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Giuseppe Gurrado

Donato Masciandaro

Università Bocconi
BAFFI
Centre on Economics, Finance and Regulation

Via Röntgen 1 | 20136 Milano – Italia | Tel +39 02 5836.5908/5564
baffi@unibocconi.it | www.baffi.unibocconi.eu

Stablecoins vs CBDCs: the Digital Money Race in the Scientific and Social Networks

Giuseppe Gurrado[♠] Donato Masciandaro[♠♠]

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Abstract

In the ongoing race between new digital currencies, a crucial factor for success will be their relative ability to gain acceptance as a medium of exchange, shaping the demand for money. Focusing on the emerging competition between stablecoins and CBDCs, this analysis offers quantitative insights into which of the two is gaining more attention among different audiences, exploring both academic and public interest in recent years. The growth rates of academic publications on stablecoins and CBDCs, after alternating periods of predominance, now appear to converge, even though research on CBDCs remains higher in absolute terms. However, beyond academia, public attention confirms the possibility of stablecoins catching up. The observed cycles of attention for the two digital currencies highlight the importance of specific events, as well as the relevance of contextual and country-specific factors.

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[♠] Department of Economics and Baffi Centre, Bocconi University.

[♠♠] Department of Economics and Baffi Centre, Bocconi University, and SUERF.

1. Introduction

How to evaluate the emerging phenomena of new digital media of payments, as the private stablecoins and the public central bank digital currency (CBDC)? The economic interest of this question – as well as its legal relevance (Avgouleas and Blair, 2020; Bossu et al., 2021; Lubello, 2023) – is evident, and its importance emerges even more if we underline the fact that these innovations can have a deep impact on trust and decentralization, with implications in terms of markets and social functioning (Limata, 2024).

On the one side, the recent wave of innovation in private payment systems has been characterized by the issuance of cryptocurrencies. Cryptocurrencies are private supplies of means of payment that are produced and distributed using a decentralized, peer-to-peer transfer system, which is known as the blockchain technology (or distributed ledger technology, DLT) (Halaburda, 2016; Bech and Garratt, 2017; Chiu and Koeppl, 2017; Huberman et al., 2017; Abadi and Brunnermeir, 2018; Casey et al., 2018; Halaburda et al., 2020). The cryptocurrency issuing can potentially destabilize the monetary policy action (Benigno, 2019; Benigno et al., 2022) and at the same time the individuals that are interested in using cash for illegal reasons can consider the cryptocurrencies as close substitutes (Hendrickson et al., 2021). Recently, in this perimeter, the stablecoins experience took the stage.

On the other side, given the above-mentioned emerging interest in new private electronic currencies, a question naturally arises: Is it necessary to have a public digital currency? It has been suggested that a central bank digital currency could transform all aspects of the monetary system, as a CBDC could serve as a costless medium of exchange, a store of value and a stable unit of account, all of which would benefit consumers (Bordo and Levin, 2017 and 2019; Moghadam, 2018; Berentsen and Schar, 2018), and it has been theoretically shown that a CBDC can increase welfare by competing with banking means of payment as a safe asset that is provided through a public narrow banking service (Williamson, 2022). Under some circumstances such function of a CBDC could transform the central bank as a deposit monopolist (Fernandez-Villaverde et al., 2020), as well as enabling unconventional monetary policies, as negative nominal interest rates and helicopter drops (Mishra and Prasad, 2024).

In the last decade the issuance of a CBDC is an option that both academics and central bankers are carefully considering (Fung and Halaburda, 2016; Skingsley, 2016; Danezis and Meiklejohn, 2016; Bordo and Levin, 2017; Bech and Garratt, 2017; Hileman and Rauchs, 2017; Lowe, 2017; Segendorf, 2017; Coeurè, 2018; Eichengreen, 2019; Bordo, 2021; Azzone and Barucci, 2023; Nocciola and Zamora-Perez, 2024; Cipollone, 2025). Nevertheless, this topic requires still deep consideration of both the economic and the political economy perspectives (Tucker, 2017), as well as the role of technological innovation (Velde, 2017). A CBDC, which would simultaneously be a public and virtual medium of exchange, should be completely different from existing forms of virtual monies, which are issued by private regulated firms (banks) and private unregulated entities (blockchain networks), and from paper currencies.

In other words, the existence of both stablecoins and CBDCs should change the possibilities each agent has to allocate her/his funds (hereafter "her") given her financial preferences. On this respect, here we adopt the novel specification of the demand for money à la Baumol and Friedman (Masciandaro, 2018). In this specification, the medium of payment (MOP) has three properties, given its standard role of unit of account: the first two are the MOP's traditional functions as a medium of exchange and as a store of value, while the third is a novel function as a store of information. Uncovering the functions of money it is possible to explore what factors could drive the demand for new digital monies, starting from their acceptability.

In this paper we focus our attention on the ongoing money race between new digital currencies, where a crucial factor of success will be exactly their relative ability to gain acceptance as a medium of exchange. Focusing on the emerging competition between stablecoins and CBDCs this analysis offers quantitative insights on which of the two is gaining more attention among different audiences, exploring both a specialized public – the academia – and the general one.

The remainder of this article is organized as follows. Section Two describes the novel demand for money à la Baumol and Friedman and its application to the alternative MOPs, that can be used in general to discover what factors could drive the user attention among different currencies. Section Three and Four describe specifically the novel digital currencies: the private stablecoins and the public CBDCs, while Section Five uncovers the analysis of their race so far in terms of attention both in the scientific and social networks, exploring respectively the academic and the public interest. Section Six concludes.

2. Comparing Different Currencies: The "New" Baumol-Friedman Demand for Money

Drawing from Masciandaro (2018), consider a population with a continuum of individuals, each of whom is free to choose her financial portfolio. Any available financial asset can potentially be used as a medium of exchange (i.e., any individual can use it to finalize an exchange as a payer or a payee). In other words, a series of assets can be used as a MOP, all else equal.

Now, given income and wealth, let us assume that individual preferences are heterogeneous with respect to the two standard properties of a MOP as a medium of exchange and store of value. Moreover, we add a new property: money as store of information. These three properties capture the different risks that holding a financial asset as a MOP can entail at any given moment.

The first two properties of a currency are highlighted in all standard theories of money demand, and they correspond to the transaction motive and the speculative motive of money holding, respectively. They were discovered by Keynes: "Let the amount of cash held to satisfy the transactions (…) be M1, and the amount held to satisfy the speculative motive be M2.

Corresponding to these two compartments of cash, we then have two liquidity functions L1 and L2 (J.M. Keynes, 1936, p.168 in Brady, 2018).

First, we assume that all individuals care about the illiquidity costs, which are associated with the probability that the asset cannot be traded (i.e., used as a medium of exchange and transformed into other goods and services) and with the costs of trading the asset – also in terms of time. In other words, the illiquidity costs depend on two drivers, which are likely to be intertwined: acceptability and efficiency. The illiquidity costs are associated with the standard precautionary motive to hold money.

Second, all else equal, we assume that the issuer type can influence the illiquidity costs. When a currency is a legal tender, we assume that it is the safer asset in a given country in normal times, as each trader is obliged to accept it in any exchange (public and private). In other words, a trader cannot refuse to accept the legal tender as payment.

The legal tender, which is also the unit of account, minimizes the expected liquidity costs. In other words, the illiquidity costs are minimized when the mean of payment has the two properties of being unit of account and enjoying the trust of the users (Borio, 2019). The public nature of this medium of exchange guarantees its complete acceptability, and the driver of this property is its capacity to supply common knowledge (Brunnermeier et al., 2019).

In a sense, the legal-tender property of outside money internalizes the public gains that such a feature implies, such as monetary-policy effectiveness and/or seigniorage gains (Rogoff, 2017). At the same time, the properties of private inside money (Diamond and Rajan, 2001) have to be acknowledged, at least as portfolio-diversification devices.

Our definition of a safe asset focuses on the asset's liquidity properties (Greenwood et al., 2015) rather than on its ability to preserve its expected value (i.e., the stability of the asset's value), as in Caballero and Farhi (2017). Nevertheless, the stability of value is a feature that increases the currency's acceptability, all else equal.

For the sake of simplicity and without any loss of generality, we assume that there is no uncertainty in the exchange series, such that a steady stream of transactions occurs. Therefore, we can zoom on the demand for money, given that our aim is to compare alternative currencies.

We acknowledge that the second property of a currency as a store of value (i.e., the standard speculative motive for holding money) is generally relevant for individuals. Individuals use as its proxy the real expected return of each portfolio asset, which summarizes the corresponding purchasing power as well as expected gains and losses.

Holding a MOP implies an expected opportunity cost equal to the overall excess level of return. The excess return can be calculated by comparing the total return associated with holding other assets with the return on the MOP.

It is worth noting that recent contributions to monetary theory summarizes the traditional properties of money claiming that money must be immune from adverse selection, being information-insensitive: in other words, money is safe when its value does not depend on short term fluctuations and then their holders can remain relatively "sleepy" (Hanson et al., 2015; Cipriani and La Spada, 2020). In this sense the information-insensitive attribute characterizes the money-like assets provided by both the public and private sectors.

To describe our demand for money it can be used a standard allocation framework in which alternative currencies are present (Santomero and Seater, 1996) and each individual subjectively cares about illiquidity risks, opportunity-cost risks and a novel property, i.e. anonymity risks, or privacy gains.

In every period, each individual receives an income Y that she can store in a portfolio where the assets are different consumption goods, alternative MOPs and a financial asset that cannot be used as a medium of exchange. Each asset is associated with its own utility, which is proxied by its net expected return. The individual seeks to optimize her portfolio allocation and defines, among other choices, the optimal quantity for each asset, including the alternative MOPs. The individual uses her income to buy an amount G of j different consumption goods:

$$Y = \sum_{j=1}^{J} G_j.$$

A series of exchanges occurs at discrete intervals during the given period. As we are considering a monetary economy, the individual has to use a MOP to finalize those exchanges. Between the exchanges the individual holds different kind of assets. First, she holds an inventory of the various consumption goods. Each good in that inventory is associated with an expected rate of return of r_{Gj}, which captures its utility.

Second, the individual holds the unspent income in two kinds of financial assets: a savings (investment) asset S which cannot be used as medium of payment, with an expected rate of return of r_S; and the alternative MOPs, with their respective expected returns r_{Mi}. The expected returns are used to proxy the opportunity costs of holding money, which represents the first attribute of any MOP, i.e. its effectiveness in terms of expected return.

Each medium of payment M_i is associated with its own rate of return r_{Mi}. Without any loss of generality, we assume that $r_s > r_{Mi} > r_{Gj}$. The individual implements any exchange using one of the available n different media of payment M_i, where the quantity of good j purchased using the medium i is G_{ji}, such that:

$$G_j = \sum_{i=1}^{n} G_{ji}\ .$$

To finalize the overall consumption expenditure for every good G_j, the individual implements a number of monetary exchanges Z_{ji} using the medium M_i. The probability that any medium M_i is accepted ranges from 0 to 1. In other words, each medium M_i is associated with perceived illiquidity costs. We assume that, in each exchange, such costs are equal to β_{ji} – a lump-sum cost that is independent from the value of the exchange, which is the assumption that we use in the experiments. Such costs represent the second attribute of any MOP, i.e. its effectiveness in terms of illiquidity risk.

Finally, any medium M_i is characterized by its properties as a store of privacy (i.e., its degree of anonymity). Here the third novel property comes in. The use of any MOP can disseminate different level of information on the money user. Money stores data – it is a "store of memory" (Kocherlakota, 1998; Fernandez-Villaverde, 2018) – and then a relevant difference between alternative MOPs relies on how much information they can spread. We assume that the privacy property associated with each medium M_i can be proxied using the switching cost α_i, which captures the privacy gains associated with converting income in that medium of exchange, i.e. the lower is the information dissemination when such medium is used, the bigger the privacy gains will be. Again, we consider these privacy gains as a lump-sum cost that is independent from the amount of the conversion, which is consistent with our experiments. It is worth noting that in principle some individuals dislike anonymity; in these cases the privacy gains are perceived as losses. With N_{ji} representing the number of exchanges involved in buying good j with money i per conversion of M_i, we have:

$$Z_{ji} = T_j N_{ji}.$$

The profit function π of each individual can be expressed using the average values of the assets as follows:

$$\pi = r_s \bar{S} + \sum_i r_{Mi} \bar{M}_i + \sum_j r_{Gj} - \sum_i T_i \alpha_i - \sum_i \sum_j Z_{ji} \beta_{ji} .$$

For the first-order conditions, we can obtain the optimal average quantity of each alternative medium of exchange M_i:

$$\bar{M}_i = \left[\frac{\alpha_i}{2(r_S - r_{Mi})} \sum_j G_{ji} \right]^{1/2} - \sum_j \left[\frac{\beta_{ji} G_{ji}}{2(r_{Mi} - r_{Gj})} \right]^{1/2} .$$

Notably, given the income, the consumption choices and the saving asset – which is the situation that we mimic in the experiments – the holding of each alternative money M_i is: i) directly associated with the privacy gains, ii) inversely associated with the illiquidity risk and iii) inversely associated with the expected return risk.

In conclusion, in our Baumol-Friedman specification (Masciandaro, 2018), with respect to the traditional demand for money, we assume that the use of any currency can spread different level of information on the money holder. In other words, we assume that money is also a store of privacy. This novel property will require a special investigation.

2.1 Money as a Store of Privacy

The protection of privacy is surely an important issue in the information age (Acquisti et al., 2015). Then, can privacy play a role also in explaining the shape of money demand? More precisely, is privacy a third attribute that can explain the demand of both traditional and new media of exchange, either already existing, as the private digital currencies, or in the pipeline, such as the widely debated central bank digital currencies? And what about the relationship between privacy and anonymity?

This paragraph aims to address these questions, reviewing the existing literature, and it is organized as follows. Section One identifies the role of money as a store of information, being an imperfect substitute of a memory technology. Given this property, Section Two describes how, in a world of imperfect and asymmetric information, money can disseminate personal information on the individuals who are going to use it.

Moreover, given that in this world moral hazard phenomena can occur, and that monetary transactions can transmit information, a risk of misuse emerges. The need to hedge this kind of risk produces a demand for privacy: individuals may like to use a monetary device that protect her personal information set.

Taking stock of the association between privacy demand and individual information, Section Three sheds light on the fact that when individuals would like to protect their personal information set in a full and systematic way, the demand for privacy coincides with the demand for anonymity, i.e. anonymity is privacy maximization; otherwise, they would consider medium of exchanges that offer lower degree of privacy protection.

2.1.1 Memory and Trust: Money as a Store of Information

We can start from two definitions: money and memory. Money is defined as a token that, having a relative stable value in terms of goods and services, it is used as medium of

exchange and unit of account (Brunnermeier et al., 2019; Borio, 2019; Avgouleas and Blair, 2020), and moreover it includes the transfer mechanisms to execute payments (Borio, 2019); memory is knowledge on the part of an agent of the histories of all agents with whom she has had direct or indirect contact (Ostroy, 1973; Kocherlakota, 1998; Kocherlakota and Wallace, 1998; Townsend, 2025). If these two definitions hold, money is equivalent to a primitive form of memory (Kocherlakota, 1998).

The logic behind this proposition is simple, doing a comparison between a monetary environment and a memory environment. If agents cannot keep track of the past, autarky is the more likely equilibrium; therefore, either money or memory is a necessary tool to allow agents to achieve more efficient allocations. In a monetary setting, when today an agent gives up resources receiving money, she can use this money to purchase resources tomorrow. In an environment with memory, a balance sheet of information is kept for each agent, that takes into account her capacity for doing future transfers. Therefore, money has a recordkeeping role (Ostroy, 1973; Kocherlakota, 1998; Kocherlakota and Wallace, 1998), and consequently this property reveals a new function of money which has been considered a much more accurate description of the money's effect than the other standard descriptions: store of value, medium of exchange and unit of account (Kocherlakota, 1998).

Moreover, if the memory setting can be considered a proxy of a systematic account-based system among individuals, the more costly and the more imperfect the available account-based system is, the greater the need for money will be (Kahn et al., 2005). Consequently, given information imperfections, this need will increase the more individuals are involved in transactions where they cannot trust each other (Kahn et al., 2005; Pagnotta and Buraschi, 2018), but instead they trust that the token functioning as money, having a stable value in terms of goods and services, will be generally accepted and that payments will be executed (Borio, 2019). The intuition is straightforward (Pagnotta and Buraschi, 2018): if individuals need or just consider the possibility to engage in personal trustless exchanges, they appreciate any medium of exchange that can be used to deal and finalize transactions, i.e. that increases the degree of trustworthiness of the exchange network.

2.1.2 Money as a Store of Privacy

If the value of money as a medium of exchanges stems from its role as memory technology, the development of more technologically sophisticated account-based networks can generate doubt about the role of money as store of information. In a sense, more developed memory technology can reduce the value of money. Yet, somewhat paradoxically, it is the role of money as a record-keeping device that motivates its utility as a device to provide transactions

privacy, when the individuals live in a world with imperfect and asymmetric information (Kahn et al., 2000; Kahn et al., 2005).

It is not surprising therefore that the economic literature progressively highlighted that in an economy with less-than perfect information distribution, the value of money, other things being equal, may derived from the privacy protection that it confers (Kahn, 2018).

The rationale goes as follows. Each medium of exchanges is associated with a payment mechanism. In each payment mechanism can be different the number of individuals that can observe, directly or indirectly, immediately or not, every transaction. In some transactions – for example using cash – the number of observers is minimized; in other payment mechanisms, any transaction is observable not only to the involved parties, but also to third parties, and this possibility increases the more the payment mechanism is an account-based network (Hendrickson et at. 2021). In fact, in an account-based network what must verified is the payer's identity (Brunnermeier et al. 2019). If individuals are sensible to the number of observers, a demand for payment privacy arises. The more individuals dislike the fact to be observed, the more they will take steps to reduce that possibility.

The demand for payment privacy has two main sources. On the one side, a demand for privacy may be formulated by individuals which are involved in illegal transactions (Kahn, 2018) ("illegal" or "pathological" demand for privacy). These agents need money that help them to reduce the probability to be incriminated (Camera, 2001; Ardizzi et al., 2014), which is a goal that characterizes more generally the demand for money laundering (Masciandaro, 1999) and specifically it that can be find also in the digital money world (Stebunovs, 2025).

On the other side, and more generally, any individual, being a risk averse agent, may wish privacy not to avoid legal sanctions, but simply for protection from any external scrutiny from other parties that can be directly or indirectly involved in the transactions (government, other individuals, payment providers) (Kahn, 2018) ("legal" or "physiological" demand for privacy): making a monetary deal involves the revelation of personal information, and the more the individual tends to be risk averse the more she would like to increase the likelihood that others cannot use the information provided in the transaction against her. The risk of information misuse is associated to the fact that in a world with imperfect an asymmetric information, any individual cannot perfectly control the hidden actions of others; it is a case of moral hazard, and the demand for monetary privacy is a device to address it (Kahn, 2018).

Focusing on the legal demand for privacy, it is worth noting that each individual can perceive a misuse information risk in very different and heterogeneous situations; someone would like to avoid any risk of fraud (Kahn, 2018); others dislike any government scrutiny, fearing censorship (Pagnotta and Buraschi, 2018) and in general politicians that act in "Orwellian" ways (Garratt and van Oordt, 2019); still others are against the fact that payment

providers, and other third parties, can monetize user data in multiple ways (Garratt and van Oordt, 2019), or simply they feel "nuisance cost" of foregoing privacy (Choi et al., 2019). All in all, it is a matter of fact that today the flood of information attached to the monetary transactions is going to give rise to a number of economic and legal issues as to its protection, misuse and possibility to harm, which has never been associated with money in the same way before (Avgouleas and Blair, 2020).

In conclusion, if a monetary transaction can disseminate personal information, and a misuse of this information can threat either individual reputation (Casal and Mittone 2016; Kahn, 2018) and/or freedom (Pagnotta and Buraschi, 2018) and/or fairness sensibility (Choi et al., 2019; Garratt and van Oordt, 2019). On this respect, the more the risk aversion, and/or the censorship aversion and/or the unfairness aversion characterizes individual preferences, the higher the demand for privacy will be.

2.1.3 Privacy and Anonymity

From the association between privacy demand and personal information set, a natural consequence arises: if the demand for privacy concerns a set of individual information, the its maximum level coincides with a demand for anonymity, i.e. all the individual information are protected: in other words, it is impossible for all the possible parties which are directly or indirectly involved in a monetary transaction to find any individual information after the deal goes through (Kahn, 2018).

More precisely, a comparison between a non-anonymous record-keeping device and an anonymous money shows that the latter is more efficient than the former (Kahn et al., 2005), given that only by using money the individuals can implement each transaction without revealing any information about their identity.

Moreover, the lack of individual privacy can impose negative externalities on others, for example allowing agent clustering (Garratt and van Oordt, 2019); in this case the cost of foregoing anonymity in payments is borne also by the rest of society. Finally, the demand for anonymity in monetary transactions is logically equivalent to the "right of anonymity" that is present in the public economics literature on tax compliance, where negative and/ positive non-monetary incentives are correlated with the value that individuals associate with the loss of anonymity (Casal and Mittone, 2016).

Obviously, if anonymity – i.e. full privacy protection – it is not available, any improvement in privacy protection leads efficiency gains on the demand for money (Kahn et al., 2005). Two effects follow. One the one side, full privacy in payment is a feature inherent to the use of well-defined public money, i.e. cash (Garratt and van Oordt, 2019); cash provides a

greater degree of financial privacy than other payment technologies (Hendrickson et al. 2021), while several cryptocurrencies are explicitly premised on the ability to facilitate quasi-anonymous transactions (Hendrickson et al. 2021).

On the other side, and consequently, other privacy-enhancing monetary techniques different from cash can be proposed and used in the payments system, as electronic cash, that in turn can be issued by a commercial party, in a decentralized network, or by a central bank (Garratt and van Oordt, 2019).

In other words, the ability of different monetary techniques in terms of privacy protection is variable (Garratt and van Oordt, 2019), given that any technique can shield the overall information set of the payee – identity or other characteristics – or alternatively just a sub-section of it. Introducing privacy protection in standard search models (Lagos and Wright, 2005), it has been shown that different medium of exchanges can promote quasi-anonymous exchanges to varying degrees, becoming substitutes in the markets where trustless transactions are needed (Hendrickson et al. 2021).

For each medium of exchange, its degree of financial privacy depends, other things being equals, on the way in which transactions are processed (Hendrickson et al. 2021). Again, if the lack of financial privacy is associated with transaction cost, for every medium of exchange a different transaction cost will emerge (Hendrickson et al. 2021). On this respect, since cryptocurrencies promote quasi-anonymous exchange, they should considered close substitutes to cash in transactions where financial privacy is a relevant issue (Hendrickson et al. 2021). Moreover, the possibility to differentiate among different degrees of privacy protection has been concretely implemented using field experiments (Athey et al., 2017).

Finally, it is worth remembering that the fact that an individual may choose not to use a privacy-enhancing monetary techniques can be associated with the so-called privacy paradox (Gross and Acquisti, 2005; Norberg et al., 2007; Acquisti et al., 2015; Athey et al., 2017; Garratt and van Oordt, 2019). The privacy paradox refers to the mismatch between stated preferences for privacy and actual behaviour to preserve it.

We assume that the expected transparency risks are associated with the distributional properties of any given currency, which can be centralized or decentralized (the latter minimizes the privacy risks). The decentralized, or peer-to-peer, system characterizes both paper currencies (a physical peer-to-peer network) and cryptocurrencies (an electronic peer-to-peer network that functions via blockchain technologies).

Notably, the distributional feature summarizes two technical characteristics – accessibility and form. While these two characteristics can be analysed separately (Bech and Garratt, 2017), they can both influence the illiquidity risks of any currency. In this respect, it is prudent to avoid any association between the distributional features and possible gains and/or

losses in terms of efficiency (i.e., transaction costs) given that the debate on this topic is still in a state of flux. Some researchers assume that the cryptocurrencies are low-cost payment platforms (Hendrickson et al., 2021), but others believe the opposite is true (Lowe, 2017; Yermack, 2014), with limited settlement space that can crowd out monetary usage (Zimmerman, 2020); in general, it can be assumed that efficiency proxies, as computing power and adoption level, matter (Bhambhwani et al., 2019).

Therefore, whether consumers benefit from using electronic decentralized systems is unclear (Bohme et al., 2015). In any case, the circulation of currencies with uncertain properties, such as cryptocurrencies, can be explained using the general assumption that, under some circumstances, the existence of good and services with such features can increase the consumer surplus via the resulting competition among producers (Berk and Binsbergen, 2017).

3. First Runner: Stablecoins

So far, stablecoins have been regarded as a solution to the high volatility of cryptocurrencies, which weakens their likelihood of becoming widely used as a medium of exchange, unit of account, and store of value. They are crypto assets whose value is pegged to specific safe financial assets or currencies, to safe government assets, or to a basket of assets or currencies, with the aim of maintaining stable values at par.

While cryptocurrencies still fail to be recognized as money for the above-mentioned reasons, stablecoins aim to be used increasingly as tools for online, peer-to-peer, and micro-payments, as well as digital monetary instruments for DLT applications such as programmable money and smart contracts (Arner et al., 2020). Their monetary feasibility raises concerns among institutions worldwide for multiple reasons, and the magnitude of the phenomenon is growing in relevance. To give some figures, in September 2025 the most important stablecoins – Tether (USDT) and USD Coin (USDC) – had market capitalizations of approximately USD 175 and USD 74 billion respectively, with the total stablecoin market capitalization surpassing USD 300 billion at the beginning of October 2025. Growth in recent years, aside from some setbacks, has been exponential and remarkable.

Stablecoins, still in an early stage of development and adoption, have attracted the attention of governments and international financial bodies because of their potential both to reshape monetary regimes and to threaten financial stability if they become a systemic phenomenon. It is no coincidence that the last five years have seen growing development of regulatory frameworks for stablecoins worldwide.

The design and purpose of stablecoins recall other financial instruments and previous attempts to establish private monetary systems. Many find similarities with Money Market Funds (MMFs) and the private banknotes issued during the US Free Banking Era, consequently viewing stablecoin issuers as unregulated banks issuing private money as a subpar medium of exchange

that could lead to bank runs. Their widespread adoption would therefore be concerning, as they could generate systemic risk in times of crisis, producing effects similar to those of private banknotes during the Free Banking Era or of MMFs in 2008 and 2020, respectively (Gorton and Zhang, 2023).

Moreover, stablecoins can have significant macro-financial effects – arguably more than cryptocurrencies to some extent. Given the strong interconnections between the cryptocurrency market and the traditional financial market through reserve-backed stablecoins, regulation in this case may influence public debt pricing, liquidity conditions, financial stability, and corporate financing structures (Kim, 2025a and 2025b; Barthélemy et al., 2023).

Beyond financial stability, stablecoins already worried international institutions and governments before the pandemic because of the risk of abrupt adoption as money, especially when proposals for global and widely used stablecoins emerged – most notably the famous case of Facebook's Libra. In 2019, Facebook announced the development of a new digital currency. Libra would have followed the mainstream model of a stablecoin – i.e., a cryptocurrency backed by government money – and would have been supported by a large pool of social and commercial networks, increasing the likelihood of widespread acceptance.

However, questions arose as to whether Libra would really hold a competitive advantage once subject to financial regulation, compared to other financial infrastructures and instant payment solutions increasingly available, often with DLT applied to financial products (Brühl, 2020). Nevertheless, the major concerns generated by Libra came primarily from the vast power and widespread use of Facebook, its social network ecosystem, and other relevant founding members. These actors would have been the vehicles for Libra's easy and broad adoption, endowing it with strong network effects.

The ambition of a cryptocurrency to become a trusted, widespread, and commonly utilized method of payment alarmed institutions about the concrete risk of systemic instability and the collapse of a cryptocurrency, as well as prompting reconsideration of fiat money frameworks. In a sense, the Libra Project represented the first practical exercise for governments and regulators in addressing private and decentralized digital currencies. One of the greatest challenges was making Libra compliant, given its global outlook, with the diverse national regulatory frameworks governing payments (Iwashita, 2021).

Over time, institutions acknowledged the significant role stablecoins can play in today's more digital and interconnected financial system, especially considering the growing consensus around decentralized finance. In this case, their regulation and the policy responses over time illustrate how governments have adapted and reconsidered their existence for both institutional and political purposes.

As explained, in 2019 the sudden private push for rapid development of stablecoins found nations and regulatory bodies unprepared. The cause was not only, as mentioned above, the

sluggishness of institutions in absorbing technological and social change into their norms, but also an initial tendency toward denial and rejection of the revolutionary forces emerging from the private sector. This tardiness led to an underestimation of the phenomenon, despite the exponential growth already demonstrated by similar financial and digital innovations during the 21st century. The collective and coordinated response of global financial bodies, central banks, and national governments in 2019 revealed the difficulty of coping with sudden change. Indeed, the first documents, declarations, and laws that were issued reflected a defensive and precautionary strategy rather than a concrete assessment of the issue. Unsurprisingly, Libra attracted the attention of major financial institutions and groups. These included the Financial Stability Board, the Federal Reserve, the Bank of England, the Bundesbank, the Bank of France, as well as the ECB, the BIS, and the G7 (Zetzsche et al., 2021).

4. Second Runner: Central Bank Digital Currencies

As previously explained, CBDCs play an important role, together with financial regulation, in challenging the rapid growth of stablecoins, with institutions adopting an "if you can't defeat them, join them" approach in the field of digital currency. Indeed, CBDCs represent a turning point in the modern history of money. To a great extent, they are the giant leap that public institutions are taking – or being driven to take – as they react to the imperatives of an increasingly digital economy where the usage of cash, hence public money, continues to decline.

This is particularly noteworthy, as institutions have historically been characterized not by the spontaneous innovation typical of the private sector, but by stability, conventions, and well-established operational norms. Institutional revolutions are more likely to occur not through proactive vision but when the prevailing state of affairs becomes unsustainable. For this reason, the public may perceive CBDCs not as an embrace of innovation per se, but as an imperative action driven by mounting external pressures pushing institutions into a reactive stance. Notably, the technologies underpinning CBDCs have long existed, but their adoption lagged until recent developments made further delay increasingly costly.

CBDCs present a multi-dimensional solution to a range of converging problems, many of which were already identified more than a decade ago but not proactively implemented: the reduction in the use of physical money, inefficiencies and vulnerabilities of current payment systems, effective lower bound (ELB) restrictions on monetary policy, the aftermath of the Covid-19 pandemic, and growing concerns over illicit finance and transparency gaps in digital transactions (Buzuriu, 2024; Auer et al., 2020).

Among the primary motivations there is the restoration of the primacy of public money in an increasingly private-dominated online reality. The proliferation of private digital currencies and stablecoins poses risks to monetary sovereignty, payment system integrity, and macro-financial stability (Davoodalhosseini and Rivadeneyra, 2018). Stablecoins and digital wallets offered by big

tech firms are particularly worrisome, as they risk fragmenting the money domain and enabling network-driven monopolies that could erode central banks' control over the monetary sphere. CBDCs are therefore not only technological instruments but also institutional innovations operating at deep frontiers: between central and commercial bank money, between state and private payment systems, and between physical and digital value (Sayyid et al., 2024).

From a design perspective, CBDCs involve a bundle of complex trade-offs that must be addressed cautiously. Their design features are not purely technical – they constrain macroeconomic outcomes and political viability. A CBDC too closely aligned with commercial bank deposits risks triggering deposit flight and reducing credit creation, while one too closely aligned with cash could push physical money out of circulation through digital network forces (Agur et al., 2019; Auer et al., 2024). Thus, privacy, compensation, and convertibility concerns are central not only to efficiency but also to the democratic legitimacy of CBDCs.

Privacy, in particular, is a contentious concern. On the one hand, CBDCs can enhance transparency, combat crime, and enable traceable fiscal transfers. On the other hand, they risk facilitating financial surveillance and self-censorship, particularly in account-based systems with limited legal protections. Kaur (2024) emphasizes that if privacy-enhancing technologies – such as pseudonymized wallets, hierarchical identification, or offline payments – are not integrated into CBDC platforms, public trust and adoption may falter.

Indeed, whether consumers will choose to hold and use CBDCs, rather than cash or private alternatives, depends not only on functionality but also on behavioral decisions and perceived trade-offs. Portfolio inertia and status quo bias can, as Masciandaro (2018) and Borgonovo et al. (2021) argue, be overcome if CBDCs provide a conjunction of legal security, moderate returns, and credible privacy. A secure but reasonably anonymous digital instrument of exchange may prove preferable to traditional cash, particularly in an increasingly surveilled economy.

From a macroeconomic perspective, CBDCs could also transform monetary policy. If required to bear interest, CBDCs would strengthen the transmission mechanism to households and firms, enhancing central banks' influence over consumption and saving decisions. They could potentially eliminate the ELB, reduce reliance on quantitative easing and forward guidance, and facilitate price-level targeting (Bordo, 2021; Bordo and Levin, 2017 and 2019). Moreover, network effects may dampen the disruptive impact of negative interest rates on CBDCs and preserve welfare while loosening policy constraints (Agur et al., 2019). A tiered remuneration regime, suggested by Bindseil (2020) and others, aims to strike a balance: offering moderate returns on small holdings to encourage adoption, while deterring large-scale outflows from commercial deposits that could destabilize the banking sector.

Nevertheless, the introduction of retail CBDCs involves significant risks. By offering a less risky alternative to cash and commercial bank deposits, CBDCs could shrink banks' funding bases, compress profit margins, and constrain lending capacity – especially during crises when liquidity shifts abruptly (Chanda, 2025). Introducing CBDCs during financial distress could amplify, rather

than mitigate, instability. Additionally, CBDCs could contract traditional credit channels and weakening amplification mechanisms such as the collateral channel (Chanda, 2025). At the same time, they could enhance competition in deposit markets, improving rates for customers and reducing frictions in credit allocation (Infante et al., 2023). The balance of these impacts is highly sensitive to design and context. For example, non-interest-bearing CBDCs risk deepening recessions by triggering deposit outflows, while interest-bearing designs could mitigate monetary contraction (Chanda, 2025).

CBDCs are thus not a one-size-fits-all instrument. Their institutional and political dimensions are as significant as their economic effects. Sayyid et al. (2024) present a typology of 49 countries showing that CBDC infrastructures reflect embedded institutional logics: liberal versus authoritarian, market-contingent versus state-interventionist. China's e-CNY, for example, is embedded in a centralized framework that accommodates state surveillance and economic guidance, while the US response – up to the recent and abrupt stop to any CBDC project – remained fragmented and conservative, shaped by tensions among innovation, privacy, and regulatory fragmentation. These cases show how CBDCs both reflect and reshape the state-market-citizen relationship in the digital era.

CBDCs therefore present a rare opportunity to modernize sovereign money and preserve monetary sovereignty in an era increasingly shaped by private digital currencies and platform finance. But they are double-edged. While they promise improved monetary policy transmission, financial inclusion, and enhanced payment infrastructures, they also risk disintermediation, surveillance, and destabilization if poorly designed or poorly timed. The central challenge for policymakers is to design and launch CBDCs that are not only technically viable but also institutionally valid, contextually appropriate, and socially desirable. In doing so, central banks will not merely join the digital revolution – they will actively shape its trajectory.

5. The Race

Given the consolidation of the two main contestants in the race for digital currencies, it is natural to ask which is more likely to prevail. Stablecoins and CBDCs share some peculiarities, but they differ substantially in their purposes, designs, and the effects they can have on financial and economic systems worldwide.

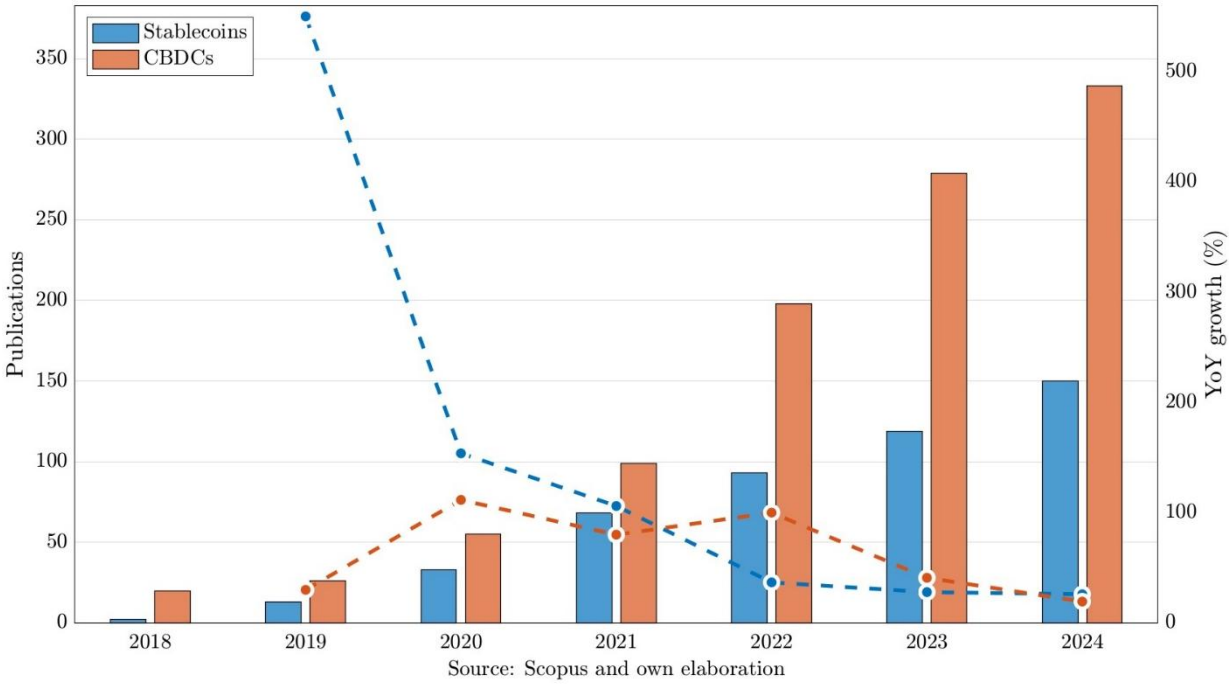
However, in a "money race", it is necessary to return to the core of the question: what is money? As discussed, the simplest yet most effective definition is that money is what money does. Hence, money must be accepted and used, and the more it is recognized as money, the more it functions as such. One of the most relevant criteria for this contest is therefore the network effects each system can build – that is, their ability to gain acceptance as a medium of exchange.

On the one hand, some might argue that CBDCs, as offspring of national fiat money, are likely to inherit the network effects of existing currencies. On the other hand, this conservative

inheritance carries drawbacks: if digital innovation challenges tradition, those network effects may be transmitted less efficiently. Beyond the above-mentioned technical and macroeconomic concerns, citizens may also resist transitioning from physical to digital cash, even when this does not imply the total disappearance of the former.

Given the novelty of the topic, it is useful to complement qualitative analysis with quantitative insights into which of the two is gaining more attention among different audiences. A first perspective comes from examining the growth in academic publications on stablecoins and CBDCs. Figure 1 illustrates the number of papers indexed in Scopus from 2018 to 2024 and their year-over-year growth.

Figure 1: Academic Publications on Stablecoins and CBDCs: Counts (Bars) and Growth (Lines)



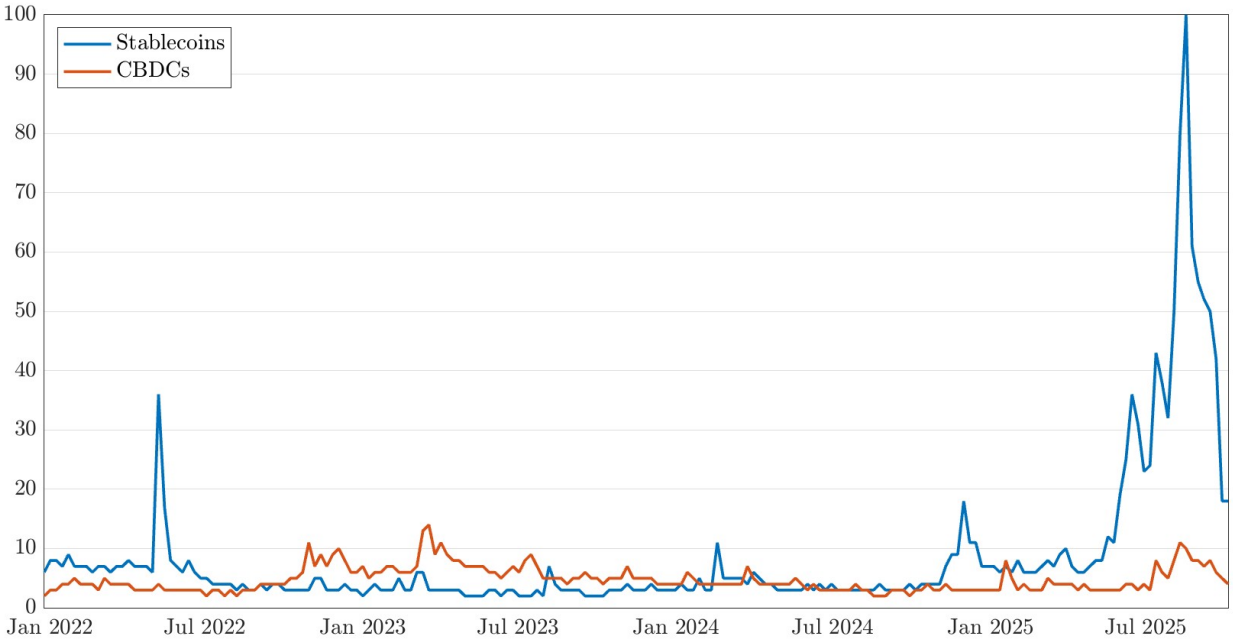
After this initial spike, the growth in publications on stablecoins continued but at a steadier pace. CBDCs, by contrast, have consistently experienced a more constant increase in academic attention. The last five years show an alternation between the two topics in having higher growth. Overall, after 2023, the growth rates of publications on stablecoins and CBDCs appear to converge, though it is uncertain whether this stabilization will last. However, it seems unlikely, given the renewed interest in stablecoins following recent U.S. regulatory developments. Furthermore, the "digital currency race" increasingly encourages comparative analysis, making it likely that future research will focus more on the relationship and competition between CBDCs and stablecoins. Notably, CBDCs have overtaken stablecoins in publication volume since 2021, with a widening

gap that has resulted in more than twice as many CBDC publications as those on stablecoins, though the renewed policy and regulatory focus on stablecoins could shift academic attention back toward them.

Another relevant consideration is the potential institutional bias of academia in choosing topics of study. CBDCs have always been directly connected to central banks and monetary policy, giving them institutional prominence. Stablecoins, by contrast, were long regarded as part of the broader cryptocurrency world and, as private innovations, struggled to be recognized early as a consolidated topic for research.

Beyond academia, public interest can be observed through the use of Google Trends. Figure 2 confirms the possibility of stablecoins catching up in terms of relevance in the public debate. Over time, the two topics have alternated in public attention.

Figure 2: Worldwide topic trends



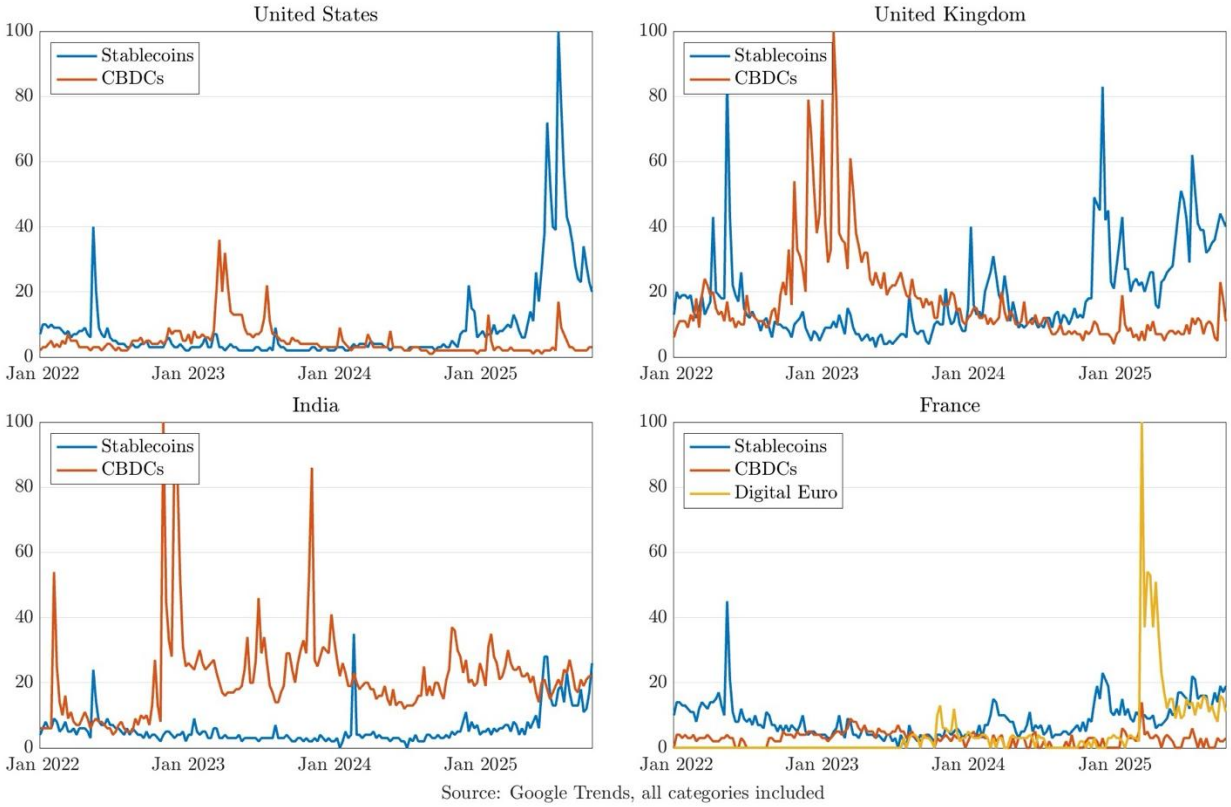
Source: Google Trends, all categories included

Between the end of 2021 and the first half of 2022, stablecoins attracted greater interest, with a sharp spike in May 2022 likely linked to the collapse of TerraUSD. From mid-2022 onward, however, CBDCs captured more attention, reflecting the progress of numerous central bank projects worldwide. By 2024, the two topic trends converged, receiving similar levels of public interest. At the end of that year, stablecoins regained momentum. This resurgence may be explained by Donald Trump's re-election campaign, during which he became a strong supporter of private digital currencies. His advocacy, combined with regulatory reforms favoring stablecoins

and the decision to dismantle any research on a U.S. CBDC, likely drove public interest in stablecoins to surge in 2025, maintaining a positive gap with CBDCs so far.

Contextual and country-specific factors are also essential to interpreting these trends. Figure 3 decomposes Google Trends data by country, showing how public attention also depends on regional contexts. Four countries are highlighted as useful examples. The general trend resembles those of the United States, France (taken as a proxy for the EU after analysis of member states), and, to some extent, the United Kingdom. For Europe, the Digital Euro was added as a third topic, given its importance as one of the most advanced and relevant CBDC projects. Data show that, in Europe, the trend mirrors that of the U.S., but the most recent spike in stablecoin interest is overshadowed by skyrocketing attention to the Digital Euro in 2025, which is now approaching the same level of public attention. A particularly interesting case is India: here, attention to CBDCs has consistently and distinctly surpassed that to stablecoins. Public interest rose significantly after the pilot launches of the wholesale and retail Digital Rupee and has maintained an overall positive gap through 2025. This provides evidence that active implementation of CBDCs can itself boost their popularity by encouraging use.

Figure 3: Cross-country comparison of topic trends



Source: Google Trends, all categories included

5. Conclusion

In the end, the race between CBDCs and stablecoins remains an open challenge. As the data show, stablecoins are rapidly gaining public interest worldwide and continue to grow in market capitalization. They are already well underway and attracting global attention – which in turn raises many concerns.

A commonly shared regulatory framework to govern these borderless digital currencies still does not exist. At present, leading countries show little willingness or incentive to meet and agree on a common path, at least until the polarization between those seeking to reap the benefits and those aiming to shield themselves from possible future consequences begins to ease. Moreover, the institutionalization of stablecoins does not necessarily reduce these concerns. On the contrary, the consolidation of stablecoins in traditional finance could pose an additional threat to public money. Allowing banks to issue their own digital currencies might even backfire.

If the United States can be seen as the epicenter of this phenomenon – with multiple banks expressing their intention to issue their own stablecoins – it is important to note that, in the absence of a strong response, European countries are beginning to join the "stablecoin team" as well. This is evidenced by the recent initiative of a group of European banks planning to issue a euro-denominated stablecoin.

The private sector of digital currency is clearly advancing faster than the public one. For this reason, CBDCs must gain momentum as soon as possible. In particular, all eyes are on the digital euro, which could have the scale and credibility to compete meaningfully in this race. The European Central Bank and EU policymakers are therefore called upon to provide a credible and appealing alternative without delay.

The evidence presented in this paper confirms that, while CBDCs could lead in academic attention, stablecoins are rapidly catching up in public debate and online visibility. This divergence between scholarly focus and popular interest reflects a deeper asymmetry between institutional deliberation and private innovation. Visibility itself can become a driver of legitimacy and adoption.

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