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on
WM's Global Clearing System
and
WM's TUV Digital Currency / CBDC equivalents

By Professor Jan Kregel
Former Chief Rapporteur, Commission of Experts
of the President of the UN General Assembly
on Reforms of the International Monetary and Financial System

ANOTHER BRETTON WOODS REFORM MOMENT:
LET US LOOK SERIOUSLY AT THE CLEARING UNION
Public Policy Brief: February 2021

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JAN KREGEL

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Preface

Digital currencies have provided challenges to the organization of the financial system, while the coronavirus pandemic has brought calls to escape from past errors and "build back better." Senior Scholar Jan Kregel argues that the willingness of central banks to consider electronic currency provides an opening to reconsider a truly innovative reform of the international financial system—one that was discarded in the 1940s but is more appropriate to a digital monetary world. In his view, a more promising reform alternative was left behind at Bretton Woods: namely, John Maynard Keynes's clearing union proposal, which is more amenable to digital transactions and would surmount the flaws of existing reform proposals, such as those centered on increasing the role of special drawing rights (SDR). The prevailing proposals would do little, in his estimation, to address the instability inherent in preservation of the current system.

Cognizant that Keynes's proposal was rejected due in part to the political and economic dominance of US financial concerns of the postwar period of reconstruction—and that such concerns, with regard to the preservation national autonomy, for instance, would certainly be resurrected in any attempt to elevate the clearing union idea—Kregel investigates whether such a clearing system could be built up from an already-existing initiative that has emerged in the private sector. He describes the operations of a private (global) payment system whose plumbing could serve as a real-world blueprint for a more politically palatable equivalent of Keynes's international clearing union.

Kregel begins by outlining the evolution of the international monetary system and the theoretical approaches applied to managing its shifting challenges. He emphasizes the importance of Keynes's theoretical alternatives to the gold-based "quantity theory" of money and the then-prevailing theory of banking which emerged from that theory. Keynes's "banking principle"—the concept of offsetting debits and credits in a clearinghouse or common balance sheet—was central to the development of the clearing union idea, as Keynes explained the logic of his proposal in reference to domestic financial institutions. The international "clearinghouse," in which a common unit of account would be used to register debits and credits for the purpose of settlement, was envisioned as a form of bank clearing writ large. (The proposal that was ultimately adopted at Bretton Woods, Kregel goes on to observe, resembled an elevation of fractional reserve banking to the international level—and brought with it the instability inherent to domestic fractional reserve financial systems.)

The common unit of account in Keynes's proposal—his "bancor"—posed an obstacle to the clearing union gaining support, and would likely do so again in any attempt to revive the idea. However, Kregel notes that an alternative already exists in the private sector, which could be conceived of as a precursor to a broader international clearing system that could deliver the core benefits of Keynes's original proposal. He outlines the operations of Webtel.mobi (WM)—a specialized mobile telephone service provider that also offers subsidiary payment services. Members of this system load their accounts with credits (through bank transfer, card payment, or cash), to be used not only for prepayment of mobile phone services, but also transactions between members, including across national boundaries. The WM system plays the role of bookkeeper in this arrangement, providing a clearinghouse mechanism such that members' account balances adjust as they engage in global transactions but the overall system balances remain stable.

The WM system, when conceived of as an embryonic clearing union, reflects Keynes's banking principle in its operations. Transactions are enabled between members without any movement or transfer of funds besides the debit/credit entries on WM members' accounts. As a model for a broader international union, it would have the benefit of not needing a new international currency, use of something like the SDR, or capital or reserve balances—and it would have the potential to control international imbalances and ensure greater stability within the system.

Finally, the pandemic has made it eminently clear that the only valid response is eradication of the virus on a global scale. The clearing union moves away from the central role of dominant national currencies to the creation of global liquidity, which can be more easily mobilized to support sustainable development of the least developed countries—a prerequisite for success in controlling the pandemic.

As always, I welcome your comments.

Dimitri B. Papadimitriou, *President*
February 2021

In October 2020, Kristalina Georgieva, the newly elected managing director of the International Monetary Fund (IMF), announced "A New Bretton Woods Moment" (Georgieva 2020). While the invitation was short on operational specifics, many commentators believed it referred to changes in the IMF's operations that would be required to accommodate and exploit the introduction of central bank digital currencies. More traditional observers have continued to recommend already proposed changes in quotas and governance conventions, or amplification of special drawing rights (SDR) allocations that sidestep the political difficulties surrounding quota adjustments. SDRs are already transacted in digital form and thus should be well positioned to incorporate the introduction of national digital currencies. This policy brief proposes an alternative route to reform that would avoid the inherent contradictions in IMF operations—contradictions that would be retained by these existing reform proposals—and suggests that the appropriate form for the introduction of the electronic currency age is John Maynard Keynes's original clearing union proposal. It is informed by Keynes's observation at the IMF's inaugural meeting in Savannah—namely, that the Fund would have been better interpreted as being a bank.[1] This brief proceeds to show that the IMF's operations continue to exhibit the instability that has plagued banks, as seen in the most recent financial crisis, while suggesting that this could be avoided by pursuing an alternative framework informed by what Keynes called the "banking principle" in his clearing union proposal. It closes by suggesting that Keynes's proposal is in fact already operating in the private sector and provides a more general framework for reform than the various private cyber currencies or central bank digital accounts.

The Theory and Practice of the 19th Century International Monetary System

The international financial crises of the 1920s raised the problem of whether gold should remain at the center of the international financial system or be eliminated in favor of a system of managed money. The framework of analysis was a theory we know as the "quantity theory" of money applied at the national level and a "price-specie-flow" mechanism on the international level. At the national level, the inefficiency of bilateral exchange of goods and services leads the market to replace the inefficient mechanism of {n(n-1)/2} bilateral exchange rates with n-1 commodity exchange rates against a single commodity, the most appropriate having particular characteristics generally satisfied by gold. Changes in gold's availability would lead to an increase in gold prices and vice versa—inflation or deflation—with stability produced by a stable supply. This is the traditional quantity theory. In the presence of international trade in commodities, external imbalances are discharged against the import or export of gold, producing the appropriate adjustment in domestic prices and relative international competitiveness leading back to balance. The only regulation required in this framework was to fix the gold weight of the national currency unit, which also fixed exchange rates. There was no need to intervene to stabilize the exchange rate—price flexibility, which implies instability in the domestic currency's value, acts to produce both international adjustment and domestic currency stability.

However, most practitioners recognized that the theory did not work in practice. For example, Keynes (1971a), in his first book on international finance under the gold standard, pointed out the crucial role of the structure of England's balance of payments that allowed it to act as an international creditor, and the role of Bank Rate set by the Bank of England in producing international financial flows that supported stability. Since Britain had claims on the rest of the Empire, any deterioration in British external accounts could be offset by a rise in Bank Rate that reduced British lending abroad and increased the debt service flows and deposits from the rest of the world to London, creating an increased demand for sterling and an inflow of gold to restore balance. In this more realistic view, it was the impact of interest rate differentials rather than goods price differentials from the price-specie-flow mechanism that were central to system stability. Indeed, a linkage between price changes and interest rates would eventually be required to make sense of the story, but the main point was that not only was gold rarely used in domestic transactions, it also rarely moved across national borders and the price adjustments tended to be slow and ineffectual.

International Financial System Reform in the 20th Century

When reform of the gold standard became necessary after World War I, economists investigated the possibility of separating national monetary relations from gold flows; Keynes followed Gustav Cassel in proposing a system of national "managed money" with the objective of achieving adjustments in relative international prices that produced purchasing power parity across countries. This was an attempt to replicate the operation of the gold standard by using active monetary policy to produce

the equivalent of the free movement of gold. It is interesting that in his *Tract on Monetary Reform* Keynes (1971b, 71–75) supports the quantity theory and domestic monetary management to replicate the impact of gold flows, at the same time that he recommends the institution of futures markets (61 ff.) to replace the implicit exchange rate insurance for short-term financial flows provided by gold points under the gold standard. Again, it is the financial flows in international markets that provide the effective motive force of stability.

Post-Great Depression: New Deal for a New World (Hans Morgenthau)

The gold standard regime's final collapse in the 1930s produced a sharp change in approach to international monetary theory and similar institutional adjustments in both the United Kingdom and the United States. The creation of the Exchange Equalisation Account and the Exchange Stabilization Fund (ESF) substituted domestic holdings of gold and foreign claims for the impact of financial market capital flows to stabilize exchange rates. Rather than influencing domestic monetary conditions to keep domestic prices compatible with purchasing power parity, these institutions used their holdings to intervene directly to stabilize exchange rates. This is the beginning of the system in which stocks of "reserve assets," rather than financial flows, are used to influence exchange rate stability.

This represented a shift in the underlying theory of the system's operation, from the quantity theory to one based on the market interventions required to ensure stability of an international financial asset: sterling. Since the time of John Stuart Mill and David Ricardo, economists had debated whether fiduciary monies representing some underlying physical commodity made the latter redundant. The question was whether this also made the quantity theory redundant. Keynes would eventually adopt this view, leading to his rejection of the gold standard's restoration.

Keynes couched his arguments in what he called the "banking principle."[2] That is, payments could be made and debts discharged by means of bankers making appropriate debit and credit entries on their clients' accounts. By the beginning of the 19th century, the application of the banking principle led to the widespread acceptance of the representation of credit creation by what is called "fractional reserve banking." But for many analysts, the banking system's stability and the value of its outstanding liabilities were thought to be due to holding commodity reserves or (pace Walter Bagehot) by a central bank providing lender-of-last-resort support for reserve balances.

By analogy, just as reserves were required to ensure exchange rate stability between bank liabilities (deposits or notes) and currency (gold, state money, or Bank of England notes), the stability of the exchange rate of domestic money to foreign currency would also appear to be determined by the holding of national treasury or central bank reserves in a "fund."[3]

The IMF (and the US) and an International Bank: Fractional Reserve Banking

It would thus appear that Keynes viewed the US proposal adopted at Bretton Woods as a bank, since it reflected the ESF and the domestic US fractional reserve banking system (as reformed under the 1933–35 banking legislation). Just as banks issued fiduciary liabilities whose convertibility with Federal Reserve notes was determined by holding of reserves and deposits with the Federal Reserve, and in the limit by lender-of-last resort support from the Fed, the new international system would have each country's domestic currency stability and convertibility determined by gold and foreign currency reserves held under the IMF quota, supported by the possibility of further IMF lending. Just as in the US domestic system, all countries would preserve their dollar exchange rates with reserve balances, which could be gold or dollars. The architecture and support system of domestic fractional reserve banking were simply carried over to the international level. And just as in this period the major domestic policy instrument was still reserve balances, IMF program support conditions were to provide methods for restoration of reserve balances: the calls for increased quotas become the equivalent of raising reserve requirements and creating an SDR in an attempt to increase quotas without requiring national political approval of IMF members.

The analysis of the breakdown of this system by Robert Triffin, as well as by Milton Friedman, focused on the reserve system's failure. For the former it was due to a national currency playing the role of both the US domestic currency and the reserve asset for the rest of the world, while for the latter it was due to the fact that exchange rates, like prices, cannot be fixed in free markets, for the market could always exhaust reserve balances and did so in frequent exchange rate crises. Both criticisms are linked to the reserve banking framework that the system adopted at Bretton Woods, which lacked an endogenous, symmetric adjustment mechanism. And this remains the case whether the system ob-

jective is exchange rate stability, as it was until the mid-1970s, or managed flexibility as is currently the case. The conclusion that should be reached is that if the problem is in the system's reserve support framework, continually seeking to increase reserves will not resolve the problem. Just as domestic fractional reserve financial systems remain subject to instability independent of reserves, the same is true of the international system.

A Different Conception of National Banking Systems: The Banking Principle

If both the underlying theory and the structure of the system are faulty, the question arises of why Keynes's proposal has not been seriously considered as an alternative. The response is that Keynes's proposal was predicated on a different theoretical framework than the quantity theory and a different banking theory—one that was more understandable to European than American economists.[4] It is interesting that Keynes sought to justify and explain the logic of his proposals by linking them to domestic financial systems. However, critics of his proposals were misled by the use of the term "overdraft" system, which at that time was not familiar to most Americans. Under a domestic overdraft system, the bank lends the client funds in excess of those on deposit—it is automatic lending of bank reserves to the client. A system of unlimited overdrafts meant loss of reserve control of the money supply and the risk of inflation.

Instead, Keynes viewed overdrafts as part of the banking principle:

> 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. (Keynes 1980a, 70)

This use of "bank money," he wrote, "depends on nothing except the discovery that, in many cases, the transference of the debt themselves is just as serviceable for the settlement of transactions as in the transference of the money in terms of which they are expressed" (Keynes 1971c, 13–14).

In the international context, the application of "this principle is to set off transactions against one another so far as you can clear and then to deal with the resulting credit and debit balances as still off-setting one another in the same way they do in internal banking" (Keynes 1980a, 209–10). Indeed, in such transactions, reserves are unnecessary, since the two transactions always cancel, so there is no change in the bank's overall balance sheet. He goes on to note that in banking practice, "great stress was laid on the possession of capital, but we have learned as time goes on that that is of insignificant importance. You need the capital if you are not in a closed system and have to meet liabilities for credit outside your system, but in a closed system … [t]he deposits on one side are necessarily exactly equal to the overdrafts of the other, so that as there is no liability to pay outside the system it involves no risk and therefore requires no capital" (209–10).

Keynes was careful to clarify that this use of "overdraft" was not the traditional addition to credit because

> these facilities are made possible by the nature of the system itself and do not involve particular indebtedness between one member state and another ... A country is in credit or debit with the Clearing Union as a whole. This means that the overdraft facilities, while a relief to some are not a real burden to others. … 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. (Keynes 1980a, 113)

For present purposes, it is enough to note this rendering of the banking principle[5] requires the offsetting or internal clearing of private claims as acknowledgements of debt and credits, which Keynes calls "bank money," denominated in terms of an abstract (notional or imaginary) unit of account, and that this does not require "state money" or "money proper." Thus, by Keynes's definitions, it also is independent of both "commodity money," such as gold coin or bullion, or government issue of "fiat" paper currency—nor does it require reserves or capital to support stability.

Just as with the US proposal, Keynes's proposal is a direct transference of a national banking framework to the international level. Countries' external balances represent the debts and credits recorded on the clearing union balance sheet in terms of a notional unit of account—Keynes proposed "bancor." The system is stable by definition and requires neither reserves nor capital to support it, as is the case in a fractional reserve system. It automatically provides the credit required to support exchange rate stability, which is determined by the rate of exchange between national currencies and the bancor unit of account. It is interesting that Keynes's proposal was not the only one that took this form. Hjalmar Schacht had a similar proposal, and another was given in an anonymous pamphlet attributed to Lord Sempill.[6] There is also a similar plan that was formulated by E. F. Schumacher, although it is interesting to note that this plan was designed solely to resolve the problem of multilateral exchange.

One of the reasons given for the rejection of Keynes's clearing union proposal was the US representatives' resistance to the use of "strange" money in the form of the nonexistent bancor—clearly US bankers only put faith in "real" money such as gold or pieces of fiduciary paper backed by real reserves. Another problem was the fact that there was no longer a version of the approach in existence that could be used for reference.

The dominance of the US banking reserve view is seen in the 1970s reform proposals that focus on improving and expanding the reserve system. The closest the US came to Keynes's system was in what came to be called the "Volcker proposals":

> In short, the logic of the U.S. proposals is that: a) better balance-of-payments adjustment is required and is essential to the maintenance of a convertibility system; b) such an adjustment process, in turn, requires recognition by both surplus and deficit countries of their obligations and responsibilities to take action; c) in that context, objective indicators of the need for adjustment are essential; d) a broad equality between the availability of, and demands for, reserves in the system must be satisfied; and e) all of these needs can be brought together, in the context of a system of established exchange rates supported by convertibility, by the use of reserve movements as the main indicator of the need for adjustment. (CEA 1973)

This was basically a proposal for a reserve metric to determine adjustment.

The Development Dimension of the Keynes Proposal

Critics of the Bretton Woods proposal, such as John Williams (1949), noted that it could only apply in full once the postwar reconstruction was completed in Europe. E. F. Penrose highlights the fact that

> the Keynes Plan in its original form was more than a measure for dealing with temporary balance-of-payments difficulties. Its additional features, which have been largely forgotten in later discussions, carried it far beyond a mere plan for dealing with long run conditions which would be established only after reconstruction had been completed. From the beginning, Mr. Keynes … was willing to use the proposed International Clearing Union for short term as well as long-term purposes: The Union might set up a clearing account in favour of international bodies charged with post-war relief, rehabilitation and reconstruction. But it could go much further than this. For it might supplement contributions received from other sources by granting overdraft facilities in favour of these bodies, the overdraft being discharged over a period of years out of the Reserve Fund of the Union, or, if necessary, out of a levy on surplus credit balances. By this means it is possible to avoid asking any country to assume a burdensome commitment for relief and reconstruction, since the resources would be provided in the first instance by those countries having credit clearing accounts for which they have no immediate use and are voluntarily leaving idle, and in the long run by those countries which have a chronic international surplus for which they have no beneficial employment. (Penrose 1953, 43)

These financing measures are easily extended to development financing: the interest charges on the credit and debit balances in the clearing union could be provided "as additional credits to support the clearing accounts of developing ('backward') countries" (Keynes 1980a, 120). This would remove much of the bilateral political influence on official development financing. Further, it would also be possible to introduce the clearing proposal on a regional basis, such as proposed by the BRICS (Brazil, Russia, India, China, and South Africa) grouping.[7]

Penrose (1953, 45) thus concludes: "the Keynes Plan was drawn on comprehensive lines and was not conceived of purely as a long-term measure to come into force after the transition period. If more of its provisions had been accepted the economic

chaos into which the world lapsed soon after the end of the war might have been largely avoided."

The Private Sector Is Already Using Keynes's Approach

Keynes notes that the "the earliest beginnings of bank money, like those of chartalist money, are lost in antiquity," and the adaptation of the system by the state to use its own liabilities to discharge debt came "from a far more ancient contrivance of private finance—namely bank money" (Keynes 1971c, 13). This state, legal, or chartal theory was rediscovered independently by Georg Friedrich Knapp. And now history seems to be repeating itself, for a clearing system based on the banking principle is currently appearing in modern financial markets, quite independently of the high-tech electronic solutions of distributed ledgers and electronic currency.

Today, a client of Webtel.mobi (WM)[8]—an existing company that operates as a specialized mobile provider (SMP) of telephony services—may load his or her account with stored credit/stored value via a bank transfer, card payment, or cash payment to its in-country affiliates (known as virtual specialized mobile providers [VSMPs]) as prepayment for mobile phone services. In addition, the company provides each member the possibility of transferring credit balances from their own prepaid account to any other member's account via an internal system transfer (called an "Inter Closed Loop Member Transfer" [ICLM]). This reflects an internal adjustment by WM's system of a debit and a credit according to the banking principle. The same procedure can also be used to discharge a commercial purchase transaction. It is also possible for a member with a credit balance to execute a transfer to another member in exchange for a promise to repay at some future date along with a fee or charge—the equivalent of a borrow-lend transaction.

By executing debits and credits on members' accounts resulting from their transfer instructions, WM executes the role of bookkeeper in the "closed loop" clearing system. Since this is a bookkeeping account adjustment, it is virtually instantaneous and thus much faster than a normal bank-to-bank transfer; since a banking relationship is not necessary, it also avoids bank charges. All member accounts and transactions, wherever in the world the member is situated, take place in the jurisdiction of the company's registration. Member accounts thus have a single geographical representation and may be in any international currency, although initial accounts are denominated in home currency. However, members may purchase or swap the home currency for other currencies from within their ICLM accounts via a conversion facility executed through global foreign exchange markets or through a peer-to-peer (P2P) swap arrangement in which account holders exchange their national balances for foreign balances at conversion rates agreed to between the members. Members may thus hold balances in multiple foreign currencies within their accounts. The same advantages of increased execution speed and reduced costs, as in the ICLM transfers, are maintained. As in the operation of the banking principle for a domestic or international ICLM transfer, it is the account balances of nationally diverse members that adjust while the overall WM system's balances remain stable.

All inward transfers, currency conversions, currency swaps, or member-to-member ICLM transfers are registered as a ledger entry in a member's account, bearing an Inter-TEL.mobi Account Number (ITAN) linked to the mobile number to be debited or credited according to the usage of services or transfer instructions. The system may thus be understood as one in which WM provides the clearing house mechanism amongst its clients, who are free to engage in global transactions in any currency, carried out in real time (in 1/100th of a second), at any time, from anywhere in the world at zero cost.[9]

Since the creation of a member's stored credit account results from a transfer from a nationally regulated bank or by a cash payment to one of WM's affiliates, it provides the equivalent of a 100 percent reserved regulated deposit banking system, something that a fractional-reserve-based private banking system cannot provide, except through the guarantee of a government deposit insurance scheme. This simply reflects Keynes's (1980a, 70) assessment that "the Union itself can never be in difficulties" in executing payment.

A further simplification of the system is that members do not require a sophisticated payments application—all that is required is a generic mobile phone. As such, it provides a cheaper, faster, and more secure system for emigrant remittances in the same way that it provides these advantages for the entire range of retail or wholesale financial operations.

In Keynes's clearing union, one of the benefits was the possibility of shared adjustment costs, which resulted from the automatic creation of unit of account liquidity produced by the size of external balances. There were those who considered this a threat to price stability, and for this reason the formal proposal placed a limit, with penalty sanction, on the size of a country's external imbalance, positive or negative. In the WM system as currently

configured, this problem does not arise, since all transfers into the system are sourced in a regulated banking system or in cash, creating an implicit limit on the system's size as determined by its use and the scale of the membership.

However, as was seen in the operation of private bank clearing houses, it was possible for them to create credit by simply writing up members' credit balances as needed to cover debits—as was the case with the New York Clearing House in the financial crisis during the outbreak of World War I in 1914. The WM system thus has this ability inherent in its structure and provides full potential competition for existing private national credit systems.

While electronic or digital currency systems have been presented as a substitute for national monies, they have not been able to provide payments services because they are not governed by the banking principle, and thus have extremely volatile value.

On the other hand, central banks are considering the creation of their own electronic money accounts to maintain control of monetary policy but have hesitated because this would challenge the survival of private banks' major source of income. Implementation of such central bank electronic money would require a reformulation of the international system, raising the same problems faced in the original Bretton Woods system.

But It Looks a Lot like Schumacher's Multilateral System

The WM clearing system provides an example of a possible solution that retains national currencies without requiring the substitution of the dollar with another national currency, such as the yuan, or a basket of national currencies such as the SDR. Indeed, there is an uncanny similarity between the WM system and Schumacher's (1943) proposal for a multilateral clearing system.

Schumacher (1943, 151–52) proposes a system of "pool clearing" in which importers settle claims in national currency by transfer to their own national clearing fund, which informs the exporter's national clearing fund of the payment and credits to the exporter in his national currency. The deficit countries' funds will have surplus accumulation, which they invest in Treasury bills. The pooling of balances arises automatically, and an "international clearing office" is proposed to act as trustee for all cash balances accumulating (in the form of Treasury bills) in the deficit countries' clearing funds, and the surplus countries' clearing funds are deemed to each own a share in the pool equal to the size of their respective surpluses.

It will be clear that the international clearing office requires no finance of its own, nor does it have to create a new international currency. Since it is impossible to disentangle the mass of individual transactions that give rise, during the course of annual trading, to the various uncleared balances in the deficit countries and to ascribe any one particular balance, or part of it, to any one particular surplus country, the surplus countries as a group become the joint owners of the balances in all the deficit countries (Schumacher 1943, 153–54).

> In this way, one might say, every national currency is made into a world currency, whereby the creation of a new world currency becomes unnecessary. Nor does the International Clearing Office—in this connection—require any special powers; it is not an agency for control, but a purely administrative body, the central accounting office for the different National Clearing Funds. … As a result of its (purely formal) operations, we get the following position: The Clearing Funds of surplus countries become indebted to their internal money markets and acquire an equivalent share in the Pool; both their debt and their share in the Pool being equal to their trade surplus. The Clearing Funds of the deficit countries are left with balances of cash in hand (equal to their trade deficits) which belong to the International Pool. The Clearing Funds, finally, of countries whose balance of trade has left neither surplus nor deficit hold neither cash nor a share in the Pool. … The main force is the fact that the holding of surpluses becomes unprofitable and risky. The surplus, instead of being convertible into gold or interest-earning investments, is tied up in the Pool: it is a share in the Pool. And the Pool's assets are always the weakest currencies of the world: the currencies of the countries that have been unable to earn as much as they have spent. (Schumacher 1943, 155–57)

Note that this provides a strong incentive for surplus countries to take action to spend their balances, automatically improving the risk characteristics of their holdings.

We thus have a real-world, actually existing blueprint of how such a system might function. It would eliminate national currencies as reserve balances, indeed eliminate the need for capital or reserve balances in commodities or currencies, and provide an incentive mechanism to keep global imbalances under control. We do not need more SDRs, or quota increases, or other reform measures.

Notes

1. "I shall always hold to the view that the christening has been badly done and that the names of the twins should have been reversed." (Keynes 1980b, 215)

2. Even Ricardo ([1816] 1951, 75), in his *Proposals for an Economical and Secure Currency*, recognized "the very great perfection to which our system of economizing the use of money has arrived, by the various operations of banking." He indicates that in this system, "money is merely written off one account and added to another" (58). For Ricardo, it was through the use of what Keynes would call "bank money" via bank clearing that payments could be made without the need of specie or paper notes, allowing "a more economical mode of effecting our payments" (51).

3. It is perhaps not surprising that the author of the US proposal for postwar international monetary reform adopted at Bretton Woods had started his government career as responsible for the US Treasury Exchange Stabilization Fund (ESF) and became Director of Monetary Research on a salary paid by the ESF. While he was also involved with domestic banking, his doctoral thesis was an analysis of the gold standard's operation in prewar France and discussed the interrelations between movement in commodities and capital (White 1933). See Rees (1973).

4. Penrose (1953, 46) writes that

> The White Plan was cast in more conventional commercial forms than those of the Keynes Plan. The general conceptions in it were familiar to bankers and businessmen whose support would be needed in the United States to obtain the consent of Congress for the U.S. to join the proposed new organization. The more original scheme of Keynes would have gained acceptance in London but hardly in Washington political circles. Unfortunately, a measure which is, as it were, ahead of its time has little chance of political acceptance under the form of government in the United States, which gives so many opportunities for irresponsible obstruction and consistently weights the scales in favor of conservatism.

5. These references to the banking principle, little discussed in his other work, are reflected in his introduction to the *Treatise on Money*, where Keynes defines money as "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," noting that money "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." He goes on to note that the definition of the money of account allows one to distinguish

> offers of contracts, contracts and acknowledgements of debt, which are in terms of it, and money proper, answering to it, delivery of which will discharge the contract or the debt … for many purposes the acknowledgements of debt are themselves a serviceable substitute for money proper in the settlement of transactions. When acknowledgements of debt are used in this way, we may call them bank money … an acknowledgement of a private debt, expressed in the money of account, which is used by passing from one hand to another, alternatively with the money proper, to settle a transaction. We thus have side by side State money or money proper and bank money or acknowledgements of debt. (Keynes 1971c, 2–5)

6. The interested reader is referred to Kregel (2015, 9–13).

7. As Keynes envisioned:

> One view of the post-war world which I find sympathetic and attractive and fruitful of good consequences is that we should encourage small political and cultural units, combined into larger, and more or less closely knit, economic units. ... Therefore I would encourage customs unions and customs preferences covering groups of political and geographical units, and also currency unions, railway unions and the like. Thus it would be preferable, if it were possible, that the members should, in some cases at least, be groups of countries rather than separate units. (Keynes 1980a, 55)

This approach is developed in Kregel (2015; 2017).

8. https://webtel.mobi/pc

9. For a more detailed description of the Webtel system, see Kregel (2021).

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About the Author

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In 2011, Kregel was elected to the Accademia Nazionale dei Lincei, also known as the Lincean Academy, the oldest honorific scientific organization in the world. Founded in 1603, the academy counts Galileo Galilei among its original members. It has remained an elite organization of only 540 members, with only 180 of those from outside Italy. Although the academy covers all scientific and literary fields, Kregel is a member of the division for moral, historical, and philological sciences; specifically, the social and political sciences. Robert Solow, Amartya Sen, the late Paul Samuelson, and fellow Levy Senior Scholar James K. Galbraith are among the other American economists who have been elected foreign members of the academy.

Kregel studied under Joan Robinson and Nicholas Kaldor at the University of Cambridge, and received his Ph.D. from Rutgers University under the chairmanship of Paul Davidson. He is a life fellow of the Royal Economic Society (UK) and an elected member of the Società Italiana degli Economisti. In 2010, he was awarded the prestigious Veblen-Commons Award by the Association for Evolutionary Economics for his many contributions to the economics field.

Levy Economics Institute of Bard College

Policy Note

2021/1

KEYNES'S CLEARING UNION IS ALIVE AND WELL AND LIVING IN YOUR MOBILE PHONE

JAN KREGEL

It is generally accepted that Keynes's clearing union framework for the postwar international financial architecture was superior to the stabilization fund approach proposed by the United States and adopted at Bretton Woods. Yet, despite the inherent contradictions that have led to the collapse of that system, modern proposals continue to seek remedies rather than consider implementation of Keynes's original proposal. While governments may consider it too difficult to implement such radical change, the private sector has already produced a virtual equivalent of an international global monetary system.

This should not be surprising, since Keynes indicated that the inspiration for his proposal was to extend what he described as the "essential principle of banking as it is exhibited within any closed system," by which he meant the credit and debit transfers "by means of a clearing system" that provide the net settlement of the debits and credits among financial institutions in terms of some notional unit of account (Keynes 1980, 171). Keynes simply proposed extending this principle to the international stage, so that countries would undertake net settlement of their external accounts in terms of a notional unit of settlement—bancor was among the proposed names for this unit.

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Since every credit would be balanced by a debit, external deficits would be automatically financed, preventing undue pressure to adjust being placed on output and employment in the debtor nation. Coordination would thus be required to combine the policies of both creditor and debtor to limit the size of the credits created.

The role of the "banking principle" in replacing commodity currencies as a means of payment had been noted by Smith, Ricardo, and Jevons, as well as by Schumpeter, Mises, and Hayek. Clearing houses for settlement of accounts amongst private banks already existed in domestic monetary systems in the 18th century, so it should not be surprising that one might still exist today. What is more surprising is that it is employed as an extension of the international mobile telephone services provided by a private company rather than a financial institution.

Today, a client of Webtel.mobi (WM)—an existing company that operates as a specialized mobile provider (SMP) of telephony services—may load their account with stored credit/stored value via a bank transfer or card payment, or via a cash payment to its in-country affiliates (known as virtual specialized mobile providers [VSMPs]) as prepayment for mobile phone services. In addition, the company provides each member the possibility of transferring credit balances from their own prepaid account to the account of any other member via an internal system transfer (called an "inter closed loop member transfer" or "ICLM"). This reflects an internal adjustment by WM's system of a debit and a credit according to the banking principle. The same procedure can also be used to discharge a commercial purchase transaction. It is also possible for a member with a credit balance to execute a transfer to another member in exchange for a promise to repay at some future date along with a fee or charge—the equivalent of a borrow-lend transaction.

By executing debits and credits on members' accounts resulting from their transfer instructions, WM executes the role of bookkeeper in the "closed loop" clearing system. This is a bookkeeping account adjustment that is virtually instantaneous and thus much faster than a normal bank-to-bank transfer; since a banking relationship is not necessary, it also avoids bank charges. All member accounts and transactions, wherever in the world the member is situated, take place in the jurisdiction of the company's registration. Member accounts thus have a single geographical representation and may be in any international currency, although initial accounts are denominated in home currency. However, members may purchase or swap the home currency for other currencies from within their ICLM accounts via a conversion facility executed through global foreign exchange markets, or through a peer-to-peer (P2P) swap arrangement in which account holders exchange their national balances for foreign balances at conversion rates agreed to between the members. Members may thus hold balances in multiple foreign currencies within their accounts. The same advantages of increased execution speed and reduced costs, as in the ICLM transfers, are maintained. As in the operation of the banking principle for a domestic or international ICLM transfer, it is the account balances of nationally diverse members that adjust while the overall WM system balances remain stable.

All inward transfers, currency conversions, currency swaps, or member-to-member ICLM transfers are registered as a ledger entry in a member's account, bearing an Inter-TEL.mobi account number (ITAN) linked to the mobile number to be debited or credited according to the usage of services or transfer instructions. The system may thus be understood as one in which WM provides the clearing house mechanism for its clients, who are free to engage in global transactions in any currency, carried out in real time (in 1/100th of a second) at any time from anywhere in the world at zero cost.

Since the creation of a member's stored credit account results from a transfer from a nationally regulated bank or by a cash payment to one of WM's affiliates, it provides the equivalent of a 100 percent reserved regulated deposit banking system, something that a fractional-reserve-based private banking system cannot provide, except through the guarantee of a government deposit insurance scheme. This simply reflects Keynes's assessment that "the Union itself can never be in any difficulty" in executing payment (Keynes 1980, 171).

A further simplification of the system is that members do not require a sophisticated payments application—all that is required is a generic mobile phone. As such,

it provides a cheaper, more rapid, and secure system for emigrant remittances in the same way that it provides these advantages for the entire range of retail or wholesale financial operations.

In Keynes's clearing union, one of the benefits was the possibility of shared adjustment costs, which resulted from the automatic creation of unit of account liquidity produced by the size of external balances. There were those who considered this a threat to price stability, and for this reason the formal proposal placed a limit, with penalty sanction, on the size of a country's external imbalance, positive or negative. In the WM system as currently configured, this problem does not arise, since all transfers into the system are sourced in a regulated banking system or in cash, creating an implicit limit on the size of the system as determined by the size of membership and the use of the system.

However, as was seen in the operation of private bank clearing houses, it was possible for them to create credit by simply writing up members' credit balances as needed to cover debits—as was the case with the New York Clearing House in the financial crisis during the outbreak of the war in 1914. The WM system thus has this ability inherent in its structure and provides full potential competition for existing private national credit systems.

While electronic or digital currency systems have been presented as a substitute for national monies, they have not been able to provide payments services because they are not governed by the banking principle, and thus have extremely volatile value.

On the other hand, central banks are considering the creation of their own electronic money accounts to maintain control of monetary policy but have hesitated because this would challenge the survival of private banks' major source of income. Implementation of such central bank electronic money would require a reformulation of the international system, raising the same problems faced in the original Bretton Woods system.

The WM clearing system provides an example of a possible solution that retains national currencies without requiring the substitution of the dollar with another national currency, such as the yuan, or a basket of national currencies such as the special drawing rights (SDR).

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New Dimensions for the TUV in the Webtel.mobi system

Jan Kregel, June 2021

Overview

WM's global clearing house structure – functioning according to the "banking principle" system

The Webtel.mobi ("WM") system is comprised of advanced telecommunications and programming technology in a Complex Adaptive System. One of the aspects of this system includes offsetting Stored Credit within WM member accounts inside an internal Closed-Loop Members-Only transfer system of debit and credits (Inter Closed Loop Member transfers or payments – referred to as "ICLMs").

This ICLM facility is similar to the clearing house systems that in the past have been fundamental to the financing of the growth and development of all market economies worldwide. Already identified by economists in the 17th and 18th century, this system has come to be known as the "clearing house" or "banking principle" system, in which economic transactions take place by means of debits and credits to client accounts without the presence or intermediary of any physical commodity, coin or fiat money -- such as bank notes -- required.

Just as this clearing house system has been exploited by all modern, reserve-based, financial institutions, the WM system carries a similar potential to provide the framework for global production, trade and finance. In the WM system, mobile ICLM instructions from clients are executed electronically on a central balance sheet system representing WM member accounts. The system provides for global, multicurrency real time transactions at lower costs and greater efficiency than traditional payments systems, or currently proposed cryptocurrency and other digital currency systems, that carry substantial environmental and security risks.

The basis of the WM system is pre-payment by members for telephony services provided to them. However, while prepaid Stored Credit in the member's WM account can be transferred between and among WM member accounts for the purpose of payment for telephony services, they can also be transferred to other WM members in payments for any other services they might provide. This member transfer facility within the ICLM also provides the possibility of member borrowing and lending, via appropriate credit and debit agreements and instructions.

Since WM and TEL.mobi Group/"TMG"[1] members exist across multiple international currency jurisdictions, their Stored Credit accounts ("Currency Wallets") have a range of currency denominations. This provides the basis for cross-currency transfers amongst members, as well as cross-currency borrowing and lending. The result that emerges is a global transfer system, a global payment system, a global credit system and a global foreign exchange system, which emanates from the members' instructions transmitted from their mobile telephone accounts for Inter Closed-Loop Member Transfers (ICLMs) amongst WM member accounts.

This complete clearing house equivalent thus provides the basis for services that are equivalent to a global, multilateral, multicurrency transfer, payment and credit system.

[1] 1. TEL.mobi Group: https://webtel.mobi/pc/info/tel.mobi-group/#TEL.mobi-Group-Overview

System functionality

Bilateral exchange of credits and debits between members makes a "money" liability redundant

The WM system has two important characteristics that distinguish it from existing financial system alternatives.

The first is that it does not require the creation or acceptance of a private institution's liability as means of payment such as a bank note or deposit; or any digital asset created by the application of a computer algorithm such as bitcoin; nor any government or central bank liability such as a central bank digital currency (CBDC) to function.

Second, while WM's ICLM facility formally provides all the characteristics of a global electronic settlement system, a global foreign currency market system, a global payments system, a global transfers system and a global P2P credit market; these services are not the result of a conscious business plan to create WM proprietary digital financial instruments or a closed access electronic market to trade them. They are rather the expression of the intrinsic attributes of the functionality facilitated by WM's Complex Adaptive System that supports its global telephony business.

It is consequently the WM ICLM facility that provides the global, multilateral, multicurrency, transfer, payment and credit systems functionality, rather than the issue of a particular liability by a private or public entity to serve as a means of payment. Instead of a credit/debit relation intermediated by the liability of a private financial institution, the WM system simply provides electronic facilitation of direct bilateral exchange of debits and credits among members.

Since these functionalities of the WM system emerge from the banking principle structure underlying WM's structural functionality there are no specific limits to the development of additional applications within the underlying clearing house system for offsetting settlement of member debits and credits.

While the applicability of the system to additional activities is inherently unlimited, since its services are limited to the Closed Loop interactions amongst and between members, the prospect for activity expansion is linked to the expansion of the number of members in the WM / TMG network.

As currently configured, the WM system and its ICLM facility might be envisaged as a symbiotic satellite system, or as an "internal" closed financial system with entry and exit portals or "bridges" to and from the "external" financial system. Expansion would then be determined by the net flow into the internal system. This flow will be determined by the public perception of the potential of the WM system defined by the different characteristics of the "internal" WM global financial system equivalent and the "external" global financial system.

As noted above, the two structural characteristics that distinguish the WM system from the current global financial system are the absence of a "money" liability issued by a financial institution -- a bank note or deposit, or computer-generated crypto currency -- to execute payment, and the potential for an unlimited creation of additional financial services. However, the potential benefits to members of these distinguishing structural characteristics may not be easily or immediately recognized or understood due to the current presentation of the WM system.

Structural Characteristic 1

Enhanced security due to "External" asset/credit security levels inherent in "internal" WM capacities

The entry or bridge to the WM "internal" system from the "external" financial system is initially via an electronic transfer of "external" credit from a member's external, government regulated financial account to the member's WM account, represented as members' "Stored Credit" in the WM system. This inward transfer of external assets to Stored Credit takes place via a credit or debit card payment, ewallet payment or direct bank transfer, denominated in any one of WM's Platform Currencies.

Alternatively, a WM Independent Marketing Agent (Agent) or Virtual Specialized Mobile Provider (VSMP) – who are also members of WM – can make a transfer to their own WM account via card payment, ewallet payment or direct bank transfer in any one of WM's Platform Currencies. The Agent or VSMP can then -- via their Agent or VSMP Administration Consoles -- use that Stored Credit in their own WM member account to create and issue Digital Top-Up Vouchers (TUVs) to TMG members who want to acquire Digital Stored Credit for their own member accounts on the WM system (this is especially appropriate for unbanked persons).

As currently configured, loading of Stored Credit into WM member accounts takes place via a bridge (the Payment Gateway) that enables transfers and transition from "external" assets held by members in private financial institutions to and into Stored Credit that is "internal" to the WM system. Once this conversion has taken place, external assets lose the physical and visual characteristics of members' bank notes or bank deposits; and appear as digital representations of the currency and value in the Currency Wallets within members' WM accounts.

However, even though there is an *appearance* of a physical and visual difference between the "external" system's bank notes or bank deposits and the "internal" WM system's Stored Credit, there is an important continuity of structure built in to the WM system, which is not clearly evident to members. This is because although the inward transfer via the bridge transforms a member's "external" assets to "internal" WM Stored Credit, these "internal" assets/credit are held in a WM bank account at a regulated external financial institution.

As a result, WM Stored Credit remains at one and the same time "internal" assets/credit *and* "external" assets/credit. Moreover, due to this structure, internal Stored Credit is backed 100 per cent with and by corresponding credit in a reserve-backed financial institution, and can therefore always be returned at full value to the external bank accounts of members in the external system via a "Refund Transfer", or otherwise converted into bank notes in a "Refund Withdrawal" via apposite WM cash withdrawal machines (Stored Credit Refund Machines / "SCRMs"[2]).

Thus although the WM system is not a bank and does not issue payment liabilities, nor is it under financial services regulation, nor does it provide any physical representation of the member's Stored credit, the currency and value of Stored Credit held within the WM system is no less secure than any external credit held in a regulated external financial institution.

[2] Stored Credit Refund Machine / "SCRM": https://webtel.mobi/pc/info/coming-soon/#SCRMs

This aspect of the “bridge” allows WM members to benefit from the decreased costs and increased efficiency and capacities of the functionalities of the WM system without incurring any increase in systemic or default risk.

This is because a WM members’ Stored Credit is simultaneously “Internal” and “external” due to it being held in WM’s “external” account at an “external” financial institution -- concurrently with it being registered and available in the member’s “internal” WM member account. WM’s “internal” Stored Credit therefore benefits from the same government support as “external” credit in banks with regard to the covering of loss of assets in regulated financial institutions (banks).

This deposit security characteristic of the WM system, facilitated by the bridge between the external and internal systems, causes WM Stored Credit in member accounts to have all the security of assets/credit in an external regulated financial institution (bank), and simultaneously have all of the advantages of WM’s elevated KYC security systems, more rapid transaction speed, multicurrency holdings, significantly lower costs and global transfer and payment capacities.

This represents a clear benefit to members and a clear advantage over the “external” financial system. However, the current structuring of the WM system and process that appears on the Webtel.mobi Platform does not highlight this advantage, and may not be readily visible or apparent to the majority of WM members.

Structural Characteristic 2

Unlimited global transaction types directly by, in or from WM member accounts

The second structural characteristic previously noted is that the multiple financial service equivalent functions of the WM system emerge from the structural design and functionality of the Complex Adaptive System. An essential aspect of this system is the offsetting of Stored Credit within WM member accounts inside an internal Closed-Loop Members-Only transfer system of debit and credits (the Inter Closed Loop Member transfers or payments -- "ICLMs"). As noted, the structuring of the system is configured to provide for transfer operations, payment operations, settlement operations, credit operations, foreign exchange operations and so forth -- with all this functionality directly integrated into the members' WM accounts, and directly accessible to members.

This brings about a situation where –

- whereas a loan transaction in the "external" financial system (bank) requires participation by, or interaction between, multiple separate entities, accounts and procedures; or
- a foreign exchange transaction in the "external" financial system requires participation by, or interaction between, multiple separate entities, accounts and procedures;
- in the WM system all of these actions and transactions occur and can be carried out by, in or from each member's WM account -- or the WM accounts of multiple members cooperating between each other P2P -- only and directly, without the requirement for participation by, or interaction between, multiple separate entities, accounts and procedures.

Since virtually all financial services involve the transfer of claims among persons between different points in time or across dimensional units, the WM system has the potential to replicate virtually all types of financial transactions, utilizing the direct P2P actions currently available from each WM member's account – or the WM accounts of multiple members cooperating between each other.

This represents a significant advantage to WM members, and represents WM's greatest advantage over the external financial system. However, again due to the current structuring of the WM system and process, this advantage is also not readily visible or apparent to the majority of WM members, who primarily view WM as only providing telephony services or simple payments services.

Objective of the TUV project

As previously noted, WM's distinguishing structural characteristics of enhanced asset/credit security and the expansion of transaction types from within WM member accounts are not sufficiently obvious or appreciated by members and the general public because of the current configuration of the WM system and platform. For this reason, in its current configuration, the full extent of WM's capacities would not be able to be understood by the general public.

This would -- if left unaltered -- inhibit the maximum utilization of the full range of the emergent functionality of the WM system among a large percentage of people; who will otherwise utilize it only for its most basic and superficial functions; leaving only persons or entities that function at an elevated level of financial expertise to utilize its advanced and emergent functions.

Paradoxically, to enhance the visibility of the full potential of the WM system will require reinforcing the perception of the "bridge" between the "external" and "internal" systems, to make explicit the role of the bridge in combining the characteristics of the external accounts with the internal WM accounts, in order to highlight the internal WM account's additional benefits.

The objective of the TUV project is thus to reconfigure the existing TUV facility in order to highlight the enhanced security and the inherent unlimited transaction type potential of the WM "internal" clearing system – and thus its superiority over the current external financial system.

The reconfiguration of the TUV is therefore meant to visibly demonstrate the existing capacities of the WM system, in a format that is more immediately visible, easily recognizable and understood by current and potential members among the general public.

Therefore, the primary objectives of the reconfiguration of the TUV are to –

- emphasize the asset/credit security advantages that the bridge between the external and internal system bring about; and
- assist recognition of the additional benefits provided by the WM system in terms of potentially unlimited transaction types – combined with lower costs, greater speed, increased security, removal of intermediaries, centralization of all functionality within members' own WM accounts and so forth; and
- enable easy and immediate recognition of these superior capacities, and comparisons thereof against external system products that provide similar services by the general public

In order to achieve this, the requirement is to simplify the appearance and functionality of the TUV, to make it visually conform more closely to the public perception of external assets (bank notes) and make more evident the additional potential functions of the TUVs for potentially unlimited transaction types – relative to the external account assets.

These amplifications for general recognition of the WM system capacities are even more important because the "external" financial system is also in the process of change. Government regulated financial institutions are being challenged by mobile payment systems, by cryptocurrencies such as bitcoin that seek to replace cash, and by digital payments instruments such as central bank digital currencies "CBDCs" that could displace private bank deposits.

Reconfiguration of "Standard TUVs"

In order to highlight the advantages and benefits of the WM system's special characteristics as previously noted, the WM system is being reconfigured to enable immediate acquisition and/or creation of TUVs via all members own WM accounts. This will be carried out via use of members' Stored Credit within their own WM accounts. WM's Independent Agents and VSMPs retain the capacity to issue TUVs to primarily unbanked persons in exchange for payment in cash. All TUVs will – as is currently the case – be issued to members without any fee or commission.

In order to strengthen the similarity in terms of security and physical representation of TUVs with external assets, the TUV will be given a physical visible format. This renamed "Standard TUV" will be held, and may be viewed, within a new "My TUV" facility in members' WM accounts. It will have a form similar to standard means of payments such as bank notes, including various serial numbers, keys, etc. which provide ironclad identification protection (see *"Addendum to New Dimensions for the TUV in the Webtel.mobi system",* page 2).

Thus, the internal end of the bridge becomes the transfer of an external asset to the holding of a Standard TUV in the My TUV facility. The next step will require the member to decide how to use the TUV. Members will be presented with a series of sub-facilities representing the full range of capacities that already exist within WM's ICLM transfers and payments, currency conversions, currency swaps, settlement, clearance, credit and all other capacities – presented in an easily visible and simplified step-by-step layout.

These two reconfiguration exercises simplify the appearance and consequent understanding of the TUV as an instrument of value, and illustrate the wide range of functionalities and transaction types that can be carried out through the use of TUVs (essentially a simplified replication of the already-existent facilities and functionalities within the WM system).

This reconfiguration will clearly illustrate to members the possibility to convert the currency underlying the TUV's value into any other currency provided by WM. Thus the TUV represents to the member an instrument of value that is comprised of not just the initial acquisition currency but also -- at the member's election and instantly -- any other currency provided by WM.

Moreover while traditional external and digital means of payment are specific in terms of use, the TUV provides security against loss, theft, fraud and counterfeiting; ease of storage, accessibility and use; instant global transferability, global settlement and global convertibility to other currencies; low or zero cost of use and 24/7/365 operation of these functions.

Added to this is that although these are applicable to the TUV in the "internal" WM system, the results thereof are simultaneously applicable to the "external" system, because the results can at any time be transferred across the boundary from the member's account in the WM system to the member's bank account in the external banking system.

Moreover, the WM system does not employ or require a unique internal monetary unit or standard for its operation. Although a TUV is initially created in the denomination of the transfer or bridge into the WM system, a TUV can always be converted to any existing national currency in order to hedge against loss in value due to inflation or deflation, depreciation or devaluation.

In this format, the “internal” TUV represents visibly the similarity with the “external” system, its clear superiority over all other current systems -- as well as its clear superiority over all other currencies, digital currencies and cryptocurrencies.

Moreover, given the almost unlimited capacities of the emergent properties within the WM system, and in order to expand these properties to cater in a more substantive manner for amelioration of the risks of inflation or deflation, depreciation or devaluation, the reconfiguration of the TUVs is incorporating an additional capacity to provide additional risk-mitigation via the ability to hedge against changes in nominal prices.

This additional capacity is represented by WM’s “Secured TUVs”.

The "Standard TUV" and "Secured TUV"

The "Secured TUV" facility enables the member to use Stored Credit on the WM system to acquire a TUV for the equivalent value and currency of the Stored Credit, and to simultaneously also acquire the corresponding amount of physical gold to the equivalent value and currency (see *"Addendum to New Dimensions for the TUV in the Webtel.mobi system",* page 3).

This converts the Stored Credit into a TUV and a de facto gold holding (and with the additional capacity to convert the underlying currency of the TUV to another currency at will -- while also carrying over the gold backing for the new underlying currency of the TUV). This is an advantage that no other payment system provides or can provide, and it is – as are the balance of TUV capacities -- unique to the TUV system.

This expands the attractiveness of the TUV and substantially reduces the benefit of returning -- or desire to return -- the Stored Credit within the TUV to the "external" bank facilities via a Refund Transfer (due to the instant loss of this protective capacity once that is done, as this capacity does not exist outside of WM).

The Secured TUV therefore creates a situation where the same central bank issued currency exists concurrently in two very different formats, each with very different levels of security, protection, value underwriting and capacities as follow –

- The central bank issued currency held in external accounts has the (comparatively) limited levels of security, protection, value underwriting and capacities.
- The same central bank issued currency -- when issued in Secured TUV format -- has all of the levels of security, protection, value underwriting and capacities as that held in external accounts (as it is also held in an external account with WM), but it simultaneously has all of the additional levels of security, protection, value underwriting and capacities of a WM TUV, and it furthermore has the additional advantage of being a gold-backed currency.
- This situation -- where the same central bank issued currency can exist concurrently in two such vastly different formats and with such vastly disparate characteristics – has not previously existed, nor has it been able to exist previously.

These attributes further expand the TUVs' a significant advantages over all other currencies, digital currencies and cryptocurrencies in mitigating the risk of loss of economic value due to inflation or depreciation. This is because a WM Standard TUV can be made "as good as gold" as a Secured TUV at no extra cost to the member.

As noted above, one of the benefits of the special characteristics of the ICLM system is the possibility of exploiting emergent properties to develop additional financial services. These developments are represented by WM's "Smart TUV".

Emergent properties and “Smart TUVs”

As previously noted, any clearing system functions on the basis of messages transmitted to the clearing house to execute instructions to adjust balance sheet entries. The reconfiguration of WM’s existing capacities into the TUV format is to visibly highlight that these functionalities that allow for executing any type of market transaction in any market sector exist within the WM system.

As additionally previously noted in this document, an important aspect of the WM system is that it does not require “bankers” or broker dealers to execute member instructions. The WM Complex Adaptive System and the reconfigured TUV -- including Standard TUVs and Secured TUVs -- are structured to have facilities and processes that have even better process flows and construction than any other current market system, and they are all centrally managed by WM’s Complex Adaptive System.

Moreover, with the WM system it is no longer necessary to have a specialist or broker-dealer execute the instructions as a middleman. The WM system provides automatic execution for current transfers and exchanges. However, most markets also include systems of deferred temporal implementation or instructions in the form of options and limit orders left with broker-dealers or specialists via a sort of pre-messaging of instructions for subsequent execution.

In Block Chain distributed ledger nomenclature this is what is now called a “smart contract” – they used to be called “contingent” contracts or limit orders with discretionary execution. This process forms the basis for the functioning of all such markets in all market-based economies since the inception of financial markets in the 1600s.

To illustrate WM’s existing capacity to replicate and improve upon all of these “contingent” contracts, or to limit orders with discretionary execution, the final pillar of the reconfiguration of WM’s system into the visibly and easily recognizable TUVs includes the creation of the “Smart TUV” (see *“Addendum to New Dimensions for the TUV in the Webtel.mobi system”,* page 4).

To create the Smart TUV, a series of menus from which to select any and all specific terms or combinations of terms -- which menus are now ubiquitous in e-commerce and other retail distribution systems -- are also being inserted into Standard and Secured TUVs. This enables the structuring and/or execution of any variable of any contract, contingent on any particular or general conditions for fixed or variable periods of time (see *“Addendum to New Dimensions for the TUV in the Webtel.mobi system”,* page 5).

This process flow includes the capacity for any number of members -- as selected by the parties programming the TUV -- to have sight and/or oversight of the TUV and the execution of or adherence to the contract terms via WM’s Complex Adaptive System. Moreover, interactive confirmations and approvals are already part of the WM system through its Multi Factor Authentication and TAN Number Text subsystems.

As an example, utilizing the system of Smart TUVs, enterprising members could undertake the creation of “real” commodities indices, and offer them to other members as inflation hedges -- de facto transposing the current derivative and other markets into the WM system of Smart TUVs in preference to -- or in combination with -- the prevailing systems.

In the preceding example the benefits of a Smart TUV are being assessed from the standpoint of the mitigation of risk from volatility in economic value – inflation or deflation. However, it is obvious that under a set of variable menu selections, a lego-set of possible future conditions and transaction become available when using a Smart TUV.

The Smart TUVs will consequently enable the replication of virtually any existent option, future and forward contract that might be imagined, as well as structured positions comprised of those contingent contracts which could be applied to specific risks, as well as to inflation or deflation risk.

These attributes not only further expand the TUVs' significant advantages over all other currencies, digital currencies and cryptocurrencies as already noted in the previous sections; they furthermore expand their scope to include advantages also over virtually all financial and commercial processes, market contracts and transactions.

Solutions for systemic risk

All payment systems are subject to two types of risk.

The first risk is the failure of the counterparty to complete the transaction, which may be due to technical economic reasons or fraudulent behavior or the failure of the financial institution.

The WM system has the lowest risk of all available payments systems due to the virtually instant transaction transmission and receipt in 1/100th of a second globally with no intervening period.

Fraud is mitigated by the WM system's multiple security levels within it, and due to the fact that a TUV representing a stored credit is at one and the same time internal and external credits by identity -- rather than by value guarantee -- within WM's inherent 100% reserve system.

While a bank may fail because it cannot validate its liabilities, the WM system cannot, since there is always a credit corresponding to any debit.

The second risk and ostensibly more ubiquitous risk is change in economic value.

In layman's terms this is the question long debated by economists of a stable monetary standard, or of gains and losses from inflation or deflation that have a dissimilar impact on creditors and debtors. Inflation benefits debtors and vice versa for deflation and creditors.

This problem of the invariable standard is in essence insoluble, because there is no mechanism in the world to ensure stability in economic value of any specific currency in a market exchange economy based on debt and credit. This is because the measure of such value must be linked to the relative prices of the goods that are exchanged in the system, and thus will change with them.

What is sought in the context of the WM system is a mechanism of protection from changes in economic value of specific currencies that are represented as the underlying value currency of a TUV.

WM's TUV system significantly ameliorates risk in respect of change of economic value through two mechanisms.

Firstly, as already noted, the WM system does not employ or require a unique internal monetary unit or standard for its operation. Although a TUV is initially created in the denomination of the transfer or bridge into the WM system, a TUV can always be converted to any other existing national currency. Consequently, the Standard TUV's mechanism for immediate conversion of the TUV's underlying value into another currency provides a natural hedge of the risk in respect of change of economic value of a transaction in a specific unit.

Secondly, WM's Secured TUV provides the possibility of a gold hedge to the value of the underlying currency of a TUV, at the gold value when the TUV was created. Consequently, the volatility of a currency is compensated for by the expected relatively stable value of gold against the currency – the amount of the underlying currency in the TUV automatically appreciating in the case of currency depreciation due to the relatively stable value of the gold that backs and secures the TUV. This mechanism thereby ameliorates the risk in respect of change of economic value of a currency (with the Secured TUV also retaining the mechanism to immediately alter the underlying currency if required – as is the case with the Standard TUV).

These two TUV mechanisms provide a hedge against loss in value due to inflation or deflation, depreciation or devaluation and therefore provide instruments and mechanisms that significantly ameliorate risk in respect of change of economic value.

Comparison against cryptocurrencies

The reconfigured visible format of the TUV also allows for a comparison of the TUV against cryptocurrencies.

Cryptocurrencies have a purely digital existence, have no inherent value of their own, are *not* currencies but rather nonessential speculative retail commodities and which require substantial technical expertise and equipment to verify and manage; including the use of a cryptocurrency exchange to convert across different types of cryptocurrencies and denominations; or to reconvert into reserve currencies as part of a speculative trading process.

WM's TUVs on the other hand are *de facto* currencies, irrevocably equivalent to the value of the central bank issued currency in which they are issued. Their value may be hedged by gold with the simple creation of a Secured TUV if desired, they require no specialized equipment or processes to acquire or create or trade with or manage, they are fully tradable and convertible worldwide on the WM platform, and their value is able to be electively returned by members to an external account, or withdrawn in cash at an SCRM machine.

Cryptocurrencies also suffer from chronic insecurity due to loss of passwords or account keys and the corresponding loss of the asset, commodity price fluctuation, fraud and outright theft – as well as susceptibility to the dangers inherent in any market or for any product whose value is predicated upon the maintenance of artificial scarcity and/or artificial demand.

Comparatively, WM's TUVs have the most robust levels of security that exist, have mechanisms in place that prevent the loss of passwords or TUV Keys, can be protected against commodity price fluctuation, are able to be converted across currencies or backed by gold to ameliorate the risks of currency depreciation or inflation and are impervious to fraud or theft. Their value is not based upon market sentiment or artificial scarcity but rather on the value of central bank issued currency and the stability of the global central banking system – which *de facto* underwrites the value of WM's TUVs.

Moreover, a fundamental difference between the TUV and cryptocurrencies is that a person has to buy a cryptocurrency in a non-recourse transaction – because it is a retail commodity and not a currency, and therefore has a volatile value that is predicated upon market perception and sentiment only, and is not due to any inherent value of its own.

This means that as a consequence of the process by which a cryptocurrency is acquired using assets/credits from an external account, the bridge between the external asset/credit and the cryptocurrency is broken, and the value of the commodity (the cryptocurrency) is therefore only maintained while there is a retail demand for it. If the demand dissipates, the value falls – often to zero.

Any TUV created and remaining in the My TUV facility on the other hand remains a fully backed asset to members because the bridge that creates the TUV is merely a format alteration between external accounts and internal WM accounts carried out at zero cost to members. This is because the TUV constitutes a *de facto* currency, not a retail commodity.

This means that the value of the TUVs transferred to the My TUV facility, less any transfers to a sub-facility to implement telephonic or financial services, remains available at its original value and can always be returned to the member's external account via a Refund Transfer, or can be obtained in cash via a Refund Withdrawal at an SCRM machine. This maintenance of economic value is an important characteristic of the WM system, which is a superior characteristic to any current cryptocurrency system.

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Conclusions and ramifications

All these attributes of the (internal) TUVs that have been evaluated illustrate that they have capacities and possibilities that are superior to the external assets from which they derive and superior to other external currencies, digital currencies, cryptocurrencies or market contracts.

This superiority in function and application -- combined with the simplification of the visual representation of the TUVs in a form distinguishable as an instrument of value – will remove the perception of any boundary between external and internal assets.

This indicates the possibility for the WM TUV facilities to evolve into an independently-created form of liquidity.

At that point, WM's TUVs would, to a large extent, become fully internal only, in the sense that there would no longer be any need for the refund to external accounts -- or withdrawal -- by members of any Stored Credit held in WM TUVs.

This would be because all desired and required functions of currency, digital currency and market contracts are offered internally according to better terms, security, speed, cost and functionality.

Furthermore a very significant number of functions and capacities that are not available outside of WM from any other entity or process are similarly available (only) internally within the WM system.

When this point is reached, WM will begin to create internal liquidity independently of the external system, and will become self-perpetuating and self sustaining.

Final transition to this state may be supplemented (although purely from a cosmetic perspective since it would be operationally redundant) with measures to provide further physical and visual similarity to prevailing systems. This might be achieved by shifting the WM general external (bank) account from its current position within a third-party bank to a WM-owned external bank.

This would be another way of clearly illustrating the direct relationship and correlation between a TUV and the corresponding asset/credit in an external bank account (which, as previously noted, is not generally recognized by members even though it is already fully existent in the current WM structure). Yet again paradoxically, this would mean that the bridge between external accounts and internal WM accounts is no longer needed, since all aspects of the external system can be more efficiently provided within the internal WM system at much lower cost.

Whether or not a WM owned bank is acquired for cosmetic purposes, given the advantages of the TUV facilities within the WM system, the point will be reached when virtually all members' desired transactions are being performed within the WM system, and members no longer have the need or wish to refund any of their Stored Credit from the internal WM system to any external entity or account.

At this point, there is no longer a need to traverse an external boundary or keep a linkage between external accounts and internal WM accounts, and the WM system will at this point become self-perpetuating, and free of any requirement to have any linkage with any entity whatsoever.

If one considers all of the capacities that already exist and function within the WM system -- of which the TUV project represents only the simplification of the existing appearance and functionality so that most attributes are able to be visually seen, understood and utilized in one medium -- it is clear that the WM system represents and provides virtually all capacities (and/or the ability to replicate virtually all capacities) of the existing global financial system.

Moreover, it provides them in a more secure, more rapid, less costly and centrally managed manner.

It can therefore be taken that the WM system -- including its TUV facilities -- is a replication and improvement of the existing global payments system and global financial system.

At this time, it is electively linked into aspects of the existing system of private financial institutions, but it is by no means permanently dependent on this linkage.

The WM system therefore represents an operational and fully functioning global financial system, which does not reform the existing one, but rather functions in parallel to it, and has the capacity to replace it.

Notes

For further contextualization of the observations in this document, see:

1. *Examples of TUVs in the "Addendum to New Dimensions for the TUV in the Webtel.mobi system"*
2. *The following papers:*

- ***ANOTHER BRETTON WOODS REFORM MOMENT: LET US LOOK SERIOUSLY AT THE CLEARING UNION***
  J.A. Kregel, Levy Economics Institute of Bard College, Public Policy Brief No 154, 2021
  https://webtel.mobi/media/info/another-bretton-woods-reform-moment-let-us-look-seriously-at-the-clearing-union.pdf

- ***KEYNES'S CLEARING UNION IS ALIVE AND WELL AND LIVING IN YOUR MOBILE PHONE***
  J.A. Kregel, Levy Economics Institute of Bard College, Policy Note 2021/1
  https://webtel.mobi/media/info/keyness-clearing-union-is-alive-and-well-and-living-in-your-mobile-phone.pdf

- ***THE ECONOMIC PROBLEM: FROM BARTER TO COMMODITY MONEY TO ELECTRONIC MONEY***
  J.A. Kregel, Levy Economics Institute of Bard College, Working Paper No. 982, 2021
  https://webtel.mobi/media/info/the-economic-problem-from-barter-to-commodity-money-to-electronic-money.pdf

- ***MONEY AND CREDIT: POTENTIAL EXPANSION OF THE WM SYSTEM***
  J.A. Kregel, April 2021
  https://webtel.mobi/media/info/money-and-credit-potential-expansion-of-the-wm-system-april-2021.pdf

Addendum to New Dimensions for the TUV in the Webtel.mobi system

This is an Addendum to the document entitled

“New Dimensions for the TUV in the Webtel.mobi system”,

by Jan Kregel, June 2021

This Addendum provides visual examples of

a Standard TUV, a Secured TUV and a Smart TUV

Standard TUV - Example

1 000 000
ISO 4217: 840

TUV
TEL.mobi Group

1 000 000
ISO 4217: 840

WM 9241
02052181090

TUV Number: **Aby!74$&*Ffh85ls**

TUV Key……..: **sVp30iLas72%?$&**

WM 9241
02052182090

This TUV is valid for **USD 1 000 000** when loaded onto a valid TEL.mobi Group (TMG) Account, provided that it is an unused TUV with the Original TUV Number and Original TUV Key. If the TUV Key has been manually changed, this TUV will only be valid for loading if loaded with the new Changed TUV Key. This TUV can only be loaded (1) By the TEL.mobi Group Member who acquired it into his or her own TMG Account, or (2) by another TEL.mobi Group Member to whom it has been transferred using the *Transfer TUV* Facility – and then only to the new owner's TMG Account. New Original TUV Keys are created when a TUV is transferred. If not acquiring a TUV via the *Transfer TUV* process, do not acquire a TUV from a third party without first personally verifying its validity using the *Check Validity* functions in the *Load Credit (TUV)* Facility of your own TMG Account

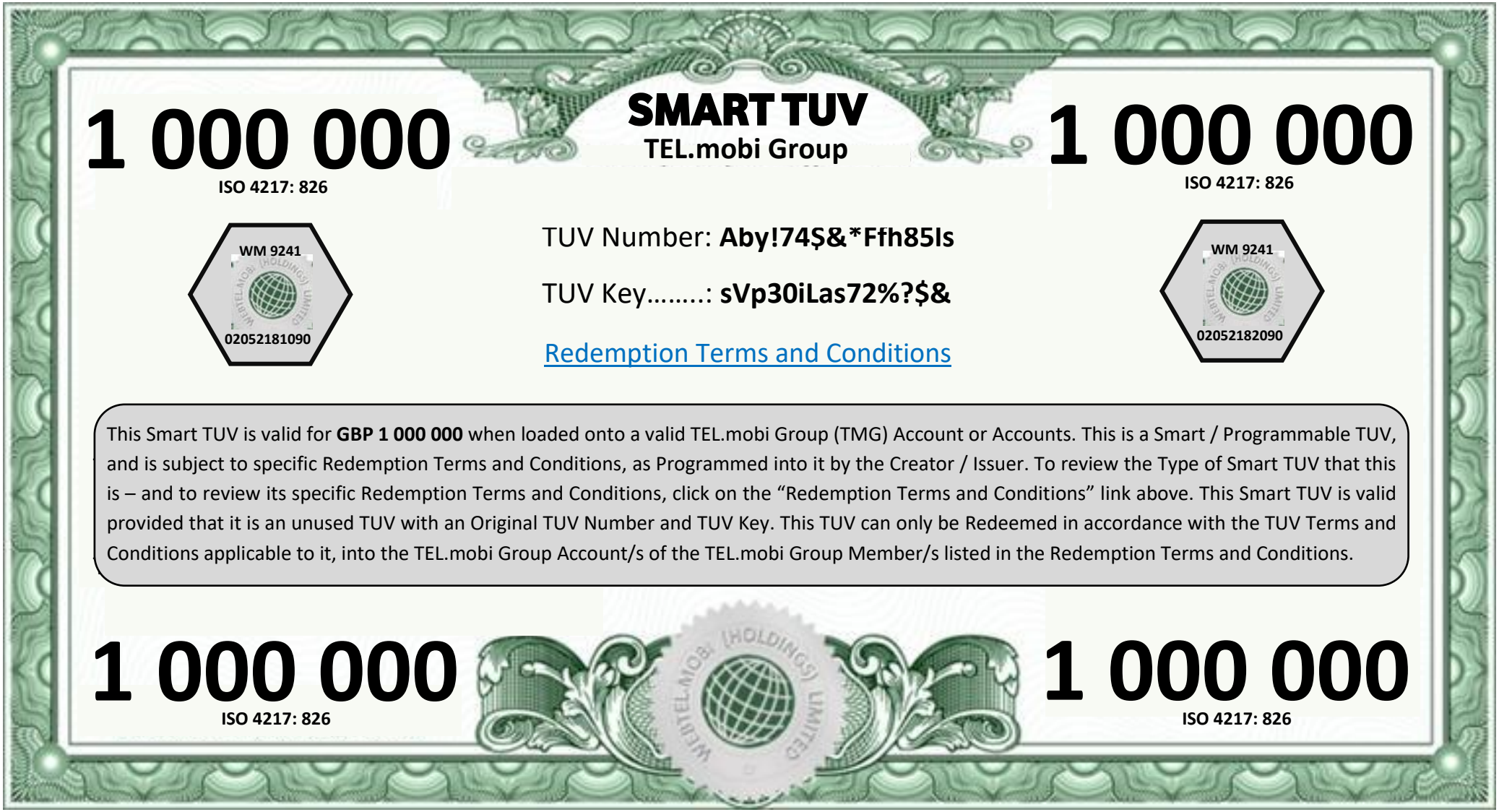
1 000 000
ISO 4217: 840

1 000 000
ISO 4217: 840

Secured TUV – Example

Note: The Face value as shown in the four corners and in Bold in the narrative section constantly changes to reflect changing value of gold against the TUV Currency

Smart TUV (Programmable TUV) – Example



Print Smart TUV Redemption Terms and Conditions

To program a Smart TUV:

- Select one option per option block.
- Selected options with refinement capacity for each are displayed once all option blocks have been completed
- Option block selections can be edited at any time prior to creating the Smart TUV

Option Blocks

- ☐ Not Applicable
- ☐ Redemption at a Specific Future Date and Time
- ☐ Redemption within the next 24 Hours

- ☐ Not Applicable
- ☐ Redemption in Tranches at Set Dates and Times
- ☐ Redemption in Tranches at Varying Dates and Times

- ☐ Not Applicable
- ☐ Redemption in Tranches of Set Amounts
- ☐ Redemption in Tranches of Varying Amounts

- ☐ Not Applicable
- ☐ Redemption Amount Increases Over Time
- ☐ Redemption Amount Decreases over Time

- ☐ Not Applicable
- ☐ Redemption via Nominated Third Party Confirmation
- ☐ Redemption via Multiple Nominated Parties Confirmation

- ☐ Not Applicable
- ☐ Redemption to a Single Party
- ☐ Redemption to Multiple Parties

- ☐ Not Applicable
- ☐ Redemption Currency Unrestricted
- ☐ Redemption Currency Restricted

- ☐ Not Applicable
- ☐ TUV Currency Alterable before Redemption
- ☐ TUV Currency Inalterable before Redemption

- ☐ Not Applicable
- ☐ TUV Divisible and Transferrable to Third Party/ies
- ☐ TUV Divisible and Non-Transferrable to Third Parties

- ☐ Not Applicable
- ☐ TUV Indivisible and Transferrable to Third Party/ies
- ☐ TUV Indivisible and Non-Transferrable to Third Parties

- ☐ Not Applicable
- ☐ TUV Terms Inalterable
- ☐ TUV Terms Alterable with a Nominated Party's Decision
- ☐ TUV Terms Alterable with All Parties Consent

- ☐ Not Applicable
- ☐ Revoke TUV – Remaining TUV Amount
- ☐ Revoke TUV – Full TUV Amount (Before Redemption)
- ☐ Revoke TUV – Full TUV Amount (After Redemption)

- ☐ Not Applicable
- ☐ Insert Transaction Agreement / Contract / Terms into TUV

Note: This is a representative selection of the multiple Option Block categories

Money and Credit: Potential Expansion of the WM System

***Jan Kregel**, April 2021*

Money and Credit

Economists have always had difficulty distinguishing money from credit. The most frequent attempt classifies money as something that has intrinsic market value that can be used as an intermediary to solve the problem of the double coincidence of wants or magnitudes. It can be held over time to conserve value between the search for matching counterparties. Credit is defined as the promise to provide whatever is the defined "money" today for restitution at some future date.

Thus, money is the intermediary that allows the exchange of goods to money to other goods, while credit is the provision of money today against the return of money tomorrow. While money produces a loss of utility without recompense, the loss of use in the latter exchange usually requires the payment of a fee called interest that causes a divergence in the relative value of present and future money.

Of course, the fact that virtually since the beginning of history the intermediary used in actual exchange has taken the form of something without intrinsic value, such as paper notes or entries on a bank's account book, recreates the problem. Since these fiduciary or fiat money substitutes are also considered as promises or pledges to return "money" in future, they look much like credit instruments.

In an attempt to ensure, or better reassure the holders of paper, that the pledge to return money is credible, most government have imposed regulations on banks requiring them to hold physical "money" reserves as evidence of their ability to meet their promise to return the money borrowed in future. However, the same problem is resurrected when these "good faith" reserves take the form of paper liabilities issued by governments, and the reliability of the promise is shifted in part to the public sector. The requirement of US government bonds to be held as reserves for national bank notes is the more evident example.

However, since a bank's reserves – whether due to regulation or good practice – were never more than a small fraction of the credit liabilities that they issue in the form of notes or deposit credits, it has become normal to consider the government's liabilities as representing "money", and the bank's liabilities as representing "credit" backed by central bank liabilities, issued against government liabilities. However, it should be clear that one might search in vain for a physical money commodity of value as the reserves available to support the pledge to redeem credit.

Indeed government money usually states on the face of the note that it may be redeemed … for another, similar, paper liability, and credit is therefore always redeemed by another credit – not by "money". This explains the call to return the global financial system to its original division, by returning to a gold standard for money, a condition that paradoxically it is almost impossible to find in the historical record. Indeed, history suggests that most "credit" instruments were means of avoiding or conserving the use of gold or physical commodities as money.

Nonetheless, there is a fundamental difference between holding a credit on the government or central bank, and a credit on a private bank. As Minsky has noted, anyone can issue an IOU, which is a liability. The real problem is to get someone to accept it as a credit to be used as a means of payment.

The answer is discovered in the fact that a credit always extinguishes a debt. If I have a debt to the government, say because I have to pay a fine or meet a tax bill, then I need a credit on the government to extinguish it. If the only way this can occur is by accepting a government IOU then I will seek to acquire one, usually though the sale of goods or services to the government.

The same reasoning applies to a bank's liabilities. If I borrow from a bank, I have a liability to the bank that I can extinguish by acquiring a credit on the bank. In each case, the demand to hold the liability as a credit is generated by the need to acquire that same liability to extinguish a liability to the bank

Now, the government or the central bank can issue any amount of liabilities, which can be used by the public as credits to redeem its liabilities to the government. This is because the government can autonomously set the amount of the payments that the public has to make in the form of credits on the government at the appropriate level.

This is not the case for banks. While it is true that just as in the case of the government, there is no limit on the amount of credit that can be created; this is not the case when bank credit must be backed by reserves.

In a multiple unit banking system, the credits issued by any one bank may be transferred to any other bank in the system, requiring the transfer of the pro rata portion of reserves. However, unlike the government, a bank cannot use its own liabilities to meet the transfers. It must use its reserves of "money" – either gold or government liabilities, which it cannot create at will.

While the bank's ability to create private credit is unlimited, its reserve holdings are not. Any question about a single bank's ability to meet its pledge to redeem its liabilities by transfer of reserves, i.e. money, will thus lead to "deposit drain", and then a "bank run" in which its clients transfer to other banks more credits than the bank's holding of reserves backing them

Since historically reserves have seldom been higher than 10-15% of bank note or deposit liabilities, this can occur quite rapidly. If doubts of solvency spread to other banks, eventually the run extends to the entire system, and there is a financial crisis and economic collapse, because the economy must then survive on the 15% of reserves of government money – no one being willing to hold insolvent banks' liabilities.

This is the instability of a fractional reserve banking system, but it should be obvious that this is not necessarily due to malfeasance or malpractice on the part of the bankers. It is simply due to the organization of the financial system around multiple unit fractional reserve banks.

As a counterfactual, note that if there were only a single bank in the economy there cannot be a deposit drain – since there is no other bank. There cannot therefore be a bank run since there is no other bank to run to. All transfers of accounts are simply debits and credits within the single bank.

Here the bank simply operates as an intermediary between borrowers and lenders. Since in this case there is a debt for every credit, it is impossible for the client not to be able to make a payment because of a lack of reserves, since every debit is backed by a credit from some other client.

With the single bank, there are only two possibilities if for some reason there is a loss of confidence in the pledge of the bank.

If there is management malfeasance there may be a flight to government currency, or a flight to convert bank credit into commodities. It is easy to see that these are the same thing since the seller of commodities requires a credit in exchange, and if there is a run from the bank this can only be accomplished by acquiring government credits.

If there is a loss of faith in a government's credit, say because the prices of commodities rise precipitously and there is hyperinflation, it is possible to have a flight to foreign government credits through exports of goods and services (financial flows would not be possible since presumably no foreign resident would accept a government's liabilities if its own citizens were unwilling to do so). For this reason, financial crises are often accompanied by exchange rate crises. As noted, this situation could be resolved by government or a central bank using its ability to create unlimited credit. This is what is called the lender of last resort function, in which government credits are exchanged for bank credits on a one for one basis, leaving total credit unchanged. In such a situation, the single private bank would simply disappear, leaving only a government central bank.

Money and Credit as Balance Sheet Networks

It is perhaps more instructive to evaluate the relationship between money and credit in terms of payment networks and balance sheets

A multiunit banking system is a series of overlapping local networks, representing the payments matrix of its local clients. As long as payments – that is the creation and cancellation of debts by credits- are between clients in the same bank network, they are simply balance sheet transactions that do not require money or credit

If I pay Paul for wood to construct a chickencoop, the bank debits my account and credits Paul for the same amount. If I do not have money in my account, the bank will advance it to me against my promise to repay with a credit from someone else who is a client of the bank. I now have a debit and the bank has a credit. If I sell eggs from the chickens living in the new chicken coop to Paul, he gets a debt and I get a credit, which I use to cancel my debt to the bank.

As long as the transactions remain in the local bank network, the debits always match the credits. Once banks figured this out they also recognized that gold or money were not needed for the system to finance exchange and payments – just a bookkeeper, keeping track of credits and debits!

However, problems arise if Paul is in a different bank network, say in another town. The credit in my bank is useless to Paul if he has debits to clients in his own bank that is in another network; just as his credits in his bank are useless to me if he wants to buy my eggs since my bank's clients have no use for credits for another network.[1]

It is the cross network interbank payments that cause "deposit drain", and require a means of payment that is acceptable to both networks to avoid it. One way to do this is to create a clearing house in which cross border payments are periodically matched or netted, with any residual settled with an external asset acceptable to both, or via a system of metacredits, which carry over the payment imbalances. This was a role originally played by gold, which was eventually displaced by government liabilities to provide the reserves necessary to make net settlement.

In the example above a financial system with a single bank network has all its payments within its client network and thus does not have to worry about holding reserves as a residual settlement asset. It can always make good on its own commitments, without having to hold physical evidence of its ability to meet commitments.

This single network system could provide all the transactions necessary for private sector activity. It is a system without "money" as defined above, or better – it is a system in which money is created with the opening of credits via accounting entries in the accounts of clients against their debts. That is, by the simple act of matching debit and credit entries. There is therefore no need for government "money" or reserves to finance exchange in this system.

[1] This indeed used to be the case in the US when a bank would not accept in payment a cheque on another bank! Once the Federal Reserve was set up one of its first acts was to impose par clearing on cheques from unit banks, creating the basis for the interbank settlement system and Fedwire.

A government could engage in economic activity in such a system by opening accounts with the single bank against its own debts, in order to procure goods and services to provide to the public. This is effectively what happens today, except that the government deals with its own bank network – the central bank. Thus, if the government did not want its activity limited by a private institution, it could offer its own liabilities to the public in exchange for goods and services.

Why would the public accept them if they cannot be used to extinguish debt at a local bank? The answer as noted above is that the government may force the public to hold them by specifying that penalties, fees or taxes can only be paid by rendering the government its own liabilities. The public then has to sell goods and services to the government to acquire the government liability notes, which can be returned to the government to pay the tax.

In this case there are two, independent, financial networks. Individuals have accounts in the private network, with debts and credits generated by decisions to create income-earning assets; and in the government network – generated by government decisions to provide public services, with goods furnished by purchases made with government liabilities, and rendered to meet the tax liabilities impressed on the public.

Similar reasoning holds on the international level. If there are no trade relations with other countries, there are independent networks that serve foreign private residents and governments. However, as soon as there is trade, debit and credits will be created to residents in different networks and a netting or clearing mechanism will be required.

The network that developed historically was a foreign exchange market, in which banks matched domestic residents with credits on foreign residents they could not use (exporters), with domestic residents that had a need to access foreign network credits they did not have in order to meet debts payable to foreign residents (importers). The exchange rate being the price at which the foreign credits were exchanged for domestic credits. In the case of any net imbalance not eliminated by rate changes, a settlement asset acceptable across both networks was required.

In the absence of a global government liability to make settlement across international payments network imbalances, another solution had to be found. This is the role that gold played in the international system until the 20th century (although in fact it was seldom used – as in domestic transactions bankers quickly found a way to use debits and credits to eliminate the need to actually ship gold across networks).

Under the more recent Bretton Woods system, countries hold foreign currency balances or quotas in the IMF – which is supposed to play lender of last resort, since it can arrange borrowing required to match settlement needs in the currencies of any of its members.

The domestic private and government networks only intersect when a multibank system uses government/central bank liabilities to make net settlement across independent private bank networks. They both overlap with the networks of foreign nations when there are trade and financial flows. However, it is also true that in the absence of trade, a (the) single bank private system could operate independently, *or in the absence of*, both government and foreign networks.

Thus to return to the question of what distinguishes money and credit. The network of accounting entries operated by the financial system creates credits, and can do so without money – or better, as a substitute for "money" as previously defined. However, for settlement of imbalances across networks, a liability that is not created by an activity within the activity of the clients in the network is required, and this settlement asset may be considered as "money".

In a private multibank national system, this is usually the government liability, and this produces the intersection of the private and public payments networks. At the international level, trade and payments imbalances produce intersection of national networks, but since there is no global government liability this role has been played by gold, or by an institution such as the IMF.

Note that the need for "money" or settlement assets across networks can always be resolved by a metaclearing system, using a notional unit of account such as proposed by Keynes in his Clearing Union scheme, or Schumacher's multilateral clearing system.[2]

[2] Keynes, J. M. 1980a. "Activities 1940–1944: Shaping the Post-War World: The Clearing Union." In D. E. Moggridge (ed.), *The Collected Writings of John Maynard Keynes*, Vol. 25. London: Macmillan.
Schumacher, E. F. 1943. "Multilateral Clearing." *Economica* 10(38): 150–65.

WM as a single world bank network

Against this background, consider the WM system. Although the principal telephony business of WM is the global transmission of text and audio messaging, its complex system structures are easily extended to the management and transmission of its clients' financial transactions messaging. It is thus able to provide its global telephony clients with a full range of financial services.3

Since it operates indifferently across national boundaries, accepting credits in all national currencies for all global residents, it is the equivalent of a global single bank payments network, represented by the closed loop member only system. It can thus operate without the need for a physical or notional means of settlement of imbalances. It neither needs, nor creates, "money" as a settlement asset or to provide evidence of its pledge, nor does it need to intersect with government networks.

Yet, as currently configured, it intersects with clients' commercial bank systems in all countries, since credits within its system are created via transfers from national commercial bank networks. The ability to create credit is therefore constrained by the intersection with national commercial bank networks.

While this model is not subject to deposit drain, as a limiting case scenario to test this assertion – i.e. the analysis of a theoretical but unlikely possibility – consider the results of a decision by all WM clients to simultaneously use the WM refund transfer function to debit their accounts of all their balances. Even in this extreme case, WM would not become insolvent, and it could always meet its pledge; it would simply return to being a pure mobile telephone service provider.

This raises the opposite question of the maximum potential expansion of WM as a network payments system. This analysis has to confront a paradox. The more rapid its expansion, the more rapid the transfer of clients' credits from their domestic private commercial banking systems to WM. The more is transferred, the lower the potential for further expansion, since this process sets the commercial banking systems' credit multiplier operating in reverse - because commercial banks' reserves are now being transferred to WM, which does not engage in credit expansion. Since WM is not a debtor of the commercial banking system the credit expansion of the commercial banking system will be curtailed, and in a sense, WM will become a snake eating its own tail.

What is the limit of this expansion? Growth must come to a halt when all commercial bank credit worldwide has been transferred to WM's commercial bank account, and WM would become the equivalent of the world's single commercial bank. However, as noted above this means that there will be a substantial decline in overall credit creation – unless WM decides to engage in fractional reserve credit creation in the private sector. This means that the continued existence and expansion of the WM system will have two implications.

[3] Cf.; http://www.levyinstitute.org/pubs/pn_21_1.pdf
http://www.levyinstitute.org/pubs/wp_982.pdf

The first is that WM's expansion will eventually lead to it becoming the world's single global bank network, whence it will have displaced the entire global commercial banking network. This means that both the top up voucher system and the refund provisions become redundant – there are no longer credits to come in and there is no need for them to go out. Thus continued growth will depend on substituting credit created within the WM network for the commercial bank creation of credit.

The next question is then to determine the form of credit creation and the time frame of its introduction.

It is already possible for WM – as a Mobile Telephony Provider – to create trade credit via the extension of credit to its prepaid telephone account members ("IOU" credit) in line with this standard practice among mobile telephony companies. Moreover, as WM is a Members-Only Closed-Loop system, the amount of "IOU" credit that it extends is limited only by WM's own internal risk management assessments.

However, this is not the only potential solution to this situation.

It is also possible for WM to phase in a complementary service to the current crediting of WM accounts – by top up vouchers, inward bank transfers or deposits via the payment gateway – by creating and providing WM account credit to WM Members, against the transfer by WM Members to WM of the right to disposition of Members' real assets. A sort of collateralized lending.

Since WM is a purely digital and electronic system, this might be achieved by means of creating smart contracts governing the disposition of real assets used as collateral. This creates the possibility of all types of lending from auto to mortgage loans.

The transfer of rights to disposition (for evidence of ownership, etc) via smart contract could be easily implemented by means of an automated process, similar to WM's current automated KYC documentation provision process.

These smart contracts could be held in a trading environment within the WM Closed-Loop Members-Only System, in which they could be borrowed or lent, or realized in the case of nonpayment via the PP2P WM process currently used for its currency swaps. If the collateral is composed of financial assets, auction markets similar to those used in electronic equity exchanges, would augment WM's liquidity on the collateral pledged.

Such a system would also provide a substantial increase in liquidity in the global economic system – of far greater potential that was generated by the securitization of the housing stock in the subprime boom. It would also be much more stable than the fractional reserve creation of credit via the global commercial banking system, since the collateral coverage ratio would probably be much higher than the standard reserve requirement. It is important to note that this will also open up an additional line of earnings in the form of interest on lending, which would take the form of additional credits to WM's account.

It is not clear a priori what principles should be followed in determining interest rate policy, because WM is in a position to set these rates itself. Initially it might be set by reference to the average of standard commercial rates in local markets, but eventually it will likely become the dominant reference rate.

Finally, and most simply, as has been the case since the inception of giro or clearing banks, it is possible for WM to simply increase the credit balances of its Members as is done with traditional signature loans. As long ago as Adam Smith, it was argued that any excessive increase in liquidity created in this way would be drained off in foreign lending or imports, but since WM is a global system – there is no external sector to absorb this liquidity.

As noted above, the expansion of the WM system, and the decisions to introduce the various possible channels of credit creation, will require a clearly specified transfer timeline. As the size of the WM network and the concomitant introduction of WM's internal credit creation grows, the requirement for inward transfers by Members to WM by top up vouchers, bank transfers and payment gateways will become less and less important, and the collateral-based internal credit transfers to Members by WM (and thereafter between Members on WM) more important.

Concomitantly, WM's Refund Transfer and SCRM exits will become less and less necessary, as well as becoming disadvantageous to WM because they would allow for competing systems to free ride on internal WM credit creation. Thus, there will be some point in the evolution of WM's credit expansion, determined by the size of the network, when the exits of external transfers via Refund Transfer and SCRM will preferably be closed.[4]

When financial economists in the 19th century suggested that banks could create money (i.e. via fractional reserve deposit banking), most vehemently denied this possibility. The individual bankers believed that whatever they took in on deposit they lent to borrowers, and it was used to make payments to clients of other banks — deposit drain. However, they failed to note that while their argument might be true for an individual bank, it was not true for the system as a whole. Paradoxically, despite the initial resistance, today few can conceive of credit creation in any other way than fractional reserve deposit banking.

As a result there may be scepticism or misunderstanding about the ability of the WM system as described to create credit –even though it is clear that it is equivalent to a single world bank as noted above –since it is not a traditional commercial bank

Thus, at some point in the expansion process, and to ease the acceptance of the introduction of WM's credit creation abilities, it may be prudent for WM to quell misunderstandings of those unfamiliar with the financial innovation process by creating a banking subsidiary.

[4] https://webtel.mobi/pc/info/how-to-and-why-to-apply-for-your-scrm/
https://webtel.mobi/pc/info/how-to-do-a-refund-transfer/

While this would not be necessary to satisfy regulatory or operational requirements, nor for WM's credit creation – and as such could perhaps be described as a form of Potemkin[5] Bank – its major purpose would be to satisfy the belief of those without acquaintance with WM's existing capacity that only commercial banks are able to create credit. Moreover, while such a subsidiary would be subject to banking regulations and reserve requirements, it would not in fact be required for WM's network credit creation.

Another point is that while China currently appears in the vanguard of the transition to a purely or largely digital payments system, in many countries there is a stubborn resistance to the elimination of cash, at the very least for menue transactions. Currently WM's SCRM Machines meet this need for cash refunds internationally. However, it is one of WM's alternative refund transfer mechanisms that will eventually become redundant and should – once the WM network credit extension reaches ubiquitous use levels – only be made available in limited circumstances. This is also a requirement that could be attended to by a WM subsidiary of a Potemkin type commercial bank.

If it were decided to establish a Potemkin type bank subsidiary by WM, the easiest means of transition would probably be to transition the current WM banking relationship from its current external commercial banking providers into WM's own chartered bank subsidiary. As noted, the end point of the process, WM – directly or via its own chartered bank subsidiary – would in effect hold all the world's deposit credits.

Thus instead of inward transfers by bank transfer, top up vouchers or payment gateway payments going to the WM account at its external commercial bank service provider, they would go to client balance sheets in the WM System, as held by WM's own chartered bank subsidiary. The consideration here is that at the end of the transition, it would become the systems' single account, and, therefore, largely, the world's single system of account or single bank. It is unclear what the political and commercial repercussions of this would be.

This is a similar situation to that which already exists in terms of the WM Top-Up Voucher system – combined with its Currency Conversion, Currency Swap, ICLM Transfer and Currency Wallets facilities – which together already provide all the features of national or international Central Bank Digital Currency (CBDCs), whether introduced at either the inter central bank or retail level. Indeed, the WM system provides the equivalent of Keynes's proposed Bancor, without requiring the introduction of an international currency.

The current distribution and implementation of this potential of the WM system has allowed the creation of these possibilities as a complement to the current global commercial and central banking systems, and without infringing on central bank or national monetary policy sovereignty – and the WM system is already fully operational worldwide. Since there is not yet full recognition of the implication of the further extension of the WM system to autonomous credit creation, the potential political and commercial repercussions are impossible to predict.

[5] https://www.collinsdictionary.com/dictionary/english/potemkin

Nevertheless, in respect of the further expansion of WM along its natural evolution to becoming the global equivalent of a single network system of payment – or "single world bank" as mentioned in the introduction – it is clear that the final stage of this transition implies the elimination of the previously mentioned network constraints at both the domestic and international levels, and the elimination of any need for reserves to provide settlement across systems.

In this scenario, although governments will remain as the providers of government "money" in the form of cash and notes, and each national system will retain its domestic government cash and currency unit, they may lose some sovereignty over some aspects of monetary and fiscal policy. However, this is already the case with free international capital flows, and is therefore not a new development.

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The Economic Problem: From Barter to Commodity Money to Electronic Money

by

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ABSTRACT

The success of alternative payment systems has led to discussion of various proposals to replace money with a new technology-based system, though many lack a clear idea of what exactly is the "money" they seek to replace. We begin by presenting the explanation of money's role in the economy embraced by most mainstream economists and policy analysts, based on the idea that money evolved out of the process of market exchange. An alternative explanation that looks on money as a part of the organization of production and distribution based on network clearing systems across balance sheets expressed in a common unit of account is then presented, distinguishing between a purely notional unit of account and means of settlement or discharge of debt. The final section addresses the possibility of a fundamentally different modern extension of this alternative approach that is not inspired by digital technology, distributed ledger accounting, or application operating on a mobile/cell phone system, but rather the actually existing system available from an internet telephone service provider that currently offers subsidiary domestic and international payment services whose operating procedures come close to replicating the alternative explanation of money mentioned above, with the potential to provide all the services of the existing payments system at lower costs and greater stability.

KEYWORDS: Banking Principle; Clearing Union; Imaginary Money; Money; Payment Systems; Unit of Account; Webtel.mobi

JEL CLASSIFICATIONS: B5; E42; E50; G2

In economic policy circles, recent discussion has centered on the definition of "money," but without a clear definition of the concept. Larry Summers (2016) and Willem Buiter (2015) have recommended the straightforward abolition of money, at least in the form of currency notes and coin. On the other hand, Lord Turner (2013) proposes that the currency notes that Summers and Buiter want to abolish be dropped on the unsuspecting population from a helicopter.

Against this background, a mysterious Satoshi Nakamoto (2008) proposed a digital currency, bitcoin, should replace money, reigniting interest in Friedrich Hayek's (1976) proposal for the "denationalization" of money. In this vein, there was soon a proliferation of imitators of what came to be called "cybercurrencies." They were soon joined by a proliferation of mobile phone apps offering payment systems such as PayPal, Apple Pay, Google Wallet, Facebook libra, and Alipay that offered to replace the disappearing currency.

The success of these alternative payment systems has led most of the world's central banks to investigate the introduction of their own digital currency to replace their own issued notes. These proposals have been broached with caution because of the threat they pose to the use of private bank deposits. But to assess these various proposals for replacing money with a new technology-based system, it is important to have a clear idea of what exactly is the money they seek to replace.

We start by explaining money's role in the economy that is embraced by most mainstream economists and policy analysts. It is based on the idea that money evolved out of the process of market exchange. In this approach, money possesses or represents a physical attribute that supports its economic value. This is the kind of money—bank notes or precious metal coins—that could be dropped from a helicopter and could be abolished.

Then an alternative explanation is presented, one that once dominated economists' discussions but has fallen out of favor. It looks at money as part of the organization of production and distribution based on network clearing systems across balance sheets that is expressed in a common unit of account. It distinguishes between a purely notional unit of account and means of

settlement or discharge of debt. This unit of account could be changed, though not replaced, and clearly cannot be dropped from the sky but could easily exist in the cloud.

The final section addresses the possibility of a modern extension of this alternative approach. This approach differs fundamentally from those mentioned above in that it is not inspired by digital technology or distributed ledger accounting, nor is it an application operating on a mobile/cell phone system; it is rather a currently existing system available from an internet telephone service provider that offers subsidiary domestic and international payment services. Interestingly, its operating procedures come close to replicating the alternative explanation of money mentioned above, with the potential to provide all the services of the existing payments system at lower costs and greater stability.

THE MAINSTREAM VIEW—MONEY AND EXCHANGE

Modern economics developed around the implications of the division of labor highlighted by Adam Smith in the *Wealth of Nations*. Smith drew contrast between an economy organized around self-provisioning by multitasking hunter-gatherers subsisting by their own capabilities and an economy based on the specialization of tasks within the production process (he referred to a pin factory in which each worker specialized in one specific stage of production) or specialized in different productive activities (his famous reference to the butcher, the brewer, and the baker). In the specialized economy, the provisioning for survival of the individual depends on access to the specialized output of other producers. How was the butcher to acquire bread if he no longer produced it himself? The answer was market exchange, regulated by relative market value, which became central to the description of economic organization. For Smith, division of labor increased productivity, but could only be exploited if the market were sufficiently large, leading to successful economies being characterized by larger production units and concentration of ownership via the accumulation of capital.

Smith was followed by the French economist J. B. Say, who notes with wonder the fact that all the specialized activities in a grand city such as Paris are somehow organized to make sure that milk arrives on his doorstep every morning and he is able to survive on provisions that are available without any formal or central direction of these activities. The independent actions of individual producers exchanging in a free market under the competitive price system are sufficient to organize this process of distribution without the need for any formal central plan or control. He expanded on Smith to note that since specialized producers would always need the output of other specialized producers, supply would always enter the market as a demand to exchange for others' output, from which he drew the unwarranted conclusion that there could never be a deficiency of demand in the market since every unit produced was either for own use or to be used in exchange.

The attention to the role of the market and prices as efficient allocators was also an organizing principle of the New Deal's brain trust, which recognized the growth of ever-larger units of production would require some oversight and regulation to ensure efficient use and allocation of resources.

Note that the basic problem to be resolved is that of exchanging specialized outputs for other specialized outputs. Initially the problems of market exchange and value were thus considered in terms of bilateral exchange ratios. If I want bananas, I can acquire them by offering some of my production of oranges. A voluntary exchange will thus determine the number of oranges that will induce the banana producer to exchange. If the exchange takes place at two oranges for a banana, then the market value of oranges is established at one-half a banana. Changes in these relative values will thus determine production in the economy. A higher offer of oranges for a banana creates an incentive for banana producers to expand their production. What appeared to be a self-regulating mechanism needed only voluntary exchange in competitive markets, no central organizing system required.

With multiple products in the economy, exchanges by individuals were organized so that the satisfaction or utility from the consumption of each would be determined by equalizing the utility derived from the quantity of each good acquired in exchange. If the satisfaction derived from the

consumption of each good differed across products, the completion of this search for the greatest possible satisfaction from an individual's specialized output required that the satisfaction derived was inversely related to the number of units acquired (denoted as diminishing marginal utility or value).

In this version of market efficiency in allocation and relative price determination it was assumed that the exchange ratios were determined by a process of bilateral bargaining or barter. But this was clearly a very inefficient method of ensuring maximum satisfaction, since an economy with n outputs would have n(n-1)/2 bilateral exchange ratios that had to be considered and require massive brain power to compare orange prices for bananas with apple prices for avocados and so forth.

The required exchanges would also be time consuming, for one could not guarantee that the supplier of the goods required would be present in the market to execute the exchange and, even if this fortuitous circumstance were to occur, there was no guarantee that the counterpart was willing to exchange the particular quantity desired to reach maximum satisfaction. This is the problem known as the "dual equivalence of wants," to which money provides the solution.

Note that up to this point there has been no reference to money. Economists noted that if the exchange ratio of each good is expressed relative only to one commodity, then the number of relative prices can be reduced to n-1. A massive increase in market efficiency. This commodity thus served as a benchmark for the relative exchange ratios, and this is where money entered the analysis as the handmaiden of exchange, the grease that allowed the wheels of commerce to progress.

But to play this role money had to be a commodity that was part of market exchange, but only used as an intermediary to acquire something else, not for its own benefit. Money was described by economists as a "veil" that masked the underlying real bilateral exchange ratios, and monetary analysis was thus focused on the characteristics of the commodity that could best serve as this general intermediary or benchmark while having little impact on the real exchange and production relations of the economy.

The most important impact would be if there was a sudden change in the quantity of the commodity available relative to the fixed amounts of other commodities, the result being an increase in the relative prices of the other goods in terms of the monetary commodity that was proportional to the expansion in its quantity. Monetary theory became the study of inflation and deflation, without any impact on the level of activity, while economists argued about whether the change in prices was due to the action of money or the real production conditions of the other commodities.

There was an inherent paradox in this approach: for if the “commodity money” represented by metal coin was to serve in maximizing satisfaction, its value in terms of other commodities had to remain stable. But since it was also a commodity with a value subject to market forces this was impossible. Monetary policy thus concentrated on conditions that would prevent inflation or deflation and maintain the value of money over time as a store of purchasing power or saving.

Money is the intermediary that facilitates exchange because it is a countervalue exchanged in the market, but if it is to play this role it should have a value independent of the market. It was also supposed to have a stable value but, as noted above, if the value of goods changed with the quantity possessed (diminishing marginal utility) it was a contradiction in terms to speak of a money representing a stable value in terms of goods since their value was not stable.

This internal inconsistency was further complicated by bankers issuing notes or deposits that served as substitute means of payments, but clearly had no inherent commensurate value in exchange. Here it was the operation of the market that was at work, as the safety and transport of gold represented a substantial cost and mechanisms came in to play to substitute commodity money with bills of exchange and time contracts such as futures and options.

The bankers for their part also soon realized that payments could be made by means of netting on the banks’ books by means of what came to be called the “banking principle” without any movement of “real” money. These soon came to be called “fiat” or “fiduciary” money, indicating that their value was linked to the faith in the honest behavior of the bankers who issued them.

This good behavior was resolved as considering them as “signs” or one-to-one representation for the physical commodity money that was presumed to remain in the bankers’ vaults.

The system thus nearly banished the use of commodity money metal, but the belief in the need for some intrinsic value for money led to formation of prudential policy imposing this one-to-one relation between the fiduciary issue and commodity money. It could then be argued that the public accepted the valueless paper notes because they had faith in the fiduciary holding of “real” commodity money in the banks’ reserves.

Monetary history stands in judgement on the impossibility of imposing this limit, and eventually the financial system simply eliminated the reserves of metal and created central banks to control of the creation of money by banks. This system has been no more successful than the original based on commodity money since there is no way to overcome the inherent paradox in this approach to money. Yet, policy and regulations continue to be formulated so as to make the system behave as if it were based on commodity money.

Recently, a new form of commodity money—a digital coin—was launched, further highlighting the inherent paradox in commodity-based money. It has a strictly controlled change in supply and a maximum limit on creation over time but has failed as a means of payment because of the extreme variability in its price relative to commodities and the volatility of its exchange with national currencies.

BUT WHAT IF BARTER WAS NEVER A PROBLEM? DID MONEY STILL EXIST? THE ALTERNATIVE EXPLANATION

The commodity money approach just described is in fact a rather modern conception, which dates from the end of the 19th century. It sought to replace the alternative theoretical representation of money that Luigi Einaudi dates from the 9th century and Keynes suggests prevailed for some 4,000 years.

Its modern revival is buttressed by the recognition that there exists no verifiable historical record of specialized market exchange ever having commenced on the basis of bilateral barter exchange, nor of a process of evolution from barter to commodity-money-facilitated exchange in response to the so-called difficulty caused by the double coincidence of wants that barter is supposed to encounter. Second, on the side of organization, the single benchmark for prices employed to reduce the number of bilateral exchange ratios can be more easily and efficiently carried out by means of a notional unit of account, what Einaudi ([1936]1953) has identified in the historical record as "imaginary" money.

According to Braudel's (1992) historical description of the evolution of market capitalism, the modern classical definitions of money set out above "leave out the essential point—the monetary economy itself, the real reason for the existence of money. Money only becomes established where men need it and can bear the cost." Indeed, rather than a linear evolution from barter to money, Braudel (1992, 439) emphasizes the simultaneous existence of monetary exchange and what is better called "exchange in-kind" rather than bilateral barter exchange: "Commodities were commonly exchanged for one another in Naples," without the intervention of a money commodity as late as the 18th century. These real exchanges required "all parties agreeing to abide by prices which the authorities fixed later (prices called alia voce). Then each consignment of merchandise was valued in money and exchanged according to the ratio of these values" (Braudel 1992, 470).

Exchange in-kind clearly existed, but it did not give rise to the inefficiencies that were supposed to have led to a commodity money to resolve the problem of the dual equivalence of wants. Braudel (1992, 447) also provides a description of the United States in 1791: "it is the practice here for country people to satisfy their needs by direct reciprocal exchanges. The tailor and bootmaker go and do the work of their calling at the home of the farmer who requires it and who, most frequently, provides the raw material for it and pays for the work in goods."

Steven Stolle (2017, 112–13) confirms this practice in the US frontier, citing the accounts of "Nimrod Warden" who recorded that he had "'bartered with a north-country merchant 6 Hhds [abbreviation for hogshead] of claret at £10 per Hhd for 40 pieces of linen cloth at 30s per piece.' … The north-country merchant *did not swap cloth for wine*, he paid sixty pounds' worth of cloth for sixty pounds' worth of wine. If one quantity had a higher agreed-upon value than the other, a scratch in the account book rectified credit or debt to be settled another time or folded into another transaction where the discrepancy would be absorbed." … "Just because money was … absent did not mean that it played no part in exchanges. … To understand why, consider this definition from an English work of arithmetic published in 1789: 'Barter, adjusts the exchange of one Commodity for another, so as neither Parties shall sustain Loss.' … In order to barter, each party must first determine the money value of their goods. They come to the table with this worth in mind. Barter is an exchange of things measured in some currency without currency present" (Stolle 2017, 111–12).

In these historical accounts the physical exchanges are recorded in-kind and valued in an agreed upon unit of account, with any possible divergence rectified by subsequent compensation in appropriately unbalanced bilateral exchanges or by the clearing of accounts at the end of an agreed upon period. This provided for a system of real exchanges without satisfying the dual equivalence of wants and size for each exchange.

In the 18th century, in reference to the US evidence above, Braudel (1992, 447) notes: "These sorts of exchanges cover many objects; they write down what they give and what they receive on both sides and at the end of the year they settle with a very small quantity of coin, a large variety of exchanges… a means of wide circulation without coin . . . [is created]." Commodity money is not needed to alleviate the difficulty created by the absence of the dual coincidence of quantities.

Indeed, Stolle (2017, 112) points out that the classical emphasis on the emergence of a single "commodity money" to serve as a reference for exchange ratios would thus seem to presume "that no one in the murky past had the brains to buy stuff in order to resell it."

In these historical descriptions, individuals may engage in unilateral transactions or bilateral transactions in physical goods without direct monetary compensation in the form of a single commodity money. Instead, records of receipts and delivery are kept and evaluated at prices expressed in a common notional unit of account. These accounts are settled over time or on a periodic basis by means of a netting or clearing process without requiring the use of any physical money coin or commodity.

Thus, a household may receive five rabbits, which are recorded as a debit (credit on the books of the supplier) in terms of some commonly accepted unit. Next week the recipient may supply the rabbit producer with a bushel of carrots. Now he is short rabbits and long carrots and may have a net surplus or debit balance in terms of the unit of account. If at the end of the period the accounts balance then no compensation is required. If one party is a net creditor, they have the option to receive additional physical goods in excess of current needs—say a rabbit—or to allow the debt to be carried over. While it is possible to clear accounts by the transfer of coin, it is not necessary to the process of exchange. It is in this sense that Braudel and Stolle both propose the simultaneous operation of a money and nonmonetary economy.

Here the money commodity is a sufficient, but not necessary, means of exchange in real terms. It is one of several different methods for settling trade imbalances. The necessary condition is the existence of a common unit of account in which to calculate the net balances, which as Einaudi ([1936] 1953) has demonstrated with reference to historical records of Europe from the middle ages may have no physical existence; he calls them “imaginary money.” He also notes the difficulty that the modern economist faces in understanding this system because coined metal pieces were widespread in this period, but they did not serve as units of account, only as means of settlement for imbalance calculated in terms of the notional units of account.

Einaudi (1937, 265) emphasizes this point:

> Books and pamphlets and statutes of the ninth to the eighteenth century are unintelligible if one does not bear in mind the distinction between money of account or imaginary money and effective or coined money. Usually the money of account was called libra, *livre*, lira. Men kept accounts, drew instruments of debt, sold and bought goods and securities and property rights in imaginary money, which they never saw. Coins had strange names, they poured into each country from all parts of the world, were gold and silver and half silver dresses, were minted at home or by foreign princes. They made no difference to people who continue to talk and negotiate and keep accounts in libras.

Note that in this approach the unit of account replaces the commodity money as the common unit to calculate the relative value of goods in exchange. The advantages of this solution are that there is no need for money to be a physical commodity and it overcomes the supposed difficulty of barter exchange as simultaneous exchange of similar commodities or value. Nor does exchange have to be bilateral if there is a common set of books recording exchanges. Money is not a physical thing, but rather a system of account recording settlements in a common notional unit of account. While commodity money or coin may play a role in such systems as a means of settlement, it is not necessary, which leads to the idea of the simultaneous historical presence of both physical and monetary exchange.

On the abstract level this system could be represented as requiring a notional unit of money of account, that following Einaudi may be called “number.” There are no number coins minted, nor are their promissory notes issued in numbers. A “number” is merely a number, an abstract notion like time or distance used for keeping accounts and expressing prices. All individuals’ accounts are kept and settled in numbers. All debts, taxes, salaries, and wages are expressed in numbers. If coins are minted, they will be of some commodity or precious metal, say gold (although many different metals may be used simultaneously) of a given quality or fineness, with a specific weight, though coins of many different weights may also be present. On the face of the gold coins, only the word “libra” is present. Similarly, banks may issue notes payable in so many gold libra and pay metal of the required coins against notes in libra.

Since numbers have no physical existence, only gold libra coins may be used to settle an imbalance or extinguish a debt incurred in an amount expressed in number. Incomes will be fixed at so many number per pay period and extinguished by rendering the appropriate number value of gold coins. The key to stability in the system is in the determination of the "appropriate amount"—the rate of exchange between the unit of account and coin. Historically this ratio is determined by the sovereign or the state setting the value in number (money of account) of the gold libra coins (means of settlement). If the rate is fixed at 10 then a salary of 100 number will be received as 10 gold coins.

In this system the physical exchanges that take place give rise to bookkeeping entries—credits for suppliers, debits for recipients—at prices expressed in number. In Joseph Schumpeter's (2014, 134) view, money represented a "current account relation … the idea that everyone's economic act is recorded on a real or imaginary current account. … Each service, whether it consists in money, money claims, or goods and services charged in money, is to be credited to each person's current account, while every receipt of money, money claims, goods, services, is to be charged to it."

In such a system money does not set a limit to economic transactions since the economy cannot run out of numbers. The limit would be set by the willingness and ability of individuals to engage in productive activity and engage in the transfer of goods and services. Here economic activity determines the "creation" of number, rather than the supply of a scarce money commodity.

While over all transactions in the economy debts must match credits expressed in number, there may be imbalances across individuals, which will require clearing or settlement of individual's imbalances with the rest of the economy. If all participants require their accounts to balance, this means creditors are no longer willing to extend debtors' negative balances. In this case it is the role of the libra coins to serve as a means of settlement at their stipulated number value.

Here the supply of gold may serve as a constraint on trade if creditors are unwilling to allow debtors to carry their negative net balances. This problem could be solved by a royal decree changing (increasing to say 20) the number value of the libra coin. This is the equivalent of an inflation in the commodity money system; note that it occurs without changing the commodity content of the coin, but simply its number value.

However, we note that there is an alternative arrangement that would allow the elimination of the effective money of settlement. If instead of individual accounts all participants in the system had accounts with a central bookkeeper who would keep track of the debits and credits in number units of account, the overall accounts would always balance, but there would still be individual imbalances that now could be automatically compensated by the central bookkeeper. If the bookkeeper is also the sovereign issuer of libra notes or mints gold libra coins they can arrange for the appropriate debts and credits in terms of notes or coins in the accounts of debtors and creditors. But since these are book entries, the notes and coins need not actually be transferred or even exist. In fact, they could be done away with (or buried in a vault or left under the sea. Pace the Trobriand Islanders). In this way the central bookkeeper has the ultimate control over creating the means of settlement in a pure credit money system.

This raises the question of why creditors would be willing to accept these libra account credits if they did not in fact represent physical commodities. The answer is that in this social accounting money of account system, credits balances have value if they can be used to extinguish debts incurred in the production of goods and services. A. Mitchell Innes (1914, 168) was one of the clearest exponents of this tradition: “A credit cancels a debt; this is the primitive law of commerce. … By sale a credit is acquired, by purchase a debt is created. Purchases, therefore, are paid for by sales. The object of commerce is the acquisition of credits. … The value of credit does not depend on the existence of gold behind it, but on the solvency of the debtor.”

Hyman Minsky (1970: note 8) adopts a similar position: “For fiat money to be generally acceptable and valuable there must be a set of payments units must make for which this money will do. … money as a liability … acquires value in the market because there exist units, the debtors …, which have payments to make for which this credit money will be acceptable. The

acceptability and value of money depend on the existence of payments denominated in that money: thus fiat money … without debtors under constraint to meet payments commitments are quite meaningless concepts."

In a commodity money approach, money is demanded because it has inherent characteristics that make it valuable. For this reason, Schumpeter (2014, 311) polemically argues that demand or supply cannot be applied to money as they are to physical commodity production since in a unit of account settlement system credits need have no physical existence or inherent characteristic other than that they may be used to extinguish a debt to someone else in the system: "without the intervention of banks … it would be a case of 'purchasing power through commerce,' a method by which the economy partially could free itself from the bridle of money."

But today we do not use this account settlement system based on a notional unit of account and absence of commodity money. How did this occur? There were two drawbacks to the unit of account money system.

The first is the possibility of inequity between debtors and creditors in loan contracts denominated in the unit of account. Since only the ratio of the unit of account to gold in the libra coin is fixed externally by the sovereign state, the ratio of other commodities to gold libra may vary. Thus, a loan contract written for 100 units of account can always be discharged with 10 libra coins (leaving aside interest) evaluating libra at 10 number. The value borrowed and repaid is the same. But, if the wage has risen in the interval from 100 to 110, then the debtor will have to work fewer hours to repay the loan—what we would now call inflation or devaluation of money. There is thus a transfer of purchasing power in favor of the debtor. It is interesting to note that Irving Fisher developed his mathematical analysis of "Appreciation and Interest" by calculating the adjustment in interest that would be required to compensate for this distributional imbalance, leading to the use of the difference between real and money rates of interest.

The second is the possibility of what is today called "control fraud" in the keeping of the accounts. Without proper surveillance, the bookkeeper has the power to create credit entries at will without corresponding debit entries (the equivalent of the banker funding a loan by creating

a deposit account). This not only disrupts the accounting balance of debits and credits in the economy, it separates the creation of purchasing power from the process of production and can create inequity across members of the economy or relative to the government. The historical example of this is the Bank of Amsterdam, which came to ruin financing the local government.

Associated is the temptation of the sovereign to change the ratio between the unit of account and effective money of settlement. If a sovereign has borrowed to finance a war he can always "cry up" the exchange ratio (a debasement or devaluation of the unit of account [cf. Einaudi ([1936] 1953, 264)], reducing by proclamation the effective money (libra) required to meet one's unit of account liability. As Einaudi (1937, 265–68) points out,

> The idea got ingrained in the minds of the people that the libra, the monetary unit of account was something invariable, however changing was the price or quotation of the effective moneys. There was something very ludricous (sic) in this conception because princes often made use of the device of increasing the libra price of coins—which was the old name of devaluation—when they desired to repay smaller sums than those received. … True, princes misused the tool, and men were made so angry by these misuses that they threw it overboard at the end of the eighteenth century. When the people proclaimed that there was only one monetary unit, a coin of so much gold—weight and fineness—they were persuaded to think that they had made a great step in the direction of simplicity and good faith.

This was an attempt to find a money that had stable value by specifying the commodity content of the unit—in practice to specify the unit of account as the libra. In the United States, the dollar serves both purposes, as does the euro in the European Union. China still retains a remnant of the dual approach in the renminbi (RMB) and the yuan as the effective means of settlement and the unit of account. But it was impossible to hold constant the relative prices of commodities and gold, just as it was impossible to keep this ratio constant in an account settlement system.

With reference to the solution of specifying the unit of account in terms of a gold coin, Einaudi ([1936] 1953) notes: “The gold units did not prove to be a sufficient bulwark against the manipulations of money. Against these manipulations no system whatever is invulnerable. Gold money and managed currency alike are subject to misuse.”

THE WEBTEL.MOBI SYSTEM AS THE BASIS FOR A UNIT OF ACCOUNT CLEARING SETTLEMENT SYSTEM

As mentioned above, cybercurrencies such as bitcoin attempt to substitute the current reserve-backed notes or coins with a digital currency backed by a binary identification system verified by calculation and distributed ledger comparison. They are meant to replace paper notes, which already bear a numerically unique serial number, with a binary identification stored on a series of computers that jointly verify the distributed ledger entries of asset transfers. But aside from being employed by the bitcoin universe (miners who carry out the transaction verification are allocated new bitcoin) it is currently impossible to acquire new bitcoin without an exchange with the formal money system so that they are neither a full-fledged unit of account nor an effective means of settlement due to large fluctuations in their dollar value. The verification system is presumed to be completely private and secure because of the distributed verification of transactions. However, the biggest difference between the bitcoin system and a settlement system is that it does not provide a balance sheet of debits and credits or provide a clearing system for net balances. Its distributed ledger system is simply a recording of credit transfers to ensure veracity and security, yet in practice it has been neither secure nor fully private. In fact, these cybercurrencies have been more successful in raising capital through IPOs of coins (called initial coin offerings or ICOs) than in providing money attributes or payment services.

To be a real competitor to the current bank-based commodity money system, the first requirement is thus to replicate the account settlement system, that is, to take on the role of bookkeeper in the banking principle arrangement cited above.

At present there is only one system that provides this possibility. Although it is based on mobile telephony, it has a radically different structure from existing mobile transfer systems.[1]

In this sense Webtel.mobi (WM) is the only currently operating system that meets this condition because it plays the role of the bookkeeper of an alternative settlement system for its TEL.mobi Group (TMG) members' stored-credit values accounts through the WM system and its Inter-TEL.mobi account number (ITAN) account identification system. It acts as bookkeeper in the sense of crediting and debiting member accounts as they are created by transfer and used for telephony services.

A TMG member account is created via an electronic transfer into the member's account from a member's regulated bank account, card, or other traditional payment means to a currency subaccount within the WM multicurrency regulated bank account. Alternatively, an electronic transfer is made by an independent marketing agent (agent) or virtual specialized mobile provider affiliate (VSMP) to one of WM's currency subaccounts within its multicurrency regulated bank account, after which the agent or VSMP will use that stored value on their own TMG member accounts to create and issue digital top-up vouchers (TUV) to TMG members in return for physical currency paid to the agent of the VSMP. The use of agents and VSMPs in this role is to provide access to TMG's services to members without formal bank relations. Thus, the agents and VSMPs are subject to know-your-client (KYC) and anti–money laundering (AML) provisions. The possible currency subaccounts (currently 43) are determined by the geographical distribution of the systems' members.

While the transfer in both cases (direct or via affiliate) is initiated from a regulated national financial institution denominated in national currency and becomes a credit in the TMG member's account, it is recorded by the WM system in the TMG member's account purely as a

[1] Webtel.mobi (WM) is a global telephony company that operates as a specialized mobile provider (SMP) providing telephony services to members globally via affiliates known as virtual specialized mobile providers (VSMPs) operating a replica of its own platform and system. The ensemble of WM and its VSMPs is known as the TEL.mobi Group (TMG). Since the platforms and systems of WM and its VSMPs are fully interconnected and controlled by WM they may be represented alternatively as the WM system or the TMG system, both of which refer to the same system.

ledger-entry record of the amount of stored value that the member owns within the total of all members' stored value in WM's regulated bank accounts. When opening a TMG member account, the member will have chosen a currency denomination as the primary currency wallet for the stored-value account and may also choose to hold additional accounts in other currencies (currency wallets). Thus, once the transfer is entered into the TMG system it is also recorded in the member's chosen primary currency wallet and for the appropriate amount in that currency.

The recording of the opening and changing of TMG member account balances from these initial account opening transfers—as well as additional amounts that may result from inter closed-loop member transfers (ICLMs) of stored value between members to and from their TMG accounts or additional inward transfers of stored value—may be considered as being an internal WM accounting and ledger-maintenance process, while the initial transfer remains unchanged in WM's multicurrency bank accounts and only the ledger entries of the amount held per TMG member are notionally adjusted as an internal bookkeeping procedure.

Moreover, on the TMG platforms there are two currency conversion facilities—the "currency swap" facility, an on-demand currency conversion facility functioning on the global foreign exchange (FX) markets, and the "currency swap" facility, which is a pure peer-to-peer (PP2P) member-to-member facility where members can swap their own stored value between accounts at conversion rates set between the two swapping members. Again, although the ledger entries in the respective TMG member accounts alter in these transactions, the stored value/stored credit remains static in the WM bank accounts.

Thus, just as Einaudi's imaginary units of account were convertible into a wide range of specific metallic coins that were used as means of settlement and discharge of debt, the WM stored value/stored credit is convertible into a range of national currencies that are available as means of settlement.

Thus, in difference from both cybercurrency and mobile payments system, there is a full balance sheet without the use of a dedicated mobile phone app to execute transactions. All inward transfers, currency conversions, currency swaps, or ICLMs are registered in a member's account

as a ledger-entry/accounting change of their stored credit in the TMG system, but the currency on account resides in the same WM (multicurrency) bank accounts and it is only electronically segmented between owners as a ledger-entry alteration, which will be debited or credited in the TMG member's account according to the usage of services or transfers.

While this system is designed only to provide payment for the provision of WM telephony services, it provides subsidiary services because of its similarity to mechanisms introduced in the 1930s in Germany to fight depression and then by US banks in the 1970s to create a "cashless" society. The German Reich Railway issued transport certificates to purchase services from suppliers redeemable at railway booking for the transport of goods and persons provided by the railway. Such a scheme differs from borrowing from a bank, where there is the risk of failing to generate sufficient sales to repay the debt. In this system the services are presold and the railway, short of bankruptcy, is certain to be able to provide them.

The key to the system is a generalized need in a large proportion of the economy for transportation services, which to the proponents seemed obvious (Zander 1933). The proposal also notes that the certificates' distribution could be facilitated if they could be accepted as payment of government taxes, providing them the additional support in a system that was then in Germany called *steuerfundation.*[2] A number of similar systems were proposed in this period, among the best known in the US was Upton Sinclair's EPIC system, which supported his candidacy for governor of the State of California.[3]

A similar system was employed in the United States in an attempt to eliminate cash transactions: "offline stored-value payment cards," with magnetic strips that recorded and stored prepaid credits in currency that were reduced upon use to purchase services. These payment cards, originally designed for the acquisition of specific services such as parking or transport fees, served not only to eliminate the use of cash payments, but also prevented the need for specialized

[2] Note that the system was tried but failed in the United States, since it was launched in order to build a railway that was never completed.
[3] Ending Poverty in California (EPIC) recommended production for use financed by the presale of worker production from idled plant and equipment, see Mitchell (1992). The final program is available at: https://www.ssa.gov/history/epic.html. A similar theoretical scheme of state money supported by taxation is found in Ezra Pound, e.g., "What is Money For?," influenced by the work of Major Douglass and Silvio Gesell.

point-of-sale units linked by trunk telephone lines to provide credit verification and reduced the labor involved in collecting low-value payments using automatic validation units at the point of sale. This archaic system lives on in New York City's Metrocard system for subway fare payment, while most other countries have introduced embedded electronic chips or remote transfer agents (RTA) found in most mobile payment technology.

An offshoot of this system was employed by Merrill Lynch in the early 1990s when it launched its cash management accounts (CMAs) that combined a traditional brokerage margin account with check writing and credit card privileges tied to a money market mutual fund (in which Merrill was an industry leader). In essence Merrill became the client of a bank and used the accumulated credits in a client's margin account to make nonequity transactions on the client's behalf via the established system of payments of regulated institutions. The accumulated credits stored in a financial institution that was forbidden the supply of payments services had become a virtual stored value that could be accessed and spent for any good or service.

The salient characteristic of the account settlement system of monetary organization outlined above is that it operates without any physical representation of money in the financing of economic production and exchange. It provides a central system of accounts in which payments take place via a clearing or netting process, which is more efficient as more economic transactors participate.

The TMG system builds on a synchrony between the technology of internet-based communications systems and the prepayment of telephony services to generate the basic aspect of a unit-of-account-based settlement system that can provide for subsidiary payment services such as financial transfers between members and the acquisition of (noncommunications) real goods and financial services. The TMG system thus appears to have these main features to provide the basis for a modern-day account settlement system capable of substituting for the regulated bank transfer system. It is in this sense that WM can be considered as the bookkeeper for the TMG system, executing these member account adjustments via what are called "mobile operator stored-credit swaps" (SCS) that adjust the system members' debits and credits.

But there is no reason for these to be limited to credits to a member's stored-value account or debits for service payment transactions. A TMG member with a positive net credit balance may use an SCS to transfer stored credit to another TMG member via ICLM.[4] This is simply a repeat of the process whereby a ledger-entry alteration is carried out by the WM system between the two TMG members' TMG accounts, but the actual currency remains static in the WM bank accounts.

While the WM system does not use a physical storage medium to hold these stored-credit balances (such as magnetic strip or chip-embedded payment cards), it reflects the traditional banking principle model in which the TMG member has credits on their notional electronic account that are debited or credited as mobile communications or payments subsidiary services are used.

These ICLMs or mobile operator SCSs between TMG members operate just as in the 19th century banking principle and are equivalent to "in-bank transactions" in a regulated bank, thus they do not produce any changes on the WM bank regulated holding accounts in the same way that a check payment between two members of a traditional bank has no impact on the bank's balance sheet reporting requirements. Thus, just as the Merrill Lynch CMA, WM can bypass a series of prudential regulations applied to traditional credit institutions.

Obviously, this holds only for transactions within the TMG system. Payments outside the system, just as traditional banks' bank-to-bank transactions, will require changes in balance sheets and the use of an external means of payment. For US banks this takes place on Fed wire, and for the WM system the same is true if stored credit is refunded to a TMG member via the formal banking system.

[4] This is facilitated by each TMG member being allocated a unique TMG account number linked to their unique mobile phone numbers when opening their TMG account. This account number known as an Inter-TEL.mobi account number (ITAN). The account number system is managed by the TEL.mobi Group Inter-Tel.mobi account number system (TITAN). It ensures that ICLMs and other transactions between TMG members are carried out virtually instantaneously (in 1/100th of a second) with 100 percent accuracy, wherever in the world the respective TMG members may be, on a 24-hour basis, 7 days a week, 365 days of the year.

As noted, the attractiveness of WM and the extent of its subsidiary services depends on the extent of the WM system's coverage—the activities of which it carries out via is VSMP affiliates within the TMG. In this regard the VSMPs facilitate access for individuals without a formal, regulated financial system presence (those who are usually classified as the "unbanked" but include those who prefer to use mobile payments systems). This is done via an arm's length transaction in which a digital TUV may be purchased from a KYC VSMP or agent with stored credit on the TMG system that was previously transferred into one of WM's bank regulated accounts by the VSMP or agent using the regulated bank system.

Once a VSMP or agent has stored credit on the WM system, they are able to use it to create TUVs for new or existing member accounts. The TUVs are encrypted with the specific currency and for the specific amount, as may be paid to the agent or VSMP by an unbanked TMG member with nonregulated credits (cash). Once the unbanked TMG member loads the TUV onto their TMG account, the currency and amount for which the TUV is valid is instantly recorded in their TMG account, and the person is then in the same position, and with the same capacities for use of the digital TMG system, as those who loaded their stored credit by regulated bank transfer.

In this way the unbanked have access to the services of a regulated bank as well as the telephony service access that they may not be granted or able to afford with a regulated bank. It is in this respect that the system's operation without a transfer app on the member's device enlarges the potential user population because it can be used from any existing mobile/cell phone—including pre–smart phones. Since the majority of phones in use among the unbanked and in developing countries do not have the capabilities to operate the mobile transfer applications currently offered, this insures a wider geographical coverage and penetration than existing mobile payments systems, and provides a safer and more secure alternative to public and private immigrant remittance systems such as licensed "money transmitters" or private "hawala," "hundi," or "fei ch'ien" systems.

Employing concepts and regulatory provisions originally developed to support the cashless stored-value payments cards, these systems do not create credit, as is the case with bank loans or bank credit cards, which are subject to prudential regulation on their activities by financial regulators.

In much the same way as the repayment and credit risk on the railway certificates was reduced because the only commitment was to provide transportation, of which the railway had no risk of failure to provide, these cards' stored credits are transferred from existing payment accounts to be used for the purchase of defined services, such as telephone calls or parking services, and thus payment was always assured. In this way, unused credits for telephony services do not require prudential regulations on credit and repayment risks. As noted above, this is the equivalent to reserves in the regulated deposit banking system but is more stable because the services can be produced by the supply and do not depend on ex post sales. The creation of stored-credit accounts based on transfers from regulated banks provides the equivalent of a 100 percent reserved regulated deposit banking system. The private regulated deposit banking system cannot provide this assurance, except through the guarantee of the Federal Deposit Insurance Corporation (FDIC).

As noted above since member accounts for telephony services are offered throughout the world in the members' respective currencies, the WM multicurrency bank account will have multiple currency balances representing the total of stored credit in the underlying member accounts. This provides for the execution of ICLM transfers (SCS) between TMG members with different national currency accounts and the possibility for TMG members to access or convert other currency credits and to hold them in their called currency wallets—which are in fact merely ledger entries representing the amount of stored credit owned by the TMG member within the various WM multicurrency bank accounts.

This raises another interesting difference with respect to the historical unit of account/ clearing/account settlement systems described above. In these systems the ratio of unit of account to effective means of settlement (gold libra per number is used in the examples above) is set outside the system of individual production and exchange by a sovereign or government

entity. The system works because everyone in the economy has debits and credits denominated in the same unit of account.

Outside of the nation state these values have no jurisdiction; they will be different according to the choices of each independent economy as to its unit of account. Imbalances across nations cannot be made or compared in unit of account and an international cross-border means of settlement will be required. It may be a commodity, as under the gold standard; it may be done through an international market in which claims on a country's means of settlement are traded at what is called the "foreign exchange rate." Or voluntary borrowing and lending in an international financial market may compensate for imbalances. The Bretton Woods System was a combination of an institution that fixed exchange rates across national means of settlement via a fixed rate relative to gold or the US dollar unit of account. All these solutions have proven to be inherently unstable and have produced periodic crises, either in the form of volatile capital flow reversals or exchange rate instability.

Keynes's clearing union proposal sought to solve the problem through a meta settlement system based on a supranational unit of account (Keynes's proposed "bancor") accepted by all participants at a fixed rate in their national unit of account and which would be the basis for automatic settlement across countries by means of adjustment in their debit and credit balances on an international balance sheet kept by a supranational authority. While this provided a technical solution, it required each member state to relinquish sovereignty over its national unit of account/means of settlement relation, and the possibility of substantial accumulations of debit and credit balances as the system only financed the imbalances but did little to eliminate them. Such proposals to eliminate imbalances also implied a loss of national autonomy in domestic fiscal and monetary policy that countries were unwilling to accept.

It is interesting to note that current proposals to substitute national currencies with electronic or digital national currencies will not solve these problems, as they would require a metasystem with a single digital equivalent of Keynes's bancor and face the same problems of countries' unwillingness to cede national sovereignty over their monetary systems and policy autonomy to limit imbalances.

The TMG system resembles Keynes's proposal in that it provides adjustment of crosscurrency holdings of TMG members' stored credit by means of a simple bookkeeping adjustment in TMG members' ledger-entry balance records consequent to currency conversions, currency swaps, or ICLMs. Because members may hold wallet accounts in several different currencies and the TMG currency conversion, currency swap, or ICLM can only occur using stored credit already in the WM multicurrency bank accounts, this adjustment simply takes the form of a debit–credit adjustment of the stored-credit amounts from the member's national currency wallet to their wallet in another currency (if a currency conversion or currency swap) or a stored-credit transfer to another TMG member in a currency other than the receiving TMG member's national currency (if an ICLM).

With a currency swap, instead of the rates being fixed by government or through the regulated bank foreign exchange market, members swap currencies internally on the TMG system at rates set by themselves independently of the formal foreign exchange market (although the TMG system does provide alternative access via formal global FX markets). Thus, the system has opened the possibility of a fixed conversion rate or leaving the conversion rate determination to a crossing system in which the rate is set by the volume of individual transactions between TMG members at their own rates and according to open competition principles.

In the academic discussions around fixed versus floating exchange rate systems, Keynes, among others (such as Milton Friedman), suggested that contingent contracts could provide coverage against the uncertainty caused by volatility of floating rates. On the one hand, the TMG system solves this problem with the condition that swap rates are produced and presented but need not be accepted if not considered representative of the market.

On the other hand, hedging instruments such as forex forwards and futures are simply mechanisms for hedging short or long positions with the opposite position. Thus, a TMG member expecting to discharge a debt in a second currency could hedge that risk by means of a currency swap of stored credit to lock in the cost of acquiring the second currency, which can be used to meet the payment when the invoice arrives.

Alternatively, it would be possible for one TMG member to borrow currency from another member with a positive net stored-credit balance via an SCS in the required currency and lend it via an SCS until the payment is made. In the normal forward market this transaction will depend on the rates charged on borrowing and lending in the two currencies, but there is no reason why these hedging mechanisms cannot take place within the TMG system. It would even be possible for members to offer to provide these services operating independently in the market. Since one of the advantages of the TMG system is the low cost and rapidity of accounting adjustments in its TMG member stored-credit account ledger system, these are all more rapid than money market "spot" transactions, which even with real-time gross settlement may clear during the day. To produce time transactions, as seen in the above example, would require holding long or short positions over time. These could clearly be developed by members within the system or by specifying repayment dates for ICLM (SCS) lending transactions.

This brings up a second difference with the account settlement system described above: in that system there was no limit on the expansion of credit because it used a notional unit of account. As noted there, unlike a commodity money or fractional reserve system, there is no limit on the number of "numbers" that can be created, so the only limit is the level of real economic activity. Thus, the creation of credit is driven by the real transactions in the system without limit from the physical means of settlement.

But, as the WM system is currently configured, these units are created by provision of credit transfer from TMG members' regulated bank accounts or transfers by VSMPs and agents to facilitate their posttransfer creation of TUVs for unbanked TMG members. These credit and currency transfers set the limit on the size of the TMG system. This is what provides the equivalent of 100 percent reserve backing in a fractional reserve deposit system. As noted, this means that WM does not create credit internally.

However, this limitation on credit creation is due only to internally imposed operating rules that allow WM to retain operations within the telephony sector rather than exploiting the possibility of the direct provision of financial services. As discussed above, when the unit of account is defined in terms of a physical means of settlement, as eventually occurred in many countries, the

supply of the coin or commodity became the direct (or, in the case of imposing a reserve requirement, indirect) limit on credit creation.

It has become common for mobile operators to allow clients to purchase ancillary services via their accounts, for example, mobile phones and other accessories, as well as to provide postpaid delayed payment facilities for these purchases in exchange for contract commitments. These direct carrier billing services have also been extended to purchases of generalized goods and services through direct-to-mobile-bill payment facilities. There is no change in the system's operation if these charges are limited by prepayment. However, since WM operates as bookkeeper of the notional member accounts system there is nothing to prevent crediting members' stored-value accounts or issuing TUVs above the prepaid balances.

As mentioned above, the bookkeeper has control over the credit entries and the use of stored credit to meet billing from other users or producers. In addition, as in other historical clearing system experiences, the management of the TMG account balances and the issue of TUVs provides not only the possibility of creating credit, but of providing delayed settlement or extending periodic clearing limits to create implicit credit. With the introduction of this facility, the TMG system could provide all the functions of any current national or international financial system.

But more importantly, by allowing all national governments to retain their national units of account and sovereignty over domestic monetary and fiscal policy, it would provide for an international financial system that features all the advantages of Keynes's clearing union proposal without the political impediments (Kregel 2021).

SUMMARY

Finally, it is clear that the proposals mentioned in the introduction cannot do anything but substitute for money in the existing regulated system. Using sophisticated distributed ledger digital technology is indeed a step back from the operation of the “banking principle” in its modern form, while the creation of digital money by central banks would have the same impact as the TMG system on the private regulated banking system’s profitability and will thus face strong resistance. Such resistance already was sufficient in the 1940s to prevent implementation of the banking principle at the international level in the clearing union proposal. Finally, as is well-known, for the mobile phone payments systems such as Apple Pay or Facebook’s libra to be successful would require widespread diffusion of expensive phone sets and internet connections, thereby limiting coverage to those with such access.

Thus, to recap the advantages of the TMG system, it is based on an account settlement protocol similar to the banking principle in which transactions are conducted without the use of any physical representation of money and thus without any actual movement or transfer of funds aside from debit and credit entries on the client accounts managed by the WM bookkeeper through the WM system. This mechanism was first developed by banks to eliminate the cost and insecurity of the use of a physical means of settlement—first for physical commodity money and then for fiduciary money.

Just as over time bank notes replaced metal coin and bank deposits replaced bank notes, the Webtel.mobi System offered by the TEL.mobi Group provides an electronic account adjustment of TMG member accounts geographically separate from a member’s location as a function of its global telephony services that is a full substitute for the existing private bank payments system. Its currency conversion and currency swap facilities provide TMG members with the capacity to convert their stored credit from any national currency to any other, reducing the transaction time by an order of magnitude, as well as substantially reducing fees.

Its ICLMs between TMG members enable the swap of stored credit between members that can be used as a means of payment for any goods, services, or other medium-of-exchange-based transactions. Its ITANs for members via its TITAN system creates a unitary and global account system with virtually instantaneous global transfers between TMG members. As the stored credit in the WM multicurrency bank accounts legally remains the property of TMG members until it is used for telephony services, on a member's request WM is legally obliged to refund any unused stored credit to the member's regulated bank account or to unbanked members via an affiliate or stored-credit refund machine (WM's inter-closed loop members cash kiosks). Electronic transfer of stored credit in members' accounts and the elimination of a human presence at the transaction site also provides the possibility of substantial cost savings. The WM system is therefore capable of handling any internal or crossborder transaction currently provided by a regulated private financial institution. It provides an operational and cost advantage over both cybercurrencies systems (such as bitcoin) and mobile payment systems (such as Apple Pay, Google Wallet, and PayPal). Full exploitation of this cost and convenience advantage, as is the case in any network system, depends on the degree of concentration and penetration.

In its present configuration, the TMG system faces an internal contradiction. While it depends on transfers from the regulated banking system, its operation provides structural efficiency advantages that will threaten the banking system's survival, because credit creation depends on dominance in issuing means of payment. If bank profits are generated by net interest margins that result from the deposit creation to fund asset acquisition, the damage to bank deposits' dominance as the sole means of system payments threatens private regulated banks' profitability and survival. This is true regardless of whether the private system provides an electronic means of payment. It would be accelerated if national central banks move aggressively to provide electronic payments in response to the proliferation of cyber/electronic currencies and mobile payment systems. The banks' response to the secular decline of their net margin lending business has been to move into other activities that engender higher risks and instability.

As a result, the TMG system's success may compel it to consider implementing an adjustment to its operating protocols and a sector switch in order to allow for the extension of credit creation within TMG member accounts and by credit-based TUVs. If the system's implementation is

successful in the sense of supplanting private banks' credit-based payments system, it would then require the development of a full-fledged settlement system that allowed for credit creation. This would clearly be a net benefit in terms of financial system stability, for it would eliminate the possibility of bank runs and bank crises that have plagued the fractional reserve financial system up to this day.

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