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The Political Stakes of Central Bank Digital Currency (CBDC) Programmability

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I. Introduction

For most citizens, central bank digital currencies ('CBDCs') are not yet part of everyday life. The discussion has so far remained largely confined to the world of central banks, monetary economists, and a small community of legal scholars. Public consultations and consumer surveys reveal that a significant portion of the public struggles to understand what distinguishes a retail CBDC from the digital commercial bank money they already use.[1]

On one specific question, however, the discussion has unexpectedly reached the wider public. The question is whether a future retail CBDC should be 'programmable'. A petition was filed before the United Kingdom Parliament asking for a formal commitment that no programmable CBDC would be introduced.[2] Libertarian and populist movements in the United States and in Europe have portrayed programmability as a new kind of threat. In response, European institutions, including the European Central Bank (ECB), have repeatedly stressed that the digital euro will not be programmable money, using unusually strong language for what might otherwise seem to be a technical issue.

There is a simple reason why this issue has attracted public attention. If money can be programmed, it can be designed to allow certain uses and block others. This challenges the familiar idea that, once issued, money is neutral. Programmability suggests, instead, that money could carry specific conditions, and perhaps even moral choices, instead of functioning simply as a neutral and fungible measure of value. Even if this concern is sometimes expressed imprecisely, it captures a real issue.

Our argument does not claim that programmable CBDCs will produce a system of total social control. Public debate often relies on exaggerated comparisons with the Chinese social credit system or with science-fiction scenarios of constant monetary surveillance. Such comparisons are misleading. Our central thesis is the following. European institutions have organised the debate on programmable money around a sharply technical definition, under which the future digital euro will not be 'programmable money' within the meaning of the Regulation Proposal on the establishment of the digital euro[3]. The same regulatory framework nonetheless expressly allows 'programmable payments' and other forms of payment conditionality[4]. These

[1] See Georgarakos *et al.* (2025).

[2] See the UK Government response to the parliamentary petition 'Prevent the introduction of any "programmable" CBDC in the UK' (2022), at: https://petition.parliament.uk/archived/petitions/624159.

[3] European Commission, Proposal for a Regulation of the European Parliament and of the Council on the Establishment of the Digital Euro COM(2023) 369 final (28 June 2023).

[4] Recital (55) of the Regulation Proposal (n 3) expressly states that "the digital euro should support the programming of conditional digital euro payment transactions by payment service providers". See also Article 24(1) of the Regulation Proposal.

mechanisms operate outside the unit of currency, in the surrounding payment infrastructure, but they can produce political and behavioural effects that are substantially comparable to those of programmable money. The distinction between programmable money and programmable payments remains technically and legally meaningful. Fungibility, the singleness of the currency, and the integrity of legal tender are easier to preserve when conditionality stays outside the unit. The point of what follows is therefore not to dismiss the distinction but to show that its political weight is much smaller than the regulatory architecture suggests.

Our analysis is not intended simply to describe CBDC programmability or to list its possible risks, but rather to distinguish between two forms of programmability: one built into the monetary unit itself, and another operating through the wider digital payment infrastructure. The key argument is that the political stakes are moving from the unit of money to the infrastructure around it. The Regulation Proposal did not fully address this shift, and a purely technical prohibition focused on the monetary unit does not resolve the problem. The original Commission proposal paid limited attention to the governance of the surrounding payment infrastructure. Later work in the European Parliament and the Council has begun to address that issue more directly, including through provisions on holding limits and offline privacy. This confirms that the central regulatory questions extend beyond the design of the monetary unit itself.

Our analysis is structured as follows. Section II explains why CBDC programmability has become a live issue. Section III examines how programmability is defined and prohibited in the European framework. Section IV argues that this prohibition is primarily intended to preserve monetary fungibility and central bank independence, rather than to protect fundamental rights. Section V distinguishes between programmable money, programmable payments, and payment conditionality, and explains why they may produce similar political effects. Section VI explores the forms of behavioural governance that conditional payment infrastructures could enable. Section VII tests the argument through two welfare examples: the French Back-to-School Allowance (*Allocation de rentrée scolaire*) and the United States Supplemental Nutrition Assistance Program. Section VIII concludes by considering how technical design can depoliticise political choices and examines the questions programmable payment infrastructures raise for monetary law.

II. The emergence of the programmability debate

CBDC programmability should not be treated simply as an abstract ethical concern about digital surveillance. It has emerged from a specific historical and institutional context which explains why, in less than a decade, central banks have moved from researching CBDCs to exploring their development and implementation.[5] Understanding this background is necessary before assessing what is politically at stake.

[5] For an overview, see Auer, Cornelli and Frost (2020), pp. 5-9; Bismuth (2023), p. 153 *et seq*.

Several long-term developments help explain why programmability has become an issue. First, cash is declining as an everyday means of payment in many advanced economies, while digital payments increasingly rely on a limited number of large payment networks and digital platforms, raising concerns about the resilience and strategic autonomy of payment systems.[6] Second, credible forms of private digital money have emerged, especially global stablecoins supported by very large platform networks. The announcement of the Libra project in 2019 marked a turning point in central bank thinking about digital currencies and accelerated work on CBDCs worldwide.[7] Third, economic life has become increasingly data-driven. Payments are no longer only transfers of value. They also generate detailed behavioural data that can be used for commercial purposes and, where permitted by law, by public authorities.[8] Fourth, payment infrastructures are increasingly used not only to process transactions but also to implement public policy objectives. The functions of payment infrastructure and public governance are therefore becoming more closely intertwined.

The development of CBDCs in Europe is best understood as a defensive reaction to a perceived erosion of monetary sovereignty rather than as a proactive instrument of social steering. As we have argued in earlier work, the original rationale for the digital euro is protective rather than transformative.[9] Its purpose is to guarantee that, in a world in which most retail transactions are dematerialised, central bank money remains available to the public in a form other than the decreasingly used banknote. In its original conception, the digital euro is closer to a digital banknote than to a tool of behavioural government. Programmability arises only secondarily, as a possibility created by the digital infrastructure on which the project depends.

This general background helps dispel the idea that programmable money is the hidden purpose of the digital euro. Whatever concerns the project may raise, it was not designed as an instrument of social engineering. The ECB has consistently presented it in more limited terms, as a way to make payments more efficient, support financial inclusion, and preserve the role of public money in an economy increasingly dominated by private digital platforms. At the same time, this does not remove the political problem. A monetary instrument designed for one purpose may become usable for another because of the infrastructure on which it rests. Banknotes are difficult to repurpose. Their physical form and anonymity limit them to the transfer of value. A digital instrument that depends on wallets, payment-service providers, and identifiers is different. Even if it is not designed for conditional use, it makes conditionality technically possible. The real political question is what democratic societies choose to do with that possibility.

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[6] European Central Bank, Report on a Digital Euro (October 2020) p. 7 *et seq.*, at: https://www.ecb.europa.eu/pub/pdf/other/Report_on_a_digital_euro~4d7268b458.en.pdf; Bank for International Settlements, Annual Economic Report 2021, Chapter III ('CBDCs: An Opportunity for the Monetary System'), p. 66 *et seq*., at: https://www.bis.org/publ/arpdf/ar2021e3.pdf.

[7] See Zetzsche, Buckley and Arner (2021), p. 80 *et seq*.; Bismuth (2023), p. 156 *et seq*.

[8] See Brunnermeier, James and Landau (2019), p. 9 *et seq*.

[9] See Bismuth (2023).

This possibility of conditionality also marks the key political difference between CBDCs and cash. Cash can be used without a wallet, an identifier, or a regulated intermediary. A CBDC normally requires all three.[10] Unlike cash, access depends on continued participation in the digital payment infrastructure, which may, in accordance with the applicable legal framework, be suspended or terminated. Cash leaves no trail. CBDCs, however well protected by privacy safeguards, leave a data trail by design.[11] Finally, cash cannot refuse a transaction. A banknote has no capacity to decide where, when, or by whom it may be used. A CBDC, by contrast, can be made subject to conditions. Whether and under what conditions an issuer or an intermediary should be permitted to make the use of money conditional on the satisfaction of rules is a new question. Cash never raised it, because it could never raise it.

III. The legal architecture of programmability in the digital euro Regulation Proposal

A. Programmability as a property of the monetary unit

The notion most commonly used in the literature defines CBDC programmability as the ability to attach built-in rules to the monetary unit itself, which govern or, more frequently, restrict its use.[12] The decisive feature of this definition is that the rules are embedded in the unit and travel with it. They are properties of the money rather than properties of the surrounding payment infrastructure. The unit of money becomes a small carrier of normative instructions in addition to its standard functions as a measure of value, means of exchange, and store of value.

Programmable money could take many forms. A digital euro could be restricted to the purchase of low-carbon goods, prevented from being used for fossil fuels, limited to a particular geographic area, or designed to expire after a specified period. Each of these examples serves a plausible public policy objective, such as supporting the ecological transition, stimulating local economic activity, or encouraging spending during periods of weak demand. The issue is not whether these objectives are legitimate or whether they may be pursued through other policy instruments. The question is what happens when they are pursued through the monetary instrument itself. Embedding such conditions into money would transform not only the way money functions but also the political relationship between public authorities, citizens, and the currency.

The European Commission addressed the issue with apparent simplicity in its 2023 Regulation Proposal on the digital euro. Article 2(18) of the Regulation Proposal defines ‘programmable money’ as ‘units of digital money with an intrinsic logic that limits each unit’s full fungibility’.[13] Article 24(2) then provides, in similarly brief terms, that ‘the digital euro shall

[10] European Data Protection Board and European Data Protection Supervisor (2023).

[11] See OECD (2023), p. 10 *et seq*.

[12] See Freiman (2024), pp. 8-9.

[13] COM(2023) 369 (n 3).

not be programmable money'. Read together, the two provisions give the impression that the matter has been settled.

The Proposal prohibits programmability at the level of the monetary unit, but it leaves room for conditionality at the level of the payment infrastructure. The Preamble of the Proposal states that the digital euro should support the programming of conditional digital euro payment transactions by payment service providers.[14] Article 24(1) of the Proposal gives this position operative effect by allowing the ECB to adopt measures, rules, and standards that payment service providers may use to ensure interoperable conditional payment transactions. The Preamble also states that conditional payments should not have as their object or effect the use of the digital euro as programmable money.[15] This formulation reveals the central tension in the Proposal. It prohibits programmable money while expressly allowing conditional payment transactions that may, in practice, produce similar effects.

B. Programmability beyond the monetary unit

A careful reading of the European text reveals that two different definitions of programmability coexist within the same instrument. The first, embedded in Article 2(18), is a strictly technical definition. Programmable money is money whose individual units carry intrinsic logic limiting fungibility. The second definition surfaces in the Preamble is functional. Programmable money is money used in such a way as to direct or restrict spending on specific goods or services. The two definitions are not equivalent. A digital euro can comply with the technical definition by containing no intrinsic restrictive logic at the level of the unit. It can nonetheless produce, when combined with a sufficiently sophisticated wallet or payment-service provider rule, restrictions that the functional definition would treat as paradigmatic of programmability.

The technical definition focuses on the architecture of the unit. The functional definition focuses on the effect on the user. Conditionality can therefore be placed in the payment infrastructure without falling within the definition of programmable money in Article 2(18). Article 24(1) reinforces this point. The Proposal does not merely tolerate conditional payment transactions. It provides for technical measures, standards, and settlement functionalities that may support their use by payment service providers. The legal definition of programmable money is therefore settled narrowly, while the broader question of payment conditionality remains open. Programmable payments are likely to be developed, debated, and contested through the rules governing payment service providers, merchants, eligibility conditions, and benefit administration, rather than through the prohibition of programmable money itself.

International monetary practice has already begun to test these intermediate spaces. The most explicit example is the Purpose Bound Money (PBM) framework developed by the Monetary Authority of Singapore in connection with Project Orchid.[16] Under that framework, PBM

[14] COM(2023) 369 (n 3), recital (55).

[15] *Ibid*.

[16] See Monetary Authority of Singapore (2022); Monetary Authority of Singapore (2023).

functions as a protocol that specifies the conditions under which an underlying form of digital money may be used. That underlying money may take the form of a CBDC, tokenised bank deposit, or stablecoin. The conditions apply during a defined phase of the transaction, for example from issuance to acceptance by an eligible merchant. Once the conditions are satisfied, the PBM is unwrapped and the recipient receives the underlying digital money without the spending restriction carrying forward. From a technical standpoint, PBM therefore occupies an intermediate position between programmable payments and programmable money. The constraint exists and operates during the transactional phase, but it does not permanently attach to the monetary asset once settlement has occurred. The European regulatory framework does not explicitly authorise such instruments at the level of the digital euro itself. This example nevertheless shows that it is possible to design arrangements that temporarily produce effects associated with programmable money while preserving the formal fungibility of the underlying instrument. The binary opposition between programmable and non-programmable money therefore does not exhaust the design space.

IV. Fungibility and the institutional logic of central banks

The rejection of programmable money in the Regulation Proposal cannot be explained solely by the public concern with individual freedoms. From the perspective of central banks, programmability primarily raises questions about the integrity and fungibility of the currency rather than about individual privacy.

Fungibility is a constitutive feature of money. Two units of currency that are not perfectly substitutable cease to function as units of the same monetary medium. They become two different goods exhibiting differential acceptance across markets. This breaks the singleness of the currency, namely the consensual fiction that one euro is one euro, regardless of the channel through which it circulates or the identity of its holder. The doctrine of legal tender depends, in turn, on this fungibility. Legal tender, in its traditional articulation, requires three conditions. The monetary instrument must be accepted as a means of payment, at par value, and with full discharging power.[17] Each of these conditions presupposes interchangeability. A digital euro that could not be used to purchase gasoline, or that could only be used within a particular area, would violate the first and third conditions. It would no longer enjoy universal acceptance, nor discharge debts indifferently. Its status as a public, single, universally usable means of payment would be at risk.

This clarifies that the prohibition of programmable money in Article 24(2) of the Regulation Proposal is, in its institutional logic, far less a libertarian guarantee than a monetary guarantee. The Proposal primarily protects the integrity of the currency by preserving its fungibility and resisting the fragmentation that programmability could introduce into the monetary system. This reading is consistent with the public statements of the European Central Bank. Then ECB Executive Board member Fabio Panetta has tied the rejection of programmability to the requirement of fungibility, suggesting that programmable units would no longer constitute

[17] Judgment of the Court (Grand Chamber) of 26 January 2021 in Cases C-422/19 and C-423/19, Johannes Dietrich and Norbert Häring v Hessischer Rundfunk (ECLI:EU:C:2021:63), paras 46-50.

money proper but at best 'vouchers'.[18] Official ECB communications consistently emphasise that the digital euro should function as a digital form of cash, preserving the defining characteristics of central bank money rather than creating a new category of conditional or restricted monetary instrument. The underlying objective is to preserve the core characteristics of cash, including universal acceptance, fungibility, and the absence of intrinsic restrictions on how individual units may be used.[19]

Functional programmability does not necessarily affect the legal-tender status of the digital euro. If conditionality operates through wallets or payment service providers, rather than through rules embedded in the monetary unit itself, the digital euro does not formally lose its status as legal tender. The unit remains capable, in law, of discharging a debt. What changes is the user's practical ability to use that unit in a given transaction. Legal tender is preserved in formal terms, but its practical reach may be narrowed. Similarly, fungibility remains intact at the level of the unit, but that does not resolve the problem at the level of the wallet. The problem is not that fungibility is formally lost, but that the user's freedom to transact is practically reduced. This is why the argument should be framed less as a breach of monetary singleness and more as a question of transactional autonomy.

A second institutional concern also explains the rejection of programmable money. Central banks are highly reluctant to become embroiled in economic disputes that cross the boundary from monetary policy into the realms of fiscal, political, or wealth-distributional policy, as safeguarding their operational independence relies heavily on maintaining a distinct separation between these spheres,[20] and programmable money would blur it. Decisions about which goods or behaviours may be paid for would become part of the design of the monetary unit itself.

These two institutional concerns explain the narrow form of the European prohibition. By limiting the prohibition to the monetary unit, the Proposal preserves fungibility and keeps central banks away from politically sensitive choices about the permitted uses of money. This design reflects the institutional logic of the framework. It also leaves largely unresolved the political questions raised by conditionality when it operates through the surrounding payment infrastructure.

In the constitutional approach to money, money is not merely understood as a commodity or a neutral medium of exchange. It is a constitutional institution through which a political community establishes a unit of account, mobilises and allocates resources, and organises economic exchange.[21] From this perspective, the singleness of the currency is a constitutive feature of the monetary order. It ensures that money functions as a common public medium of

[18] See Panetta F., The Digital Euro: Our Money Wherever, Whenever We Need It (Introductory statement at the Committee on Economic and Monetary Affairs of the European Parliament (23 January 2023), at: https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230123~2f8271ed76.en.html.

[19] See European Central Bank (2023).

[20] See Goodhart (2010), p. 13 *et seq*.

[21] See Desan (2014), p. 1 *et seq*; Desan (2017).

exchange, rather than as a collection of differentiated instruments whose legal and economic properties vary from one unit to another. A monetary system in which individual units could be used only for specified purposes would fragment that common medium. The consequence would extend beyond the operation of the payment system. It would alter the constitutional role of money as the shared unit through which a political community organises economic exchange. The prohibition of programmable money can therefore also be understood as preserving the constitutional character of money. The argument developed below extends this reasoning beyond the monetary unit itself. If money is understood as a constitutional institution, the legal and technical infrastructures through which it circulates also acquire constitutional significance. They are no longer merely payment technologies. They shape the conditions under which money may be used and, in doing so, structure the relationship between public authority, private intermediaries, and users.

V. Programmable money, programmable payments, and payment conditionality

A. A working taxonomy

The debate on CBDCs often uses the terms programmable money, programmable payments, and payment conditionality interchangeably. They refer, however, to different legal and technical features.[22] Programmable money, in the strict sense, consists of rules embedded in the monetary unit itself. Those rules travel with each unit and remain attached to it after settlement. This is the form of programmability prohibited by the EU Regulation Proposal. Programmable payments leave the monetary unit unchanged. The conditions are implemented through the surrounding payment infrastructure, including the wallet, the payment service provider, or the merchant interface. They apply only when the payment is executed and do not affect the legal or technical characteristics of the underlying money. Payment conditionality is a broader category. It refers to rules that determine whether a person may use particular funds for particular purposes. Such conditions commonly govern public transfers, welfare benefits, vouchers, or other targeted schemes. They need not rely on digital technology and are often implemented through ordinary administrative rules.

This distinction helps explain the structure of the European framework. The Regulation Proposal prohibits programmable money while permitting conditional payment transactions. Payment conditionality, meanwhile, predates CBDCs and forms part of many existing welfare and regulatory schemes. The legal debate therefore cannot be reduced to Article 24(2) of the Regulation Proposal. It concerns a wider set of mechanisms through which the use of money may be directed or restricted.

The Regulation Proposal envisages conditional payment functionality being offered by payment service providers.[23] This reflects situations in which users voluntarily rely on conditional payments, for example in machine-to-machine transactions or other contractual arrangements requiring automated execution. Much of the public debate, however, concerns a

[22] See Freiman (2024); Dionysopoulos, Marra and Urquhart (2024), p. 6 *et seq*.

[23] COM(2023) 369 final, Recital 55.

different type of conditionality. Restrictions linked to welfare benefits, geographical limitations, age requirements, or sanctions are imposed by public authorities rather than chosen by users. The same technical infrastructure can support both forms of conditionality. A payment mechanism developed for commercial purposes may also be used to implement public policy where the State provides the funds or determines the eligibility criteria. The original Regulation Proposal focused primarily on regulating the monetary unit while leaving the legal framework governing payment service providers, welfare schemes, contractual arrangements, and administrative rules largely outside its scope, though recent co-legislative amendments have begun introducing explicit democratic checks over structural features like holding limits and offline payment pathways.

B. The functional argument

The distinction between programmable money, programmable payments, and payment conditionality becomes less decisive once the analysis shifts from the architecture of the monetary instrument to the practical effects experienced by the user. From the perspective of the payer, what matters is not the technical location of the rule but whether the payment is ultimately authorised or refused. A restriction embedded in the monetary unit, implemented through a payment-service provider, or imposed through an administrative eligibility rule may rely on different legal and technical mechanisms, yet each is capable of producing the same practical outcome, namely that the transaction cannot be completed. The regulatory categories therefore distinguish between different modes of implementation rather than necessarily different forms of behavioural constraint.

This observation helps explain the limits of the European regulatory approach. The Digital Euro Regulation Proposal prohibits programmable money in the strict sense while not prohibiting conditional payment functionality. The prohibition contained in Article 24(2) of the Regulation Proposal therefore addresses only one possible method of implementing transactional restrictions. Other mechanisms capable of directing or limiting the use of money remain available through payment-service providers, contractual arrangements, or administrative schemes. The legal prohibition consequently narrows the range of permissible technical architectures without eliminating the broader possibility of conditional payment infrastructures.

The principal issue concerns the extent to which digital payment infrastructures may shape, channel, or restrict individual economic choices through *ex-ante* transactional conditions. The relevant concern is therefore not the formal integrity of the currency itself but the degree of transactional autonomy retained by users once conditions governing the use of money are increasingly implemented through the surrounding payment architecture. The debate consequently extends beyond the legal characteristics of the monetary unit and towards the governance of the infrastructures through which monetary transactions are conducted.

C. Existing infrastructures of conditional payment

Conditional payment mechanisms are not a new feature of digital currencies. They are already part of everyday economic life in many jurisdictions and, in some cases, have operated on a large scale for decades.

The French *titres-restaurant* provide a familiar example. Originally issued as paper vouchers and later as payment cards, they are now increasingly administered through digital applications. Employers credit a predefined amount that may be spent only at authorised merchants, typically restaurants and food retailers, subject to statutory limits on daily use. At the point of payment, the payment infrastructure verifies whether the transaction satisfies those conditions. If it does, the payment is authorised and the merchant receives ordinary euros. The conditions govern the payment, not the money itself.

The French *Pass Culture* follows the same logic. Piloted from 2019 and generalised nationwide in 2021 (its parameters were significantly revised in 2025), it provides young people with a digital allowance that may be spent only with approved cultural providers and only for eligible goods and services. The application determines which purchases are permitted and applies limits to certain categories, including digital subscriptions and video games, in order to encourage participation in cultural activities. Here again, the conditions are implemented through the payment infrastructure rather than through the monetary unit.

A comparable example exists outside Europe. The United States Supplemental Nutrition Assistance Program (SNAP) distributes benefits through Electronic Benefit Transfer (EBT) cards. Those benefits may be used only for eligible food products. Restrictions on alcohol, tobacco, household goods, pet food, and other excluded items are enforced automatically at the point of sale through product eligibility coding in authorised retailers' point-of-sale systems. For many years, SNAP has illustrated how payment infrastructure can implement public policy objectives through automated transactional conditions. The debates surrounding the programme, including questions of paternalism, dignity, administrative efficiency, and the appropriate balance between trust and supervision[24], closely resemble those now emerging in discussions of CBDC programmability.

These examples show that conditional payment mechanisms are already embedded in a range of sector-specific legal regimes. The European debate therefore concerns less the emergence of a new form of conditionality than the prospect of integrating existing arrangements into a common digital payment infrastructure. A widely available CBDC could provide a common technological infrastructure through which these and other forms of conditionality could be implemented more easily and adapted over time. Whether, and under what legal conditions, public authorities should make use of that possibility is ultimately a question of public policy rather than monetary design.

[24] See Currie and Gahvari (2008) for a review of these debates in the context of the Food Stamp Program.

VI. CBDCs as an infrastructure of behavioural governance

A. Possible extensions

Once a general-purpose CBDC makes conditional payment functionality widely available, the range of potential applications expands considerably. The purpose of this section is not to predict how such functionality will be used, but to identify the types of policy choices that it could facilitate.

Some applications would simply implement existing legal restrictions through the payment infrastructure. A teenager's digital wallet could automatically refuse payments for alcohol, tobacco, or online gambling, even though those transactions are already prohibited by law. A wallet associated with a person subject to a judicial curfew could refuse transactions outside authorised hours. None of these measures would introduce a new legal obligation. They would change the way existing rules are enforced. Compliance would result from the design of the payment system rather than from the possibility of *ex-post* sanctions.

Other applications would pursue economic or territorial objectives. A municipality seeking to support local economic activity could distribute a digital allowance that may be spent only within a defined geographical area or only with participating local businesses. Such arrangements could pursue a range of public policy objectives by directing spending towards particular beneficiaries, purposes, or categories of expenditure.

Conditionality could also be linked to judicial or administrative status. A wallet held by a person subject to probation could incorporate geographical restrictions consistent with the conditions imposed by a court. A wallet belonging to a person subject to financial sanctions could be suspended or frozen automatically where the applicable legal framework so provides. The payment infrastructure itself becomes the instrument through which legal restrictions are applied, reducing the gap between the legal rule and its execution.

B. Conditional payments and behavioural inferences

The examples discussed so far concern conditions that apply before or at the time of payment. The same payment infrastructure may also be used differently. Instead of preventing a transaction, it may record spending patterns and attach legal or financial consequences to them at a later stage.

One example, frequently discussed in the climate policy literature, is a personal carbon allowance.[25] Under most proposed schemes, individuals receive a carbon budget that is reduced as they purchase carbon-intensive goods and services. Once that budget is exhausted, additional purchases may require the acquisition of further carbon allowances, thereby increasing their cost. If such a scheme were implemented through a CBDC or a conditional payment infrastructure, high-emission purchases could also be refused automatically or made subject to an additional charge at the point of payment. Another possible application concerns health policy. Behavioural data generated through payment systems could, for example, be

[25] On personal carbon allowances as a policy tool, see Fawcett and Parag (2010).

used to adjust social insurance contributions in light of expenditure patterns associated with alcohol or tobacco consumption. A CBDC would extend this possibility by placing such data-driven assessments closer to the public payment infrastructure itself, especially where payments are made through wallets linked to verified users. The behavioural economics literature has long explored the broader question of whether public authorities may legitimately encourage healthier choices through incentives and other forms of behavioural intervention.[26]

These examples are not purely hypothetical. Similar forms of behavioural inference already exist in the financial sector. Algorithmic credit-scoring systems increasingly rely on transaction data, digital footprints, and other forms of alternative data to assess creditworthiness. As Katja Langenbucher has shown, these systems already influence access to credit through automated inferences drawn from patterns of individual behaviour.[27] The development of CBDCs would not introduce behavioural inference into economic life for the first time. It could, however, extend its use beyond private credit markets to public payment infrastructure and, potentially, to the implementation of public policy.

C. Conditional payment infrastructures and democratic safeguards

The examples discussed above should not be equated with a social credit system or other forms of comprehensive state surveillance. Each pursues objectives that democratic legal systems already recognise, including the protection of minors, public health, environmental policy, and the proper use of public funds. The issue is not the legitimacy of those objectives but the means through which they are implemented. As conditional payment infrastructures become more sophisticated, the payment system itself may increasingly become the mechanism through which public policies are applied.

This development has several consequences. First, legal rules that have traditionally been enforced through sanctions may instead be implemented through the design of the payment infrastructure. Rather than prohibiting a transaction and imposing a penalty if the prohibition is breached, the system may prevent the transaction from taking place. Secondly, conditionality becomes increasingly personalised. The monetary unit remains fungible, but the user's ability to spend it depends on the characteristics attached to the wallet or account through which it is held. Finally, the use of conditional payment mechanisms may become progressively easier to justify. Once payment infrastructure is available to implement one category of public policy, extending it to other objectives may appear as a limited technical adjustment rather than a significant regulatory choice.

This evolution has been analysed extensively in the literature on regulation by design. Hildebrandt has shown how digital architectures regulate behaviour through the design of

[26] For a general discussion of behaviourally informed regulation, see Sunstein (2014), p. 88 *et seq*. For a cautionary perspective on data-driven behavioural governance, see Yeung (2017).

[27] See Langenbucher (2020); Langenbucher (2022).

technological environments,[28] while Brownsword argues that technological management increasingly replaces regulation through *ex-post* legal sanctions with *ex-ante* design constraints.[29] Compliance is no longer achieved primarily through the prospect of legal sanctions but through systems that make certain forms of conduct impossible or substantially more difficult. Applied to payment systems, this development places part of the implementation of legal rules within the architecture of the payment infrastructure itself. The constitutional implications therefore extend beyond the legal status of the monetary unit. They also concern the governance of the digital infrastructure through which monetary transactions are carried out.

Important safeguards already exist in the EU legal order. For instance, the European Data Protection Board and the European Data Protection Supervisor have emphasised that the digital euro should comply with strict requirements concerning data minimisation, privacy, and the protection of low-value offline transactions.[30] These safeguards remain essential, but they do not resolve every institutional question raised by conditional payment infrastructures. They review the legality of particular measures once adopted. They do not determine, as a matter of democratic choice, which forms of conditionality should become technically feasible in the first place. Existing mechanisms of monetary accountability, including parliamentary scrutiny, central bank reporting, and public consultation, were developed primarily to oversee monetary policy and financial stability. They are less well suited to addressing the growing role of payment infrastructures in the implementation of individualised public policies. Whether additional forms of democratic oversight are required is therefore a question that extends beyond the law governing the digital euro itself.

The European Parliament has also addressed the issue. In its June 2026 report on the Regulation Proposal, the Committee on Economic and Monetary Affairs proposed an amendment to the Preamble stating that "it is fundamental that the establishment of the offline digital euro does not give ground for means to track or control on how it is spent in comparison to cash."[31] The ECB has focused on the singleness and fungibility of the currency, while the Parliament has placed greater emphasis on protecting users against monetary surveillance and behavioural control through the payment infrastructure. The coexistence of these concerns within the same legislative process confirms that programmability is no longer only a question of monetary technique. It also raises questions about democratic oversight of payment infrastructure and the conditions under which that infrastructure may shape individual economic conduct.

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[28] See Hildebrandt (2015) p. 11 *et seq*.

[29] See Brownsword (2019) p. 181 *et seq*.

[30] European Data Protection Board and European Data Protection Supervisor (2023).

[31] European Parliament, Report on the proposal for a Regulation of the European Parliament and of the Council on the establishment of the digital euro (A10-0185/2026, Committee on Economic and Monetary Affairs, 26 June 2026), at: https://www.europarl.europa.eu/doceo/document/A-10-2026-0185_EN.html (Proposed recital (34a)).

VII. Welfare conditionality as a test case

Two welfare schemes help test the argument that prohibiting programmable money does not eliminate the political questions raised by conditional payment infrastructures. The French Allocation de rentrée scolaire (ARS) shows how an unconditional cash benefit could be converted into a conditional payment through programmable infrastructure. The United States Supplemental Nutrition Assistance Program (SNAP) shows how such conditionality operates at large scale and over time. Both cases illustrate the political dilemmas that programmable infrastructures place on the agenda of democratic societies.

A. The French "Allocation de rentrée scolaire"

The *Allocation de rentrée scolaire* (ARS) is an annual benefit paid to around three million low-income families in France to help meet the costs of the school year, including school supplies, clothing, and equipment. In its current form, the benefit is paid by bank transfer and recipients remain free to decide how the money is spent. This reflects a deliberate policy choice. Although the allowance is intended to support school-related expenses, it forms part of the household's disposable income and is not subject to conditions governing its use.

The ARS has nevertheless been the subject of recurring political debate. Critics regularly claim that some recipients use the allowance to purchase televisions, video-game consoles, or other goods unrelated to education. Empirical evidence paints a different picture. A study found that almost all recipients purchased school supplies (98%) and clothing (96%), while a large majority also used the allowance for canteen fees, school insurance, sports equipment and extracurricular activities. It concluded that back-to-school expenses broadly correspond to the amount of the allowance itself.[32] While no convincing evidence demonstrates widespread misuse, proposals are nevertheless periodically made to convert the ARS into a voucher or another form of conditional payment that could be used only for specified goods or at authorised merchants.[33]

A CBDC-based programmable payment infrastructure would make such a scheme comparatively simple to implement. The allowance could be credited to a dedicated wallet or linked to authorised merchant categories. When a payment is initiated, the payment system would verify whether the transaction satisfies the applicable conditions before authorising it. The conditionality would therefore operate through the wallet or the payment service provider rather than through the digital euro itself. The monetary unit would remain fully fungible, and the merchant would ultimately receive ordinary digital euros.

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[32] Caisse nationale des allocations familiales (2023), at: https://www.caf.fr/sites/default/files/medias/cnaf/Nous_connaitre/Recherche_et_statistiques/Essentiel/220_2023_ESSENTIEL_ARS_et_beneficiaires_CNAF.pdf.

[33] See, among other initiatives, Proposition de loi n° 918 (2022-2023) pour encadrer le versement et l'utilisation de l'allocation de rentrée scolaire (1 September 2023), at: https://www.senat.fr/dossier-legislatif/ppl22-918.html. See also, at the Assemblée nationale, Proposition de loi n° 192 visant à encadrer l'utilisation de l'allocation de rentrée scolaire et à lutter contre la fraude (4 August 2022), at: https://assemblee-nationale.fr/dyn/16/textes/l16b0192_proposition-loi.

It is not difficult to identify the arguments that could be advanced in favour of such a reform. Conditionality could be presented as a way of aligning the use of the allowance more closely with its statutory purpose, strengthening public confidence that public funds are spent as intended, and making political support for the scheme more durable. It could also reduce concerns about misuse while preserving, or even increasing, the level of financial support provided to eligible families.

Such a reform would raise several objections. The first concerns the legal conception of the benefit itself. The ARS is currently paid as an ordinary cash transfer. Although intended to assist with school-related expenses, it forms part of the household's disposable income and leaves decisions about expenditure to the recipient. Converting it into a conditional payment would alter that conception by replacing discretion with predefined spending rules.

A second concern relates to the extension of public control beyond eligibility. The administration already verifies whether a person is entitled to receive a benefit. A conditional payment infrastructure goes further. It allows the public authority to supervise how the benefit is used after it has been granted. The recipient is therefore not treated simply as someone who qualifies for public support, but as someone whose subsequent spending decisions remain subject to administrative control.

A third concern is stigma. A payment system that limits how a particular category of beneficiaries may spend public transfers does more than regulate transactions. It expresses a judgment about the capacity of those recipients to make ordinary consumption decisions for themselves. It differentiates between citizens who receive public support under conditions of trust and those whose everyday decisions remain subject to continuing supervision.

Supporters of conditionality may respond that welfare systems have long relied on eligibility criteria, residence requirements, and anti-fraud controls. A conditional ARS would nevertheless go further by extending public control from entitlement to post-payment use. Once such control is embedded in the payment infrastructure, the debate concerns the degree of supervision that public authorities may exercise over individual spending decisions.

B. SNAP as a comparative point of reference

The United States Supplemental Nutrition Assistance Program (SNAP), administered through Electronic Benefit Transfer (EBT) cards, provides a useful comparison. SNAP recipients receive a monthly benefit that may be used only at authorised retailers and only for eligible food products. Purchases of alcohol, tobacco, pet food, household supplies, and other non-food items are excluded through automated controls at the point of sale. The system has operated at national scale for several decades and demonstrates that conditional payment infrastructures can be integrated into the ordinary administration of welfare benefits.

The debates surrounding SNAP closely resemble those that would accompany a conditional ARS. Supporters emphasise that spending restrictions ensure that public funds are used for their intended purpose, strengthen public confidence in the welfare system, and protect vulnerable households. Critics point to the stigma associated with restricted payment instruments, the reduced discretion available to recipients in managing their household

budgets, the practical difficulties created by restrictions on eligible goods and retailers, and the greater degree of administrative oversight imposed on low-income households.

The comparison is instructive in two respects. First, conditional payment infrastructures are not confined to authoritarian systems. They have long formed part of welfare administration in a liberal democracy. Secondly, many of the legal and political questions raised by conditional payments have already been debated in the context of SNAP. The development of CBDCs does not create those questions. It provides a new technological infrastructure through which they may arise in a broader range of public policies.

Neither the ARS nor SNAP provides a definitive answer to the question of conditionality. Reasonable disagreement remains as to whether the gains in accountability and the more targeted use of public funds justify the corresponding limits on household discretion, the risk of stigma, and the extension of administrative control over individual spending decisions. As case studies, they show that conditional payment infrastructures already exist, can serve legitimate public objectives, and may also reshape the relationship between public authorities and welfare recipients. A general-purpose CBDC would not create these questions, but it could make similar forms of conditionality easier to implement across a wider range of public policies. The use of such mechanisms therefore requires democratic assessment rather than being treated as a matter of technical implementation.

VIII. Conclusion

The preceding analysis has argued that the legal debate on CBDC programmability has focused primarily on the monetary unit. By prohibiting programmable money while allowing conditional payment functionality, the European framework draws a clear legal boundary around the digital euro itself. But that boundary does not exhaust the political questions raised by programmable payment infrastructures. Conditionality may continue to operate through wallets, payment service providers, and the broader payment environment without altering the legal characteristics of the monetary unit.

Preserving the fungibility of the digital euro, the singleness of the currency, legal tender, and central bank independence provides a coherent justification for excluding programmable money from the monetary unit itself. Our analysis does not challenge that choice but suggests that the principal legal and political questions have shifted elsewhere. They increasingly concern the conditions governing the use of money rather than the characteristics of money itself.

The examples examined in this contribution show that conditional payment infrastructures are neither hypothetical nor confined to CBDCs. They already exist in welfare systems and other forms of targeted public spending. A general-purpose CBDC would not create these mechanisms. It could, however, provide a common infrastructure through which they may be deployed more easily and on a broader scale.

This shift has implications for monetary law. The discipline has traditionally concentrated on the issuance, value, circulation, and legal status of money. Digital payment infrastructures require a broader perspective that also considers the legal and constitutional implications of

the conditions governing the use of money. The central question is no longer confined to whether money itself should be programmable. It also concerns the circumstances in which public authorities should rely on conditional payment infrastructures and the legal safeguards that should govern their use. Those questions cannot be resolved through technical design alone. They require democratic choices.

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