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Banking on Payments?

by

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ABSTRACT

For the past hundred years or more, payments have been primarily associated with banking, and banking as we know it today—being the result of many centuries of evolution—features a bundling of (at least) three main lines of business: lending, deposit-taking, and payment services. In the past 15 years or so, banks have come under severe competition as providers of payment services. Will "banking on payments" become outmoded and payments untethered from banking, or will payments still have a place in the future of banking?

This paper sets out to explore this question and to address the following two related issues. First, what are the likely consequences (especially for the financing of growth and the provision of liquidity in the form of bank deposits) of the apparent "unbundling" of the traditional connections in banking between lending, deposit-taking, and payment services? Second, what are the implications of the evolution (or revolution) of money, payments, and banking for public policy, monetary theory, and the theory of monetary policy?

KEYWORDS: banking, money, payments, financial intermediation, bank regulation, monetary policy

JEL CODES: B22, E12, E42, E58, G21

1. INTRODUCTION

For the past hundred years or more, payments have been mostly associated with banking. Banking as we know it today, being the result of many centuries of evolution, features a bundling of (at least) three main lines of business: lending, deposit-taking, and payment services. In the traditional "bundled" banking model that typifies today's two-tiered monetary system of bank money, money is primarily issued by profit-seeking private banks as part of their lending business, but is ultimately anchored by a national central bank equipped with a public mandate that is also issuing a shrinking residual of public (paper) money. The public–private partnership of issuance of bank money observed around the world with manifold national idiosyncrasies—particularly its associated centralized ledger-based payments technological infrastructure—had not seen much fundamental change over the past century. As lenders, banks have always competed with alternative providers of finance, and as issuers of bank deposits, banks are also accustomed to competing with nonbank issuers of near-monies. But it is only in the past 15 years or so that banks have come under severe competition as providers of payment services. Today, Fintechs, big tech, and cryptocurrencies offer payment services to households and businesses that are not directly—although often still indirectly—tied to bank money.

In fact, since the Global Financial Crisis of 2007–9, banks and bank money have come under a multi-pronged attack. With banks both weakened by crisis and restrained by post-crisis re-regulation, new players and new products have entered the market for payments, traditionally occupied by banks alone. New technologies and a zero-interest monetary policy backdrop helped to stir up the new-found competition. As a result, after being rather dormant for a century, money and payments are changing super rapidly today. What does the future of payments hold in store for the future of banking?

Will "banking on payments" become outmoded, and payments untethered from banking, or will payments still play a role in the future of banking? This paper sets out to explore this question and address the following two related issues. First, what are the likely consequences, especially for the financing of growth and the provision of liquidity in the form of bank deposits, of the apparent "unbundling" of the traditional connections in banking between lending, deposit-taking,

and payment services? Second, what are the implications of the evolution (or revolution?) of money, payments, *and banking* for public policy and for monetary theory and the theory of monetary policy?

The analysis proceeds as follows. Section 2 revisits some conspicuous dichotomies present in theories of money and banking. Joseph Schumpeter and John Maynard Keynes are seen as heretics challenging—past and present—mainstream conceptions of money and banking. Two perspectives emerge on how "banking on [faster and better] payments" might matter. Do payment innovations simply present an efficiency booster, or is there more at play? A Minskyan symbiosis of Schumpeter's and Keynes' theories of banking suggests that as payment innovations might potentially affect the provision of finance and liquidity to the economy, the investigation must focus on any impact on financial structure. Section 3 attempts a selective review of the mainstream microeconomic banking literature: the "new view" of financial intermediation, asymmetric information, bank runs, and economies of scale and scope. Section 4 discusses the never-ending challenges of regulating banking. Section 5 reviews the specific impacts of the different challengers to banks as payment service providers, focusing on the experiences in China, the EU, and the United States. Section 6 briefly discusses some implications for monetary policy and emergency liquidity support. Section 7 briefly reflects upon some implications for monetary theory and the theory of monetary policy. Section 8 concludes.

2. SOME LONG-RUNNING DICHOTOMIES IN MONETARY THEORY AND THEORIES OF BANKING AND A MINSKYAN SYMBIOSIS OF SCHUMPETER AND KEYNES ON BANKING EVOLUTION

Classical and Neoclassical economists have always wrestled to make sense of money (Goodhart 2005). As the culmination of this age-old struggle, the most sophisticated (Arrow-Debreu) version of neoclassical economics cannot find any room for money at all (the "Hahn problem"). In general, neoclassical economists, then and now, have charted a rather ambivalent, if not schizophrenic, course on money. On the one hand, money is acknowledged as an important device in facilitating exchange in market economies when no Walrasian auctioneer happens to be

around. On the other hand, there is the overarching urge that afflicts all neoclassical investigation to somehow look through the "veil of money" and treat economic activities *as if* they were determined by "real" things only. In short, a "dichotomy" is presumed to exist between the real and monetary spheres of the economy. Postulates of "money neutrality," "homogeneity," and the absence of "money illusion" reflect this peculiar compulsion. In other words, money somehow matters as a means of exchange but not otherwise. Given commercial habits and the exchange technology in place, (the quantity of) money supposedly only determines the price level but does not determine anything "real."

The pedigree of money neutrality compulsion describes mainstream monetary theory until today. An equilibrium determined by real forces alone provides the benchmark for all mainstream macroeconomic theorizing. Money enters the analysis only as an afterthought. The standard approach is to add money as a "friction" of one kind or another that might affect, at least temporarily, the course of the real economy in certain ways. There are variations on how money (and/or other aspects of the financial system) seemingly matter(s) to the economy—briefly disturbed and pushed away from its real long-run equilibrium.

Both Joseph Schumpeter and John Maynard Keynes judged the mainstream approach to monetary theory as misguided.[1] Schumpeter argued that evolution was the essence of capitalism and that mainstream equilibrium thinking was ill-equipped to come to grips with the phenomenon supposedly under study by economists. Keynes argued that, rather than being merely an afterthought, "money plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation, so that the course of events cannot be predicted, either in the long period or in the short, without a knowledge of the behavior of money between the first state and the last" (Keynes 1933). In contrast to the mainstream focus on the exchange of goods with money merely featuring as a medium of exchange, Keynes called for a "monetary theory of production"; with capitalistic production being an evolutionary process, according to Schumpeter. In short, the postulated mainstream dichotomy between the real and

[1] The reader of chapter 6 of Schumpeter's (1954) opus will not miss that the substance of what I stated in the previous three paragraphs largely echoes Schumpeter's assessment of "real" versus "monetary analysis" 80 years ago. The money neutrality compulsion is a long-run love affair.

monetary spheres of the economy also marks a dichotomy in monetary thought between the mainstream on one side and Schumpeter and Keynes on the other.

Schumpeter and Keynes departed from mainstream thinking about money in another important way. Classical and neoclassical economists have traditionally approached money itself as a real thing, a commodity like gold, or some numeraire good. The phenomenon of banking, once again, is more of an afterthought in their thinking about money, a factor adding instability to the real thing. By contrast, Schumpeter and Keynes associated money not with any commodity, but with banking, and saw banking as a fundamental force in economic performance and evolution. Schumpeter and Keynes treated money as bank money, a financial instrument created by banks that *also* facilitates exchange as a means of payments.

Moreover, Schumpeter and Keynes conceived of banking in a way diametrically opposed to the mainstream conception. Schumpeter himself identified yet another dichotomy in monetary theory by contrasting, what he called, the [mainstream] "monetary theory of credit" with the alternative "credit theory of money" (Schumpeter 1954, 717). He associated his own monetary theory and that of Keynes with the latter. On the closely related issues of banking and bank credit, Schumpeter mockingly observes that in the early 1900s, 99 out of 100 economists still believed that banks were mere intermediaries channeling deposits into loans. He then approvingly refers to Chapter 2 of Keynes's (1930a,b) *Treatise on Money*, stating: "it proved extraordinarily difficult for economists to recognize that bank loans and bank investments create deposits. In fact, throughout the period under survey [1870-1914] they refused with practical unanimity to do so. And even in 1930, when the large majority had been converted and had accepted that doctrine as a matter of course, Keynes rightly felt it to be necessary to re-expound and to defend the doctrine at length" (Schumpeter 1954, 1114).

Chapter 2 of Keynes's *Treatise on Money* (TM) is titled "Bank Money" and is subdivided into "1. The 'Creation' of Bank Money" and "2. Current Money is Predominantly Bank Money." In light of the bank money realities of the time, Keynes assumed in TM that all the central bank money is held by banks while all money in the hands of the public is in bank deposits. Keynes notes that depositors are *not* the drivers of banking: "Each bank chairman sitting in his parlour

may regard himself as the passive instrument of outside forces over which he has not control; yet the 'outside forces' may be nothing but himself and his fellow-chairmen, and certainly not his depositors" (Keynes 1930a, 23).

The essential point is that, by the time Schumpeter and Keynes were theorizing about money and banking and certainly no less today, banks created money (i.e., immediate purchasing power denominated in the national[2] unit of account) by lending and investing.[3] In short and in reality, loans make deposits. By contrast, mainstream textbooks even today—and in contrast to what Schumpeter described as "accepted doctrine" in 1930, though much in line with the earlier conception of banking he mocked—still tell stories whereby bank deposits make loans. In other words, Schumpeter and Keynes's credit theories of money are diametrically opposed to monetary theories of credit, with the latter featuring the standard mainstream depiction of banks as special financial intermediaries collecting deposits ("loanable funds") first, which are then made available as loans to borrowers.

Having established the heretical nature of Schumpeter's and Keynes's monetary thought, we now turn to how exactly banks matter in their respective monetary thought.

Schumpeter's (1912) own credit theory of money features banks as "ephors" (gatekeepers), determining which potential "innovations" do or do not get finance and hence are made to happen, or not, in the evolution of capitalism. In other words, Schumpeter highlights the micro role of banks and considers banks' credit creation as the vital monetary complement to innovation. This is not to deny that Schumpeter's theorizing also features macro concerns, especially since he assumes that the new money created by loans to innovators might prove inflationary in the first instance. As the full employment assumption in Schumpeter (1912) is

[2] We ignore here the phenomenon of banks creating purchasing power denominated in foreign currency. See McCauley 2010, for instance.

[3] The origins of modern banking reach back to northern Italy in the Middle Ages. The context was that of facilitating payments for non-local trade; often involving currency exchange. Monetizing claims on traders seems to be a valid description. Common accounts of the origins of banking in Britain – which came to dominate theorizing about money and banking until WWII – feature the practice of deposit-taking by London's goldsmiths. Sissoko 2025 argues that, quite similar to developments in Italy and elsewhere in Europe, discount banking provided the origins of banking in Britain too.

inessential for his key insight, it seems appropriate to crystalize the matter by concluding that Schumpeter underscores the micro role of banks.

Keynes (1930a, b; 1936), on the other hand, offers a macro perspective on bank credit while also underscoring the importance of "liquidity"—with bank deposits featuring as "liquidity par excellence" in his "liquidity preference theory"—as a vital element facilitating capitalistic production under uncertainty (Bibow 2009). Schumpeter's and Keynes's emphases are complementary, and Keynes himself suggests a synthesis in his discussion of investment in capital goods from a macroeconomic perspective, noting that "[a]part from the many minor reasons why these should fluctuate in a changing world, Professor Schumpeter's explanation of the major movements [driving by innovating entrepreneurs] may be unreservedly accepted. […] It is only necessary to add to this that the pace, at which the innovating entrepreneurs will be able to carry their projects into execution at a cost in interest which is not deterrent to them, will depend on the degree of complaisance of those responsible for the banking system" (Keynes 1930b, 85-86).

Moreover, both Schumpeter and Keynes portray bankers as active players rather than as passive channels of depositors' funds or automatic multipliers of central bank reserves; they are players equipped with agency that can be applied for better or worse, but which is inherently essential for economic performance.

In a noteworthy more recent contribution, Jakab and Kumhof (2015) decisively break with the mainstream loanable funds banking tradition and instead present a new generation of DSGE models featuring a "financing through money creation" (FMC) conception of banking. The authors observe that the "problem with [the mainstream loanable funds] view is that, in the real world, there are no pre-existing loanable funds, and the [loanable funds] type institutions do not exist" (Jakab and Kumhof 2015, 38). Calibrating their otherwise standard DSGE model based on US data prior to the GFC, they study how the loanable funds and money creation versions of their DSGE model show different performances when subjected to shocks—both "borrower riskiness" shocks" and "willingness-to-lend" shocks. The key result of their study is that money creation models fit the stylized facts much better than the more traditional loanable fund models.

Clearly impressed by their results, Jakab and Kumhof voiced their confidence that their FMC approach to banking would "generate a very useful research agenda" (39).

Their hopes never came to pass.[4] The important dichotomy in theories of money and banking still remains the paradoxical reality today. And the mainstream conception of banking as financial intermediation of loanable funds vastly dominates today's thinking about banking.

We may stop here for a moment to pinpoint the following enigma: mainstream monetary analysis has generally underplayed the relevance of money and systematically misrepresented banking but, to the extent that money is considered at all, the focus is on the medium of exchange function of money. By contrast, Schumpeter and Keynes, sharing a real-world conception of banking at the heart of their credit theories of money, emphasize money as a real factor, but pay only little attention to the efficiency of the payment system as such. Therefore, it appears that, from a mainstream perspective, focusing on money as a medium of exchange (while ignoring the wider role of money and banking), the observed changes in money and payments unfolding today—supposedly delivering *better payments*—should matter primarily as an *efficiency booster to the economy*. Turning to Schumpeter and Keynes, the two prominent heretics may not offer us any special insights regarding payment system innovations as an efficiency booster,[5] but their

[4] The number of mainstream researchers following their lead appears to be small. Moreover, even this strand of mainstream research follows the usual "financial frictions" approach. For instance, Gersbach and Zelzner (2022) use an otherwise standard DSGE model featuring a financial friction in the form of potential bank-level moral hazard (banks skipping monitoring) while households/depositors are unable to observe how well banks are fulfilling their monitoring role (asymmetric information). In a FMC kind of modelling world the regulator setting the leverage constraint on banks is seen playing a vital role. If the job is done well (and hence the "economically efficient monitoring technology" works), economic performance is superior compared to the modelling world featuring loanable funds banking. One problem is of course that the latter world is nonexistent and hence providing a purely fictitious benchmark. Another problem is that in the real world the leverage constraint of banking is steered by (fast-moving) monetary policy rather than (slow-moving) banking regulation.

[5] Schumpeter certainly took it for granted that serving as a means of payment constitutes moneyness: "you cannot ride on a claim to a horse, but you can pay with a claim to money. But this is a strong reason for calling money what purports to be a claim to legal money, provided it does serve as means of payment" (Schumpeter 1954, 321). Keynes was taking for granted that bank money served as a means of payments but stressed that the "money of account" role was primary: "Money of account, namely that in which debts and prices and general purchasing power are *expressed*, is the primary concept of a theory of money. … Money itself, namely that by delivery of which debt contracts and price contracts are *discharged*, and in the shape of which a store of general purchasing power is *held*, derives its character from its relationship to the money of account, since the debts and prices must first have been expressed in terms of the latter" (Keynes 1930a, 3). In his *Tract on Monetary Reform* Keynes (1923) had made the case for a managed currency focused on keeping prices expressed in the national unit of account stable.

more profound understanding of the role of money and banking alerts us to the possibility that more than efficiency gains in payments may be at play, especially *if the apparent unbundling of banking progresses and banks may no longer be able to bank on payments going forward*.

We explore this point further by bringing Schumpeter's pupil Hyman Minsky into the picture. Schumpeter presents "innovations" as the key feature in the evolution of capitalism. Keynes, too, clearly analyzes an evolving economy but he does not highlight "evolution" as such. Instead, Keynes highlights time and uncertainty. The fact that production takes time creates the need for finance. The fact that the future is unknowable creates the attractiveness of money as "liquidity par excellence," as a means to cope with the uncertainties of capitalistic evolution.[6] Building on Keynes' liquidity preference theory, Minsky proposes an evolutionary theory of banking and finance that develops hypotheses both regarding medium-term cyclical as well as longer-term structural developments.[7] Minsky provides a symbiosis of the monetary thoughts of Schumpeter and Keynes.

Minsky (1975; 1986a) starts from the liquidity preference theory as a theory of asset prices. He adds his distinctive tang by distinguishing different kinds of debt structures and financial positions—hedge, speculative, and Ponzi—and hypothesizing that there is an inherent instability in how financial structures evolve over time. Minsky's take on financial evolution features both boom-bust cyclicality and longer-term structural change. The cyclical part is captured by Minsky's famous "financial instability hypothesis" according to which "stability breeds instability."

The breeding of cyclical instability occurs as good times entice players to moving into more risky and fragile financial positions—positions that do not appear risky for as long as interest rates keep falling and/or asset prices keep rising. As actual margins of safety get gradually thinner and thinner, financial fragility then only becomes apparent, and typically abruptly, when

[6] Keynes notes that the "conception of what contributes to 'liquidity' is a partly vague one, changing from time to time and depending on social practices and institutions" (Keynes 1936, 240).

[7] While Minsky's analysis is generally US-centered, the late Vicky Chick provided an evolutionary analysis of the "stages of banking development" focused on Britain that builds on Keynes and Minsky. See Chick 1993, 2013.

some event (such as rising interest rates) undermines asset prices. The need to make payments (the "survival constraint") may then force debtors to sell assets at fire prices. As debtors engage in fire sales and attempt to de-lever, "debt deflation" processes á la Irving Fisher can cause havoc in the financial system and the economy. Ultimately the central bank has to ride in to the rescue as lender of last resort to halt the wreckage and turn things around—laying the groundwork for a new cycle.

Minsky's theorizing also features an analysis of the longer-term evolution of financial instruments, practices, and structures (Ferri and Minsky 1992; Dafermos et al. 2023). Banking is central to his analysis, but the nature of banking—and the ways in which banks and near-banks create liquidity—continues to evolve. In the later stages of his life, Minsky had much to say about securitization and banking reform.

In summary, starting from a Minskyan symbiosis of the heretical theorizing on money and banking by Schumpeter and Keynes (Minsky 1986b; 1990; 1993), the analysis of ongoing payment system innovations will investigate how today's evolving financial system channels finance and liquidity and *how payment innovations might affect financial structures*. The issue has both a micro dimension (allocation [Schumpeter]), as well as a macro dimension (stability [Keynes]). Until today, regulated banks, as providers of bank credit and liquidity par excellence and as actors in financial markets, remain an essential core element of the financial system. But banking and finance continued to evolve, and one recent and conspicuous aspect of this evolution concerns the formerly exclusive role of bank deposits in payment systems.

3. MICROECONOMIC THEORIES OF BANKING

While mainstream *macro* theories of money and banking do not seem to have much of use to say on the matter, that still leaves a variety of microeconomic theorizing about banking as a potential source of insight, which will be the subject of review in this section (see Bhattacharya and Thakor [1993] and Freixas and Rochet [1997]).

It is quite remarkable how much of the literature on banking focuses on banking crises rather than banking as such. Supposedly the reason is that centuries of banking evolution were also centuries of banking instability. It is clear from this vast literature that banks—or, rather, the banking system—by their very nature, it seems, are systemically important. Public policy attempts to prevent and contain banking instabilities through regulation will therefore be discussed in the next section. This section does not attempt a comprehensive but a selective review of the banking literature. It focuses on particular approaches to microeconomic theorizing about banking, approaches that investigate what banks do, what kind of risks they take on in the process, and why and how banks can get themselves—and the financial system and wider economy—quite easily into serious trouble.

3.1 Money in a Theory of Finance: Are Banks Special?

Gurley and Shaw's (1960) influential treatise on financial intermediation titled "Money in a Theory of Finance" provides an excellent starting point. Their work stands firmly in the mainstream tradition, but we may ignore here postulates about money neutrality and adherence to the traditional conception of banking as starting with deposits that are passed on and loaned out by the intermediary common in the literature (Fama 1980). The fundamental point that Gurley and Shaw introduce is the conception of financial intermediaries as entities that "go in between" two parties that could also interact directly, but choose to do so indirectly.

Financial intermediaries—positioned between ultimate borrowers and ultimate lenders—have financial instruments on both sides of their balance sheet, their assets providing financing in some form to certain parties and their liabilities providing specific forms of wealth holding to other parties. The characteristics of their financial assets and liabilities differ in important ways, differences that seem to constitute the attractiveness, from the perspective of the two parties that could also deal with each other directly, to employ the go-between entity instead. Of course, financial intermediaries exist in this business to make profit, that is, profit from finance and money by going in between.

Gurley and Shaw's approach helps to identify both what financial intermediaries "produce" and what kind of risks they are taking on in that capacity. For instance, if a financial intermediary's

assets have longer maturities than liabilities, they may be said to engage in "maturity transformation," taking on interest rate risk in the process (i.e., insuring the holder of its liabilities against such risks; see Drechsler et al. for a critical view), or, if the financial intermediary's assets bear credit risk while certain liabilities are promised not to, the intermediary may be said to engage in "credit risk transformation." If a financial intermediary issues financial instruments that are promised to have a certain monetary value under all circumstances ("money"), we may speak of "liquidity production" and identify this kind of intermediary as a "bank", that is, an entity issuing a presumed perfectly safe and liquid financial instrument that can also be used for making payments, whilst holding a portfolio of assets that may be risky in a number of ways (Kashyap et al. 2002). (Although "liquidity" production may certainly be conceived more broadly [Keynes 1936; Gorton and Pennacchi 1990; Bougelli 2018; Gabor 2020].)

Given that Gurley and Shaw integrate their approach to financial intermediation and money issuance into the (mainstream) theory of finance emerging at that time, we may add that said financial instruments may include portfolios of assets built on the principles of diversification.

In his essay "Commercial banks as creator of 'money'," James Tobin (1963) elaborates on what was by then dubbed the "new view" of banking and financial intermediation, namely that the differences between commercial banks and other financial intermediaries were a matter of degree rather than kind. Tobin defines the "new view" as stating that "the essential function of financial intermediaries, including commercial banks, is to satisfy simultaneously the portfolio preferences of two types of individuals or firms" (Tobin 1963, 4). An important context of the "new view" was the emergence of "monetarism" around that time, a revival of the Quantity Theory of Money, which is based on the proposition that "money" could be neatly defined, measured, and controlled. Accordingly, with a sharp line drawn between money and other assets, banks as issuers of money are very special too.

Notably, Tobin rejects both conventional views that have banks as either lending out deposits or multiplying reserves provided by the central bank. Instead, he approvingly refers to "a long line of financial heretics [who] have been right in speaking of 'fountain pen money,' money created

by the stroke of the bank president's pen when he approves a loan and credits the proceeds to the borrower's checking account" (Tobin 1963, 1); which puts him in one camp with Schumpeter and Keynes. But at the same time, Tobin rebuffs the idea that commercial banks possess a "widow's cruse," emphasizing that *profit-seeking* banks (and other financial intermediaries alike) face constraints on their balance sheet expansion dependent on prevailing yields on the financial instruments they take on as their assets, on the one hand, by issuing their liabilities, on the other:

> There is at any moment a natural economic limit to the scale of the commercial banking industry. Given the wealth and the asset preferences of the community, the demand for bank deposits can increase only if the yields of other assets fall. The fall in these yields is bound to restrict the profitable lending and investment opportunities available to banks themselves. (Tobin 1963, 9)

What is not spelt out by Tobin here is the central bank's role in providing an important benchmark and anchor to asset yields in general, determined by the financial system with banks as an important player.

Regarding the issue central to our concerns here—payments—Tobin acknowledges that the "means-of-payment characteristic of demand deposits is indeed a feature differentiating bank liabilities from those of other intermediaries" (Tobin 1963, 7), but he does not see this feature as granting banks exceptional powers. Banks can pay for the assets they buy by "writing up" their deposit liabilities, thereby directly creating new purchasing power. But unless nonbanks wish to hold correspondingly more deposit liabilities, this might only be for a "fleeting moment" until banks sell additional (supposedly higher-yielding) non-deposit (or non-payment-deposit) liabilities instead. This possibility has to be part of banks' profit calculus at the time of purchasing any assets or making loans.

By contrast, other financial intermediaries generally cannot directly create the new purchasing power needed to purchase and pay for their target assets. Hence, the nonbank financial intermediary has to first acquire the bank deposits serving that purpose. But, again, Tobin (1963) explains, this may only be for a "fleeting moment" until the asset swap on the nonbank financial intermediary's balance sheet is completed.

The commonness feature is that financial intermediaries issue their liabilities by buying assets. One might even imagine situations here like a nonfinancial corporation's financial officer issuing commercial paper acquired by a money market fund, with the nonfinancial corporation holding MMF shares issued by said money market fund as a precautionary reserve. Payments may still involve bank deposits and settlement central bank deposits, but only for "fleeting moments." *Also, the faster the payment system, the more fleeting these moments will be.* The alternative option would be for a bank providing an overdraft facility to the nonfinancial corporation, at a fee. Liquidity statistics would look different. Different choices might be more or less attractive under varying circumstances.

The broader issue is that banks may not only be lending directly to nonfinancial corporations and households as their ultimate borrowers, but indirectly, namely by lending to other financial players. Similarly, they may be borrowing from ultimate lenders indirectly by borrowing from other financial intermediaries. What is true for banks is also true for other financial intermediaries, thus potentially forming whole chains of financial intermediation, which may be either transparent or quite opaque, but with banks remaining at the core of an increasingly complex financial structure. Keynes captured this aspect in his *Treatise on Money* under the concept "financial circulation."

Keynes defines financial circulation as covering bank deposits used for the purposes of finance, explaining that: "[b]y *finance* […] we mean the business of holding and exchanging existing titles to wealth (other than exchanges resulting from the specialization of industry), including stock exchange and money market transactions, speculation and the process of conveying current savings and profits into the hands of entrepreneurs" (Keynes 1930, I, 217). The key determinants of the volume of the financial circulation are the volume of trading activity in financial instruments and the desire to hold liquidity in the form of "savings deposits" (non-payment deposits) with their credit counterpart consisting of borrowings to finance investments in securities: "The existence of savings deposits is an indication that there are persons who prefer to keep their resources in the form of claims on money of a liquid character realizable at short notice. On the other hand, there is another class of persons who borrow from the banks in order to finance a larger holding of securities than they can carry with their own resources" (Keynes 1930, I, 223). Keynes provides an insightful discussion of how the banking system can either

offset or aggravate changes in the "bearishness" of the nonbank public and how the banking system can also facilitate the emergence of "differences of opinion" as to the prospects of securities prices (referring to the Wall Street boom in the years preceding the crash of 1929 when "bulls" were in effect borrowing money via the banking system as "brokers' loans" from "bears").

Keynes, however, makes it clear that his focus on bank loans and deposits must not be understood too narrowly as alternative forms of financing and liquidity may arise as substitutes in a highly elastic financial circulation greatly dependent on sentiment:

> In modern conditions, both in Great Britain and in the United States, the total 'bear' position can, of course, much exceed the amount of savings deposits B, since professional investors have other, and generally more profitable, means of lending 'bear' funds against liquid claims on cash than through the banking system, e.g., by buying treasury bills and by direct loans to the money market and the stock exchange; and in addition there are those transactions of bears who have sold what they do not own, which are directly offset against the transactions of bulls who 'carry-over' what they have bought. (Keynes 1930, I, 225)

The "new view" of the 1960s remains relevant as an insightful depiction of the phenomenon of financial intermediation. Keynes' analysis of the financial circulation (in the "modern times" of 1930) must be borne in mind as background to our subsequent discussions of the effects of the apparent "unbundling" of banking through payment system innovations on how today's financial system is creating purchasing power and providing finance and liquidity to the economy. Specifically, *how do these innovations affect the position of the banks at the core of an increasingly complex financial structure featuring chains of financial intermediation?* But as "shadow banking" is becoming ever more shadowy, bank deposits remain the closest thing to public money in the system.

Beforehand, we will continue our analysis of microeconomic theories of banking by returning, once more, to Tobin's seminal essay on the "new view", in which he identifies the following "reasons" as economic rationale behind the phenomenon of financial intermediation:

> The reason that the intermediation of financial institutions can accomplish these transformations between the nature of the obligation of the borrower and the nature of the asset of the ultimate lender are these: (1) administrative economy and expertise in negotiating, accounting, appraising, and collecting; (2) reduction of risk per dollar of lending by the pooling of independent risks, with respect both to loan default and to deposit withdrawal; (3) governmental guarantees of the liabilities of the institutions and other provisions (bank examination, investment regulations, supervision of insurance companies, last-resort lending) designed to assure the solvency and liquidity of the institutions. (Tobin 1963, 5)

In Tobin's view, banks' distinctiveness arose from their special treatment by the government (his reason #3), and we will discuss banking regulation in Section 5 below. Suffice to mention that Tobin also made several contributions to the theory of finance (i.e., portfolio selection, liquidity preference etc.). On another occasion, Tobin also promoted "narrow banking," or the idea of having a special category of banks providing current accounts and payment services that are made super-safe by restricting their asset portfolios to super-safe assets only (Fisher 1936; Tobin 1985; 1987; Bossone 2001; Chari and Phelan 2014; Ricks 2016).

For the remainder of this section we focus on Tobin's reasons #1 and #2.

3.2 Imperfect Information and Relationship Banking

As reason #1 Tobin (1963) mentions "expertise in negotiating, accounting, appraising, and collecting." An extensive literature on "asymmetric information" in credit and insurance markets, championed by Joe Stiglitz, has emerged since the 1970s.[8] The asymmetric information paradigm only covers specific informational challenges that are examples of the realities of uncertainty and evolution emphasized by Keynes and Schumpeter; which are generally assumed away in standard mainstream modelling exercises of a perfect-information world criticized by Stiglitz.

[8] Once again, we ignore here that these theorists may have a confused conception of banking and focus on what insights this literature might have to offer in spite of it. Stiglitz and Greenwald (2003, 151) even called "for a return to pre-Keynesian emphasis on 'loanable funds'." These authors erroneously suggest that what they attack as the traditional monetary paradigm, featuring the Hicksian IS/LM model, followed Keynes's liquidity preference theoretical lines – which they regret and reject.

Asymmetric information means that, of the two parties to a contract, one has superior (or even a monopoly of) information at hand. Asymmetric information can give rise to "moral hazard" where the insured party hazards behavior they would have an incentive to avoid without insurance while the other party cannot detect their reckless behavior. The party selling insurance or lending has to take such behavioral changes into account. Asymmetric information can also give rise to "adverse selection" when predominantly inferior risks choose to enter contract while better risks abstain. Again, the party making the lending selection has to take this bias favoring high-risk borrowers into account.

The general result in this literature is that markets may not see clearing through prices but through quantity "rationing" instead as this—together with other contractual stipulations—might create superior incentives that ameliorate the informational challenges. Applied to financial intermediation, the general insight is that banks (or other financial intermediaries) develop special expertise in "screening" and "monitoring" risks delegated to them.

Apart from the specific cases of asymmetric information featuring in the literature, a more general approach to informational challenges highlights relationship-building between banks and their customers as important (Berlin and Mester 1999). This literature emphasizes that certain types of borrowers may be "bank-dependent" as they lack alternative sources of finance. This literature is related to macroeconomic research on the "credit channel." Banks gain important informational advantages from their longer-standing relationships with clients, specifically from handling their payments (Rishabh 2025).

This literature thus alerts us to the question of how the apparent "unbundling" of banking, through newfound competition from nonbank payment service providers, might undermine the banks' traditional informational advantages, and what the wider repercussions might be regarding the provision of financing and liquidity for the economy. Specifically, what does "open banking" mean in the presence of fintechs and big tech in payments?

3.3 Diversification, Liquidity Creation, and the Challenge of Bank Runs

As reason #2, Tobin mentions "the pooling of independent risks, with respect both to loan default and to deposit withdrawal." Diversification of independent risks is the general case that is central to the theory of finance. But pooling also features in an influential literature on bank runs that started with Diamond and Dybvig's (1983) seminal essay titled "Bank runs, deposit insurance, and liquidity."

The DD-model of banking, based on Diamond and Dybvig (1983), highlights the transformation of illiquid assets into liquid liabilities. It describes how banks' demand deposit contracts enable risk sharing among depositors with random consumption (and hence withdrawal or payment) needs. The DD-model introduces shifts in depositors' expectations (or confidence) that can prompt even those depositors who do not have actual liquidity needs to run on the banks who do not have actual liquidity needs. Such self-fulfilling bank runs can cause real damage to the economy as they force banks to recall loans, which, in turn, causes production disruptions.

Credit as a factor that can disrupt production describes some common ground with concurrent research by Ben Bernanke (1983) on the "Nonmonetary effects of the financial crisis in the propagation of the Great Depression." Both branches of this related research on banking—specifically bank credit—represent a critique of the influential monetarist interpretation of the Great Depression due to Friedman and Schwarz (1963), which solely focuses on deposit shrinkage through bank failures. DD promote deposit insurance by the government as a solution to panic-driven bank runs.

Ignoring the standard mainstream deficiencies discussed in Section 2 above, the class of banking models following in the DD tradition highlights that banks are special among lenders in producing "liquidity" as their own funding source, despite the fact that such liquidity production seems to leave them fragile. Suffice to mention that revised portfolio decisions regarding financial instruments rather than surprise consumption choices are the real issue in banking instability, independent of the peculiarity of DD models to assume absence of productivity shocks.

Diamond and Rajan (2001) propose a rationalization of the existence of fragile demand deposits that allows persistent relationship building between lenders and entrepreneurial borrowers to be delegated to bankers. Mainstream bank-run models seem to unearth a role for "liquidity" that is otherwise absent from macro models. But these models do not illuminate why the peculiar form of liquidity produced by banks may be especially important in the economy and fundamentally different from the liquidity provided by financial markets. And the payment function of liquidity in the form of bank deposits does not feature prominently. It is only captured implicitly as the threat of quick withdrawal at par—which equally affects money market funds, providing (near)perfect liquidity without payment functionality.

Keynes emphasized the importance of liquidity, particularly "liquidity par excellence" issued by the banking system, under conditions of uncertainty. Demand deposits—as "instant-access deposits—are directly related to the payment system and their "fragility," from the perspective of the issuing bank, arises from the standing option of moving them away at any time; even if for the banking *system*, including the central bank, it is not really an issue as long as the challenge is liquidity rather than solvency (Bindseil and Senner 2024). *Uninsured demand deposits are runnable and subject to confidence shocks, and greater speed in payments means greater speed in runs—perhaps even beyond instant-access deposits*.[9] Time deposits like Keynes' "savings deposits" and various near-monies are next in line in terms of liquidity. How do the ongoing innovations in money and payments affect (the fragility of) banking and "shadow banking" and the potentiality of disruptions to the economy? In particular, do the shadow banks bank with banks, implying connectedness and contagion risks through chains of intermediation?

3.4 Industrial Organization and Banking Structure

Under reason #1, Tobin also mentions "administrative economy," an issue related to the presence of economies of scale and scope in banking. In general, it is to be expected that there are economies of scale in banking as fixed costs can be significant, and empirical findings show as much. In fact, much research focuses on the opposite question whether banks can be too big: "too big to fail" or "too big to save" (Humphrey and Pulley 1991; Hancock et al. 1999; Davies

[9] The design of the underlying payments infrastructure shapes the banks' intra-day and overnight liquidity needs and the extent to which their assets become encumbered as collateral. See Kabadjova et al. 2023.

and Tracey 2014; Demirgüc-Kunt and Huizinga 2012). A related matter is whether implicit subsidies by the government arising from the provision of a public safety net may encourage the problem. Overall, it is clear that banks of different sizes exist, although in banking, as in many other industries, we seem to observe a tendency toward rising industry concentration.

On the matter of scope economies, the situation is far less clear. Large universal banks coexist with small, specialized niche banks. When it comes to payments, there is a clear hierarchy present in the system, as smaller banks tend to bank with larger banks or central institutions. This is especially the case with payments services which in the traditional bank money system are all built on central bank money as the ultimate settlement asset. Moreover, in payments there are clear-cut "network externalities": the benefits of the individual user rise with the number of users and extent of the network.

A payment system or network consists of an infrastructure and users connected to it through access products. While fragmentation is the enemy of network effects, the presence of network externalities does neither preclude competition among payment infrastructure providers nor among providers of payment access services. In fact, we are observing new-found competition at both levels of the existing bank money-based payment network.

The theoretical IO literature on banking does not seem to capture the core of the traditional banking model: lending, deposit-taking, and payments services. What are the advantages of the joint production of these services? The empirical IO literature on banking appears to yield somewhat mixed evidence (Berger et al. 1987; Clark and Speaker 1994). Rishabh (2025), although studying fintechs, does find evidence that payment flows provide additional information beyond that in traditional sources for screening and monitoring. "Narrow banking" proposals would partly unbundle banking by law; separating lending from deposits used for payments. The fact that these proposals have met persistent resistance would seem to suggest that economies of scope do matter.

3.5 Some Preliminary Conclusions

The evolution of financial structures features rising complexity and lengthening chains of intermediation, with *banks traditionally, and until today, positioned at the core*. Faster payment processes may seem to shrink the differences between banks and other financial intermediaries. But the key issue remains: banks and bank deposits stand higher in the liquidity hierarchy, closest to the central bank as the source of ultimate liquidity. Technological innovations, including payment innovations, are changing the collection and aggregation of information and who has access to it. This can affect banks' traditional competitive informational advantages derived from payments. In fact, it might potentially improve the efficiency of lending (Schumpeter). But "Open Banking" regulations need to ensure a level playing field in lending.[10] Payments are traditionally associated with instant-access deposits as perfect liquidity produced by banks. How do "shadowy" instant-access products fit into the picture, and how could this impact the vulnerability of the traditional liquidity producers when adequate liquidity provision is essential (Bagehot, Keynes)? According to the IO literature, economies of scope in banking are elusive, although a specific focus on the traditional bundling of lending, deposit-taking, and payment services appears to be missing.

4. REGULATION (AND SUPERVISION) OF BANKING: THE NEVER-ENDING CHALLENGE

The quest for sound money and stable banking calls for regulation—but of what kind? The temptation of gaining resources through "creating new purchasing power" (rather than stealing gold from someone else through theft, piracy, or otherwise) seems too great to be left unchecked. The temptation exists for the sovereign, and many cases of "over-issuance" in one form or another are scattered throughout history. The temptation exists in equal measure for private money issuers, as a long history of banking instability vividly attests—with certainly not all cases signifying the risk from over-issuance as such.

[10] See Alonso-Robisco et al. 2025. The issue remains contested. See Quinio and Franklin 2025.

There is a long-running divide between those who believed that restricting the issuance of some strictly-defined "money" would solve the whole matter for good, and others who believed that "moneyness" was too slippery a slope to yield to any easy and clear-cut solution. David Ricardo's intellectual powers stood behind the British Banking Act of 1844, as an example of the former. Milton Friedman's monetarism represented a revival of the same tradition of ideas that generally fall in line with "narrow" or "100-percent" banking regulation. Adam Smith, Henry Thornton, Walter Bagehot, Joseph Schumpeter, and John Maynard Keynes are representatives of the other tradition, thinkers who were vigilant observers of financial realities and who concluded that "money" could not be bottled up for safety all that easily. Historically, these debates also related to the challenge of intellectually grasping the emerging role of central banking as the heart of the emerging public–private partnership that is the foundation of bank money issuance today.

In light of the review of banking theories in Sections 2 and 3, regulation should best help rather than hinder efficiency in the allocation of bank credit as part of overall finance provided to the economy; judged as critical to the progressive evolution of capitalist economies by Schumpeter. At the same time, regulation should help rather than hinder gauging and steering the right provision of aggregate credit and liquidity—as part of overall finance and liquidity needed by the economy—conducive to economic and financial stability (diagnosed as critical by Keynes).

Suffice to mention that Keynes identified monetary policy as the monetary authority's lead "central control" for steering the macro economy through adjusting the price of "money," the (policy) rate of interest. In practice, the monetary authority has two policy parameters to operate on, fast-moving monetary [i.e., interest rate] policy, and typically slow-moving regulation; although regulation too might be adjustable more quickly when needed, especially in acute crisis or its aftermath ("forbearance").

Originally, banking regulation focused on what kind of business banks can do and where. America's "Glass-Steagall" separation of commercial and investment banking is a famously restricting example. As is a strong American focus on separating banking from commerce. Still visible today are historical locational restrictions imposed on American banks (scattered

regulatory framework). With banking historically fractured along national lines, additional restrictions of these kinds played less of a role in continental European countries where the prevalence of "universal banking" paired with generally less-developed financial markets. A significant degree of financial fragmentation along national lines still characterizes Europe's monetary union today.

With the rise in banks' international activities since the 1970s, there have been continued attempts and various rounds of negotiations to establish some degree of harmonization in banking regulation globally through the "Basel Committee"—focusing on quantifying banking risks and requiring banks to harbor adequate precautions against those very risks on (and off) their balance sheets. Those precautions mainly concern bank capital on the one hand, and bank liquidity on the other. (This approach may be understood as broadly following the "new view" and DD-model discussed above.)

Given the evolution in finance emphasized by Schumpeter and Minsky, regulation has to be continuously (in practice, discretely) adapted to "financial innovations." In turn, however, financial practices and innovations continuously adapt to changing regulations, often with the aim of circumventing or evading regulation or at least weakening its impact ("regulatory arbitrage"). Thus, there is a long-standing, two-way relationship and rich interaction between financial regulation, on the one hand, and technology and financial innovation, on the other, featuring "trial & error" on both sides and monetary policy as an important backdrop to economic and financial activities in general. With the addition of bank lobbying, especially powerful in the US[11], into the picture, there is a constant wrangling between financial innovation and (re-)regulation (and implementation or enforcement) shaping financial evolution.

In the decades leading up to the Global Financial Crisis of 2007–9, "securitization" and "structured finance" innovations were the order of the day, allowing banks to "economize" on their capital. The banks' connectedness with the expansive "shadow banking system" through

[11] Some things never seem to change. Regarding the political cloud of Wall Street, Keynes observed in 1931 that "Democrats … are just as dependent on Wall Street for funds as the Republicans are" (Keynes 1931j, 587).

liquidity lines and asset exposures—signifying chains of intermediation—then came back to haunt them—and the public (Pozsar et al. 2010 Pozsar et al. 2010).

The GFC, which at its heart was a banking crisis at the center of the globalized financial system, triggered a profound rethinking and recalibration in regulation. The post-crisis assessment concluded that regulated banks had taken on excessive risks, were extremely levered, as well as highly interconnected with nonbank financial intermediaries, and deeply globally interconnected on top. In response, capital and liquidity requirements were generally raised, especially for large banks. Special treatment is applied to (globally) systemically important banks (and some nonbank financial institutions; Hanson et al. 2013).

The relative weakness of banks in the aftermath of the GFC and the tightening of restraints they were facing through re-regulation provided an opening for new (typically unregulated) nonbank competitors (Buchak 2018; Buch et al. 2021; Shin 2010). Navarro and Strahan 2023; Intense competition affected all traditional lines of banking business. Asset managers and nonbank financial intermediaries have grown greatly in influence, as have "private markets." In particular, "private credit" surged as an alternative for syndicated loans or high-risk bonds (Wigglesworth 2025).

Effectively, though, bank lending is both enabling "private credit" through loans to NBFI—signifying new chains of intermediation—as well as competing with private credit as a source of finance for others (Aramonte and Avalos 2021; Sissoko 2023; Avalos et al. 2025; Chernenko et al. 2025). Similarly, banks also lend extensively to hedge funds (through repos), enabling them to lever up their holdings of Treasury securities, supplementing the banks' own Treasury holdings as dealers. Money market funds and repo markets have greatly expanded as alternatives for liquidity in the form of bank deposits, providing a liquid store of wealth under uncertainty that is trusted to be convertible into deposits at par. While these (unregulated or more lightly regulated) near-monies may not be "payments-ready" (directly usable for payments), they are nonetheless "runnable" and hence can trigger "liquidity events"—i.e., when trust suddenly dissipates, quite similar to regulated banks (since uncertainty also means promises that are accepted by convention at some point in time can become questionable at another.)

Coinciding with new technologies—most prominently, "blockchain"—banks' role in payments has become a new surprise pressure point of intense competition. This comes after a long period of relative tranquility in payments evolution; aside from the introduction of ATMs and real-time gross settlement systems decades ago. New products and new players have suddenly entered the market for payments services, challenging banks as the traditional top dog in payments. Competition may concern access to the payments network and/or its underlying infrastructures (Bindseil and Pantelopoulos 2023) as well as other lines of banking business.

Notably, recent innovations in money and payments fundamentally challenge the existing balance in the public-private partnership that serves as the foundation of today's bank money system, which has simultaneously come under pressure due to the declining use of banknotes in payments. What is unclear is whether these changes really involve an "unbundling" of banking as we know it, or if it is just another round of shrinking regulated banking with a concomitant rise of unregulated banking; i.e., a new form of "shadow banking" with payments as the focal point. In other words, is the apparent "unbundling of banking" real or are we witnessing processes whereby new payment services provided simply use payments as their entry point into banking, which remains as traditionally bundled as ever?

The next section discusses the new key players in payment innovations and the consequences for banking and banking regulation, zooming in on developments in the EU, China, and the US.

5. PAYMENT INNOVATIONS AND THE CONSEQUENCES FOR BANKING AND REGULATION

The (private) challengers to banking come in the form of fintech companies, big techs, and cryptocurrencies, including "stablecoins." All portent to have some technological edge over banks in payments, and customer usage suggests this is true. Fintechs and big techs are often lumped together and not clearly distinguished, and there is some commonality in that both use innovative technology which they apply to payment services. The distinctive feature of big techs, however, is that they start with a huge network of their original (non-payments) customer base.

They were big players in commerce and/or social media to begin with. The fact that their original line of business is built on a huge network appears to tempt them into payments as an additional exploit of network externalities and of potential economies of scope.

It is mainly for these reasons that big techs pose peculiar public policy challenges. The challenges are only partly related to payments as a traditional banking business as such. There are other challenges that may be even more important related to big techs' sheer network size, mass data aggregation, and deep connections of banking with commerce. Potentially, given the size of its network, a big tech could create a monetary system that is wholly private, global in reach, and largely separated from existing bank money–based monetary systems. It is therefore no surprise that Facebook's "Libra" initiative in 2019 triggered major concerns among central bankers and other public policy authorities.

Fintechs are a different matter (Agarwal and Zhang 2020). The splurge of these companies into the payments market is purely based on technology—typically, as start-up firms—in the absence of any existing "network" to speak of. In fact, part of their advantage may stem from not having legacy issues such as existing IT systems or branches. Another part of their competitive advantage over banks in payments purely stems from some technological edge, most often in offering faster, safer and/or more convenient ways to access and use the existing bank money–based payment system.

Original cryptocurrencies, such as Bitcoin, are not only separate from the existing bank money–based monetary system but also are based on a very different "decentralized ledger" technology that comes with the ideological kicker of getting rid of the middleman (the centralized ledger in traditional banking), including the government's central bank. (Ideologically this feature seems to unite those with reservations about the government with those who have reservations about big banks, making for strange bedfellows.) Distributed ledger technology (DLT) offers the opportunity to be applied in payments, however inefficient, wasteful, and cumbersome the payment process may be, and this feature inspired the marketing of these instruments as "currencies"—private currencies free from government or bank control.

Importantly, cryptocurrencies can be used in global payments. Any apparent advantage over cross-border bank money payments may arise precisely from avoiding the "frictions" created by national borders rather than from purely technological efficiency. Apart from special situations where these "frictions," especially legal ones such as anti-money-laundering laws, are especially annoying, cryptocurrencies are of limited usefulness as payment instruments given their remarkable price volatility—reflecting their true nature as highly speculative assets (Weber 2014). There are variations in the issuance of cryptocurrencies. For instance, Bitcoins get "mined," or so it may seem, for this mining appearance conveniently hides the fact that the inventor ("Satoshi Nakamoto") sits on a seigniorage hoard of some $100 billion.[12] An extreme version of cryptocurrencies with less complicated issuance mechanisms, not masquerading as a payments instrument, is "meme coins"—i.e., collector "coins"—which provide opportunities for online gambling apart from enriching their "issuer" (original seller).

A second generation of cryptocurrencies is known as "stablecoins" (see Ahmed and Aldasoro 2025; Ahmed et al. 2025; Aldasoro et al. 2025; Anadu et al 2025). Their key characteristic is the promise to stay "stable" in terms of a particular government currency (mostly USD). This means that stablecoins must have some market-making mechanisms in place to actually make the promised peg effective in the market in the face of fluctuating demand. Stablecoins have come to hold a "central" position in the crypto universe as a medium of exchange for pure cryptocurrencies and as a way to temporarily park liquidity. Stablecoins are also used in cross-border payments, side-stepping bank money–based monetary systems while borrowing the stability of some official unit of account.[13]

There are many questions around the promised stability of stablecoins and how they should best be regulated. There are some similarities to the fragility of money market funds, but the threat of "breaking the buck" (or, rather breaking the promise of trading and exchanging at par with bank money at all times) seems even more acute given that stablecoins are more like instance-access

[12] https://ig.ft.com/trump-bitcoin-reserve/

[13] Van Oordt (2024; 2025) applies the classical framework for rational bubbles to model the price of Bitcoin, distinguishing transactional demand and speculative demand derived from net investment inflows. Auer et al. 2025 provide an empirical analysis of cross-border flows of Bitcoin, Ether and stablecoins. Krugman 2024 makes the point that any transactional demand for crypto may be strongly associated with crime.

deposits than saving deposits, which does not preclude the possibility that they might gain greater use, including internationally, as a liquid store of wealth.

It is in response to this potpourri of challengers to bank money, and also in view of the declining role of banknotes in payments (though not in the "hoarding" of government paper money) that appears to have accelerated since the pandemic (Di Iorio et al. 2025), that many central banks have decided to enter the fray and explore the issuance of a new form of central bank money called (retail) "central bank digital currency" (rCBDC) for general public use (apart from wholesale CBDC [wCBDC], placed as a critical infrastructure layer of the future "unified ledger" financial ecosystem). Specific motivations differ markedly between central banks ranging from financial inclusion, market concentration in payments, national security, and monetary sovereignty (Bibi and Yerzhan 2024; Dowd 2024). One not insignificant motivation may also be that a declining use of banknotes implies a declining share of the seigniorage pie – heralding the unwelcome prospect that one day central banks might become dependent on finance ministries for their own budgets.

There was once a fairly steady balance between banks and the central bank in the "money business"—as a well-established public-private partnership—over the past hundred years. The GFC rocked the balance as banks' central bank reserves, which were generally very small prior to the crisis, surged in the context of quantitative easing. But through newly remunerating reserves, central banks made sure this was not going to rock bank profitability as well. Now, with the declining use of banknotes, it is the central banks' profitability which is under (longer-term) threat, it would seem. But other motivations are important too and central banks seem to be inclined to design their CBDCs in ways that would tend to protect rather than expand their share in the money business – particularly as banks under pressure from those other challengers anyway (Diehl and Drott 2023; ECB 2023).

All these factors are likely to continue playing a role in the evolution of payments and banking (Bibi 2025, Fiebiger 2025). In the next 10 years, decisive change appears possible. At this point, it is informative to take a closer look at some international experiences. Different countries are

charting different courses at this stage in the evolution of payments and banking. We will look at China, the EU, and the US as the three key global players, before turning to the rest of the world.

China

China provides a case study of super-rapid innovations in payments, described by many observers as a "revolution" in payments (see, for instance, Chorzempa 2022; Dollar and Huang 2022). Until about 10 years ago, there was still very extensive use of banknotes in payments in China. The banking system was dominated by large (state-owned) banks catering mainly for large (state-owned) enterprises while presiding over an antiquated bank money–based payment system with little use of card payments. China's central bankers and regulators then chose to stay on the sidelines as China's two home-grown big techs—Alipay and WeChat Pay—catapulted "fintech" into China's payment system. The two giants essentially took over much of the payments market. While doing so—and also exploiting their data advantages derived from their commercial and/or social media platforms—they added the whole range of other financial services to their business. In other words, starting with payments, they became banks.

As other Chinese fintechs joined the online financial marketplace, fraud was rampant, and turmoil ensued—regulators stepped in to end China's brief era of financial Wild West. Regulators stepped in hard on payments too. The two big techs dominating payments had to turn their payments business into "narrow banking"; they have to hold 100 percent backing for their money balances at the central bank. They were essentially absorbed for safekeeping into China's (traditionally digital) bank money–based monetary system which is ultimately controlled by the PBoC.

In effect, China marshalled its home-grown big techs as a vehicle to leap-frog Western payment system technology, and end up with a state-of-the-art payment system that, at the end of the journey, became tightly regulated (again). That is not so say that China has found any satisfactory solutions to dealing with the other challenges posed by big techs related to data aggregation and connections between commerce and banking. Moreover, whatever lessons China has learned in this regard, they may not be easily transferable to the West. Suffice to mention that China is hostile to cryptocurrencies and the PBoC launched a retail CBDC ("digital yuan")

years ago, which has only met comparatively limited demand (Kumar 2022, Bai et al. 2025). China has clear ambitions to further expand the external reach of renminbi payments, through CIPS and other channels, whilst reducing its dependency on the US dollar.

While China provides important insights into "revolutionary" changes in the payments system, it is hard to tell to what extent the loss of payments business may have weakened Chinese banks, perhaps to the point that the "unbundling" of banking through the takeover of payments by Big techs has squeezed the banks' capacity to fulfill their critical role—identified by Schumpeter and Keynes—of providing finance and liquidity to the economy.

China's banking system is still reflective of its centrally-planned economy of the past. China's mostly state-owned banks remain central to the provision of credit to the economy which, in turn, is central to how the CCP controls the economy today. But the CCP has other levers of control at its disposal which make the role of finance in China's economy quite different from the situation in Europe and in the US (which both were the background to Schumpeter and Keynes' theorizing). A lack of finance does not seem to hinder innovation and investment in China; although a good number of Chinese private corporations have listed on US stock markets. China is restraining foreign competition on its financial home turf—with Hong Kong playing a special role as an international financial center and as a bridge between China and the West in some respects.

Europe (with a Concentration on the EU and the Euro Area)

Europe is said to have a "bank-based" financial system—as opposed to America's more "market-based" financial system. Banks do seem to play a more dominant role in European finance. Avoiding harsh (Glass-Steagall-style) separations, Europe's banks may be "universal banks" by tradition, but their financial market activities have traditionally played a relatively smaller role reflecting the "underdevelopment" of its financial markets compared to the US. Today, the issue is not so much "underdevelopment" as such but the continued fragmentation in both banking and financial markets along national borders that is holding back Europe's financial system to live up to its full potential.

Europe also lacks home-grown big techs, and card payments too are dominated by US players. Attitudes toward crypto vary among EU members. Europe's banks are either competing or merging with its cohort of flourishing fintechs that have delivered manifold innovations in retail payments access products. The EU has passed regulations on payments at a relatively early stage of the recent surge in payment innovations to provide a level playing field for fair competition between banks and nonbank payment service providers and forestall regulatory arbitrage.

Some might say that the EU's payments regulations are too "preemptive" in the sense of hindering experimentation and innovation. They will say that payments regulation provides just another example of "over-regulation" that is the source of Europe's lack of innovation and growth. But with Europe's recent record of banking crises in mind, much is at stake. It is further noteworthy that the events in the US in the spring of 2023—when America experienced three of its largest four bank failures, with the crypto industry featuring prominently—did not spread to the EU. (Switzerland's Credit Suisse seems to be a special case.)

At this point, it seems unlikely that ongoing payments innovations taking shape in a settled regulatory environment will impact banks in such profound ways as to undermine their capacity to fulfill their traditional roles as providers of finance and liquidity in Europe's traditionally "bank-based" financial system. That does not mean the existing financial system is ideally suited to fulfill that role. Not at all. Start-up financing appears to be a particular weakness, despite the presence of public sector investment banks (KfW, Bpifrance, for instance). But the existing deficiencies do not seem to stem from payments innovations and their potential impact on banks. The ECB appears to be cautious in designing the "digital euro" (CBDC) in ways that would not encroach on the banks' money business and profitability either.

Regarding its payments infrastructure, Europe appears to be broadly on track to follow the path outlined in the BIS blueprint[14] for a modernized monetary system based on bank money but

[14] The BIS—as best reflected in "Blueprint for the future monetary system: improving the old, enabling the new"—makes the case for modernizing rather than replacing the established two-tiered banking system with central banks as guardians of the payment system and stability of the unit of account, creating a new tokenized monetary architecture incorporating "smart contracts" transforming settlement processes. See BIS 2022, 2023. 2025.

featuring “tokenized” bank deposits and tokenized central bank reserves (wholesale CBDC) with transactions being recorded in a “unified ledger.”

Critical challenges are of an external nature. Apart from successfully creating a common currency adopted by a majority of countries and the associated payments infrastructure, initiatives in payments to live up to Europe’s aspired “strategic autonomy” may find new urgency in light of the ongoing dissolution of the transatlantic partnership by US President Donald Trump. The ECB’s “digital euro” may be partly a project born of concerns for monetary sovereignty in and of itself, and partly a vehicle of competition to compel private players into creating private euro-wide payment solutions.

United States of America

The evolution of payments in America appears to point in a different direction. Despite recent Instant Payment innovations, America’s payment system is in many ways “behind the curve” and exceptionally costly. Card payments are deeply entrenched, but many fintechs and some of the US’s big techs are active in payments, including collaborations with the nation’s powerful credit card companies. US payments regulation appears to be even more behind the curve than its payment system, which is at least catching up (Awrey 2024). Payment service providers are either regulated (and supervised) as banks by the respective authorities (depending on size and location) or “money transmitters” the prudential regulation of which is a state-level responsibility.

Under the leadership of President Trump, who declared that America should be the “crypto capital of the planet” and issued his own meme coin, the US is readying itself to take a big gamble on crypto. The gamble features the idea of building a strategic crypto reserve and promoting stablecoins as a means to bolster the US dollar’s global status (Trump 2025). Another related hope is that stablecoins will boost the demand for Treasuries (as backing), the issuance of which was put on a rampant path by the “Big Beautiful Bill” that was signed into law in July 2025. Stablecoin regulation passed Congress later the same month. While a safe “narrow banking” stablecoin version backed by wCBDC with niche usage in cross-border payments is conceivable, that is not the route taken in the GENIUS act. Backing rules will create interconnections with traditional finance. Issuance is open to both banks and nonbanks, including

even commercial players.[15] As a rarity among the world's central banks, the Federal Reserve was even blocked from launching a CBDC. Meanwhile, a general push for financial deregulation—that seems unlikely to make banking any safer—is on its way, whilst shaking up the "Basel endgame" along the way.

In short, the US appears to be on track for entering a new monetary Wild West of wildcat stablecoins issued by both bank and nonbank players. Forecasts vary widely as to how fast stablecoins might gain in size and reach and how fast the crypto ecosystem's interconnections with the traditional financial system will grow. Given the global role of the US dollar and US finance, the unfolding American crypto gamble will be a development of global significance. Especially as America appears to be inclined to pursue a strategy of promoting the active use of USD stablecoins in foreign nations for both payment and holding purposes.

At this time, it is hard to gauge whether and to what extent payment innovations as such might undermine America's financial system's capacity to fulfil its vital roles—as identified by Schumpeter and Keynes—in providing finance and liquidity to the economy. Banks have long played a relatively smaller role in the US "market-based" financial system. But perhaps that appearance is misleading. As in the US, too, liquidity produced by banks—as member banks of the Federal Reserve System—remains the closest layer to ultimate system liquidity and therefore central to finance. It is that the chains of intermediation appear to become ever longer and ever more complex, making it ever harder to identify just how and by which players the job of providing credit and liquidity to the economy is achieved, both in the aggregate (Keynes) and through which specific channels any new purchasing power might reach the creatively destructive Schumpeterian entrepreneurs as drivers of innovation and growth in the US economy.

[15] Monetary policy is a critical factor shaping the fate of stablecoins. Higher short-term interest rates boost the profitability of stablecoin issuance (seigniorage) but competition from (tokenized) money market funds or (tokenized) Treasury funds will limit the demand for zero-yielding stablecoins. By contrast, a zero-interest rate environment would mean less competition from close substitutes while stablecoin issuers might be tempted into "investing" in the crypto bubble.

Recent rounds of innovation and financial evolution were built on securitization and repo and derivative markets. While innovations continue in the traditional financial system, the coming transformation or convulsion might well center on the crypto industry. The US crypto industry has already become a sizeable piece of the pie. Among other things, this new industry is creating new purchasing power (of some kind) that is proving powerful not only in the crypto universe itself. In a number of ways, crypto is also already having significant effects on the dollar economy, including by giving rise to enormous demands for computing power and energy (Agur et al. 2022), through "wealth effects" and "collateral effects" that seem to bridge the crypto-dollar divide.[16] Stablecoins might turn out to be the decisive factor in shaping the extent of connectedness between the crypto universe and dollar banking (and global monetary) system(s). We may be on the verge of making online gambling casinos part of the global financial system. That all this is happening at the same time that the "AI revolution" frenzy is gripping the US stock market (reminiscent of the dot.com bubble), reminds one of Keynes's aside that: "Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done" (Keynes 1936, 159).

Rest of the World and Cross-Border Payments

The big three surely count greatly, and diverging developments in money and payments between the three global giants might become a critical aspect in the potential fragmentation of the global financial system and global trade system that appears to be in the making, but much innovation and experimentation in payments is also unfolding with rapid speed in the rest of the world. In Asia, India's "Unified Payments Interface" (UPI) is lauded as a great success in boosting financial inclusion and reaching many previously unbanked people (Cornelli et al. 2024; Sen 2025). In Latin America, Brazil's central bank coordinated an instant payment system initiative ("Pix") that proved so successful (Duarte et al. 2022) as to provoke an attack by President Trump, alleging unfair discrimination against US credit card giants (see Stott and Pooler 2025).

[16] Franklin (2025) reports that "JPMorgan explores lending against clients' crypto holdings". https://www.ft.com/content/70279a78-6e48-49ec-a0c3-b091e9d87bc1. Steer (2025) reports that "Crypto lenders dial up risk with 'microfinance on steroids'", https://www.ft.com/content/c531a2bc-d258-431b-855c-2a6aaf230661?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c

Additionally, Kenya's mobile money success story M-Pesa has reached many countries in Africa and beyond (Sy 2029). Countries at different stages in their financial development explore different paths.

As the "quest for speed in payments" (Bech el al. 2017) continues, a key obstacle is that countries have different payment and settlement infrastructures (Kabadjova et al. 2023) that hinder global payments. For now, the G20 continues to pursue a coordinated upgrade to cross-border payments, traditionally based on correspondence banking with SWIFT as the central messaging hub of the network (Cipriani et al. 2023; Garratt et al. 2024). Related initiatives (initially) spearheaded by the BIS Innovation Hub include "mBridge" and "Agorá," of which only the latter includes the US dollar. CBDCs, stablecoins, and connecting national instant payment systems—perhaps built on tokenized bank deposits—provide alternative avenues for cross-border payments that will not be fully compatible without a high degree of international cooperation in both regulation and infrastructure. Correspondence banking networks typically include credit and hence feature the elasticity characteristic of bank money, in contrast to stablecoins.

While global finance would gain from more efficient cross-border wholesale payments, remittances represent an important concern for cross-border retail payments. The high cost of remittances and the lack of inclusiveness of banking continue to represent development challenges in many poorer countries. Dollar stablecoins might further impinge on nations' monetary sovereignty and further augment vulnerabilities created by financial globalization, especially—but not only—in developing countries (ECB 2020; Kregel and Savona 2020; Morgan 2023; Chia and Helleiner 2024; Lane 2025).

6. IMPLICATIONS FOR MONETARY POLICY AND EMERGENCY LIQUIDITY SUPPORT

The evolution of the US financial system might provide indications for the direction of travel elsewhere, and the direction of travel is one of rising complexity and lengthening of chains of

intermediation, including new forms of "shadow banking" that pertain to payments. Among other things, financial evolution will tend to make deciphering the "transmission mechanism of monetary policy" ever harder, both by the monetary authorities and the markets. It becomes more testing to imagine that the routes through which policy impulses are travelling through the system will remain stable over time. Innovations in payments and their potential impact on banking provide just one of the moving parts in the overall picture (De Fiore et al. 2023; Hanson et al. 2024).

What is true in normal times is even more pertinent at moments of acute crisis. Crisis management is about flushing official liquidity into the system or opening new valves for the system to draw on when private channels of finance are at risk of stoppage due to a surge in preference for liquidity of higher quality. It is convenient to think of traditional bank lending as the only source of finance provided to the economy. In that case, emergency liquidity support—i.e., support of the system as a whole rather than individual troubled banks—just means bolstering the banks and/or subbing in for their lending to the economy when needed.

The Federal Reserve's emergency liquidity programs unleashed in the context of the GFC, the pandemic (Barone et al. 2022; Milstein and Wessel 2024), and the most recent US banking crisis in the spring of 2023 (see Caglio et al. 2023; Rose 2023; Cipriani et al. 2024) tell a very different story of what is required to keep a complex financial system afloat and in shape to provide adequate finance and liquidity to the economy. Ignoring any extensions to standard monetary policy (a moving Fed Funds rate target) in the form of QE and forward guidance, the Fed boosted its emergency liquidity facilities beyond its traditional discount window (featuring "primary credit" and "secondary credit") and expansion of its repo operations (Term Auction Facility) with the following programs:

- Primary Dealer Credit Facility (PDCF)
- Term Securities Lending Facility (TSLF)
- Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF)
- Money Market Investor Funding Facility (MMIFF)
- Commercial Paper Funding Facility (CPFF)

- Main Street Lending Program (MSLP)
- Money Market Mutual Fund Liquidity Facility (MMLF)
- Municipal Liquidity Facility (MLF)
- Paycheck Protection Program Liquidity Facility (PPPLF)
- Primary Market Corporate Credit Facility (PMCCF)
- Secondary Market Corporate Credit Facility (SMCCF)
- Term Asset-Backed Securities Loan Facility (TALF)
- Permanent Standing Repo Facility
- Foreign and International Monetary Authorities (FIMA) Repo Facility
- International Swap Lines
- Temporarily relaxing regulatory requirements (TLAC, reserve requirements)
- Bank Term Funding Program

While some of these programs were designed to bolster banks, either in their lending to the economy or to the financial system, the vast majority were set up to target particular financial markets directly. It has become commonplace to refer to central banks extending their "lending of last resort" responsibility for banks á la Walter Bagehot (1873) to financial markets as assuming the role of "market maker of last resort" (Mehrling 2011; Mehrling et al. 2013); even as support tends to be one-way rather than two-way in acute crisis.

Just as the transmission mechanism is making it more complicated to assess as the complexity of the financial system progresses, so it is also the case for emergency liquidity support at times of crisis. Ongoing payments innovations and their potential impact on banking provide an important aspect of financial evolution in our times. The apparent "unbundling" of banking may negatively impact the banks' capacity for providing finance to the economy and reducing the elasticity of the monetary system accordingly, thus forcing central banks to make up for it. Or, in case of further compensatory expansion of "shadow banking," central banks may need to further expand the channels through which they provide emergency liquidity to the system. Finally, if through stablecoins, the crypto universe becomes increasingly interconnected with the traditional bank money dollar system, central banks may come to encounter unknown fragilities arising from blocks of inelastic elements promising liquidity. Central bankers will need to be highly alert to

these developments in assessing monetary policy and emergency liquidity support (see Bowman 2023, 2024).

For financial regulators, as always, the big question is whether all financial innovation and evolution is necessarily efficiency-boosting and welfare-enhancing (Dow 2019; Sissoko 2023, 2025). Instead, much of it may be either driven by regulation itself ("regulatory arbitrage") or represents an outgrowth of applying power toward rent-seeking purposes ("financialization"). Given the political heft of the financial and crypto industries today, especially in the US, the alternative route of concerted efforts to contain the ever-expanding shadow-banking sprawl, including through payments innovations, may be a tough one (at least ahead of the next great financial crisis).

7. IMPLICATIONS FOR MONETARY THEORY AND THE THEORY OF MONETARY POLICY

There is quite a tradition among macroeconomists to theorize about money and monetary policy in rather simplistic ways. I pointed out certain dichotomies describing mainstream thinking versus two favored heretics—Schumpeter and Keynes—at the beginning of the paper. Here are some more distinctive examples of excessive simplicity:

- the money-multiplier model of central bank control over "the" money stock;
- the monetarist prescription that the central bank should control base money by some strict rule (Friedman 1960);
- Post Keynesian "endogenous money" models featuring the central bank as setting "the" rate of interest and banks as providing credit by automated overdraft facilities (Dow 1996; Bibow 2000);
- Mainstream models of the pre-GFC era featuring some interest rate; but no money, banks, or finance;
- Mainstream models promoting central bank independence and featuring the central banks as controlling some imaginary "inflation switch" that can launch surprise inflation,

identified as a cause of an inflationary bias when operating in a monetary structure with "discretion."

Today's standard DSGE models generally feature an inflation-targeting central bank and some kind(s) of "friction(s)" that is (are) meant to capture the role of the financial system in the macroeconomy while otherwise hanging on to outdated views on money and banking as discussed in Section 2. Central bankers will continue to draw on these models since they can hardly be seen as ignoring "state-of-the-art" macroeconomics.

In practice, central banks need to intensify their research into constantly evolving financial structures—including evolution driven by payments innovations—to assess what policy stance may be required at any time for the financial system to provide adequate finance and liquidity to the economy.

Adding to the challenge, the environment is one in which speed in payments, finance, and information seems to grow ever faster and financial market players ever more hooked on what the central bank might do next. Explaining their "business" to the general public and the political authorities charged with holding central bankers to account will not become any easier. The ivory tower may continue to cherish its privilege in staying aloof from these evolving realities and cherish long-held habits of excessive simplicity in money matters instead. Not even generative AI will be able to solve the underlying challenge of an uncertain future that inspired the thinking of both Schumpeter and Keynes.

8. SOME CONCLUDING OBSERVATIONS

A series of conspicuous dichotomies describes the history of theorizing about money and banking. Schumpeter and Keynes were heretics who attacked a mainstream position that—just as today—postulates that money is neutral, treats money as a commodity, and portrays banking as the financial intermediation of loanable funds. Making sense of payments innovations from a mainstream perspective suggests that: "better payments" should be an efficiency booster to the

economy (either productivity or convenience). A Minskyan synthesis of Schumpeter and Keynes would not deny this possibility, but adds another dimension as innovations shape the evolution of the financial structure. Specifically*, if payments become "unbundled" from banking, the capacity of banks to provide finance and liquidity to the economy might become impaired.* The issue has both a micro dimension—allocation (Schumpeter)—as well as a macro dimension—stability (Keynes). Would the financial system, rather, easily compensate the apparent unbundling of banking with respect to the overall provision of finance and liquidity without raising any concerns for regulators?

I attempted to glean insights from certain microeconomic theories of banking. The "new view" of financial intermediation might suggest that faster payments make banks and other financial intermediaries more alike. They commonly issue their liabilities by buying assets. But banks are and remain the closest liquidity layer to the ultimate (official) system liquidity. And banks stand at the (private) core of expanding "chains of financial intermediation" featuring non-bank financial intermediaries that constitute the shadow banking sprawl. The asymmetric information revolution suggests that banks could lose their informational advantages gained through payment services if payments "unbundled" from banking. The presence of big techs in payments raises questions about a level playing field in information, apart from other delicate public policy issues. The literature on bank runs suggests that speedier payments mean speedier runs on runnable (uninsured) deposits; especially instant-access deposits but perhaps others as well. While traditional "bundling" in banking suggests that economies of scope are relevant, but the concrete benefits of joint-production of lending, deposit-taking and payments—apparent from banking evolution—seem elusive in the literature.

As financial evolution progresses, the never-ending challenges of banking regulation remain much the same. Regulation both adapts to and shapes financial evolution. While banks have always faced competition as lenders and liquidity providers, today's fierce competition in payments is new and quite disruptive. The long-established balance in the public-private partnership on which bank money traditionally rests is under pressure. The specific design of CBDCs will be one important factor shaping the balance going forward.

Globally, the evolution or revolution in payments is taking place within different national regulatory environments. China has marshalled its home-grown big techs to "revolutionize" its payment system, before turning their payments business into "narrow banks." The EU keenly established a level playing field in an attempt to avoid fresh banking instabilities. Here the future is pointing in the direction of a tokenized bank money-based monetary architecture. The US is taking a more adventurous approach that features a gamble on crypto. Stablecoin positioning is the wild card in the game. Geostrategic considerations are at play. Fresh threats of vulnerability in weaker countries in the rest of the world seem likely. Even advanced economies may find their monetary sovereignty threatened.

Central bankers everywhere are on high alert. As payments innovations are helping to reshape financial structures, the progressing complexity of the financial system will make it harder to decipher the "transmission mechanism" and gauge the appropriate stance of monetary policy. Banks are still central to the system, but their role becomes more elusive as chains of intermediation become ever more complex.

The "richness" of the Fed's emergency liquidity programs created since the GFC attests to the same phenomenon: supporting only banks and hoping they would carry the rest of the financial system along no longer seems an option. Instead, the Fed is providing more direct and targeted support to critical markets too. The US banking crisis of in the spring of 2023 illustrated that the crypto universe and the dollar monetary system are already interconnected to some degree. The direction of travel seems clear.

Will macroeconomists continue to cherish their well-trodden paths in theorizing about money and banking based on "heroic assumptions"? Central bankers would have to look all the harder at financial evolution, including phenomena like the *apparent* unbundling of payments.

Is banking on payments really outmoded then? Perhaps not so much. It rather seems that nonbank payment service providers use payments as their entry point into banking – as money issuance (and seigniorage) remain as attractive as ever; especially if one can hide from banking

regulation. Perhaps the phenomenon under study is just a fresh round in “shadow banking” *with* banking on payments.

REFERENCES

Agarwal, S. and Zhang, J. 2020. "Fintech, lending and payment innovation: a review." *Asia-Pacific Journal of Financial Studies* 49(3): 353-367.

Ahmed, R., Aldasoro, I. and Duley, C. 2025. "Public information and stablecoin runs." BIS Working Papers no 1164, January.

Ahmed, R. and Aldasoro, I. 2025. "Stablecoins and safe asset prices." BIS Working Papers, No 1270, 28 May.

Aldasoro, I., G. Cornelli, M. F. Minesso, L. Gambacorta and M. M. Habib 2025. "Stablecoins, money market funds and monetary policy." BIS Working Papers No 1219, https://www.bis.org/publ/work1219.htm

Alonso-Robisco, A., Carbo, J.M., Cuadros-Solas, P. J., and Quintanero, J. 2025. "The effects of open banking on Fintech providers: evidence using microdata from Spain." Banco De Espana, Documentos de Trabajo no. 2514.

Anadu, K. et al. 2025. "Stablecoins and crypto shocks: an update." Liberty Street Economics. April 23.

Aramonte, S. and Avalos, F. 2021. "The rise of private markets." BIS Quarterly Review, December 69-82.

Auer, R., Lewrick, U. and Paulick, J. 2025. DeFiying gravity? An empirical analysis of cross-border Bitcoin, Ether and stablecoin flows, BIS Working Paper no 1265.

Agur, I., J. Deodoro, X. Lavayssière, S. M. Peria, D. Sandri, H. Tourpe, and G. V. Bauer. 2022. "Digital Currencies and Energy Consumptions." IMF FINTECH Note 2022/006.

Avalos, F., Doerr, S. and Pinter, G. 2025. "The global drivers of private credit." BIS Quarterly Review, March, 13–30.

Awrey, D. 2024. *Beyond Banks—Technology, Regulation, and the Future of Money*. Princeton and Oxford: Princeton University Press.

Bagehot, W. 1906 [1873]. *Lombard Street: A Description of the Money Market*, New York: Charles Scribner's Sons.

Bai, H., Cong, L.W., Luo, M., and Xie, P. 2025. "Adoption of Central Bank Digital Currencies: Initial Evidence from China." *Journal of Corporate Finance*.

Bank for International Settlements 2022. *Annual Report*, chapter 3. The future monetary system, Basel.

Bank for International Settlements 2023. *Annual Report*, chapter 3 Blueprint for the future monetary system: improving the old, enabling the new. Basel.

Bank for International Settlement 2025. *Annual Report*, chapter 3 The next-generation monetary and financial system, Basel.

Barone, J., A. Chaboud, A. Copeland, C. Kavoussi, F. Keane, and S. Searls. 2022. "The Global Dash for Cash in March 2020." Liberty Street Economics, July 12, 2022, https://libertystreeteconomics.newyorkfed.org/2022/07/the-global-dash-for-cash-in-march-2020/

Bhattacharya, S. and Thakor, A. V. 1993. "Contemporary banking theory." *Journal of Financial Intermediation* 3: 2–50.

Bech, M., Shimizu, Y. and Wong, P. 2017. "The quest for speed in payments." BIS Quarterly Review, March, 57–68.

Berger, A. N., Hanweck, G. A. and D. B. Humphrey. 1987. "Competitive viability in banking: Scale, scope, and product mix economies." *Journal of Monetary Economics* 20(3): 501–520.

Berlin, M. and Mester, L. J. 1999. "Deposits and relationship lending." *The Review of Financial Studies* 12(3): 579–607.

Bernanke, B. 1983. "Nonmonetary effects of the financial crisis in the propagation of the Great Depression." *American Economic Review* (73)3: 257–76.

Bibi, S. and Yerzhan, I. 2024. "Central Bank Digital Currency and digital payment instruments: Kazakhstan's experience between obstacles, threats and opportunities." https://www.tandfonline.com/doi/full/10.1080/01603477.2025.2503149?src=exp-la

Bibi, S. 2025. "Bitcoin, Central Bank Digital Currency and the loss of money value(s)." *Review of Political Economy*, 1–29. https://www.tandfonline.com/doi/full/10.1080/09538259.2025.2456734

Bibow, J. 2000. "On exogenous money and bank behaviour: The Pandora's box kept shut in Keynes' theory of liquidity preference." *European Journal of the History of Economic Thought* 7(4), 532–68.

Bibow, J. 2009. *Keynes on Monetary Policy, Finance and Uncertainty: Liquidity Preference Theory and the Global Financial Crisis*. Routledge, London and New York.

Bindseil, U. and Pantelopoulos, G. 2023. *Introduction to Payments and Financial Market Infrastructures*. Springer.

Bindseil, U. and Senner, R. 2024. „Destabilisation of bank deposits across destinations: assessment and policy implications." ECB Working Paper 2887.

Bossone, B. 2001. "Should banks be narrowed?" IMF Working Paper No. 01/159, October.

Bouguelli, R. 2018. "A note on 'rethinking liquidity creation: Banks, shadow banks and the elasticity of finance'." Journal of Post Keynesian Economics 41(4): 648–53.

Bowman, M. W. 2023. "The Evolving Nature of Banking, Bank Culture, and Bank Runs." Speech given at the 21st Annual Symposium on Building the Financial System of the 21st Century: An Agenda for Europe and the United States, European Central Bank, Frankfurt, Germany, May 12, 2023.

Bowman, M. W. 2024. "Bank liquidity, regulation, and the Fed's role as lender of last resort, Remarks, Roundtable on the Lender of Last Resort: The 2023 Banking Crisis and COVID, sponsored by the Committee on Capital Markets Regulation." Washington DC, April 3.

Buch, C. M., B. G. Dages, and H. Remsperger. 2021. "Structural Changes in Banking After the Crisis". In: International Journal of Central Banking 17.4, pp. 1–38.

Buchak, G. et al. 2018. "Fintech, regulatory arbitrage, and the rise of shadow banks". In: Journal of Financial Economics 130.3, pp. 453–483.

Caglio, C., J. Dlugosz, and M. Rezende. 2023. "Flight to Safety in the Regional Bank Crisis of 2023." Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4457140

Chari, V. V. and Phelan, C. 2014. "On the Social Usefulness of Fractional Reserve Banking." *Journal of Monetary Economics* 65: 1–13.

Chernenko, S., Ialenti, R. and Scharstein, D. 2025. „Bank capital and the growth of private credit," SSRN Working Paper https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5097437

Chia, C. and Helleiner, E. 2024. "Central bank digital currencies and the future of monetary sovereignty." *Finance and Space* 1(1): 35–48.

Chick, V. 1993. "The evolution of the banking system and the theory of monetary policy," in S.F. Frowen (ed.) *Monetary theory and monetary policy: New tracks for the 1990s*, 79–92. Springer.

Chick, V. 2013. "The current banking crisis in the UK: an evolutionary view," in J. Pixley, and G.C. Harcourt (eds.) *Financial crises and the nature of capitalist money*. London: Palgrave Macmillan, 148–161.

Chorzempa, M. 2022. "The Cashless Revolution – China's Reinvention of Money and the End of America's Domination of Finance and Technology." New York: BBS Public Affairs.

Cipriani, M., Eisenbach, T. and Kovner, A. 2024. "Anatomy of the bank runs in March 2023." Liberty Street Economics, December. https://libertystreeteconomics.newyorkfed.org/2024/12/anatomy-of-the-bank-runs-in-march-2023/

Cipriani, M., Goldberg, L. S. and La Spade, G. 2023. "Financial sanctions, swift, and the architecture of the international payment system." *Journal of Economic Perspectives* 37(1): 31–52.

Clark, J. A. and Speaker, P. J. 1994. "Economies of scale and scope in banking: evidence from a Generalized Translog Cost Function." *Quarterly Journal of Business and Economics*, 33(2): 3–25.

Cornelli, G., Frost, J., Gambacorta, L., Sinha, S. and Townsend, R. M. 2024. "The organization of digital payments in India – lessons from the Unified Payments Interface (UPI)." SUERF Policy Note no. 355, August.

Dafermos, Y., Gabor, D., & Michell, J. 2023b. „Institutional supercycles: An evolutionary macro-finance approach." New Political Economy, 1–20.

Davies, R. and Tracey, B. 2014. "Too big to be efficient? The impact of implicit subsidies on estimates of scale economies for banks." *Journal of Money, Credit and Banking* 46(s1: 219–53.

De Fiore, F., Gambacorta, L. and Manea, C. 2023. "Bit techs and the credit channel of monetary policy." BIS Working Paper no. 1088, April.

Demirgüc-Kunt, A. and Huizinga, H. 2012. "Do we need big banks? Evidence on performance, strategy and market discipline." BIS conference paper. https://www.bis.org/bcbs/events/bhbibe/demirguc.pdf

Diehl, M. and Drott, C. 2023. „Empowering central bank money for a digital future." *SUERF Policy Note*, Issue no 312, June.

Di Iorio, A., Kosse, A. and Mustafi, I. 2025. "And so we pay: more digital and faster, with cash still in play." Bank for International Settlements – Committee on Payments and Market Infrastructure, CPMI Brief no. 8, March.

Diamond, D. W. and P. H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91(3): 401–19. http://www.jstor.org/stable/1837095

Diamond, D. W. and R. G. Rajan. 2001. "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking." *Journal of Political Economy* 109(2): 287–327.

Dollar, D. and Huang, Y. (eds.). 2022. *The Digital Financial Revolution in China*. Washington, DC: Brookings Institution Press.

Dow, S. 1996. "Horizontalism: a critique." *Cambridge Journal of Economics*, 20(4): 497–508.

Dow, S. 2019. Monetary reform, central banks, and digital currencies, *International Journal of Political Economy* 48(2): 153–73.

Dowd, K. 2024. "So far, Central Bank Digital Currencies have failed." *Economic Affairs*. 44: 71-94.

Drechsler, I., Savov, A., and Schnabl, P. 2021. "Banking on deposits: maturity transformation without interest rate risk." *Journal of Finance*, vol. LXXVI (3): 1091-1143.

Duarte, A., Frost, J., Gambacorta, L., Koo Wilens, P. and H. S. Shin. 2022. "Central banks, the monetary system and public payment infrastructures: lessons from Brazil's Pix." BIS Bulletin, No. 52, March 23.

ECB 2020. „Stablecoins: implications for monetary policy, financial stability, market infrastructure and payments, and banking supervision in the euro area." Crypto-Assets Task Force, Occasional Paper no. 247, September.

European Central Bank. 2023. "A Stocktake on the Digital Euro: Summary Report on the Investigation Phase and Outlook on the Next Phase." October.

Fama, E. F. 1980. "Banking in the theory of finance." *Journal of Monetary Economics* 6(1): 39-57.

Ferri, P. and Minsky, H. 1992. "Market processes and thwarting systems." *Structural change and economic dynamics*, 3 (1): 79–91.

Fiebiger, B. 2025. "The future of money – Central Bank Digital Currencies and/or cryptocurrencies?: Safebuarding moentary sovereignty and deterring U.S.-owned payment system oligopolies." *Review of Political Economy*, https://www.tandfonline.com/doi/full/10.1080/09538259.2025.2481424?af=R

Fisher, Irving 1936. *100% Money*. Adelphi Company, New York.

Franklin, J. 2025. "JPMorgan explores lending against clients' crypto holdings." *Financial Times*, July 22, https://www.ft.com/content/70279a78-6e48-49ec-a0c3-b091e9d87bc1.

Freixas, X. and Jean-Charles Rochet. 1997. *Microeconomics of Banking*. MIT Press, Cambridge/Mass.

Friedman, M. 1960. *A Program for Monetary Stability*, New York: Fordham University Press.

Friedman, M. and A. J. Schwarz 1963. *A Monetary History of the United States*, 1867-1960, Princeton University Press.

Gabor, D. 2020. "Critical macro-finance: A theoretical lens." *Finance and Society*, 6(1): 45–55.

Garratt, R., Koo Wilkens, P. and H. S. Shin. 2024. "Next generation correspondent banking." BIS Bulletin no. 87, May 30.

Goodhart, C. 2005. "What is the essence of money?" *Cambridge Journal of Economics*, vol. 29, no. 5, 817–25.

Gorton, G. and Pennacchi, G. G. 1990. "Financial intermediaries and liquidity creation." *Journal of Finance* 45: 49–71.

Gurley, J. G. and Shaw, E. S. 1960. *Money in a Theory of Finance*, Washington, DC: Brookings Institution.

Hancock, D., Humphrey, D. B., and J. A. Wilcox. 1999. "Cost reductions in electronic payments: The roles of consolidation, economies of scale, and technical change." *Journal of Banking & Finance*, 23: 391–421.

Hanson, S.G., Kashyap, A. K., and Stein, J. C. 2011. „A macroprudential approach to financial regulation." *Journal of Economic Perspectives* 25(1): 3-28.

Hanson, S.G. et al. 2024. "The evolution of banking in the 21st century: evidence and regulatory implications." *Brookings Papers on Economic Activity*.

Humphrey, D.B. and Pulley, L. B. 1991. "Scope Economies: Fixed Costs, Complementarity, and Functional Form." Federal Reserve Bank of Richmond, Working Paper 91-3, February, https://www.richmondfed.org/-/media/richmondfedorg/publications/research/working_papers/1991/pdf/wp91-3.pdf

Jakab, Z. and Kumhof, M. 2015. "Banks are not intermediaries of loanable funds – and why this matters." Bank of England Working Paper no. 519, May. https://www.bankofengland.co.uk/working-paper/2015/banks-are-not-intermediaries-of-loanable-funds-and-why-this-matters

Kabadjova, B. A. et al. 2023. "Intraday liquidity around the world." BIS Working Paper no. 1089, April, https://www.bis.org/publ/work1089.htm

Kashyap, A. K., Rajan, R., and Stein, J. C. 2002. "Banks as liquidity providers: an explanation for the coexistence of lending and deposit-taking." *Journal of Finance* 57: 33–73.

Keynes, J.M. [1923] 1971. A Tract on Monetary Reform, reprinted in The Collected Writings of John Maynard Keynes, Vol. 4, London: Macmillan.

Keynes, J.M. [1930a] 1971. A Treatise on Money – The Pure Theory of Money, reprinted in The Collected Writings of John Maynard Keynes, Vol. 5, London: Macmillan.

Keynes, J.M. [1930b] 1971. A Treatise on Money – The Applied Theory of Money, reprinted in The Collected Writings of John Maynard Keynes, Vol. 6, London: Macmillan.

Keynes, J.M. (1931j) 1981. "Economic Advisory Council: A note on economic conditions in the United States." Reprinted in D. Moggridge (ed.), The Collected Writings of John Maynard Keynes, Vol. 20. London: Macmillan

Keynes, J.M. (1933). A monetary theory of production, in Der Stand und die nächste Zukunft der Konjunkturforschung: Festschrift für Arthur Spiethoff. Munich: Duncker & Humboldt, pp.123-25, reprinted in in D. Moggridge, editor, 1973, Collected Writings of John Maynard Keynes, vol. XIII - The General Theory and After, Part I - London: Macmillan, pp.408-411

Keynes, J.M. [1936] 1973. The General Theory of Employment, Interest and Money, reprinted in The Collected Writings of John Maynard Keynes, Vol. 7, London: Macmillan.

Kregel, J., and P. Savona. 2020. "The Impact of Technological Innovations on Money and Financial Markets." Levy Economics Institute Public Policy Brief No. 150.

Krugman, P. 2024. "Crypto is for criming." December 16, Substack. https://paulkrugman.substack.com/p/crypto-is-for-criming

Kumar, A. 2022. "A report card on China's Central Bank Digital Currency. The e-CNY, *Atlantic Council*. 1 March 2022. https://www.atlanticcouncil.org/blogs/econographics/a-report-card-on-chinas-central-bank-digital-currency-the-e-cny/

Lane, P. R. 2025. "The digital euro: maintaining the autonomy of the monetary system." Speech at the University College Cork Economics Society Conference 2025, March 20.

McCauley, R. 2010. "Internationalising the Australian dollar", in C Shu and W Peng (eds), Currency internationalization: international experiences and implications for the renminbi, Palgrave Macmillan, Basingstoke, pp 56–77.

Mehrling, P. 2011. *The New Lombard Street: How the Fed became the Dealer of Last Resort*, Princeton University Press.

Mehrling, P., Pozsar, Z., Sweeney, J. and D. Neilson. 2013. "Bagehot was a Shadow banker: Shadow Banking, Central Banking, and the Future of Global Finance." INET, working paper, November.

Milstein, C. and Wessel, D. 2024. „What did the Fed do in response to the COVID-19 crisis?" Brookings, January 2.

Minsky, H. P. 1975. *John Maynard Keynes*. New York: Columbia University Press.

Minsky, H. P. 1986a. *Stabilizing an Unstable Economy*. New Haven, CT: Yale University Press.

Minsky, H.P. 1986b. "Money and crisis in Schumpeter and Keynes," in I Wagener and J Drukker (eds) The Economic Law of Motion of Modern Society, Cambridge University Press.

Minsky, H.P. 1990. "Schumpeter: finance and evolution," in A. Heertje and M. Perlman (eds) Evolving Technology and Market Structure. Studies in Schumpeterian Economics, The University of Michigan Press, 51-74.

Minsky, H.P. 1993. "Schumpeter and finance," in S. Riasco, A. Roncaglia and M. Salvati (eds.) *Markets and Institutions in Economic Development*. Macmillan.

Mitchell, J. 2024. "Theorizing non-bank financial intermediation."

Morgan, J. 2023. "Systemic stablecoin and the brave new world of digital money." *Cambridge Journal of Economics* 47: 215–60.

Navarro, Pablo and Philip E. Strahan. 2023. "How Shadow Banking Competes with Traditional Banks". In: Journal of Money, Credit and Banking 55.2: 427–456. doi:10.1111/jmcb.13015.

Pozsar, Z., T. Adrian, A. Ashcraft, and H. Boesky. 2010. "Shadow Banking." New York Fed Staff Report No. 458, July.

Quinio, A. and J. Franklin. 2025. "J. P. Morgan spooks fintechs with plans to charge for access to customer data." *Financial Times*, July 28, https://www.ft.com/content/85ccc517-4a34-4221-aec7-4d8a72a21f35?segmentId=dddf6252-6e37-bb4b-bda7-2193a3453893

Ricks, M. 2016. "Safety first? The deceptive allure of full reserve banking." Chicago Unbound.

Rishabh, K. 2025. "Beyond the bureau: interoperable payment data for loan screening and monitoring." SSRN Working Paper, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4782597

Rose, J. 2023. "Understanding the speed and size of bank runs in historical comparison." Economic Synopses, 2023/12, Federal Reserve Bank of St. Louis.

Sen, J. 2025. "India's Unified Payments Interface (UPI) system and its transformative impact." London School of Economics and Political Science, SRC Discussion Paper no. 131, February.

Schumpeter, J. A. 1912 [1959]. *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.

Schumpeter, J. 1997 [1954]. *History of Economic Analysis*. London: Routledge.
Shin, H. S. 2010a. "Financial Intermediation and the Post-Crisis Financial System", BIS Working Paper No. 304.

Sissoko, C. 2023. 'Private' equity is a misnomer; government support has been driving the restructuring of US corporate structure and the transfer of wealth to buyout firms over the past 40 years, August 23.

Sissoko, C. 2025. "Banks are different: why bank-based versus market-based lending is a false dichotomy." *European Journal of Economics and Economic Policies: Intervention*, 22(1): 32–53.

Steer, G. 2025. "Crypto lenders dial up risk with 'microfinance on steroids." Financial Times, July 27, https://www.ft.com/content/c531a2bc-d258-431b-855c-2a6aaf230661?segmentId=b0d7e653-3467-12ab-c0f0-77e4424cdb4c

Stott, M. and M. Pooler 2025. "Brazil rallies to defend much-loved payment system from Donald Trump's attack." Financial Times, July 21, https://www.ft.com/content/e17e6de1-d863-46f8-bfab-fa8cbfc495f0

Sy, A. N. R. 2019. "Fintech in Sub-Saharan Africa: A Potential Game Changer." IMF Blog, February 14, https://www.imf.org/en/Blogs/Articles/2019/02/14/fintech-in-sub-saharan-africa-a-potential-game-changer

Tobin, J. 1963. "Commerical banks as creators of money." Cowles Foundation Discussion Paper. no 388.

Tobin, J. 1985. "Financial innovation and deregulation in perspective." Bank of Japan Monetary and Economic Studies, 3(2): 19-29.

Tobin, J. 1987. "The case for preserving regulatory distinctions," in Restructuring the Financial System, Federal Reserve Bank of Kansas City, 167-183.

Trump, D. 2025. "Strengthening American Leadership in Digital Financial Technology." Executive Order. 23 January. https://www.whitehouse.gov/presidential-actions/2025/01/strengthening- american-leadership-in-digital-financial-technology/

Van Oordt, M. R. C. 2024. "Bitcoin valuation: transactional demand versus speculative bubble." *VoxEU*, December 7, https://cepr.org/voxeu/columns/bitcoin-valuation-transactional-demand-versus-speculative-bubble

Van Oordt, M. R. C. 2025. "On bubbles in cryptocurrency prices." 24 February.

Weber, B. 2014. "Bitcoin and the legitimacy crisis of money." *Cambridge Journal of Economics* 40(1): 6.

Wigglesworth, R. 2025. “The $1tn shadow bank lending boom.” *Financial Times*, May 29, 2025. https://www.ft.com/content/b7729107-afb1-4fd7-bfd2-434d1ef7edbb