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Chapter 4. The Scarcity of Money

Money is an institution. It has therefore normative content which is derived from the functions it serves. Standard economic textbooks define money as a token that facilitates trade. However, in this theoretical frame it is hard to explain why money is the foundation of individual liberty and why it has crowded out ancient liberty.

Money becomes the foundation of modern liberty when we look at it as a means of payment. It then ceases to be merely a medium of exchange and becomes the institutional means by which contractual obligations are created, transferred, and finally discharged. The link between money and liberty are contracts. Previous chapters have shown how contracts constitute individuals normatively as free and equal. I will now show how the practice of making contracts expands in the monetary economy.

Money takes different observable forms across economies, though its nature as credit is continuous. In economies with shallow financial systems — Myanmar, Zimbabwe, Sudan — cash circulates because banking barely reaches most transactions. In high-inflation economies — Venezuela, Argentina, or Weimar Germany — money collapses back into banknotes because inflation destroys the credit relationships that sustain deposit money. In developed economies with stable prices, money is overwhelmingly bank credit. Coinage supported monetised exchange but limited the elasticity of settlement capacity, thereby constraining growth. Credit money has transformed not only the economic dynamics but also the normativity of modern societies.

Gurley and Shaw (1955) argued that economic development is driven by financial deepening: as economies grow, a more complex financial system expands the supply of *inside money* and financial contracts. This fits my approach that money provides the foundational context of modern liberty because, as I will show, inside money creates a recurrent pressure to reproduce settlement capacity through new credit contracts. This is a structural imperative, not a contingent outcome. Credit money has shifted the desire for survival security from hierarchical collective protection to individual management of liquidity. The driver behind this development has been the interest rate which combines liquidity preference with the need to expand financial and commercial contracts.

To explain the logic behind this process I need to delve into monetary theory. When money is primarily interpreted as a means of exchange, the normative implications of credit money are obscured, but when we see it as a means of payment that settles debt contracts, the link to liberty becomes apparent.

Two paradigms of money

In the economic literature, two paradigms of money have been salient. Schumpeter (1954/82) spoke of the commodity and the claim theory of money. The commodity theory interprets money as a means of exchange. I call it the exchange paradigm. The claim theory, by contrast, focusses on money as a means of payment which corresponds to the contract paradigm

discussed in the last chapter. The first is a theory of efficient barter, the second integrates financial transactions. These are not strictly two different theories but rather two perspectives on money. Let us look at this more closely.

Money as a means of exchange

The classical theory focusses on the exchange of commodities as the prime motive for economic transactions. Individuals exchange useful goods for other useful goods. Walras' (1988) general equilibrium theory stipulated the conditions under which these exchanges clear simultaneously and Arrow and Debreu showed them to be welfare optimising. In general equilibrium models, all markets clear simultaneously and any endowment constitutes immediate purchasing power.¹ Money is therefore redundant as a medium of exchange. But if money is redundant, why does it exist?

One answer is that it reduces information costs (Brunner & Meltzer, 1971) and improves the efficiency of barter by overcoming frictions caused by the "double coincidence of wants" (Jevons, 1970 [1871]).² But gathering information takes time, of which we have little. Goodhart (1989, p. 3) therefore argued that "if we had to rely on barter, involving not only the double coincidence of wants but also a double coincidence of timing of those wants, it would take an eternity to be able to reach a general equilibrium solution described by Pareto optimal allocations in all markets".

Since holding cash balances facilitates the exchange of goods over time, Sidrauski (1967) placed money directly in the utility function, together with goods and services. His money-in-utility model yields monetary utility by enabling smoother intertemporal consumption. This yields a super-neutrality result: under perfect foresight and frictionless adjustment, changes in money growth do not affect the real allocation of goods (Blanchard & Fischer, 1989). Exchange is effectively reduced to barter.

A correlate to Sidrauski's *money-in-utility* is the *cash-in-advance* model.³ The most widely accepted proposition about money — bordering on banality — is that money buys goods. All economic transactions are necessarily mediated by money. Robert Clower (1967) said the obvious: "goods do not buy goods; money buys goods and goods buy money." He was right that goods do not buy goods and that purchases require money. The claim that "goods buy money" really means that goods are sold for money. In practice, one buys by giving money

¹ (Walras, 1988); (Arrow & Debreu, 1954)

² In a pure barter system, there are as many markets as there are pairs of exchangeable goods. In one market, apples are traded against nuts in another apples against cars, and so on. For q goods, there are $(q/2)(q-1)$ markets. Under barter conditions, some of these markets may be inactive, but in a fully monetized economy, all $(q-1)$ nonmonetary commodities are exchanged against money only. Money is the commodity that serves as a general equivalent. This reduces the number of markets to $(q-1)$ and thereby lowers the complexity of finding exchanges and generates efficiency gains (Niehans, 1971). The term costs "is a catchall for different items. Costs may arise because the parties have to communicate, the goods have to be inspected, measured and marked, a title search may be necessary, contracts have to be drawn up, title of ownership has to be transferred in certain prescribed forms, the transfer may have to be recorded etc. There are good reasons for classifying many of these items as search or information costs."

³ (Lucas & Stokey, 1987); (Blanchard & Fischer, 1989).

and sells to receive it. Lucas and Stokey (1987) have shown how the cash-in-advance restriction can be embedded in a competitive general equilibrium framework. They define the value of money implicitly by what it can buy — its purchasing power — and only by this. But what constitutes purchasing power remains unexplained.

The exchange paradigm holds that money evolved as a private-sector, market-oriented response to the transaction costs inherent in barter and exchange. Adam Smith (1978 [1776], p. 25) thought that “the propensity to truck, barter, and exchange one thing for another” was a “propensity in human nature”. The classics, from Aristotle to Smith and through to Marx, identified the institution of money with a commodity—mainly gold and silver. Goodhart (1998) called this group of thinkers the metallists.

An alternative interpretation, starting with Plato (1967, pp. 742a–b), refers to fiat money. “Fiat” is Latin for “let it be done” — a command or decree. Applied to money, it refers to money whose validity derives from public authority rather than from commodity backing or contractual agreement. In this view, the use of money is based essentially on the power of the issuing authority because the coins or monetary instruments are struck with the insignia of sovereignty. This is the Chartalist approach, famously represented by Georg Friedrich Knapp who described money as a “creature of law,” arguing that a system of payments cannot be understood “without reference to the state”.⁴ Similarly, Modern Monetary Theory emphasizes that the state imposes obligations—most importantly taxes—denominated in its unit of account, thereby generating demand for its money (Wray, 2016, S. 631). In this view, monetary institutions are grounded in directive authority: the state defines the unit of account and enforces its use through legal obligations.⁵

Both these approaches have their strengths and shortcomings. However, I shall focus on money as an institution. In principle, barter theories assume voluntary exchanges and choice. Ludwig von Mises (1981 [1912], p. 46) argued that liberty requires the capacity to choose meaningfully, which in markets requires monetary calculation. Without money there are no prices and hence no real choice. He therefore rejected Knapp’s Chartalism, because “by declaring an object to be fitted in the juristic sense for the liquidation of liabilities expressed in terms of money, the state cannot influence the choice of a medium of exchange, which belongs to those engaged in business”. Von Mises claimed that people choose a stable store of value as money. This may be true in hyper-inflationary environments but in a stable monetary economy no one arbitrarily chooses a monetary standard for making contracts.

⁴ “What forms part of the monetary system of the State and what does not?... The criterion cannot be that the money is issued by the State (...). No can legal tender be taken as the test (...). We keep most closely to the facts if we take as our test, that the money is accepted in payments made to the State’s offices. (...). On this basis it is not the issue, but the *acceptation* which is decisive. State acceptance delimits the monetary system. By the expression ‘State acceptance’ is to be understood only the acceptance at the State pay office where the State is the recipient” (Knapp, 1924, p. 95).

⁵ Clearly, in the Middle Ages, monetary laws were commands (Desan, 2014). In modern democratic societies that is disputable, for it depends to what degree one considers taxes as commands unfounded on commissive speech acts. I have argued in earlier chapters that in the fully modern economy the state is an institution constituted by the social contract. Tax laws can therefore be interpreted as collective commissive speech acts, and public debt is a loan contract as any other.

Monetary contracts are denominated in collectively accepted units of account. Individuals choose to pay with these units because everyone else does so, not because other assets are better stores of value. Von Mises does not recognise this collective intentionality. On the other hand, the Chartalist imposition of a specific monetary standard by the sovereign also fails when it is not supported by the collective intentionality which creates institutions.⁶ When acceptance is lacking, authoritarian regimes impose exchange controls. Money then becomes dysfunctional because it is no longer scarce. The demand for other assets is higher. By contrast, our institutional approach explains money neither by barter-like exchange nor by government imposition—it sees money as an institution.

Institutions, we have seen, are constituted by status function declarations in the sense of John Searle (1995). They assign deontic power to a unit of account. Acceptance is not created by decree alone; it emerges from the alignment between institutional declarations and the actual practices of agents.⁷ Governments cannot create money at will without regard to how agents accept and use it in their contractual relations.

This institutional perspective recognises the commissive structure of monetary relations that is constituted by contracts. In modern economies, money predominantly takes the form of bank deposits. They emerge when banks make loans to their clients. Deposits are created through credit contracts, not by government command, although the central bank may regulate (not constitute) the supply of money. The monetary system is therefore not only sustained by directive obligations (such as taxes), but also by a dense network of reciprocal commitments between private agents. It is this contractual structure that generates the demand for money as a settlement asset and gives money its central role as the means of payment.

Money as a means of payment

In the contract paradigm, the emphasis shifts from exchange to payment. The exchange is constituted by a contractual agreement between free and equal individuals. Money is an institution when a status declaration assigns the function of a means of payment to an object X within the context that defines it as legal tender. The basic structure of such declaration is: “This unit of account (e.g. pound, dollar, euro) counts as the means for discharging monetary obligations.” Governments may formally declare which objects (X) are to perform monetary functions, but their status (Y) depends on collective recognition in practice.

⁶ (Mitchell-Innes, 1913) reports that a Carolingian ruler punished refusal of coin by branding the offender’s forehead with the rejected coin, but I have not been able to verify that anecdote in the Carolingian monetary capitularies. The identifiable primary texts instead prescribe fines or corporal punishment for refusing valid denarii; see especially the Capitulary of Frankfurt (794), c. 5, which says that if someone refuses the new denarii, a free person pays 15 solidi, while a servile person may lose the transaction or be stripped and publicly beaten.

⁷ (Desan, 2014, p. chap. 2) describes how “the legalism of the monetary vocabulary regains its validity: this is value tried, verified, and decreed by the highest authority in the land” (p. 77). Desan has a more balanced approach than most Chartalists when she writes: “The government sold people a money that would work in both private and public worlds”.

By referring to legal tender, one invokes the collective acceptance that money counts as a means of payment. The crucial point is that legal tender confers institutional power: it designates which means of payment are recognized for discharging obligations under the law. In line with Searle (2010), I consider legal tender laws as the standing status function declaration: they constitute the institutional reality where contracts are made by commissive speech acts that give money the legal power to discharge debt definitively. This power remains in force as long as collective recognition sustains it. I have described the mechanism that generates this collective intentionality in the last two chapters. It clearly establishes that an institution like money cannot be constituted by barter or command.

This institutional mechanism is deeper than merely facilitating exchange. Without such institutional recognition, money would remain a coordination device—a convenient medium of exchange. With it, money acquires the capacity to serve as the final settlement asset for monetary obligations because everyone knows that this is what money does.⁸ Legal tender is therefore the institutional context that gives money meaning and generates security and certainty for the discharge of debt contracts.

THE CONTEXT OF ROMAN LAW

The roots of legal tender laws go back to antiquity, but the modern concept evolved gradually through Roman law, medieval monetary sovereignty, and the rise of modern states and banking. Roman jurists developed the legal framework of monetary debt that was far more formalised than Greek law (Zimmermann, 1996). The central concept in Roman private law was *solutio*—the extinction of an obligation through performance (Watson, 1965). The key principles in the Digest of Justinian (between 530 and 533 AD) established that monetary debts must be paid in money, that payment dissolves the obligation, and that the nominal amount determines discharge. Money thereby became the universal settlement instrument of the legal system.

A famous principle attributed to the jurist Paulus states: “*Pecunia soluta liberat*” (“Payment in money frees [the debtor]”).⁹ Roman law treated money as the standard instrument for settling obligations. It established that an obligation ends when the debtor performs the promised prestation: *Solutio liberationem continet*. “Payment contains (or brings about) liberation.” This is exactly the function that modern law attributes to legal tender.

Roman jurists defined an obligation as a legal bond that disappears once payment (*solutio*) occurs (Digest 44.7.3; 46.3.1). Monetary payment therefore functioned as the definitive discharge of debt. Modern financial systems rely on an analogous mechanism: interbank payments, settled in central-bank money, extinguish the obligation between banks once reserves have been transferred. Across two millennia

⁸ For the history how bank notes became legal tender see (Horsefield, 1960) and (Desan, 2014, p. 311).

⁹ Digest of Justinian 50.16.176 (Paulus)

the institutional principle has remained the same: an obligation ends when payment is made in the universally recognised settlement asset. Money thus derives its special status from its capacity to terminate obligations with certainty.

The stakes of this principle were starkly visible in early Roman practice. A debtor who failed to repay could fall into *nexum*, a form of debt bondage in which the debtor pledged his own person as security: upon default, the creditor could seize and physically control him. Livy (1919, p. Bk VIII) described how indebted citizens could be imprisoned by creditors, forced to work off the debt, and were sometimes physically abused. Although technically the debtor did not become a slave, default on a monetary obligation meant the loss of personal liberty itself. The link between money and freedom was therefore not about the accumulation of goods—it was about the institutional freedom of debt.

The abolition of *nexum* by the Lex Poetelia Papiria (326 BCE) was therefore not merely a legal reform but an institutional transformation: it decoupled monetary default from personal subjugation, making the obligation itself—rather than the debtor's body—the object of enforcement.¹⁰ This is precisely why the specification of what constituted valid payment mattered. This established the Roman principle of nominalism. Under nominalism, a debt denominated in money is discharged by paying the nominal amount of that currency, regardless of fluctuations in metal content or purchasing power.¹¹ If a contract required 100 denarii, paying 100 denarii discharged the obligation even if the coin contained less precious metal. This nominalist principle still governs modern monetary law, providing the formal security inherent in contractual institutions. Money, not purchasing power, discharges debt.

By transforming obligations into legally enforceable bonds that were dischargeable through monetary payment, Roman law laid the foundations for the impersonal exchange relations characteristic of modern market economies. Without a settlement institution, obligations remain uncertain, credit relations personal, and markets limited. With money, obligations can be quantified, debts settled definitively, and contracts are made transferable. Individuals can exit debt relationships without subordination by making payments. The universal settlement function of money thus makes possible a society of formally equal contracting individuals; money is not merely a medium of exchange but an institutional foundation of individual liberty.

¹⁰ (Livy, 1919, pp. Bk VIII, 28): “That year, for the Roman plebs, there came as it were a new beginning of liberty, because people ceased to be bound in debt-bondage. The law was changed, moreover, because of the notorious lust and cruelty of a single moneylender.” (Eo anno plebi Romanae velut aliud initium libertatis factum est quod necti desierunt; mutatum autem ius ob unius feneratoris simul libidinem, simul crudelitatem insignem. L. Papirius is fuit, cui cum se C. Publilius ob aes alienum paternum nexum dedisset, quae aetas formaque misericordiam elicere poterant, ad libidinem et contumeliam animum accenderunt.)

¹¹ *In pecunia numerata non qualitas sed quantitas spectatur.* (“In coined money it is the quantity, not the quality, that matters.” (Digest 12.1.2))

The Roman perspective differs from the classical view of economists such as Adam Smith. Instead of emphasising exchange, it focused on settlement and obligation, which is closer to modern monetary law and institutional economics. The Roman concept implies that money creates certainty in contracts because obligations can be discharged definitively. This certainty was one of the institutional foundations of impersonal exchange and contractual freedom.

Roman law reinforced this by developing specific mechanisms—assignment of claims, negotiable credit instruments, agency, and partnership—that extended economic relations beyond family, kinship, and status networks. Over time, Roman law gradually moved toward recognising consensual agreements, laying the groundwork for the modern principle that agreement creates obligation (Frier, 2016).

The emergence of modern credit money was a gradual process that changed the normative logic of money and society. The legal context and therefore the institution of money differed significantly in Rome from ancient Greece.¹² Greek city-states such as Athens had coinage, markets, long-distance trade, and banking and credit. But Greek law never developed a unified doctrine of obligation, a systematic concept of contract, or a law of transferable claims (Phillips, 2013). Contracts were enforced through specific actions that were embedded in status relations or civic membership. As a result, economic relations often remained personal and contextual. The Roman system, by contrast, was relatively free of prejudice and moralistic considerations. The legal system was designed to preserve formal rules for economic relations (Vivenza, 2012). The impersonal role of money enabled Rome to expand into a vast empire integrating multitudes of cultural identity.

The Roman monetary system collapsed with the Empire. The decline of monetary taxation and the debasement of imperial coinage gradually undermined the legal infrastructure of contractual exchange. As monetary settlement disappeared, economic relations reverted to hierarchical obligations of status — turning into the feudal structures of medieval Europe. As I shall describe in later chapters, it took nearly 1000 years for contracts and monetary laws to re-emerge. Between the 11th and 13th centuries, Europe experienced the Commercial Revolution, expanding monetary exchange again and new forms of individual liberty emerged in cities and commercial law. Economic relations thereby became independent of social hierarchy—the institutional transition from status to contract later famously emphasised by Henry Sumner Maine (1861).

MODERN MONEY

¹² (MacDowell, 1978); (Harris, 2008). I come back to this in the next chapter.

Ancient economies were based on coinage.¹³ Coins were issued by temples and monarchs. They embodied value through their metal content, and the authorities stamped them to declare that the coins had the promised metal content. But coins did not represent contractual claims— they defined a unit of account. I will show in the next chapter how coins became transferable means of payment in ancient Greece and how this relates to the emergence of the liberty of the ancients.

The earliest banks were institutions embedded in the context of religious and political authority. Their core function was safekeeping, accounting, and settlement, but lending developed only gradually. With the development of long-distance trade in the Renaissance, disruptions in payment networks caused financial vulnerabilities which gave rise to new banking institutions. The establishment of the Bank of Amsterdam in 1609 illustrates that money could be stabilised through centralised settlement in a uniform unit of account. By transforming heterogeneous coin into ledger balances transferable *at par*, the Wisselbank created money as a purely institutionalised claim to final settlement, independent of the physical movement of assets (Quinn & Roberds, 2009). Its defining feature was not its role in financing the state (that came later), but its capacity to guarantee settlement. Money thus appears, from its earliest modern form, as liquidity *par excellence*: an asset valued not for its intrinsic properties or yield, but for the certainty with which it discharges obligations.

The next step in the evolution of money shifts from settlement as ledger transfer to settlement through transferable claims. With the creation of the Bank of England in 1694, monetary innovation became linked to public debt management, and bank liabilities began to circulate as instruments of payment. Banknotes became accepted means of payment denominated in the legal unit of account and recorded as liabilities of the issuing bank. They were constituted by contracts, that is by commissive speech acts, while their acceptance was reinforced by the regulative framework of legal tender laws.

Modern monetary systems distinguish between liabilities of the central bank and commercial banks. Keynes (1971 [1930], p. 5) called central bank money “money proper” and commercial bank deposits “bank money”. Central bank money is also sometimes called high-powered money or M0. Minsky (2008, p. 258) observed that “the public uses bank deposits as money, while banks use central bank deposits as money. This layered arrangement is the fundamental hierarchical property of our money and banking system”.¹⁴

Yet while commercial banks provide payment services to the public, their deposits are not legal tender. That status applies only to central bank money. If liquidity is understood as the capacity of an asset to settle obligations with certainty when they fall due (Hicks, 1967), only

¹³ For Finley (1999) ancient “money was coin and nothing else”. Schaps (2008, p. 48) also concluded: “no matter how carefully I look at the money of ancient Greece and Rome, I do not see a cowrie shell, nor a token of an embedded transaction, nor a transient marker in a vast system of credits and debits. I think I know much better than I used what a coin is, but after more than twenty years of looking at Greek money, I still see a coin”.

¹⁴ See also (Mehrling, 2011),

central bank money fully satisfies this definition, because this is how legal tender laws constitute money. This explains why central bank money is liquidity *par excellence* and banks keep it as “reserves”. Banknotes are simply printed central bank IOUs distributed to the public through commercial banks. Other assets, including deposits or money market instruments, are more or less liquid depending how easily they are convertible with little loss of value into central bank money. The certainty that they will settle obligations when they fall due is not absolute. In bank runs, commercial banks may default on their obligation to provide means of payments to their clients. When economic agents — or even the entire financial system — fail to obtain money quickly enough to meet obligations as they fall due, severe shortages of liquidity will cause financial crises, although this does not necessarily imply insolvency as non-monetised assets may still exceed liabilities. Nevertheless, despite such fragilities bank money is widely accepted as a means of payment because in normal times it can be converted into money proper at low cost with a high degree of probability.

Money and scarcity

Neoclassical theory has contracted to a single idea: economics is the allocation of scarce resources. But what constitutes scarcity? Robbins (1932) defined it relationally — the gap between unlimited ends and limited means. I argue that it is the monetary economy itself that generates the aggregate scarcity driving the dynamics of modern market economies.

Scarcity means that wants exceed available resources. If ends are captured by a utility function and means are finite, the problem becomes one of maximising utility under constraints. Introduce cash-in-advance, and money becomes the hard budget constraint. Psychologically, we scale down our desires to match what is available; in the standard framework, however, desires — the utility function — are held fixed. What is optimised is the allocation of quantities subject to the constraint, satisfying desires as fully as resources permit. In equilibrium, goods exchange at ratios equal to their marginal rates of substitution, that is, their relative marginal utilities. Where money is the binding constraint, its shadow price measures the marginal value of relaxing it. The fundamental implication follows directly: every good that enters exchange is, by definition, scarce

Yet, in a pure exchange economy, utility maximisation under scarcity yields exchange ratios equal to the marginal rate of substitution between goods — money is not required. With many goods, however, the multiplicity of bilateral exchange ratios creates the inefficiency that Jevons (1970 [1871]) identified as the double coincidence of wants. The standard solution is to introduce a general equivalent: a numéraire that expresses all exchange ratios relative to a single unit. But a numéraire is merely a unit of account. It has no institutional force and cannot discharge obligations. What transforms a numéraire into money is the certainty that transferring the unit discharges the liability. This is the institutional fact — sustained by the collective recognition — that constitutes money as a means of payment.

The marginal value of access to the one asset that extinguishes obligations with certainty is the shadow price of liquidity — the liquidity premium. Then all relative prices can be expressed as prices in terms of a single monetary unit, that is as exchange ratios between the

marginal utility of goods and the shadow value of liquidity. But this leaves open a prior question: what determines the marginal value of money? If nominal prices equal the marginal rate of substitution between money and goods, then the shadow price of liquidity must reflect its scarcity. We therefore need to explain what constitutes the scarcity of money.

Metallists derive the value of money from the value of gold and silver of which coins are made. Coins are then exchanged for equivalent value against commodities. The growing demand for money as a means of exchange and the low elasticity of supply of gold and silver generate scarcity and limit the size of markets. But when money is no longer metal, what determines its value? It cannot be purchasing power, because that is the inverse of prices and therefore requires the value of money as the measure.¹⁵

The answer is that money derives its utility from functioning as the accepted settlement asset, which provides certainty of discharge. People need money to make payments. Liquidity is priced not because agents psychologically enjoy holding money, but because scarce settlement capacity becomes essential for maintaining exchange, honouring contracts, and avoiding default. The liquidity value of money is then the shadow price of holding scarce money balances. This is precisely Keynes's liquidity premium: not the price of a scarce commodity, but the shadow price of the settlement constraint itself.

The settlement gap

The scarcity of money is created by what I call the settlement gap. The annex to this chapter provides a formal model of its logical structure. To understand how it works, assume a pure credit economy where money is bank deposits and nothing else — what Gurley and Shaw (1960) called inside money. Distinguish between banks that make loans and the real sector — firms and households — that borrows and holds all deposits. Deposits are the real sector's assets and banks' liabilities; loans are assets for banks and liabilities for the real sector.

Since bank loans are secured by claims on borrowers' assets, loan contracts embody a direct claim to the payment of money and only an indirect claim on future output. The creditor's right to seize real assets remains dormant so long as contractual payments are honoured; it becomes operative only in default. The direct claim, by contrast, is extinguished when the agreed monetary payment is made. This shifts the analytical focus from purchasing power toward the capacity to settle obligations as they fall due.

¹⁵ In a Money-in-the-Utility (MIU) model, money enters directly into the utility function alongside consumption, so holding money itself generates utility. The consumer maximizes utility subject to a budget constraint, and the first-order conditions imply that the marginal utility of money balances equals the Lagrange multiplier λ , which is the shadow value of liquidity. Thus, at the optimum, the utility gained from holding one more unit of money equals the utility sacrificed by not spending that unit on consumption. In contrast, in cash-in-advance models (CIA) or settlement-constraint models, money is valuable because it relaxes the settlement constraint and allows obligations to be discharged. There, λ is not the marginal utility of money itself, but the shadow price of liquidity or settlement capacity — the marginal increase in attainable utility from having one additional unit of means of payment under conditions of scarcity and uncertainty.

A substantial literature in institutional economics has emphasised the role of secure property rights, the rule of law, independent courts, and credible governments in ensuring contract enforcement. Yet enforcement and settlement are not identical. The former concerns the power to seize assets in case of default; the latter concerns the availability of means of payment capable of extinguishing the debt.

Institutional economics tends to reduce uncertainty to insufficiently stable property rights and weak enforcement. But uncertainty is a broader concept. In agricultural economies, climatic volatility is a major source of insecurity; civil unrest and war devastate individuals' survival; economic crises undermine the contractual infrastructure on which credit depends; and financial bubbles with excessive leverage erode the capacity for payment settlement.

Keynes (1967 [1936], pp. 166-7 and 170) captured this dual character of money when he defined it as “a command over general purchasing power” while simultaneously emphasizing the precautionary motive as the “desire for security as to the future cash equivalent of a certain proportion of total resources.” The former highlights money's role in exchange; the latter its role in securing future settlement. What unites these functions is not merely a claim on goods and services, but the assurance that contractual obligations can be discharged when due. Purchasing power derives from this settlement capacity not the other way around.

When making loans, banks charge interest, which increases the liabilities of the real sector. The interest claim is settled by paying money — in this simplified model, by deposits. A credit economy therefore contains a structural tension. Loan contracts require repayment of principal plus interest at maturity. The deposits in circulation represent loans previously disbursed; interest falls due only later. When the borrower repays the principal, deposits are extinguished and the banking sector's balance sheet contracts — money is destroyed.

When a loan is granted, no corresponding deposits are created to cover the interest obligation. Individual borrowers may acquire the necessary funds through income, asset sales, or transfers from other agents — but taken in aggregate, the banking system creates deposits equal only to the principal. Total debt-service obligations therefore exceed the stock of deposits originally brought into existence to finance them.

This gap — between the original loan principal and the total debt-service obligation — is the settlement gap. It arises because contractual interest obligations cause outstanding debt to grow faster than the deposits created to fund it: a structural divergence between commitment and liquidity. It is not a temporary disequilibrium but a recurrent feature of any economy in which money is born as credit and extinguished through repayment. The settlement gap theory does not deny that individual borrowers can service their debts; it holds that the system as a whole must continuously reproduce settlement capacity — through new credit, outside money, or default.

Three modalities exist by which the gap may be closed. The first is new deposit creation: to ensure sufficient liquidity for accumulated debt obligations — principal plus interest — new credit must expand at least enough to cover the contractual interest charge. This closes the private aggregate settlement gap today but opens a new one tomorrow.¹⁶ The interest claim thus explains the continuous expansion of contractual practices in a credit economy. Because money confers the certainty of being able to settle contracts when they fall due, the interest rate compensates lenders for surrendering that certainty. Uncertainty is therefore the binding constraint of a credit economy, and money is the instrument by which individuals insure themselves against it.

The settlement gap and uncertainty

Security, however, takes different forms across societies — a point I return to below. For the ancients, hierarchy guaranteed survival. In the credit economy, holding liquid money balances guarantees that contractual liabilities can be met, and individuals remain free to choose the purposes to which they commit themselves.

The settlement gap is forward-looking. Agents are contractually committing to pay a fixed sum of money at a specified future date, while facing uncertainty about future income, refinancing conditions, and the behaviour of other agents. With risk aversion, they anticipate states of the world in which available means of payment may be insufficient to meet outstanding commitments — states in which the monetary settlement constraint binds. This anticipation is the structural foundation of liquidity preference: the greater the perceived difficulty of meeting future money-denominated obligations, the greater the value of holding liquid balances today.

The precautionary function of money derives value from its role as immediately available settlement capacity. Because non-monetary assets must be converted into money before obligations can be discharged, the settlement gap separates asset ownership from final payment. Money redeems debt; liquidity preference reflects the valuation of the settlement capacity under uncertainty.

The liquidity premium is the shadow price of payment security: the marginal value of holding one additional unit of money in an economy where contractual commitments systematically outrun the deposits created to service them. It is not an incidental feature of asset choice but a structural price signal generated by the settlement gap itself.

This accounts for two features of monetary economies that neoclassical theory struggles to explain. First, the liquidity premium rises with uncertainty: as confidence weakens that future income or refinancing will close the gap in time, demand for settlement capacity intensifies.

¹⁶ Monetary circuit theory notes that when banks pay dividends and meet operating costs — including wages — they generate additional deposits and expand the money supply. This is correct. Equilibrium requires that firms book profits as unsold working capital while banks carry theirs as non-monetised assets. When banks purchase goods and services from the real sector, they monetise firms' working capital accordingly. A significant rise in uncertainty, however, widens the settlement gap and depresses aggregate income — reducing, in all likelihood, bank expenditure as well. Closing the gap then requires an injection of outside money.

Second, money commands the highest liquidity premium of any asset because it alone discharges obligations immediately and without prior conversion. Every other asset must compensate for its inferior settlement properties with a higher pecuniary yield — and that yield is the interest rate.

The less liquid the asset, the higher the return required to compensate for surrendered settlement assurance. Because that assurance becomes more valuable as the environment grows less predictable, the liquidity premium rises with uncertainty. The transmission mechanism is direct: high uncertainty drives up liquidity premia, which raise borrowing costs, compress credit demand, and reduce the endogenous supply of deposits — depressing growth.

But the pressure does not stop there. Outstanding interest obligations, fixed by contracts written yesterday, continue to widen the settlement gap regardless of today's conditions. Higher uncertainty thus simultaneously enlarges the gap and shrinks the capacity to close it. Financing conditions in a monetary economy do not merely transmit shocks — they amplify them. Monetary economies are, for this reason, endogenously prone to instability.¹⁷

Uncertainty shapes not only the demand for money but also its supply. In a pure credit economy, the elasticity of credit supply is high, though not infinite.¹⁸ It depends on bank costs — refinancing costs with the central bank foremost among them, alongside the liquidity premium as the shadow price of settlement assurance in uncertain environments — while loan demand is a function of borrowers' expected income. Keynes focused on the expected rate of return on new investment, which he termed the marginal efficiency of capital.

The lending rate is a composite: the liquidity premium plus the costs banks incur in supplying credit — refinancing costs for central bank money, fixed operating costs, and idiosyncratic borrower risk.¹⁹ It reflects the interaction of loan supply and demand, but it is anchored by lenders' perceptions of uncertainty, since shifts in uncertainty alter the terms on which credit is offered. Those perceptions determine the shadow price of holding liquidity. The interest rate is therefore a function of the liquidity premium, and through the settlement gap channel uncertainty governs the creation of deposits and, with it, aggregate income.

Seen this way, monetary economies are characterised not merely by exchange relations but by a continuous process of discharging contractual obligations through money payments. Money is not the grease that keeps the wheel of exchange turning — it is the condition under which markets can function at all. Exchange explains why money is useful; settlement explains why it is indispensable.

¹⁷ (Stiglitz & Weiss, 1981); (Greenwald & Stiglitz, 1993); (Minsky, 2008)

¹⁸ Endogenous money theories often model money supply as perfectly elastic (Moore, 1988). Stiglitz & Weiss (1981), challenge this: because higher lending rates worsen adverse selection and moral hazard, banks may ration credit rather than clear the loan market by price. In the later Greenwald–Stiglitz framework (1993), lending depends further on banks' net worth, risk perceptions, and balance-sheet constraints, so monetary transmission operates through credit availability, not the policy rate alone. See also Stiglitz & Greenwald (2003).

¹⁹ The distinction between measurable risk — approximating the fixed costs of compensating probable losses — and pure unmeasurable uncertainty originates with (Knight, 1921).

Inside and outside money

If closing the settlement gap is left to the private sector and sufficient new credit is not forthcoming, default becomes the residual mechanism: debt write-offs restore the balance between valid claims and available means of payment, but at the cost of wealth destruction. That destruction raises uncertainty, drives up the liquidity premium, and destabilises the system further. This is the Keynes–Minsky spiral (Minsky, 2008). Stability is restored only when the stock of money expands sufficiently to meet the required interest payments.

The second modality for closing the settlement gap is the provision of outside money. Inside money supply emerges in response to credit demand; the binding constraint is the cost of borrowing, not a quantity set by policy. It denotes privately issued monetary liabilities that generate repayment obligations and thereby produce the structural settlement gap: every loan creates an interest obligation that exceeds the deposit it brings into existence. Outside money does not.²⁰ This is now the standard account of money creation.²¹

Outside money consists of financial assets that are nobody's private liability and therefore represent net financial wealth for the private sector. The classic form is commodity money — gold above all — a real resource that enters circulation through trade, not credit. Modern outside money takes two forms: government-issued fiat currency and commercial bank reserves held at the central bank, both liabilities of the state rather than of any private agent. Because outside money reaches the economy without generating a corresponding private debt obligation, it closes the settlement gap without opening a new one.

The total stock of means of payment available for settlement is the sum of inside and outside money. When the banking system fails to create sufficient new inside money to close the settlement gap — because liquidity preference is elevated, risk spreads are wide, or balance sheets are impaired — outside money can substitute. At equal velocity, each unit of outside money injected reduces the private credit required for settlement by exactly one unit.

This is not demand management in the conventional Keynesian sense. It is a settlement-capacity effect: central bank money complements private refinancing, relieving the pressure that would otherwise force a liquidity crisis.

This reframes how we should think about central bank interventions and fiscal policy. Quantitative easing, emergency liquidity facilities, and net fiscal injections work primarily by substituting outside money for inside money at precisely the moment when the settlement gap cannot be closed by private credit alone — though lower interest rates or higher incomes may follow as a consequence. The question is not whether the government spends more, but whether outside money reaches the settlement constraint before a Keynes–Minsky spiral — high uncertainty feeding higher liquidity preference, higher lending rates, and collapsing

²⁰ This is a slight simplification, for banks borrow reserves (central bank money) at the policy rate. This generates a settlement gap for central bank money which allows the central bank to set the policy rate.

²¹ (McLeay, Amar, & Ryland, 2014); (Moore, 1988)

money supply — has already compressed income and growth. If the liquidity injection exceeds the amount required to close the settlement gap, the excess will be absorbed by rising prices.

Outside money can stabilise, but it can also destabilise. When outside money shrinks — through fiscal consolidation, current account deterioration, or central bank balance sheet reduction — the full burden of closing the settlement gap falls back onto private credit creation. The substitution is not necessarily one-for-one. Whether private credit expands depends on the degree of uncertainty surrounding future settlement capacity and on expected income, which governs the demand for new borrowing.²²

Under normal conditions, there is an equilibrium range when the liquidity premium is stable. Firms borrow against prospective returns, and the margin of new credit is set by investment opportunity. The institutional boundary between inside and outside money is therefore not a technical detail. It is the fault line along which monetary crises develop. Monetary policy can regulate and stabilise the economy by issuing outside money, but money is constituted by credit contracts in the legal context of monetary laws; and those contractual practices are the foundation of the discourses of modern liberty, as the preceding chapter established.²³

Credit and liberty

Inside money consists essentially of deposits created by contracts. Because credit contracts are constituted by commissive speech acts — where lenders and borrowers are free to accept or reject the terms — inside money embodies the logic of political individualism: deposits arise only where agreements are voluntarily concluded.

Outside money, by contrast, is fiat money created through authoritative public institutions. In the pre-modern world, the sovereign commanded the mint; coinage was later displaced by fiat paper money. Outside money is therefore brought into existence by directive rather than commissive speech acts. Supplied by the state and the central bank, it does not generate the same need for continual refinancing as inside money. Government deficits may expand the stock of outside money when monetised but need not do so when financed by private investors.

Whether government debt constitutes net wealth for the private sector — the question at the heart of the Ricardian equivalence literature (Barro, 1974) — is distinct from the issue examined here. The settlement gap is a liquidity phenomenon, not a wealth phenomenon. Its direct connection to public debt arises only when that debt is monetised, thereby expanding the stock of means of payment. Monetised public debt can then stimulate spending by increasing settlement capacity. Otherwise, the government is a borrower like any other.

When the central bank monetises a public deficit — in the limit, by issuing banknotes — it generates additional liquidity, reduces the liquidity premium, and expands settlement capacity. As precautionary demand for money falls, expenditure rises. If output does not expand in proportion, however, the excess liquidity spills into prices. Higher demand may

²² This applies to public debt financed by central bank money. Where the government borrows exclusively from the private sector, no additional liquidity is created.

²³ As I said, these are meta-discourses that emerge from reflecting on contractual practices.

improve profit expectations and stimulate investment, but volatile inflation raises uncertainty and can trigger the very dynamics it was meant to suppress. Only as additional output reaches the market do inflationary pressures subside and the system return to its steady state. This mechanism captures the endogenous interaction between liquidity, expectations, and financial fragility that Keynes identified and Minsky later developed.

Inside and outside money are complements. Inside money is generated through voluntary contractual commitments and therefore reflects reciprocal individual agency; outside money derives its validity from collective authority. It is inside money that expands contractual relations among formally free agents — though it remains vulnerable to fluctuations in uncertainty. Outside money stabilises this process by supplying settlement capacity precisely when private credit creation falls short. In this sense, outside money performs a holistic function: it sustains the institutional environment within which decentralised contracting can continue.

Monetary regimes differ in the relative weight they assign to inside and outside money, generating different balances between individualistic and holistic narratives. Periods of instability heighten uncertainty and may strengthen demands for hierarchical protection and coordination. But even stable regimes vary in this balance, and over time the accumulated experience of living under one or the other may reinforce deep narratives of political authority and collective provision.

Clague, Keefer, Knack, and Olson (1999) offer indirect support for this interpretation through their concept of contract-intensive money — a measure I use at the end of this chapter and in Chapter 6 to document the long-run evolution of contracting practices in England and Great Britain across five centuries.

The constitution of market competition

Before we look at this evidence, I need to explain how the settlement gap constitutes market dynamics. This has important normative indications. The exchange paradigm treats the exchange of goods as symmetrical and value-equalising. Aristotle (1939) called this arithmetic justice, because equality can be restored by addition and subtraction. This was the basic idea of classical economists from John Locke and Adam Smith to Karl Marx. In neoclassical economics, marginal utilities are equalised, too. The contract paradigm is less definitive. Equality here expresses the freedom of contractual parties to accept or refuse the terms of a contract, but not necessarily equality of value in the transaction. As Hobbes observed, if I surrender to the highwayman who says, "your money or your life", I may choose my life freely — but the agreement is deeply asymmetric. Power distorts equality.

We can catch the asymmetric effect of power in the monetary economy through the theory of conflict. According to the contest literature, exchange theory and conflict theory constitute "two coequal branches of economic analysis, the first based upon contract and mutual gain, the second upon contest for asymmetric advantage" (Hirshleifer, 1995). To understand the nature of competition in the monetary economy, I will combine these approaches with the theory of settlement gaps.

The settlement gap generates both the bright side and the dark side of money and capitalism. The bright side is invoked by the defenders of the system. They assume pure and perfect competition, where prices for homogenous goods are equalised, and firms are free to enter or leave markets. This yields welfare maximisation with improved goods, services, technological progress, and qualitative economic growth. The dark side provokes the ire of critics; they observe a reality consisting of barriers to market entry, political influence, and the “jealousy of trade” — Hume’s (1987) term for mercantilist rivalry. These power relations dominate economies and politics by generating growing inequality, social unrest, civil and international wars (Whatmore, 2023).

The issue here is symmetry versus power. The exchange paradigm implies symmetric reciprocity. By contrast, in the contract paradigm the settlement gap generates a macroeconomic asymmetry between money and the real sector which translates into microeconomic competition for secure access to settlement capacity. The cash-in-advance proposition implies this sequencing imposed by a monetary budget constraint: agents must first sell goods to obtain money before they can spend. However, this does not imply symmetry, because only money serves as a means of final settlement. Goods generate money income, but they do not discharge obligations. Money and goods are not perfect substitutes, because money carries liquidity value that goods do not have.

Well before Robert Clower, Carl Menger (1892) had already challenged the idea that goods and money are perfect substitutes. Menger (1892) was one of the first to observe the asymmetry between buying and selling. Even in the best organised markets, we may purchase what we like at the purchasing price, but we can dispose of it again only at a loss — the selling price.²⁴ Thus, although Menger, one of the founders of the Austrian school of marginalism, remained deeply committed to the exchange paradigm, he observed that buying and selling prices are different magnitudes. He did not attempt to explain this, but argued that the most readily sellable commodity, convertible into other assets with minimal loss, is chosen as monetary standard.²⁵ His great insight was that money is not merely a *numéraire*. Yet, this meant that exchange is not symmetric. His crucial concept was *Absatzfähigkeit* (saleability, marketability) which meant that money was the most liquid asset in exchange. But Keynes recognised that holding money balances was also useful to provide security in uncertain environments and this led me to formulate the settlement gap theory above.

The asymmetry between money and real resources is reflected in the bid-ask spread between the buying and the selling price. Goodhart (1989) explained why converting non-money assets

²⁴ (Menger, 1892, p. 243) described it like this: “It is an error in economics, as prevalent as it is patent, that all commodities, at a definite point of time and in a given market, may be assumed to stand to each other in a definite relation of exchange, in other words, may be mutually exchanged in definite quantities at will. It is not true that in any given market 10 cwt. of one article = 2 cwt. of another = 3 lbs. of a third article, and so on”.

²⁵ In the German original article *Geld* (reprinted in (1936)) of the frequently quoted translation in the *Economic Journal* (1892), Menger speaks of *marktgängig* or *absatzfähig*. *Marktgängigkeit* is translated as “saleableness”, but the notion of *Absatzfähigkeit*, which appears already in Menger’s earlier (1871) *Grundsätze der Volkswirtschaftslehre*, is closer to “marketability”.

into money is costly: market-makers charge a spread to supply the immediacy of payment and delivery under uncertainty. The bid-ask spread can be interpreted as an observable market manifestation of liquidity preference. It is a practical measure of an asset's convertibility into money. It captures the underlying asymmetry between money and goods: owners of non-money assets must accept a discount when they seek immediate conversion into settlement balances, whereas holders of money already possess settlement certainty. The spread therefore measures, in market terms, the difference between ownership of a saleable asset and possession of money as final means of payment. Thus, the bid-ask spread reflects the utility gap between possessing goods and possessing purchasing power. The greater the scarcity value of settlement capacity, the wider the wedge. Money therefore buys goods more readily than goods buy money — not because goods are less valuable, but because liquidity carries a premium when settlement capacity is scarce.

The settlement gap therefore creates a structural asymmetry between buyers and sellers. If one can always exchange money for commodities without loss of value, but not commodities for money, money has a unique advantage. Because money is the scarce settlement asset, sellers compete for access to buyers' money holdings.²⁶ In this sense, capitalism systematically places sellers in competition for scarce settlement assets. This is a necessary condition for the constitution of market competition in capitalism. The buyer possesses money; the seller seeks to have it. The customer is king, and sellers compete for money. This asymmetry constitutes purchasing power.

The contrast with command economies makes the point vivid. In capitalist market economies, shops overflow with commodities, and everyone seems short of money. In planned economies — the Soviet Union, Mao Zedong's China — goods were scarce relative to money balances. In East Germany, people had enough money to buy a car, but they had to wait 15 years for delivery (Riese, 2004). In classical Soviet-style economies the state controlled both the banking system and enterprise investment. The central bank and state banks created money as required by the plan. Investment funds were allocated through the plan and enterprises received financial resources according to planning targets rather than competitive credit markets. Prices were administratively fixed and did not clear markets. Monetary balances therefore could not guarantee access to goods. The sellers of products did not compete for money. Instead, enterprises competed for administrative allocations of inputs, investment funds and production quotas. (IMF, Bank, OECD, & EBRD, 1991). Kornai (1980) called this the shortage economy.

Monopolies and conflict

The competition for means of payment can be explained by the logic of collective action (Olson, 1971). The maintenance of *aggregate* settlement capacity is a collective good. It

²⁶ Buyer's markets are usually defined as partial disequilibria where the supply of commodities exceeds demand at given prices. By aggregate buyer's market I understand a situation in which the demand for money in aggregate exceeds the demand for transaction purposes.

depends on the creation of new credit or outside money, neither of which can be supplied by individual firms acting in product markets. Firms can only improve their own access to it. They therefore face a situation analogous to Olson's public-goods problem: because they cannot generate liquidity on their own, firms pursue private solutions. This means, firms have incentives to seek selective advantages—market power, monopoly rents, political privileges, exclusive contracts, and other mechanisms that secure priority access to existing liquidity. These strategies redistribute *settlement security* among firms but do not increase aggregate *settlement capacity*. The larger the expected settlement gap and the higher the liquidity premium, the stronger the incentive to set up favourable distributional channels.

Thus, when the settlement gap increases the scarcity of money, firms respond by competitive behaviour which can be productive and generating innovation, or redistributive and leading to monopolistic competition and conflict. Of course, they can do both. The settlement gap does not imply that firms freely choose between innovation and monopoly. Rather, the relative attractiveness of productive versus contest investment depends on the degree of settlement uncertainty. When future revenues are sufficiently predictable, productive investment offers the highest expected return and competition tends toward innovation and growth. But as uncertainty and liquidity premia rise, the value of securing future cash flows increases. Firms will then devote resources to monopoly formation, political influence, regulatory capture, and other forms of contest activity that improve their individual access to settlement capacity.

Whether competition takes predominantly productive or redistributive forms depends on the institutional environment. Secure property rights, open entry into markets, predictable legal rules, and access to finance increase the expected return on productive investment relative to contest expenditure. Under such conditions, firms can improve their position more effectively by creating new wealth than by redistributing existing wealth. Conversely, when uncertainty is high and access to future cash flows is insecure, the incentive to seek privileged positions and monopoly rents becomes stronger. The struggle for liquidity is then increasingly channelled into contests over distribution rather than innovation and growth.

In models of pure and perfect competition, with free entry and no uncertainty, economic profits converge to zero. Firms earn only the normal return required to compensate the cost of capital. If lending is the only source of finance, the expected return on investment covers the financing cost, including the liquidity premium embodied in the interest rate. Competition will then drive a Schumpeterian process of creative destruction with productivity improvement, innovation, and the elimination of uncompetitive firms. This is the bright side of competition. However, competition takes the form of nasty conflicts when contenders try to hamper, disable, or destroy rivals (Hirshleifer, 1995, p. 167).

This model provides a mechanism through which the settlement gap can transform competition from a purely productive activity into a potentially wasteful contest for future

liquidity. As uncertainty increases, firms devote growing resources to securing privileged access to future revenue streams. Monopoly formation, patent races, lobbying and corruption are therefore not merely distortions of competition; they are endogenous responses to the scarcity of settlement capacity in debt-based monetary systems.

However, economic competition often spills over into the political sphere. Firms lobby for regulatory advantages that improve their profit, most commonly for tax and tariff advantages. But when partial interests capture the state that secures monopoly rents, competition becomes truly nasty. The mild version was mercantilism where current account surpluses generate outside money income for exporters and simultaneously lower the pressure on the settlement gap. In ancient times, when money was coinage, the current account generated the inflow of metal which was then minted in local currency. In modern times, a current account surplus is likely to increase central bank money when the central bank buys foreign currency. Thus, mercantilism had a point.

The most radical form of state intervention in favour of national monopolies was colonialism. As a system of political and economic domination, one society established control over a different society in a distant territory by military means. It extracted resources, labour, slaves, and wealth while imposing its own culture, governance, and laws. The early colonial monopolies, such as the Dutch East India Company (VOC, 1602–1799) and the British East India Company (EIC, 1600–1874), generated cash flows and monopoly rents that reinforced the development of liquid capital markets in the seventeenth century.²⁷ Monopolies accounted for more than three quarters of the capitalization of the emerging London stock market in 1703 (Andrianova, Demetriades, & Xu, 2011).

The model also explains why rent-seeking and monopolisation seem to increase during periods of financial stress. However, historical evidence suggests that under specific institutional conditions monopoly organisations may actually perform a developmental role. As Andrianova et al. (2011) show, the great trading and banking monopolies of early modern Europe generated the rents that financed governments, mobilised savings, stimulated financial innovation, and strengthened investors' property rights. In England and the Netherlands, the East India Companies became vehicles through which private wealth was channelled into liquid financial markets and public credit.

Thus, monopolies can be understood as organisational responses to the scarcity of settlement capacity. By securing predictable cash flows, they reduce exposure to settlement uncertainty and thereby facilitate large-scale investment and financial innovation. Yet, contest expenditures do not create new credit or additional outside money. Unlike productive investment, contest investment cannot close the aggregate settlement gap. It merely reallocates settlement security among firms. As a result, contest expenditures generate firm-

²⁷ (Gelderblom & Jonker, 2004); (Chatterjee, 2012); (Broadberry, Custodis, & Gupta, 2014); (Atack & Neal, 2009); (Dickson, 1967).

specific deviations around the economy-wide liquidity premium. This asymmetry reflects economic power.

Moreover, contrary to government deficits, the monetization of foreign exchange revenue is mostly driven by markets and therefore by contracts. Open markets therefore create incentives for firms to expand commerce, innovation, and state capacity. Colonialism and international monopolies secured settlement capacity in the centre but lowered the settlement capacity in the periphery — with all the damaging effects of underdevelopment, power dominance, and violations of human rights. Modern export-led growth strategies are more likely to contribute to modern liberty. Here, openness refers broadly to institutional arrangements that permit entry into economic and political activity and thereby limit the ability of incumbent organisations to convert temporary privileges into permanent barriers to competition (North, Wallis, & Weingast, 2009). Thus, while the settlement gap generates endogenous pressures for firms to seek privileged access to liquidity, these same organisations can become engines of financial development, economic growth, and liberty when they are embedded in institutions that protect property rights and maintain openness to domestic and international competition.

Thus, when openness transforms monopoly from a mechanism for excluding rivals into a mechanism for expanding contractual opportunities, organisations that initially emerge to secure privileged access to liquidity can become vehicles for financial deepening, economic growth, and the diffusion of contractual liberty.

Money and liberty: some empirical evidence

What evidence do we have that money contributes to the foundation of modern liberty? In ancient societies, money was primarily a means of exchange. Metal coins defined the unit of account, and the value of the silver and gold from which they were struck established their equivalence to commodities. Contractual logic governed commercial exchange but rarely extended to credit and debt. Money supply responded to merchants' willingness to bring bullion to the mint or hold it in reserve. Scarcity reflected the gap between demand for metal to finance purchases and the limited supply available in the form of a stochastic equilibrium that, in the long run, resolved into a stationary steady state where demand for goods and services adjusted to the stock of bullion. Stagnation was the structural consequence, and it persisted throughout the Middle Ages. Modern individual liberty did not exist.

Without the interest rate as an economic driver, practices embodied what Aristotle (1939) called arithmetic justice: equality as a principle of commutation confined to transactions, not the generalised norm of individual freedom and equality. Aristotle subordinated arithmetic to geometric justice — the holistic principle of hierarchy that governed the social order as a whole. This subordination of equality to hierarchy required that financial practices remained constrained leading to the institutionalised imperative of the medieval prohibition of usury. With the low elasticity of money supply, the protective function of money was constrained.

Security of survival was ensured by patrons and hierarchy. Aristotle's concept of arithmetic justice coupled with illegal usury sustained the ancient liberty of the collective and blocked the development of individual liberty. The Renaissance deregulation of usury laws set in motion a transformation that culminated in the financial revolution. Credit money became the driver of contractual practices and, with them, the engine of modern liberty.

Modern money therefore carries an ambivalence at its core. By generalising credit contracts, money diffuses the practices of reciprocal agreement and formal equality from which modern liberty emerges. But the recurrent scarcity of settlement capacity also creates incentives to secure privileged access to future liquidity through monopoly, hierarchy, and domination. The history of modern liberty is inseparable from the history of modern money: the same institution that liberates individuals through contract also exposes them to new forms of dependence generated by the struggle for liquidity.

This historical process unfolded over roughly four to five centuries — though even ancient liberty was bound up with the creation of money as coinage, as the next chapter will show. Chapter 6 traces the transformation of the English economy leading to the financial revolution, and Chapters 7 and 8 examine how Hobbes and Locke constructed the narratives of modern liberty in its immediate wake. However, at this point I wish to show some evidence from the global economy over the last half century.

[Econometric evidence from 133 countries, 1972–2010](#)

I have argued that contractual monetary practices and modern liberty evolve jointly. To capture the normative essence of modern liberty empirically, I take two indicators from Freedom House, for political rights and civil liberty. Political rights cover electoral processes, pluralism and participation, and the functioning of government. Civil liberties fall into four categories: freedom of expression and belief; associational and organisational rights; the rule of law; and personal autonomy and individual rights. Recent Freedom House editions classify around 195 countries and 15 territories, most of them since 1972. I have also used the V-Dem indicator for liberal democracy; it is closely correlated with the Freedom House political rights indicator, although when using it my econometrics are less precise. I therefore focus on the Freedom House data.

Contractual monetary practices are measured by contract-intensive money (CIM), which, following Clague et al. (1999), is calculated as the difference between broad and narrow money. Narrow money consists of outside money created by central banks and governments, while CIM arises from bank deposits and monetary contracts. Hence, CIM is our proxy for inside money. My interpretation of CIM nonetheless differs from that of Clague et al., who treat it as a proxy for the security of contract enforcement. In my model, such institutional factors influence uncertainty and the liquidity premium and therefore act only indirectly on the settlement gap. Contract-intensive money, by contrast, signals an economic practice rather than an institution, and so lies much closer to the core of my argument. Countries with

more extensive contractual monetary systems should record stronger values on the liberty indices.

I also test for the effect of market concentration, measured by the Herfindahl–Hirschman Index (HHI). Constructed from WITS trade data,²⁸ this index gauges the competitive structure of the economy, with higher concentration indicating greater monopolisation. Unfortunately, it is available only for the later part of the panel period.

Testing causality rather than mere correlation requires a dynamic framework. I first estimate Granger causality shown in Annex 2 and then a panel vector autoregression (pVAR) across 133 countries observed annually between 1972 and 2010. Robustness tests are also reported.

The evidence supports the basic proposition. The result is unambiguous, and it is asymmetric. Contract-intensive money Granger-causes civil liberty at every conventional threshold ($\chi^2 = 23.06$, $p < 0.001$), and the impulse response is positive and cumulative: a shock to CIM raises civil liberty steadily across the following decade. Yet against political liberty the same variable falls silent ($p = 0.13$); against the V-Dem liberal democracy score it is weaker still. The civil-liberty relationship is, moreover, predominantly one-way. Civil liberty's feedback onto CIM is at best marginal ($p = 0.08$) and dissolves under stricter specification. In other words, money does not purchase the ballot, though the monetary contractual practices embodied by inside money help inside money to take root and foster civil freedoms.

Alongside the two Freedom House series, Annex 4.2 reports also the broader measure of democracy, the *V-Dem Liberal Democracy Index*.²⁹ The three columns must not be read as a single instrument. The effects of political liberty causing an increase in contract-intensive money is highly significant for the Freedom House series, weakly significant for V-Dem liberal democracy, and much less for civil liberty. On the other hand, the impact of CIM on civil liberty is highly significant but not measurable for political liberty and democracy.

Table 4.1. Granger causality across three liberty measures

Direction	Democracy	Political liberty	Civil liberty
Liberty → CIM	0.068	0.012	0.083
CIM → Liberty	0.362	0.127	0.000

Note: cells report p-values from Granger-causality (Wald) tests; values below 0.05 (in bold) indicate significance. Democracy is drawn from a separate index (see text); political rights and civil liberty are the Freedom House series.

²⁸ [HH Market concentration index By Country in 1988 - 2022 | WITS Data](#)

²⁹ [V-Dem](#)

Figure 4.1 sets the two responses side by side, each drawn from its own bivariate system with CIM.

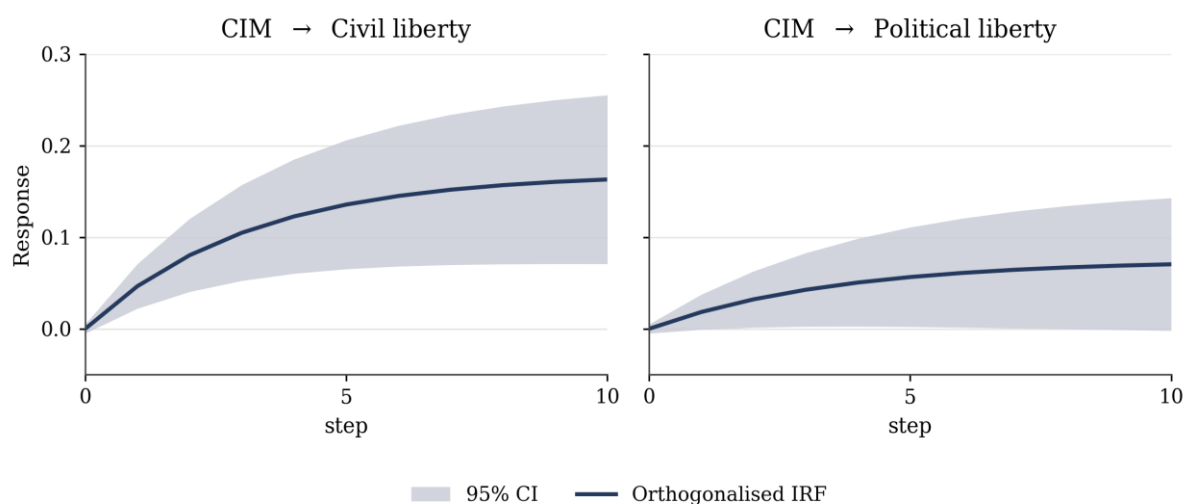


Figure 4.1. Response of civil liberty (left) and political rights (right) to a one-standard-deviation innovation in contract-intensive money, each estimated in its own bivariate panel VAR. Shaded areas are 95 per cent confidence bands. *cim* = contract-intensive money; *cl_rev* and *pl_rev* are the Freedom House civil-liberties and political-rights scores, reverse-coded so that higher values denote greater freedom. Cholesky ordering [*cim*, liberty]; the pattern is robust to reversal.

The civil-liberty response cumulates to roughly 0.17; the political-rights response reaches only about 0.07. Money leads civil liberty, not political rights.

Because the sequence from political liberty through money to civil liberty is assembled from two separate bivariate systems, I confirm it in a single trivariate specification in Annex 2.

Adding market concentration to the VAR collapses the estimation window to 1992–2009, the only years for which the Herfindahl–Hirschman Index exists. In this shortened trivariate system the CIM coefficient on civil liberty weakens, while the coefficient from HHI to CIM becomes significant. The lesson is not that the civil-liberty result is fragile, but that HHI belongs to the analysis of levels rather than dynamics. Static fixed-effects estimates place CIM and HHI as level determinants of democracy ($p \approx 0.08$ and 0.07 respectively), with GDP per capita confirming the Lipset (1959) effect whereby democracy is correlated with economic development. HHI is therefore retained for the discussion of levels.

To conclude, modern liberty did not emerge despite modern money but because of it. The extension of contractual money generalised contractual freedom, reciprocal obligation and formal equality across society. Yet the same institution also generated persistent struggles over settlement capacity, economic power and monopoly. Modern money is therefore neither simply liberating nor simply oppressive: it expands contractual freedom while creating new incentives for domination. The history of modern liberty is consequently inseparable from the history of debt, and recognising this duality sheds new light on the long development

of liberty, democracy and human rights. The evidence presented here supports this conjecture.

Annex 4.1. A formal model of the settlement gap

This annex captures insights from the cash-in-advance approach by Clower (1967) and Lucas and Stokey (1987), Keynes' (1967 [1936]) liquidity preference with an institutional foundation (Marglin, 2021), and reflux theories, associated historically with Adam Smith and later the Banking School, that emphasized that bank-created money returns through expenditure flows and debt repayment. It also builds on the monetary-circuit view of bank-created money (Graziani, 2003) and is consistent with stock-flow consistent accounting (Godley & Lavoie, 2012). My specific contribution is to formulate the closure problem in the payment system as an aggregate settlement-gap. It links uncertainty to the liquidity premium, credit transmission, debt sustainability, and economic growth.

I first derive the micro-foundation of liquidity preference as the shadow value of settlement certainty. I second develop three progressively richer models of the settlement gap. I conclude, third, that in debt-based monetary economies dynamic feasibility requires the growth of effective settlement capacity keeping pace with maturing obligations. Uncertainty links expenditure, liquidity premia, leverage, and debt sustainability.

A 4.1.1. Microfoundation of the liquidity premium as the shadow price of settlement certainty

Money balances can be used for transaction or precautionary purposes. Consider an agent i who allocates current nominal income y between expenditure x and money balances m carried into the next period, choosing to maximise expected utility:

The agent maximises

$$\max_{x, m} U(x) + \beta E[V(m, s')] \quad (1)$$

$$\text{subject to: } y = x + m \quad (2)$$

Future states s' are uncertain. The continuation value $\beta V(m, s')$ reflects both the role of money in financing future expenditure and its value as a buffer against possible settlement shortfalls across future states. Agents face a forward-looking settlement constraint:

$$m + f(s') \geq \omega(s') \quad (3)$$

Here $f(s')$ is the state-contingent nominal monetary inflow expected to be received in state s' and $\omega(s')$ is the nominal payment obligation falling due in that state. The agent must be able to meet obligations from available liquid resources; prior asset conversion is ruled out consistent with the cash-in-advance structure adopted throughout, so only money balances and incoming liquid monetary flows count for the settlement constraint.

Let λ denote the multiplier on the settlement constraint and μ the multiplier on the budget constraint. The first-order conditions are:

$$\frac{\partial U}{\partial x} = \mu \quad \text{FOC 1}$$

$$\beta E \left[\frac{\partial V}{\partial m} \right] = \mu - \lambda \quad \text{FOC 2}$$

By the envelope theorem applied to the budget constraint, μ equals the marginal utility of income, which at an interior optimum is equated to $\partial U / \partial x$. Combining (FOC.1) and (FOC.2):

$$\beta E \left[\frac{\partial V}{\partial m} \right] = \frac{\partial U}{\partial x} - \lambda \quad \text{and rearranging we get:}$$

$$\lambda = \frac{\partial U}{\partial x} - \beta E \left[\frac{\partial V}{\partial m} \right] \quad \text{FOC 3}$$

This is the key result. λ is the gap between the marginal utility of current expenditure and the discounted expected marginal value of carrying an additional unit of money into the next period. Were settlement costless — i.e. were the constraint (3) never binding — the optimum would require these two to be equal and $\lambda = 0$. When the settlement constraint binds with positive probability, the agent is forced to hold more money than pure expenditure-smoothing requires; the shadow cost of that forced diversion is $\lambda > 0$.

λ is therefore the marginal value of relaxing the constraint by one unit: the shadow price of guaranteed settlement. Because money balances alone settle obligations instantly without prior conversion, λ reflects liquidity's settlement service beyond its transactional use.

The constraint binds whenever obligations may exceed available liquid resources with positive probability. Hence, λ rises with higher expected obligations $E[\omega(s')]$, and with greater uncertainty regarding net settlement positions $\omega(s') - z(s')$, which increases the probability of settlement shortfalls.

Proposition 1.

The liquidity premium is the shadow price of relaxing a state-contingent settlement constraint and is increasing in uncertainty.

A 4.1.2. The Settlement Gap, Maturity Structure, and the Liquidity Premium

In the aggregate economy, λ_t summarizes this shadow value across agents and depends on the expected future settlement gap and macro-financial uncertainty σ_t .

I first formalize the baseline model A assuming a one-period pure inside-money economy. In model B, I admit multiperiod debt settlement, and in model C, I introduce outside money.

The following notation applies:

B_t = debt stock

N_t = new lending flow

D_t = deposit stock (inside money)

Z_t = outside money

M_t = total money stock

Y_t = nominal income equal to aggregate expenditure

The central claim is that contractual obligations can grow faster than immediately available settlement balances, generating a structural demand for expandable liquidity. When money is created by contracts rather than by government commands, monetary expansion is tied to the growth of contractual obligations.

B_t denotes the nominal stock of outstanding private bank-credit liabilities at the end of period t . This consists of previously created bank loans not yet extinguished through repayment or default. In Case C, government liabilities are represented by Z_t as outside money and are not included in B_t . If a household buys a corporate bond or lends directly to a firm, this increases debt, but no new bank deposits are created by the lending act itself (existing money is reallocated). So, it matters for finance, but not for the endogenous settlement-gap mechanism. Outside money can contribute to closing the gap but does not remove it.

Case A. Baseline model: one-period pure inside-money economy

Assume a closed economy with banks and a real sector (firms and households). Banks issue loans and simultaneously create deposits. In this simplified model, deposits are the only settlement money.

At the start of period t , banks extend new loans N_t . In aggregate, these loans create new deposits one-for-one:

$$\Delta D_t = N_t \quad (4)$$

Loans create means of payment but not additional settlement balances beyond principal.

In the one-period benchmark, all loans mature in $t+1$. If the contractual lending rate is r_t , contractual obligations maturing in $t+1$ are:

$$\Omega_{t+1} = (1 + r_t)N_t \quad (5)$$

Since only principal deposits $\Delta D_t = N_t$ were created, the one-period settlement gap is:

$$SG_{t+1} \equiv N_t^* = \Omega_{t+1} - \Delta D_t = r_t N_t \quad (6)$$

N_t^* is the minimum amount of new money required for settlement. If contractual obligations exceed the money stock previously created, full aggregate settlement requires new money creation. Circulation of existing deposits in market transactions may distribute liquidity across agents, but it does not increase the aggregate stock of deposits. Closing the gap may occur through new bank lending, or through bank expenditures and dividend payments that create deposits against accrued interest claims. In model C, I add outside money.

Proposition 2.

A pure credit economy generates a positive settlement gap. When $r_t > 0$, then positive nominal obligations exceed initially created principal balances. This implies a structural need for sufficient liquidity ensuring aggregate settlement of contractual claims.

The settlement gap is the central mechanism of the model. It arises because credit creation generates principal, but contractual obligations include principal plus interest. Aggregate obligations therefore grow faster than the settlement balances initially created. The remainder of the annex examines how this gap is managed through refinancing, rollover, and outside-money creation.

UNCERTAINTY AND THE LIQUIDITY PREMIUM

The aggregate liquidity premium depends positively on the expected future settlement gap and macro-financial uncertainty σ_t :

$$\lambda_t = \rho(E_t(SG_{t+1}), \sigma_t), \quad \rho_1 > 0, \quad \rho_2 > 0 \quad (7)$$

The lending rate on credit is:

$$r_t = i_t + \lambda_t + \theta_t \quad (8)$$

where i_t is the policy benchmark rate and θ_t captures Knightian risk and intermediation costs.

INCOME AND GROWTH

Let Y_t denote aggregate demand, the nominal expenditure flow. In our base model, N_t is the flow of new credit, while M_t is the stock of deposits. In reduced form, aggregate expenditure depends on transaction money which is the share of money stock net of precautionary hoarding:

$$Y_t = M_t - H_t = \chi(\lambda_t)N_t \quad \text{with} \quad \chi'(\lambda_t) < 0 \quad (9)$$

$\chi'(\lambda_t) < 0$ measures the propensity and $\chi(\lambda_t)N_t$ denotes effective credit creation (or credit effectiveness). It measures the amount of nominal expenditure generated by a unit of newly created credit. It captures the extent to which new credit is converted into spending rather than precautionary liquidity holdings. Because liquidity preference rises with uncertainty, credit effectiveness is decreasing in the liquidity premium.

Proposition 3.

High liquidity premia reduce credit-financed expenditure and aggregate demand.

Case B. Multi-period debt with pure inside-money economy

The one-period benchmark assumes that all debt issued in period $t-1$ matures in period t . More generally, only a fraction of outstanding debt falls due in each period. There are two corner solutions. Let $\mu_t \in [0,1]$ denote the rollover rate of debt and $(1 - \mu_t)$ the share of outstanding debt maturing in period t . The one-period model of case A is the special case

$\mu_t = 0$ where the full debt stock must be settled and the settlement gap is shown by equation (6). Infinite rollover implies $\mu_t = 1$, but realistically $0 < \mu_t < 1$.

Let B_t denote the nominal stock of previously accumulated debt outstanding at the end of period t . The stock of outstanding principal evolves according to:

$$B_t = \mu_t B_{t-1} + N_t \quad (10)$$

Where $\mu_t B_{t-1}$ is the rollover share of previously outstanding debt and N_t is new lending issued in period t . Then gross principal repayment retired in period t is:

$$(1 - \mu_t) B_{t-1} \quad (11)$$

SETTLEMENT REQUIREMENT

Gross contractual obligations including interest on the maturing share falling due in period t are:

$$\Omega_t = (1 - \mu_t)(1 + r_{t-1})B_{t-1} \quad (12)$$

where r_{t-1} is the contractual lending rate in maturing debt.

Because the economy contains only inside money, all liquid balances are deposits previously created by bank lending. Let L_t^I be inherited liquid balances associated with non-retired deposits. Hence:

$$L_t^I = \mu_t B_{t-1} \quad (13)$$

Let N_t denote new bank lending in period t , which simultaneously creates new deposits. Gross settlement balances available during period t are therefore:

$$L_t^A = \mu_t B_{t-1} + N_t \quad (14)$$

Let H_t denote precautionary hoarding which is a function of liquidity preference and uncertainty

$$H_t = h(\lambda_t, \sigma_t) \quad \text{with } h_1 > 0, h_2 > 0 \quad (15)$$

Net settlement balances available for settlement after hoarding are:

$$L_t^{AH} = L_t^A - H_t \quad (16)$$

The multi-period settlement condition requires:

$$L_t^{AH} \geq \Omega_t \quad (17)$$

Substituting:

$$\mu_t B_{t-1} + N_t - H_t \geq (1 - \mu_t)(1 + r_{t-1})B_{t-1} \quad (18)$$

Define the *ex ante* multi-period settlement gap as the shortfall of inherited balances relative to maturing obligations prior to hoarding:

$$MSG_t \equiv N_t^* = \Omega_t - \mu_t B_{t-1} \quad (19)$$

This is the structural settlement gap. Minimum new lending required after accounting for hoarding must also satisfy the demand for precautionary hoarding. Hence:

$$N_t^* \geq \max\{0, [(1 - \mu_t)(1 + r_{t-1}) - \mu_t]B_{t-1} + H_t\} \quad (20)$$

The settlement gap itself is determined by the relationship between maturing obligations and inherited settlement balances. Precautionary hoarding does not create the settlement gap but increases the amount of new lending required to close it.

Proposition 4.

Longer maturities redistribute settlement pressure intertemporally rather than eliminating it. As maturities are prolonged ($\mu_t \rightarrow 1$), the multiperiod settlement gap MSG_t shrinks in period t , but the stock B_t grows, so future periods face larger potential obligations. Hence, the pressure is deferred rather than removed.

GROWTH EQUATION

With a multi-period settlement gap, the liquidity premium becomes:

$$\lambda_t = \rho(E_t(MSG_{t+1}), \sigma_t), \quad \frac{\partial \lambda_t}{\partial E_t(MSG_{t+1})} > 0 \quad \frac{\partial \lambda_t}{\partial \sigma_t} > 0 \quad (21)$$

As before (see equation (8)), the lending rate on new borrowing is a function of λ_t and nominal income is generated by the expenditure share of new credit (equation (9)) which falls when the liquidity premium rises.

Hence, when the settlement constraint is exactly met, the equilibrium growth rate of nominal demand satisfies:

$$g_t^* = \frac{Y_t - Y_{t-1}}{Y_{t-1}} = \frac{\chi(\lambda_t)N_t^* - Y_{t-1}}{Y_{t-1}} \quad (22)$$

with $\frac{\partial g_t^*}{\partial \lambda_t} < 0$ under standard assumptions.

Proposition 5

Longer maturities mitigate immediate refinancing pressure and reduce the current settlement gap, but they do not eliminate the need for settlement-capacity growth because obligations are deferred rather than extinguished.

DEBT SUSTAINABILITY

Define the debt ratio

$$b_t = \frac{B_t}{Y_t} \quad (23)$$

Using (10) and (22), under the binding/interior settlement condition N_t^* , i.e. when $[(1 - \mu_t)(1 + r_{t-1}) - \mu_t]B_{t-1} + H_t > 0$ the debt-income ratio satisfies:

$$b_t = \frac{\mu_t B_{t-1} + N_t^*}{(1 + g_t^*)Y_{t-1}} = \frac{\mu_t b_{t-1} + N_t^*/Y_{t-1}}{1 + g_t^*} \quad (24)$$

A sufficient condition for stability $b_t \leq b_{t-1}$ is:

$$g_t^* \geq (1 - \mu_t)r_{t-1} - \mu_t + \frac{H_t}{B_{t-1}} \quad (25)$$

The $-\mu_t$ term implies that higher rollover lowers the required growth rate. Defining the hoarding rate $h_t = \frac{H_t}{Y_{t-1}}$ we get the equilibrium growth required to ensure debt sustainability:

$$g_t^* \geq (1 - \mu_t)r_{t-1} - \mu_t + \frac{h_t}{b_{t-1}} \quad (26)$$

Debt sustainability therefore depends on whether effective settlement capacity grows sufficiently rapidly relative to maturing obligations and precautionary hoarding.

Using (8): $r_{t-1} = i_{t-1} + \lambda_{t-1} + \theta_{t-1}$ gives:

$$g_t^* \geq (1 - \mu_t)(i_{t-1} + \lambda_{t-1} + \theta_{t-1}) - \mu_t + \frac{h_t}{b_{t-1}} \quad (27)$$

As a limiting case, if debt is permanently rolled over ($\mu_t = 1$), refinancing pressure arising from maturing principal disappears. The debt-stability condition reduces to

$$g_t^* \geq \frac{H_t}{B_{t-1}} - 1$$

Hence, debt sustainability remains compatible with negative required growth provided precautionary hoarding is small relative to the outstanding debt stock. Negative required growth means growth is not necessary to keep the system going. Positive income growth becomes necessary only when hoarded liquidity exceeds the outstanding debt stock.

Proposition 6:

Higher rollover rates (μ_t) reduce current refinancing pressure, but higher expected future settlement gaps raise liquidity premia, weaken credit-financed demand, and tighten the growth conditions required for debt sustainability. The extreme case $\mu_t = 1$ is a theoretical benchmark. In practice debt contracts have finite maturities, so refinancing pressure remains positive and the required growth rate exceeds the lower bound implied by perpetual rollover.

Case C. Multi-period debt with inside and outside money

The previous cases assumed a pure inside-money economy in which all means of payment are bank deposits created through lending. This highlighted the structural settlement gap: contractual obligations grow with interest, while the stock of means of payment expands only

through new credit. We now extend the framework by admitting outside money supplied by the government or central bank.

Outside money Z_t is defined as liquid settlement assets that are not liabilities of domestic private debtors. It consists primarily of central-bank reserves, currency, and net external claims. Unlike inside money, its circulation does not require matching private indebtedness. This usually includes central-bank reserves, physical currency (printed notes and coins), foreign reserve assets or net external claims usable for settlement, and treasury balances when injected into private circulation. It excludes private bank deposits matched by private loans (inside money), corporate debt instruments, household liabilities, government bonds if held merely as securities rather than payment media. To keep things simple, these channels are analytically grouped into the variable Z_t because each can reduce reliance on new private credit, although their transmission mechanisms differ.

Government spending does not magically create deposits without a corresponding balance-sheet operation. The deposits arise through the payment system, and the exact mechanism depends on whether the Treasury already has inherited balances from taxation or previous borrowing, and whether it borrows from banks/private sector, or is financed by the central bank.

Let M_t denote the total stock of liquid means of payment available for settlement in period t . This stock now consists of inside money created by banks and outside money supplied exogenously:

$$M_t = D_t + Z_t \quad (28)$$

where D_t is the stock of inside-money claims generated by bank lending, and Z_t is the stock of outside money.

The stock of private debt continues to evolve as in Case B:

$$B_t = \mu_t B_{t-1} + N_t \quad (29)$$

Where μ_t is the rollover rate and N_t new lending issued in period t .

Outside money evolves according to net injections by the public sector:

$$Z_t = Z_{t-1} + G_t - T_t \quad (30)$$

Where G_t denotes government expenditure or central-bank transfers to the private sector, and T_t taxes or equivalent withdrawals. Hence, $\Delta Z_t = G_t - T_t$ is the net addition of outside money in period t . Gross new settlement capacity is given by $N_t + \Delta Z_t$, while the net change in the money stock is $\Delta M_t = \Delta D_t + \Delta Z_t$, where loan repayments extinguish inside-money deposits while outside-money injections increase them.

SETTLEMENT REQUIREMENT

The maturing share of private debt due in period t remains:

$$\Omega_t = (1 - \mu_t)(1 + r_{t-1})B_{t-1} \quad (12)$$

If agents hoard H_t of available liquidity, only $M_t - H_t$ remains available for settlement. Dynamic feasibility therefore requires:

$$M_t - H_t \geq (1 - \mu_t)(1 + r_{t-1})B_{t-1} \quad (31)$$

Substituting for M_t gives:

$$\mu_t B_{t-1} + N_t + \Delta Z_t - H_t \geq (1 - \mu_t)(1 + r_{t-1})B_{t-1} \quad (32)$$

Hence, the settlement gap with hoarding and outside money is the minimum amount of new private lending consistent with settlement is:

$$ZSG \equiv N_t^* = \max\{0, [(1 - \mu_t)(1 + r_{t-1}) - \mu_t]B_{t-1} + H_t - \Delta Z_t\} \quad (33)$$

Proposition 7.

Outside money reduces the refinancing pressure generated by the settlement gap. In the pure inside-money economy, all additional liquidity had to come from new credit. With outside money, part of required settlement liquidity can be supplied by monetised fiscal deficits, reserve creation (current account surplus), or currency issuance.

The structural settlement gap originates in private credit contracts and therefore remains positive whenever debt carries interest obligations. Thus, the settlement gap is not abolished by outside money, but its macroeconomic consequences are transformed. The greater the stock or flow of outside money, the lower the dependence of the system on continuous private credit expansion. Yet outside money does not eliminate the structural source of the gap, although it can supply settlement balances that close it operationally. Thus, if inside money promotes contractual practices, liberty will flourish less in cash-intensive economies.

DEBT SUSTAINABILITY

Dividing by inherited nominal income Y_{t-1} , let $b_{t-1} = B_{t-1}/Y_{t-1}$ denote the inherited debt burden, $n_t^* = N_t^*/Y_{t-1}$ the new bank-lending ratio, $\Delta z_t = \Delta Z_t/Y_{t-1}$ the outside-money injection ratio, and $h_t = H_t/Y_{t-1}$ the hoarding ratio. The sustainability condition becomes:

$$n_t^* = \max\{0, [(1 - \mu_t)(1 + r_{t-1}) - \mu_t]b_{t-1} + h_t - \Delta z_t\} \quad (34)$$

Holding Δz_t fixed with respect to λ_{t-1} , the comparative statics in ratios describe how the required new bank-lending ratio responds to changes in the liquidity premium, outside-money injections, and precautionary hoarding:

$$\frac{\partial n_t^*}{\partial \lambda_{t-1}} = (1 - \mu_t)b_{t-1} + \frac{\partial h_t}{\partial \lambda_{t-1}} > 0 \quad (35)$$

$$\frac{\partial n_t^*}{\partial \Delta Z_t} = -1 \quad (36)$$

$$\frac{\partial n_t^*}{\partial h_t} = 1 \quad (37)$$

Increases in precautionary hoarding can be fully offset by outside-money injections on a one-for-one basis. More generally, each additional unit of outside-money injection reduces the amount of new private lending required for settlement by one unit. By contrast, an increase in the liquidity premium raises required lending through two channels. First, it increases refinancing pressure on the share of debt that matures. Second, it induces additional precautionary hoarding. The magnitude of the first effect depends on the share of debt maturing, $(1 - \mu_t)$ while the second depends on the sensitivity of hoarding to the shadow price of liquidity.

A 4.1.3. An ambiguity theorem

I will now show an ambiguity between the credit-transmission effect and the settlement-compensation effect. Inside money is the driver of dynamics in a monetary economy because credit contracts carry interest claims. Outside money depends on government orders and is not based on individual contracts. This raises the question of whether aggregate demand dynamics are primarily driven by endogenous credit expansion or by exogenous sovereign liquidity injection.

Aggregate demand is now:

$$Y_t = \chi(\lambda_t)N_t^* + \psi\Delta Z_t \quad \chi'(\lambda_t) < 0, \quad 0 \leq \psi \leq 1 \quad (38)$$

Aggregate demand consists of two components: expenditure financed by newly created inside money, $\chi(\lambda_t)N_t^*$, and expenditure financed by outside-money injections, $\psi\Delta Z_t$. The parameter $\chi(\lambda_t)$ captures the proportion of newly created inside money that is translated into expenditure and declines as liquidity preference rises.

Nominal demand growth compatible with monetary sustainability is

$$g_t^* = \frac{\chi(\lambda_t)N_t^* + \psi\Delta Z_t - Y_{t-1}}{Y_{t-1}} \quad (39)$$

The effect of higher uncertainty on aggregate demand depends on which mechanism dominates. Assuming government policy is exogenous, hence $\frac{\partial \Delta Z_t}{\partial \lambda_t} = 0$, we get:

$$\frac{\partial g_t^*}{\partial \lambda_t} = \frac{1}{Y_{t-1}} \left[\chi'(\lambda_t)N_t^* + \chi(\lambda_t) \frac{\partial N_t^*}{\partial \lambda_t} \right] \quad (40)$$

The credit-transmission effect measures that less of the newly created credit is converted into expenditure:

$$\chi'(\lambda_t)N_t^* < 0 \quad (41)$$

The settlement-compensation effect measures the additional credit that must be created to generate the same settlement capacity. Maintaining a constant level of settlement capacity requires additional lending whenever liquidity preference increases. But because higher liquidity preference raises the amount of credit required for settlement, we have:

$$\chi(\lambda_t) \frac{\partial N_t^*}{\partial \lambda_t} > 0 \quad (42)$$

So, the net effect is ambiguous unless one imposes the condition that the absolute magnitude of the credit-transmission effect exceeds the settlement-compensation effect:

$$|\chi'(\lambda_t)| N_t^* > (\lambda_t) \frac{\partial N_t^*}{\partial \lambda_t} \quad (43)$$

If this condition holds, then according to (40):

$$\frac{\partial g_t^*}{\partial \lambda_t} < 0 \quad (44)$$

When the credit-transmission effect dominates the settlement-compensation effect, higher liquidity preference reduces the amount of expenditure generated by each unit of new credit. Aggregate demand growth therefore declines even if the financial system expands credit to meet settlement needs.

Proposition 8.

An increase in liquidity preference generates two opposing forces. First, greater precautionary hoarding reduces the share of new credit that is translated into expenditure, weakening the transmission of credit to aggregate demand (the credit-transmission effect). Second, because outstanding debt contracts still require settlement, the decline in expenditure generated for each unit of new credit reduces the economy's settlement capacity. Maintaining the same level of settlement therefore requires a larger volume of new credit (the settlement-compensation effect). Thus, higher liquidity preference raises the credit expansion required to maintain a given level of nominal demand. If the financial system fails to supply this additional credit, aggregate demand contracts and the settlement gap widens.

Equations (39)-(44) imply that policies increasing outside-money injections, $\psi \Delta Z_t$, can partly offset the contractionary effect of higher liquidity preference. But if $\frac{\partial z_t}{\partial \lambda_t} < 0$, stress becomes self-reinforcing. When income declines after a rise in liquidity preference, the debt ratio b_t increases and the debt burden becomes harder to service. This creates a self-enforcing loop. The resulting rise in refinancing pressure increases the expected settlement gap and thereby raises the shadow price of liquidity further. This model describes the monetary Keynes-Minsky-Clower spiral.

Thus, under debt commitments fixed in nominal terms, a fall in output can endogenously increase the liquidity premium, generating cumulative contraction unless offset by outside money or debt restructuring. This shows that liquidity preference is not merely a passive psychological phenomenon reflecting individual preferences. In a credit economy it is a structural variable because it governs the conversion of newly created credit into expenditure, determines the settlement capacity generated by the financial system, and thereby influences macroeconomic stability.

A 4.1.4. Macroeconomic conclusion

Our three models show that when money is created by bank deposits and interest rates reflect liquidity preference, a settlement gap occurs which can make settlement capacity scarce relative to outstanding obligations. The extent of this gap depends on the degree of debt rollover and the creation of outside money by public authorities.

Inside money links liquidity creation to leverage. Outside money partially delinks liquidity provision from private indebtedness. A mixed monetary economy is therefore more resilient to liquidity crises than a pure credit economy, because it can meet rising settlement needs through either expanding credit or expanding sovereign liquidity. But the dynamic for promoting contracts and liberty is also weaker.

Given our definition of liquidity preference and the liquidity premium, the single most important variable for increasing aggregate demand and debt sustainability is reducing uncertainty. Public financing through outside money reduces the need for additional private credit, but it also shifts monetary closure — the mechanism by which outstanding obligations are extinguished in aggregate — from contractual relations toward hierarchical public authority.

A 4.1.5. Microeconomic implications

The settlement gap reflects aggregate scarcity of settlement capacity. Because individual firms cannot control aggregate liquidity creation, they compete for privileged access to future monetary inflows. The settlement gap therefore creates incentives for competition not only as a process of production but also as a process of securing settlement.

Competition is a process in which multiple agents pursue similar objectives under conditions where the success of one agent depends partly on its relative performance compared to others. It may take two forms, productive and appropriative.³⁰ Productive competition expands future income through innovation and investment. Appropriative competition

³⁰ (Grossman and Kim 1995); (Anderton & Carter, 2019)

reallocates existing settlement capacity among competitors. This form of competitiveness can be described by Contest Success Functions developed by the conflict research literature.³¹

The productive model approximates competitive market processes in which firms seek temporary quasi-rents through innovation, cost reduction, and product improvement. These advantages are gradually eroded by imitation and entry. Temporary quasi-rents are incentives for innovation and new investment, which typically require credit and thereby contribute to the expansion of settlement capacity. Competition then reallocates resources toward productive uses and exchange takes place at approximately equivalent values. Competitive markets therefore support the meta-discourse of equality, discussed in the previous chapter.

Appropriative competition is a contest that allocates a “prize” through conflict. Applying the conflict literature to the settlement gap theory, the prize is not settlement capacity by itself but privileged access to future money incomes that increase the probability of successful settlement when obligations fall due. Firms differ in their ability to secure stable future cashflows. Through successful contest activity some firms acquire the power that enables them to set prices above competitive levels while still facing rivalry from other firms. Typically, contest expenditure produces monopoly power, oligopoly power, regulatory privileges, financial advantages, and political influence.

This power creates persistent differences in future liquid monetary inflow and returns on capital. Some firms can obtain higher returns at the expense of others. In contest models, different parties allocate resources to gain power which does not increase but only redistribute income (the “prize”).³² By influencing or capturing the state firms that can seize rents from favourable regulations or transfers from the government’s budget. The objective of the contest is therefore either to tilt the market or to capture the state (even at a regional substate level) (Collier & Hoeffler, 1998).

Firms therefore spend resources not only to produce goods but also to gain advantage in the contest. In the basic framework, two players spend resources x_1 and x_2 to win a prize worth V (Konrad, 2009). The most common class of Contest Success Functions is:

$$p_1 = \frac{C_1^\alpha}{C_1^\alpha + C_2^\alpha} \quad (45)$$

where p_1 is player 1's probability of winning. If $\alpha = 1$, probabilities are proportional to effort C . $\alpha > 1$, small effort advantages are magnified. If $\alpha < 1$, outcomes are relatively insensitive to effort. The probability of winning rises with relative contest expenditure. A player that expends more on resources C obtains a higher probability of securing the prize, although success remains uncertain. Efforts to gain asymmetric power require firm-specific expenditures — lobbying, legal barriers to entry, regulatory capture, exclusive concessions —

³¹ For an overview of Contest Success Functions in the conflict research literature see (Konrad, 2009); (Skaperdas, 1996).

³² **Invalid source specified.** have described this for the narrower case of civil war.

while others take the form of public expenditures used to secure strategic advantages, such as military protection of trade routes or privileged access to resources.

The contest function therefore captures the key insight that conflict is neither pure force nor pure chance. Success depends on *relative* commitments. Were every agent to spend C equally on such rent-seeking, no one would gain, yet aggregate income would be lower.

Such expenditures do not generate new income or increase settlement capacity. They shift the distribution. The Contest Success Functions framework shows that “the prize” accrues to those who outspend their competitors: a firm, or coalition of firms, that secures favourable regulatory treatment through superior lobbying reaps an additional prize beyond normal profit — at the expense of those who spend less.

To see how such expenditure benefits individual firms, let the average expected return be

$$E(R) = i + \lambda_0 \quad (46)$$

with λ_0 as the aggregate liquidity premium. Equation (46) describes the condition determining aggregate investment. Investment proceeds until the expected return on capital $E(R)$ equals the cost of finance $i + \lambda_0$, which includes the liquidity premium associated with settlement uncertainty. In a competitive economy with no uncertainty shocks, firms have little incentive to devote resources to strategic positioning because any temporary advantage is competed away.

Now assume an uncertainty shock raises aggregate liquidity preference. The problem is not merely that future revenues become less predictable. It is that debt obligations are fixed in nominal terms, while future access to settlement capacity becomes uncertain. Hence, the settlement constraint becomes tighter as the firm's problem is no longer simply to generate expected revenue larger than debt service, but rather that the probability of revenue sufficient for settlement must remain high enough to service the debt. But whether that will be achieved depends on the financial sector and not on firms in the real sector.

Facing a high aggregate liquidity premium, firms will respond in two ways. First, firms increase precautionary liquidity holdings H . As firms collectively increase liquidity holdings, aggregate expenditure falls and market demand weakens. The resulting intensification of competition increases the value of securing protected future revenue streams. Second, settlement scarcity increases the value of predictable future liquid monetary inflows. Economic actors therefore engage in contests to reduce their own liquidity risk and shift it onto others. Firms will not merely compete to sell products; they will strive to secure their individual future money incomes at the expense of others by increasing their market power. In other words, aggregate liquidity scarcity affects all firms, but strategic competition redistributes exposure to that scarcity unequally.

When uncertainty increases, the premium λ_0 goes up and the settlement gap becomes more threatening. The value of securing future liquid monetary inflows rises as λ_0 increases. This generates incentives for rent seeking and market power investment. The value of a protected revenue stream increases when settlement becomes more difficult because the avoided cost of liquidity scarcity rises with the aggregate liquidity premium. As λ_0 increases, firms rationally devote a larger share of resources to contest investment relative to productive investment. As settlement uncertainty rises, the expected return on productive investment falls because future revenues become less predictable, while the expected return on contest investment rises because protected revenue streams become more valuable. Resources are diverted from productive competition to actions that increase the probability of safe future liquid monetary inflows and therefore reduce the individual liquidity premium.

Hence, the liquidity premium for firm i is:

$$\lambda_i = \lambda_0 - \phi_i \quad \text{with} \quad \phi'_i(C_i) > 0 \quad \text{and} \quad 0 \leq \phi_i \leq \lambda_0. \quad (47)$$

where ϕ_i measures the reduction in the firm's liquidity premium generated by contest activity. Because C_i denotes contest expenditure, ϕ_i is a function of p_i . Higher probability to win the prize lowers the firm-specific liquidity premium. As a first approximation and over short horizons, contest activity redistributes settlement security across firms while leaving aggregate liquidity scarcity unchanged. Because aggregate liquidity is generated by the banking system (including the central bank), competition between firms can only redistribute liquidity. Any reduction in one firm's liquidity premium must be offset by an increase elsewhere. Hence, $\sum \phi_i = 0$.

Firms that systematically reduce their liquidity premia obtain lower financing costs, higher valuations, and greater capacity to expand. The resulting power asymmetries generate persistent differences in market access, financing conditions, and profit opportunities. Over time these advantages may become self-reinforcing, producing structural inequalities in market power, wealth, and political influence.

These results feed directly into the consensus dynamics of Chapter 2. Two properties of the contest matter there. First, the condition $\sum \phi_i = 0$: contest activity redistributes settlement security without creating it, so it generates heterogeneous exposure to the aggregate liquidity premium — the individualised premia λ_i that enter the disposition function of the Chapter 2 annex (equation A2.24b). Second, the character of appropriative relations: concessions, captured regulation and protected monopoly are contracts in form but hierarchies in content, and therefore enter the contractual network of Chapter 2 with low quality coefficients q_{ij} . Because contest success also confers the wealth and political weight that constitute epistemic influence, a rising aggregate premium concentrates influence on precisely those agents whose contractual experience no longer enacts reciprocal agency. The contest for liquidity is therefore simultaneously a contest over the meta-discourse: it determines not only who settles, but whose interpretation of the contractual order becomes generally accepted. The

next subsection completes the link by deriving the law of motion of the contractual network itself.

A 4.1.6. The settlement gap and the contractual network

The annex to Chapter 2 represents society's contractual relations as a network A and takes it as given at each date: the model asks how a given distribution of contractual engagement generates normative consensus, not why the network grows. The settlement-gap model developed above supplies the missing law of motion.

In a pure inside-money economy, money is created by contracts and by nothing else. Every loan is a contractual relation; every deposit records one. The settlement gap of equation (6), $SG_{t+1} = r_t N_t$, is therefore more than a monetary magnitude. It is a structural demand for new contracting. In each period, contractual obligations exceed the deposits created to fund them by exactly the interest claim, and the only private means of closing that gap is new lending — that is, new contractual relations. The settlement gap drives the formation of new contractual ties. What appears at the macroeconomic level as the required flow of new credit N_t^* appears at the level of the network as the arrival of new connections a_{ij} .

Whether this demand translates into new contracts depends on the liquidity premium. Equation (9) shows that the conversion of new credit into expenditure is governed by the credit-effectiveness function $\chi(\lambda_t)$, with $\chi'(\lambda_t) < 0$: as the liquidity premium rises, hoarding diverts liquidity from transactions, and lending rates rise through equation (8). The same suppression governs the extensive margin of the network. Writing Δa_t for the arrival rate of new contractual ties,

$$\Delta a_t = \nu \chi(\lambda_t) E_t(MSG_{t+1}), \quad \nu > 0, \quad \chi'(\lambda_t) < 0. \quad (48)$$

The expected settlement gap determines the demand for new ties; the liquidity premium determines how far that demand is realised. Equation (48) makes the contractual network dynamical. Its densification is driven by the settlement requirement of the monetary economy; its stalling is driven by the same liquidity premium that weakens the normative efficacy of contracting in the annex to Chapter 2 (equation A2.9). Contractual engagement is therefore not an exogenous count of transactions. It is the cumulative record of gap-closing contractual acts.

Two regimes follow, and the boundary between them is the dominance condition of equation (43). Below the threshold, the circuit is virtuous: the gap is closed by new inside credit, contracts perform, the quality coefficients q_{ij} of the contractual network remain high, uncertainty σ_t remains low, and the normative efficacy of contracting remains strong. Credit expansion simultaneously builds settlement capacity and the social foundations of liberty. Above the threshold, the credit-transmission effect dominates: new lending fails to convert into expenditure, the gap migrates to the outside-money margin, and closure depends on the

monetary regime. Where outside money accommodates, performance holds. Where it is constrained — under metallic standards or convertibility rules — the gap remains open and contracts become non-performing.

Non-performance feeds back to the quality of the network. A promise that is not honoured does not enact reciprocity. Define the unclosed gap as the shortfall of available settlement capacity relative to the settlement requirement:

$$U_t \equiv \max\{0, N_t^* - N_t - \Delta Z_t\}. \quad (49)$$

A positive shortfall forces non-performance. It degrades the mean quality coefficient and raises uncertainty:

$$\Delta \bar{q}_t = -\xi U_t \quad \text{and} \quad \Delta \sigma_t = \zeta U_t, \quad \xi, \zeta > 0 \quad (50)$$

The micro- and macro-dimensions of contractual reliability are therefore two ends of a single mechanism, not independent assumptions. The quality of individual relations falls *because* the aggregate settlement gap failed to close; the same shortfall raises σ_t by equation (50), hence λ_t through equation (21), hence lowers the efficacy coefficient $\kappa(\lambda_t)$ of the annex to Chapter 2. Reliability enters the normative model once, through one monetary channel observed at two scales.

The identity between the two annexes can now be stated clearly. Proposition 8 above (the Keynes–Minsky–Clower spiral) and Proposition 4 of the annex to Chapter 2 (endogenous fragility) describe the same event in two state spaces. In the monetary state space, rising liquidity preference reduces the expenditure generated by each unit of new credit, widens the settlement gap and, absent outside money, sets off cumulative contraction. In the normative state space, the same event stalls the densification of the contractual network (equation 48), degrades the quality of its relations (equation 50), and lowers the normative efficacy of contractual experience. Monetary contraction and normative erosion are one process. The settlement gap builds the social foundations of modern liberty while settlement is fundable, and corrodes them once it is not.

Annex 4.2. Empirical Evidence for Contract-Intensive Money and the Civil Foundations of Liberty

This annex documents the data, estimator and diagnostic tests underlying the results of empirical evidence for contract-intensive money and the civil foundations of liberty reported in Chapter 4. All estimates were produced in Stata using the panel-VAR suite of Abrigo and Love (2016). It covers five estimated systems – two bivariate (CIM with civil liberty; CIM with political liberty) and three trivariate (political liberty, CIM and civil liberty; and each liberty measure with CIM and the market concentration index HHI) – together with the four robustness tests and the panel unit-root diagnostics. Figures are reproduced directly from the estimation logs; the placebo test used seed 20260702.

A2.1 Data and sample

The source file records 6,430 country-year observations for roughly 140 countries. Estimation is restricted to 1972–2010 and to countries with at least fifteen years of data and no gap exceeding three consecutive years. The Freedom House political- and civil-liberty ratings enter as strings containing a small number of non-numeric placeholders (a dash for missing, and a handful of split ratings such as "2(5)"); these were converted with `destring`, `force`, sending 149 cells per variable to missing, and then reversed so that higher values denote greater freedom. After filtering, the estimation sample comprises 133 panels and 3,437 observations in the two-lag specification. The trivariate {pl_rev, cim, cl_rev} system is estimated on the 1972–2010, 133-panel sample; the two market-concentration systems are confined to 1992–2009, the only years for which HHI exists, leaving roughly 1,445 observations.

Table A2.1. Variables

Variable	Definition and source
cim	Contract-intensive money: ratio of inside money to total money (Clague, Keefer, Knack & Olson 1999)
cl_rev	Civil liberty, Freedom House, reversed (8 – cl); higher = freer
pl_rev	Political liberty, Freedom House, reversed (8 – pl); higher = freer
democracy	V-Dem electoral democracy index
hhi	Market concentration (Herfindahl–Hirschman); sparse before 1992
gdppc	GDP per capita (level-effects controls only)

A2.2 Panel unit-root tests

Fisher-type tests (augmented Dickey–Fuller, one lag, cross-sectional means removed) reject the null that all panels contain a unit root for both series, consistent with the differenced VAR remaining informative.

Table A2.2. Unit root tests

Series	Statistic	Value	p-value
cl_rev	Inverse $\chi^2(268)$	468.97	0.000
cl_rev	Inverse normal Z	−6.51	0.000
cim	Inverse $\chi^2(266)$	412.53	0.000
cim	Inverse normal Z	−3.25	0.001

A2.3. VAR Estimations

Each system is a panel vector autoregression estimated by GMM, with fixed effects removed by forward orthogonal deviation (the Helmert transform). Lag length is two, selected on the stability criterion; all reported systems satisfy the eigenvalue stability condition. Granger causality is assessed by Wald test (pvargranger) and dynamics by orthogonalised impulse responses over ten steps with 200 Monte-Carlo draws for the 95 per cent bands.

Main specification: Granger causality across three liberty measures

Three bivariate systems share an identical structure, differing only in the liberty variable paired with CIM. The p-values below are from the Wald tests; the asymmetry between civil liberty and the other two measures is the substantive result.

Table A2.3. Granger causality across three liberty measures

Direction	Democracy	Political liberty	Civil liberty
Liberty to CIM	0.068	0.012	0.083
CIM to Liberty	0.362	0.127	0.000

Note. Cell entries are $\text{Prob} > \chi^2$ from panel Granger-causality Wald tests (2 d.f.); values below 0.05 in bold. The civil- and political-liberty columns are the verified bivariate logs reported in full at A2.4 and A2.5; the democracy column is from the initial V-Dem specification. CIM Granger-causes civil liberty (0.000) but not political liberty (0.127) or democracy (0.362), while political liberty alone feeds back onto CIM (0.012).

Table A2.4 Headline model: full coefficients (pvar cl_rev cim, lags 2)

Equation / regressor	Coef.	Std. err.	z	P > z
<i>cl_rev equation</i>				
L1.cl_rev	0.8630	0.0333	25.93	0.000
L2.cl_rev	0.0017	0.0313	0.06	0.956
L1.cim	0.5111	0.3843	1.33	0.183
L2.cim	0.7718	0.2945	2.62	0.009
<i>cim equation</i>				
L1.cl_rev	0.0022	0.0019	1.18	0.237
L2.cl_rev	0.0018	0.0017	1.03	0.303
L1.cim	0.8706	0.0465	18.73	0.000
L2.cim	0.0669	0.0424	1.58	0.114

Note. $N = 3,437$; panels = 133; instruments $l(1/2).(cl_rev\ cim)$. Largest modulus 0.9825, inside the unit circle. Granger: CIM to cl_rev $\chi^2 = 23.06$, $p = 0.000$; cl_rev to CIM $\chi^2 = 4.98$, $p = 0.083$.

The reverse link: political liberty and CIM (pvar cim pl_rev, lags 2)

The companion bivariate pairs CIM with political liberty. It isolates the one feedback that Table A2.3 records as significant: the past of political liberty improves the prediction of CIM ($\chi^2 = 8.84$, $p = 0.012$), while CIM carries no dynamic information about political liberty ($\chi^2 = 4.13$, $p = 0.127$). In the CIM equation the first lag of political liberty is individually near-significant (0.0030, $p = 0.081$) and the two lags are jointly significant. The direction is the mirror of the civil-liberty case: political liberty leads money, money does not lead political liberty.

Table A2.5. Granger causality, {cim, pl_rev}

Equation / Excluded	χ^2	df	Prob > χ^2
<i>cim equation</i>			
pl_rev	8.837	2	0.012
ALL	8.837	2	0.012

Equation / Excluded	χ^2	df	Prob > χ^2
<i>pl_rev equation</i>			
cim	4.128	2	0.127
ALL	4.128	2	0.127

Note. *N* and panels as A2.4. Significant entries ($p < 0.05$) in bold.

Trivariate test of the sequence: {pl_rev, cim, cl_rev} (lags 2)

Because the headline (CIM to civil liberty) and the reverse link (political liberty to CIM) are established in separate bivariate systems, the transmission they jointly suggest – from political liberty through money to civil liberty – is not itself tested until the three variables are estimated together. The trivariate does so and delivers three findings.

First, the headline is robust and, if anything, sharper. With political liberty in the system, CIM still Granger-causes civil liberty ($\chi^2 = 24.52$, $p = 0.000$), and civil liberty is now wholly inert on CIM ($\chi^2 = 0.12$, $p = 0.943$), a cleaner null than the 0.083 of the bivariate. Second, the reverse link holds: political liberty Granger-causes CIM ($\chi^2 = 6.62$, $p = 0.037$), and money still does not lead political liberty ($\chi^2 = 2.14$, $p = 0.343$) – money does not purchase the ballot even under this stricter control. Third, and qualifying the neat sequence, political liberty also Granger-causes civil liberty directly ($\chi^2 = 12.32$, $p = 0.002$). In the civil-liberty equation both the second lag of CIM (0.788, $p = 0.008$) and the first lag of political liberty (0.074, $p = 0.003$) enter significantly. Money is therefore one channel from political to civil liberty, not the sole channel; the two liberties are in addition mutually reinforcing (civil to political, $p = 0.000$).

Table A2.6. Granger causality, {pl_rev, cim, cl_rev}

Equation / Excluded	χ^2	df	Prob > χ^2
<i>pl_rev equation</i>			
cim	2.138	2	0.343
cl_rev	47.035	2	0.000
ALL	51.232	4	0.000
<i>cim equation</i>			
pl_rev	6.618	2	0.037

Equation / Excluded	χ^2	df	Prob > χ^2
cl_rev	0.117	2	0.943
ALL	9.654	4	0.047
<i>cl_rev equation</i>			
pl_rev	12.319	2	0.002
cim	24.520	2	0.000
ALL	34.178	4	0.000

Note. Same 1972–2010, 133-panel sample as A2.4. Entries are Prob > χ^2 ; significant values ($p < 0.05$) in bold. Reading by equation: CIM and political liberty both drive civil liberty; political liberty drives CIM; neither civil liberty nor CIM drives political liberty away from its own path except through the strong civil–political co-movement.

Robustness tests

Each test targets a distinct way in which the headline could be spurious. The baseline is CIM causes cl_rev, $\chi^2 = 23.06$, $p = 0.000$.

Table A2. 7 Robustness tests

Test	Specification	CIM to cl_rev	Verdict
1. Placebo	cl_rev shuffled within country (2,062 rows changed); values kept, timing destroyed	$\chi^2 = 1.49$, $p = 0.475$	effect disappears
2. First differences	pvar D.cl_rev D.cim, lags(2)	$\chi^2 = 7.11$, $p = 0.029$	survives
3. Single lag	pvar cl_rev cim, lags(1); cim coef z = 4.05	$\chi^2 = 16.44$, $p = 0.000$	survives
4a. Over-ID	instl(1/3); Hansen J = 5.72, df 4, $p = 0.221$	$\chi^2 = 23.44$, $p = 0.000$	instruments valid
4b. Over-ID	instl(1/4); Hansen J = 14.46, df 8, $p = 0.070$	$\chi^2 = 12.19$, $p = 0.002$	instruments valid

Note. In the placebo the own-lag of the shuffled series collapses ($L1 = -0.018$, $p = 0.638$), confirming its dynamics were destroyed. In first differences the monetary lags carry opposite signs ($L1 = -0.534$, p

= 0.071; $L2 = 0.589$, $p = 0.086$), an overshooting response whose joint test remains significant. Hansen p -values above 0.05 indicate the overidentifying restrictions are not rejected.

A2.4 Market concentration in the dynamic system

Adding market concentration (hhi) to the VAR collapses the estimation window to 1992–2009 – the years for which HHI exists – leaving roughly 1,445 observations and introducing multicollinearity among three correlated series. Two trivariate systems were estimated, one for each liberty measure. In {cl_rev, cim, hhi} the dynamic link CIM $\rightarrow$ cl_rev weakens to $p = 0.190$, while HHI to CIM emerges as significant ($p = 0.047$). In {pl_rev, cim, hhi} the reverse link political liberty to CIM likewise weakens, to $p = 0.221$, with HHI to CIM now only marginal ($p = 0.054$).

The joint pattern is instructive. Two independent dynamic findings – CIM to civil liberty and political liberty to CIM, each firm on the full sample – lose significance together once the window is cut to eighteen years. That common collapse points to the shortened sample, not to fragility of either relationship or to HHI absorbing a genuine effect: the 1992–2009 window simply lacks the within-country time variation that dynamic Granger tests require. HHI belongs, rather, to the analysis of levels. Static fixed-effects estimates place CIM and HHI as level determinants of democracy ($p \approx 0.08$ and 0.07 respectively), with GDP per capita confirming the Lipset effect. HHI is therefore retained for the level-effects discussion and omitted from the dynamic VAR, whose comparative advantage is the identification of direction.

Table A2.8 Granger causality, {cl_rev, cim, hhi}, 1992–2009

Equation / Excluded	χ^2	df	Prob > χ^2
cl_rev equation			
cim	3.322	2	0.190
hhi	3.463	2	0.177
ALL	7.172	4	0.127
cim equation			
cl_rev	1.141	2	0.565
hhi	6.112	2	0.047
ALL	6.551	4	0.162
hhi equation			

Equation / Excluded	χ^2	df	Prob > χ^2
cl_rev	4.795	2	0.091
cim	3.215	2	0.200
ALL	5.844	4	0.211

Table A2.9. Granger causality, {pl_rev, cim, hhi}, 1992–2009

Equation / Excluded	χ^2	df	Prob > χ^2
<i>pl_rev equation</i>			
cim	0.128	2	0.938
hhi	0.919	2	0.632
ALL	1.661	4	0.798
<i>cim equation</i>			
pl_rev	3.021	2	0.221
hhi	5.838	2	0.054
ALL	7.746	4	0.101
<i>hhi equation</i>			
pl_rev	1.032	2	0.597
cim	1.927	2	0.382
ALL	2.809	4	0.590

Note. 1992–2009 window ($\approx 1,445$ observations). Entries are Prob > χ^2 ; significant values ($p < 0.05$) in bold. On this short window both CIM to cl_rev and pl_rev to cim lose the significance they hold on the full sample, while HHI to CIM appears – the signature of a window effect rather than of fragility.

Summary

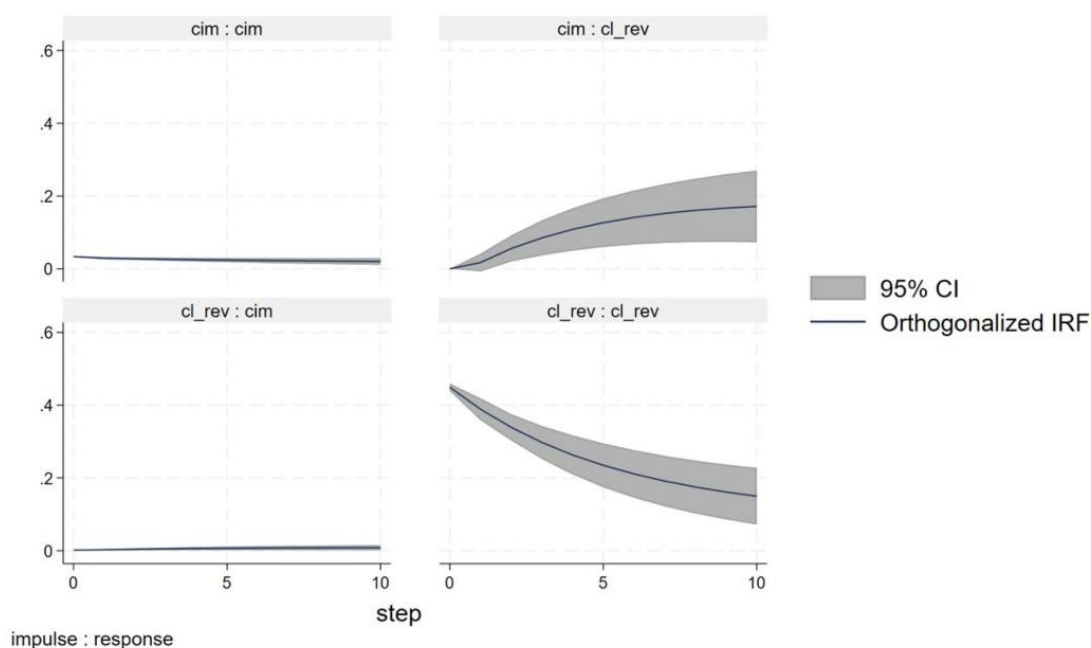
The dynamic evidence supports a directional proposition that the trivariate refines rather than overturns. Contract-intensive money leads civil liberty ($p = 0.000$, and $p = 0.000$ again with political liberty controlled); it does not lead political liberty (0.127; 0.343 controlled) or

democracy (0.362); and it is not led by civil liberty (0.083; 0.943 controlled). Political liberty leads CIM (0.012; 0.037 controlled) but is not led by it.

The one qualification the trivariate adds is that political liberty reaches civil liberty by a direct path as well as through money (0.002), so the transmission is a network with a monetary channel rather than a single monetary chain.

The core relationship withstands a within-country placebo, first-differencing, variation in lag length, and formal instrument testing; it attenuates but survives in differences; and its apparent weakening once market concentration is added is an artefact of the short 1992–2009 window, common to the political link as well. These properties motivate the turn, in chapter 6, to a single long-run national series in which the mechanism can be observed directly.

Figure A2.1. Orthogonalised impulse responses, {cim, cl_rev}



Note. Own-shock and cross responses over a ten-year horizon with 95 per cent bands. The off-diagonal panels carry the substance: a CIM shock raises civil liberty (top right), while a civil-liberty shock leaves CIM flat (bottom left).

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