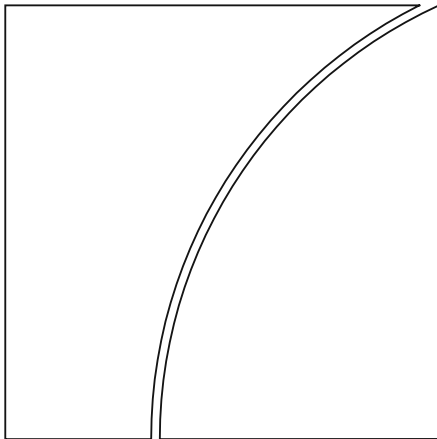




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by Iñaki Aldasoro

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Money and the architecture of trust

Iñaki Aldasoro¹

Abstract

Money is one of the most consequential social institutions humanity has built. Starting from the most elementary monetary act, a payment, this paper provides an account of how money works, grounded in the tradition of credit theories of money. It does so by tracing the tensions that define how monetary systems function: between money and credit, highlighting the inherent hierarchy of money and the critical role of par as the price that binds the hierarchy together; between the elasticity of credit and the discipline of funding; between private initiative in money creation and the public validation that ultimately sustains it; and between domestic monetary architectures and their more fragile global counterparts. The paper argues that money is not primarily a medium of exchange, a commodity or a technology. It is an institutional achievement, a system of interlocking promises sustained by trust. Trust at scale is supported by a specific architecture: hierarchical money anchored by a central bank, elastic credit disciplined by funding, and backstops that socialise the inherent fragility of a system built on promises about an unknowable future. The paper applies the framework to gold, bitcoin and stablecoins: the first two as assets that reject the social compact that money embodies, the third as private claims that seek to join it.

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Keywords: money, credit, hierarchy of money, settlement, par, elasticity, discipline, backstops, stablecoins, trust.

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1. Introduction: money as a social institution

Every society that has achieved economic complexity has done so with money at its core (Goetzmann (2016)). Money is, arguably, one of the most consequential social institutions humanity has built: it coordinates activity at scale, enables the division of labour and supports the web of commitments through which agents bind themselves to one another across time and space.

The word “social” deserves emphasis. Money is a social institution sustained by a shared expectation: that money accepted in the settlement of obligations today will also be accepted in the settlement of obligations tomorrow. This expectation is based on trust – in the stability of money and promises to pay built around it, in the system’s capacity to scale with economic activity (ie its elasticity) and in the institutional arrangements that underpin it.² Two kinds of trust are at stake. One is trust in particular promises: whether this bank or that issuer will deliver what it has promised when settlement falls due. The other is trust in the monetary system as such: whether there will be an acceptable means of settlement at all, and whether it will hold its value. The first is tested continually and is routinely broken, since individual issuers fail without the system failing. The second is tested rarely, and its failure is an event of a different order (eg hyperinflation, monetary collapse).³ Crucially, trust must operate at scale: across millions of agents, most of whom will never interact directly with one another. Achieving trust at scale is what distinguishes a functioning monetary system from a network of bilateral credit relationships. It is also what the architecture described in this paper is meant to deliver. When that trust holds, money recedes into the background and economic life proceeds smoothly. When it fails, the very foundations of the social order can be called into question.

Two claims follow from this perspective, which this paper develops at length.

The first is the centrality of money. The notion that money is a veil that masks an underlying real world of commodity production and that exchange is ubiquitous and deep-rooted.⁴ But money is not a veil. It is the essential substance of a world of interlocking promises to pay. The economy as we actually observe it, in cash flows, money prices and balance sheets, is a monetary economy, and the “real” categories

² Trust is conceived here as a warranted expectation grounded in institutions: the parties to a payment need not know one another, and they do not need to believe anything in particular about one another. The point of the architecture described below is precisely to economise on the interpersonal kind of trust by making the expectation of settlement impersonal and general. A reader who prefers to reserve the word for the interpersonal case may read what follows as an account of the arrangements that make such trust unnecessary; nothing in the argument turns on the word.

³ Much of what follows describes an architecture built so that failures of the first kind do not become failures of the second. It also explains where the system’s elasticity comes from: from trust in the promises, not from trust in money as such, which is what ultimately constrains it.

⁴ The metaphor is old: money is “the oil which renders the motion of the wheels more smooth and easy” (Hume (1752)), and for Mill (1848) there “cannot, in short, be intrinsically a more insignificant thing, in the economy of society, than money; except in the character of a contrivance for sparing time and labour”. Pigou (1949) gave the idea its enduring name. Its modern form is the classical dichotomy taught to every undergraduate (Mankiw (2022)) and restated by Lucas (1996). What is at issue here is not the empirical proposition that money is neutral in the long run, but the analytical priority the framing assumes: that there is a real economy to be described first, to which monetary magnitudes are then added. This is what Schumpeter (1954) called real analysis, as opposed to monetary analysis; see also Appendix A.

of standard theory are derived from monetary magnitudes, not the other way round. Tokenisation is much discussed at present (BIS (2023; 2025; 2026)), and in a sense one could think about money as the original tokenisation: the representation in transferable form of the credit and debt relationships that bind economic agents together through the financial commitments they make to one another.

The second is the emphasis on payment and settlement. Money is first and foremost a means of settlement. It is what one delivers in order to extinguish an obligation, to discharge a debt. This is not the same as saying money is a medium of exchange, and the distinction matters more than it might first appear. Exchange is one context in which settlement occurs, but settlement is the deeper concept.⁵

Focusing on settlement rather than exchange opens the door to a richer understanding of what money is and how monetary systems actually work. It reveals that money and credit are qualitatively different things (money settles, credit promises) and that this distinction gives rise to an inherent hierarchy, in which what counts as money and what counts as credit depends on where they sit in that hierarchy. It reveals that the critical price in the system is not the price level (ie the price of goods in terms of money) but par – the price at which a bank deposit converts into cash or central bank reserves. Most of us never think about par, which is the point: It is unity and it must stay like that for the system to work. It is the price whose constancy allows all the others to be discussed at all. Finally, focusing on settlement reveals that the system’s capacity to expand and contract as well as the backstops that prevent contraction from becoming catastrophic are not incidental features but the necessary architecture of trust at scale.

The paper develops these ideas by starting from the most elementary monetary act, a single payment, and following its logic outward through a series of tensions whose balance determines how the system behaves.⁶ The first is the tension between money and credit: the qualitative distinction between means of settlement and promises to pay that delay settlement, and the hierarchical arrangement of promises to pay that emerges from this distinction (section 2). The second is between elasticity and discipline: the system’s capacity to expand credit, and the forces that constrain

⁵ This is also why the paper is not organised around the conventional trio of medium of exchange, unit of account and store of value. There are obvious objections to the third. Hicks (1989) notes that the store of value “is no distinguishing property of money as such”, so one is left with “two distinguishing functions of money: standard of value and medium of payment”, of which the second implies the first, since “money as means of payment implies money as a standard”. Awrey (2024) observes that the functions of money as a unit of account and a store of value “are neither necessary nor sufficient conditions for an asset to qualify as money”. Borio (2019) argues that the function is not unimportant (“far from it”) but that it is intrinsic rather than independent: “any asset, financial and real, is a store of value”, and, “more importantly, a viable means of payment must also be a store of value. So, there is no need to refer to this function explicitly.” The store-of-value function is most relevant in discussions about the price level and expectations about its stability, an issue taken up in the next section.

⁶ This is not a paper about the history of money. Interested readers have plenty to choose from in this space in addition to work cited later, including wide-ranging academic endeavours such as Graeber (2011), Desan (2014), Goetzmann (2016) or Aglietta (2018) (not to mention classics such as Keynes (1930), Schumpeter (1954) and several others); work on the politics of money such as Eich (2022) or Kapadia (2024); wonderful popular books about money such as Martin (2013) or McWilliams (2024); or recent work such as Eichengreen (2026) and Greeley (2026). Some of the arguments developed here also have points of contact with recent books by Pantelopoulous (2025) and Mason and Jayadev (2026).

that expansion that are ultimately grounded in the scarcity of money one level up in the hierarchy (section 3). The third is between private initiative and public validation: the recurrent pattern by which private agents create money-like claims that eventually require endorsement and backstopping from the authorities at the top of the hierarchy (section 4). The fourth is between domestic and global money: the replication of these tensions at the international level, but with weaker institutions and greater asymmetry (section 5). The paper then applies the framework to gold, bitcoin and stablecoins, which test the architecture from different directions: gold and bitcoin as assets that reject the social compact money embodies, stablecoins as private money-like claims that seek to join it (section 6).

The paper draws on a credit theory of money tradition with deep roots, from Thornton, Bagehot, MacLeod and Hawtrey through Mitchell-Innes and Schumpeter to Minsky and Mehrling, and engages with work in economic sociology, law and central banking.⁷ The central claim is that what makes money work is not a property of the instrument but the architecture that sustains it. The overall ambition in turn is to articulate, as clearly and as systematically as possible, what money is, how the monetary system works and why this matters for evaluating proposals to change it.

2. Money versus credit

Payment and the survival constraint

Every day, across every economy in the world, millions of agents face the same elemental requirement: they must pay what they owe.⁸ A firm must pay its suppliers. A household must pay for groceries and service its mortgage. A commercial bank must settle its positions vis-a-vis other banks across accounts at the central bank. This requirement, what Minsky (1954) calls the “survival constraint”, is not an abstraction or a modelling simplification. It is the discipline that holds a decentralised market economy together, day in and day out.⁹

Consider what happens at the moment of payment, when one agent transfers money (in modern conditions, a claim on someone else) to another agent in settlement of a maturing obligation.¹⁰ Because one agent’s inflow is always another’s

⁷ For a brief review of alternative frameworks in monetary thought, including chartalism, the legal scholarship on money, and the search-theoretic tradition, see Appendix A. A broader comparative assessment of theories of money is beyond the scope of the paper.

⁸ The analysis takes as given obligations denominated in a unit of account and asks what it takes to settle them at scale. For origins, see Ingham (2004), Graeber (2011) and Desan (2014), among others.

⁹ The paper uses “survival constraint” and “settlement constraint” interchangeably. Minsky’s term emphasises the consequence of failing to meet the requirement; the other emphasises the act by which it is met.

¹⁰ To be sure, not every obligation is discharged in money. Companies acquire other companies by issuing their own shares; agents barter; debts are settled in kind. Such transactions extinguish obligations but do so by bilateral agreement on a particular object rather than by delivery of a generally accepted means of settlement. The argument here concerns the latter, which is what makes settlement possible between parties who have agreed on nothing beyond the amount owed. Setoff and netting are a different matter: there the obligations are money obligations, and only the residual

outflow, the books net to zero across the system. This guarantees that at any moment some agents run deficits and others surpluses. For any individual there is no reason that inflows should match, let alone exceed, outflows at the moment settlement falls due. So what are the options available to the payer? When the money balances they have accumulated are insufficient to cover a deficit at settlement, they face a choice: borrow (including refinancing), liquidate assets or default. Borrowing means acquiring a means of payment from a counterparty with a temporary surplus (or who can otherwise create the means of payment) in exchange for a promise to pay at some future date, thereby pushing settlement into the future. Liquidation means selling an asset for a means of payment, pulling settlement from the future into the present. Default means failing to pay, with all the consequences that cascade outward when one agent's failure becomes another agent's unforeseen deficit.

The discipline of eventual settlement is therefore in the mind of anyone who issues promises to pay, and equally of anyone who accepts those promises and depends on their fulfilment to meet their own promises. When the promise is made, both sides understand that the future is uncertain and that the inflows that the issuer is counting on may fall short of the outflows already committed. This awareness, the shadow of the survival constraint stretching forward in time, shapes behaviour from the moment a promise is made: "every market transaction creates a debt, a payment commitment, a promise to deliver money" (Neilson (2019)).

The discipline of settlement also brings to the fore the importance of *liquidity*. Conventional accounting pushes the timing of inflows and outflows into the background and trains attention on net worth, the gap between the assessed value of assets and liabilities. The accent falls on solvency rather than liquidity. But from the perspective developed here, this emphasis can be misleading because what the survival constraint is testing at the moment it binds is liquidity, not solvency. In other words, liquidity is a market reality rather than an accounting convention. An agent can be solvent, in the sense that the assessed value of its assets exceeds the assessed value of its liabilities, and yet be unable to meet the settlement constraint because those assets cannot be converted into cash at the required moment. The conventional focus on solvency takes liquidity for granted rather than explaining it (ie "a solvent actor can make payment only if liquidity is assumed" (Neilson (2019))), and in doing so obscures a risk that is logically prior to it.¹¹

Money settles, credit promises

A fundamental distinction emerges from the logic of payment. Money is a means of settlement: it extinguishes an obligation when settlement is due. Credit is a promise to pay money: it delays settlement. The two are qualitatively different. Credit is a promise; money is what you deliver when the promise comes due.¹² In this precise

is delivered. That practice is not a qualification of my argument, but evidence for it (for reasons taken up in section 2.3).

¹¹ The point is about analytical priority. Solvency and liquidity are of course connected: the willingness of others to supply liquidity is itself a judgment about solvency, and an agent with assured access to liquidity faces no effective solvency constraint at all. But the connection runs through the market's willingness to lend.

¹² In the words of Hawtrey (1919), "finance is the art of providing the means of payment".

sense, money is better than credit, especially during crises, when promises are tested and the distinction between the two reasserts itself with force.

I emphasised “social” at the outset because this distinction is sustained by a shared convention: the expectation that money accepted in settlement today will also be accepted in settlement tomorrow. This convention does not arise from the physical properties of whatever serves as money. It arises from the institutional arrangements that make money credible as a means of final settlement. As Mitchell-Innes (1913; 1914) argued over a century ago, a dollar or a pound is simply an acknowledgment of debt, and the act of payment is the exchange of one obligation for another of a different kind. Ingham (2004) develops the insight at length, treating money itself as a social relation: “a claim or credit that is constituted by social relations that exist independently of the production and exchange of commodities”. Money is ultimately about trust, and the institutional arrangements that sustain trust are what make the monetary system possible (Borio (2019)).¹³ When trust holds, the distinction between money and credit recedes into the background: when credit is easy, money is barely needed, because promises circulate as freely as the thing they promise. When trust breaks, the distinction reasserts itself violently: when everyone wants money, no one’s promise will serve instead.¹⁴

But if money is a means of settlement and credit is a promise to pay money, the question immediately arises: which money? There is more than one, and payer and payee must agree on which of them will do. The answer depends on who you are and who you are paying.

The hierarchy of money

Suppose a creditor is owed a payment. What the creditor wants is something that *they* can use to settle *their own* obligations, which means the debtor must deliver something that the creditor’s own creditors will also accept. The means of settlement taking this form (ie a claim on someone) is a feature of the arrangements we have rather than a definition of money, a point taken up in section 6. Because not all promises are created equal, if we follow this chain upward, we arrive at a layered system in which promises to pay are arranged hierarchically, with the most widely accepted means of settlement at the top and progressively more contingent promises below.

This is the inherent hierarchy of money (Mehrling (2013)). The hierarchy is not imposed by decree; it is an emergent property of the logic of payment itself.¹⁵ At the apex in any modern economy stand the liabilities of the central bank (reserves and

¹³ It is not a coincidence that the etymology of credit traces back to the Latin verb *credere*, meaning “to believe, to trust, to entrust.” The relevant past participle is *creditum* (“something entrusted, a loan”) and from there the noun *creditum* came to mean a thing lent on trust. The accounting pairing with “debit” preserves a neat underlying logic: debit is from *debere* – what is owed versus what is entrusted. In this sense, Martin (2013) argues that money is at the root transferable credit, ie socially recorded trust about what is owed.

¹⁴ A related result appears in the new monetarist literature, where models with both money and credit show that the two are substitutes in equilibrium. See Gu et al (2013).

¹⁵ As discussed in section 6, developments in the crypto space, where hierarchical structures keep arising despite the founding ideology of decentralisation, are testament to this.

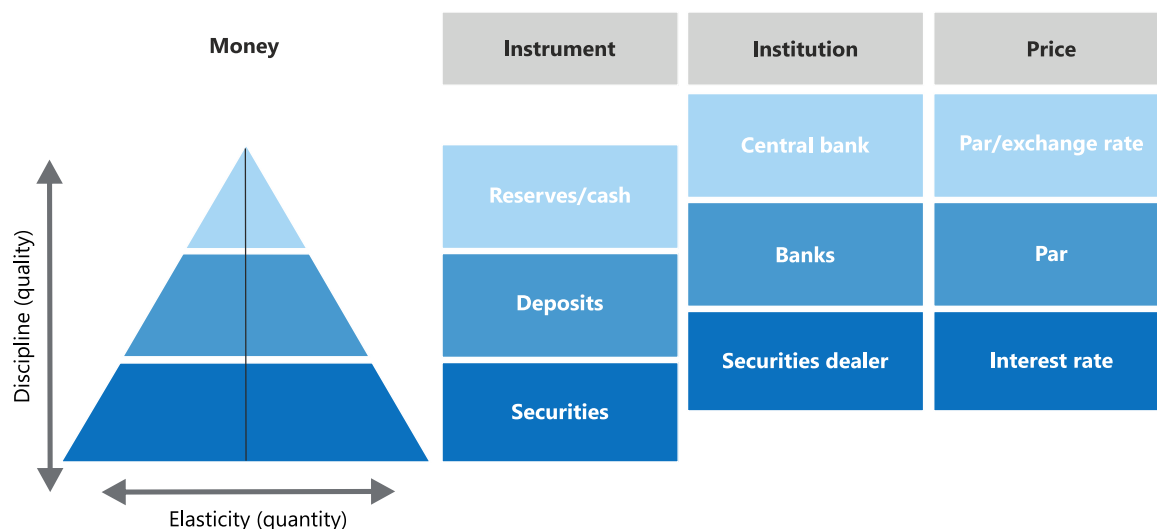
cash), which are the ultimate means of settlement for the banking system and, through cash, for all of us.¹⁶ One level below sit bank deposits: money for the public, but merely credit for the banking system. Further down are securities, promises to pay deposits over some time horizon, further removed from the ultimate means of payment. And below those, further layers of increasingly contingent promises to pay.

What is money and what is credit thus depend on the level of the hierarchy at which they sit (Graph 1). At each level, the liabilities of the layer above serve as the means of settlement, and the liabilities of their own layer are promises to pay in that higher-level money. Of course, this is a stylised representation; reality is considerably more granular and complex, with finer distinctions even within these broad categories. Deposits differ by their insurance coverage, securities differ by maturity and rating, and diverse deposit-like claims such as money market fund shares occupy intermediate positions (Pozsar (2014)).

The monetary economy is therefore a web of interlocking balance sheets reflecting promises to pay, removed to different degrees from the ultimate form of money. From a system’s perspective, the liabilities of any agent are someone else’s asset. What binds these balance sheets together is precisely the commitment to settle, to convert promises into payment when the time comes. The ultimate form of money is the anchor of trust that sustains this web of promises.

A stylised representation of the monetary hierarchy

Graph 1



Source: Aldasoro, Mehrling and Neilson (2023).

A corollary of the discussion so far deserves emphasis because it bears on discussions I return to later: payment systems are effectively credit systems. They are

¹⁶ Bindseil (2019) defines central bank money in similar terms: financial money of the highest attainable liquidity and credit quality, accepted in settlement of any other financial claim and used on a significant scale as a means of payment. What that definition leaves implicit, and what the rest of this section makes explicit, is that the quality in question is conferred by position in the hierarchy rather than by any property of the instrument.

so in two fundamental senses. First, the routine mechanism by which agents meet the settlement constraint is credit: when outflows exceed inflows, the go-to option is to borrow, acquiring means of payment in exchange for a promise to pay later. Without this continuous extension of credit, the payment system would seize up almost immediately. Second, the instruments being transferred in payment are themselves credit claims. Credit is both the fuel that enables agents to pay and the substance of what they pay with. It follows that the institutions at the core of the system must be credit institutions: banks do not merely process payments through a neutral pipe; they create the very instruments used for payment, and they supply the credit that allows participants to meet their settlement commitments, ie their survival constraint. The payment function and the credit function are not performed by two systems that happen to coexist. They are two aspects of one system, carried out by the same institutions on the same balance sheets.

To say that money is the means of settlement does not imply that most obligations are met by handing over money. From the medieval fair to the village ledger to the modern clearing house, the great bulk of obligations have been extinguished by offset: claims are set against counter claims, and only the residual is settled, often by carrying it forward as a new credit. This is not counter to the argument I am developing: agents net because the means of settlement are scarce and costly to hold, and netting arrangements are a device for economising on them.¹⁷ A means of settlement that nobody ever had to deliver would discipline nobody, and the elaborate machinery built to avoid delivering it is the best evidence of what delivering it costs.

Par

The hierarchy would be of limited practical use if the different layers did not connect to one another at a reliable price. Mehrling (2020) identifies four prices of money, each governing an interface at which money meets something else: par, the interest rate, the exchange rate and the price level.¹⁸ Of these four, standard monetary theory places almost all emphasis on the price level, treating the determination of general prices as the central question of monetary economics.¹⁹ In the perspective developed here, the most fundamental price is par.

Par is the price of bank deposits in terms of central bank money and is, by definition, unity.²⁰ It is what allows a restaurant to accept a card payment without asking about the issuing bank's portfolio. It is what allows an exporter to ship goods

¹⁷ Such netting arrangements typically operate *within* layers of the hierarchy.

¹⁸ The four connect different things. Par, the interest rate and the exchange rate are rates at which one monetary claim converts into another; the price level is the rate at which money converts into goods.

¹⁹ This is where the store-of-value function of the conventional triad belongs. What that function tracks is not a property of any particular instrument but the stability of the unit of account against a prescribed bundle of goods and services: the price level, and hence the conduct of monetary policy and the expectations that surround it (section 4).

²⁰ The promise is tested overwhelmingly through transfer rather than through withdrawal: what the deposit holder routinely demands is that the balance move to another institution at face value, and settlement in central bank money between those institutions makes this possible. Limits on large cash withdrawals are a matter of anti-money laundering rules rather than of any inability to convert.

without wondering whether the importer's bank will still be standing when the invoice falls due. Par socialises trust, leaving individual transactions free from the burden of bilateral investigation (Box A relates this to the influential view that money circulates "with no questions asked").

But par is not an intrinsic property of any form of money. It is a hard-won achievement, sustained daily by institutional arrangements and market practice, and ultimately by the willingness and capacity of the central bank to act. Diverse mechanisms underpin it: prudential regulation, deposit insurance, access to wholesale money markets and the central bank's readiness to lend against good collateral in stress. When these mechanisms function, par holds and the hierarchy operates smoothly, with fluctuations in demand between different forms of money showing up as changes in quantities (eg expansion and contraction of reserves relative to deposits) rather than changes in price. When they fail, par breaks, and with it the convention of trust on which the entire system rests. Defending par is not the same as rescuing banks. A bank may fail (and in a well-functioning system, some must) while par is defended throughout, provided its monetary liabilities are honoured through deposit insurance, resolution or transfer to another institution. The commitment is to the price, not to the issuer, and the authorities' willingness to let an institution go is as much part of the arrangement as their capacity to lend (section 4).

Par is so fundamental that pressure on it usually shows up as a default rather than as a visible deviation from parity. A bank that cannot honour the promise to convert deposits into central bank money at par does not typically offer 99 cents on the dollar; it fails.²¹ Par has no neighbourhood. There is no stable resting place slightly below it, which is why a price that never moves is nonetheless the price that matters most. This is precisely why par can seem invisible in normal times and catastrophic when it breaks. History is rich with episodes revealing this fragility. During the wildcat banking era in the United States, banknotes that traded at small discounts when far from their home territory appeared harmless until a shock hit confidence. Then discounts widened, merchants refused unfamiliar notes, and commerce stalled. What had looked like a tolerable approximation to par proved fragile.²² The lesson, repeated throughout history, is that par tolerates very little doubt. Suspicion that a claim might not clear at par can be enough to unravel the arrangement, even where the suspicion is unwarranted.

²¹ The reason is that a discount on a bank's deposits is not a price at which anyone wishes to transact. A depositor offered 99 cents learns two things at once: that the bank cannot pay in full and that waiting is unlikely to improve things. The rational response is to demand the whole amount immediately (ie run). A quoted discount is therefore self-defeating: the moment it appears it generates the withdrawals that widen it.

²² Par was policed privately before it was policed publicly. The Suffolk Bank in New England from the 1820s, and later the urban clearing houses, required member banks to hold balances and settle regularly and could exclude those that did not; notes circulated at par within those networks and at a discount outside them (Rolnick et al (2000); Gorton and Mullineaux (1987)). Par has thus followed the pattern described in section 4: private practice first, public support later.

Settlement versus exchange

The architecture described in the main text, of hierarchy anchored by par and sustained by specific institutional arrangements, has a consequence that is worth making explicit, because it bears on how one thinks about the nature and design of money.

Recent influential literature proposes that the defining quality of money is that it is accepted “with no questions asked”: money is an informationally insensitive asset that passes from hand to hand without the receiver needing to investigate its pedigree (Holmström (2015); Gorton and Metrick (2012)). The idea captures something real. When money is working well, no one scrutinises it. But this property is grounded in the act of exchange (money is handed over and the recipient does not inspect it) and it is best understood as a consequence of the architecture, not its foundation. The recipient of a payment does not ask questions because a specific institutional apparatus (hierarchy, par, backstops) has made it credible that the claim will settle at face value against the ultimate means of payment. Take away the architecture, remove deposit insurance, suspend lender of last resort facilities, let par break, and questions will be asked very quickly indeed. Informational insensitivity is an outcome of the system, not a primitive attribute of money.

A related point concerns the concept of the singleness of money. The idea traces its roots to discussions of “singleness of the currency” (Padoa-Schioppa (2004); Committee on Payment and Settlement Systems (2003)) in the context of European monetary unification. More recent iterations, which have gained prominence in policy discussions of digital money and payment innovation, picked up the theme to define singleness as the idea that all forms of money in an economy should trade at par and share a common unit of account (Garraff and Shin (2023); Hemingway (2026)). The concept captures something important about the vertical dimension of the monetary system. But singleness, when presented as a standalone attribute, can obscure the deeper point that monetary systems are hierarchical. Singleness is par, and par is a price sustained by the hierarchy, the discipline of settlement and the backstops that support it. The symptom is singleness, but the mechanism is the architecture, and this paper is concerned with the latter.

Market-making and the prices of money

Par is the most fundamental of the four prices of money, but the other three complete the picture.²³ Moving down the hierarchy, the interest rate is the price of future money in terms of present money, the price at which securities (promises to pay deposits over time) convert into deposits today. Moving up, the exchange rate is the price of one jurisdiction’s money in terms of another’s. And the price level is the price of a particular weighted bundle of goods and services in terms of money. Together, these four prices render qualitatively distinct things commensurable in money (Mehrling (2020)).

These prices do not quote themselves. At every interface someone must stand ready to buy and sell, absorbing any resulting imbalance onto their own balance sheet. This is the dealer function, understood as market-making in a broad sense (Treyner (1987)). Banks are the key dealers in the system: they stand between central bank money and deposit money and undertake to convert one into the other at par, on demand – they can be conceived of as dealers in money (Neilson (2019)). Security

²³ See P Mehrling, “[The four prices of money](#)”, Boston University Global Development Policy Centre, for further elaboration of these issues.

dealers occupy the interface between deposits and promises to pay deposits over time.²⁴ Foreign exchange (FX) dealers occupy the interface between one jurisdiction's money and another's. In each case, the same function is performed at a different boundary. As Hicks (1989) recognises, a competitive multilateral system depends on the activity of intermediaries who are ready to buy and sell. And once multilateral trading is in play, there is immediately a question of trust, because the introduction of a third party brings with it the possibility that a promise may not be honoured. Markets are not liquid of their own accord: someone must stand ready to make them, for a price.²⁵

This institutional structure is the mechanism through which the hierarchy is made operational. Without someone willing to quote prices and make a market by taking the other side, the hierarchy would be a set of nested promises with no liquid interface between them. And because the capacity to hold inventory depends in turn on access to funding, the liquidity of markets and the liquidity of balance sheets are not independent (Brunnermeier and Pedersen (2009)). The interaction between the two governs behaviour under stress. The hierarchy of money is also, in practice, a hierarchy of dealers, and of the prices they make (Mehrling (2013)).

The section that follows turns to the dynamics of this hierarchy, its capacity to expand and contract and the forces that govern that process. Money is a means of settlement. Credit is a promise to pay money. The distinction between the two generates a hierarchy. Par holds that hierarchy together, dealers keep its interfaces liquid, and the central bank anchors the level of interest rates. Everything else in the monetary system, from elasticity and discipline to backstops and global money, builds on this foundation.

3. Elasticity versus discipline

The hierarchy of money described in the previous section is not a rigid architecture. It breathes. It expands and contracts, mostly gradually, but sometimes violently. Thinking of money in hierarchical terms illuminates a second fundamental tension in the monetary system: that between the elasticity of credit and the discipline of funding. One relates to the *horizontal* dimension of the hierarchy in Graph 1 (ie within a layer), the other to the *vertical* dimension (ie across layers); one is about the *quantity* of credit, the other about its *quality*.²⁶

²⁴ This does not mean of course that dealers set the *level* of interest rates. In modern economies the central bank sets the reference short-term rate, exploiting its monopoly over the interbank settlement medium, and the structure of rates is built outward from there (Borio (1997)).

²⁵ As Martin (2013) puts it, the insight of Bagehot (1873), and of Thornton (1802) before him, was the recognition of the importance of liquidity as a distinct property of credit, "the property which makes it money when it exists, and inert bilateral credit when it does not".

²⁶ This section draws on Mehrling (2020) and Aldasoro, Mehrling and Neilson (2023).

Flux and reflux: creating money and funding it

Within each layer of the hierarchy, agents can expand the quantity of credit. The most consequential instance of this is what happens when a bank makes a loan. The bank does not lend out pre-existing deposits (McLeay et al (2014)). Rather, it simultaneously creates a new asset on its balance sheet (the loan) and a new liability (the deposit credited to the borrower). This is the creation of new purchasing power: the borrower can spend without having first saved and without anyone else having to relinquish their own prior saving (Schumpeter (1954)).²⁷ This is “flux”: an endogenous expansion of both money and credit, in which the bank and its borrower simultaneously issue liabilities to one another (Mehrling (2020)). It is what gives the system its elasticity,²⁸ and banks are the key gatekeepers to this privilege, deciding who gets credit and on what terms (see Box B).

Across layers of the hierarchy, differentiation in the quality of credit matters.²⁹ The moneyiness of the various types of credit is either taken for granted or questioned. Through this vertical dimension, expansions of the system are periods when the liabilities issued across adjacent layers of the system are treated as close substitutes. In turn, contractions are defined by differentiation in the claims to moneyiness of various instruments: agents no longer assume substitutability, and the hierarchy of money reasserts itself. This is what provides ultimate discipline to the system.

More immediately, however, something must prevent the system from simply expanding without limit as a matter of everyday practice. In other words, something must discipline the flux. “Reflux” is the endogenous contraction of money and credit that answers the flux. The initial expansion of credit through flux gives way to a subsequent contraction, or more precisely a reallocation, through reflux.

The mechanism driving reflux is the portfolio preference of those who end up holding the newly created money balances. Do they want to hold the new deposits, or would they prefer something else? If they prefer something else, what follows depends on what they buy. Buying a bond from another non-bank extinguishes nothing: the deposit simply changes hands, and the holder who wanted less money has passed it to someone who wanted more, at a price. That price is where the discipline lives.³⁰ Portfolio shifts out of deposits bid up the price of whatever is bought and push up the yield the banking system must offer to keep its own liabilities held, and this repricing, rather than any mechanical disappearance of balances, transmits the constraint. Deposits are extinguished when a borrower repays a loan (retiring the

²⁷ Access to this ability is naturally contested, which is why the attempt to create new forms of money recurs in every era, a theme taken up in section 6.

²⁸ The elastic creation of money by means of readily transferable debt is the essence of capitalism (Ingham (2004)).

²⁹ At any given level of the hierarchy, agents cannot unilaterally increase the quantity of what counts as money one level above. Banks can create deposits, but they cannot create central bank reserves. Firms can issue commercial paper, but they cannot create bank deposits.

³⁰ This is a core insight from the 19th century Banking School (Tooke (1844); Fullarton (1845)): market forces discipline the creation of credit. It is not the physical scarcity of some underlying commodity that constrains the system. It is the cost of pushing settlement into the future that persuades holders of reserves to lend or buy, and that imposes discipline on those who would borrow or issue. In other words, the system is disciplined via price (the interest rate).

asset and liability together) and when a holder exchanges deposits for a non-monetary liability of a bank, which shrinks the money supply while leaving the balance sheet intact. Reflux, properly understood, is the process by which the banking system discovers what its expansion costs and contracts when the cost is too high.³¹

This is not a minor technical point. It marks the line between payment and funding: the elasticity of flux determines how a borrower comes by the means to settle, while the discipline of reflux determines whether the credit thus created is ultimately held rather than merely issued. The first is initial finance, the second is final finance (Graziani (2003)). The bank creates purchasing power in the act of lending, but the question is then whether wealth holders will willingly absorb it into their portfolios. If they do, the credit is funded and the expansion is sustained. If they do not, the credit must be refinanced or retired.

This pattern is not confined to recent decades. A central characteristic of capitalism is that its financial system continuously devises new forms of credit instruments, and when authorities attempt to regulate any particular form, the private financial system creates new ones not covered by existing regulation (Ingham (2004)). If a scarcity of one kind of money were imposed, financial innovators would simply invent new kinds of money or new ways to exchange money more quickly (Neilson (2019)). The system's elasticity is not confined to the traditional banking channel; it finds expression through whatever institutional form is available.

The fact that deposits were created without requiring prior saving ("out of thin air", as the rather unhappy popular expression would have it) does not imply they are unbacked: the loan is the asset that stands behind them.

³¹ The general equilibrium point is that the banking system as a whole cannot rid itself of deposits by any action of depositors alone. Something must induce banks to shrink their balance sheets, and that something is the price at which banks can fund themselves.

What makes banks special?

Banks occupy a unique position in the monetary system. They are not merely financial intermediaries that channel funds from savers to borrowers. They are issuers of liabilities that circulate as means of payment, and this distinguishes them from every other type of financial institution. The architecture described in the main text, of a hierarchy anchored by par and sustained by specific institutional arrangements, has a consequence that is worth making explicit, because it bears on how one thinks about the nature and design of money.

The distinction is a social fact, not merely a legal or regulatory one (and to be sure, these differ across countries and over time, an issue I abstract from). An economy's allocation to bank-issued assets is not determined at the individual margin but by social norms and network effects (Sissoko (2025)). People hold transaction deposits first and foremost because deposits are what everyone else accepts in payment. Usage begets acceptance, acceptance begets wider usage, and the feedback loop delivers the scale that makes the modern payment system efficient.

A banking system can be seen as the institutionalisation of the naked shorting of the unit of account (Sissoko (2021)). A naked short creates a phantom supply of the shorted object that disappears when the short is closed out. Banks do precisely this when they accept private debt and issue their own liabilities in return: they create a phantom supply of the unit of account in the form of deposits, a supply that expands when loans are made and contracts when they are repaid. The metaphor is apt because it captures both the alchemy of banking (ie the ability to generate means of payment that did not previously exist) and its inherent fragility, since the phantom supply is sustainable only as long as confidence in the issuer holds and, critically, as long as the claims made today against an unknowable future are validated tomorrow.

If what makes banks special is this attribute of their liabilities, an important question follows: is the attribute confined to traditional deposits, or does it extend to other instruments? Much discussion in recent decades has centred on the rise of so-called market-based finance or shadow banking, and on the apparent disintermediation of traditional banks (Pozsar et al (2010); Adrian and Jones (2018)). From this paper's perspective, banks have been disintermediated only nominally. What has happened is that the form of bank liabilities functioning as money has shifted, from traditional retail deposits into wholesale funding, off-balance sheet commitments and money-like instruments such as repo and commercial paper (Sissoko (2025)). Shadow banking, in this reading, is not the growth of a market-based alternative to banking. It is an extension of banking itself (Acharya et al (2024); Mehrling et al (2013)), a multiplication of the types of bank liabilities (and bank-adjacent liabilities) that the economy is willing to treat as money. Under this view, the structure of banking sector liabilities adjusts to meet the portfolio and liquidity preferences of the non-bank sector. These preferences are a function of many variables (including policy rates and returns on other assets, risk aversion, the general state of the economy, etc), and they can shift under stress – which is when the hierarchy of money is most useful for locating the pressure points. (These considerations are relevant of course for new, digitally driven forms of shadow banking.)

Boom and bust: the inherent instability of credit

The interplay between elasticity and discipline is not just a mechanism that operates at a point in time. It plays out dynamically, over time, in the form of credit cycles.

During a boom, the hierarchy flattens. Credit expands at every level. Liabilities that in normal times would be scrutinised against the layer above are instead treated as close substitutes: promises are taken at face value and those of weaker borrowers are accepted almost as readily as those of stronger ones. Agents economise on reserves, stretching liquidity across an ever-wider set of commitments. As Neilson (2019) describes, over the course of a boom more and more position-making becomes dependent on a smaller and smaller base of underlying cash, and the

distinction between cash and a promise to pay cash becomes blurred – *layering* in the words of Minsky. The effects of this layering are not immediately visible. When the survival constraint does not bind too tightly for too many, a promise to pay is as good as payment itself.

The downside shows up only when the boom comes to its end. The survival constraint begins to close in. Agents who must find cash to settle their maturing obligations turn to their usual sources, only to find that the cash has been pledged repeatedly as the hierarchy stretched during the expansion. The distinction between money and credit, which had faded during the boom, reasserts itself with force. Differentiation in the quality of claims along the hierarchy reappears. This is what provides discipline to the system, but the discipline, when it arrives after a period of excess, can be brutal. Weaker claims lose their moneyness. Agents who cannot settle are forced into default. And because one agent's failure is another agent's unforeseen deficit, the contraction can cascade (Kindleberger (1978)).

This is what Hawtrey (1932) calls the "inherent instability of credit". It is neither a pathology nor a market failure in the conventional sense, but rather the natural consequence of a system that creates purchasing power through promises about an unknowable future. The boom is about elasticity: the system's capacity to expand to meet the demands of trade, investment and speculation. The bust is about discipline: the reassertion of the hierarchy, as the question of who can actually pay separates the solvent from the insolvent and, more immediately and importantly, the liquid from the illiquid. A crisis arises out of the normal functioning of the system: it is not a moment when the rules cease to apply but when the underlying structure is most clearly exposed as it unravels (Neilson (2019); Minsky (1982; 1986)).

Elasticity is what the system is for, and it is also what the system must be protected against. The exposures that make a contraction painful are accumulated on the way up: a system with "excess elasticity" (Borio (2014)) finances activity that no sober assessment would have financed and misprices risk while the mispricing is still invisible. That accumulation is not self-limiting: a bank that underprices risk wins market share, and its better-managed peers must follow it or withdraw (Sissoko (2016)). The bust then reveals what the boom built. Constraints on expansion, such as capital and liquidity requirements and supervisory judgment, therefore belong in this account alongside the mechanisms that arrest a contraction once it has begun.

The inherent instability of credit raises an immediate question: what prevents the bust from being fatal? If the hierarchy can steepen so violently that the entire payment system freezes (and history shows that it can), there must be some mechanism for halting the cascade before it destroys the web of promises on which economic life depends. That mechanism is the subject of the next section. It involves the tension between the private creation of money-like claims and the public authority that ultimately stands behind them.

4. Private initiative versus public validation

The previous section ended with a cascade. When the hierarchy steepens, when the distinction between money and credit reasserts itself and agents scramble for means of settlement they cannot find, the payment system itself comes under threat. Minsky

called the activity of assembling the means to meet one's obligations as they fall due "position-making" – the daily business of arranging to be able to pay. In ordinary times an agent who cannot make position has a problem of their own. In a crisis the difficulty changes character. The trouble is no longer that a particular agent cannot arrange to pay, but that no one can be confident that arranging to pay is possible at all (Neilson (2019)). What halts the cascade? And what does the answer tell us about the relationship between private money creation and public authority?

Backstops

The immediate answer is that someone at a higher level of the hierarchy steps in to supply money elastically when the survival constraint binds. This is the lender of last resort function: the central bank's willingness to lend freely against good collateral when private sources of funding have dried up (Bagehot (1873)). In its more modern form, developed under fire during the Great Financial Crisis (GFC) of 2008–09 and validated during the market dislocations of March 2020, the function extends beyond lending to outright purchases of assets in distressed markets, what has been termed the "dealer of last resort" (Mehrling (2011)) or "market-maker of last resort" (Hauser (2021)).

The logic of backstops is straightforward once one takes the hierarchy seriously. At each level, the layer above has a capacity that the layer below does not: the ability to create, at its discretion, the means of settlement for the layer below. Commercial banks can create deposits but not central bank reserves. Central banks can create reserves but not, in the international system, the key currency liabilities that serve as global means of settlement. The backstop works because it mobilises this asymmetry. When the central bank lends reserves to a bank that cannot obtain them in the market, it is using its unique position at the apex of the domestic hierarchy to loosen a survival constraint that the private system, left to itself, cannot loosen. As Neilson puts it, the central bank is the issuer of the ultimate means of payment, the money that clears payments regardless of who the transactors are and regardless of where one sits in the system; "the actor who can issue the means of final settlement is unique in the financial capitalist system: it can loosen the survival constraint, for anyone else, at its discretion" (Neilson (2019)).³² Backstops are not merely emergency mechanisms activated in a crisis. Backstops socialise trust and are constitutive of the system in normal times as well.

In this sense, the central bank's contribution to the monetary system has several distinct facets. It seeks to stabilise the purchasing power of the unit of account over a chosen bundle of goods and services (that is itself an institutional choice), through its monetary policy framework – the most familiar of its functions and the most indirect. But it also guarantees par settlement by operating or overseeing wholesale payment infrastructures (including banking supervision, either directly or in tandem with other public authorities). And it supplies liquidity on demand, from intraday credit that keeps high-value payment systems running to the backstops discussed above. Critically, these functions rest on a balance sheet backed by the sovereign's taxing power. Independence matters a great deal for the conduct of monetary policy

³² See also Markets Committee (2022).

(Eijffinger and de Haan (2026)), but it is the fiscal backing rather than the independence that makes the balance sheet a backstop: governments have on occasion performed the function directly; however, a central bank taking credit risk on any scale must be indemnified by the government.

Validation: how private money is absorbed

The relationship between private money creation and public backstops unfolds over time through a recurrent historical pattern that Minsky identified and that Neilson (2019) calls “validation”.

The first phase of the pattern is private initiative. As Minsky famously observed, anyone can create money; the problem is getting it accepted (Minsky (1986)). The allure of issuing liabilities that circulate as money is almost a force of nature, and history shows private agents discovering new ways to do so in every era (Graeber (2011)). The bill of exchange in medieval Europe allowed merchants to settle debts across jurisdictions without shipping coins, a private monetary innovation that preceded and ultimately shaped public monetary institutions (Ingham (2004); Aglietta (2018)). Goldsmith banknotes in 17th century England circulated as money on the strength of the goldsmith’s reputation, outside any sovereign mandate (Desan (2014)). After World War II, the eurodollar market created dollar-denominated liabilities by private initiative, outside US jurisdiction, though not without official acquiescence since claims had to ultimately clear in New York (Schenk (1998); McCauley and Schenk (2020)). Money market funds in the United States in the 1970s offered households deposit-like claims that were not deposits and not insured. In each case, private agents found a way to issue liabilities that the market was willing to treat as money, at least for a while.

The second phase is crisis. Each of these innovations eventually confronts a moment when the private promise fails, when the survival constraint binds and the issuer cannot deliver the money it has promised. The wildcat banknotes trade at a discount. The money market fund “breaks the buck”. The eurodollar market freezes as banks refuse to lend to one another. At this point, the question becomes whether the promise will be fulfilled at all, and if not, whether a public authority will step in.

The third phase is validation: the decision by authorities at the top of the hierarchy to extend backstops to the new form of money, thereby absorbing it into the official monetary system. Validation is not automatic and it is not free. It comes with conditions (regulation, supervision, reporting requirements, capital standards) because the extension of backstops necessarily involves the socialisation of trust and risk. When governments established deposit insurance, they were validating bank deposits, accepting that privately created money was a public good requiring public support. The backstops of money market funds during the GFC and again during the Covid-19 crisis were similarly a form of validation of that promise to pay. As discussed in more detail in the next section, the deployment of swap lines during the same crises was also effectively a validation of the eurodollar system, accepting that dollar liabilities created abroad were integral to the global payment system. In each case, validation transforms the monetary landscape: what had been a precarious private arrangement becomes an integral part of the institutional infrastructure.

But validation is meaningful only if it is not assured (Neilson (2019)). There is no value to the backstop if every promise is automatically guaranteed: that would eliminate the discipline that makes the hierarchy function. The central bank's dilemma is that it must sustain a constructive ambiguity: assuring support for the system as a whole, while leaving each participant uncertain as to whether it will be supported (Neilson (2019)). This is the too-big-to-fail problem in its most general form, and it has no clean solution, only a series of pragmatic compromises that shift over time as the system evolves. It takes a particular form here, because what is validated is a class of instrument rather than a firm: size becomes the argument for rescue, and the expectation of rescue is part of what allowed the instrument to reach that size (Kettering (2008)). Validation unaccompanied by discipline is not absorption into the hierarchy but a subsidy to it.

The state, the law and the unit of account

The pattern of private initiative followed by public validation raises a question about the role of the state in money. It is basically impossible, as a matter of modern practice, to conceive of generally accepted money in isolation from governments and the law. The sovereign (including its taxing power) plays a critical role in anchoring the hierarchy, as it makes central bank liabilities credible as the final means of settlement. Legal frameworks define the rights of depositors, the obligations of banks and the conditions under which backstops are extended (Awrey (2024); Ricks (2016)). And as Pistor's (2013; 2019) legal theory of finance has shown, the boundary between binding commitment and elasticity is itself a legal construct, revised in crisis when the law is suspended or reinterpreted to prevent systemic collapse. Without the institutional apparatus of the state, the monetary system as we know it could not exist.

But to say that the modern monetary system cannot exist without the state is not the same as saying that money is *created by* the state.³³ The state's most consequential monetary act is not issuance but denomination. It designates the unit of account in which obligations are written, enforced and taxed. Who issues claims denominated in that unit, and on what terms, is largely a private matter (Pantelopoulous (2025)). The historical record points in the same direction. Private initiative comes first: agents discover new ways to issue money-like claims, driven by the allure of seigniorage and the demand of the economy for means of payment. Legal and institutional recognition comes later: the state validates the new form of money by extending regulation and backstops, typically in the aftermath of a crisis that has revealed the fragility of the private arrangement.³⁴

³³ Another way to put this is that promises to pay existed before states and central banks (as did interest rates for that matter). If anything, as Mason and Jayadev (2026) put it, "modern credit money in important ways originated as an *escape* from sovereign authority" (emphasis in original).

³⁴ As Desan (2014) observes in her study of English monetary history, purely private partnerships between borrowers and lenders could produce credit, but not that particular form of credit so generally accepted as to constitute money. That required a public element. But the public element built on, rather than originated, the private practice. The distinction between credit that circulates within a closed network and money that is universally accepted is akin to the one I am drawing between private initiative without validation and private initiative that has been absorbed into the hierarchy.

This dynamic of private initiative, crisis and public validation is a recurrent feature of monetary systems, driven by the tension between the initiative of private money creation and the necessity of public anchoring. Every period of financial innovation is also a period in which the boundary of what counts as money is being renegotiated and the question of who provides the backstop is being answered anew. And each answer reshapes the institutional landscape for the next cycle.

5. Domestic money versus global money

The tensions developed in the preceding sections, between money and credit, elasticity and discipline, and private initiative and public validation, do not stop at a nation's border (as the discussion of swap lines made explicit). Modern money is global money. And the global monetary system replicates the logic of the domestic hierarchy, but with weaker institutions, fewer backstops and deeper asymmetries.

The hierarchy of international money and the global dollar system

The domestic hierarchy has the central bank at its apex and par as the critical price binding its layers. The international hierarchy has a dominant, or “key”, currency at its apex, at present the US dollar (McCauley (2020)),³⁵ and the exchange rate as the price connecting national monetary systems to one another.

But the international hierarchy is not simply the domestic hierarchy scaled up. In the domestic system, every promise to pay is payable in liabilities issued by the layer immediately above: securities promise deposits, deposits promise central bank money. In the international system, the hierarchy arises from a different source: the capacity of countries to fulfil promises to pay in the key currency. Every country must plug into the global system, and for most of them the terms on which money can be obtained are shaped materially by conditions set beyond their borders. What differs sharply is the terms on which that connection is available (Mehrling (2015)).

The international hierarchy runs roughly as follows. The United States, as the issuer of the key currency, sits at the top. Major currencies of the Global North (the euro, the yen, the pound) occupy the next tier, with their central banks typically possessing standing swap lines with the Federal Reserve.³⁶ Below them sit the currencies of emerging market economies, whose central banks generally lack such swap lines and must rely on owned reserves and more limited facilities. Further down are the developing economies, with the most constrained access to the mechanisms of international settlement. Centrality is not acquired by a decision of the central

³⁵ In the past this role was played by other currencies such as the pound sterling and the Dutch guilder (Eichengreen (2026)).

³⁶ Jurisdictions that peg their currencies to the dollar accept a promise to pay dollars as the anchor of their own money and so formally occupy their position in the hierarchy. Floating currencies make no such promise. They are typically commitments to domestic price stability, and their connection to the dollar runs through the balance sheets of their banks rather than through the constitution of their money. Dollar swap lines address this second kind of dependence, which is why they reach jurisdictions that make no commitment to the dollar at all.

government or its banking system but rather comes from decisions by others who choose to make the currency of that country their chief international money (Hicks (1989)).

One way to represent the current arrangement is through access to dollar liquidity (Graph 2).³⁷ A group of central banks that have access to standing swap lines with the Fed form the core that gravitates around the dollar centre (C6 central banks). Access to dollars is not confined to this group, but the terms on which the core obtains them are unmatched. Further out there is a group that includes eight additional central banks granted temporary swap lines during market crises (together with the first group, making up the C14 group). A third layer includes those eligible to access dollar liquidity by posting previously accumulated US Treasury securities as collateral through the Foreign and International Monetary Authorities (FIMA) repo facility. Second- and third-degree connections capture central banks that must borrow an intermediary currency from a connected partner and exchange it for US dollars in FX markets. Proximity to the centre reflects quality of access.

This hierarchy has concrete operational consequences. In the domestic system, a bank facing a reserve deficit at settlement can borrow in the interbank money market, liquidate assets or turn to the central bank's discount window. In the international system, the available mechanisms depend on one's position in the hierarchy. Borrowers with direct access to US money and capital markets (ie American banks and firms, but also the many foreign banks that operate through US branches and subsidiaries) can fund themselves in dollars directly. Those in the major currency zone can access dollar funding through FX swap markets, converting domestic currency into dollars for the term of their need. Those lower in the hierarchy, lacking deep FX swap markets, must fall back on owned dollar reserves, a costlier and less flexible mechanism (Mehrling (2015)).

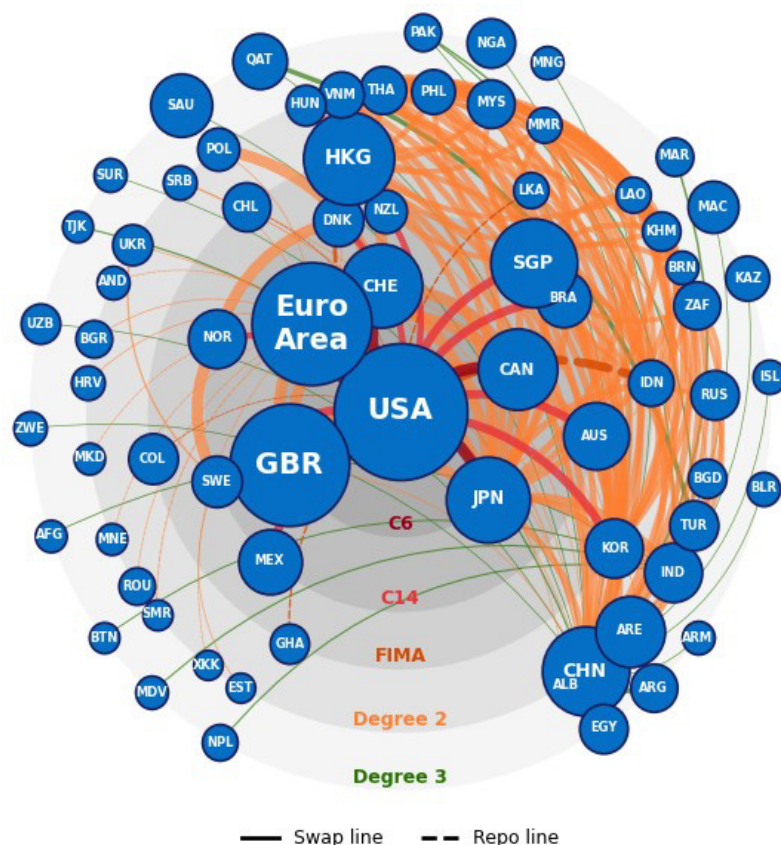
What the discussion so far makes clear is that the global monetary system is to an important extent a global dollar system, and its scale is remarkable (McCauley (2020); McCauley et al (2021)). As of the end of 2025, there was roughly USD 14.7 trillion in dollar-denominated liabilities booked outside the United States (Aldasoro et al (2026)).³⁸ This is an enormous sum, and it represents promises to pay dollars by entities that do not have direct access to the ultimate source of dollar liquidity, the Federal Reserve.

The institutional infrastructure supporting these promises is the global equivalent of the domestic banking system described in sections 2 and 3. The eurodollar market, discussed in section 4, is the foundation of the global dollar system (Schenk (1998)). Over time, this market evolved into a complex web of short-term and long-term dollar-denominated credit, intermediated by banks and non-bank financial institutions across multiple jurisdictions.³⁹

³⁷ I thank Iván Weigandt for sharing this graph.

³⁸ For the euro, the comparable figure was approximately EUR 3.2 trillion; for the pound and the yen, around GBP 810 billion and JPY 630 billion, respectively.

³⁹ The eurodollar market represents the pattern described in section 4 played out on a global scale and with a longer lag. It grew for half a century in institutional limbo – too large to ignore, too useful to suppress and without the backstops that sustained the domestic dollar system – until the GFC forced the issue and the swap network resolved it through validation.



The size of nodes illustrates cross-border liabilities as of end-2025. The thickness of the links represents the maximum amount of swaps, with “unlimited” as the highest; the colour indicates the layer. Central banks are identified by three-letter country codes, with the exception of the ECB, identified as “Euro area”. FIMA = Foreign and International Monetary Authorities repo facility.

Source: Weigandi (2026).

The FX swap market is the connective tissue of this system. Banks in Japan and Europe that issue dollar liabilities but earn revenue in yen or euros must manage the resulting currency mismatch. They do so through FX swaps, derivative contracts that allow them to exchange domestic currency for dollars for a specified term. The FX swap market is one of the largest financial markets in the world by turnover,⁴⁰ and its smooth functioning is essential to the global dollar system. When FX swap markets seize up, as they did spectacularly during the GFC and again briefly in March 2020 (Avdjiev et al (2020)), the result is an acute dollar shortage that propagates rapidly

⁴⁰ Global FX turnover reached USD 9.5 trillion per day in April 2025, and a significant share of that was FX swaps (Huang et al (2025)). The stock of obligations these contracts create is largely invisible. Because they are accounted for as derivatives rather than as borrowing, the obligation to deliver dollars at maturity does not appear as debt on the borrower’s balance sheet, though functionally equivalent repo borrowing would. For banks headquartered outside the United States, such off-balance sheet dollar obligations substantially exceed the dollar debt that is recorded (Borio et al (2022)).

across borders, tightening financial conditions for borrowers who may have no direct exposure to the original source of stress.

Asymmetric backstops

The domestic monetary system is sustained by backstops that socialise the risk inherent in a system built on promises. The international monetary system has backstops too (Graph 2), but they are distributed unevenly across the hierarchy, and the asymmetry is consequential.

At the apex, the Federal Reserve has in practice demonstrated a willingness to backstop all three of the key markets in the domestic dollar system: the overnight market, the term money market and long-term capital markets. This extension of the central bank's traditional role discussed earlier, from lender of last resort to dealer of last resort, has a strong international dimension and is among the most significant institutional developments of the past two decades (Mehrling (2011); Blustein (2025)).

For the core, the system of central bank liquidity swap lines essentially amounts to a backstop of the term funding market. When dollar liquidity tightens and banks in core jurisdictions cannot roll over their dollar liabilities in the private market (ie when the survival constraint begins to bite), they can turn to their own central banks, which in turn draw dollars through the swap lines. This mechanism proved decisive in both 2008–09 and 2020.

For the periphery, the backstop is thinner. Emerging market central banks generally do not have standing swap lines with the Fed. They rely instead on owned reserves, accumulated dollar assets (typically US Treasury securities) which they can sell or pledge to obtain dollar liquidity. And the International Monetary Fund (IMF), through Special Drawing Right (SDR) allocations and lending programmes, provides a further layer of support. But these mechanisms are less automatic and more conditional than standing swap lines. Here too, rank in the hierarchy sets the strength of the backstop.

The consequence is that the tensions between elasticity and discipline, and between private initiative and public validation, are sharper at the global level than at the domestic level. The global dollar system expands and contracts through credit cycles that are themselves global in scope. The “global financial cycle” (Rey (2013)) is broader than the dollar funding system described here.⁴¹ But the mechanism it identifies runs through US monetary policy, and the dollar funding channel discussed above is one of the principal routes by which it operates. When the dollar is weak and global liquidity is abundant (Bruno and Shin (2015); Avdjiev et al (2019)), dollar credit flows outward, flattening the international hierarchy. When the dollar strengthens and liquidity contracts, the hierarchy steepens: weaker borrowers lose access to dollar funding, reserves are drawn down, and the countries with the least access to backstops bear the greatest adjustment burden.

⁴¹ It is a co-movement in risky asset prices, capital flows and leverage across a wide range of markets and instruments. See Aldasoro, Avdjiev et al (2023) for the relationship between global and domestic financial cycles.

There is no global central bank and no global sovereign. The management of global money therefore depends on a patchwork of bilateral and multilateral arrangements (swap lines, the IMF, the SDR, the FIMA facility) – the global financial safety net – that are more fragile than their domestic counterparts. And the system’s dependence on global private dollar credit creation continues to outpace the institutional apparatus that supports it. In the terms used in section 4, the swap lines are the closest global counterpart to domestic validation.

6. New monies, old lessons

The preceding sections have developed an account of money grounded in payment, hierarchy and trust. This section applies that account to the enduring appeal of gold, the rise of bitcoin and the attempts to design trust out of settlement itself, and the emergence of stablecoins. These illuminate the framework from different angles: gold, bitcoin and those attempts by negation; stablecoins by aspiration.

Gold, bitcoin and the negation of trust

Monetary economists are asked about gold’s enduring appeal with some regularity. The answer does not come easily within standard frameworks, but it is straightforward from the perspective developed in this paper.

The allure of gold today is, at the core, the negation of the social nature of money. Nothing is priced in gold and nothing is paid in it; what is valued is precisely that it is no one’s liability.⁴² It does not depend on the creditworthiness of any issuer, the solvency of any bank or the fiscal capacity of any sovereign. It exists outside the web of interlocking promises to pay that the preceding sections have described. For those who hold it, that is the point.

The desire for an asset that is no one’s liability is a desire to exit the social compact that money embodies.⁴³ It reflects a distrust in the architecture of trust: in institutions, in central banks, in the capacity of the system to honour its commitments. Under the appropriate circumstances, rising gold prices can be read as a barometer

⁴² This concerns gold as it is held today, not its monetary past. Gold was money in a demanding sense, and in its 19th century form, its role was less to supply the means of payment than to restrain their creation (ie to constrain the system’s elasticity). Settlement in metal happened at the margin, with bills, notes and deposits doing most of the work. The promise to convert into metal on demand meant that over-issue drained reserves, and that threat disciplined issuance (Sissoko (2016)).

⁴³ “Asset” is used here in the balance sheet sense (an item on the asset side of somebody’s books) rather than in the narrower sense of a claim on a stream of payments; gold yields not a cash flow but the assurance that there is no promise to be broken. The national accounts register the oddity from the other direction: monetary gold and SDRs are the only assets classified as financial for which no corresponding liability exists.

of eroding confidence in that architecture.⁴⁴ Gold, in this sense, is not a monetary alternative, but a monetary protest.

Bitcoin shares this impulse and adds a technological veneer.⁴⁵ The founding document of the bitcoin project (Nakamoto (2008)) is explicit: the aim is a system of electronic payments “based on cryptographic proof *instead of trust*” (my emphasis). The entire design is oriented towards the elimination of trusted intermediaries: no central bank, no commercial banks, no hierarchy. Bitcoin aspires to be money without the architecture that makes money work.⁴⁶ What the design removes, though, is trust in an issuer rather than trust itself: the holder still depends on others continuing to accept it. The irony is that the crypto ecosystem has not escaped hierarchy either. It has reinvented it, in cruder form and without the backstops that centuries of institutional evolution have produced.⁴⁷ The hierarchy is emergent, as it always is, and the infrastructure of trust is being constructed ad hoc, often after a crisis.

Crypto inverts both halves of the pairing set out in section 3: it is inelastic where a monetary system needs elasticity, and undisciplined where it needs restraint. Where elasticity is wanted there is none: no lender of last resort and no balance sheet that can expand to supply settlement means when the survival constraint binds. Bitcoin’s fixed supply and issuance schedule (which plays a foundational role in the collective imagination of crypto enthusiasts) are set by code and unresponsive to any conceivable state of the world. Where restraint is wanted there is none either: coins and tokens are issued continually and with essentially no constraint,⁴⁸ each a fresh claim on the same underlying pool of value. The result is a system that cannot expand the means of settlement when settlement is what everyone wants, and it cannot restrain the issuance of claims when restraint is what would protect their value. It is an inversion of the architecture that works.

⁴⁴ The exit is not, in any case, available: a system resting on an asset that is nobody’s liability cannot expand its means of settlement in response to the economy’s needs, since supply is governed by geology rather than by credit. Such a system, in pure form, cannot scale. Instead, the settling is done in a credit superstructure, with the metal anchoring rather than circulating.

⁴⁵ The two are often presented as equivalents, not least by proponents of bitcoin touting it as digital gold. But they are not. Gold has a monetary history and bitcoin has not acquired one: it has been designated legal tender twice (in El Salvador and briefly in the Central African Republic) and in both cases the designation was withdrawn without general use taking hold. Gold has industrial and ornamental uses and a supply that responds, sluggishly, to price. Bitcoin’s supply responds to an algorithm, and its value rests entirely on the expectation that others will value it. What the two share is that they can represent the wish for an asset that is nobody’s promise.

⁴⁶ See for example Budish (2025) on the limits of trust at scale for blockchains. The cost of blockchain-based trust, what he calls “Nakamoto trust”, scales linearly with the value at stake, making it extraordinarily expensive at any significant scale. Traditional trust, by contrast, exhibits economies of scale: society pays a largely fixed cost (eg institutions, legal infrastructure) to enjoy trust over a vast quantity of economic activity at low marginal cost.

⁴⁷ Bitcoin sits at the apex of a crypto hierarchy, with other tokens and coins arranged below it in varying degrees of perceived reliability. Exchanges function as de facto banks, taking deposits and intermediating between buyers and sellers. Stablecoins (which I will come to shortly) function as the money of the crypto system, the means of settlement within it.

⁴⁸ Counts vary by orders of magnitude according to what is included: CoinMarketCap ranks around 8,000 actively traded assets, and CoinGecko tracks some 18,600. CoinMarketCap’s tally of all tokens ever detected runs to tens of millions (August 2026). The dispersion is itself indicative: there is no threshold that an issuance has to clear.

The inversion of elasticity and discipline describes the supply structure of crypto money. But the ambition to eliminate trust from the monetary system extends further, into the design of payment and settlement itself.

Two ideas that have gained prominence in this context are worth discussing. The first is “atomic settlement”: the conditional, all-or-nothing exchange of two assets, in which both legs either complete together or neither does, and in which they do so without a settlement lag. The first of these two properties is not new. Delivery versus payment (DvP) and payment versus payment (PvP) have been standard in securities and FX settlement for decades and exist precisely to eliminate the risk that one party delivers without receiving. What atomic settlement adds is the elimination of the lag: settlement becomes not merely conditional but immediate and gross.⁴⁹

From the perspective developed in this paper, the enthusiasm for atomic settlement rests on a misunderstanding of the system it seeks to improve. As argued in section 2, payment systems are credit systems: agents routinely meet the settlement constraint by borrowing, and the instruments they transfer are themselves credit claims. Requiring every transaction to settle atomically would force agents either to hold large precautionary balances at all times or to borrow at the right moment and on the right terms to bridge the gap. The former destroys the elasticity that allows the system to accommodate the economy’s needs; the latter reintroduces credit through the back door, as a committed line rather than an overdraft. Atomic settlement would also eliminate the netting arrangements through which modern payment systems economise on settlement means, since netting is itself a form of intraday credit.

This is not a hypothetical trade-off. The shift from deferred net settlement (DNS) to real-time gross settlement (RTGS) in the 1980s and 1990s involved the same exchange: finality and the elimination of settlement risk, at the cost of a much higher demand for intraday liquidity. Central banks met that cost deliberately, by supplying intraday credit on a large scale.⁵⁰ Atomic settlement proposes to repeat the exchange while dispensing with the credit that made it affordable. It is self-defeating on its own terms.

The second idea about settlement is the notion that money and payments can be “unbundled”, with payment reconceived as a technology service separate from the issuance of money. The proposition is hard to state coherently. If money is the means of payment, then separating payment from money separates a thing from its defining function, and what remains is not money. What proponents of unbundling typically describe is narrower and acceptable: the entry of new intermediaries into the payment chain. But each of those intermediaries ends up issuing its own liability: a stablecoin is the issuer’s promise to pay a dollar; a fintech balance is the platform’s promise to pay the holder. In each case, a new credit claim is created and the payment function is attached to it. The hierarchy has not been dissolved; it has been extended downward by one layer, with the payment function now bundled with a weaker

⁴⁹ The distinction matters because the two properties have very different costs. Conditionality is close to costless and has been adopted almost universally. Immediacy is expensive, because it removes the interval during which obligations can be netted and settlement liquidity economised.

⁵⁰ The consequence was understood at the time and was intended (Borio and Van den Bergh (1993)).

promise rather than a stronger one. This is not unbundling; it is rebundling, but at a layer further removed from the ultimate means of settlement.

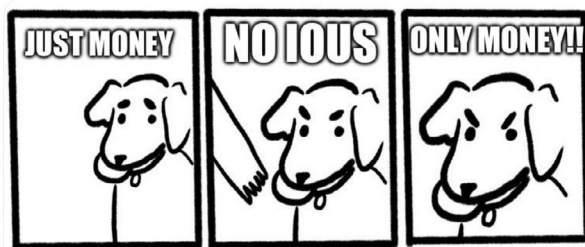
Unbundling belongs to the same family of ideas as narrow banking, which proposes to separate deposit-taking from credit creation by requiring banks to back their monetary liabilities fully with safe assets (Fisher (1936); Friedman (1960); Cochrane (2014)). Narrow banking is the more coherent of the two: it does not deny that money is the means of payment but proposes to remove credit creation from the institutions that issue it. It is, in that respect, the balance sheet counterpart of atomic settlement: an attempt to guarantee settlement by pre-funding it in full. The underlying impulse is the same one that animates the appeal of gold and bitcoin: a desire to squeeze credit, and therefore trust, out of the monetary system. But, as argued throughout this paper, credit is not a contaminant that can be filtered out of money. Credit is a feature of our monetary system, not a bug.⁵¹

The desire to purge credit from the monetary system reflects a deeper reluctance, namely, to accept that the money we actually use is someone else's liability, and that holding it is therefore a social relation that requires trust. A meme circulating on social media captures this reluctance with both humour and precision (Graph 3). It refers to the work of Luca Pacioli, credited with the first published systematic treatment of double-entry bookkeeping in the 15th century. The caption laments the joint invention of assets and liabilities, wishing instead that only assets had been invented, not liabilities (ie no promises to pay). In the accompanying image, a dog wants to hold money but does not want IOUs. As the discussion above has made clear, in the modern world all money *is* an IOU, a liability of whoever issued it, sustained by the trust that the issuer will honour its commitments. The dog wants an asset that is no one's liability because it does not trust. It wants gold. It wants bitcoin. But it cannot have money without trust, because money without trust is a contradiction in terms.

Money (that's what I want)

Graph 3

If I were Luca Pacioli I would just have
invented assets, not liabilities.



⁵¹ The formulation is Perry Mehrling's, as is the observation above that payment systems are credit systems.

Stablecoins: private initiative at the frontier

Stablecoins are a different proposition. Where bitcoin aspires to replace the monetary system, stablecoins aspire to join it (notwithstanding their shared roots). They are, in the language of section 4, the latest episode of a private initiative creating promises to pay that seeks validation from the authorities at the top of the hierarchy.

A stablecoin is, at its most basic, a promise to pay a dollar, or more precisely a digital token whose issuer promises to redeem it at par with the US dollar on demand. In functional terms, they are private quasi-money: liabilities of their issuers that circulate (potentially, though not much yet, as means of payment) among those who accept them (Arner et al (2020); Aldasoro, Mehrling and Neilson (2023)).

Assessed against the framework developed in this paper, stablecoins fall short on three counts.

The first concerns hierarchy and par. A bank deposit trades at par with central bank money because the issuing bank has an account at the central bank, access to wholesale money markets and (in extremis) access to lender of last resort facilities. These institutional arrangements make the promise of par convertibility credible, and they are why other banks accept the deposit at par – which is the acceptance a depositor actually encounters. Stablecoin issuers, by contrast, stand outside the settlement sphere of the central bank, at least for now. They do not hold accounts at the central bank. They do not have access to standing lender of last resort facilities. Their promise to redeem at par is effective only for the arbitrageurs that have direct redemption rights with issuers in the primary market. For regular users, the promise relies on a secondary market structure mediated by those arbitrageurs and supported not by institutional access to the ultimate means of settlement but by a portfolio of assets (typically Treasury securities and bank deposits) that stablecoin issuers commit to holding in reserve. The promise is only as good as the liquidity of those assets and the operational capacity of the issuer to honour redemptions under stress. The stablecoin promise to pay a dollar is a money market instrument, but one that lacks the backstops that sustain other money market instruments (Aldasoro, Mehrling and Neilson (2023)).

The second challenge concerns elasticity. As section 3 and Box B argue, commercial banks can expand their liabilities' elastically in response to demand; that is the alchemy of banking. When a bank makes a loan, or indeed any asset purchase, it creates both an asset and a liability simultaneously, expanding the supply of money to meet the economy's needs. Banks are distinguished from all other financial institutions not because they intermediate between savers and borrowers, but because they issue liabilities which, by social norm and network effects, circulate as a generally accepted means of payment. This acceptance gives banks their payment elasticity: the capacity to purchase assets by issuing new units of their own liabilities, which the seller is willing to hold precisely because everyone else accepts them too.⁵²

⁵² And "key to the alchemy is the fact that the newly created means of payment is indistinguishable from the old, and for that reason just as acceptable in payment" (Mehrling (2020)).

Under their current configuration, stablecoin issuers cannot do this.⁵³ A stablecoin can be minted only when someone deposits a dollar with the issuer. The supply of stablecoins is thus tethered to inflows, not to the credit needs of the economy. In the parlance of previous sections, a stablecoin-based payment system is not a credit system: the coin is an IOU, but the system built on it does not create credit.⁵⁴

This may change in future, depending critically on whether stablecoin issuers can purchase assets only with bank deposits acquired through coin issuance, or also by issuing new units of their own liabilities directly (Borio et al (2026)). In the first scenario (the current one for most stablecoins) the issuer is essentially a narrow bank: it takes in deposits, holds reserves and pockets the spread, but it does not create money. In the second scenario, which becomes plausible if and when a stablecoin achieves wide acceptance as a means of payment, the issuer would acquire what Borio et al (2026) call “the exorbitant privilege” of creating money, so far reserved to banks and central banks. The mechanism is the same as the one that makes banks special: general acceptance of the liability *is* the source of the monetary power. At that point, the stablecoin issuer would no longer be a narrow bank but something closer to a proper bank, able to expand both sides of its balance sheet simultaneously in the way section 3 describes.⁵⁵

This conditionality is important. It means that the question of stablecoin elasticity is not a fixed property of the instrument but a function of its acceptance, itself a function of use cases and market practice as well as regulatory and policy choices. If stablecoins remain a niche instrument, the inelasticity constraint binds and the system cannot expand to meet demand. If they become widely accepted (if usage begets acceptance and acceptance begets wider usage), the issuers gain the monetary powers of banks. But those powers require regulation. The exorbitant privilege must come with discipline.

The third challenge for stablecoins concerns backstops. When a bank’s promise to pay at par comes under stress, the institutional apparatus described in section 4 activates: deposit insurance reassures small depositors, the central bank stands ready to lend against good collateral, and resolution frameworks ensure that even a failing bank’s monetary liabilities are honoured. Stablecoins have none of this. When TerraUSD collapsed in May 2022, there were no backstops: no lender of last resort, no deposit insurance, no resolution mechanism. The algorithmic promise to maintain par with the dollar unravelled in a matter of days, destroying tens of billions of dollars in value (Liu et al (2023)). Even for stablecoins backed by conventional reserves rather than algorithms, the absence of backstops means that a sufficiently large and rapid

⁵³ This describes the arrangement as issuers disclose it and as regulation is coming to define it. Whether every issuer has confined itself to that arrangement is a separate question, and the sector’s record on disclosure leaves this question open (Faux (2023)).

⁵⁴ Stablecoins can provide elasticity within the crypto ecosystem, which in Knapp’s terms is a “private pay” community (Knapp (1905)). This is not the claim at issue. Elasticity within a community of users is not elasticity for an economy. Any instrument that a community agrees to accept is elastic among its members; that is what makes it a community, not what makes it money. Nor is that acceptance a verdict on the instrument. A community with no alternative accepts what it has, so survival is not evidence of soundness.

⁵⁵ Judging by the emergent regulatory frameworks, there would be, however, stricter limits on the type of admissible assets.

wave of redemptions could force fire sales of reserve assets, driving the stablecoin below par and triggering exactly the kind of run that the modern banking system's institutional infrastructure is designed to prevent. A case in point is the fact that Silicon Valley Bank's backstop was effectively also a backstop for parts of the stablecoin ecosystem (Ahmed et al (2024)). It illustrates a broader issue: during crises no one wants credit and everyone wants money, so promises to pay money will always be tested, and when they are, high-level money and the institutions that issue it will be called on to act as a backstop (Aldasoro, Mehrling and Neilson (2023)).

None of this means that stablecoins cannot become part of the monetary ecosystem. But it means that doing so requires their being brought into the hierarchy. Par with the dollar is ultimately a policy choice: one could conceive of a future in which the regulatory, supervisory and central banking apparatus supports stablecoins' par convertibility. But that support should come with conditions: supervision, capital requirements, reporting obligations and ultimately access to backstops that socialise the risk of the issuer's failure. This is the same bargain that has been struck with every previous form of private money that has secured validation. But social validation should come with social usefulness.

What the preceding discussion highlights is, to borrow a phrase, "déjà vu all over again".⁵⁶ The dilemmas brought about by stablecoins are not new but are instead the latest iteration of a pattern that has recurred throughout monetary history. Private agents discover a way to issue liabilities that circulate as (some form of) money, driven by the allure of seigniorage and the genuine demand of the economy for various money-like instruments. For a time, the new money functions, confidence holds, par is maintained, and the innovation appears to have solved a problem without creating another one. Then a crisis arrives, the promise to pay is tested, and the fragility of the arrangement is revealed. At that point, the authorities must decide: validate the new money by extending backstops and imposing regulation, or allow it to fail and let the hierarchy reassert itself.

A variety of instruments followed this path: bills of exchange, goldsmith banknotes, eurodollars and money market fund shares are the best known examples. In each case, the initial private innovation was eventually absorbed into the monetary system, but only after crises had demonstrated the need for public anchoring, and only on terms set by the authorities at the top of the hierarchy. As Martin (2013) has written, "history proves that the power to issue money is an irresistible lure. If sovereigns allow it, whether by commission or omission, private issuers will take full advantage."

Stablecoins are at an early stage of this cycle. Whether they will be validated, brought within the regulatory perimeter, granted access to backstops and subjected to the disciplines that come with that access, or whether they will remain outside the hierarchy, tolerated but not trusted, is a question that policymakers are currently confronting. The framework developed in this paper suggests that the answer will depend not on the technology but on the institutional choices that surround it, themselves a function of actual use cases. Money is not a technology. It is an

⁵⁶ Quote attributed to Yogi Berra (1925–2015), a professional baseball player.

institutional achievement (BIS (2026)). And the institutions ultimately matter more than the instruments.

7. Conclusion: the architecture of trust

This paper began with a claim: that money is one of the most consequential social institutions humanity has built, and that what sustains it is trust. The intervening sections have shown what that trust consists of and what architecture is required to maintain it at scale.

The argument started from the most elementary monetary act, a payment, and followed its logic outward. The requirement to settle obligations as they come due, the survival constraint, is the discipline that binds a decentralised market economy together. From that discipline emerges the distinction between money and credit: money settles, credit promises. And from that distinction emerges the hierarchy of money, in which what counts as money and what counts as credit depends on where they sit, with central bank liabilities at the apex and progressively more contingent promises below, all bound together by the critical price of par.

The hierarchy is not static. It expands and contracts through the interplay of elasticity and discipline. Banks, distinguished by the fact that their liabilities circulate as a generally accepted means of payment, provide the system with its capacity to grow, creating purchasing power as they grant credit. But credit is payable in money, and money is scarce from the perspective of any agent below the apex. That scarcity, expressed through the price of pushing settlement into the future, is what constrains the expansion and gives the system its gravitational pull. When the balance tips too far towards elasticity, the hierarchy flattens and fragility accumulates. When discipline reasserts itself, the hierarchy steepens and the distinction between money and credit comes back with a vengeance.

What prevents this cycle from being a spiral is the backstop provided by public authority. The central bank's capacity to issue the ultimate means of settlement, and its willingness to do so when the survival constraint binds at the core of the system, is what halts cascading defaults and preserves the payment system on which economic life depends. But backstops are not merely emergency mechanisms. They are essential to the system in normal times: the knowledge that par will be defended, that deposits are insured and that the central bank stands behind the hierarchy allows money to circulate without scrutiny. Backstops socialise trust. They achieve what no fully decentralised mechanism can: trust at scale, at a cost that does not grow linearly with the value the system secures.

This architecture – hierarchical money anchored by a central bank, elastic credit disciplined by funding, private initiative validated by public authority – was not designed from a blueprint. It evolved through centuries of experimentation, crisis and institutional adaptation, from the bill of exchange to the goldsmith's note to the eurodollar. At each stage, private agents discovered new ways to create money-like claims; and at each stage, the authorities at the top of the hierarchy were eventually called upon to validate or reject the innovation. The pattern recurs because the underlying tension between the creation of private money and the need for public anchoring is part of the monetary system. The tension is never resolved; it is only managed.

The international dimension adds a further layer. Modern money is global money, and the tensions that the paper has traced domestically replicate at the global level, but with weaker institutions, asymmetric backstops and no global sovereign. The management of global money remains, in important respects, an unsolved problem.

Understanding this architecture is a precondition for evaluating any proposal to change it. New forms of money may promise programmability, speed or broader access. But unless they are denominated in the unit of account rather than merely priced against it, guarantee par through ultimate settlement in central bank money and provide (or are provided with) elastic liquidity backstopped by public authority, they risk reviving the frictions that the modern monetary system evolved to solve. The appeal of gold and bitcoin, as assets that are no one's liability, reflects a desire to exit the social compact that money embodies. But money without trust is a contradiction in terms. Stablecoins, for their part, are the latest instance of a private initiative creating promises to pay that aspires to be treated as money. Their success will depend not on the technology but on whether they are brought within the hierarchy and subjected to its disciplines. As always, the exorbitant privilege of money creation comes with commensurate responsibility.

Money, in the end, is far more than a medium of exchange, a store of value or a unit of account. It is an institutional achievement, a system of interlocking promises sustained by the shared expectation that settlement will occur as promised. That expectation is trust. And trust, at the scale required by a modern economy, requires an architecture. This paper is an attempt to describe that architecture, in the hope that clarity about what we have may help inform the discussion and choices about what comes next.

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Appendices

A The argument in context

This appendix situates the argument of the main text within the broader landscape of monetary thought. The goal is not to provide a detailed account of monetary thought, but to understand where the argument in the paper sits relative to alternatives and clarify what it claims and what it does not.

A.1 Two traditions

Schumpeter once observed that there are really only two theories of money that deserve the name: the commodity theory and the claim theory (Schumpeter (1954); Ingham (2004)). The distinction, in a form adapted for present purposes, can be stated as follows. On one side are what Schumpeter called monetary theories of credit: approaches that start from metallic coin or fiat notes, focus on exchange and treat money as a separate entity whose quantity can in principle be controlled by the monetary authority. On the other side are credit theories of money: approaches that proceed in the opposite logical direction, treating money as inherently a form of credit (the highest form of credit) and the monetary system as a web of interlocking promises to pay.

The monetary theory of credit tradition has deep roots. The commodity theory of money, in which money derives its value from the intrinsic worth of the material it is made of, runs from at least Smith (1776) through the classical economists. Its modern descendant, the quantity theory of money, shifts focus from the nature of money to the macroeconomic implications of changes in its supply, grounded in the equation of exchange (Fisher (1911); Friedman (1956)). Its workhorse in contemporary macroeconomics, the dynamic stochastic general equilibrium model, builds a fundamentally real macroeconomy and then bolts on a central bank to pin down the price level and the policy rate (Woodford (2003)). The gap is long-standing: Hahn (1965) showed that Walrasian general equilibrium leaves no room for money within its formal structure.

The credit theory of money tradition is less prominent in the academic literature but has always had a strong presence among practitioners: central bankers, money market participants and those whose daily work involves the settlement constraint. Mitchell-Innes, writing in 1913, articulated its core claim with remarkable clarity: that a sale and purchase is the exchange of a commodity for a credit, and that the giving of a commodity is the extinction of a debt (Mitchell-Innes (1913; 1914)). But earlier, the Banking School writers of the 19th century (Thornton, Tooke and Fullarton) emphasised that the money supply in a modern economy is a private sector phenomenon, with the role of government being to support and stabilise the privately issued money supply (Sissoko (2025)). Macleod (1889) pushed this insight further, arguing that a bank does not lend existing money but creates new credit: by discounting a bill or advancing a loan, it brings into existence a new form of purchasing power that did not exist before. The American institutionalist tradition, including Dunbar, Young, Kindleberger and Minsky, developed these ideas in the

context of a country that, for much of its history, lacked a central bank and relied on private banking arrangements centred in New York (Mehrling (1997); Kindleberger (1978)). Schumpeter, who straddled both traditions, insisted that the banker is not a middleman in the commodity of purchasing power but a producer of that commodity (Ingham (2004)). Keynes, in his *Treatise on Money*, placed the money of account at the foundation: “money of account is the description or title, and the money is the thing which answers to the description” (Keynes (1930)). And Mehrling has synthesised these strands into the money view, which places the monetary and financial system at the centre of economic analysis rather than treating it as one sector among many (Mehrling (1997; 2011)). The anthropological work of Graeber has provided further corroboration from a different direction, demonstrating that credit and debt relations preceded the emergence of coins and that the conventional story of barter giving way to money gets the history backwards (Graeber (2011)).

The main text of this paper stands squarely in the credit theory tradition.

A.2 Properties versus mechanisms

Having located the paper’s argument within the credit theory tradition, it is worth engaging with an influential alternative that starts from a different place, because the contrast sharpens what is at stake.

In recent years, the view that the defining quality of money is that it is accepted “with no questions asked” has gained considerable influence (Holmström (2015); Gorton and Metrick (2012)). Money, in this framing, is an informationally insensitive asset that passes from hand to hand without the receiver needing to investigate its pedigree. The idea is analytically precise and captures something real about how money functions in practice: when money is working well, no one scrutinises it. In Schumpeter’s taxonomy, this framing belongs on the monetary theory of credit side of the divide, not because its proponents are commodity-money theorists (they are not) but because the framing takes the act of exchange as its point of departure. Money is characterised by how it behaves in a transaction: it is handed over, and the recipient does not inspect it. The analytical focus falls on the properties of the asset (its informational insensitivity) rather than on the structure of the system that makes those properties credible.

Box A sets out why the perspective developed here reverses the priority: informational insensitivity is an outcome of the architecture, not its foundation. The distinction matters for how one thinks about monetary design. If the defining quality of money is informational insensitivity, then the task is to produce assets with that property. If instead the question is what makes the *system* capable of producing assets that settle at par, the analytical attention shifts from the instrument to the institutional arrangements that sustain it. The concept of singleness, also discussed in Box A, shares the same tendency: it describes a property of well-functioning money without explaining the mechanism that produces it.

The same reading applies to the store-of-value function, whose standing in the conventional definitional triad of money has long been contested. Part of the objection is that such a definition catalogues what money does rather than explaining what money is: standard treatments, as Ingham (2004) notes, render “moneyness” as “somewhat tautologically ‘exchangeability’”, and the advantages of money for the

individual presuppose the institution in which its moneyness is established. Another part of the objection is that the definition descends from Jevons (1875), that is, from an account of monetary origins in barter and the double coincidence of wants that the credit theory tradition rejects. None of this denies that the function has an important role to play – beyond the elements discussed in the main text, also eg in the liquidity preference in Keynes (1936), or the more modern tradition that treats money as an asset carried across periods (Samuelson (1958); Tobin (1969)). But that work concerns the demand for money balances, not the question of what makes an instrument money.

A.3 Adjacent traditions

Two adjacent bodies of thought also deserve engagement, both for their contributions and for the light they shed on the argument developed in the main text.

The first is chartalism and its modern descendants. Chartalism holds that money is a creature of the state, its value derived from the state's power to impose taxes payable in that money (Knapp (1905); Lerner (1947)). The sociological tradition represented by Ingham's work shares the emphasis on sovereign authority, arguing that an abstract money of account is both logically and historically prior to market exchange (Ingham (2004)). The present argument is sympathetic with much in this tradition. The emphasis on the money of account as foundational, the insistence that money is a social institution rather than a commodity, the recognition that the state's authority is central to the credibility of the monetary system: all of these resonate with the account developed in the main text. Where this paper's argument differs is in the weight assigned to private initiative. The state is indispensable (without its taxing power and its capacity to provide backstops, the hierarchy cannot be anchored), but money is not *only* a creature of the state. It is a creature of the ongoing interaction between private creativity and public authority.

The second is the growing body of legal scholarship on money and finance. To name just a few, Awrey (2024) draws attention to the tension between "good payments" and "good money"; Ricks (2016) emphasises the problem of ensuring the credibility of short-term, fixed-value liabilities in the shadow of bankruptcy; and Pistor's legal theory of finance has illuminated how the boundary between binding commitment and elasticity is itself a legal construct, revised in crisis when the law is suspended or reinterpreted to prevent systemic collapse (Pistor (2013; 2019)). The money view and the legal view are complementary rather than competing: one focuses on the daily practice of the system, the other on the institutional scaffolding that supports it. A full understanding of money requires both.

A.4 Equilibrium concepts and the search-theoretic tradition

Finally, it is worth addressing a set of concepts that are sometimes taken as theories of money but that serve a different analytical purpose. Concepts such as “money is memory” (Kocherlakota (1998)) or money as a coordination device describe important properties of monetary equilibria. They capture the insight that holding money is, in effect, a record of goods sold or services rendered, and that the social convention of money achieves almost as much as a complete ledger of all past transactions. These are not trivial results and they are not incompatible with the credit theory of money. But they are not, in themselves, theories of money. They describe what money does in equilibrium without explaining what money is, how the system that produces it is structured or why it periodically breaks down. As Ingham (2004) emphasises, the advantages of money for the individual presuppose the existence of money as an institution, and it is the institution, not the equilibrium property, that needs to be understood.

The search-theoretic tradition in monetary economics, associated with Lagos and Wright (2005) and the substantial body of work that followed, has made genuine progress in incorporating money into general equilibrium frameworks. It is worth noting, however, that this literature works with a definition of money, “an object that does not enter utility or production functions, and is available in fixed supply” (Kocherlakota (1998)), that is explicitly designed to fit within a monetary theory of credit.⁵⁷ A key result of this literature is that credit (or memory) supports better outcomes than money so defined; monetary outcomes are, in formal terms, a subset of credit-based outcomes (Kocherlakota (1998)). Much of the subsequent work has focused on explaining how such “money” can circulate in equilibrium despite being dominated by credit-based mechanisms. Such work does so by imposing structural restrictions on the use of credit, for instance requiring that loans equal deposits (Berentsen et al (2007)) or that debt be supported by collateral (Gu et al (2013); Gorton and Ordoñez (2014)). The credit theory of money, by contrast, takes as its starting point precisely the world these models reach as a conclusion: one in which credit is the primary mechanism and the interesting questions concern its institutional structure, its hierarchy and its periodic fragility. The main text of this paper takes that world as given and attempts to describe its architecture.

⁵⁷ I thank Carolyn Sissoko for clarifying this.