple, in the middle a combination of weight and token currency, and at the bottom a coin which stands on its own feet, and neither receives support from nor absolutely gives it to any other unit in the series.'[4] Though the reality was not as simple as he triply classified, in using the phrase 'stands on its own feet' he seemed to realise

[1] *North China Herald*, 1889, fol. 411, cited in E. Kann, *The Currencies of China* (Shanghai, 1927), p. 415.
[2] G. Vissering, *On Chinese Currency*, vol. 1 (Amsterdam, 1912).
[3] Kann, *Currencies of China*, pp. 416–17.
[4] H. B. Morse, *The Trade and Administration of the Chinese Empir*e (London, 1908), p. 166.

that, dependant on neither intrinsic contents nor regulations, the currencies worked quite locally and temporally, and that the entire empire-wide structure of monetary system stood on an uncertain but flexible foundation.

It was not only China that was labelled as chaotic in its monetary situation by 'inexperienced' observers, as Wolters will make clear on the Netherlands Indies in the next article in this issue. The conditions in Bengal when the British East India Company inaugurated its rule were quite similar to those in China noted above. It is also important to note that, as Fantacci will show in another article in this issue, European countries were likewise not 'inexperienced' with uncertain monetary usages until the eighteenth century, though the extent of uncertainty was not the same as in the Chinese case.

This article is organised as follows. Section II discusses the coexistence of a number of monies in modern China and early colonial India, where we will find many pairs of a particular currency and a trade circuit. We call these currency circuits. The currency circuits did not reflect the segregation of markets but rather a multiplicity of interfaces. Section III investigates early twentieth-century rural China and argues that both the seasonality of monetary demand and the primary commodity traded in any particular zone affected the circulation of currencies. Section IV suggests that, though the multiplicity of currency circuits appears to be unaccountable in a modern sense, it becomes comprehensible if we realise that the actual stream of currency is unidirectional, separable, and consequently multiple. Section V notes the difficulty of harmonising heterogeneous demands for money and uneven supplies of currencies. These conditions created the conditions in which multiple currencies could circulate, typically as in the case of the early twentieth-century Red Sea region. Under such circumstances the necessity of keeping accounts neutral also caused numerous commercial centres to create 'imaginary monies', a unit of account with no actual substance. However, the separable steams of currencies were rarely synchronised. Section VI undertakes a comparison of the early modern history of China, Japan and other societies, and suggests the importance of a combination of the remittance system and local credit supply. The article concludes by suggesting that currency could be current in a circuit but sometimes stagnant in sinks, and that, though the market might ideally be conceived of as making a pair with a single money, actual markets in history required plural monies.

II

The 'chaotic' feature of monetary usage in late imperial and early republican China was particularly conspicuous in the use of different money for different commodities even within the same city. For example, Jiujiang, a treaty port of Jiangxi province, in the 1910s had several silver dollars circulating concurrently, but each dollar had its own circuit. The Mexican dollar, which was the most popular in Shanghai, was used exclusively for the trade in tea and porcelains in Jiujiang, since their export abroad was via Shanghai. Meanwhile, the provincial dollar, issued by the Jiangxi

government, was preferred for dealing in tobacco or beans sold for the domestic market. Besides these the Japanese dollar was also used in the business of cotton yarn and kerosene oil for southern Jiangxi. The exchange ratio between the silver dollars in Jiujiang fluctuated daily according to their respective supply and demand.[5]

These silver coins were, however, just some of the monies used in this inland port. Silver dollars were too expensive to mediate daily transactions, thus they had to be exchanged for copper coins in order to purchase daily goods. The ratio of copper currency against silver quoted by currency exchangers fluctuated daily. Particularly important is that the rate became invalid outside the port area. According to a report in the early 1910s, peasants in the Mid Yangzi region were reluctant to accept silver dollars, to the extent that they preferred copper coins of 1,000 *wen* to one silver dollar quoted at 1,300 *wen*.[6] Nor were silver coins the primary currency for merchants. Local merchants usually used a weighed unit of silver, *yinliang* or *tael*, in keeping their accounts. Though silver ingots of various fineness and weight were in circulation among merchants, the unit of account represented no particular ingots. The weighed unit of silver was a sort of imaginary money shared by local merchants. Nor did it coincide with governmental units of silver which measured the payment of taxes. By count or by weight, silvers were quoted apart from their intrinsic contents.[7] The market value of silver content could work as an anchor at best, not as a precise measure of a currency's value.

Heterogeneous phenomena in monetary circulation among a quarter of humanity, China, were also found among the second largest population, India. Bengal was the most commercialised region of the subcontinent in the early colonial period. In 1789, the British East India Company planned to introduce the uniform silver rupee and it canvassed opinions on this plan from the Commercial Residents across Bengal. A Resident of Dacca, in his reply, revealed his hope that a uniform currency system would be established, stating that as many as 52 kinds of coins of different weights and fineness circulated in Dacca and that shroffs (moneychangers) fully exploited the situation to their advantage.[8] The same striking feature as in China was found in reports on the local markets in Bengal, where even within a single region they used different monies according to commodity; for example, the silver coin for trading rice was different to that for cloth.[9] In the case of Jessore, trade for rice and other grains was done with the Sicca rupee, while the French Arcot rupee was used for salt trade.[10]

[5] Tōa Dōbunkai, *Shina Shōbetsu Zenshi* (Provincial topographies in China), vol. 11, *Kōsei shō* (Jiangxi province) (Shanghai, 1918), p. 931.

[6] Imperial Maritime Customs, China, *Decennial Reports, 1902–11*, vol. 1 (Shanghai, 1912), p. 283.

[7] 'The exchange value between local dollars and local taels fluctuates considerably, and into this fluctuation many elements quite apart from the intrinsic value of either currency enter.' Vissering, *On Chinese Currency*, p. 152.

[8] D. B. Mitra, *Monetary System in the Bengal Residency* (Calcutta, 1991), p. 54.

[9] J. C. Sinha, *Indian Currency Problems in the Last Decade (1926–1936)* (Delhi, 1938), p. 4.

[10] Mitra, *Monetary System*, p. 81.

Asymmetric preferences for monies by merchants and peasants also occurred in Bengal, along the same lines as in the Mid Yangzi region mentioned above. Local reports across Bengal tell us vividly how the English Residents suffered from the unpopularity of silver in the local markets. The Collector of Rajshahi discovered to his surprise that silver rupees were not available in the open bazaar.[11] Though the weavers of Golagore used to get their advances from the East India Company in silver rupees or gold mohurs to procure cotton and thread from the local markets, they had to convert these currencies into cowries (shell money) before they purchased necessary materials in the local markets.

Though they appeared to be complicated, it is not difficult to see that China and India shared some aspects. First of all, some currencies appreciated every autumn. Copper cash and cowries[12] tended to increase in value against silver during the harvest season. Both were fractional in value, but suitable for distribution among peasants. However, seasonality also affected the relationship among different silver monies. In some districts of Bengal the Arcot rupee appreciated against the Sicca rupee during the harvest season. Unlike the Sicca rupee, which was preferable in payment of taxes and in remittance to Calcutta, the Arcot rupee in Bengal was more popular among peasants and artisans.[13]

The seasonal clash between monetary supply and demand was not conditioned solely by grain or autumn. In Shanghai the silver dollars increased in value in terms of the silver *tael* every spring due to the silk cocoon season, since certain kinds of dollars were popular in acquiring cocoons from the sericultural areas of Jiansu and Zhejiang provinces. For five years from 1922 to 1926 Shanghai annually exported on average 63,332 thousand dollars. However, exports in May of these years amounted to 13,850 thousand dollars on average, or nearly 22 per cent of a year, while April and June accounted for only 3,326 and 2,458 thousand dollars respectively.[14]

Apparently the rates of silvers moved independently of the value of the metal, since there was no reason why one silver money, in terms of its intrinsic value, should appreciate temporarily against another form of silver. The movements of quotations of currencies seemed to be linked to their particular demands, not to their metallic values. However, why were some quantities of copper coins or Arcot rupee not imported or minted when they appreciated so much? If the supply were increased incessantly, the appreciation of a particular currency could be halted quite quickly. However, transactions were in fact mostly concluded according to a spot price set on a daily basis. Therefore, any late supply of additional money was useless.

[11] Ibid., p. 176.

[12] P. R. Mahapatra, 'Currency system in medieval Orissa', *Quarterly Review of Historical Studies*, 9.2 (1969–70).

[13] Mitra, *Monetary System*, pp. 72-3.

[14] Shanghai Yinhang Diaochabu, 'Shinianlai shanghai xianjin liutong zhi guancha (Observation of silver circulation in Shanghai during this decade)', *Yinhang Zhoubao*, 16–43 (1932), pp. 22-5.

Equilibrium through arbitrage could work only when the gap in quotations became so significantly large that ill adjustment of timing in transactions became trivial.

The appreciation of both copper coins in the Mid Yangzi and the Arcot rupee in Bengal were beyond the control of a government or merchants' organisation. However, this does not mean that governmental activities had no effect on the exchange rates between monies. On the contrary, both a silver unit in China (specifically the Kuping *tael*) and the Sicca rupee in India appreciated during the period when taxes were collected. Fiscal administration in terms of money also gave strong seasonality to the relationship between currencies. In this sense, the governmental flow of currencies also had its own circuit.

Here we call the coupling of a particular money and a particular trade a currency circuit. Not just China and India, but other societies displayed many of these currency circuits until the end of eighteenth century at least. In order to see what lay behind this universal phenomenon, the rural markets of early twentieth-century China will be examined in the next section.

III

The cycle of harvest and slack season strongly influenced peasants' activity across the world. Their access to markets had seasonal rhythm. Table 1 shows the seasonal

Table I. *Monthly sales of products by 45 farmhouses in a village of Shanxi, 1939 (unit:* yuan*)*

	Grain	Vegetables	Total	In village market	For Taiyuan city	Direct from homes
Jan.	0.0	20.0	20.0	0	20.0	0.0
Feb.	0.0	0.0	0.0	0	0.0	0.0
Mar.	24.0	7.5	31.5	16.5	0.0	15.0
Apr.	57.0	0.0	57.0	42	0.0	15.0
May	0.0	0.0	0.0	0	0.0	0.0
June	17.0	100.8	117.8	3.8	70.8	43.3
July	115.0	218.3	218.3	126.3	48.8	43.3
Aug.	214.5	99.7	314.2	192.0	122.2	0.0
Sep.	90.7	369.9	460.7	137.2	257.2	48.3
Oct.	377.5	401.0	778.5	409.0	269.5	100.0
Nov.	15.0	70.0	85.0	15.0	70.0	0.0
Dec.	297.4	49.7	447.1	284.9	132.2	30.0
Total	1208.1	1321.9	2530.0	1226.6	1008.5	294.9

Source: Akinobu Kuroda, '20 seiki shoki taigen-ken ni miru chiiki keizai no genki (What made a boundary of regional economy? The case of Taiyuan county in early twentieth-century China)', *Tōyōshi Kenkyū* 54.4 (1996).
Numbers may not sum, due to rounding.

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fluctuation in peasants' sale of their products in northern China. They mostly sold them in autumn through winter after the harvest, while little was sold during the summer. Naturally the demand for money increased after the harvest, while it remained low during the other seasons, which meant the currencies were stagnant for a longer period than they were in circulation.

The seasonal movement of monetary demand brought another fluctuation; interest rates also largely followed the cycle of peasants' product sales. Table 2 suggests that the interest rate in a city in another northern province also rose during autumn. We have to note that it was not before but after the harvest that the interest rate reached its peak. There is no doubt that the movement of ready cash to villages caused the interest rate in cities to rise.

The point to notice here is that each of the various demands for money can have a different geographical zone from other demands. The primary sources of Table 1 show that grain was mainly sold in periodic markets in villages, while most vegetables were sold in the nearest large city, Taiyuan. Table 3 below classifies the commodities sold in rural markets of 1930s Shandong by the distance from their place of production to the market. It is obvious that the grain sold in rural markets was brought overwhelmingly from the closest zone. The smallest zone of 'within 25 km' in the table is too wide to reflect the reality, since this zone consisted of 11 rural markets. Many other reports on rural markets in China support the conclusion that surplus grain produced by local peasants was mostly traded at a periodic market they could easily reach within half a day. In contrast, tea was brought from more than 150 km away.

Thus we may assume that setting the prices of grain could depend more on the demand and supply in rural markets than that of other commodities like tea and raw silk, the prices of which were dependent on wider markets. Here I take a 'lower-level market' to be one where demand and supply were basically adjusted within a rural market zone, while I call an 'upper-level market' one in which the adjustments were made within wider range zones. A peasant relied on a lower-level market to sell his grain, but on an upper-level market for buying tea or selling tobacco. Daily urban transactions for necessary commodities should be categorised into the former rather than the latter. In studying monetary circulation, the vertical classification of markets in this way can be more suitable than geographical, or horizontal, division between urban and rural, though I continue to use these terms for

Table 2. *Interest rate (monthly per cent) in Ji-nan, Shandong, early 1920s*

Spring	Summer	Autumn	Winter
1	0.80	1.80	1.50

Source: 'Ji-nan zhi jinrong jiguan yu tonghuo (Financial institutes and currencies in Ji-nan)', *Zhongwai Jingji Zhoukan,* 84 (1924).

Table 3. *Commodities and their trading distances in 11 rural markets, Zouping, Shandong, 1933 (unit:* yuan*)*

	Within 25 km	25–50 km	50–150 km	over 150 km	Total
Machine-made products	0	250	2805	8745[(i)]	11800
Handicraft products	9190[(ii)]	1850[(iii)]	955	3575[(iv)]	15570
Agricultural products	36705[(v)]	0	6755[(vi)]	7195[(vii)]	50675
Total	45895	2100	10535	19515	78045

Specific commodities: (i) matches, cotton yarn, cotton cloth, (ii) hand-made cloth, shoes, (iii) belts, writing brushes, (iv) tin foil, (v) grain, vegetables, livestock, (vi) tobacco, (vii) tea. *Source*: Zhang Youyi, *Zhongguo Jindai Nongyeshi Ziliao* (Materials on the agricultural history of modern China), vol. 3 (Beijing, 1957), p. 319.

expedience. To put it simply, silver circulated in the upper layer, while copper cash circulated in the lower layer.

As Table 3 suggests, we can take the market layers as being more multiple than just upper and lower. Thus, the concentric image of traditional markets has been described as the centre place theory has done.[15] However, the overlap between a particular currency and a trade zone has been mentioned but never attracted sufficient attention. This is because very few have noticed the differences in the behaviour of currencies and the tensions between currencies across trade circuits.

IV

Just as water flows in streams while it is stagnant in reservoirs, a currency also runs at certain times and stands still at others. Unlike peasants and the government, who received monies seasonally with the harvest and tax collection, merchants struggled to prevent their own currencies from stagnating. From the modern viewpoint a unified currency would be desirable to reduce uncertainty and cut various transaction costs. However, in reality it was extremely difficult for a single currency to meet the demands from all levels of the market with sufficient flexibility. A lower-level market might require more currency at one particular time, while an upper-level market might need to hang on to it. Their demands may not be complementary, and could even be synchronous. If uneven demands for money from different layers could not find flexible supplies of different-denomination currencies, an unfixed rate between two monies respectively mediated transactions at two levels, and provided the flexibility to avoid a liquidity crisis (Model 1).

However, why was the supply of currencies so inflexible? As shown in the introductory note to this issue, even with the development of a banking system which

[15] B. J. L. Berry, *Geography of Market Centers and Retail Distribution* (Englewood Cliffs, NJ, 1967).

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will inevitably work well to collect idle currencies, a large quantity of coins was annually lost out of visible circulation for unaccountable reasons. Statistics based on investigations in the 1960s revealed that the smallest-denomination coins disappeared faster than larger-denomination ones. These statistics indicate that the propensity to assemble differs according to currency. The outcome of this modern experiment offers a new perspective on the monetary history of the period when there was no banking system and a greater dependency on coins.

The highest propensity to return to the issuer is found in the cases of precious metal coins in re-minting systems under regional authorities. Medieval archaeological findings in England show that most hoards consist of silver pennies less than five years old.[16] It is probably safe to say, as far as northwestern Europe is concerned, that responding to orders to re-mint by kings, princes and barons, a significant portion of precious metal coins returned to the mint from where they had been issued. Other than a strong commitment to monetary circulation by the authorities possessing the right of issuance, we cannot explain this high return tendency.

Such a high propensity for silver pennies to return stands in clear contrast with the unidirectional tendency in the movements of copper cash in East Asia. Though taxation in terms of copper cash prompted some portion of the small-denomination coins to return to the official treasury, the majority of them did not return after leaving the mints. Ruling Chinese dynasties rarely felt the need to issue their own coins to replace those issued by their predecessors. Consequently, it was common for copper coins minted over a very long time-span to be in circulation side by side. Thus, it may astonish Japanese (or Chinese) historians, accustomed to seeing hoards of coins with inscriptions ranging from the seventh century to the fifteenth century[17] (though not always reflecting the actual date of issuance), to learn that, in medieval England, most hoards of the same period comprised coins that were no more than five years old, at most twenty years. Thus, in different parts of the world we find a sharp contrast between the high propensity to assemble in one currency and the strong tendency to disperse in another.

A dispersed currency could cause difficulties for large-scale commercial activities. For example, in early twentieth-century Mid Yangzi, China, some Japanese firms suffered from a shortage of copper coins for purchasing peasant products such as raw cotton.[18] This was serious for them, because bringing in silver was rarely suitable for acquiring commodities from small households, who preferred fractional coins. An abrupt surge in demand for small change hiked the rate of copper coins to silver, and consequently hampered their businesses. Similar situations had been already reported in late eighteenth-century Bengal, India. The Residents of the

[16] P. Grierson, *Numismatics* (Oxford, 1975), p.134.

[17] K. Suzuki, *Shutsudo Senka no Kenkyū* (Study of unearthed copper coins) (Tokyo, 1999); T. Miyake, *Chūgoku no Umerareta Senka* (Buried copper coins in China) (Tokyo, 2005).

[18] A. Kuroda, *Chūka Teikoku no Kōzō to Sekai Keizai* (The structure of the Chinese empire and the world economy) (Nagoya, 1994), p. 303.

British East India Company found that silver rupees were too expensive to purchase goods in rural markets where small-denomination currencies, such as copper coins and shell monies (cowrie*s*), were preferable.

As mentioned above, China and India shared another important feature. In both countries small-denomination currencies appreciated considerably after the harvest. This is easily explained, if we consider the strong seasonal biases of monetary distributions in peasant-dominated economies. As Table 1 indicated, an investigation of peasant households in early twentieth-century China explicitly showed that most monetary income was obtained in a few months during and after the harvest. The same tendency can be confirmed in other peasant economies such as Java.[19] Considering these high seasonal demands for money in rural areas, it is not surprising that the amount of coins issued by the Reserve Bank of India would surge every autumn.[20] The interest rates of cities in China rose after harvest seasons as well.

The distribution of currencies from urban markets to rural ones, or from merchants to peasants, was concentrated within a few months. In other words, currencies poured into small householders over the short term. On the other hand, monthly movements of their expenditures were flat rather than biased. It means that the velocity in the return flow of currency from rural markets to urban ones, or from peasants to merchants, was more constant than the downward flow from city to village.

In addition, we may assume that, while large-denomination currencies were necessary in upper-level markets, small ones were in demand in lower-level markets. The downward flow of money needs to accommodate exchange into fractional currencies, while the return up-flow must allow for the reverse exchange. Considering the transport, exchange and other expense costs per unit, distributing currencies could be easier than collecting the same currencies to return.

Thus, given the need to find suitable denominations, and the temporality of their individual demands, the relationship between the distributed flow of currencies to the lower market and the return flow to the upper market can be thought of as being asymmetric. Even if the annual amount of purchases by peasants from merchants in cities might have been equivalent to that of sales in the opposite direction, the components of the currency flows would be different. Recall the tendency for spot transactions to prevail in rural markets after the harvest in Asia. During this time, small-denomination currencies were in greater demand to distribute among peasants in return for their agricultural products. (Here one may distinguish a major difference between China preferring small coins and Europe using large money, as Fantacci will argue in this issue.) However, the merchants' side in the upper-level market had no strong wish to re-collect the small change and transport it back. That is why, though they were exchangeable, the streams of large-denomination currencies and small ones were often separate.

[19] W. Wolters, 'Southeast Asia in the Asian setting: shifting geographies of currencies and networks', in P. H. Kratoska, R. Raben and H. S. Nordholt (eds.), *Locating Southeast Asia* (Singapore, 2005).

[20] Reserve Bank of India, *Report on Currency and Finance for the Year 1937–38* (Bombay, 1938), p. 49.

Trade must be bilateral. The value handed to the opposite side should be thought to be the same as that obtained. However, the compositions of monetary flow were not always in symmetry. Rather, as far as its flow between urban and rural markets is concerned, the monetary current down to the rural markets did not match that up to the urban markets. Like a vortex appearing on the edge of a stream, a currency flow entering the seasonally biased cycle of a rural market would separate from the currency currents among merchants, and between cities, and could not easily return to the urban market (Model 2).

Currency flows separated from the main stream might appear to be 'hoarded' because of their diminished connection with business activities in upper-level markets. However, we must distinguish such an involuntary 'hoard' from a voluntary hoard based on the holder's choice, such as Keynes assumed.[21] The large portion of unaccounted loss of coins mentioned above suggests that it was not easy for the former to rejoin the main current. The argument here is that the frictions produced by streams of currencies would inevitably result in the unaccountable loss of currencies.

V

Non-uniform streams of currencies did not always confine themselves to just a dual structure like the urban and the rural, or long-distance trade and local usage. Rather, currencies could operate in triple or multiple layers according to circumstances.

The Maria Theresa dollar's circulation in the early twentieth-century Red Sea region shows at least three layers of monetary circulation, with the layer of the silver dollar of Austrian origin inserted in the middle (Figure 1). Above the layer of the dollar's circulation the pound sterling or the equivalent Indian rupee was used in the international or interregional circuits. At the boundaries between the two upper layers, depending on fluctuating exchange rates, native exchangers such as shroffs and traders engaging in interregional trade were competing for profits through speculation. On the other hand, below the dollar's flow, a variety of smaller monies such as the Italian 10 lira note, copper coins, ammunition cartridges, cloths, salt bars and beads circulated, varying from region to region. At the borders between the two lower layers, currency exchange businesses also prospered, though on a smaller scale.

Within the multiple set of currencies, the Maria Theresa dollar performed as a device switching local markets on or off the international market according to favourable or unfavourable conditions for exporters. The movement of annual issuance of the Maria Theresa dollar suggests that the currency became more necessary after the 1890s than before, as demands for agricultural products such as coffee and hides in the Red Sea region increased. Its role as a buffering device in multiple

[21] J. M. Keynes, *A Treatise on Money*, vol. 1 (London, 1971), p. 130.

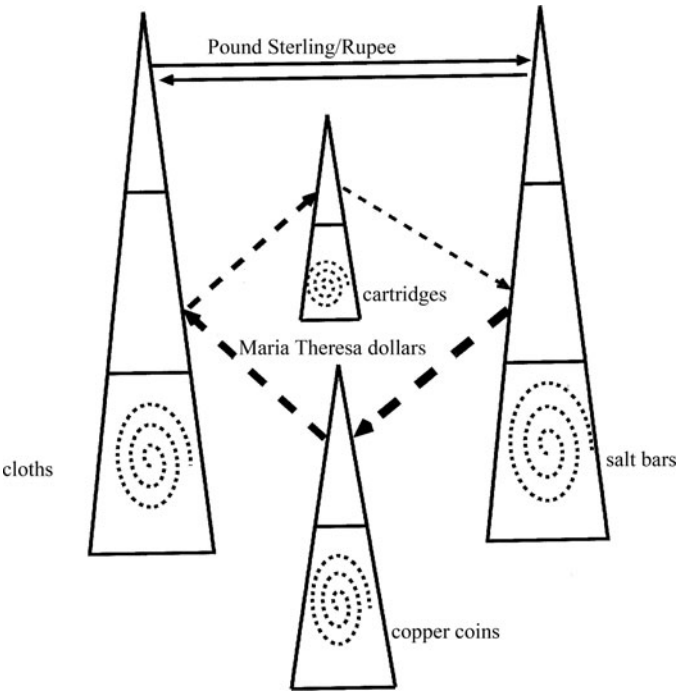

Figure 1. *Triple layer of currencies interfaced by the Maria Theresa dollar*

markets caused the Maria Theresa dollar to survive and to be continually overvalued (Model 3).

Besides the vertical movements interfacing between peasant households and the international market, the dollar also worked well to combine urban cities through a grand circuit of long journeys. Maria Theresa dollars leaving Aden continued to make their way further, rather than be returned by the same route, and some of them finally ended up back in Aden after a series of one-way trips. Figure 1 indicates that the stream of the Maria Theresa dollar made a circuit diminishing due to unaccountable loss.

Thus, horizontal movements between cities as well as the vertical ones between urban and rural markets were also unidirectional rather than bilateral.[22] Here we find a clear example of a complementary relationship among currencies, in which any single money could not represent actual liquidity, but an assortment of monies could. Similar combinations of currencies could be found in other areas and other periods including early twentieth-century China and late eighteenth-century India, as mentioned above. Even more complicated assortments were not so rare. The

[22] A. Kuroda, 'The Maria Theresa dollar in the early twentieth-century Red Sea region: a complementary interface between multiple markets', *Financial History Review*, 14.1 (2007).

coexistence of numerous currencies, each behaving independently, forced merchants to invent a device for measuring them neutrally.

The most stable neutrality could be attained through abandoning any actual substance. That is what we call imaginary money or ghost money. A typical case is found in some silver *taels* in modern Chinese cities such as Ningbo, where various currencies, a number of silver ingots, silver coins, copper cash and private paper currencies were concurrently in circulation with no fixed quotation, but merchants made their trade among themselves in terms of a particular silver *tael*.[23] The *tael* had double meanings: a unit of weight and a unit of money. Though silver ingots of various weights and finenesses were in circulation, nothing representing the unit of *tael* as a monetary account circulated. The unit was alive only in the account books of local merchants. The important point here is that similar imaginary units of account were found across the world and across a long span of time. We can notice a similar system of keeping bills of exchange among late medieval European merchants.[24]

So far, the word 'currency' has been used only for money physically circulating. In this sense ghost money, which was working only as a unit of account with no substance, cannot be classified as currency. This position is in accordance with Einaudi in insisting that imaginary money should not be considered money.[25] It was a secondary structure with no substantial presence. However, we can take it as a part of the complementary monetary system, as far as it interfaced with assortments of currencies. Surely imaginary money could work only in association with coexisting currencies.

Note that a monetary unit of account without substance, the imaginary money defined above, must not be confused with a governmental paper currency or a central bank note, the value of which appears to be independent from any material substance. Their face value may look imaginary, but they have substances of paper and are geographically in circulation across nations. Ghost money without substance could not exist beyond a particular merchant circuit. There is a substantial difference between a monetary unit of account with substance and one without it, which even Einaudi failed to distinguish clearly.

VI

What conditions could mould a variety of monies into a single monetary system? In some west European countries, typically England, the east coast of the United States, and, to a lesser extent, Japan, a sort of compatibility among monies existed until around 1800, that is, before industrialisation. As far as their financial situations are

[23] Kuroda, *Chūka Teikoku*, pp. 35, 108.

[24] M.-T. Boyer-Xambeu, C. Deleplace and L. Gillard, *Private Money and Public Currencies*, trans. from the French by Azizeh Azodi (New York, 1994).

[25] L. Einaudi, 'The theory of imaginary money from Charlemagne to the French Revolution', trans. Giorgio Tagliacozzo, in Frederic C. Lane and Jelle C. Riemersma (eds.), *Enterprise and Secular Change* (London, 1953), p. 237.

concerned, those societies shared two characteristics: firstly the presence of a remittance system involving public finance, in which a centre for offsetting worked well; and secondly the prevalence of local credit institutions which could substantially save the usage of cash.[26] A well-centred remittance system could replace unidirectional round circuits connecting cities by particular trade currencies such as the Maria Theresa dollar, while flexible credit supplies in local markets could ease the tension between the demand and supply of money, and consequently make it easier to fix the local monetary unit of account to that of the upper-level one.

The point does not lie in whether either factor existed but in the combination of the two factors. On one hand, a sort of exchange bill system was developed in Mughal India.[27] China also had long history of transferring money over long distances through paper bills. On the other hand, local credit supplies like mutual credits were found in various ways in many societies. However, few societies before the twentieth century had knitted both threads to form a structure synchronising them. Some sort of adaptor was necessary to adjust monetary circuits with different dispositions into a single unit. The three regions mentioned above shared the experience of developing local banks which could supply credits compatible with currencies circulating nationwide. Under a mutual dependence between the two conditions the space in which currencies bilaterally moved along both vertical and horizontal axes appeared. In China and India, exchangers could make profits both in urban and rural markets, but they did not develop indigenous local banks. However, the different institutional structures are more important than the superficial issue of whether bank or exchanger fulfilled this function. The different paths taken by China and Japan after the eighteenth century prove that, insofar as synchronising currencies is concerned, a combination of sociopolitical factors rather than the degree of commercialisation in peasant households happened to bring about the very different results.

In mid eighteenth-century Japan, a combination of changes in monetary circulation began. The changes include the prevalence of the *Hansatsu* (paper currencies issued by the domains); the disappearance of silver by weight out of actual circulation and the successful introduction of silver by count with a fixed ratio to gold;[28] the acceptance of multiple-unit coins made of non-precious metals heralded by the 4-mon brass coin in 1767.[29] This series of transformations can be seen as a development of convertibility among local currencies, or, from the opposite viewpoint, a loss

[26] P. T. Hoffman, *Growth in a Traditional Society: the French Countryside 1450–1815* (Princeton, 1996); E. Ōtsuka, *Nihon Kinsei Nōson Kinyūshi no Kenkyū* (Study of rural financial history in early modern Japan) (Tokyo, 1996); N. Lamoreaux, *Insider Lending: Banks, Personal Connections and Economic Development in Industrial New England* (Cambridge, 1994).

[27] I. Habib, 'The system of bills of exchange (hundi) in the Mughal empire', *Proceedings of Indian History Congress*, Patiala Session (1967).

[28] M. Iwahashi, 'Kinsei sanka seido no seiritsu to hōkai (Formation and collapse of the tri-monetary system in the Tokugawa period)', *Matsuyama Daigaku Ronsyū*, 11.4 (1999).

[29] T. Takizawa, *Nihon no Kahei no Rekishi* (History of Japanese currencies) (Tokyo, 1996), p. 142.

of locally self-organised currency supply to meet local demand, representing the dominance of town merchants, or the disappearance of autonomous rural markets.

The most important change happened in the relationship between copper cash and silver (or gold). The point is that, after the middle of the eighteenth century, the current rates in local towns began to follow that of Osaka, the commercial centre of Japan, with small margins. In other words, the exchange rate reflected demand/supply between silver and copper coins in Osaka rather than demand/supply within a local town. This change was closely related to the prevalence of paper currencies issued by the domains in the same period.[30] The domainal paper currencies were available only through the domainal administration, including the monopoly businesses by the domains in association with privileged merchants, especially those in a central city such as Osaka where the domains brought their products, including rice.

The contrast in the early nineteenth century between rural-market-dominating Qing China and local-castle-town-dominating Tokugawa Japan has already been made clear.[31] More important is their marked further divergence after this period. The estimated number of rural periodic markets in Japan decreased to almost nil through the nineteenth century,[32] whereas in China they increased to about 50,000 in the early twentieth century, twice as many as in the eighteenth.[33]

The demand for money in rural markets was fragmentary in amount for each transaction and biased strongly by the seasonality of agricultural society. Vigorous business activities by numerous Chinese peasants, who could also be petty traders, needed a large amount of coin and currency in the season after the harvest, but most of them were not current during the rest of the year. The Chinese peasant economy created huge exogenous money, including various local private notes,[34] to meet the disproportionate demand.

In contrast, in rural Japan it was not village traders but the merchants from the castle towns who dominated market activities. Peasants tended to accept the prices offered by the merchants. In addition, Japanese village communities and townships offered a framework of mutual aid which would turn out to be institutions for credit supply. Some of them metamorphosed into local banks after the Meiji Restoration. Put simply, Japanese peasant societies created endogenous money to deal with scarcity of currencies. Without this background we could not account for the formation of

[30] S. Nakagawa, *Osaka Ryōgaeshō no Kin'yū to Syakai* (Financial activities of the Osaka exchangers and society) (Osaka, 2003), pp. 352–3.

[31] G. Rozman, *Urban Networks in Ch'ing China and Tokugawa Japan* (Princeton, 1973), p. 102.

[32] After the latter half of the eighteenth century, rural markets in Japan either changed to perform the specific function of collecting local special products for central cities like Osaka or Edo, or otherwise went towards extinction. Y. Ito, *Kinsei Zaikata-ichi no Kōzō* (Structure of the rural market in Tokugawa Japan) (Tokyo, 1967), pp. 117–19.

[33] G. W. Skinner, 'Marketing and social structure in rural China', *Journal of Asian Studies*, 24.1, 2, 3 (1964–5).

[34] See J. B. Dai, *Zhonguo Qianpiao* (Beijing, 2001).

the network connecting local financial institutions in Japan in the second half of the nineteenth century.[35]

Obviously, geographical and historical conditions were different between Japan and Sweden, which Engdahl and Ögren will show later in this issue. However, as far as limited dependence on ready cash for rural transactions, the advantage of cities in setting prices, and the dependence on a remittance system in distant trades are concerned, both countries in the early nineteenth century had certain characteristics in common.

VII

Let us return to the observation by H. B. Morse cited at the beginning of this article. Sharing laments and criticisms with foreign contemporaries engaging in business in early twentieth-century China, Morse, who struggled with the most complicated monetary system in history, seemed to have distinguished a multiple system amid the apparent confusion. His long career with the Maritime Customs, which was the most influential agency in Chinese finance, allowed him the insight to notice an order behind the 'chaos', though he did not have the words to explain what it meant. The concept of the complementarity among monies could have supplied him with the words.

The concept indicates that an assortment of monies can supply what a single money can not do. Even though, at the bottom of the multiple market, a coin appeared to 'stand on its own feet' as Morse put it, in fact it only worked well in association with other monies at the upper layers. The association was loose and fluctuating, but it represented couplings of a trade circuit and a particular currency. We called the union a currency circuit. The circuits can overlap and the currencies can permeate each other. However porous the membrane separating the circuits might be, though, one money cannot substitute for another.

In the actual market, especially in agricultural societies, the total demand for different monies cannot move together. According to the bias between busy seasons and slack seasons, in the lower-layer market or rural market, the demand for money has to have a large fluctuation, while, in the upper-layer market or urban market, the demand will have a more restricted movement. The trajectory summing up the different demands from layer to layer is inevitably irregular or incoherent (Model 4). Otherwise, a system with a single money would have to have sufficient flexibility by itself to supply the variety of demands.

On the other hand, neither can all the supply of money move together. To collect currencies is not as effortless as to disperse them. The difficulty of assembling some currencies makes the stream of currency unidirectional rather than bilateral. The propensity to assemble differs from currency to currency, according to the gap between

[35] M. Tsurumi, *Nihon Shin'yōkikō no Kakuritsu* (The establishment of Japanese credit system) (Tokyo, 1991).

small denominations and large ones. As the statistics from the 1960s show, the smallest-denomination currency has the lowest probability of returning to the issuer.

Assume a combination of demand and supply in which a government issues only a mono-unit coin, but the currency can reach rural markets sufficiently to mediate daily transactions (China). In contrast with another combination in which only a large-denomination currency is supplied purely within urban or upper layer markets, the majority of the small money stays and waits for the next busy season such as the harvest.

Thus, unidirectional and uneven streams of currencies make it difficult for any single money elastically to meet incoherent demands. A solution is the coupling of a monetary supply and a partial market with a coherent demand for money. However, this resolution makes a market full of currency circuits.

The standard formula for a currency is a trinity of currency, unit of account and weight of a particular material such as gold. In contrast to the case of imaginary money, its unit of account has an actual substance. Its supply could be elastic, using paper currencies and subsidiary coins as well as gold or silver coins of a specified weight and fineness. The point is that all the currency is in a compatible relationship. The compatibility could be achieved, not simply with commercialisation among households, but with synchronisation across market layers. This article has left aside the question of credit for later consideration, but a local credit supply can work to reduce friction in monetary demand between currency circuits.[36]

The friction of a fluid is denoted by viscosity. It is not with velocity but with viscosity that we can depict well the behaviours of currencies in actual markets, as opposed to conceptual markets. The complementary relationship among monies proves that the viscosity actually affects the circulation of currencies. Social scientists have rarely paid attention to incoherent aspects in actual monetary flows. So far they appear to suppose that, with no friction or no loss of energy, an ideal fluid can be in circulation uniformly and eternally. That is why few cast any doubt on fundamental assumptions such as the velocity holding constant, or uniformity in the quantity theory of money, $MV = PT$.

This article has tried to provide a clue for describing the behaviour of currencies as they were actually used in China and other Asian regions. A multiplicity of markets and non-synchronised cycles in demand for money caused currencies to move incoherently. Thus, a number of currency circuits could be concurrent but non-integrable. A combination between inelasticity in the monetary supply and diversified demand forced local traders to establish a complementary order

[36] One institutional study assumes transaction costs caused by asymmetry of information as a friction. O. E. Williamson, *The Economic Institutions of Capitalism* (New York, 1985), pp. 18-19. Unlike the cases of making contracts among individual traders with different knowledge, the frictions appearing in monetary circulation suggested here are caused by currencies' own movements beyond personal perceptions.

among monies, though concurrent currencies in history did not always succeed in reaching complementary balance. Complementarity is too intangible to be called an institution, but it was flexible enough to stabilise transactions in variable conditions. Monetary history indicates that certainty does not always bring stability.[37]

Appendix

Model 1. The reason why currencies become plural

In the case of a single currency:

$$M = \frac{P_u T_u}{V_u} + \frac{P_r T_r}{V_r}$$

In the case of plural currencies:

$$M_u = \frac{P_u T_u}{V_u}$$
$$M_r = \frac{P_r T_r}{V_r}$$

u indicates urban market, while r indicates rural market; V_u and V_r are given.

In a case where a single currency, for example, a silver coin, circulates in both urban and rural markets, if the elasticity of additional currency supply is not perfect, the relationship between $P_u T_u$ and $P_r T_r$ must be negative. Assume that the demand for grain in an urban market becomes stronger. Without an elastic additional supply of silver the trade in a rural market would contract. In addition, V_r can be assumed to be lower than V_u. If this is true, in order to keep the same size of trade in both markets, it would be necessary to hoard more silver in the rural market. If the urban market side wishes to keep the silver, the best way is to conduct businesses with the rural market in terms of non-cash: commodities, credit and service. Meanwhile, if different currencies, such as a silver coin in an urban market and a copper coin in a rural market, circulated side by side without a fixed ratio, the actual exchange ratio between the two currencies would depend on $P_u T_u$ and $P_r T_r$ as well as on the supplies of both currencies. Both markets could then have a more flexible monetary supply to stabilise transactions in each market, while businesses ranging across two layers of markets would suffer from uncertainty due to the fluctuating exchange rate between the two currencies.

[37] Current institutional approaches put too much stress on reducing uncertainty to decrease transaction costs. D. C. North, *Institutions and Institutional Change and Economic Performance* (Cambridge, 1990), pp. 3-4.

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Model 2. The reason why streams become unidirectional

$$\rho_u v_u A_u = \rho_r v_r A_r$$

$$A = f(s, p, t)$$

v: velocity of currency (annual average)
s: degree of spatial dispersion of traders
p: population independently engaging in trade
t: temporary bias in demand for money such as seasonality

If the fluid is incompressible, the density (ρ) must be constant.

The difference between A_r and A_u becomes larger, as the rural market covers more space (s), has more traders (p), and its monetary demand has more temporal bias (t). Assume that the size of both the purchase and the sale from urban to rural is the same in terms of a monetary unit. For example, the urban side purchases a bottle of wine for 10 cents one thousand times, while it sells a piece of cloth for 10 dollars ten times. From the urban side viewpoint 100 one-dollar coins appear to be paid and returned. However, in the sphere of the rural market the dollar must be converted into another currency, such as a brass penny whose face value is less than one dollar, as if a line in a stream were divided into multiple sub-lines. Then, the inelastic supply of small money disables some dollars from conversion, like the vortexes appearing in the two left corners. In returning to the urban market, small monies need to be converted to a full dollar. However, some small coins dispersed in the rural market fail to assemble, like the emergence of the vortexes in the right corners (Figure A1). These vortexes represent the unaccounted loss of coins out of visible circulation. Thus, the same monetary unit has different contents between the urban market and rural market, and as long as the conversions are not perfect, additional supplies of currency are necessary to maintain the volume of trade. Since the usefulness of coins differs between the two markets, the exchange rate can be different according to the market and change depending on the situation, such as the harvest season or slack

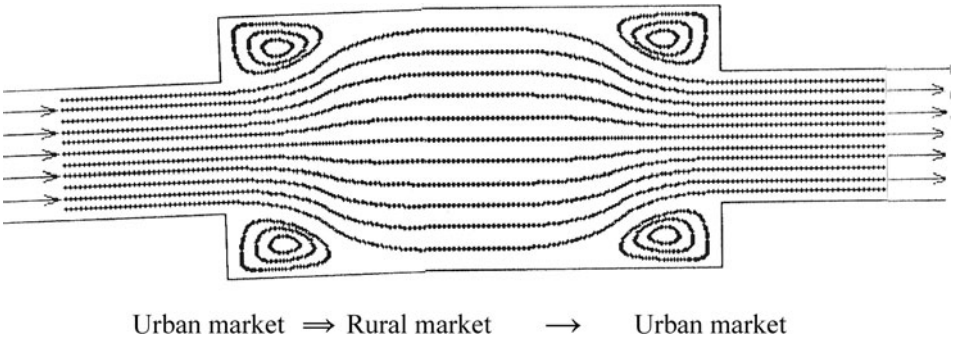

Figure A1. *Unidirectional streams of currency with frictions*

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season. The fluid dynamics assumes that, when the fluid is compressible, the density (ρ) must be inconstant.[38] On this basis, the flow of the currency in the sphere of the rural market can have a different density (currencies per monetary unit) from that in the urban one. A compatible currency system adjusts monetary supply to keep the density constant, while an incompatible one accommodates the densities to supplement the inelastic supply.

Model 3. The reason why circuits multiplied (the extent of the viscosity effect)

$$\Delta h = \left(1 - \frac{A_u}{A_r}\right) v_u$$

To use the terminology of fluid dynamics, h indicates the loss of head, or the size of vortex (separated stream).

Figure A1 in Model 2 is doubly connected: through the urban and rural markets. However, the connection could be triple or more. If the gap between A_u and A_r is so big that more and larger vortexes appear, inserting a third currency layer with an intermediary denomination between two spheres may decrease the loss of head. That is why the actual circulation of currencies can be in more multiple layers. The circulation of the Maria Theresa dollar in the Red Sea region was a case in point.

Model 4. The reason why a supply with a single money has difficulty meeting the demand of a multiple market

If we plot a demand for money along a horizontal time scale, a seasonal fluctuation of monetary demand would appear to be like a wave function. Assuming a simple harmonic oscillation as expressed by a trigonometric function expressed as $x = A \cos(\omega t + \theta)$, we can write out the three trajectories with different amplitude and different angular frequency as below:

$X = A \cos(\omega t + \theta)$

$Y = B \cos(\omega' t + \theta')$

$Z = C \cos(\omega'' t + \theta'')$

ω: angular frequency t: time A, B, C: amplitude θ: phase constant

If the three curves move independently, they would appear to be regular. However, in combining three trajectories into one, it would generate 'chaotic' behaviour (Figure A2) as expressed by the following equation:

$$\emptyset = A \cos(\omega t + \theta) + B \cos(\omega' t + \theta') + C \cos(\omega'' t + \theta'')$$

[38] Part of Figure A1 is modified from R. Ishiwata, *Ryūtai Rikigaku Nyūmon* (Introduction to fluid dynamics) (Tokyo, 2000), p. 101.

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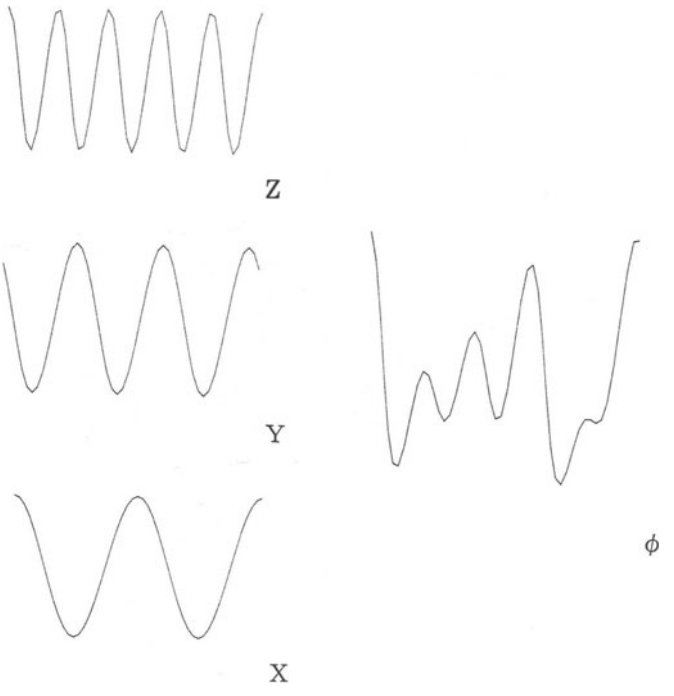

Figure A2. *Incoherent trajectory integrating coherent ones*

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