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Abstract

Diese Arbeit untersucht, ob unterschiedliche Botschaften in der öffentlichen Kommunikation über den digitalen Euro die Nutzungsabsicht von Menschen in der EU verändern und ob Botschaften, die Privatsphäre betonen, oder solche, die Souveränität betonen, überzeugender sind. Damit geht die Arbeit über allgemeine Debatten zur Ausgestaltung von CBDCs hinaus und prüft, welche der beiden zentralen Kommunikationslinien der EZB, Schutz der Privatsphäre oder europäische Zahlungssouveränität, die Nutzungsabsicht gegenüber dem digitalen Euro stärker erhöht. Grundlage ist ein Online-Experiment mit drei voneinander unabhängigen Gruppen, das eine öffentliche Informationskampagne simuliert. Die Daten stammen aus einem standardisierten Online-Fragebogen mit 171 in der EU lebenden Personen, die über persönliche Netzwerke und SurveySwap rekrutiert wurden. Die Teilnehmenden wurden zufällig einem souveränitätsbezogenen Sujet, einem auf Privatsphäre bezogenen Sujet oder einem neutralen Kontrollsujet zugewiesen. Anschließend wurde die nach der Betrachtung des Sujets gemessene Nutzungsabsicht zwischen den Gruppen mithilfe einer Kovarianzanalyse verglichen, wobei die vorab erhobene Nutzungsabsicht kontrolliert wurde. Die Ergebnisse zeigen, dass die souveränitätsbezogene Botschaft die Nutzungsabsicht im Vergleich zur Kontrollbedingung erhöhte, während dies für die auf Privatsphäre bezogene Botschaft nicht der Fall war. Auch im Hauptmodell erwies sich die souveränitätsbezogene Botschaft als wirksamer als die auf Privatsphäre bezogene, wobei dieser Unterschied geringer wurde, sobald demografische Kontrollvariablen berücksichtigt wurden. Sowohl die Einschätzung, dass der digitale Euro die Privatsphäre schützt, als auch die Einschätzung, dass er europäische Datensouveränität stärkt, standen in positivem Zusammenhang mit der Nutzungsabsicht. Die experimentellen Botschaften veränderten diese Einschätzungen jedoch nicht stark genug, um signifikante indirekte Effekte auszulösen. Insgesamt zeigen die Ergebnisse, dass die Kommunikation über den digitalen Euro die Nutzungsabsicht beeinflussen kann. In dieser Stichprobe war das vor allem dann der Fall, wenn der digitale Euro mit der Abhängigkeit von außereuropäischen Zahlungsanbietern in Verbindung gebracht wurde und nicht mit allgemeinen Zusicherungen zum Datenschutz.

This thesis examines whether different public communication frames about the digital euro change intended use among EU residents, and whether a privacy frame or a sovereignty frame is more persuasive. In doing so, this thesis moves beyond general debates on CBDC design and tests which of the ECB's two main public narratives, privacy protection or European payment sovereignty, is more effective in increasing intended use of the digital euro. It uses a between-subjects online experiment that simulates a public information campaign. Data comes from a standardized online questionnaire of 171 EU residents recruited through personal networks and SurveySwap. Participants were randomly assigned to a sovereignty-framed

poster, a privacy-framed poster, or a neutral control poster. Post-exposure intended use was then compared across groups with analysis of covariance, controlling for pre-exposure intended use. The results show that the sovereignty-framed message increased intended use relative to the control condition, while the privacy-framed message did not. The sovereignty frame also performed better than the privacy frame in the main model, although this difference became weaker once demographic controls were added. Both perceived privacy protection and perceived European data sovereignty were positively related to intended use, but the treatments did not shift these beliefs enough to produce significant indirect effects. Overall, the findings suggest that communication about the digital euro can affect intended adoption, but in this sample it worked mainly when the digital euro was linked to dependence on non-European payment providers rather than to general privacy assurances.

Theoretical background

What is a retail CBDC?

The World Bank defines a CBDC as a digital liability of the central bank that is recorded electronically and denominated in the existing national currency (cf. World Bank 2021, p.1). In simpler terms, a CBDC is official public money issued by the central bank, but held and transferred in digital form rather than as paper notes and coins. CBDCs can be designed in two main forms: retail and wholesale (cf. Brühl 2025, p.1). A retail CBDC is meant for households and businesses to use in everyday payments, while a wholesale CBDC is for banks and other financial institutions to settle transactions with one another. With no technical background, the retail form is the easiest to picture: it is a digital version of central bank money for daily use.

A CBDC is often described as a digital alternative to cash, but it is not the same thing as cash (cf. Brühl, 2025, p.1). Cash is physical and has special features such as direct exchange and anonymity, whereas a CBDC exists on a digital system and can be designed with different privacy and access rules (cf. World Bank, 2021, pp. 3ff). A CBDC is also different from the money most people already use when they pay by card or banking app, because that money is usually a commercial bank deposit rather than central bank money. In other words, money in a bank account is a claim on a private bank, while a CBDC is a claim on the central bank. For the general public, direct access to central bank money is usually limited to cash, so a CBDC would extend that access into digital form. The World Bank note also explains this difference in terms of risk, because central bank money does not carry the same default risk as money issued by private institutions.

A CBDC is also not the same as a cryptocurrency. Avgouleas and Blair describe CBDCs as digital fiat money, which simply means official state-issued money in digital form, and they emphasize that this is fundamentally different from privately issued crypto-assets (cf. Avgouleas, Blair, 2024, p. 103 ff.). The design literature also distinguishes account-based, token-based, and hybrid access models, as well as direct, indirect, and hybrid operating models (cf. Genc & Takagi, 2024, pp. 203-204). This means a CBDC does not necessarily require every person to hold an account directly at the central bank, because banks and other payment service providers can also help distribute it and provide day-to-day services.

Many current proposals present CBDCs as a complement to cash rather than as an instant replacement for it (cf. Brühl, 2025, p. 2). In short, a CBDC is a digital form of public money: it is issued by the central bank, exists in digital form, and is meant to be usable in electronic

payments (cf. World Bank, 2021, p. 5ff). Its technical design can vary, but the core idea is simple: to offer digital central bank money that is distinct from both ordinary bank deposits and privately issued digital currencies (cf. Brühl, 2025, p. 2).

Central bank digital currencies have become important because economies are becoming more digital and, in many places, demand for physical cash is weakening (cf. Brühl 2025, p.1). At the same time, digital payments have increasingly been shaped by private payment networks and private digital currencies, which has pushed central banks to rethink how public money should work in everyday life (cf. Avgouleas & Blair, 2024, pp. 104–105). In that setting, CBDCs are an attempt to make sure that central bank money can still be part of ordinary payments even when those payments are made electronically rather than in cash (cf. World Bank, 2021, p. 5ff). The issue is also linked to trust, the World Bank describes central banks as the institutions responsible for protecting confidence in money and the payment system (cf. World Bank, 2021, p. 3).

Why a digital euro?

The ECB presents the case for a digital euro as a response to structural changes in payments and as a safeguard for the role of public money in the economy (cf. European Central Bank, n.d.). At present, citizens can only access central bank money in the form of banknotes and coins. This limitation contrasts with the increasing reliance on digital means of payment, which are provided almost entirely by private actors such as commercial banks or non-European payment platforms. According to the ECB, this situation creates a gap. While cash remains guaranteed and accessible, there is no equivalent digital instrument of public money available to everyone in the euro area. The digital euro is intended to fill this gap by ensuring that central bank money remains usable and relevant in a digital economy.

The ECB stresses that the digital euro would not replace cash but complement it (cf. European Central Bank, n.d.). Cash will remain legal tender and continue to be accepted. Instead, the digital euro is conceived as an additional choice, designed for situations where cash is impractical, such as online payments. Its main features are planned to mirror the essential qualities of cash. It would be universally accepted in the euro area, available to all citizens, and usable free of charge.

Privacy protection is also highlighted as a core design element. According to the ECB the digital euro should provide stronger safeguards than many existing electronic payment solutions (cf. European Central Bank, n.d.).

At the same time, the privacy promise should not be understood as identical to cash anonymity. Wenker (2022) stresses that CBDC privacy is constrained by KYC, AML/CFT and law-

enforcement requirements, meaning that a digital euro may offer stronger privacy than existing private digital payments without reproducing the full anonymity of cash.

A further motivation relates to Europe's financial independence and resilience (cf. European Central Bank, n.d.). The ECB notes that a growing share of electronic payments is processed by non-European providers. Dependence on infrastructures located outside the European Union exposes the euro area to risks concerning data protection, operational continuity, and jurisdictional control. A digital euro could strengthen Europe's monetary sovereignty by establishing a European public payment instrument that functions independently of external providers.

The ECB recognizes that private payment services are indispensable but emphasizes that the dominance of a limited number of providers could reduce competition and innovation (cf. European Central Bank, n.d.). A digital euro would provide a common settlement layer, supporting a competitive payments market while anchoring it in central bank money. At the same time, safeguards such as holding limits are under consideration to prevent the digital euro from destabilizing bank deposits or disrupting credit provision.

The ECB frames the initiative as a way to "future-proof" the euro (cf. European Central Bank, n.d.). As payment behavior evolves, the existence of a digital euro would ensure that central bank money continues to serve as a stable reference point for the monetary system (Cipollone, 2024). By offering a digital counterpart to cash, the ECB seeks to preserve public trust in the euro and guarantee universal access to safe money.

"The digital Europe is not just a means of payment, it is also a political statement concerning the sovereignty of Europe and its capacity to handle payment, including on a cross-border basis, with a European infrastructure and solution," ECB-Governor Christine Lagarde said at the press conference (as cited in Gronholt-Pedersen & Strupczewski, 2025).

Piero Cipollone, Member of the Executive Board of the ECB, pointed out at his Keynote speech at the Economics of Payments XIII Conference 2024 organized by the Oesterreichische Nationalbank: cross-border and international transactions in Europe depend heavily on large card schemes like Visa and Mastercard, which are non-European entities. These schemes dominate the infrastructure for such payments, which gives them strong negotiating power over merchants and banks in Europe, since competing local or European payment systems are often unable to reach the scale or reach that they have.

Because of the market power that Visa, Mastercard and similar schemes enjoy, the fees ("merchant service charges", interchange and scheme fees) that merchants pay have been rising (Cipollone, 2024). The ECB claims many of these costs are passed on ultimately to

consumers, or reduce competitiveness of smaller merchants. In particular, the ECB notes that despite regulation of certain fee components (like the interchange fee regulation), non-regulated parts (such as scheme fees) have enabled card networks to raise charges. Because of the dominance of international card schemes, and because many digital/electronic payment innovations are national in scope, European payment providers struggle to scale. The dominance of Visa/Mastercard makes it harder for local or pan-European alternatives to achieve critical mass.

Relying on non-EU payment infrastructure can create risks for data protection, legal control, and the continuity of payment services (Cipollone, 2024). In situations of geopolitical or regulatory tension, this dependence on card schemes native from outside Europe could pose risks, for example around control, data, infrastructure, costs, and regulation. If these external players increasingly mediate payments in Europe without European alternatives, the euro's global standing and Europe's ability to govern its payment infrastructure could be weakened.

A digital euro would allow Europe to build its own payment rails with sovereign backing (Cipollone, 2024). Cipollone argues that introducing a digital euro could enhance competition in the payment market and lead to lower transaction costs. Because merchants would have an alternative to card payments dominated by Visa and Mastercard, competitive pressure could reduce fees. Also, having a public standard might enable more efficient and affordable innovations by domestic or European payment service providers.

Determinants of CBDC Adoption

Privacy Concerns in CBDC Adoption

The ECB (2021) found that privacy was the single most important concern for both citizens and professionals in their public consultation on a digital euro (cf. European Central Bank, 2021). The majority of respondents prioritized strong data protection and offline usability, which they associated with enhanced privacy, though few supported full anonymity due to the need for compliance with anti-money laundering (AML) regulations. Similarly, Tronnier et al (2024) found that privacy concerns significantly reduced adoption of the e-CNY in China, as users feared government surveillance, lack of anonymity and data misuse. They argued that these concerns closely mirror those identified by the European Central Bank (2021) in the context of the digital euro, suggesting that privacy is often a decisive factor in CBDC adoption. Wenker (2022) also found that privacy concerns hampered the adoption of the Bahamian Sand Dollar, and that consumers viewed the lack of anonymity in CBDC transactions as a disadvantage compared to cash and cryptocurrencies. León et al (2024) similarly showed that users were reluctant to adopt a retail CBDC due to privacy and usability concerns and stressed that

privacy-preserving features would be essential for broader acceptance. Likewise, Rutter and Morten (2019) identified privacy concerns as a central barrier to CBDC adoption, emphasizing that cash provides a uniquely anonymous alternative that citizens may be unwilling to give up.

Taken together, these studies suggest that privacy is not a marginal design issue but a recurring condition for CBDC acceptance across very different contexts. What varies across studies is less the importance of privacy itself than the form it takes, ranging from fears of state surveillance to the loss of cash-like anonymity, which suggests that privacy concerns must be addressed in a context-specific way.

Factors Influencing Adoption Behavior

This strand of the literature shifts attention from abstract acceptance to the practical conditions of use. Across studies, ease of use, compatibility with existing payment habits, merchant acceptance and tangible incentives recur more consistently than any single demographic variable, while age and prior digital experience appear mainly to shape how easily users can integrate a CBDC into routine payment behavior.

The ECB (2021) found that ease of use, security, interoperability with existing payment systems, and trust were major factors influencing the likelihood of digital euro adoption. Older respondents and those with higher levels of digital literacy were found to be more inclined to adopt the new currency. Hutterski et al (2024) supported these findings, revealing that trust in banks and payment habits significantly shape digital euro adoption patterns in Germany and France. Their study showed that individuals who mistrusted banks were paradoxically more willing to adopt a CBDC as an alternative, while those already familiar with mobile banking or cryptocurrency were more open to its use. Bhensook et al (2025) found similar behavioral patterns in Thailand, where adoption of the retail CBDC was driven by user age and reward incentives. They observed that users tended to withdraw the CBDC quickly after payments, indicating a preference for traditional deposit accounts as savings options. Morales-Resendiz et al (2021) confirmed that usability, financial literacy, and merchant acceptance were key to adoption in CBDC pilots in the Bahamas, Uruguay, and Sweden. They argued that the success of CBDCs depends on technical readiness as well as social and behavioral factors such as incentives and everyday usability. Wu et al (2024) added that users' adoption behavior reflects a balance of perceived advantages and barriers. While government support, convenience, and compatibility encourage adoption, privacy concerns, complexity, and perceived risks discourage it.

The role of age is less consistent than the broader technology-adoption literature might suggest. Bhensook et al. (2025) find in the Thai rCBDC pilot that older users made greater use of rCBDC for payments and transfers, while Hutterski et al. (2024) do not find a clear

relationship between age and readiness to use the digital euro in Germany and France. SPACE 2024 confirms that age structures existing payment behavior, especially online and mobile payments, but this does not translate into a simple expectation that younger users will necessarily be more willing to adopt a digital euro.

Trust and Attitudes Toward CBDCs

Attitudes toward CBDCs are shaped by varying forms of trust, trust in institutions, technology, and data protection, and that these trust dynamics differ across cultural and regulatory contexts. Tronnier et al (2023) found that trust in central banks and privacy concerns are the dominant factors shaping citizens' attitudes toward the digital euro. Their research demonstrated that people compare CBDCs to existing payment options and are more willing to adopt them when they provide clear advantages such as stronger privacy protection or offline functionality. Hutterski et al (2024) found that distrust in financial institutions actually increased willingness to adopt a CBDC in Germany and France, indicating that some consumers view CBDCs as safer or more transparent than private financial institutions. By contrast, Tronnier et al (2024) found that in China, trust in the financial system did not significantly influence e-CNY adoption, suggesting that institutional trust may play a smaller role in environments where government involvement in finance is already strong. Wu et al (2024) observed that financial literacy has a moderating effect on these trust dynamics: individuals with higher literacy levels were less concerned about risks such as loss of privacy or technical failures and thus more open to adoption.

Overall, the literature suggests that trust matters, but not in a uniform way. Trust in the central bank and confidence in data protection appear to support CBDC acceptance more consistently, whereas trust in the wider financial system is context-dependent and can even work in the opposite direction when users see a CBDC as a public alternative to private institutions.

CBDC and Cash Usage Trends

Cash preferences and policy design jointly determine how a CBDC might coexist with or replace physical money. Maino and Pani (2024) modeled the impact of CBDC introduction on payment systems and found that it could trigger a self-reinforcing process leading to the extinction of cash. They argued that as more consumers and merchants switch to CBDCs, the incentives to use or accept cash decline, pushing the system toward an irreversible cashless equilibrium. Once cash usage falls below a critical threshold, they warned, restoring it would be nearly impossible. Rutter and Morten (2019) agreed that in countries where cash use has already sharply declined, such as Sweden and Norway, a CBDC could naturally replace it. However, they emphasized that CBDCs must offer tangible advantages over cash to gain

public acceptance, particularly offline functionality and strong privacy protection. In contrast, the Austrian National Bank (2023) found that in Austria, cash remains the most popular payment method despite a steady rise in card payments, indicating that CBDC introduction would face greater resistance in societies with entrenched cash preferences. León et al (2024) found that balance limits also influence CBDC adoption: a higher holding limit of 3.000 Euros did not constrain usage, while a lower limit of 1.000 Euros discouraged adoption.

The literature is therefore divided on whether CBDCs should be interpreted mainly as cash substitutes or as complements to cash. Maino and Pani (2024) and Rutter and Morten (2019) emphasize that a CBDC could accelerate or accompany cash replacement in already cash-light economies. By contrast, Morales-Resendiz et al. (2021) define a successful rCBDC as a resilient and inclusive digital complement to physical cash, while SPACE 2024 shows that the option to pay with cash remains important for a majority of euro-area consumers. León et al. (2024) further complicate the replacement argument by showing that, in their Spain simulation, an attractive rCBDC often competes more with existing digital payment instruments than with cash, except when government benefits are distributed through rCBDC.

Cross-Border and Financial System Integration

The ECB (2021) emphasized that the digital euro must be integrated with existing banking and payment systems rather than operating as an independent alternative. Respondents also called for cross-border usability to enable seamless international payments while ensuring compliance with financial regulations. Bhensook et al (2025) similarly found that in Thailand, the retail CBDC functioned mainly as a payment instrument rather than a store of value, highlighting the need for integration with the banking system to support savings and broader financial use cases. Hutterski et al (2024) argued that payment habits and levels of financial digitalization differ widely across eurozone countries, implying that a one-size-fits-all approach would be ineffective. They concluded that the ECB should tailor digital euro strategies to national payment habits to maximize acceptance and efficiency.

CBDC Incentives and Policy Considerations

León et al (2024) found that distributing government benefits through a retail CBDC increased adoption, particularly among low-income and cash-dependent users, which fits broader financial inclusion goals. Bhensook et al (2025) confirmed that reward incentives positively influenced CBDC uptake in Thailand, suggesting that user motivation is closely tied to tangible economic benefits. Morales-Resendiz et al (2021) found that incentives and merchant participation were key to success in CBDC pilots in the Bahamas and Uruguay, where adoption remained limited without clear rewards or strong institutional support. Maino and Pani (2024) argued that policymakers must carefully design CBDC rollouts to avoid unintended

consequences such as the extinction of cash. They proposed safeguards including the maintenance of cash as legal tender, mandated merchant acceptance, and design features that preserve privacy and offline usability.

There is also a difference between pilot evidence and stated consumer priorities. Pilot and simulation studies show that incentives can increase CBDC use, especially reward programs or government benefit payments. Yet SPACE 2024 shows that, when consumers are asked what would persuade them to try new payment solutions, incentives rank below security, ease of use, lower costs and privacy.

Usage of e-government services in general

Balaskas et al. (2022) examined how trustworthiness and technology acceptance factors influenced citizens' use of e-government services in Greece during the COVID-19 pandemic, using survey data from 301 respondents and a structural equation modeling approach. Their main model focused on trust, social influence, and perceived usefulness. Age and education also play a role as background factors affecting adoption. Younger citizens, who are generally more technologically skilled and adaptable, were quicker to embrace e-government services, whereas older adults faced barriers linked to limited digital experience, and higher educational attainment was associated with greater likelihood of use and participation in digital public services.

ECB Space Survey

Whereas the preceding literature identifies general drivers and barriers of CBDC adoption, the SPACE 2024 study helps to situate those factors within actual payment behavior in the euro area. Although it does not ask about the digital euro directly, it provides evidence on payment habits, privacy perceptions, cash attachment and openness to new payment solutions, all of which shape the context in which a digital euro would be communicated and received (cf. European Central Bank, 2024).

The SPACE 2024 study provides a broad empirical background for analyzing how a digital euro might be received, even though it never mentions the digital euro explicitly (cf. European Central Bank, 2024). It describes how people in the euro area pay, what they prefer, how important cash remains, how they perceive privacy in digital payments, and what would motivate them to adopt new payment solutions. This can be used both at euro-area level and, to a more limited extent, for Austria.

SPACE 2024 is based on a survey and one-day payment diary of adult consumers in all 20 euro-area countries. The ECB coordinated data collection for 18 countries; Germany and the Netherlands contributed largely harmonized national surveys. In the 18 ECB-coordinated

countries, about half of interviews were done as telephone interviews (CATI) and half via web (CAWI) (cf. European Central Bank, 2024, p. 7). Quotas were set for country, age, gender and day of the week, and the final data are weighted to reproduce population structures by gender, age, education, occupation, region and household size. The 2024 wave was conducted in two survey rounds between late September and mid-November 2023 and between early April and early June 2024, which helps to smooth seasonal effects in payment behavior (cf. European Central Bank, 2024, p. 8).

Austria is covered with a country sample of 2,531 respondents, which is in the medium-sized group of countries in the survey design (cf. European Central Bank, 2024, p. 9). The data are weighted so the weighted distributions reflect the adult resident population (cf. European Central Bank, 2024, p. 8). Age is recorded in twelve categories from 18–24 years to 75 years and above and was recoded into three broader groups commonly used in the SPACE analysis: 18-39 years, 40-54 years and 55 years and older (cf. European Central Bank, 2024).

Regarding overall payment behavior, the euro area is clearly moving towards more digital payments, but cash continues to play a central role (cf. European Central Bank, 2024, p. 4). In 2024, 75 % of non-recurring day-to-day transactions by number were made at the point of sale (POS), 4 % were person-to-person (P2P) and 21 % were online. 58 % of the value of spending was at POS, 6 % P2P and 36 % online. Online payments have grown strongly compared to 2019 (7 % of transactions) and 2022 (17 %), and they capture disproportionately high-value purchases, which is why their value share (36 %) exceeds their share by number (cf. European Central Bank, 2024, p. 10).

Within the euro area, Austria belongs to the group of “high online use” countries. The share of online payments in all day-to-day transactions is 28 % in Austria, which places it among the countries with the highest online share (Lithuania 29 %, Croatia 28 %, Austria 28 %) (cf. European Central Bank, 2024, p. 11). This indicates that Austrian consumers are comparatively active in remote and e-commerce payments, an area where a digital euro would most directly compete with cards and existing online payment solutions.

Point of sales

At the POS, there is a clear but gradual shift away from cash towards cards and mobile payments at euro-area level. In 2024, cash is used in 52 % of POS transactions, down from 59 % in 2022 and 72 % in 2019. Card payments increased to 39 % of POS transactions (34 % in 2022), and mobile device payments reached 6 % of POS transactions (cf. European Central Bank, 2024, p. 13). Regarding value of purchases, cards are the most important instrument (45 % of POS value), followed by cash (39 %) and mobile payments (7 %). This shows that cash

is still widely used, especially for small amounts, while cards dominate higher-value POS payments (cf. European Central Bank, 2024, p. 14).

There are substantial cross-country differences in how often cash is used at POS. In 2024, cash was the most frequently used POS instrument in 14 of the 20 euro-area countries, with country shares ranging roughly from about one fifth to around two thirds of POS transactions. Card payments are dominant in a smaller group of countries (cf. European Central Bank, 2024, p. 14).

Austrian respondents show a consistently high preference for cash in stores across all age groups, with a pronounced age gradient.

Among respondents aged 18–39, 35.9 % state that they prefer to pay with cash when they have a choice, 45.9 % prefer card or another cashless method, and 18.2 % report no clear preference between cash and cashless. In the 40–54 age group, the share preferring cash is virtually unchanged at 36.2 %, but the share preferring cashless falls to 39.9 % while the share with no clear preference rises to 23.9 %. In the group aged 55 and older, the pattern shifts more clearly in favor of cash: 40.8 % prefer cash, 33.7 % prefer card or other cashless methods and 25.5 % have no clear preference (cf. European Central Bank, 2024).

Recording transactions made in a diary showed that for Austrians, among all weighted POS transactions performed by respondents aged 18–39, 58.3 % are made in cash, 27.8 % by card and 13.9 % using other cashless instruments. For the 40–54 age group, the corresponding shares are 60.7 % cash, 27.1 % card and 12.2 % other cashless. In the group aged 55 and older, cash accounts for 66.0 % of POS transactions, card payments for 24.7 %, and other cashless instruments for 9.3 %. The total number of POS transactions observed in the diary is ample in all groups (around 1,500 for 18–39, 1,300 for 40–54 and 1,600 for 55+), so these percentages are based on a reasonably rich empirical base (cf. European Central Bank, 2024).

Use of online payments is strongly age-dependent. At euro-area level, 26 % of day-to-day transactions of consumers under 40 are made online, compared with only 16 % for consumers aged 65 or older (cf. European Central Bank, 2024, p. 12). Younger people have more digital payment exposure even before any potential digital euro is introduced.

For POS instruments, age patterns are also pronounced. Across the euro area, consumers under 40 use cash for less than half of their POS transactions, while the oldest group (65+) uses cash in 57 % of POS payments (cf. European Central Bank, 2024, p. 17). Card use is similar across age groups (around 37–40 % of POS transactions), but mobile payments show a steep age gradient: 10 % of POS transactions among the youngest group versus 3 % among the oldest. The study also found that for consumers with a higher level of education and income, the number of cash payments as well as the value of cash payments when made was

lower. A finding complementing this, payments with a mobile device increased for higher levels of education and income (cf. European Central Bank, 2024, p. 18).

Stated preferences of participants

Turning to stated preferences, SPACE 2024 distinguishes between actual behavior and what consumers say they would prefer if several payment methods were available. At euro-area level, preferences at the POS have stabilized compared with 2022. In 2024, 55 % of consumers prefer cards or other cashless payment methods in shops, 22 % prefer cash, and 23 % have no clear preference. The share preferring cash has declined from 27 % in 2019 and has remained at 22 % since 2022, while preference for cashless methods has risen from 49 % to 55 % over the same period (cf. European Central Bank, 2024, p. 42). Even though cash is still used more often in practice than these preferences suggest, the trend is clearly towards a cashless preference. Still, the option to pay with cash remains fairly important or very important to in total 62 % of the euro population (cf. European Central Bank, 2024, p. 40).

Preferences also differ by age at euro-area level. Among 18–39-year-olds, 20 % state a preference for cash, compared with 21 % in the 40–54 age group and 24% among those aged 55 and older. Across all age groups, 55 % prefer cashless payments, and 22 % prefer cash (cf. European Central Bank, 2024, p. 44). Even in the youngest group, a substantial minority still actively prefers cash, which aligns with the finding that the “option to pay with cash” remains important even for younger people (cf. European Central Bank, 2024, p. 41).

In this respect, Austria stands out. Among all euro-area countries, Austria has the highest share of consumers who prefer to pay with cash at the POS: 38 % in 2024, compared with only 10% in Finland. At the same time, Austria has the lowest share of consumers who prefer card or other cashless means of payment (39 %), while in other countries this share can be as high as 76%. Although cash preference in Austria has declined by 7 percentage points since 2022, it remains at the top of the euro-area distribution (cf. European Central Bank, 2024, p. 43).

Comparing stated preferences with actual payment behavior shows a few clear differences. In terms of preferences, the youngest group exhibits a plurality in favor of card and other cashless payments (45.9 % versus 35.9 % preferring cash, with 18.2 % indifferent). In terms of actual transactions, however, even the 18-39 group still uses cash for 58.3 % of all POS payments (cf. European Central Bank, 2024). This discrepancy suggests that part of the high observed cash usage among younger Austrians is driven not by strong preferences for cash, but by situational factors such as merchant acceptance, transaction size or habit. Younger respondents in Austria appear, on average, more open to paying by card than their diary behavior alone would suggest, but the infrastructure and the existing payment equilibrium still result in a majority of their transactions being settled in cash.

In the 40-54 and 55+ groups, preferences and behavior are more closely aligned in the direction of cash. Cash is preferred slightly more often and used more often. The share of card preference falls, and the share of cash use rises. Other cashless methods remain marginal both in preference and use (cf. European Central Bank, 2024). The group of older Austrians can be characterized as both more cash-attached in their preferences and more cash-dependent in their day-to-day behavior.

The question on the importance of having the option to pay with cash reinforces this. At euro-area level, 62 % of respondents consider it very or fairly important to have the option to use cash, up from 60 % in 2022. More than half of respondents in every euro-area country, including those with predominantly digital behavior, consider this option important (cf. European Central Bank, 2024, p. 40). By demographics, the option to pay with cash is especially important for respondents over 55 and those with upper- or post-secondary education, but it is still important for the majority of the youngest age group (cf. European Central Bank, 2024, p. 41).

Perceived advantages of digital payments

In the questionnaire, respondents could tick up to three main advantages of cash versus cards. Respondents chose: “cash is anonymous and protects my privacy better” (41 %) and “cash makes me more aware of how much I’m spending” (35 %), “cash transactions are immediately settled” (30 %) and “cash is accepted in more situations” (28 %) (cf. European Central Bank, 2024, p. 47).

For card payments, the main advantages are that people do not need to carry cash, (61 %) and that cards are perceived as faster (40 %), easier (36 %) and safer (27 %) to use. 21 % found it useful for budgeting and 19 % of respondents perceived cards as accepted in more situations (cf. European Central Bank, 2024, p. 48).

SPACE 2024 also includes a dedicated question on what would persuade consumers to try new payment solutions. Respondents could choose up to three factors from a list. At euro-area level, 37 % mention higher security standards, 34 % ease of use, 29 % lower costs, 27 % more privacy and 21 % speed. Only 17 % mention incentives such as loyalty programs and 11 % innovative functions. Offline usability is mentioned by 10%, and recommendations by friends and family by 6%. 14 % are not interested in trying new solutions at all (cf. European Central Bank, 2024, p. 49).

The most frequently cited motivations differ somewhat by country (cf. European Central Bank, 2024, p. 50). By demographics, higher security standards are the main factor across genders, age groups and education levels, except among respondents with lower-secondary or less

education, who rank ease of use first. There are no substantial differences between age groups in the relative importance of these factors (cf. European Central Bank, 2024, p. 51).

The Austrian results are generally similar to the euro-area results, but there are some clear differences. Ease of use emerges as the single strongest motivator, selected by 40.8 % of Austrian respondents, and security is nearly as important at 40.4 % (cf. European Central Bank, 2024). These shares are slightly higher than the euro-area averages and suggest that usability and safety of a new payment instrument are especially important to Austrian respondents. Cost considerations remain relevant but are somewhat less influential in Austria than in the euro area at large, with 29.0 % citing lower costs as a motivator compared to 31.7 % in the euro area. Privacy occupies roughly the same relative position in Austria as it does in the euro area: 25.9 % of Austrians state that enhanced privacy would encourage them to try a new payment solution, compared to 27.0 % at the euro-area level.

Other motivations such as faster transactions, incentives, innovative features, or offline functionality show only minor divergence between Austria and the wider euro area. Support for these attributes remains relatively low everywhere, and in Austria they fall within similar ranges to the European averages. One difference that does stand out slightly is the share of respondents who declare that they are not interested in new payment solutions at all. At the euro-area level, this group accounts for 11.7 % of the population, in Austria, the share rises to 15.4 % (cf. European Central Bank, 2024).

Privacy concerns

Privacy concerns in digital payments or banking activities are addressed in a separate question. The response options distinguish between wanting transactions to be more private, worrying about data use for commercial or other purposes without consent, feeling adequately protected, or not making cashless payments at all. At euro-area level, a clear majority of consumers (around 58–60 %) say they are concerned about their privacy when performing digital payments or banking (cf. European Central Bank, 2024, p. 51). Country-level patterns show that more than half of the population in every euro-area country except the Netherlands and Estonia express privacy concerns; in some countries such as Portugal and Spain, about one-third of respondents simultaneously want more privacy and fear misuse of their data. In Austria, 55 % reported having privacy concerns, 41 % did not (cf. European Central Bank, 2024). In Germany, around 7 % report that they do not make digital payments at all – a pattern not seen in other countries (cf. European Central Bank, 2024, p. 51).

The Austrian results are similar to European ones. While concern about data misuse in Austria remains close to the European average at 30.4 %, and the desire for more privacy in digital payments is slightly lower than the euro-area figure at 27.2 %, Austria diverges more strongly

in the share of respondents who express no privacy concerns at all (cf. European Central Bank, 2024). In Austria, 42.4 % of respondents report that they do not have any privacy worries related to digital payments, a proportion substantially higher than the euro-area average. This suggests that many Austrian respondents are relatively comfortable with the current privacy level of digital payments and do not see digital privacy as a major concern. As in the euro area, non-users of digital payments are effectively absent (0 %), so these privacy views mainly come from people who already use digital payments.

Austria remains one of the most cash-oriented countries in the euro area. More than half of all Austrian respondents report that privacy is a central advantage of cash, a figure that is approximately twenty percentage points higher than the euro-area average (cf. European Central Bank, 2024). This strong link between cash and privacy seems to be one reason why cash remains popular in Austria across age groups. Even among younger adults aged 18–39, more than one third prefer to pay in cash when given the choice, while fewer than half prefer card or other cashless methods. Among older adults aged 55 and above, more than 40 % express a preference for cash.

Austrian respondents are much more likely than the euro-area average to perceive privacy as a key advantage of cash. However, they are not significantly more concerned about privacy in digital payments. About 27 % state that they wish digital payments were more private, which is slightly below the euro-area figure, and around 30 % express concerns about misuse of personal data, which is close to the euro-area average (cf. European Central Bank, 2024). At the same time, a relatively large share of Austrians (42 %) report having no privacy concerns about digital payments at all. This suggests that in Austria, cash is valued for privacy in itself, even more than digital payments are rejected because of privacy concerns.

Ease of use for digital payments

Ownership of payment accounts and cards is very high in the euro area: 93 % of respondents have a payment account and 92 % own a payment card, compared with 91 % and 94 % respectively in 2022 (cf. European Central Bank, 2024, p. 61). Differences by age are now very small, after a previous gap for 18–24-year-olds has largely disappeared (cf. European Central Bank, 2024, p. 63). Ownership rates are slightly lower in rural areas than in urban areas, and lower among respondents with only primary or lower-secondary education compared for higher education groups, diverging by around 5 percentage points.

9 % of participants reported owning crypto assets, as opposed to 4 % in 2022 (cf. European Central Bank, 2024, p. 64).

However, a non-negligible group still struggles with digital payments. SPACE 2024 includes, for the first time, a question on whether respondents need assistance when paying online or

with a card or mobile. Across the euro area, 83 % report that they do not need assistance, 9 % say they do, and 3 % say they do not make such payments at all (cf. European Central Bank, 2024, p. 36). The share needing assistance is lowest in the Netherlands (2 %), Luxembourg (4 %), Lithuania and Malta (5 %), and highest in Cyprus (12 %) and Slovenia (11 %). Austria belongs to the group of countries where 10 % of respondents need assistance, together with Belgium, Spain, Portugal and Italy.

By age, the share needing help is highest among the youngest and oldest groups (10 % for 18–24 and 65+) (cf. European Central Bank, 2024, p. 37). Combining those needing assistance with those who do not use digital payments at all into a group, 18% of the 65+ group and 13 % of the 55–64 group either need help or avoid digital payments. Their share in younger age groups is significantly lower. The report interprets this as evidence of digital illiteracy or lack of access to devices among older people and low-income or low-education groups.

Person to person payment preferences

For P2P payments, cash remains the single most used instrument in the euro area, accounting for about 41 % of P2P transactions, followed by cards and mobile apps (33 %), credit transfers (9 %) and instant payments (6 %) (cf. European Central Bank, 2024, p. 21). Preferences for P2P payments are more cash-oriented than POS preferences: on average, 35 % of respondents prefer cash to pay friends or family, 32 % prefer bank transfers, and 24 % prefer mobile or other online payments (cf. European Central Bank, 2024, p. 46). For recurring payments (rent, mortgages, utilities, insurance, subscriptions, etc.), direct debits are clearly dominant, often accounting for around two-thirds of such payments, with credit transfers in second place and cash a marginal instrument (cf. European Central Bank, 2024, p. 38).

In Austria, cash remains the single most used instrument for P2P transactions, accounting for approximately 41 % of all P2P payments (cf. European Central Bank, 2024). This is followed by cards and mobile apps (24 %), credit transfers (17 %), and instant payments (8.5 %). Stated preferences for P2P payments in Austria diverge from actual usage: on average, the largest share of Austrian respondents (approx. 40 %) state they prefer bank transfers to pay friends or family, followed by 33 % who prefer cash, and 16 % who prefer mobile or other online payments (with 11 % having no clear preference).

Aggregating by age

The age-disaggregated results for the euro area show that privacy-related attitudes are relatively homogeneous across age groups, with only modest variation in how different generations evaluate privacy in payments. When examining the data aggregated by age, a clear pattern emerges across the whole euro area and the Austrian sub-sample. The variety in payment behavior between different age cohorts is remarkably small. Payment preferences

remain relatively stable across generations and differences between younger, middle-aged, and older cohorts typically amount to only a few percentage points.

For example: Attitudes towards the privacy of digital payments vary only slightly by age. The preference for more privacy in digital transactions is recorded for 33.1 % of younger adults, 33.0 % in the 40-54 group, and 30.6 % among those aged 55 and above. Concerns about the potential misuse of payment data follow a similarly uniform pattern, with 33.6 % of younger respondents, 33.2 % of middle-aged respondents, and 32.7 % of older respondents reporting this fear (cf. European Central Bank).

One area where age differences are somewhat more visible is the share of respondents who state they have no privacy concerns about digital payments. In the 18-39 age group, 31.8 % report no concerns, rising slightly to 32.5 % among those aged 40-54, and further to 35.8 % in the 55+ group. Older euro-area residents therefore appear marginally more confident in the privacy protections of current digital payment systems, although the differences remain modest.

Taken together, SPACE 2024 provides useful background for a study of digital euro communication. It documents a payments landscape in which digital methods (cards, online payments, mobile) are widespread and growing, especially among younger people and in online contexts, while cash remains central at the POS and for P2P transactions and is valued for privacy and spending control. In Austria specifically, there is a combination of high online payment usage, very strong stated preference for cash at the POS, and a relatively high share of people needing assistance with digital payments. Privacy concerns about digital payments are widespread across the euro area, and higher security, ease of use, low cost and privacy are main factors that could motivate adoption of new payment solutions.

The Austrian data caution against an overly simple narrative that equates “young” with “non-cash users” and “old” with “cash users”. In Austria, cash is still extensively used by younger adults and explicitly preferred by more than a third of them. Young people may be more technologically capable and more likely to have experience with cards and mobile payments, but they are not a purely digital group. At the same time, the Austrian data confirm that younger adults are more inclined than older adults to adopt non-cash instruments and to view them favorably. If a digital euro were introduced alongside cash and cards, younger adults might be early adopters willing to try it, but they would probably still keep using cash.

The Austrian results suggest that a digital euro should be presented as complementing cash instead of as a replacement. This applies to all age groups, but is especially relevant for older cohorts, where both preference and behavior are dominated by cash and where the shift towards card usage is weaker. The high share of “no clear preference between cash and

cashless” among older respondents also hints at potential responsiveness to well-designed communication and design choices. These groups may respond better to a digital euro if it can be framed as offering the convenience and security of a modern digital instrument while preserving some of the perceived advantages of cash, such as privacy and control over spending.

Taken together, the literature suggests that digital-euro adoption is shaped less by one single factor than by the interaction of privacy, trust, usability, and existing payment habits. Privacy appears to function as an important threshold condition, but not necessarily as a sufficient driver of active uptake on its own. By contrast, practical relevance, institutional credibility, and perceived advantages over existing payment instruments seem more decisive for whether users would actually adopt a CBDC. At the same time, the literature says much more about design features and adoption determinants than about how these arguments should be communicated to citizens. This thesis addresses that gap by testing whether two prominent ECB narratives, privacy protection and European payment sovereignty, differ in their ability to increase intended use of the digital euro.

Against this background, the next section turns from broader payment patterns to the specific communication question examined in this thesis.

Hypotheses development

While existing literature documents the theoretical drivers and barriers of CBDC adoption such as privacy concerns, institutional trust and the desire for monetary sovereignty, there is a gap regarding how these factors should be communicated to the general public. In its own communication, the European Central Bank (ECB) has focused on two main narratives. One is the protection of European payment sovereignty against non-European providers. The other is strong privacy protection. It is still not clear which of these institutional messages actually resonates with citizens and increases their willingness to adopt a new legal tender.

To address this gap, this study tests how different informational framings impact citizens' intended use of the digital euro. I designed a between-subjects online experiment simulating a public information campaign, targeting residents of the European Union. Participants were randomly assigned to one of three experimental conditions, each featuring a different digital euro campaign poster: A poster emphasizing European payment sovereignty and independence from international card schemes, a poster emphasizing the digital euro's strong privacy protection features and a baseline poster without a specific thematic message serving as a control condition.

By comparing post-exposure intended use across experimental conditions while controlling for pre-exposure intended use, this study estimates the causal effect of the two communication strategies on intended use of the digital euro. It explores how the two framing effects are moderated by individuals' pre-existing trust in institutions (EU vs. banks) and their specific privacy anxieties (fear of corporate tracking vs. government tracking).

To evaluate the persuasive effect of the two messages, the experiment includes a neutral informational control condition. This “control” poster provides general information about digital payments but does not emphasize either privacy protection or European payment sovereignty. It serves as the reference category against which the effects of the other two experimental treatments are evaluated.

The hypotheses move from the direct framing effects to the mechanisms behind them and then to the conditions under which they may be stronger or weaker and are organised in four blocks. H1 to H3 test the direct persuasive effects of the two communication frames. H4 to H4.2 examine whether these effects work through changes in perceived privacy protection and perceived European data sovereignty. H5 and H6 then test whether surveillance worries condition these effects, while H7 to H10 assess whether trust in EU institutions and banks changes how persuasive the two frames are. This structure moves the analysis from average

treatment effects to underlying mechanisms and, finally, to the conditions under which those effects are stronger or weaker.

The Impact of Privacy Assurances on Digital Euro Adoption

Privacy is repeatedly shown as a decisive factor for the acceptance of CBDCs in current literature. According to the ECB's public consultation, privacy was identified as the single most important concern for both citizens and professionals regarding the potential introduction of a digital euro. This finding is supported by empirical research on other CBDCs; for instance, Tronnier et al. (2024) found that privacy concerns significantly reduced the adoption of the e-CNY in China due to fears of government surveillance, while Wenker (2022) observed similar hesitation regarding the Bahamian Sand Dollar.

The preference for cash in the euro area, and particularly in Austria, that was reported in the SPACE survey is strongly linked to its anonymity (cf. European Central Bank, 2024). Rutter and Morten (2019) emphasize that cash provides a uniquely anonymous alternative that citizens are often unwilling to relinquish. The "option to pay with cash" remains important even for younger demographics, and privacy is cited as the single most important perceived advantage of cash over digital payment methods. The lack of perceived anonymity in digital payments creates a barrier to adoption.

However, the ECB has explicitly stated that the digital euro is designed to mirror the essential qualities of cash, including privacy protection (cf. European Central Bank, 2024). Tronnier et al. (2023) demonstrated that citizens are more willing to adopt CBDCs when they provide clear advantages such as stronger privacy protection. Therefore, I argue that explicitly communicating these privacy-preserving features will alleviate user concerns regarding surveillance and data misuse. If privacy concerns are the main inhibitor of adoption, then reassuring potential users of the digital euro's privacy standards should positively influence their willingness to adopt it.

H1: *Exposure to privacy-framed information will increase the intended use of the digital euro compared to a control group.*

Monetary Sovereignty and Independence from Non-European Providers

European payments still depend heavily on non-European infrastructure. As noted by ECB Executive Board member Piero Cipollone (2024), cross-border and international transactions in Europe depend significantly on large international card schemes, such as Visa and Mastercard. These dominate the infrastructure for such payments, granting them substantial market power over European merchants and banks.

This dependence poses significant strategic risks. The ECB argues that reliance on infrastructures located outside the EU exposes the euro area to risks concerning data protection, operational continuity, and jurisdictional control (cf. Cipollone, 2024). The dominance of these schemes has led to rising merchant service charges, as local European alternatives often fail to reach the necessary scale to compete effectively.

Testing the "sovereignty" framing is plausible because it has become a central pillar of the ECB's official discourse regarding the digital euro (cf. Cipollone, 2024). The project is explicitly framed not just as a technical upgrade, but as a "political statement concerning the sovereignty of Europe" and a necessary measure to "safeguard the role of public money" and reduce dependence on non-European providers.

A digital euro would provide a common settlement layer that fosters competition, potentially lowering transaction costs for merchants and consumers. Huterski et al. (2024) found that distrust in traditional financial institutions can actually increase willingness to adopt a CBDC. Framing the digital euro as a sovereign counterweight to the market power of foreign private providers appeals for users both to economic concerns, such as lower fees, and to distrust of large private providers.

H2: *Exposure to sovereignty-framed information (highlighting independence from non-European providers) will increase the intended use of the digital euro compared to the control group.*

Sovereignty versus Privacy as Adoption Drivers

While privacy is consistently identified as a central concern for citizens, empirical evidence from the SPACE 2024 survey suggests it often functions as a baseline expectation rather than a main driver of active adoption (cf. European Central Bank, 2024). In the hierarchy of motivations to try new payment solutions, privacy ranks significantly below functional attributes such as security and ease of use. In contrast, the "Visa" framing addresses the structural dominance of non-European card schemes, which the ECB identifies as a threat to monetary sovereignty and a source of rising costs for the European economy (cf. Cipollone, 2024). The sovereignty argument addresses practical concerns about economic resilience and reliance on outside providers and thus adds something beyond data protection alone. Therefore, I propose that an appeal to European autonomy will generate a stronger positive effect on usage intentions than an appeal focused solely on privacy.

H3: *The effect on intended use is stronger for the sovereignty framed than the privacy framed poster.*

Mediation Analysis: Cognitive Mechanisms of Information Effects

Based on technology-acceptance theory, the experimental treatments should influence adoption intentions primarily by changing the beliefs and evaluations on which those intentions are based (cf. Davis, 1989, p. 329ff). Users' adoption behavior likely reflects a balance of perceived advantages and barriers. Communication strategies could successfully increase the intended use of a digital euro if they first successfully change beliefs about the digital euro. I hypothesize that the effect of the experimental information treatments on usage intentions is mediated by changes in the specific beliefs of perceived European data sovereignty and perceived privacy protection.

H4: *The effect of the information treatments on intended digital euro use is mediated by changes in specific beliefs regarding data sovereignty and privacy protection.*

The ECB argues that the current dominance of non-European payment providers, such as large international card schemes exposes the euro area to risks concerning operational continuity, jurisdictional control, and data protection (cf. Cipollone, 2024). A digital euro is conceptualized as a way to strengthen Europe's monetary sovereignty and establish an independent public payment instrument. The sovereignty information treatment explicitly highlights these dependencies. I hypothesize that this framing will mainly work by increasing the belief that the digital euro would keep European payment data within Europe. This strengthened belief in data sovereignty is, in turn, expected to drive the increase in usage intention

H4.1: *The sovereignty information increases the intention to use the digital euro by strengthening the belief in European data sovereignty.*

Current research identifies privacy concerns as a main barrier to and a potential driver of CBDC adoption. Tronnier et al. (2023) and the ECB (2021) show that citizens compare CBDCs to existing payment options and are significantly more willing to adopt them when they provide clear advantages, such as stronger privacy protection. The privacy information treatment is designed to address this by emphasizing the digital euro's data protection features. This treatment is expected to work by convincing participants' that the digital euro protects their personal information. Therefore, I hypothesized that the Privacy information increases the intention to use the digital euro by making users more likely to believe that it protects their privacy.

H4.2: *The privacy information increases the intention to use the digital euro by strengthening the belief in privacy protection.*

Moderation by Surveillance Fears

The ECB emphasizes that reliance on foreign private infrastructures such as Visa and Mastercard exposes European consumers to risks regarding data protection, operational continuity, and jurisdictional control (cf. Cipollone, 2024). Because the sovereignty message positions the digital euro as a sovereign, public alternative to private, data-driven networks, its message speaks to worries about companies using payment data for commercial purposes. Therefore, this framing should matter most for individuals who are worried about their data being tracked and monetized by private companies. Because of that, I propose that the fear of corporate tracking will positively moderate the effectiveness of the sovereignty message.

H5: *Worry about corporate-tracking strengthens the sovereignty message.*

Because a retail CBDC is a direct liability of the central bank, it may introduce concerns regarding state overreach. Current research found the fear of government surveillance, lack of anonymity, and data misuse as main barriers to CBDC adoption across different cultural contexts, as seen in studies of both the e-CNY and the digital euro. To address this issue, the privacy message emphasizes the digital euro is built to protect users' privacy. The privacy treatment should be most relevant and have the strongest positive effect on usage intentions among individuals whose main hesitation is the fear of state monitoring. I hypothesized that government-tracking worry will positively moderate the effect of the Privacy message.

H6: *Worry about Government-tracking strengthens the Privacy message.*

The Moderating Role of Institutional Trust

The digital euro is a project initiated and overseen by the European Central Bank, an institution of the European Union. Tronnier et al. (2023) demonstrated that trust in central banks is a factor shaping citizens' attitudes towards a CBDC. For informational treatments to be persuasive, the recipient must believe that the issuing authority can deliver on its promises. If an individual holds high trust in EU institutions, they are more likely to believe the ECB's assurances regarding privacy safeguards. Similarly, they are more likely to value and believe arguments framing the digital euro as a necessary tool for European monetary sovereignty and resilience against foreign market dominance. I hypothesize that trust in EU institutions will positively moderate the effect of both the privacy information and the sovereignty information on digital euro usage intentions.

H7: *The positive effect of the privacy information on digital euro usage intention is positively moderated by trust in EU institutions.*

H9: *The positive effect of the sovereignty information on digital euro usage intention is positively moderated by trust in EU institutions.*

In the current two-layer monetary system, the public interacts almost exclusively with commercial bank money. The digital euro would provide a public alternative to private intermediaries. Hutterski et al. (2024) found that distrust in private financial institutions actually increased consumers' willingness to adopt a CBDC in Germany and France. Individuals who mistrust banks view the CBDC as a safer or more transparent alternative. Applying this to the communication frames, individuals who highly trust commercial banks likely feel adequately protected by the current system, making arguments about the need for enhanced privacy or European independence from private card schemes less urgent or persuasive. Conversely, individuals with low trust in banks should be receptive to messages that present the digital euro as a public alternative to private providers. Therefore, I hypothesize that trust in commercial banks will negatively moderate the positive effects of both the privacy information and the sovereignty information.

H8: *The positive effect of the privacy information on digital euro usage intention is negatively moderated by trust in banks.*

H10: *The positive effect of the sovereignty information on digital euro usage intention is negatively moderated by trust in banks.*

Having derived the hypotheses, the next sections describe the sample, experimental stimuli, variables, and empirical strategy used to test them.

Sample

The data for this study were collected through a standardized online questionnaire created and hosted on SoSci Survey using the free research license provided by the University of Vienna. The survey targeted residents of the European Union (EU), as the research focuses on attitudes and preferences related to European payment methods and the potential introduction of a digital euro. To match the focus of the study, participation was restricted to individuals residing in EU member states.

Data collection relied on a non-probability convenience sampling strategy in combination with online recruitment through two primary channels with an expected overrepresentation of younger, higher-educated EU residents. First, the survey link was distributed personally by me to acquaintances, colleagues, and contacts across various social and professional networks. This initial recruitment phase yielded approximately 90 responses. The participants reached through this method represented a broad age range and diverse educational backgrounds; however, a large part were from Austria, within my personal network and location. For this reason, this subsample is likely to include a comparatively higher share of younger adults and individuals with tertiary education.

In a second step, the questionnaire was uploaded to SurveySwap, an online platform where users exchange survey participation to help one another reach target sample sizes. On this platform, a filter was applied requesting EU residents only, to maintain the study's focus on the European context. This second recruitment phase produced an additional approximately 100 responses. According to the platform's own demographic information, most SurveySwap participants tend to be university students or recent graduates, primarily from the United Kingdom, Germany, and the Netherlands, and are typically in their mid-twenties. (<https://surveyswap.io/buy-credits>, accessed 25.10.2025) This suggests that the total sample will likely lean toward younger, well-educated respondents.

Given the recruitment method, the sample is not representative of the overall EU population. Individuals who are more digitally active and possess higher education levels are likely overrepresented.

The questionnaire was made available in both German and English, allowing respondents to select their preferred language at the beginning of the survey. Participation was entirely voluntary and anonymous, and no financial incentives were provided. Respondents were informed about the general purpose of the study, the approximate duration, and data protection measures before giving informed consent.

Data collection lasted from the 29th of October 2025 until 15th of December 2025.

No upper age limit was applied in this study. The survey was open to all adults living within the European Union, regardless of age, provided they were able to access and complete an online questionnaire. This decision was based on the idea that digital literacy matters more than age alone for using digital payment systems. Any person who is sufficiently familiar with online tools to participate in the survey can also be considered a potential user of a future digital euro.

Of the initial 190 responses collected, 19 participants were excluded from the final analytical dataset ($N = 171$) due to failing a pre-established attention check, completing the survey in an implausibly short amount of time, or providing incomplete responses.

Experimental Stimuli

The experimental stimuli consisted of three posters corresponding to the three study conditions: a neutral control poster, a privacy-framed poster, and a sovereignty-framed poster. I designed all three posters myself. I wrote the text for each poster and assembled the final materials in Canva. For the visual design, I used a color palette loosely oriented toward styles commonly used in financial communication, with reference to materials from the European Central Bank and the Austrian Ministry of Finance. The icons used in the posters were generated with the help of an AI assistant and were then selected and integrated into the final designs by me. The aim was to create materials that were visually coherent across conditions while differing in their substantive message. The final versions of the three posters are reproduced in Appendix A.

Data

Independent variable: Experiment

The between-subject experiment was captured in a categorical unordered variable with three levels, each level indicating which one of three posters the participants were shown. Participants were randomly assigned to one of the experimental conditions: a control poster without a specific message (32.75 %), a poster emphasizing European payment sovereignty in relation to international card schemes (34.5 %), or a poster emphasizing privacy protection (32.75 %).

Dependent variable: Intended use of the digital euro

Participants were asked to rate on a scale of 1 to 7 how likely they are to use the digital euro within the next 12 months if it were available in their country. This question was asked once before exposure to the poster and once post.

Table 1

Variable	N	Mean	SD	Min	Max
Intended Use Pre	171	4.88	1.99	1	7
Intended Use Post	171	5.12	1.74	1	7

Moderators

Privacy concerns and institutional trust

Participants were asked to rate on a scale of 1-7 how much they agreed (not at all - completely) with statements “I worry about my payment data being tracked by private companies” and “I worry about my payment data being tracked by governments” as well as “I trust EU institutions to manage payment systems responsibly” and “I trust banks to manage payment systems responsibly”.

Mediators

Post experiment, I measured people's beliefs in relation to the ads. Perceived privacy protection and perceived European payment data sovereignty were used as mediating variables capturing participants' perceptions of the messages conveyed by the experimental

advertisements. Perceived privacy protection stated in the questionnaire: “Using the digital euro would protect my privacy while paying”, perceived European payment sovereignty stated: “Using the digital euro would help keep Europeans’ payment data within the EU”. Both variables were measured on seven-point Likert scales ranging from “completely disagree” to “completely agree”.

Table 2

Variable	N	Mean	SD	Min	Max
Privacy concern companies	171	4.54	1.81	1	7
Privacy concern government	169	4.47	1.96	1	7
Trust in EU	171	4.82	1.67	1	7
Trust in banks	171	4.98	1.53	1	7
Belief in Privacy protection	171	4.46	1.55	1	7
Belief in Data sovereignty	170	5	1.36	1	7

Controls

Age

Participants’ ages range from 17 to 82 years, with an average age of about 32 years (mean = 32.53, SD = 11.52). Most respondents are young adults, with a clear concentration in the early to late twenties. Around half of the sample is younger than 28 years, and roughly two thirds are under 34 years of age. Older age groups are progressively less represented, although respondents in their forties and fifties are still present in smaller numbers. Very young and very old ages occur only rarely. Overall, the age distribution is skewed toward younger respondents, while still covering a broad span of age groups.

Education

One participant opted not to answer about education, making the sample $N = 170$. The sample was highly educated, which aligns with the recruitment strategy utilized. The largest group holds a Master's, Magister, or Doctorate degree, making up 38.24 % ($n = 65$) of the sample. Another 34.71 % ($n = 59$) have a Bachelor's degree. For those without a university degree, 17.06 % ($n = 29$) completed a General Certificate of Secondary Education, and 7.06 % ($n = 12$) have a secondary school-leaving certificate. Only a very small number of people reported having just an elementary school education (1.76 %, $n = 3$) or leaving school with no qualifications (1.18 %, $n = 2$).

Gender

The majority of the sample consisted of women, with a frequency of 100 participants making up 58.48 %. 69 males made up 40.35 % of the sample and two participants that checked "other" as their gender make up 1.17 %.

Robustness checks

Manipulation check

To check the comprehension of the ads shown, I included true-false questions about the contents of the posters. The comprehension checks were asked after questions about intended use, attitude and mediators ("using the digital euro would protect my privacy when paying" and "Using the digital euro would help keep Europeans' payments data within Europe and lessen dependence on large non-European payment providers").

Each comprehension check consisted of two questions tailored to the individual ad the subject had seen. The subject was only shown the questions corresponding to their experimental group.

Questions consisted of one true and one false statement about the contents of the posters.

Attitude scores

Participants were given semantic pairs to rate to determine their attitude towards the digital euro pre and post experiment. Participants were asked "In my view, the digital euro is...". On a seven-point scale, semantic pairs were: bad-good, unnecessary-useful, privacy-invasive-privacy-preserving, and risky-safe.

An attitude score pre and post combines the results from these items.

Prior to seeing the experimental advertisements, the combined attitude score shows a moderately positive baseline attitude towards the digital euro (mean = 4.50, SD = 1.35). Looking at the individual items, participants generally viewed the digital euro as "good" (mean

= 4.98, SD = 1.50) and "useful" (mean = 4.70, SD = 1.86), while leaning slightly toward "safe" (mean = 4.44, SD = 1.63). However, baseline perceptions regarding privacy were noticeably lower, with the "privacy-invasive versus privacy-preserving" scale receiving the lowest pre-exposure rating (mean = 3.87, SD = 1.43).

Following exposure to the informational posters, the overall attitude index increased across the sample (mean = 4.81, SD = 1.38). This positive shift was reflected across all four individual items. Post-exposure ratings increased for viewing the digital euro as good (mean = 5.09, SD = 1.49), useful (mean = 5.03, SD = 1.69), and safe (mean = 4.73, SD = 1.60). The most substantial increase occurred in the privacy domain, where the mean score for the privacy-preserving item rose to 4.40 (SD = 1.50).

Table 3

Variable	N	Mean	SD	Min	Max
Pre-Experiment					
attitude score	171	4.49	1.35	1	7
bad vs good	171	4.98	1.50	1	7
unnecessary vs useful	171	4.70	1.86	1	7
privacy-invasive vs privacy preserving	171	3.86	1.43	1	7
risky vs safe	171	4.44	1.63	1	7
Post-Experiment					
attitude score post	171	4.81	1.38	1	7
bad vs good	171	5.09	1.49	1	7
unnecessary vs useful	171	5.03	1.68	1	7

privacy-invasive vs privacy preserving	171	4.40	1.50	1	7
risky vs safe	171	4.72	1.60	1	7

Method

Statistical analyses were performed using Stata/SE (Version 19). The significance level was set at $\alpha=.05$ for all tests. Because the primary dependent variables were measured on seven-point scales, they were treated as approximately continuous. All linear regression models were estimated using heteroskedasticity-robust standard errors. Distributions and residuals were inspected as diagnostics, but inference does not rely on exact normality.

Participants were randomly assigned to one of three conditions: a neutral control poster, a privacy-framed poster, or a sovereignty-framed poster. The control poster was designed to provide generic information without emphasizing either of the two main persuasive messages.

Randomization check

Before estimating treatment effects, I checked if the experimental groups were comparable prior to exposure to verify if treatment assignment is independent of potential outcomes. Respondents in the different experimental conditions should not systematically differ in relevant characteristics before treatment.

To assess this assumption, I compared pre-treatment intended use of the digital euro across the three experimental groups (control, Visa ad, and privacy ad). Intended use prior to exposure should be a strong predictor of post-treatment intentions and directly related to the main outcome of interest. If baseline intended use differed across groups, this would raise concerns about imbalance and potential bias in subsequent analyses.

I conducted a one-way analysis of variance (ANOVA) to test whether mean pre-treatment intended use differed by experimental condition. Since the intended use pre test variable is left-skewed, I used the Brown-Forsythe test, a median-centered Levene's test, to verify the assumption of equal variances across groups.

Manipulation check

To verify that participants actively engaged with and understood the experimental stimuli, a comprehension check was administered following the experiment. Participants were presented with two true-false statements tailored to the experimental condition they were randomly assigned. One statement was factually correct, the other one was factually incorrect. Responses were scored as correct or incorrect, and descriptive statistics (frequencies and

percentages) were computed across the three experimental groups to see how clear the message was and whether participants understood it.

Attitude scores

For measuring attitude change as an ancillary robustness check, I combined the semantic differential items (bad-good, unnecessary-useful, privacy-invading - privacy preserving and risky-safe) into an “attitude index”. I checked Cronbach’s Alpha for the items to see if there was sufficient internal consistency. The pre-treatment attitude item yielded a value of 0.8533, the post-treatment attitude item a value of 0.9026.

This was done by getting the row mean. A Cronbach’s Alpha higher than 0.7 suggests sufficient internal consistency, while also not indicating possible redundancy within the items by being lower than 0.95.

Regression

To test H1, H2 and H3 and find the relative effectiveness of the advertisements, I estimated an analysis of covariance (ANCOVA) model. The post-treatment intended use score served as the dependent variable, while the experimental condition served as the independent variable. The pre-treatment intended use was included as a covariate to control for baseline differences and reduce error variance. In the expanded model, I controlled for age, gender and education.

To check if one advertisement worked better than the other (H3), I used a post-estimation Wald test. This test compares the regression coefficients of the sovereignty group and the privacy group directly to see if the difference between them is statistically significant.

Additionally to the primary ANCOVA model, I employed paired-sample t-tests as a complementary within-subject analysis. This way I assessed the specific changes in intended use from pre- to post-treatment within each experimental group. To estimate effect size, I calculated Partial Eta-Squared (η_p^2) to isolate the proportion of variance in intended use post experiment uniquely explained by the advertisements.

Having established the direct treatment effects, the next step examines whether these effects operated through changes in privacy and sovereignty beliefs.

Mediation Analysis

To examine possible reasons for the differences in intended use, I conducted a mediation analysis focusing on two theoretical mechanisms: perceived European data sovereignty and perceived privacy protection. I hypothesized that the information treatments would influence usage intentions by altering specific beliefs. Specifically, I assumed that the sovereignty treatment would increase intentions by enhancing the belief that the digital euro ensures data remains within Europe, while the "Privacy" treatment was expected to operate by strengthening the belief that the digital euro effectively protects personal privacy.

I tested these pathways using ordinary least squares (OLS) regression with robust standard errors to account for potential heteroscedasticity.

First, I regressed each proposed mediator (sovereignty and privacy beliefs) on the experimental condition to test whether the treatments changed the beliefs they were supposed to affect relative to the Control group.

Secondly, I regressed post-treatment intended use on both mediator variables and the experimental condition simultaneously. I included pre-treatment intended use as a covariate in this model to isolate the change in intentions and control for baseline preferences.

Finally, to test the indirect effects of the treatments on intended use via the proposed mediators, I bootstrapped with 5,000 resamples to generate 95 % confidence intervals for the indirect effects.

These mediation models address whether the treatments changed key beliefs on average. The next section asks instead for whom the two messages were more or less effective.

Moderation Analysis

To explore H5 and H6, whether the persuasive power of the information treatments depended on participants' existing attitudes, I ran two moderation analysis where I interacted the experimental conditions (Control, Sovereignty, and Privacy) with two separate types of privacy anxiety: worry about being monitored by private companies and worry about being monitored by the government. For H5, both the sovereignty and privacy group were interacted with concern about tracking by private companies. For H6, both the sovereignty and privacy group were interacted with concern about tracking by governments. This let each concern variable interact with both treatment conditions, although H5 and H6 focused on the interactions described within them.

In the expanded models for both H5 and H6 I added control variables age, gender and education. In every model, I also controlled for participants' baseline likelihood of using the Digital Euro.

Hypotheses H7 to H10 examine whether the effect of the information treatments on digital euro usage intention depends on respondents' trust in key institutions. The underlying assumption is that informational messages about the digital euro do not have the same impact on all individuals, but instead interact with pre-existing levels of institutional trust. Two types of trust were considered: trust in EU institutions and trust in banks. The dependent variable in all models is intended digital euro use post experiment, controlling for baseline intended use.

To test this I estimated two OLS models, one for each moderator. One model used trust in EU institutions as the moderator and included both treatment indicators and both treatment-by-trust interaction terms, allowing simultaneous tests of H7 and H9. A second model used trust in banks in the same way, allowing simultaneous tests of H8 and H10.

For H7, I examined the interaction between the privacy information treatment and trust in EU institutions. A positive interaction effect would indicate that the privacy information increases digital euro usage intention more strongly among respondents who have higher trust in EU institutions. H8 tested whether the effect of the privacy information is negatively moderated by trust in banks. In this model, a negative interaction term would suggest that individuals who trust banks more respond less positively to privacy-related arguments for the digital euro.

H9 examined the sovereignty information, assuming its positive effect is positively moderated by trust in EU institutions. H10 tested if the positive effect of the sovereignty information on digital euro usage intention is negatively moderated by trust in banks.

Moderation effects were evaluated based on the statistical significance and direction of the interaction terms.

Ancillary robustness analysis

As an ancillary robustness check, I estimated a parallel regression model in which post-exposure attitude toward the digital euro was regressed on experimental condition while controlling for pre-exposure attitude, again using robust standard errors. This analysis checks whether the effects of the informational treatments is similar when using a broader composite attitude measure rather than the single-item intended-use measure.

Exploratory analysis of optional open-ended comments

In addition to the closed-ended survey items, respondents could leave optional written comments at the end of the questionnaire. These comments were analyzed as a complementary exploratory qualitative content analysis. Across the 171 completed cases, 40 respondents provided at least one non-empty comment, yielding 92 comment entries across the three open fields. After screening out 12 obvious non-answers such as “no”, “-”, “yes”, or “idk”, 80 interpretable entries remained. These were read line by line and separated into substantive comments concerning the digital euro, payment behaviour, or reasons for use and non-use, and meta-comments about the questionnaire or poster material. The substantive comments (67 entries) were then grouped into recurring themes, including usefulness and ease of use, limited added value, privacy, security, and European payment sovereignty. Because respondents could comment in more than one field and some entries mentioned several issues at once, the coding was thematic and non-exclusive; the reported theme counts therefore refer to coded comment entries rather than unique respondents.

Results

Pre-Tests

Randomization Check

I compared baseline intended use of the digital euro across experimental conditions to assess whether randomization produced comparable groups prior to exposure. A one-way analysis of variance shows no statistically significant differences in pre-treatment intended use between the control, sovereignty, and privacy conditions ($F = 0.11$, $p = 0.8917$).

The Brown-Forsythe test suggests that the assumption of equal variances across groups is not violated ($p = 0.429$).

The results show that average baseline intentions were very similar across groups: the control group reported a mean of 4.98, the sovereignty group 4.86, and the privacy group 4.80 on the seven-point scale.

Manipulation check

Comprehension of the advertisement content varied across experimental conditions. In the control condition, respondents showed a high level of understanding overall. 49 out of 56 participants (87.5 %) correctly identified the true statement, while 40 out of 56 participants (71.43 %) correctly rejected the false statement, indicating that most participants grasped the core content, although rejecting incorrect information was somewhat more challenging.

In the privacy-framed condition, comprehension was noticeably weaker. While 45 out of 56 respondents (80.36 %) answered the true statement correctly, correct responses to the false statement dropped to 38 out of 56 participants (67.86 %), meaning that nearly one third of participants failed to reject an incorrect claim.

Comprehension was strongest in the sovereignty-framed condition. Here, 50 out of 59 (84.75 %) respondents correctly answered the true statement, and 49 out of 59 participants (83.05 %) correctly identified the false statement as incorrect.

Participants who failed to correctly identify the true or false statements were nevertheless retained in the final analytical sample to preserve sample size and reflect realistic, real-world engagement with informational materials.

Hypotheses testing

This section examines whether exposure to different advertising frames affected respondents' intended use of the digital euro. Twelve hypotheses were tested.

Main regression results

To test hypotheses H1, H2 and H3, post-treatment intended use was regressed on experimental condition, controlling for baseline intended use. All models were estimated using heteroskedasticity-robust standard errors. Baseline intended use was included as a covariate to account for pre-existing differences in willingness to use the digital euro.

To test the hypotheses that exposure to specific information types (sovereignty vs. Privacy) alters participant intended use of a digital euro, I conducted an Analysis of Covariance (ANCOVA).

The regression model showed a strong fit to the data, explaining 72.1 % of the variance in post-treatment intended use ($R^2 = 0.721$, $F(3,167) = 106.67$, $p < 0.001$). As anticipated, participants' pre-existing intended use was the strongest predictor of post-treatment intended use ($b = 0.737$, $SE = 0.04$, $p < 0.001$). Exposure to the sovereignty-framed advertisement significantly increased intended use compared to the control group ($b = 0.41$, $SE = 0.17$, $p = 0.017$). In contrast, the Privacy-framed advertisement did not significantly affect intended use relative to the control condition ($b = 0.06$, $SE = 0.18$, $p = 0.744$).

The ANCOVA yields the following linear equation for predicting post-exposure intended use:

$$\text{Intended use}_{\text{post}} = 1.366 + 0.737(\text{Intended use}_{\text{pre}}) + 0.407(\text{sovereignty}) + 0.060(\text{Privacy})$$

$$\widehat{\text{Intended use}_{\text{post}}} = 1.366 + 0.737(\text{Intended use}_{\text{pre}}) + 0.407(\text{sovereignty}) + 0.060(\text{Privacy}) + \varepsilon$$

Pre-treatment intended use accounts for the vast majority of the variance ($\eta_p^2 = 0.718$). The partial eta-squared for the experimental group variable was $\eta_p^2 = 0.037$. While this indicates a small-to-medium effect size in isolation, it still represents a shift given how stable the participants' baseline opinions were.

Adding controls

I extended the ANCOVA by controlling for baseline intention, age, gender, and education. The adjusted model demonstrated a very strong fit to the data, explaining approximately 73.5 % of the variance in post-treatment intended use ($R^2 = 0.735$, $F(6,163) = 61.49$, $p < 0.001$).

Consistent with the previous model, participants' pre-existing intended use remained the dominant predictor of their post-treatment intended use ($b = 0.702$, $p < 0.001$).

The results revealed positive, but just short of the conventional 5 % threshold effect of the sovereignty framing compared to the control group ($b = 0.33$, $SE = 0.17$, $p = 0.053$). In contrast, the privacy framing showed no significant effect ($b = 0.01$, $SE = 0.18$, $p = 0.938$). Among the control variables, only education was a significant predictor ($b = 0.29$, $SE = 0.12$, $p = 0.022$), suggesting that higher education levels are associated with stronger adoption intentions.

Table 4. Main ANCOVA Results Predicting Post-Treatment Intended Use

Predictor	Model 1: Baseline-adjusted	Model 2: With controls
Sovereignty frame	0.407** (0.173)	0.327* (0.168)
Privacy frame	0.060 (0.176)	0.014 (0.181)
Pre-treatment intended use	0.737*** (0.036)	0.702*** (0.049)
Gender	—	-0.148 (0.135)
Age	—	0.002 (0.006)
Education	—	0.287** (0.124)
Constant	1.366*** (0.217)	0.981** (0.452)
Observations	171	170
R-squared	0.721	0.735

Note. Entries are regression coefficients with standard errors in parentheses. The dependent variable is post-treatment intended use of the digital euro. The model controls for pre-treatment intended use. The control condition is the reference category. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

The ANCOVA yields the following linear equation for predicting post-exposure intended use based on the demographic-adjusted model:

$$\widehat{Intended\ use_{post}} = 0.98 + 0.70(Intended\ use_{pre}) + 0.29(Educ) - 0.15(Gender) + 0.002(Age) + 0.327(Sovereignty) + 0.014(Privacy) + \varepsilon$$

The coefficients for age ($b = 0.002$) and gender ($b = -0.148$) were included in the calculation. However, they were not significant.

When introducing demographic controls into the model, the experimental condition's effect size decreased from a partial eta-squared of 0.037 to 0.028. Education shows an effect size of 0.037 that slightly exceeded the magnitude of the experimental manipulation itself. Age and gender had negligible effect sizes of partial eta-squared < 0.01 .

H1 was not supported. The privacy condition did not differ significantly from the control group. H2 was supported only in the baseline-adjusted model. After demographic controls were added, the sovereignty coefficient remained positive but no longer reached the 5 % significance threshold.

Direct comparison between sovereignty and privacy frames

To test H3, whether the sovereignty-framed advertisement had a stronger effect than the privacy-framed advertisement, I conducted a formal equality test comparing the two treatment coefficients after the main ANCOVA test. The baseline-adjusted model controlled for intended use pre-experiment. $F(1,167) = 4.17$, $p = 0.0427$.

The joint significance of the experimental manipulation was assessed using Wald tests based on the robust variance estimator. The treatments are jointly significant ($F(2,167) = 3.56$, $p = 0.0306$).

In the second model where I controlled for age, gender and education level, a direct comparison of the two treatment conditions shows a marginal pattern: the null hypothesis of equal coefficients cannot be rejected at the 5 percent level ($F(1,163) = 3.67$, $p = 0.0573$).

For the Wald test in the second model, the experimental condition does not reach joint significance level. The test of the two EX01 dummy coefficients yields $F(2,163) = 2.66$ with $p = 0.0732$. The experimental treatments are jointly insignificant at the 5 percent level, though marginally significant at the 10 percent level.

Table 5. Baseline ANCOVA Results Predicting Post-Treatment Intended Use

Predictor	Intended use
Sovereignty frame	0.407** (0.173)
Privacy frame	0.060 (0.176)
Intended use before treatment	0.737*** (0.036)
Constant	1.366*** (0.217)
Observations	171
R ²	0.721

Note. Entries are regression coefficients with standard errors in parentheses. The dependent variable is post-treatment intended use of the digital euro. The model controls for pre-treatment intended use. The control condition is the reference category. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

H3 received support in the baseline-adjusted model, but the coefficient difference fell below 5 % significance after demographic controls were added.

Within-group pre–post comparisons

As a complementary descriptive analysis, I conducted paired t-tests to examine changes in intended use within each experimental group.

In the control group, there is no significant difference between pre- and post-treatment intended use (mean difference = 0.05, $p = 0.68$).

In the privacy group, intended use increased slightly on average (mean difference = 0.16), but this change is not statistically significant ($p = 0.28$).

In the sovereignty group, intended use increased substantially from pre- to post-treatment (mean difference = 0.49, $p = .001$).

These comparisons are descriptive and should not be interpreted independently of the ANCOVA results.

Table 6

Experimental Condition	Pre-Test Mean (SD)	Post-Test Mean (SD)	Difference	p-value
Control	4.98 (1.78)	5.03 (1.81)	+0.054	0.68
Sovereignty	4.86 (2.13)	5.36 (1.61)	+0.49	0.0012**
Privacy	4.80 (2.08)	4.96 (1.81)	+0.160	0.28

Mediation Analysis

I tested H4, H4.1 and H4.2 using ordinary least squares (OLS) regression with robust standard errors to account for potential heteroscedasticity.

H4.1 examined whether the experimental manipulations caused stronger beliefs in European data sovereignty ($F(3, 166) = 14.58, p < 0.001$). The model accounted for 23.6 % of the variance ($R^2 = 0.236$). As expected, prior likelihood to use the digital euro was a strong, positive predictor of sovereignty beliefs ($b = 0.31, SE = 0.05, p < 0.001$). The sovereignty condition produced a positive effect but was not significant at the 5 % mark ($b = 0.43, SE = 0.23, p = 0.060$). The Privacy condition showed no meaningful deviation from the control group on this dimension ($b = -0.031, SE = 0.24, p = 0.896$).

I incorporated demographic variables (age, gender, and education level) in a second model. The overall model remained highly significant ($F(6, 162) = 7.27, p < 0.001, R^2 = 0.242$) but still only accounted for 24.2 % of variance. None of the demographic variables emerged as significant predictors of sovereignty beliefs (all $p > 0.29$). While the coefficient for the sovereignty treatment remained relatively stable in magnitude ($b = 0.35, SE = 0.23$), after adding demographic controls, the sovereignty effect moved further away from the 5 % significance level ($p = 0.120$).

H4.2 tested the effectiveness of the treatments in changing perceived privacy protection ($F(3, 167) = 12.85, p < 0.001$) The model explained 19.8 % of the variance in privacy perceptions

($R^2 = 0.198$). Prior likelihood to use the digital euro was a strong and highly significant predictor of perceived privacy ($b = 0.34$, $SE = 0.06$, $p < 0.001$). Even after accounting for these pre-existing adoption intentions, both the privacy condition ($b = 0.26$, $SE = 0.27$, $p = 0.34$) and the sovereignty condition ($b = 0.40$, $SE = 0.25$, $p = 0.11$) failed to exert a significant effect on privacy beliefs.

Including demographic covariates (age, gender, and education) overall produced a significant model ($F(6, 163) = 6.27$, $p < 0.001$, $R^2 = 0.201$), yet none of the included demographic variables significantly predicted privacy perceptions (all $p > 0.47$). Across both models, the experimental treatments failed to reach statistical significance.

Testing the Path to Intention

To figure out whether these specific beliefs really predict whether someone will adopt the digital euro, I expanded the basic ANCOVA model. Regressing people's usage intentions using the two mediator variables and the experimental condition yielded a highly significant result ($F(5, 164) = 124.97$, $p < 0.001$).

This model explained a large amount of the differences in usage intentions across individuals ($R^2 = 0.76$). Pre-treatment intention was still the strongest predictor of post-treatment behavior ($b = 0.63$, $p < 0.001$). However, both European data sovereignty ($b = 0.18$, $p = 0.015$) and privacy protection ($b = 0.14$, $p = 0.036$) were also significant and independent predictors of usage.

A bootstrap analysis with 5,000 resamples confirmed that the indirect effect of the sovereignty information condition on usage intentions through perceived European data sovereignty was not statistically significant (Indirect Effect = 0.077, 95 % CI [-0.026, 0.181]). Similarly, the indirect effect of the Privacy information condition on usage intentions through perceived privacy protection was also not significant (Indirect Effect = 0.041, 95 % CI [-0.043, 0.124]).

Adding the standard control variables to the mediation model yielded consistent results; the bootstrapped indirect effect for the sovereignty condition failed to reach statistical significance (Indirect Effect = 0.060, 95% CI [-0.033, 0.153]), the same for the privacy treatment (Indirect Effect = 0.031, 95% CI [-0.048, 0.111]).

H4, H4.1 and H4.2 are not supported. The indirect effects through the two proposed mediators were not statistically significant.

Moderation analysis

Surveillance worries (H5 and H6)

When looking at concerns about corporate surveillance, I estimated the interaction between the experimental conditions and participants' baseline worry regarding corporate tracking with pre-treatment likelihood of using the digital euro as a covariate. The model had a highly significant overall fit ($F(6, 164) = 58.95, p < 0.001$) that explained 73.3 % of the variance in usage intentions ($R^2 = 0.733$). As expected, prior usage intention was a notable predictor of post-treatment intention ($b = 0.73, SE = 0.05, p < 0.001$). The interaction between the sovereignty treatment and corporate tracking concerns proved statistically significant ($b = 0.25, SE = 0.10, p = 0.011$), indicating that the sovereignty-framed message became more effective as concern about private-company tracking increased. The Privacy treatment interaction remained non-significant ($b = 0.17, SE = 0.12, p = 0.171$).

Adding control variables (age, gender, and education) showed that the overall model predicting usage intentions was highly significant ($F(9,160) = 44.64, p < 0.001$) and explained 74.8 % of the variance. The interaction between the sovereignty treatment and worries about private company tracking remained highly significant and slightly increased in magnitude ($b = 0.265, SE = 0.09, p = 0.005$). By contrast, the Privacy information treatment still did not show a statistically significant interaction with corporate concerns ($b = 0.173, SE = 0.12, p = 0.147$). Higher education levels again emerged as a significant positive predictor of post-experiment usage intentions ($b = 0.28, SE = 0.12, p = 0.023$).

H5 is supported because high concerns about corporate surveillance significantly increased the persuasiveness of the sovereignty argument.

Using fear of government surveillance as a moderator, the interaction pattern changed. Model 1 tested with pre-experiment intended use as a control variable was highly significant ($F(6,162) = 63.15, p < 0.001, R^2 = 0.75$), the interaction between the sovereignty treatment and concern about government surveillance was not statistically significant ($b = 0.139, SE = 0.092, p = 0.132$). In the same way, the interaction for the Privacy treatment stayed non-significant and was very close to zero ($b = -0.033, SE = 0.094, p = 0.725$).

Controlling for age, gender and education produced a highly significant result ($F(9,158) = 48.08, p < .001, R^2 = 0.76$). The addition of demographic parameters caused the main negative effect of government surveillance concerns to become statistically significant ($b = -0.13, SE = 0.06, p = 0.032$). The interaction between the sovereignty treatment and concern about government surveillance became marginally significant ($b = 0.170, SE = 0.089, p = 0.057$).

However, the interaction for the Privacy treatment remained non-significant and close to zero ($b = 0.002$, $SE = 0.090$, $p = 0.986$). Education also remained a significant positive predictor ($b = 0.23$, $SE = 0.11$, $p = 0.036$).

H6 is not supported because fears of government surveillance failed to make the Privacy argument more effective.

Trust in EU institutions (H7 and H9)

H7 and H9 examined the respective information treatments effects being moderated by trust in EU institutions.

The overall model was highly significant ($F(6,164) = 70.02$, $p < 0.001$) and explained a substantial proportion of the variance in usage intentions ($R^2 = 0.736$). As expected, pre-treatment intention was the strongest predictor of post-treatment intention ($b=0.69$, $SE = 0.05$, $p < 0.001$).

Independently of the experimental treatments, trust in EU institutions was a significant positive predictor of intended use of a digital euro ($b = 0.21$, $SE = 0.10$, $p = 0.030$).

Hypothesis 7 predicted that the positive effect of the privacy information on digital euro usage intention would be positively moderated by trust in EU institutions. The interaction term between the privacy condition and trust in EU institutions was not statistically significant ($b = -0.09$, $SE = 0.12$, $p = 0.431$). Contrary to the hypothesis, the coefficient was negative, though statistically indistinguishable from zero.

Hypothesis 9 predicted that the positive effect of the sovereignty information would be positively moderated by trust in EU institutions. The interaction term between the sovereignty condition and trust in EU institutions was not statistically significant ($b=-0.13$, $SE=0.11$, $p=.272$). The coefficient was negative, but it was not statistically significant, so the data does not support a clear moderation effect.

Model 2 controlled for age, gender, and education level. The adjusted model demonstrated an excellent fit to the data ($F(9,160) = 52.68$, $p < .001$), explaining approximately 75 % of the variance in post-treatment intention ($R^2 = 0.7495$). This represents a slight improvement compared to the baseline adjusted model ($R^2 = 0.736$).

Among the demographic controls, education level emerged as a statistically significant predictor of intended use ($b = 0.30$, $SE = 0.12$, $p = 0.018$), while neither age ($p = 0.529$) nor

gender ($p = 0.275$) were significant predictors. Consistent with the initial analysis, institutional trust remained a significant positive predictor of intended use ($b = 0.20$, $SE = 0.09$, $p = 0.023$).

The addition of covariates did not alter the conclusions regarding the moderation hypotheses. The interaction between the privacy treatment and trust remained statistically non-significant ($b = -0.09$, $p = 0.442$). The interaction between the sovereignty treatment and trust also remained non-significant ($b = -0.13$, $p = 0.248$).

H7 was not supported. Although trust in EU institutions was a significant positive predictor of digital euro adoption overall, it did not significantly strengthen the effect of the privacy-framed information on intended use.

H9 was not supported. Trust in EU institutions did not significantly strengthen the effect of the sovereignty-framed information on intended use.

Trust in banks (H8 and H10)

Hypotheses 8 and 10 examined whether the respective information treatments were moderated by participants' trust in banks.

The model showed a strong fit to the data ($F(6,164) = 56.21$, $p < .001$), explaining approximately 73.3 % of the variance in usage intentions ($R^2 = 0.733$). Baseline intention remained the dominant predictor ($b = 0.72$, $p < .001$).

The analysis revealed a significant positive main effect of trust in banks ($b = 0.22$, $SE = 0.10$, $p = 0.022$). This indicates that, for the control group (the reference category), higher trust in banks is associated with a higher intention to use the digital euro.

Hypothesis 8 predicted that the effect of the privacy information would be negatively moderated by trust in banks. The interaction term between the Privacy condition and Trust in Banks was negative but not statistically significant ($b = -0.13$, $p = 0.374$).

Hypothesis 10 predicted that the effect of the sovereignty information would be negatively moderated by trust in banks. The interaction term between the sovereignty condition and trust in banks was statistically significant and negative ($b = -0.24$, $SE = 0.12$, $p = 0.044$).

The negative interaction coefficient indicates that as trust in banks increases, the positive effect of the sovereignty treatment on usage intention decreases. The sovereignty treatment was significantly more effective among respondents with lower trust in banks. The main effect of the sovereignty treatment ($b = 1.66$, $p = 0.013$) represents the theoretical effect when trust in banks is zero.

For H8 and H10, too, a second regression model was estimated including demographic control variables: age, gender, and education level.

The fully adjusted model demonstrated a strong fit to the data ($F(9,160) = 42.80$, $p < .001$), explaining approximately 74.4 % of the variance in usage intentions ($R^2 = 0.7444$).

Among the demographic covariates, education level was again a significant positive predictor ($b = 0.30$, $SE = 0.12$, $p = 0.016$). This indicates that individuals with higher education are generally more inclined to use the digital euro. In contrast, neither age ($p = 0.942$) nor gender ($p = 0.504$) showed any significant relationship with intended use in this model.

When controlling for demographics, the main effect of trust in banks became marginally significant ($b = 0.21$, $SE = 0.11$, $p = 0.051$). The interaction between the privacy treatment and trust in banks remained statistically non-significant ($b = -0.13$, $SE = 0.15$, $p = 0.383$). The interaction between the sovereignty treatment and trust in banks, which was significant in the unadjusted model ($p = .044$), shifted below significance in the adjusted model ($b = -0.23$, $SE = 0.13$, $p = 0.073$).

H8 was not supported. Trust in banks did not significantly weaken the effect of the privacy-framed information on intended use in either the baseline-adjusted or the demographic-adjusted model.

H10 was supported in the baseline-adjusted model, but not after demographic controls were added.

Robustness

Attitude scores

As an ancillary robustness check, attitudes toward the digital euro were measured using four semantic differential items both before and after exposure to the advertisement. The items showed high internal consistency at both time points (pre-ad: Cronbach's $\alpha = 0.85$; post-ad: $\alpha = 0.90$) and were therefore combined into an overall attitude score by averaging responses across items.

I regressed post-exposure attitude toward the digital euro on the experimental condition, while controlling for pre-exposure attitude and using robust standard errors. The model explained a large share of the variation in post-exposure attitudes ($R^2 = 0.798$, $F(3, 167) = 238.27$, $p < 0.001$). Pre-exposure attitude was by far the strongest predictor of post-exposure attitude ($b = 0.916$, $SE = 0.035$, $p < 0.001$), showing that attitudes were highly stable. Compared to the

control group, the sovereignty-framed advertisement was associated with a small but statistically significant increase in post-exposure attitude ($b = 0.233$, $SE = 0.118$, $p = 0.049$). In contrast, the privacy-framed advertisement did not significantly affect attitudes ($b = 0.146$, $SE = 0.111$, $p = 0.192$).

Table 7. Ancillary Regression Predicting Post-Ad Attitude toward the Digital Euro

Predictor	Attitude toward the digital euro (post-ad)
Sovereignty frame	0.233* (0.117)
Privacy frame	0.146 (0.118)
Attitude toward the digital euro (pre-ad)	0.916** (0.036)
Constant	0.563** (0.184)
Observations	171
R-squared	0.80

Note. Entries are regression coefficients with standard errors in parentheses. The dependent variable is post-ad attitude toward the digital euro. The control condition is the reference category for the experimental treatment. * $p < .10$, ** $p < .05$, *** $p < .01$.

Discussion

The central finding of this study is that not all public narratives about a digital euro are equally persuasive, and the experiment shows this clearly. The sovereignty-framed message increased intended use of the digital euro relative to the control condition, while the privacy-framed message did not. The neutral control poster itself was basically inert and did not really move responses. The direct comparison between the two treatments also favored the sovereignty frame in the baseline-adjusted model, although this difference became weaker once demographic controls were added. Across all models, pre-treatment intended use remained the strongest predictor of post-treatment intended use, which suggests that baseline attitudes were highly stable. The within-group comparisons and the ancillary robustness check using the broader attitude index showed the same basic pattern: only the sovereignty condition produced a clear positive shift, while the control and privacy conditions did not. Both perceived European data sovereignty and perceived privacy protection were positively related to intended use, but the treatments did not shift these beliefs strongly enough to produce significant indirect effects. The results suggest that communication can move intended adoption, but in this sample it mainly did so when the digital euro was framed as a European response to dependence on large non-European payment providers rather than as a privacy-enhancing payment instrument.

At the same time, the findings also show how difficult it is to shift digital-euro attitudes through just one single information exposure. One possible explanation for this finding could be that the sovereignty message was simply easier to understand and also more concrete than the privacy message. The manipulation checks seem to point in this direction, since comprehension was highest in the sovereignty condition and lowest in the privacy condition. This is not unimportant. A message which points to a clear external problem, namely Europe's dependence on foreign payment schemes and infrastructures, and then presents the digital euro as a practical institutional answer, gives respondents a clearer problem-solution structure. The privacy message, by comparison, is more abstract and maybe harder to grasp in a short format. This also fits with the research done so far, where the ECB's own justification for the digital euro is strongly connected to payment sovereignty, resilience and the role of public money in a more digital payments system. Translated into a short and understandable message this framing could work well.

This interpretation makes sense when it is placed into the broader payment context discussed in this thesis. SPACE 2024 shows that online and digital payments are growing quite strongly in the euro area, while cash still remains very important at the point of sale. Austria is a particularly interesting case here, because it combines relatively high online-payment use with

the strongest cash preference at the POS in the euro area. At the same time, cash is still strongly associated with privacy and control. In such a context, the sovereignty narrative may work because it mainly speaks to the digital side of everyday payments, meaning cards, apps and platform infrastructures, without directly challenging the symbolic role of cash. In this sense, the digital euro is presented as a European public alternative in payment situations where cash is less dominant anyway, not as a replacement for cash.

The weak result for the privacy frame is better read as a failure of the message than as evidence that privacy is not important. In fact, the mediation analysis points more in the opposite direction. Both perceived European data sovereignty and perceived privacy protection were significant and independent predictors of intended use. What did not work was the treatment itself, because it did not manage to shift these beliefs enough. The sovereignty poster only marginally increased sovereignty beliefs, while the privacy poster did not significantly increase privacy beliefs at all. Accordingly, the indirect effects were also non-significant. Put simply, this means that the underlying beliefs do matter, but the privacy message as it was operationalized in this experiment was not really able to change them. Privacy may therefore function less as a persuasive distinguishing feature and more as a kind of baseline expectation, or also a baseline doubt, which respondents already bring with them into the experiment.

Previous studies repeatedly identify privacy as an important driver of CBDC attitudes, but at the same time also as an important source of skepticism. The ECB consultation, studies on the e-CNY and research on the Sand Dollar all suggest that privacy concerns can reduce adoption when users fear surveillance or do not trust anonymity claims. In a cash-oriented context such as Austria, this may be even harder to address rhetorically, because privacy is already strongly associated with cash. A digital instrument issued by the central bank therefore seems to face a credibility problem. Even when privacy is important to people, they may still not easily believe that a digital public payment system can offer the same privacy properties they associate with cash. In this sense, the privacy message may have failed exactly because the issue is important and contested, and not because respondents do not care about it.

In the moderation analyses, concern about tracking by private companies significantly strengthened the sovereignty frame, whereas the privacy frame did not become more persuasive among those respondents who were most worried about either corporate or government surveillance, suggesting that the sovereignty treatment did not mainly work as a general pro-Europe cue, but more as an anti-corporate sentiment. It seems to have activated a more specific concern about large foreign payment companies and how they use data. In contrast, the privacy treatment did not really manage to reassure the most skeptical

respondents. There was an asymmetry between corporate and government surveillance: The digital euro could apparently be framed as a protection against private platform power, but this does not automatically reassure people whose stronger concern is state monitoring. Because the digital euro is a public liability, these respondents may see the public provision itself as part of the problem and not necessarily as the solution.

The results on institutional trust point in a similar direction. Trust in EU institutions positively predicted intended use directly, but it did not moderate either treatment. This suggests that institutional confidence generally increases openness towards a European CBDC, but it does not really change which narrative is more persuasive. Trust in banks showed a more interesting pattern. On the one hand, it predicted higher baseline openness. On the other hand, it weakened the sovereignty treatment, which was strongest among respondents with lower trust in banks and became weaker once trust in banks increased. This interaction was only marginally significant once demographic controls were added but the substantive pattern is clear enough. The sovereignty frame seems to appeal most to respondents who are more skeptical of the existing financial status quo. This fits well with Huterski et al. argument that distrust in banks can make CBDCs appear more attractive as a public alternative. The repeated significance of education in the adjusted models suggests that openness to the digital euro in this study was related more to education and people's ability to process the information than to age or gender.

People probably will not adopt a digital euro by principle alone. León et al. show that an rCBDC without attractive design features or stimulus policies diffuses only slowly, while Bhensook et al. and Morales-Resendiz et al. emphasize incentives, usability and ecosystem design in actual or pilot settings. Although this experiment did not test design features directly, the results still suggest that messages work better when they connect the digital euro to a concrete problem participants recognize.

Exploratory evidence from the optional open comments

The optional open comments add a small but useful layer of context to the experimental results. They should be read cautiously, because they are voluntary and post-treatment, but they help clarify how some respondents understood the digital euro and why particular messages may have been more or less persuasive. Overall, the comments suggest that respondents evaluated the digital euro mainly by concrete usefulness, added value relative to existing methods, privacy, and operational trust (See Appendix C).

The largest cluster of comments concerned conditional usefulness and ease of use. Respondents repeatedly stated that they would only consider the digital euro if it were practical,

easy to use, simple to set up, and integrated into payment routines they already know. Some explicitly referred to familiar interfaces such as mobile wallets or services like Revolut or Google Wallet, while others stressed that the digital euro would need to be accepted widely in shops, online, and ideally across borders. A few respondents also mentioned discounts, lower costs, or specific use cases as reasons to try it. These comments suggest that people are unlikely to adopt the digital euro just because it is backed by a public institution. Respondents often asked, in effect, what concrete problem the digital euro would solve for them.

At the same time, a substantial group of comments pointed to limited added value compared with existing payment options. Some respondents wrote that debit cards, credit cards, mobile wallets, or cash were already “enough”, or that they did not see why they would need “one more” payment method. Others said they might try the digital euro out of curiosity, but not because they felt any strong practical need for it.

Privacy and anonymity remained highly important, but mainly as a source of concern rather than as a straightforward positive selling point. Comments referred to being “tracked”, to state surveillance, to corporate data access, and to the fear that the digital euro might not be as anonymous as cash. Some respondents stated that the digital euro would need to be “more anonymous than card payment”, while others linked their hesitation to broader concerns about privacy, democracy, or state control. Privacy clearly mattered to respondents, yet the privacy-framed poster did not significantly raise intended use. The comments suggest that privacy matters less as a selling point and more as a basic condition users want to see met before they would seriously consider using the digital euro. Several remarks also combined privacy with convenience, implying that privacy protections alone would not be enough unless the instrument were also easy to use.

A closely related cluster concerned security, reliability, and implementation risks. These comments reinforce a theme already present in current research, that adoption depends on trust in the idea, but also on trust in the payment experience. Respondents mentioned hacker attacks, technical failures, weak infrastructure, merchant non-acceptance, and general doubts about whether the system would be reliable in practice. Some also referred to administrative effort, bureaucratic burden, or time-consuming setup. One isolated comment also pointed to disability and poverty as possible barriers, suggesting that accessibility and inclusion may matter for at least some users.

A smaller group of comments focused on European payment sovereignty. These respondents described the digital euro positively as an “alternative to Visa, PayPal and co.” or as a way to reduce dependence on US-based payment providers. Most of these comments came from respondents who had seen the sovereignty-themed poster. That pattern should not be

overinterpreted, since the comments were post-treatment and self-selected, but it does suggest that the sovereignty narrative offered some respondents a more concrete and recognizable reason to care about the digital euro than a general privacy reassurance did. This also fits the moderation results, where the sovereignty effect was stronger among participants who were more concerned about corporate tracking and weaker among those with higher trust in banks.

One set of comments asked for clearer practical information before respondents would consider adoption. Some wanted more technical explanation, others wanted clearer information about the actual difference between the digital euro and ordinary digital bank money, and some wanted to see that the system had proved itself in practice before trusting it. This helps interpret the null mediation results and why respondents' prior views changed very little. If respondents still did not clearly understand what the digital euro would actually do differently, a single poster was unlikely to change their beliefs.

The open comments help interpret the quantitative pattern, but they also highlight the practical and methodological boundaries of the present study. The next section therefore turns to the main limitations.

Limitations

The findings of this study should be interpreted in light of several limitations. First, the study is based on a non-probability convenience sample of 171 respondents, who were recruited through personal networks and SurveySwap after exclusions. The sample is relatively young, highly educated and likely somewhat more digitally active than the broader EU population. This clearly limits the external validity of the study. It may also have reduced the treatment effects, since such a sample may already be more familiar with digital payment environments, while groups with stronger access barriers, stronger cash dependence or stronger institutional distrust are underrepresented. In addition, the rather modest sample size limits statistical power, especially for the interaction models. This can be seen in several results which are significant in the baseline-adjusted models, but become only marginally significant once controls are added. For this reason, the subgroup findings are analytically interesting, but they should be understood as rather suggestive than definitive.

Another limitation is that the dependent variable in this study is intended use and not actual payment behavior. This is an important distinction, especially in a field where habits, merchant acceptance, convenience and the actual interface design matter a lot. A respondent may say that they would be willing to use the digital euro, but still not adopt it once real trade-offs, onboarding requirements or limited acceptance points become relevant. Related to this, the intervention in the experiment was only a single and brief poster exposure. In reality, public communication by the ECB would probably be repeated, spread across different channels and embedded in a broader institutional rollout. The weaker comprehension of the privacy poster is also important in this regard. Some of the null findings, especially the failure of the privacy frame and the absence of mediation, may partly be explained by the difficulty of changing already firmed beliefs through one short and relatively abstract stimulus. Even with these limitations, the study still provides some useful evidence: randomization worked, the control group did not change, and the sovereignty effect appeared in both intended use and the broader attitude measure.

Further Research

The main implication is not that privacy should disappear from communication about the digital euro. Rather, the results suggest that privacy cannot simply be asserted in a general way, but has to be made more concrete, more credible and also connected to situations that people actually recognize. In this experiment, generic reassurance was not effective. By contrast, the sovereignty narrative was more persuasive because it linked the digital euro to a visible structural issue in European payments, namely the dependence on non-European providers and the concern about private data power. For the ECB and also national actors, this may suggest that communication should be more targeted, repeated and sensitive to different subgroups. Messages about European payment autonomy may be especially effective for respondents who are concerned about corporate tracking or who are more skeptical towards banks. Privacy communication may need to move away from abstract claims and focus more on concrete mechanisms, such as offline functionality, data minimization or clear limits on data access. At the same time, communication should still continue to present the digital euro as a complement to cash and not as a replacement, especially in Austria and similar contexts with a high preference for cash.

Future research should therefore not only test repeated exposure and multi-message communication instead of relying only on single posters, but also compare different formats, senders and levels of detail. It may matter whether a message comes from the ECB, a national central bank, a bank, a consumer-protection body or another public actor, and whether it is communicated through a poster, a short video, a FAQ format or a more interactive explanation. It would also be useful to work with larger and more representative cross-country samples and to compare high-cash contexts with more digital payment cultures. This is especially important because the present sample was relatively young, highly educated and digitally active, while more cash-dependent or less digitally confident groups were underrepresented. Future research should also pay closer attention to accessibility barriers, including lower digital literacy, disability, poverty and the need for assistance with digital payments.

In addition, future research should compare not only privacy and sovereignty narratives, but also more basic and perhaps more intuitive framings. Messages emphasizing security, ease of use, reliability, broad merchant acceptance, low cost, or the usefulness of the digital euro in concrete everyday settings may prove more effective than abstract institutional claims. Institutional narratives could also be compared with more specific use-case narratives, for example online shopping, peer-to-peer transfers, emergency payments or situations with temporary connectivity problems. Another simple but important step would be to examine

whether communication effects depend on how clearly respondents understand the actual difference between the digital euro and ordinary digital bank money.

The interaction between digital-euro communication and prior familiarity, institutional trust, skepticism towards banks and national payment cultures may deserve closer attention.

Future research should look more at actual or more realistic payment behavior, not only stated intentions. This could include incentivized experiments, simulated checkout situations, wallet prototypes, onboarding tasks or small field pilots with real or quasi-real payment choices. It could also be valuable to study communication together with actual design features, such as privacy settings, offline functionality, holding limits or merchant acceptance. Finally, the null mediation results suggest that future research should test additional mechanisms more directly, for example perceived credibility, clarity, usefulness, surveillance risk and source trust. Qualitative interviews or focus groups could complement experimental work here to help explain why privacy may matter less as a selling point than as a basic condition users need to trust before they would even consider adopting the digital euro.

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Appendix

Appendix A: Experimental stimuli

Appendix Figure A1. Control poster



**You have options.
Everyday ways to pay.**

-  People use cash, cards and mobile wallets for daily purchases.
-  Different options suit different moments—at the store, online, or with friends.
-  No matter the situation, having flexible choices makes everyday payments simple and convenient.
-  It's all about using what works best for you.



Appendix Figure A2. Privacy poster

Everyday payments with EU-grade privacy.

-  The Digital Euro is cash - but digital. Up to 5.000 €, your payments happen offline.
-  Even when you pay online, your financial activities remain your own. The Eurosystem can not directly link you to your payments.
-  The digital euro is a public good. It will never use your data for commercial purposes.



Pay European. Stay Private.

❓ Did you know? The US-companies Visa and Mastercard have a monopoly on card payments in Europe.

➔ The digital Euro provides a simple public way to pay — alongside cash and your cards.

✓ It keeps your data protected, private and within the EU. The digital euro is a public good. It will never use your data for commercial purposes.



Appendix B: Survey instrument

1. Introductory information

Study on payment methods

You are invited to take part in a short academic survey about everyday payments. Your participation is voluntary. You may stop at any time without penalty.

What we collect: your responses to survey questions and basic demographics (e.g. age band, education). We do not collect direct identifiers.

Data handling: responses are stored on German servers. Data will be analyzed in aggregate, it will not be passed on to third parties or used to train AI models.

Contact: a*****2@unet.univie.ac.at

Administrative note displayed in the original preview: “This survey contains Karma to get free survey responses at SurveySwap.io.”

2. Short explanation shown before the survey items

What is the digital euro?

Please read the short text below before continuing.

The digital euro is a digital version of cash — central bank money in electronic form.

Everyone in the euro area (people and businesses) could use it for everyday payments, like in shops, online, or when sending money to others.

It would be issued by the European Central Bank (ECB), not by private companies or banks.

It would complement, not replace, cash, so you could still use banknotes and coins if you want.

People would have a digital wallet, managed through their bank or another official provider, to hold digital euros.

With that wallet, they could pay with a phone, card, or online, even offline in some cases (without internet).

(Source displayed: European Central Bank)

Instruction shown below the bullets:

For the following questions, please assume that the digital euro has already been introduced and is available for use across the euro area. Based on this assumption, please answer the questions according to how you think you would behave or feel in that situation.

3. Pre-treatment measures

Q1. How familiar are you with the digital euro?

7-point scale: **Not at all familiar** to **Very familiar**

Q2. If available in your country, how likely are you to use the digital euro in the next 12 months?

7-point scale: **Not at all likely** to **Very likely**

4. Pre-treatment attitude battery

Q3. In your view, the digital euro is...

7-point scale: **Bad** to **Good**

Q4. In your view, the digital euro is...

7-point scale: **Unnecessary** to **Useful**

Q5. In your view, the digital euro is...

7-point scale: **Privacy-invasive** to **Privacy-preserving**

Q6. In your view, the digital euro is...

7-point scale: **Risky** to **Safe**

5. Privacy concerns and institutional trust

Q7. I worry about my payments data being tracked by private companies.

7-point scale: **Strongly disagree** to **Strongly agree**

Q8. I worry about my payments data being tracked by governments.

7-point scale: **Strongly disagree** to **Strongly agree**

Q9. I trust EU institutions to manage payment systems responsibly.

7-point scale: **Strongly disagree** to **Strongly agree**

Q10. I trust my bank to manage payment systems responsibly.

7-point scale: **Strongly disagree** to **Strongly agree**

6. Attention check

Q11. Attention check: Please select agree.

Response options:

Strongly agree

Agree

Disagree

Strongly disagree

7. Payment-habit questions

Q12. How do you mainly pay?

Response options:

Cash

Debit card

Credit card

Mobile wallet

Other

(Multiple options were possible)

Q13. Do you use a mobile wallet (e.g., Apple Pay/Google Pay)?

Response options:

Yes

No

Not sure

(Multiple options were possible)

Q14. On how many days in a typical week do you use a card to pay?

Response scale: **0 to 7 days**

8. Experimental stimulus

Instruction:

“Bitte sehen Sie sich dieses Bild genau an / Please look at the following picture carefully:”

Respondents were then shown one randomly assigned poster. See Appendix A.

9. Post-treatment intended-use question

Q15. If available in your country, how likely are you to use the digital euro in the next 12 months?

7-point scale: **Not at all likely** to **Very likely**

10. Post-treatment mediator items

Q16. Using the digital euro would help keep Europeans' payments data within Europe and lessen dependence on large non-European payment providers.

7-point scale: **Strongly disagree** to **Strongly agree**

Q17. Using the digital euro would protect my privacy when paying.

7-point scale: **Strongly disagree** to **Strongly agree**

11. Post-treatment attitude battery

Q18. In your view, the digital euro is...

7-point scale: **Bad** to **Good**

Q19. In your view, the digital euro is...

7-point scale: **Unnecessary** to **Useful**

Q20. In your view, the digital euro is...

7-point scale: **Privacy-invasive** to **Privacy-preserving**

Q21. In your view, the digital euro is...

7-point scale: **Risky** to **Safe**

12. Manipulation checks

Each respondent saw two true/false manipulation-check items, depending on experimental condition they were assigned:

Condition branch 1 (*neutral/control condition*)

- The poster I saw earlier mentioned cash, cards, and mobile wallets.
 - True / False
- The poster I saw earlier said the digital euro replaces existing payment methods.
 - True / False

Condition branch 2 (*sovereignty condition*)

- The poster I saw earlier said payments would be processed within Europe under EU oversight.
 - True / False
- The poster I saw earlier said the digital euro has a holding limit.
 - True / False

Condition branch 3 (*privacy condition*)

- The poster I saw earlier said the digital euro never uses data for commercial use.
 - True / False
- The poster I saw earlier guaranteed complete anonymity for all transactions.
 - True / False

13. Demographics

Q22. Finally, we'd like to ask you for some details about yourself.

Gender

Response options:

- female
- male
- other

Q23. Your age:

Open numeric field: I am ____ years old

Q24. Which country do you currently live in?

Country: _____

Optional box: **No answer**

Q25. What is the highest level of education you have completed?

Response options:

- Elementary school
- Finished school with no qualifications
- Secondary school-leaving certificate / Junior High Diploma / Unterstufe / Berufsschule
- General Certificate of Secondary Education (GCSEs) / Matura
- Bachelor's degree
- Masters degree / Magister / Doctorate

Q26. What do you do professionally?

Response options:

- Pupil / In school
- Training / Apprenticeship
- University student
- Employee
- Civil servant
- Self-employed
- Unemployed / Seeking employment
- Other: _____

Q27. What is your monthly net income?

Instruction shown in the questionnaire: "Net income is defined as your total income after tax and social security deductions."

Response options:

- I do not have a personal income
- less than 500 €
- 500 € up to 1500 €
- 1500 € up to 2000 €
- 2000 € up to 3000 €
- 3000 € up to 4500 €
- 4500 € up to 6000 €
- 6000 € up to 8000 €
- 8000 € up to 10,000 €
- 10,000 € up to 20,000 €
- 20,000 € or more
- I do not wish to answer

14. Open-ended final questions

Q28. Would you like to comment on this questionnaire, or would you like to add information for us to better understand your answers?

Supporting text shown underneath:

“Do you think this questionnaire needs improvement? Did you feel some question were unclear, or did you feel unpleasant answering specific questions? Please leave us notes.”

Q29. What, if anything, would make you try the digital euro?

Q30. What would make you avoid it?

15. End screen

Thank you for completing this questionnaire!

“We would like to thank you very much for helping us.

Your answers were submitted, you may close the browser window or tab now.

(The German questionnaire is available upon request.)

Appendix C: Exploratory open-ended comments

Theme	Description	Number of comments	Example quote	Overlapping/non-overlapping
Conditional usefulness and ease of use	Adoption was often conditional on simple setup, familiar interfaces, wallet integration, broad acceptance, or a clear everyday use case.	31	“If it was as easy to use and set up as Revolut.”	Overlapping
Privacy, anonymity and tracking concerns	Comments stressed anonymity, fear of surveillance, or concern about	15	“It must be more anonymous than card payment.”	Overlapping

	corporate/government tracking.			
Security, reliability and implementation risks	Respondents mentioned hacking, technical failure, weak infrastructure, merchant readiness, or general reliability concerns.	14	“Technical issues or lack of merchant acceptance would make me avoid it.”	Overlapping
Limited added value / preference for existing methods	Some respondents saw no clear reason to switch because cards, wallets, or cash already worked well enough.	12	“Bank card, credit card and wallet are already enough.”	Overlapping
Need for clearer practical information before adoption	Respondents wanted clearer technical explanation, more practical detail, or evidence that the system had already proved itself.	6	“More details on how it works technically could help me trust it.”	Overlapping
European autonomy / alternative to private foreign providers	A smaller group explicitly welcomed the digital euro as an alternative to Visa, PayPal, or US-based providers.	5	“Alternative to Visa, PayPal and co.”	Overlapping

Accessibility / affordability concern	One comment pointed to social or access barriers rather than technology alone.	1	“Disability and poverty.”	Overlapping
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