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Two primary forms of money

*Immediate money and mediated money***

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Abstract

Money has **two primary forms** – **immediate** money and **mediated** money. Decisive distinction is that the former circulates **off-line**, while the latter **in-network**, via intermediaries. Immediate money accomplishes its functions without intermediaries, circulating hand-to-hand (ingots, bars, coins, banknotes) or device-to-device (in the future). Mediated money exclusively circulates account-to-account in books of payment institutions. It implies that money stays in-network, i.e. in banking system. Due to clearing and settlement technology it may appear that payments in-banks are performed without money or with little money. All other functions of mediated money are also realized in-network only. These two forms of money have circulated in parallel, intertwined and mutually conditioned during their multimillennial evolution. Three basic channels of creation and circulation of money have been built in this process – factor incomes channel, asset channel and credit channel. The analysis of **clearing and settlement** process is the key, because it reveals concealed nature of mediated money and differences to immediate money.

Key words: money evolution, immediate money, metal money, intrinsic problems, mediated money, book money, payments, clearing, settlement, banknotes, liquidity, banks, central banks, reserves, payment intermediaries (PSPs), electronic/digital/quantum money, central bank money.

1 Introduction

Coins and banknotes are clearly visible, tangible, widely distributed and ubiquitous in everyday life. Transaction accounts with banks also seem understandable to most of their holders. Nevertheless, economic explanations of money nature and their flows and stocks are mostly different and often completely opposite. Therefore, since the 19th century and Stanley Jevons to the present day, most definitions of money rely on the three most frequently cited functions – medium of exchange, unit of account and store of value. Occasionally, several additional functions are mentioned – means of payment, standard or measure of value, and means of deferred payments.

One of the fundamental causes of controversial definitions and opposite economics explanations is the neglect of **two primary forms of money** – **immediate** money and **mediated** money. The decisive distinction is that the former circulates **off-line**, while the latter circulates **in-network**, via

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intermediaries. This assertion is an *axiom*, so obvious that it is needless to prove it. At the same time, it is the *premise* on which the analysis presented in this study is based.

Immediate money performs its functions without intermediaries, circulating *hand-to-hand* (ingots, bars, coins, banknotes) or device-to-device (announced off-line CBDC). Of course, an initial issuer (authorized mint, government, central bank, and others) and distributor (money-changer, bank, ATM, money provider) is needed. The payment function of immediate money is performed instantaneously, finally, irrevocably and unconditionally. The stock of immediate money is always in the money-holder's possession. If the holder entrusts their stock of coins and/or banknotes to a deposit institution, it transforms into mediated deposit money, which can circulate only in-network via selected intermediary.

Mediated money circulates exclusively *account-to-account* in the books of payment institutions (templ, trapezite, argentarius, bank, central bank, PSP). The basic issuer of modern mediated money is the central bank, and it circulates between commercial banks. Payment instructions may be given using instruments or devices in paper form (check, payment order), plastic (payment cards) or electronic (PC, smartphone). Regardless of the physical form of payment instructions, transfers are most often made digitally today. Payments are processed internally (*in-bank*) and via clearing houses and settlement systems. Due to clearing and settlement technology, it may appear that payments are made without money or with very little money. However, in every transaction, the *payer* pays a specific amount of money, and the same amount is received by the *payee* on their transaction account. The certainty and finality of payment depend on the liquidity of the payer and their intermediary. The stock of mediated money is always in the possession of the intermediaries. Intermediaries are not custodians, but can freely use the deposited money.

Over thousands of years of money's evolution, long before the first Lydian coins in the 7th century BC, these two forms of money circulated side by side, intertwined, and conditioned by each other. Their joint evolution often concealed their fundamental differences, caused by their circulation mode – *off-line* opposite *in-network*.

The decisive difference lies in the *power of clearing and settlement in payments*, although many well-known textbooks on monetary economics and banking do not even contain the words *clearing* and *settlement*.¹ This power has relativized the importance of money stock in modern payment system to the point of unrecognizability, so that the household sector, which holds more than half the value of all transaction accounts, makes 200 times fewer payments than wholesale transactors (Table 1, source: BIS).

A clear understanding of the two primary forms of money through their multimillennial evolution requires **evolutionary** and **dynamic** monetary analysis. Respective analysis implies explicit differing of *direct exchange* opposite *wholesale* barter, *weighed* metal money opposite *coins*, *retail* payments opposite *wholesale* payments, transaction *accounts* opposite *deposits* (time, saving), money *stocks* opposite money *flows*, money *issuers* opposite payment *intermediaries*, as well as money circulation *hand-to-hand* (*off-line*) opposite *account-to-account* (*in-network*).

The analysis includes the main channels of money creation and circulation: factor incomes channel (wages, profit, rent, interest), asset channels (real and financial assets), and credit channel. Without such differentiation, it is impossible to explain how individuals and companies who have never used credit have money in their bank accounts, how people without any income or creditworthiness also have money in their portfolios or how it is possible to withdraw \$140 billion uninsured deposits from an illiquid bank in two days.

The paper after this Introduction (1) is organised as follows: Evolution of money (2), Immediate money (3), Mediated money (4), Concealed differences (5), and Conclusion (6).

2 Evolution of money

‘One of the chief things which monetary theory ought to explain is the evolution of money. If we can reduce the main lines of that evolution to a logical pattern, we shall not only have thrown light upon history, we shall have deepened our understanding of money, even modern money, itself’ (Hicks, p. 2).²

It is indisputable that *modern money* cannot be understood without explaining the evolution of money. Four main lines of that evolution can be observed: metal money – book money – paper money – electronic/digital money. Separating these main lines of evolution from the apparent, i.e., material forms of money shows the unique logical pattern: ***immediate money*** and ***mediated money***.

Both primary forms embody ***the same functions*** of money and illuminate their ***different creation and circulation***, without being obscured by material forms (metal, paper, plastic, PC, mobile device). The term *paper money* is the best example of confusion (book money, cheques, banknotes, etc.).

The first archaeological evidence of the existence of money over 5,000 years ago comes from *temples* in Mesopotamia. They were the first to shape immediate metal money as a *standard of weight* and mediated (accounting) money in the third millennium BC (Keynes, 1930a, p.12–13). The original immediate money consisted of weighed metal ingots and bars, most commonly silver. ‘Silver by weight was a widely used form of currency in the Near and Middle East during the second and first millennia B.C.’ (Grierson, p. 3).

Regardless of the physical form, transactions in temple were *documented*. These *documented transactions* in temples were not bureaucratic tools, but brilliant innovations in settlement of obligations, i.e., in payments (Peacock)³. The misconception that payments occurred only when ‘silver changing hands’ and the identification of monetization with the amount of metal in circulation (see: Dale, p. 167, 170–1), results from the metallist view of money. Temple’s documented transactions preceded the emergence of modern book/deposit money (Vuković, 2022).

The development of seafaring enabled the spread of ***wholesale barter***, with the use of weighed

metal money for settlement. This type of international trade reached its peak with the super-commercial Phoenicia and its most powerful colony – Carthage.⁴ *Weighed metal money* remained dominant even after the appearance of metal coins, because coins, due to their intrinsic problems, were not suitable for wholesale trade and large-value payments. The bars of gold in modern central banks' vaults reveal the importance and uninterrupted continuity of weighed metal money. Coined metal money is rapidly disappearing, as our wallets testify.

The *minting of coins* and their usage were first started by the Lydians in the seventh century BC. Herodotus testifies about this: 'They were the first men whom we know who coined and used gold and silver currency; and they were the first to sell by retail.'⁵ Thus, Herodotus, in one sentence, connected currency, i.e., **coins**, with **retail**. The Lydians' role in the history of coins ended unfortunately with the military defeat of Croesus, the last king of Lydia.

Through the cities of Ionia and nearby Aegina, silver-rich Athens (mines at Laurium) embraced coins at the beginning of its era of brilliant prosperity and expansion. Thucydides testified that the primary purpose of coins at that time was to pay mercenaries (soldiers and sailors).⁶

With the appearance of coins in the Athenian Agora, the emergence of moneychangers, i.e., trapezites, inevitably followed. By testing coins, they facilitated payment (Andreau, p. 30). In doing so, they established themselves as indispensable intermediaries in monetary transactions and 'the first bankers to receive deposits' (ibidem). In their everyday deposit business, the trapezites rediscovered the Babylonian secret – *not shift metal money from one purse to another, but from account-to-account*. Thus, mediated money was reinvented as book money.

The military (and political) power of coins motivated subsequent issuers. 'The third people to issue coins were the Persians' (Seaford, p. 128). They were followed by the super promoters of coins – the Macedonians, led by kings Philip II and Alexander the Great. The Macedonian conquests were launched by taking control of gold and silver mines and the expansion of coinage, supported by the systematic looting of enemy temple treasuries.⁷ Numerous mints continuously produced new coins (staters) and bullions, which mercenaries dispersed across the then-known world. This global promotion of immediate money was continued by Alexander's successors (Diadochi), as they paid their mercenaries (Kroll, p. 14).

The first *argentarii* appeared in *the Roman Forum* at the end of the fourth century BC, but coins in Rome never gained the significance they had in the Greek polis. Two main problems were the inconsistent intrinsic value of coins and their constant scarcity,⁸ due to insufficient coinage and excessive hoardings. A long list of intrinsic problems of coins in Antique includes difficult transport, risky storage, different metals and debasement.

Unsolvable issue were large-value payments.⁹ In Rome, with chronically scarce metal money, such transactions were unfeasible only in cash. Therefore, payments were necessary 'by a transfer within a particular bank' (Finley, p. 141). With the acceleration of debasement of silver denarius in the 3rd and 4th centuries AD, mediated book money was inevitably disappearing.

As early as the fourth century AD, the main role in coinage with gold *solidus* was taken over by Byzantium, which also had major expenses for paying mercenaries. In western Europe, silver coins circulated until the 13th century, followed by large silver coins (groats or grossi), which increased another intrinsic problem – outflow of silver to Asia (Spufford, p. 259). At that time, gold coins also appeared (florin in Florence and ducat in Venice), announcing bimetallism problems.

The book money was once again reinvented as deposit money in Genoa (at the end of the 12th century) and Venice (in the 13th century). The ancient money intermediaries – trapezites and argentarii – were replaced by new ones: bankers. Similar to their antiquity predecessors, they began as moneychangers with their own secure storages (Kohn)¹⁰, and then expanded their business to accepting deposits and making payments on behalf of clients (Spufford).¹¹ From the 14th century onward, one can already observe a pattern: mediated book money was increasingly used for payments in wholesale trade, and coins in urban retail.

Venice, the greatest financial and trading power of the 14th and 15th centuries, was the leader in the development of deposit banking and payment in books with mediated money. A few private banks (maximum 10) were grouped on the *Piazza di Rialto*, within easy reach of merchants arranging commercial transactions. The very names of these banks – *banchi di scritta* – indicated their primary mode of payment and the possibilities for client lending and investment.

Thanks to their proximity, the banks on the Rialto Square ‘[...] could effect such interbank transfers only through reciprocal accounts that they held with each other, and which they settled periodically as needed’ (Kohn, p. 3). Thus was discovered interbank clearing and the benefits of payments ‘in network’.

Despite all the advantages,¹² these private transfer banks were fragile institutions. Times were uncertain and turbulent,¹³ and depositors’ runs on banks were frequent (Ugolini, p. 39-40). In the end, by the mid-1580s, no one was interested in the banking business in Venice anymore. ‘Only in 1587 would the public *Banco della Piazza di Rialto* be substituted for private banks, [...] Finally Venice had the bank envisioned more than two centuries earlier, which held, at least at the outset, 100 percent reserves and provided the service of clearing debts via giro among its depositors’ (Mueller, p. 118). The biggest changes in the design of the new bank were public ownership and lending prohibition.¹⁴ Thus, mediated money was revitalized as a state project.

For large payments in metal money during the 16th and 17th centuries, silver bullions were used, mostly for waging wars (Kohn).¹⁵ If there were no more coins and bullions, nor new creditors, armies would disband, and peace would follow (Kindleberger).¹⁶ Therefore, the inflow of gold and silver from the Americas motivated more wars than it facilitated large and small payments. Understandably, a large portion of wholesale and retail trade satisfied military needs. The financing of wars was also supported by mediated money as early as the 13th century (Mueller),¹⁷ and to this day has become almost the only means of paying military expenses.

The peak of coinage chaos was recorded in the Netherlands at the beginning of the 17th century: countless types of coins, issued by numerous autonomous mints, of poor quality and dubious weight. With the establishment of the public Bank of Amsterdam (BoA) in city ownership in 1609, this problem was significantly mitigated, although the primary goal was to create a system of large

international payments account-to-account. It was a triumph of mediated money: the BoA guilder as account money was the dominant currency in European and global wholesale for almost two centuries, until the 1790s (Quinn and Roberds, p. 63).

‘The initial design of the Bank borrowed heavily from Venice’s Banco di Rialto. The Bank’s charter granted it extensive legal privileges’ (Roberds and Velde).¹⁸ Adam Smith classified the BoA guilder into **bank money**, i.e. deposit money, emphasizing its ‘intrinsic superiority to currency, security, simplicity and risk-free transfer’.¹⁹ Thanks to these features, mediated money remained the backbone of the development of private and public deposit banks and banking in general.

Innovations and stricter coinage rules in the 17th and 18th centuries also mitigated the intrinsic problems of coins,²⁰ but they could not solve the enigma of bimetallism. The problem of the fluctuating market price ratio between gold and silver was alleviated only in the 19th century, when the era of *the gold standard* officially began.²¹ At that time, the myth of the intrinsic value of metal money was solidified.

Paper immediate money appeared in London during the second half of the 17th century, initially in the form of goldsmith notes or deposit receipts.²² The development of this innovative form of money was accelerated by the founding of the Bank of England in 1694. ‘It is from these goldsmiths’ notes that the Bank of England note ultimately derives. [...] The notes issued after 1725 were in mainly printed form and they began to appear in fixed denominations; the first was for £20’ (Bank of England, 1969, p. 211-2). Their high denomination – from £30 to £1,000 (ibid, p. 222), confirmed that all BoE notes and other bankers’ notes in circulation were primarily intended to serve as ‘*instruments of commerce*’ (Smith). ‘For context, the majority of Londoners had never seen a **banknote** before the 1790s’ (Vuković, 2020c, p. 5).

However, banknotes were in practice impractical for *larger transactions*, which as a rule had to be *documented*. This new immediate money also could not solve the old snags of hand-to-hand payments, unsuitable for wholesale trade: ‘the trouble of counting, or the risk of transporting it from one place to another’ (Smith, p. 448). Moreover, the banknote issue business was risky and low-profit. For that reason, London bankers gradually abandoned the issuance of their own notes, replacing them with BoE notes in interbank transactions as early as the mid-18th century (Arnon, p. 23).

The abandonment of private banknotes did not prevent private bankers from developing internal clearing and settlement of payments among its depositors. At the same time, London bankers initiated the clearing of interbank payments, which would soon revolutionize mediated money. The epicenter of that revolution was the Bankers’ Clearing House, established in London during the 1770s. Interbank clearing, with the use of metal money for final settlement, was well known to Rialto bankers, but Venice in the 15th and 16th centuries was a less secure environment than London in the second half of the 18th century.

At that time, BoE notes, as an advanced form of immediate money, significantly contributed to the promotion of mediated money in interbank payments, serving as the means of final settlement. In this way, the millennia-long intertwining of two primary forms of money continued. **Pure**

mediated money emerged by excluding BoE notes from final interbank settlements. ‘Starting in 1854, these notes were replaced by cheques drawn on bank deposits with the Bank of England’ (Vuković, 2020c, p. 6). Already in the 1870s, ‘[...] debts to the average amount of nearly twenty million sterling per day are liquidated without the use of a single coin or bank-note’ (Jevons, p. 263).

The evolution of money accelerated dramatically in the 19th century, when ***mediated central bank money*** with unlimited deposit transactions was shaped. This unlimitedness was ensured by the Bank Charter Act of 1844 by separating banknotes issue and deposit business. The benefits of such liberalization were enjoyed by commercial banks as well: ‘We must never forget that a quarter of a century has passed since 1844, - a period singularly remarkable for its material progress, and almost marvellous in its banking development’ (Bagehot, p. 3). The phrase ‘*almost marvellous banking development*’ describes the eruption of ***mediated money in commercial banks***.

Banknotes of small denominations were launched throughout Europe only in the 19th century (with the exception of Scotland during the 18th century), convincing people that even ‘worthless bits of paper’ (Jevons, p. 194) could represent hard money. This was the continuation of the interrupted paper money alchemy started by John Law between 1716 and 1720. Nevertheless, despite the alchemy of ‘*bits of paper*’, banknotes reached their zenith before the end of the 1840s. ‘The total bank-note circulation of England and Wales in June 1914 was almost precisely what it had been in 1866 and in 1844, that is, between £28,000,000 and £29,000,000. Peel’s Act became a classroom theme, while with every decade the bank note became less and less important’ (Clapham, II, p. 270). The declining use of immediate money was noticeable throughout the 20th century. This negative trend dramatically accelerated in the 2020s, signaling a cashless society, in which money would circulate exclusively *in-network via intermediaries*, i.e. payment institutions.

The global expansion of mediated money was hindered by the international settlement in gold until the 1930s. The Bank for International Settlements (BIS), to settle the question of war reparation payments, was established in January 1930. From July 1932, ‘[...] the BIS focused its activities on the technical cooperation between central banks (including reserve management, foreign exchange transactions, international postal payments, gold deposit and swap facilities) and on providing a forum for regular meetings of central bank Governors and officials’ (www.bis.org/about/history). This general formulation about *the technical cooperation between central banks* describes the creation of a *global clearing and settlement system* within the most powerful international monetary institution—BIS—although much less known and more discreet than the IMF, World Bank, and other supranational financial organisations.

The gradual rise of cheque usage for disposing mediated money in books of banks marks the first half of the 20th century. From the 1970s, cheques were supplanted by payment cards, which, with the development of electronic communications, came to be called electronic money. In this way, the spread of mediated money accelerated. Of course, these were new instruments and devices for the circulation of the old book money, which had meanwhile been renamed into deposit money. The same applies to digital money, embodied in smartphones, as well as to the future quantum money. During the 2020s, these multifunctional mobile devices took the lead in transferring mediated money, increasingly suppressing payment cards and PCs in developed economies.

Paradoxically, the same mobile devices have already become dominant in most developing countries, and even predominant - in China 99% of people.

Accelerated technological progress has multiplied the clearing and settlement power of mediated money. Consequently, *total networking* of retail and wholesale transactions is taking place in national and global payment systems. This announcements of totalitarian monetary future raise difficult questions that require comprehensive research.

3 Immediate money

The original immediate metal money enabled the establishment of *the standard of weight* of a representative metal, most commonly silver. Therefore, the emergence and use of *ancient money* are inseparably linked to weighed metal money. The money weight standard was usually determined by the sovereign or the state, which remained common practice until the abolition of the gold standard in 1971. 'The first State reform of the standard of weight, of which we have definite record, was the Babylonian reform towards the end of the third millennium B.C.' (Keynes, 1930a, p. 12).

Non-metal commodities were used as a primitive barter standard among archaic communities in pre-coin time. After the invention of coins, it is evident that most primitive communities encountered money forcibly, through their conquerors and colonizers. '*The primitive man's distaste for exchange*' (Simmel, p. 94) has also been proven.

Weighed metal was in every respect the embryo of money. "To weigh" was the term used for payment in metal, [...] The shekel and the talent which came to be known subsequently as coins or monetary units, first originated as units of weight (Einzig, p. 212). These units of weight served as monetary units at least two thousand years before the first coins.

Ancient Mesopotamia's millennial experience had a strong influence on Phoenician trading cities and Hellenistic poleis. In pre-coin age, for Solon, silver was weighed (Kroll, p. 16).

Weighed metal money was regularly *stamped*. 'The monetary character of silver was reinforced by the stamping of the ingots to guarantee their weight and/or fineness' (Einzig, p. 212). Modern representatives of weighed metal money, such as gold bars in modern banks' vaults, are also stamped with markings of weight and fineness. Additionally, it was often practiced '[...] that the ingots were enclosed in sealed sacks' (ibid, p. 213), which clearly facilitated large-value transactions.

The widespread use of weighed metal money enabled the development of wholesale barter, primarily as the means of settlement. This is likely the reason why '[...] coins should have been invented by Lydia, a predominantly pastoral community, instead of Phoenicia, one of the most highly commercialized communities of all times' (ibid, p. 224).

Coined metal money never held such importance for wholesale trade. 'It is a practice which has never caught on in some important commercial areas. Egypt never coined money before the Ptolemy, and China (broadly speaking) has never coined silver, which is its standard of value, until

the most recent times. The Carthaginians were reluctant coiners, and perhaps never coined except for foreign activities' (Keynes, 1930a, p. 12).²³

Nonetheless, coins played an epochal role in introducing people across the then-known ancient world to coined money and its military, commercial, and sacral powers. The usual domains of coin usage included mercenary salaries, urban retail, rural reserves, hoarding, and taxes. Coins were the most visible representatives of immediate metal money, as they circulated hand-to-hand much more frequently than ingots or bars. This explains why, until the end of the 19th century, coins were synonymous with money. 'Standard legal tender coin of full weight is undoubtedly money, and as convertible legal tender bank-notes are exactly equivalent to the coined money [...]' (Jevons, p. 248).

The coins are usually minted in royal mints, which today are generally under the authority of ministries of finance, i.e. treasury, and less often within central banks. Due to their metal content and non-mediated circulation, coins were often used in neighboring countries until the end of the 19th century. Similarly, coins from long-defunct original mints (e.g. Roman coins in England until the 15th century) were accepted for payment. From this, one may conclude that coins were the most mobile form of immediate money.

Coined metal money remained on the pedestal of *true* or *proper* money for more than two and a half millennia. It served as the benchmark for *representative money* until the 1930s. Despite that, the reputation of coins has not been compromised. In the 21st century, numerous private cryptocurrencies have been launched, starting with bitcoin. Many have proposed the abolition of banknotes, but no one has suggested abolishing metal coins! Could they be the last bastion of immediate money?

Banknotes are the youngest and most developed shape of non-mediated money, but they have never been *the dominant means of payment* (Vuković, 2020b). Nevertheless, from their inception, they have attracted great public attention (*bits of paper*), magnetically drawn researchers (*printing money*), been loudly contested (*central bank monopoly*) and accused (*curse of cash*). Exclusive issuers of banknotes over the past hundred years are central banks, yet even that has not spared them from marginalization in modern payments.

Like coins, banknotes circulate hand-to-hand and are always in the possession of their holder. Thanks to off-line transference all payments are final. Hence, it is understandable that together with coins they are classified as cash money. Circulating without intermediaries means that this immediate money is out of networks, i.e. it can only be used by its owner. From the perspective of intermediators, this money is insufficiently mobilized, while for depositors it is the only way to step out of the network.

Due to technological neglect and systematic suppression, cash has become impractical even for retail payments. This has eliminated the threat of old-fashioned *run on banks* (the last one being the run on Northern Rock in September 2007). The possibility to withdraw own money from the banking system today is reduced to a minimum — almost all money is locked in network. Thus, immediate money is condemned to extinction, left to monetary reservations which unbanked people are inhabited (Vuković, 2021).

According to issuers, coins and banknotes are classified as central bank money. Consequently, with their disappearance, immediate central bank money will also vanish, and retail payments will be conducted exclusively in-network. In the end, weight metal money remains the only shape of immediate money with a somewhat certain future, but only in bank vaults.

A potential opportunity for the reanimation of cash could be provided by announced off-line CBDC, which would circulate device-to-device. This *technical solution* has been explored by central banks since the second half of the 2010s, when they realized that the general public had been almost completely deprived of access to central bank money.

4 Mediated money

The rudimentary pattern of ancient *money-on-account* was represented by Babylonian temples' clay records on claims and transactions. This *temple money* was the early book money. The extraordinary role of temples in shaping money and its functions is largely neglected or misinterpreted, despite countless archaeological findings. The contested formulation of a "marketless Babylon" is profoundly unjust to a civilization that, besides the weighed metal money and accounting money, conceived credit, interest, and interest rates, and gave the world the Code of Hammurabi (c. 1755–1750 BC). Equally unacceptable is the claim about 'significant periods of unfettered market activity' (see: Dale, p. 173). In any case, ancient Mesopotamia is the birthplace of mediated money.

The trapezites in the Athenian Agora, who appeared during the fifth BC (Andreau, p. 3), were the first to develop mediated money based on deposits of coins. In this way, coins enabled the rediscovering of the book money and the Babylonian secret – *shifting ingots and coins from account-to-account*.

'The *argentarii* – money-changers, assayers and **deposit** bankers, installed in the Roman Forum between 318 and 310 BC' (Andreau, p. 30). The advantage of the trapezites and argentarii was that they could provide not only coin exchange and testing, but also safekeeping and payments 'in bank' with documentary evidence.

Here the ancient roots become visible of 'one of **the most misleading words** in the English language – the word "**deposit**", when used to refer to a claim against a bank' (Milton Friedman).²⁴ The same problem exists in all other languages that have adopted this word from Latin. *Circulating* deposits, *current* deposits or *transaction* deposits are oxymoron. A deposit by legal definition cannot circulate and cannot flow – its essential law feature is stationarity.

Two types are known: *regular* deposits and *irregular* deposits. Etymologically, regular deposits reflect the original meaning in the sense of '*nomen est omen*'. The original meaning is also confirmed by their everyday name – *sealed* deposits. 'These deposits, in the form sometimes of coins, sometimes of objects or documents, had to be restored to their owners untouched by whoever accepted them as deposits. [...] But such sealed deposits were clearly not the major feature of a bank, for that was constituted by the non-sealed deposits, which the banker had the right to invest, provided he would subsequently restore an equivalent sum to its owner. However,

a study of bank deposits in Rome is complicated by the legal problems to which they gave rise' (Andreau, p. 40).

One of those *legal problems* was the failure to distinguish cash and non-cash transactions. Documentary transactions 'in bank' referred to both cash and non-cash payments (Andreau, p. 44). This still confuses archaeologists and historians when interpreting textual evidence. All payment transactions via the *argentarii*, cash and non-cash (*numerare, in saculo dare, persolvere*), were documented in the register chronologically.²⁵ 'All these operations put together constituted the deposit account of his client, his *ratio*' (ibidem).

Historians provide detailed descriptions of payments based on textual evidence, but fail to see the 'multiplier effect' because 'no clearing centres' (see: Harris, p. 201) and 'negotiable instruments' (Finley, p. 141). Many economists share the same conclusion. The reason is that payments without coins are linked exclusively to 'modern institutions' such as 'clearing banks' (Harris). However, for non-cash payments, licensed, credible, and liquid payment intermediaries such as *trapezites* and *argentarii* were sufficient. Many cases are known where '[a] payment had been made but no coins had changed hands' (Harris, p. 198).

Let us apply the *mengerian* methodology (Menger, p. 257–285). The *economizing individual* deposited coins with his *argentarius*, with whom he had an account. Many other Romans did the same with the same *argentarius*. It was certainly common for them to have mutual payments. It is hard to imagine a payment transaction executed purse-to-purse in the presence of three parties – the banker and his two clients, payer and payee. Even harder to imagine is a payment purse-to-hand and hand-to-purse. It would be absurd to shift coins from one purse to another at the same banker. These obvious *peculiar difficulties* due to *double handling* were resolved by bankers through the use of mediated book money. Mutual payments at the same banker were documentary transactions without coins, i.e. account-to-account. All coins remained in the purse of bankers! Without *double handling*.²⁶

Trapezites, argentarii, and other payment intermediaries represented the basic level of clearing (internal) on which mediated money is based. They were intermediaries for mutual payments of their depositors in own network. It is not difficult to conclude that the banker and his clients, thanks to overdraft in network, were able to execute many more mutual payments than there were coins in purse of banker. They could do this without connecting with other bankers, although that was inevitably the case.²⁷ Numerous documentary transaction payments of enormous amounts, which would require tons and tens of tons of silver coins and ingots, cannot be explained otherwise.

Evidence of the lack of metal money in circulation indicates that Rome was under-monetized. It seems that mediated money hides one of the secrets of ancient *monetization*. '[T]he Roman monetary system was far indeed from relying entirely on coinage. Romans, especially those whose credit was good, frequently made payments without coinage' (Harris, p. 207).

The Renaissance of book money, which began in Genoa at the end of the 12th century, gained its greatest momentum in Venice from the 13th to the 16th century. '[T]he more holders of current accounts in Venice used those accounts as means of payment, the more credit was created and the more specie was freed for export to the Levant, which suffered from a chronic bullion famine and

which attracted Venetian coin as an exchange commodity' (Mueller, p. 25). It is clear that this hub of wholesale trade with East would not have achieved global maritime power and commercial domination without the use of mediated money for transfers account-to-account.

A succinct description of the job of deposit bankers was given by the famous mathematician Fra Luca Pacioli in 1494, as a direct witness: 'It is common practice to deal directly with a transfer bank, where you can deposit your money for greater security or for the purpose of making your daily payments [...]' (Mueller, p. 5).

From the end of the 16th century to the 1870s, the use of mediated money in continental Europe was most strongly promoted and developed by old deposit banks in public own. 'The Bank of Amsterdam represented the peak of development of public deposits banks: it was modelled after Venice's Banco di Rialto (1587) and followed by the Hamburger Bank or Bank of Hamburg (1619). [...] Most of these public banks were not doomed to fail by the superiority of note issuing banking: most were swept away only by the Napoleonic wars.' (Vuković, 2020b, p. 4).

However, not even Napoleon managed to destroy them all. A shining example is the Bank of Hamburg. 'In short, in the 1870s, a public bank more than 250 years old (established in 1619) operated the best developed system of transfer transactions in the new German Empire' (ibidem).²⁸ The statistics are irrefutable evidence: 'Transactions on transfer account, which had amounted in 1875 at the Prussian Bank to only 834,000,000 marks and at the Hamburg Bank to 2,658,000,000 marks'.²⁹

London bankers were well acquainted with money transfer technology and used public deposit banks on the Continent. 'All banks will to a certain extent economize currency, and those of Amsterdam and Hamburg have for some centuries carried on a system of transfers, the true prototype of our system' (Jevons, p. 338). The Bankers' Clearing House in London from **1770s** was a continuation of the evolution of mediated money, with a Copernican leap – from 1841 it performed **multilateral clearing**,³⁰ previously unknown in the world of banking.

The revolutionary nature of the **London BCH** is highlighted by the years of establishment of other clearing houses: **New York CH** established 1853, **Paris CH** established 1872, and **Berlin CH** established 1883 (Vuković, p. 10–11). At the same time, this testifies to how difficult it was for the practice of using mediated money in interbank payments,³¹ since many bankers in the 19th century failed to understand what had already been clear to Luca Pacioli and Venetian bankers in the 15th century!

Bank of England entered the London Clearing House in May of **1864**, technically: 'enter the clearing' (Clapham, II, p. 251).³² Thus, the first national clearing system was created, which no longer had spatial limits in domestic payments – main clearing bankers were in-network.

International clearing was hindered by *gold fetters* until 1932, when the newly established BIS began '[...] activities on the technical cooperation between central banks (including reserve management, foreign exchange transactions, international postal payments, gold deposit and swap facilities)'. Naturally, gold deposits were not removed from central bank vault, but only a portion of them was transferred to the BIS as collateral to secure international settings. With the abolition

of the gold standard in 1971, the formal link between gold and international clearing and settlement systems was severed.

At the end of this historical overview, it may be concluded that the most important places for development of mediated money were, chronologically: **Babylonia** (temples and palaces) – **Phoenicia** (trading cities and colonies) – **Athenian Agora** (trapezites) – **Venetian Rialto** (bankers) – **Amsterdam** (Wisselbank) – **London** (Bank of England and Bankers' Clearing House) – **New York** (Clearing House and Federal Reserve Bank) – **Basel** (Bank for International Settlement).

Mediated money remains to this day the greatest monetary enigma, even though its evolution has lasted more than four millennia. The development of mediated money presented above suggests that the essential reason for its enigmatic nature lies in transactions evidence *in-book*, as well as in the diversity of its payment instruments and devices (from clay tablets to smartphones). The failure to distinguish between issuers and intermediaries of book-money further contributes to its *monetary deceiving*.³³ Still, the biggest illusionists in this ancient story about mediated money are clearing and convertibility. That is why further research should begin with them.

Clearing is the basic method of settling mediated money, i.e. their transactions from *account-to-account* in the books of payment intermediaries, which represented the *internal network*. The payer sent money and the payee received money via the intermediary. The transaction was recorded in intermediary's book, creating the illusion that it was executed without money, although it is clear that without payer's money there would be no payment. This illusion is so strong that the Governor of BoE in 1992 emphasized *explicit transactions* in gross payment systems opposite net payment systems (Leigh-Pemberton, p. 454). Are there explicit payments vs implicit payments or explicit money vs implicit money?

The original internal clearing is probably the best example of mediated money circulation, already described through the relationship between *economizing individuals* and Roman *argentarii* (p. 11). The brilliantly simple Babylonian formula – *not shift money from hand-to-hand, but from account-to-account* – functioned effectively with licensed, credible, and liquid intermediaries in a stable environment of trusted money issuers. The disruption of these conditions reduces or eliminates any form of clearing (internal, bilateral, multilateral, etc.).

The logic of clearing is based on the symmetricity of payments, expressed by the equation *sent payments = received payments* in network. This symmetricity of payments characterizes immediate money as well, but without intermediators. Considering the stock of mediated money is always in the intermediary possession, he can freely use deposited money. Freely using of money in-network allows incomparably **expansive payments** than cash, but also causes illiquidity and failure of intermediaries. Until the founding of Federal Deposit Insurance Corporation (FDIC) 1934, bankruptcy of deposit institution meant the loss of money of depositors.

Obligation of convertibility explains the rest of the enigma. Accepting mediated money has always been related to the convertibility of money-on-account into money of more stable value. Until the 20th century, metal money, weighed and coined, was considered more stable money. Non-metal money, including banknotes, had not been treated as proper-money.

The gold standard was formally inaugurated in 1821 precisely due to the convertibility of banknotes into gold, as a way to regulate the freely print of numerous issuers. The problem of *numerous issuers* was brought under control only in 1844, when the Bank Charter Act was enacted. Central banks, as the sole issuers of banknotes since the 1920s, strengthened public trust in these *bits of paper* and made them proper-money. Consequently, the convertibility of mediated money became tied to central bank notes.

During the Great Depression of 1929–1933, this *paper money* became the most sought-after store of value. It was the time of the infamous *run on banks*, which collapsed more than ten thousand banks, mostly in the United States (over 9,000). The impracticality and legal limitations of using banknotes marginalized them as a *medium of convertibility* after the Global Financial Crisis, in the late 2010s. Since then, the term convertibility has referred only to the possibility that ‘one currency can be freely exchanged for another’.³⁴

It was shown that the acceptability of mediated or book money, as well as its very existence, depended on the deposit convertibility into immediate metal money up until the end of the 19th century,³⁵ and during the 20th century into central bank notes. This gave deposit holders a sense of security about their transaction money in the bank. “People are so used to having payment services provided against checkable fixed nominal value liabilities, with **100% convertibility of demand deposits**, [...]” (Goodhart, 1988, p. 89).

Today, the convertibility of mediated money rests solely on the possibility of transferring deposits to another bank. Simply put, you can no longer get out from the network of commercial banks! Because of minimizing convertibility of demand deposits into immediate money, the only mode of exit from the network has been abolished, in case trust is lost in the chosen intermediary or the entire banking sector. ATMs remain the last resort of convertibility of our bank deposits.

The basic issuer of modern mediated money is a central bank, and it circulates between commercial banks. That central bank money is issued and circulates via commercial banks’ accounts with the central bank, the so-called **reserves**. Direct access to this non-cash money is available only to a smaller portion of payment intermediaries – authorized commercial banks and selected financial institutions. Other intermediaries access it through correspondent banks. All of them, along with the central bank, are interconnected through retail and wholesale payment systems in a comprehensive national clearing network.

The only money that is created and circulates in national network, as well as through all other levels of clearing (internal, bilateral, multilateral, etc), is the central bank money, denominated in national currency. “Commercial bank money” is an illusion created by the very clearing of transactions in books of banks. The bank money that Adam Smith emphasized as early as 1776 was the money of public deposit banks; during the 19th century, it evolved into central bank money. Today, this is the only shape of mediated money or bank money.

Mediated money enables the multiplication of payments within the network, provided that banks can freely use deposited money their clients. The expansion of payments is effectuated through overdraft and other loans, which are *promise of money*, i.e., *promise of payment* in the form of bank liabilities – deposits. It can be noticed that this is a process of an apparent deposit and credit

multiplication, which actually represents a reflection of clearing. Without clearing and monopoly of payments, the credit potential of any bank would be equal to that of any non-deposit financial institution with the same liabilities and equity. The proposal on balance sheet reconstruction of central bank money in commercial banks (Section 9) explains this *monetary deceiving*.

With the suppression of cash in retail transactions, a closed payments network is being created, eliminating the limits of mediated money creation. ‘Today’s central banks have the capability of creating or destroying **unlimited** supplies of money and credit’ (Alan Greenspan).³⁶ The terrifying monetary expansion during the 2010s and early 2020s unequivocally confirms this.

The national clearing system is a closed payments network. This comprehensive network is managed by the central bank,³⁷ which is the sole issuer of modern mediated money and the lender of last resort. Mediated money circulates exclusively account-to-account in books of payment intermediaries – banks and other PSPs. The central bank is a supermediator – comprehensive and universal. The unlimited clearing and settlement power of central bank is the nuclear reactor of mediated money emission. Only thanks to such power of the central bank were wholesale depositors who were able to withdraw \$140 billion uninsured deposits from the illiquid Silicon Valley Bank in just two days in March 2023.³⁸

5 Concealed differences

The first and most important concealed difference is the very existence of two primary forms of money: immediate and mediated money. Such concealment is a consequence of neglecting the relation to their fundamental mode of circulation – *off-line (hand-to-hand) versus in-network (account-to-account)*. That is why the belief that mediated money in circulation is a value-equivalent of hard money persists to this day as a form of metallist blindness. Current data (Table 1) indicate that all global monetary gold reserves would not be sufficient for wholesale transactions in a single day!

Immediate and mediated money have the same issuer – the central bank, but differ in their access to it – direct access (cash) and indirect access (bank accounts). Access to money is determined by their key characteristics – *safety* for immediate money and *efficiency* for mediated money.

Monetary statistics of most developed economies show that the household sector holds more than half the value of all transaction accounts (so-called demand deposits) at banks. The rest belongs to the corporate sector and financial sector. This is not surprising, as households are traditionally net creditors. Of course, for a smaller portion of retail transaction, people still use cash. With this dominant value of transaction accounts, households execute less than 0.5% of the value of total transactions! Two hundred times less than corporations and financial institutions!

Table 1 - Proportions of retail and wholesale transactions

	Volume transactions / year	%	Value USD / year	%
Retail	2,000 bn	88.8	35 trn	0.6
Commercial (Wholesale)	250 bn	11.1	650 trn	11.4
Financial (Wholesale)	2 bn	0.1	5,000 trn	88.0
Total	2,252 bn	100.0	5,685 trn	100.0

Source: BIS Annual Economic Report 2020, Basel, June 2020, p. 73.

The drivers of the eruption of payment transactions and mediated money are clearly wholesale (commercial and financial) transactions, which have completely marginalized retail payments (Table 1). As already emphasized above, freely using of mediated money in-network enables incomparably **more expansive payments** than cash, but also causes illiquidity and failure of intermediaries. From time to time, the entire system faces collapse, which is why systemic liquidity risk is one of the more frequent topics in monetary literature.³⁹

At first glance, it is evident that there is no problem of household sector liquidity, but only wholesale sectors liquidity – commercial and especially financial. There is no longer a danger of withdrawing household deposits from banking network. Thanks to the crowding-out of cash, the depositor can no longer exit the network, but can only switch banks. Thus, mediated money is locked in bank system.

The rapid growth of mediated money, followed by the eruption of transactions *in-bank*, encouraged theoretical equalization of issuers (central banks) and intermediaries (commercial banks). The main product of this confusion is the promotion of commercial bank money as equal or even superior to central bank money. In public attitudes about money, commercial bank money does not exist.⁴⁰ ‘Most of the public intuitively knows that a money issuer cannot go bankrupt. But commercial banks go bankrupt. Despite the access to central bank’s liquidity, prudential regulation, supervision and effective resolution regimes (Financial Stability Board),⁴¹ there will still be bank failures’ (Vuković, 2023, p. 9). The same applies to other fictions from mediated money – there is no such thing as clearinghouse money or netting money,⁴² not even as ‘*a very close substitute*’ (BIS, 1989).⁴³

Lastly, concealed differences between money issuers and money intermediaries are revealed by the interbank settlement process itself. This process has always relied on an acceptable settlement asset; without such an asset, there could be no settlements, and therefore no mediated money. Commercial banks have never accepted claims from other banks for settlement. The only settlement asset that all banks have accepted was and remains the central bank money – immediate (until the mid-19th century) and mediated. That is why central banks are the ultimate providers of interbank settlement assets.

The comprehensive dynamic approach explains all the diversity and peculiarity of mediated money. *Dynamic analysis* focuses on the stock-flow relationship. The stock of money is the result of flow; money flow contains a series of payment transactions; transactions occur in network between payer and payee; transaction outflow of payer = transactions inflow of payee (*symmetric*); each transaction changes the stock of money for both the payer and payee; the transaction does not change the stock of money in the overall system; transactions are *successive* and ***interdependent*** – previous transactions determine the next ones; full information on money stock and flow in the network is held only by the system mediator; stock of money enables the start of flow; the difference between Stock(t) and Stock(t-1) does not show the total value of flow.

Why is the flow of money important? Most monetary analyses are static. The first sentence of one of the most well-known monetary studies is enough: ‘This book is about **the stock of money** in the United States’ (Friedman and Schwartz, p. 3). However, money stock is not the only measure

of money supply. A more complete explanation requires a systemic approach, i.e. *money flow analysis*. Cash-flow analysis is partial because it focuses on individual units within the system.

The fundamental stock-flow relationship equation is:

$$\text{Stock}(t) = \text{Stock}(t-1) + \sum \text{Inflow} - \sum \text{Outflow}$$

The most important flow variable is Net flow:

$$\text{Net flow} = \sum \text{Inflow} - \sum \text{Outflow}$$

Consequently, the key stock variable follows:

$$\text{Stock}(t) = \text{Stock}(t-1) \pm \text{Net flow (Net position)}$$

The above equations and variables are relevant for every intermediary and every payment system.

In a closed interbank payment network:

$$\sum \text{Inflow} = \sum \text{Outflow} \Rightarrow \text{Stock}(t) = \text{Stock}(t-1)$$

Two main conclusions arise: first, central bank money determines and constitutes the stock of money (base money); second, transaction accounts with commercial banks (so-called demand deposits) are promise money (most of M1). The relationship between these two monetary aggregates is usually shown as the *money multiplier*:

$$\text{M1} = m \cdot \text{BM}$$

However, a more accurate term would be *promises multiplier*.

Mediated money, by itself, is not the cause of the expansion of promise money. The cause is its free use by intermediaries under conditions of insufficiently clear legislation. The advantage of this freedom of use was the efficiency in payments and power of netting.

Understandably, the multiplication of payments with immediate money is impossible due to its fundamental characteristics – circulation hand-to-hand and because the cash is always in the holder's possession. Therefore, it is unfounded to equate the safety of cash and mediated money. Even when its 'immediate' settlement is emphasized, mediated money remains promise money. Immediate money is cash in hand, whose transactions are instantaneous, final, irrevocable, and unconditional.

6 Conclusion

The main finding of this research is that money has *two primary forms* – *immediate* money and *mediated* money. The former circulates *off-line*, and the latter *in-network*, via intermediaries. Immediate money performs its functions without intermediaries, circulating hand-to-hand. Mediated money circulates exclusively account-to-account in the books of payment institutions (in-network). Payments and other functions of mediated money are realized only in-network.

The payment function of immediate money is performed instantaneously, finally, irrevocably, and unconditionally. The stock of immediate money is always in the possession of the money-holder. If the holder entrusts their stock of coins and/or banknotes to a deposit institution, it transforms into mediated deposit money.

Mediated money processes payments internally (in-bank) and via clearing houses and settlement systems. Certainty and finality of payments depend on the liquidity of the payer and its intermediary. The stock of mediated money is always in the possession of intermediaries. Intermediaries are not custodians, and can freely use the deposited money.

These two forms of money have coexisted, intertwined, and conditioned one another throughout their multi millennia-long evolution. Both primary forms embody *the same functions* of money, and illuminate their *different creation and circulation*, without being obscured by material forms. Their shared evolution has often hidden their fundamental differences caused by their mode of circulation – *off-line* versus *in-network*. The decisive difference lies in *the power of clearing and settlement in payments*, although many well-known textbooks about monetary economics and banking do not even contain the terms *clearing* and *settlement*.

The oldest archaeological evidence comes from the temples in Mesopotamia, which first developed immediate metal money as *a standard of weight* and then mediated (accounting) money in the third millennium BC. Weighed metal is by all accounts the embryo of money – known units of weight (such as the shekel, the talent) served as monetary units for at least two thousand years before the first coins. The weighed metal money, which regularly stamped, enabled the development of wholesale barter, but above all as a means of settlement.

Coined metal money never had such importance for the wholesale trade. Nevertheless, coins played an epochal role by introducing people across the known Antique world to coined money and its military, commercial and sacral powers. Coins remained on the pedestal of true or proper money for over two and a half millennia – they were the benchmark for representative money until the 1930s. Banknotes are the youngest and most advanced shape of non-mediated money, but have never been *the dominant means of payment*.

According to their issuers, coins and banknotes are classified as central bank money. Consequently, with their disappearance, immediate central bank money will also vanish, and retail payments will be conducted exclusively in-network.

Mediated money remains to this day the greatest monetary enigma, even though its evolution spans more than four millennia. The previously presented development of mediated money suggests that the essential reason for its enigmatic nature lies in the in-book evidence of transactions, as well as the diversity of its payment instruments and devices (from clay tablets to smartphones).

The brilliantly simple Babylonian formula – *not shift money from purse-to-purse, but from account-to-account* – functions effectively with licensed, credible and liquid intermediaries in a stable environment of trusted money issuers. When those conditions are disrupted, all clearing (internal, bilateral, multilateral, etc.) is reduced or eliminated. The logic of clearing is based on the symmetry of payments, expressed as the equation: *sent payments = received payments* in network. This symmetry of payments also characterizes immediate money, but without intermediaries.

The only money that is created and circulated within a national network, as well as on all other levels of clearing (internal, bilateral, multilateral, etc.), is central bank money, denominated in national currency. Mediated money enables the multiplication of payments in the network through overdrafts and other loans, which is *a promise of money*, i.e., *a promise of payment* in the form of bank liabilities – deposits. Seemingly, this is a process of apparent deposit and credit multiplication, which in reality represents a reflection of clearing.

Commercial banks have never accepted claims from other banks for settlement. The only settlement asset accepted by all banks has always been central bank money – immediate (until the mid-19th century) and mediated. That is why central banks are the ultimate providers of interbank settlement assets.

The central bank is the supermediator – comprehensive and universal. The unlimited clearing and settlement power of the central bank is the nuclear reactor of mediated money emission. Only thanks to such power was it possible for wholesale depositors to withdraw \$140 billion in uninsured deposits from the illiquidity-stricken Silicon Valley Bank in just two days in March 2023.

Based on available historical evidence, the most important places for the development of mediated money, chronologically, are: *Babylonia – Phoenicia – Athens – Venice – Amsterdam – London – New York – Basel*.

Immediate and mediated money have the same issuer – the central bank, but they differ in access to it – direct access (cash) and indirect access (bank accounts). Access to money determines their key attributes – *safety* for immediate money and *efficiency* for mediated money.

The drivers of the eruption in payment transactions and mediated money are clearly wholesale (commercial and financial) transactions, which have completely marginalized retail payments (see Table 1). With the dominant value of transaction accounts, household payments represent for less than 0.5% of the total transaction value – two hundred times less than corporations and financial institutions! It is evident that there is no problem of liquidity in the household sector, but only in the wholesale sectors – especially financial.

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¹ For instance: Peter Rose and Sylvia Hudgins (2005), *Bank Management and Financial Services*, Seventh Edition, McGraw – Hill; Frederic Mishkin (2007), *The Economics of Money, Banking and Financial Markets*, Eighth Edition, Pearson; or Pierre Siklos (2002), *The Changing Face of Central Banking – Evolutionary Trends Since World War II*, Cambridge University Press.

² '[T]he transactions motive – if it is a 'motive' at all, which we shall find reason to doubt. There is evidently a relation between the Transactions Motive and the function of money as a means of payment' (Hicks, p. 2)

³ 'It was not necessary that silver function as a means of payment because transactions were documented as accounting entries denominated in silver shekels;' (Peacock, p. 648).

⁴ It is one of the most important reasons why dominant seafarers and superior traders have not mint coins for a long time although they came up to them since they had originated in Lydia.

⁵ Herodotus, *The Histories*, Book 1, Chapter 94, A.D. Godley, Ed., Perseus Digital Library.

⁶ Thucydides, *The History of the Peloponnesian War*, NY: E.P. Dutton and Company, Inc., p. 78.

⁷ 'The gold and silver reserves of the Persian Empire have been estimated at as much as £43,000,000 (this is the figure of E. Meyer, confirmed by Andreades and other authorities). It was with these funds that Alexander waged his latter campaigns [...]. (When Alexander had set out a few years before to cross the Hellespont, he had less than £20,000 in his treasury!)' (Keynes, 1930b, p. 291).

⁸ This problem caused two major crises in liquidity – the first was Catiline's conspiracy in 64-63 BC, and the second in 33 AD (Andreau, p. 103-4).

⁹ Cicero's experience with buying the house on the Palatine and enormous amount of coins necessary for this tells us about this – some three and a half tons of silver coins (Harris, p. 176).

¹⁰ 'Moneychangers handled coin and bullion in large quantities and consequently had facilities for secure storage. It was natural for them to accept coin and other valuable for safekeeping' (Kohn, p. 1).

¹¹ 'Within certain of the leading commercial cities money-changers extended their activities from manual money-changing to taking deposits, and then to transferring sums from one account to another on the instructions of the depositors. [...] Only in an extraordinarily limited number of cities, such as Genoa and Venice, was there a sufficiently developed system of *banchi del giro* or *banchi di scritta* for payment to be made frequently and easily by transfer in the books of the bank' (Spufford, p. 256, 395).

¹² Their books as public records, bank transfers as a legal way to discharge debt, finality of payments, coins of equal value, licensing, equity (20,000 ducats), unlimited liability, supervision, safekeeping (strongbox in Treasury / *Camerlenghy*), etc.

¹³ 'As Contarini wrote, it did not take much to upset public trust and unleash a run. A rumor was sufficient: that there were insufficient reserves; that the banker had sustained a loss in a commercial venture; that a depositor had been seen withdrawing his money in cash; that a debtor of the bank had failed; that war was declared. Some such event was bound to occur sooner or later, he wrote, and convince panicking creditors to forgo the facility of making payments in bank and get their hands on the cash, in order to avoid a lengthy liquidation process and the risk of loss' (Mueller, p. 122).

¹⁴ 'The public policy issue was that banks provided an essential payments function: that function had to be provided somehow, by the State if need be and however reluctantly. [...] Venice created a public bank, but one that could not create credit: in fact, the possibility of creating credit was seen as dangerous. The main function was to provide payments services to merchants' (Roberds and Velde, 2014a, p. 32).

¹⁵ 'War was a major cause of bullion flows: payments to armies in the field and subsidies to allies required the movement of enormous sums of money'. (Kohn, p. 11).

¹⁶ 'At St. Quentin, Philip II and Henry II exhausted both their finance and their armies, which they were forced to disband. Peace came at Cateau-Cambresis in 1559. In the meantime, however, both monarchs had stopped servicing their debts'. (Kindleberger, 1998, p. 16).

¹⁷ 'And again, just how important were the lines of credit offered by Rialto banks to the state? "Pecunia nervus belli" is a truism and holds for all times and all places. In the case of Venice, the readiness of Rialto

banks to lend money in times of war was a crucial factor in maintaining its military strength' (Mueller, p. 426).

¹⁸ 'Bills of exchange for large amounts were to be settled exclusively through the Bank. Private bankers (cashiers) were simultaneously outlawed, though these soon returned in a secondary role. To promote confidence in the Bank, it was to accept only recognized coins at legal value, and other coins by weight only. Lending activity was prohibited' (Roberds and Velde, 2014a, p. 12).

¹⁹ 'Bank money, over and above both its intrinsic superiority to currency, and the additional value which this demand necessarily gives it, has likewise some other advantages. It is secure from fire, robbery, and other accidents; the city of Amsterdam is bound for it; it can be paid away by a simple transfer, without the trouble of counting, or the risk of transporting it from one place to another' (Adam Smith, p. 447-8).

²⁰ 'Until the innovation of milled edges in the 1660s, coins were typically clipped, sweated (or rubbed), and adulterated, as well as worn in normal use. Some passed at their nominal values; others were so deteriorated that they had to be tested and weighed before the recipient was willing to accept them' (Kindleberger, 1984, p. 22).

²¹ 'The 1821 introduction of banknote convertibility into gold and silver put Britain on a *de jure* gold standard, as recommended by the high-profile Bullion Committee of 1810, in contrast to the *de facto* gold standard that had operated before the Suspension Era' (Vuković, 2020c, p. 8).

²² 'The failed 1660s experiment of Palmstruch's private Stockholm Banco with issuing notes was an isolated incident that had no broader impact on the monetary trends of the day' (Vuković, 2020c, p. 4).

²³ 'The Semitic races, whose instincts are keenest for the essential qualities of Money, have never paid much attention to the deceptive signatures of Mints, which content the financial amateurs of the North, and have cared only for the touch and weight of the metal. It was not necessary, therefore, that talents or shekels should be minted; it was sufficient that these units should be State-created in the sense that it was the State which defined (with the right to vary its definition from time to time) *what* weight and fineness of silver would, in the eyes of the law, satisfy a debt or a customary payment expressed in talents or in shekels of silver' (Keynes, 1930a, p. 12).

²⁴ Milton Friedman and Rose Friedman (1980), *Free to choose: A personal statement*, NY: Harcourt Brace Jovanovich, p. 72-73

²⁵ 'All the operations effected on an account were entered in a register kept by the banker, the *rationes*, [...]. Secondly, a banker's register of accounts was required by law to be produced whenever a client was involved in a law-suit, even if this did not involve the banker personally'. (Andreau, p. 45-46).

²⁶ The double handling would include counting again and again as well as testing coins in the purse of bankers.

²⁷ 'Thanks to a number of papyri, we know that transfers were sometimes made from one bank to another, and we are beginning to gain a better understanding of the techniques used. A papyrus dating from the second century BC refers to a banker in Egypt with an account at one or several of his colleagues' banks. Similar examples are known in the first century BC and the first century AD'. (Andreau, p. 58).

²⁸ 'Immediately upon the conversion of the Prussian bank into the Reichsbank the transfer business of the new Bank was considerably extended through taking over the state Girobank of Hamburg, which had developed transfer transactions, as local business, almost to perfection, [...] the transfer business of its predecessor, the Prussian Bank, was almost negligible' (The Reichsbank, 1876-1909, National Monetary Commission, Document No. 408, Washington: Government Printing Office, p. 89).

²⁹ Ibid, p. 105.

³⁰ 'In time, the formal processes put in place by clearing house allowed for the introduction of multilateral netting, whereby all the banks that were short overall for the day would pay in their net position and the clearing house would pay out to each long bank. [...] Thus, the Bankers' Clearing House in London settled on a multilateral basis from 1841 onwards' (Norman et al, p. 12).

³¹ 'The New York Clearing House transactions are very extensive, as we have seen, and there is an elaborate banking system extending over all the States of the Union; [...] In France and most continental countries

the cheque and clearing system can hardly be said to exist except in some of the large towns' (Jevons, p. 338).

³² 'At last, in May of 1864, the Governor approached the Bankers' Committee through John Lubbock its Secretary, with a proposal that the Bank should "enter the clearing". Delegates met and the business was settled promptly. "Articles on the Bank" in bankers' hands were to be paid in as at present, and credited at once; the Bank, that is, was in the clearing "on one side only". Cheques on clearing bankers in the Bank's hands were to be passed through the clearing. "Transfer cheques" – that is, cheques drawn on a banker's account at the Bank – were to be considered as paid, unless they were returned on presentation" (Clapham, II, p. 251).

³³ 'In monetary matters, appearances are deceiving; the important relationships are often precisely the reverse of those that strike the eye' (Friedman and Schwartz, p. 676).

³⁴ '**Convertibility** The extent to which one currency can be freely exchanged for another' (Oxford Dictionary of Finance and Banking, Oxford University Press, 2008, p. 100).

³⁵ 'But we must never forget that all the figures in the books of a bank represent gold, and every creditor can demand the payment of the metal' (Jevons, p. 309).

³⁶ Alan Greenspan (1998), The globalization of finance, *Cato Journal*, Vol. 17, No. 3, p. 247.

³⁷ '[S]ettlement in modern-day monetary systems ultimately occurs in central bank money, so that central banks stand at the centre of the network of clearing and settlement arrangements in their currency' (Norman et al, p. 19).

³⁸ 'On 9 March, SVB lost over \$40 billion in deposits, and SVBFG management expected to lose over \$100 billion more on March 10. This deposit outflow was remarkable in terms of scale and scope when compared with other episodes of banking stress (see Box A). In response to these actual and expected deposit outflows, SVB failed on 10 March, which in turn led to the later bankruptcy of SVBFG' (BIS, 2023, p. 7).

³⁹ See: ECB (2018), Systemic liquidity concept, measurement and macroprudential instruments, *Occasional paper*, No 214, European central bank, October 2018.

⁴⁰ 'Unsurprisingly, most did not see a difference between central bank money and commercial bank money' (Kantar Public, 2022, Study on new digital payment methods, March 2022, p. 7).

⁴¹ Financial Stability Board (2023), 2023 Bank Failures – Preliminary lessons learnt for resolution, October 2023.

⁴² 'In particular, the expanded use of netting has allowed banks to substitute inside *clearinghouse money* for outside *central bank money*' (Henckel et al, p. 3).

⁴³ 'Thus systems for the binding netting of foreign exchange and other financial obligations provide a service that is a very close substitute for the function of money as a medium of exchange' (BIS, 1989, p. 6-7).