

Prospects for the Introduction of a Clearing Union at the International Level¹

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Summary:

The possibility of successful International Financial System reform based on a Currency Union will depend on three factors. The first is an understanding of the proposal as an extension of Keynes' alternative approach to monetary theory to substitute the Quantity theory of money and prices. Section 1 presents the Currency/Clearing proposal of the 1940s as a natural extension of Keynes's alternative theory initially investigated in the 1920s. The second is an understanding of the technical as opposed to the political factors that have prevented the introduction of a global clearing system for international transactions. Section 2 thus provides an historical panorama of the various attempts to introduce clearing systems at different levels of integration and the technical factors which have led to their demise. This history ranges from systems providing netting across clients within individual financial institutions, to the use of netting of client accounts across diverse financial institutions, to the use of netting as the basis for the development of regional commercial banking using note issue and then checkable deposits to formal regional Clearing Houses, to the proposals for national level Clearing Houses, and finally to the global integration of national clearing systems. At each of these stages, netting may be considered as an alternative response to transactions costs (such as double coincidence of wants) that the quantity theory presents as the impetus for the use of a single commodity recognized as "money" as well as the existence of "middlemen" or wholesalers who offer to sell money against goods that have not found a trading counterparty. Keynes' approach is thus seen as an alternative to these traditional explanations.

On the basis of the history of the technical difficulties that the Clearing proposal has faced the third problem is the design of a successful strategy for the technical

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and political adoption of a global clearing system. Section 3 thus considers the opposition between what may be termed the top-down system of multilateral agreements on a global scale to implement compatible domestic clearing systems such as employed in the creation of the Bretton Woods system, as compared to a bottom up approach reflecting the historical record of private sector implementation of the appropriate technology as the basis for defacto implementation of a global clearing system.

The analysis is based on an appreciation of the Clearing concept as an alternative organization of exchange which seeks reduction in transactions costs², as well as on the technical inefficiencies created by an increase in scale of transactions. It notes that these immanent constraints have been resolved by technological innovations allowing progression from clearing within individual institutions, to clearing across local institutions, to clearing across regional institutions to clearing across national financial markets to clearing across global transactions. It thus suggests why national clearing systems had not yet been fully developed at the time of Keynes' proposal and would have made its extension to the global level impossible in the absence of Information technology that has been developed since the 1970s. The analysis leads to the conclusion that the introduction of retail central bank digital currencies would provide de facto national clearing systems which could provide the groundwork for application of a global clearing system.

1. Keynes' journey to replace the Quantity theory of prices from the 1920s to the 1940s.

Keynes's original proposal for the reform of the international monetary system based on a global clearing system was considered as radical. Paul Einzig noted that it would have eliminated one of the major activities of international banks – foreign exchange trading-- redundant.³ It was also viewed as presenting the risk of

² "though originally designed as a labor-saving device, the clearing house has expanded far beyond those limits, until it has become a medium for united action among the banks ... A clearing house, therefore, may be defined as a device to simplify and facilitate the daily exchanges of items and settlements of balances among the banks and a medium for united action upon all questions affecting their mutual welfare." (James Graham Cannon, Clearing Houses, National Monetary Commission, Washington, 1910, 1)

³ Einzig, (1944. *Currency after the War—The British and American Plans*. London: Nicholson

inflation by replacing the constraints on monetary policy provided by the gold standard “rules of the game”. On the other hand, its benefits were identified as the introduction of a more symmetric international adjustment mechanism to support Keynes’s proposals for active national economic policies in pursuit of full employment. It was rejected by both international bankers and most economists who considered the gold standard control of money creation as a prerequisite of price stability as support for stable economic expansion.⁴

Virtually overlooked in discussions of the clearing proposal was Keynes’ more modest claim for the system: that it was simply the application of already common banking practice on the national level to the international level, what Keynes called the ‘banking principle’.⁵

Also overlooked was the fact that this principle provides an alternative monetary theory that he had been developing since the 1920s in his prior proposals for international monetary reform in his *Tract on Monetary Reform* and *Treatise on Money*. It appeared as something innovative to readers of Keynes’ *General Theory*, for as he had reminded his readers, technical monetary detail had been minimized in that book. It was thus formulated on the basis of the alternative to

and Watson.) But, Keynes had assured bankers that “the fabric of international banking organisation, built up by long experience to satisfy practical needs, should be left as undisturbed as possible. Except as regards a provision, explained below, concerning the balances of Central Banks themselves, there should be no obstacle in the way of the existing practices of international banking except those which necessarily arise through measures which individual Central Banks may choose to adopt for the control of movements of capital.” (Horsefield, 11), far more conciliatory than the threat of Secretary Morgenthau to drive them from the temple of international finance.

⁴ Triffin (“National Central Banking and the International Economy,” *The Review of Economic Studies*, 1946 - 1947, Vol. 14, No. 2 (1946 - 1947), pp. 53-75) among others would argue that the belief in the benefits of the gold standard was largely mythical and Knapp (“The Theory of International Capital Movements and its Verifications,” *The Review of Economic Studies*, Vol. 10, No. 2 (Summer, 1943), pp. 115-121 noted the absence of any statistical verification.

⁵ “The idea underlying such a Currency Union is simple, namely, to generalise the essential principle of banking, as it is exhibited within any closed system. This principle is the necessary equality of credits and debits, of assets and liabilities. If no credits can be removed outside the clearing system but only transferred within it, the Union *itself* can never be in difficulties. It can with safety make what advances it wishes to any of its members with the assurance that the proceeds can only be transferred to the clearing account of another member. Its problem is solely to see to it that its members keep the rules and that the advances made to each of them are prudent and advisable for the Union as a whole.” (Horsefield, 3)

“In short, the analogy with a national banking system is complete. No depositor in a local bank suffers because the balances, which he leaves idle, are employed to finance the business of someone else. Just as the development of national banking systems served to offset a deflationary pressure which would have prevented otherwise the development of modern industry, so by extending the same principle into the international field we may hope to offset the contractionist pressure which might otherwise overwhelm in social disorder and disappointment the good hopes of our modern world.” (Ibid., 4)

the Quantity theory of prices represented in Irving Fisher's Equation of Exchange and Alfred Marshall's Cambridge equation of the demand for money.

The work on this alternative begins in his work on Indian Currency reform and is first spelled out in his "Notes on Ancient money" dating from the 1920's where Keynes argued: "An article may be deemed to have some at least of the peculiar characteristics of money (1) if it is regularly used to express certain conventional estimates of value such as religious dues, penalties or prizes, or (2) if it is used as the term in which loans and contracts are expressed, or (3) if it is used as the term in which prices are expressed, or (4) if it is used as an habitual medium of exchange. In the first three cases the article in question is the term in a money-of-account, in the fourth case it is used as actual money. Now for most important social and economic purposes what matters is the money-of-account; for it is the money of account which is the subject of contract and of customary obligation." (CW: 252-3, Vol XXVIII)

This approach rejected the standard argument that money was the result of the difficulties surrounding barter exchange: "The presumption of many writers that where there were no coins there was barter is far from accordance with the truth." (CW: 255)

The elaboration of this view is reflected in the opening sentence of the first Chapter of Keynes's *Treatise on Money*; "Money-of-Account, namely that in which Debts and Prices and General Purchasing Power are expressed, is the primary concept of a Theory of Money. A money of account comes into existence along with debts, which are contracts for deferred payment, and price lists, which are offers of contracts for sale or purchase. Such debts and price lists, whether they are recorded by word of mouth or by book entry on baked bricks or paper documents, can only be expressed in terms of a money of account. Money itself, namely that by delivery of which debt contracts and price contracts are discharged, and in the shape of which a store of general purchasing power is held, derives its character from its relationship to the money of account, since the debts and prices must first have been expressed in terms of the latter." (1930, 3)

He then goes on to point out that "the introduction of a money of account gives rise to two derived categories—offers of contracts, contracts and

acknowledgments of debt, which are in terms of it, and money proper, answering to it, delivery of which will discharge the contract or the debt.”

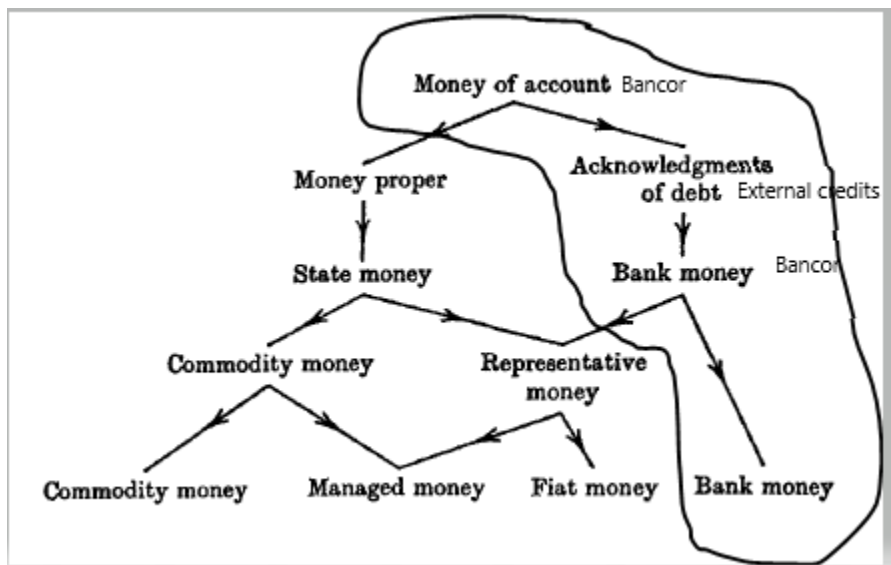
This leads to “the discovery that for many purposes the acknowledgments of debt are themselves a serviceable substitute for money proper in the settlement of transactions. When acknowledgments of debt are used in this way, we may call them bank money—not forgetting, however, that they are not money proper. Bank money is simply an acknowledgment of a private debt, expressed in the money of account, which is used by passing from one hand to another, alternatively with money proper, to settle a transaction.” (Ibid. 5)

This bank money of account is liberated from any physical or commodity form and reflects what Luigi Einaudi has called “imaginary money”⁶. Bank money of account serves as money proper when it is the object of action of bankers “entering debits and credits in their clients’ accounts.” Bankers managing clients’ accounts denominated in money of account thus replace gold or bank notes as the “primary concepts” of monetary theory and substitute for the quantity theory of prices.

This representation of the financial system thus evokes bankers’ clients’ balance sheets showing debts and credits denominated in a common money of account and a system of transactions based on the banker employing multilateral netting across client accounts. These operations were straightforward when transactions were between clients with accounts in the same bank. With a financial system comprised of multiple banks transactions between clients with accounts in different banks required an arrangement allowing multiple bankers to settle their clients’ net transactions across banks. The problem was resolved by the creation of bankers’ clearing houses that grew up in all major financial centers. Keynes’s post-war clearing proposal based on the banking principle thus posits a global clearing house in the form of a Currency Union, with individual member-nations’ accounts represented by their current account debit and credit balances denominated in a common, notional, unit of account – bancor. No physical or physical commodity currency was required, neither were bank capital or bank

⁶ Einaudi, Luigi (1953 [1936]) “The theory of imaginary money from Charlemagne to the French Revolution.” In F. Lane and J. Riemersma (eds.) *Enterprise and Secular Change*. London: Allen & Unwin.
Einaudi, Luigi (1937). “The Medieval Practice of Managed Currency”. In A. D. Gayer (ed.), *The Lessons of Monetary Experience*. New York: Rinehart.

reserves required in such a system. Only a consistent common recording of member-countries' external account transactions. The Currency Union proposal can be represented in terms of Keynes's *Treatise* definitions as the area inside the circumscribed area in the chart adapted below.



Implicitly the system would replace money proper with an overdraft system in which creditor countries could make advances to debit balance countries denominated in the common notional unit of account.

As Keynes suggested, this representation was neither innovative nor radical. Indeed, he notes that it had existed for thousands of years.⁷ However, he is less forthcoming on the fact that economists from Petty to Ricardo to Jevons to Einaudi had all recognized the importance of the money of account and the existence of “bank money” as the foundation of money proper. But, until Luigi Einaudi’s historical study, most economists considered this as the result of financial innovation eliminating the danger and inconvenience of using a commodity money for transactions purposes.⁸

⁷ “Money, like certain other essential elements in civilisation, is a far more ancient institution than we were taught to believe some few years ago. Its origins are lost in the mists when the ice was melting, and may well stretch back into the paradisaic intervals in human history of the interglacial periods, when the weather was delightful and the mind free to be fertile of new ideas—in the islands of the Hesperides or Atlantis or some Eden of Central Asia. (*Treatise on Money* 11-2)

⁸ Adam Smith and David Ricardo provide sufficient reference. Smith (1776): “Buying and selling upon credit, and the different dealers compensating their credits with one another, ... will supply {physical money} with

Only Petty in the mid-17th century comes close to Keynes in recognising bank money as money proper: “Money is an artificial Thing or rather No Thing ... but is rather the Sign of a Thing. For if men were excellently versed in accounts money were not necessary at all and many places as Barbados &c have made shift without it & and so they do in Banks.”

From the point of view of Keynes’s alternative monetary theory the open question is whether the netting of bank money in a clearing house – the banking principle—can be scaled up from the single bank, to the regional, to the national level and then to the international level in a global Currency Union, and who would be responsible for the operation of the global multilateral clearing system in the absence of an international bank or equivalent global institution?

II. Historical Development of Clearing Systems

The history of the development of this alternative financial system starts with the development of information transmission which preceded even counting and language: bookkeeping. Cultural anthropologists have traced this to the use of clay tokens as abstract representations of the movement and transfers of real property in early Mesopotamia.⁹ These were eventually enclosed in clay wrappers

less inconveniency” than barter. “Ricardo (1816): noted that instead of gold being used in exchange “money is merely written off one account and added to another”; so payments may be “effected without the intervention of either bank notes or money.” Marginal theorists, such as Jevons and Walras even though still supporting the quantity theory, also recognized the existence of bank clearing: “the idea of settling a certain number of daily exchanges by means of the following procedure. People who have a credit account at a bank buy and sell commodities all day long to or from each other, just paying by means of receipts on their bank called cheques. Between 5.00 p.m. and 6.00 p.m. the bankers meet and compensate their clients’ debts and credits and each of them supplies in money only the surplus of cheques written over those he received, or obtains in money only the excess of the cheques he received over those he wrote. Purchases and sales are also made by credit,” although he did not take the last step that this could provide final settlement as Keynes proposed, and insisted that there would be “settling them only later on in paper or metallic money.” And noted that “We shall not deal with this type of exchange.” (Walras, *Elements*, 80-1) Note that the basic difference between this view and Keynes is whether the subsequent “settling” requires paper or metal, or whether “bank money” net settlement makes metal and or paper redundant.

⁹ “From an accountant’s point of view the surprising achievement of Schmandt-Besserat is the insight that record keeping for commodities (including labour and metals) and related accountability purposes preceded writing as well as abstract counting. But even more startling is her claim that this kind of accounting was the precondition and impetus to the invention of writing as well as abstract counting. This would make prehistoric accounting a foundation stone of culture.” Richard Mattessich (1994) “Archaeology of accounting and Schmandt-Besserat’s contribution”, *Accounting, Business & Financial History*, 4:1, 5-28 collections of plain, concrete clay tokens of various shapes over 10,000 years old have been discovered among village finds (and later temple finds) unearthed in great numbers in the Fertile Crescent of the Middle East. Starting about 3250 BC, these tokens were sometimes enclosed in hollow clay balls, which Legrain (1921) originally called ‘bulles sphériques’ and which Schmandt-Besserat (1980, p. 359) prefers to address as ‘clay envelopes’. On

or “envelopes” representing which have been interpreted as rudimentary accounts of debits and credits which then evolved into flat clay sheets with debit on one side and credit on the other. This before the development of the more well-known double entry form of bookkeeping which served the different purpose of providing evidence of business results for distribution of net receipts to business partners. The development of abstract physical representations made possible for impressions on tablets, and eventually more formal journals, ledgers and double entry account books to replace the tokens or the physical envelopes. There is also evidence that such accounts could be informal records amongst private citizens, or held by shopkeepers allowing their clients to buy on “tick”, as well as by official individuals that took various forms and names, such as scribes, notaries and eventually emerging as bankers.

Geoffrey Lee¹⁰ notes the application of a system of netting across an individual notary's; accounts: “The most significant terms are those relating to positive and negative movements in the balance of the account, ... of which two pairs may be distinguished [give-have given and receive-have received]. From the first pair is derived the modern Italian usage of [debit and credit] ... The thirteenth-century bookkeeper did not think of them as direct opposites, but regarded ‘have given’ as opposed to ‘gave’ and ‘have received’ as opposed to ‘receive,’ that is, he thought on the one hand of a loan to someone, and its repayment. ... The medieval ledger-keeper also became familiar with the procedures of offsetting the balance of a customer's loan account against that of his deposit account, and of using a transfer from a debtor's deposit account to his creditor's deposit account, or against his creditor's loan account (with the agreement of both customers), as a means of settling their reciprocal indebtedness.”

Raymond de Roover confirms that the system also expanded to the clearing of clients accounts across diverse Florentine bankers in which “[i]n order to pay by transfer, it was not necessary for the assignor and the assignee to have their bank accounts in the same bank.” Since all the local banks were in account with each

occasion the surface of those receptacles or 'envelopes' bore markings indicating the content of the envelopes at a glance. They seem to be the earliest systematic accounting systems. Mattessich, ABACUS, vol. 25, No. 2, 1989. See Appendix 1

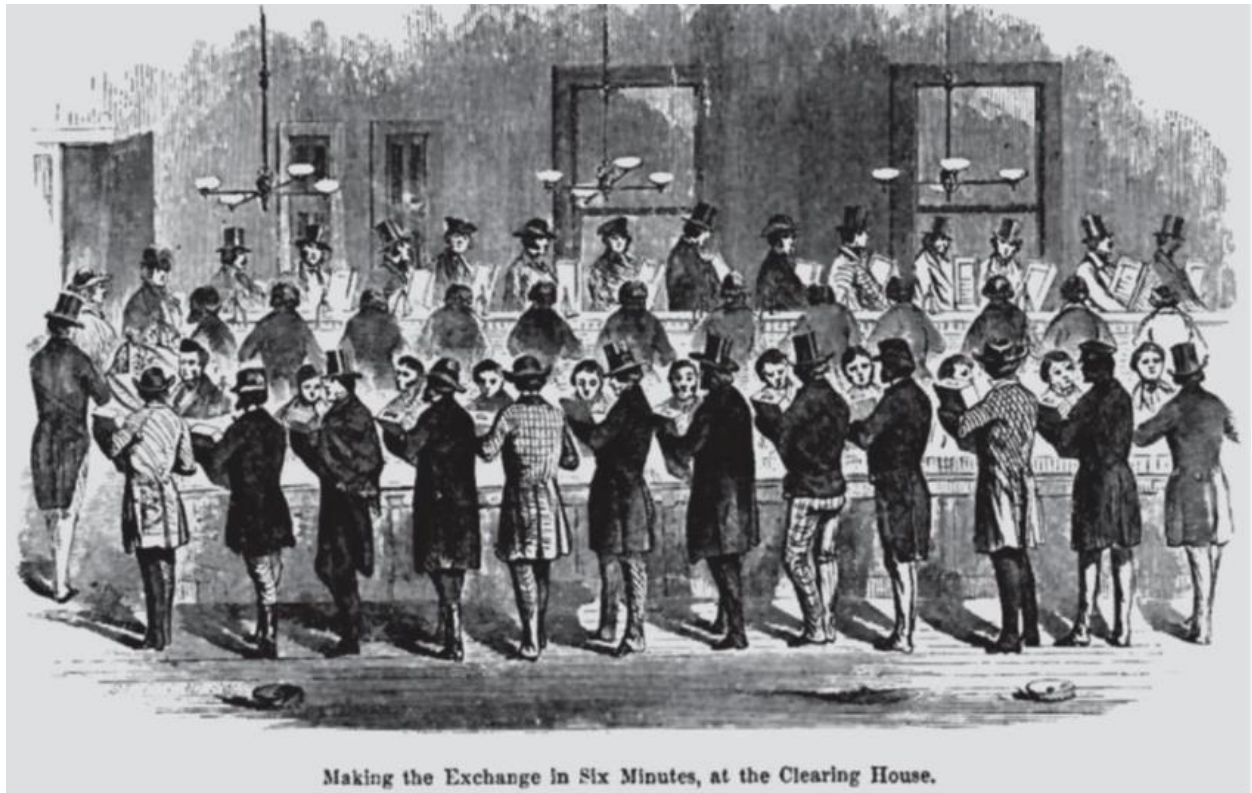
¹⁰ G A Lee, "The Development of Italian Bookkeeping 1211-1300", Abacus, IX, 1973, p. 141; in B S Yamey (ed), The Historical Development of Accounting: A Selection of Papers, New York, Arno Press, 1978.

other, it was easy enough to transfer credit from the account of Mr. A, customer of banker X, to the account of Mr. B, customer of banker Y. An example of a transaction of this sort is found as early as 1200 in the records of a Genoese notary. The account books of two Bruges money-changers of the fourteenth century also contain many examples which prove the existence of clearing arrangements among the banks.”

While both Classical and neoclassical economists have a well-rehearsed explanation of the dominance in trade of a single commodity which is identified as “money” because of its ability to reduce the transactions costs of exchange (under the problems raised by the double coincidence of wants in barter exchange), they have recognized the existence of net settlement institutions as providing the same functions, but have classified them as credit as distinguished from “money”. While some, such as Plato and Menger indicate the role of intermediary/speculators or market-makers/ wholesalers as facilitating the indirect exchanges that occur when direct barter exchange cannot be achieved, few have recognized the development of banking institutions employing clearing or netting function that Keynes baptized the “banking principle”. Indeed, following developments by Ronald Coase, if firms exist because they resolve the problems of transactions costs more efficiently than market transactions, then the banking principle argues that banks replace market barter transactions by applying account netting can also be explained as “firms” that exist because they mitigate the transactions costs of market exchange.

At small scale, the banker/bookkeeper easily provides validation, clearing and settlement of transactions for the market transactions of clients: a bank is a clearing house – this is Keynes’s bank money system. As banks multiplied and clients engaged in transaction that required settlement with other banks, systems of local clearing houses were developed in which member banks engaged in net clearing of their client accounts ¹¹

¹¹ Such institutions were ubiquitous across commercial relations, emerging also for commodity trading. It is interesting that both Walras’ tatonnement and Edgeworth’s recontracting system can be viewed as a form of matching bids and offers in order to clear or net across multilateral supply and demand positions that do not require bilateral market trading.



In the system bankers as bookkeepers are simply agents, service providers for their clients. What would be called brokers or agents. Mitchell Innes called banks the “clearing house of commerce”. Colwell’s (1859: 188–89) *The Ways and Means of Payment*, represents banking as “a system by which men apply their credits to the extinguishment of their debts. ... This is in direct contrast with the cash or money system, in which every article is either paid for in the precious metals at the time of delivery, or at some time afterwards. These two systems work side by side.”

But Usher points out that although the main activity of the medieval banker was as an agent/bookkeeper “[t]he banker might allow a customer to overdraw his demand account in the ledger on the security afforded by a credit due from a third party in the record of conditioned deposits, or against an engagement of the borrower to repay the banker at a stated time. This operation would have the same effect as the discounting of a negotiable bill of exchange or promissory note, although different in form. ... The loans made by these early bankers commonly resembled the modern overdraft. The loan was created by transfers or withdrawals from the ledger account in excess of the credit... The non-negotiable bill of exchange, which came into extensive use in the second half of the

fourteenth century, was an important factor in the credit business of banks. ... Bills might also serve, indirectly, as a basis for a loan. A merchant could not, however, raise money directly on an accepted bill, but a banker could permit the merchant to overdraw his current account, with or without a supplementary engagement as to the details of repayment.” (Usher, op. cit. : 414)

Bankers thus went beyond simple netting of client accounts and provided credits against themselves to match client debits; the era of note issue and cheques came to dominate the activity of bankers. As described by Alexander Hamilton: ‘Every loan, which a Bank makes is, in its first shape, a credit given to the borrower on its books [i.e., a deposit], the amount of which it stands ready to pay, either in its own notes, or in gold or silver, at his option. But, in a great number of cases, no actual payment is made in either. The Borrower frequently, by a check or order, transfers his credit to some other person, to whom he has a payment to make; who, in his turn, is as often content with a similar credit . . . And in this manner the credit keeps circulating, performing in every stage the office of money, till it is extinguished by a discount with some person, who has a payment to make to the Bank, to an equal or greater amount. Thus large sums are lent [by a Bank] and paid, frequently through a variety of hands, without the intervention of a single piece of coin.’”

As Seyd has pointed out the “great saving of labour to merchants and others who keep a Banking account, in regard to collecting the Cheques and Bills by paying them into the Bankers' hands—who, so to speak, collect them wholesale.” But the expansion of deposit banking was so rapid that bankers could no longer manage the netting across different client accounts at different banks. The solution was: “The Clearing House now, as far as the mere mechanical and automatic nature of this business is concerned, renders in its turn similar services to the Bankers themselves. In the Clearing House then, the Cheques received during the day are brought together and concentrated, for the purpose of being exchanged among the Bankers themselves, i.e. those who are members of the Clearing House. (Seyd). Thus the functions that had been the province of individual banks were

now transferred to the meta-level in which a separate organization provided the verification, clearing and settlement across the individual banks.¹²

In New York in 1851 “a new bank was started for each month of the year; fifteen more sprang up in 1852 and 1853; and worst of all, nearly half of their nominal sixteen millions of capital was paper—a book entry secured by stock certificates. Secretary Gallatin had already pointed out in one of his lucid pamphlets, how important “a regular exchange of notes and checks, and an actual daily or semi-weekly payment of the balances.” „, This was in essence the Clearing House idea; but it was a dozen years or more before the inconvenience of the old method brought action.¹³

Again while Classical and neoclassical economists these innovations were considered as means to bypassing commodity monies, the bankers themselves approached the problem of multilateral payments through the creation of netting systems called clearing houses. These institutions provided a means of prudential regulation as well as elasticity to credit in addition to liquidity as means of payment.

¹² The Bankers’ Clearing House was an organization that processed the rapidly increasing number of checks being used in commerce. When the use of checks became popular in the eighteenth century, a bank clerk physically had to take a check deposited by a customer to the bank that issued it to have it exchanged for cash. As the use of checks gained in popularity in the middle of the eighteenth century, each of the London banks employed a “walk clerk,” whose function was to make a tour of all the other banks in the City, the financial district of London, exchanging checks for cash. In the 1770s, this arrangement was simplified by having all the clerks meet at the same time in the Five Bells Public House on Lombard Street. There they performed all the exchanging of checks and cash in one “clearing room.” This obviously saved a lot of walking time and avoided the danger of robbery. It also brought to light that if two banks had checks drawn on each other, the amount of cash needed for settlement was simply the difference between the two amounts owed, which was usually far less than the total amount of all the checks. As the volume of business expanded, the clearing room outgrew its premises and moved several times. Eventually, in the early 1830s, the London banks jointly built a Bankers’ Clearing House at 10 Lombard Street, in the heart of London’s financial center. Babbage *Economy of Machinery and Manufactures*

¹³ Even after the subject had been discussed exhaustively at informal conferences, it was a year before a meeting was called... to take up the project definitely. ...The New York Clearing House was formed, and began operations on October 1, 1853. The next year, a formal constitution, prepared by George Curtis, was adopted—again in face of protests against “dangerous concentration of power.” From the day it first went into operation there has never been any question as to its indispensable functions. Boston followed suit in 1856, Philadelphia in 1858, and Chicago in 1865;” By the modern method all checks are sorted into numbered bundles belonging to each member bank and those for whom it clears. On a settling-sheet the credit and debit accounts are entered and balanced, giving each bank a final balance to pay to, or receive from, the Clearing House, which in turn settles with each. ... Obviously there is a saving of thousands upon thousands of individual transactions.

II.1 From In Bank Clearing to Local Clearing Houses to National Clearing Systems

Thus while net clearing across client accounts in individual financial institutions led to clearing across multiple banks to resolve the difficulties associated with increasing size through the creation of formal Clearing house associations, additional difficulties arose in extending clearing arrangements from the local or regional to the national level. In England the process was initiated by a 1854 decision to allow settlement via drafts on Bank of England¹⁴ accounts and eventually admitting the Bank to membership of the Clearing in 1864. Metropolitan (London) Clearing was instituted in 1907. But since these systems were private associations, there were always problems of making them fully inclusive. The English identification of a “clearing bank” as an exclusive member lives on despite the fact that the Bank of England eventually became the de facto inclusive national Clearer.

In the United States the proposals for a National Clearing preceded discussion of a Central bank and well before the 1913 creation of the Federal Reserve (indeed some thought it would have made a Central bank redundant). As in England, members of the New York Clearing house resisted extending membership to competitors; indeed the exclusion of trust banks is credited as a contributing factor in the crisis of 1907 that generated calls for a central bank.

In addition, the US system of small local unit banks created resistance to national clearing since it would have limited their income from “exchange charges” for collection of their checks from outside the local region. The decision of the Federal Reserve to pursue national clearing by imposing par clearance of bank drafts through the Federal Reserve District banks led to periodic legal challenges through the 1940s.¹⁵ The diverse interests of small local unit banks and large money center banks were in part due to the fact that membership in the Federal Reserve System was not obligatory on local often State charter banks most of which were subject to State law forbidding branching and were not part of the Federal Deposit Insurance scheme introduced in the New Deal banking reforms. Even with Fed dominance in clearance problems remained due to the regional

¹⁴ Recall that the Bank of England was a private institution holding a government monopoly on the issue of bank notes and a competitor of other banking organisations.

¹⁵ (See Walter Wyatt, “The Par Clearance Controversy,” *Virginia Law Review*, Vol. 30, No. 3 (Jun., 1944), pp. 361-397)

nature of the Federal Reserve which required netting of physical paper checks and bank notes between different districts. The accounts of winter weather grounding air transport and breakdowns of antiquated computer system disrupting clearing and creating volatility in the overall money supply are apocryphal.¹⁶

The failure of the Fed to deal with these difficulties produced competing cost-reducing private bank settlement systems based on Automated Teller Machines, and bank issued credit cards such as BankAmericard which became Visa and then Mastercard

II.2 Private Financial Institutions Implement Clearing in the Bretton Woods Era

The failure of the Clearing Proposal in the Bretton Woods Conference and its difficulties in the 1960s opened the way for the introduction by private financial institutions of the newly evolving information technology in the clearing process. Charles Babbage had already expressed interest in the application of his “Analytical Engine” to bank clearing and had personally visited the London Clearing House, although its introduction was not attempted and according to experts deemed unnecessary given needs at the time. On the other hand, the US application of von Neumann’s “Universal Constructor” was dedicated to the development of nuclear munitions, weather forecasting and socio-biological evolution; the first to attempt an application was not the business machine vendor, IBM, associated with von Neumann’s initiative, but rather Burroughs¹⁷

As early as the mid-1950s the Bank of America began development of a computerized system called ERMA (Electronic Recording Machine, Accounting) to facilitate and reduce costs of check processing. In the early 1960s, Barclays Bank in England purchased its first mainframe computer and established electronic clearing. By the mid-1960s, banks in the United States, Britain, and elsewhere would begin exploring the application of computer automation to teller

¹⁶ “Uncurrent Events: Check Processing and the Fed,”

<https://fraser.stlouisfed.org/blog/2020/09/check-processing-and-the-fed/>

¹⁷ In 1885 Burroughs filed his first patent, founded the American Arithmometer Company his first businesses targeted banks and clearing houses for which his machine had been especially designed, although it was not capable to algorithmic netting.

Historical Information in the following sections on the application of information technology comes from Martin Mayer, *The Bankers : the Next Generation*, New York: Truman Talley, 1997, and Martin Campbell-Kelly, William Aspray, Nathan Ensmenger Jeffrey R. Yost, *Computer: A History of the Information Machine*, 3rd Edition, London, Routledge, 2018.

operations, embarking on a technological trajectory that by the 1970s would lead to the Automated Teller Machine. (ATM)

The creator of what was to become Visa approached clearing as money represented by guaranteed alphanumeric data used in shared computer clearing networks. He aimed at a system in which any alphanumeric value—whether a credit account, checking account, savings account, or brokerage money market account—could be used for electronic-based global purchases or transfers. It was thus the introduction of bank credit cards that led to the replacement of manual clearing and settlement through an automated computer system that eliminated the mailing of paper by transforming the sales drafts into electronic records and clearing through a centralized powerful IBM computer. The NBI/Visa BASE II was America's first nationwide automated clearinghouse. As credit card use expanded more powerful systems were needed to accommodate higher volume, and Visa implemented IBM's Airline Control Program operating system which was initially developed for the SABRE airline reservations system. Thus, a private national clearing system grew up largely unnoticed behind the expansion of bank credit cards and automated cash machines. It is interesting that the costs for use of the credit card clearing system are still referred to as "interchange fees".¹⁸

By the 1980s electronic money systems, meant to replace physical cash transactions were ubiquitous, and could have been applied to the problems of the checking system and provided a system of national direct clearing.¹⁹ However, despite the support of the European Union -- facing the problem of currency unification in the ECU -- for David Chaum's digicash, and its introduction by the St

¹⁸ Martin Mayer's *The Bankers*, 1997: 117 gives a lucid account of the Fed's defence of its antiquated clearing practices to defend its dominance and control of bank clearing. As Mayer notes: . For the credit card industry, speed was of the essence. A bank check in process of collection was an asset to the bank that had put it in the system but not yet liability for the bank that would eventually pay it: it generated float, extra money in the system. But a credit card slip generated a credit to the merchant (which meant a debit to the bank) from the moment of its presentation, which was to be as soon as possible after the sale to speed the discovery of fraudulent cards. And it did not become a loan on the books of the bank that paid it (usually interest - bearing) until the claim arrived from The Interchange, the electronic clearing house operated by the credit card company. Thus the normal banking system push to delay the completion of a transaction was transformed in the credit card environment to a push for fast payment. , In that atmosphere electronics blossomed."

¹⁹ A review is provided in <https://business.leeds.ac.uk/downloads/file/178/the-future-of-regulation-can-financial-regulation-prevent-the-next-financial-crisis-jan-kregel>

Louis bank which had Hy Minsky on its Board of Directors, these digital or electronic money systems never prevailed. Electronic digital money had to wait until the 1990s and the creation of bitcoin based on an accounting procedure called blockchain. However, neither bitcoin nor any of the other cryptocurrencies provide for the equivalent of the evasive national Clearing house system.

Thus Keynes's 1940s Clearing proposal, which preceded these operational and organisational difficulties and the development of the technology capable of resolving them, would have been stymied by their absence. Successful implementation would have required the existence of effective national clearing systems across members which did not then exist, or implementation by national central banks, that were not yet full public entities, the Federal Reserve District Banks, responsible for the par clearing system being technically owned by the member banks, and the Bank of England only nationalized in 1946.

III. Political Impediments to Global Clearing

The historical description of the implementation and expansion of clearing suggests that one impediment of the introduction of global clearing was paradoxically the absence of appropriate technical innovations to handle the expanding scale of transactions on the one hand, and then the failure to introduce new technology when it was available. It also suggests that while the international cooperation that might have been available for introduction of the system in the post-war period, the technology that would have been necessary was not available. Thus the British Clearing proposal ceded to US preference just as the design of the international trading system, based on free, multilateral trade preordained in the Atlantic Alliance agreements, displaced British imperial preference and maintenance of the Sterling Area.

On the theoretical level, there was also a basic difference between the US and the UK over the operation of the banking system, the US system based on the provision of bank reserves and the UK system of overdraft implicit in Keynes's presentation of the banking principle. This can be understood as the difference between the classical quantity theory interpretation of fiat money systems as being linked to an underlying physical commodity, central bank reserves substitution for gold. In the Clearing system, there is no reserve for currency other than the fact that all members of the clearing are both debtors and creditors

which is aggregate balance – the credits have value because they serve to discharge debts. As Slobodian has documented²⁰, there has been a long-term political project, starting after the First World War, by business and financial interests to preserve the dominance of the quantity theory/gold standard approach to monetary theory and international monetary organisation. The thesis is that the rise of national democratic governments in the Treaty of Versailles placed control in the hands of voters, rather than being subject to incontrovertible economic principles such as free markets and the gold standard. Bretton Woods may thus be seen as a partial preservation of this approach as national austerity policies are not subject to national plebiscite, but IMF lending programmes.

The historical record surveyed above also suggests that the driving force behind the introduction of clearing systems and the application of appropriate technology was private sector institutions, and this continued even after governments and central banks sought to appropriate and implement clearing on the national level. Thus neither the needs of the private sector to extend local and regional organisations to the national level, nor the attempts of governments to impose national clearing systems on the private institutions has been successful.

Current technological capabilities however suggest that these difficulties may be overcome. The development of cryptocurrencies has been based on a paradoxical combination of restoration of democratic individual control via the introduction of an ersatz gold standard system based on inviolable computer code. The creation of these systems as competitors for national or central banks' payments systems has created pressure on governments and central banks to create national digital currency systems. These proposals currently come in two forms. The "wholesale" system would simply provide existing private banks with digital reserve accounts at central banks, and provide private banks the opportunity to offer their clients accounts in, or backed by, central bank digital reserves. This would produce minimal change from current systems.

On the other hand the "retail system," would be the equivalent of allowing individuals deposits in the central bank in digital form; it is presumed that clients

²⁰ Quinn Slobodian, *Globalists: The End of Empire and the Birth of Neoliberalism*, Cambridge, MA: Harvard University Press, April 2018.

would prefer to hold digital credits with the central bank rather than risky private, banks with the result that the system would replace traditional paper currency and private bank deposits. The implication is that this would eliminate the need for a clearing system for private banking institutions and provide the basis of a national Clearing system within the central bank. If Central banks were to offer digital accounts to private clients, then there would no longer be any need for private bank provision of means of payment. Complete bank disintermediation would be the result.

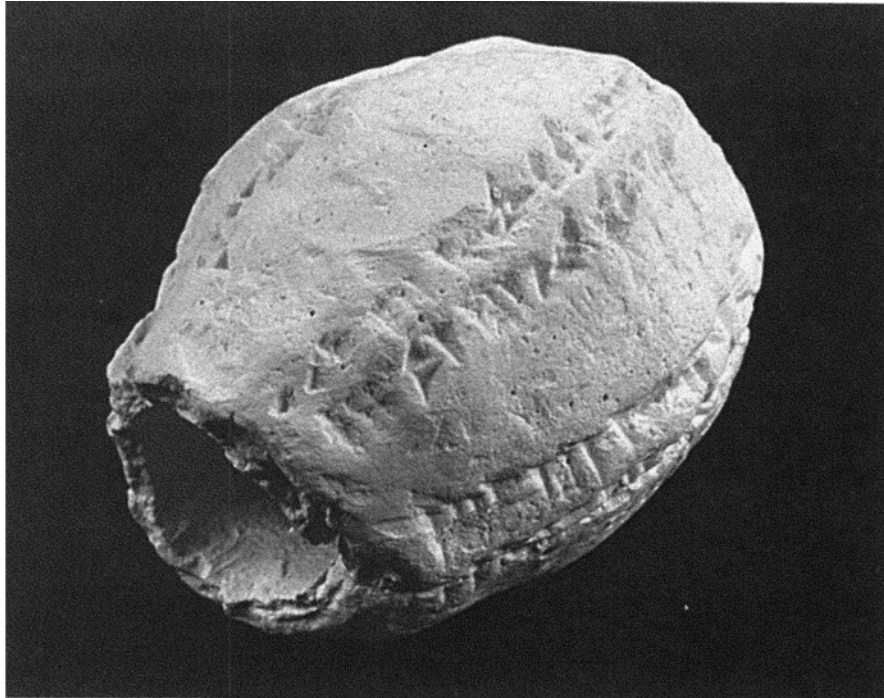
This would open the way to the global clearing system, such as the amendments to Keynes's Clearing system by Oxford economists Schumacher²¹ Balogh and Kalecki. While this would technically challenge the position of private institutions and create incentives for them to implement a national clearing independently of national governments. This would also fulfill the technological requirements of a global clearing. The remaining impediment would then be the coordination of the different national central bank's digital currency systems.

As I have noted elsewhere²², there is already a private formulation of Keynes's system which is a mirror of the Schumacher-Kalecki amended clearing system. Given the application of the technological base, it exerts clear competitive pressure in both the private and public sector to either acquire or develop such systems.

²¹ E.F. Schumacher, "Multilateral Clearing," *Economica*, New Series. Vol. 10, No. 38, May 1943, 150-65, for Kalecki see *International Equilibrium and Bretton Woods: Kalecki's Alternative to Keynes and White and its Consequences*, Jerzy Osiatynski (ed.), Jan Toporowski (ed.) Balogh, T. and Schumacher, E. F. 1949. "The proposals for post-War international currency and investment," pp. 201-25 in Balogh, T. (ed.), *The Dollar Crisis: Causes and Cure*, Oxford, Basil Blackwell and A. Faudot, "The Keynes Plan and Bretton Woods debates: the early radical criticisms by Balogh, Schumacher and Kalecki, *Cambridge Journal of Economics* 2021, 45, 751-769.

²² "Another Bretton Woods Reform Moment: Let us Look Seriously at the Clearing Union," available at jankregel.org

Appendix 1 Early Accounting Precedes Abstract words and numbers



“I have endeavoured to demonstrate that the foundation of accounting is not to be found in the techniques of double entry but in the logical form of a transaction (Mattessich, 1957, 1964, 1984, 1987, 1988, etc.). This structure manifests itself empirically in such economic events as sales and purchases, investment and debt transactions, production and other transfer processes, etc. ... this logical form has already manifested itself in prehistoric data processing systems. Since the ancient people of the Middle East exploited the transfer of clay tokens from one location to another to represent various economic transactions, there can be little doubt that an input—output structure dominated those early accounting systems the crucial idea of duplicating the input—output of actual commodities through the input—output of tokens by means of which conceptual representation of this duality becomes possible. Once this decisive fact of the input—output principle is recognized, it is a secondary problem, whether the ancient people of the Middle East possessed a double entry system or not.”

“The pictographic tablets inherited from tokens the system of a code based on concept signs, a basic syntax, and an economic content. Writing did away with the greatest inadequacies of the token system by bringing four major innovations

to data storage and communication. First, unlike a group of loose, three-dimensional tokens, pictographs held information permanently. Second, the tablets accommodated more diversified information by assigning specific parts of the field for the recording of particular data. For example, signs representing the sponsor /recipient of the transaction were systematically placed below the symbols indicating goods . In this fashion, the scribe was able to transcribe information such as "ten sheep (received from) Kurlil" even though no particular signs were available to indicate verbs and prepositions . Third, writing put an end to the repetition in one-to-one correspondence of symbols representing commodities such as "sheep". Numerals were created. From then on, these new symbols, placed in conjunction with the signs for particular goods, indicated the quantities involved."

The error made by later economists-and especially by the " rules of the game " school-was to extend to world-wide, cyclical disturbances, an analysis aimed at fundamental maladjustments between one economy and the rest of the world