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Readiness to Use the Digital Euro (CBDC) by Consumers Based on the Example of France and Germany

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Abstract

Theoretical background: Attempts to offer the users of state money its new digital form with characteristics partially similar to cash and cryptocurrencies led to the creation of the Central Bank Digital Currency (CBDC) concept. In October 2020, the European Central Bank (ECB) published a report on the conditions for building the concept of the digital euro. On January 12, 2021, the ECB completed collecting the opinions of potential users (understood as natural persons) and representatives of companies, institutions, and experts on their expectations for the future digital euro. However, the survey only asked a few questions about the preferred features of the digital euro. The questionnaire form was only available on the website

of the ECB, which made the respondents a specific group as only those who were interested in visiting the website replied. Representatives of companies, institutions, and experts also provided answers from the user's point of view. The questions did not take into account the characteristics of the respondents ensuring the representativeness of the research sample.
Purpose of the article: The article aims to define the relationship between the characteristics of consumers (individual users of money as a product of the central bank) from France and Germany and their acceptance of using the digital euro.
Research methods: The analysis used data from a survey conducted using the CAWI method. The study was conducted in August 2021 on a group of adult internet users representative in terms of gender, age, and place of residence, including 638 German and 646 French respondents (full responses).
Main findings: The results show that in both countries the consumers most willing to accept the digital euro are men rather than women, consumers already taking advantage of the opportunities offered by mobile banking, and consumers who believe that the money entrusted to banks is not safe. However, the differences observed in the example of only these two countries support the conclusion of other researchers about the need to conduct this type of research either in the entire eurozone or in selected eurozone countries with specific payment habits.

Introduction

Nowadays, the role of the monetary system in the economy can be compared to the role of the nervous system in the body. The money system provides a complex network of interactions between producers, suppliers, institutional recipients and consumers. The monetary system can be briefly defined as a set of institutions and instruments that facilitate the circulation of money in the economy and society (Fratianni & Hagen, 2019). Money functioning in the monetary system is a motivator of actions, a creator of the behaviour of various entities participating in economic exchange, but also in non-economic social life (Carvalho, 2015).

With the evolution of the economy and society, money and the monetary system in which it operates are changing on the basis of mutual adjustments. In the 21st century, there has been a dynamic development of the digitalization of the functioning of the economy and society, initiated in the second half of the twentieth century by the widespread use of computers and the Internet (OECD, 1998). The increased dematerialization of money is one of the important manifestations of this process. Banks used the money in the form of computer records already in the 1960s, that is, much earlier, before their clients obtained such a possibility in the late 1990s. Among bank customers, the computer form of money was first used by large enterprises and institutions, and later also by consumers as individual customers (BNP Paribas, 2021).

The development of cryptocurrencies, initiated in 2009 with the appearance of bitcoin created by a person or a group of people hiding under the pseudonym of "Satoshi Nakamoto", caused an avalanche development of financial instruments based on cryptographic mechanisms and the popularization of peer-to-peer (P2P) networks and distributed ledger technology (DLT) (Chowdhury, 2019). A significant contribution to the development of cryptocurrencies was made by the Cypherpunk community –

activists promoting the widespread use of strong cryptography as a way to social and political change (Jarvis, 2021). The cryptocurrency movement also grew out of the protest of fiat money users against the flaws of the existing monetary system, limiting the freedom of action and anonymity of its individual users (Corbet et al., 2020). It should be emphasized that the cryptocurrency market is primarily a creation of individual people who want to restore the possibility of creating private money. The emergence of companies, financial institutions and even entities related to public authorities on this market on a larger scale is a phenomenon observed since 2018, which in the recent 2–3 years began to gain strength (Wintermeyer, 2021; Hajric & Regan, 2021).

A specific consumer rebellion against the current form of state money, expressed by the creation and dynamic development of the private cryptocurrency market, caused a reaction from various public authorities, in particular central banks (Boar et al., 2020). On the one hand, in various countries, this resulted in a ban on the issue and use of cryptocurrencies, and on the other hand, it provoked central banks to experiment with state money based on cryptography and some other solutions developed by cryptocurrencies (Orji, 2022). Both types of government reaction to cryptocurrencies can be found, for example, in China (Kumar, 2022).

Attempts to offer the users of state money its new form with characteristics similar to cryptocurrencies led to the creation of the Central Bank Digital Currency (CBDC) concept. In October 2020, the European Central Bank (ECB) published a report on the conditions for building the concept of the digital euro (European Central Bank, 2020). ECB publications focus on retail digital euro, intended as digital cash primarily for individual users (consumers), not institutional. Banks, fin-techs and other intermediaries are involved in the process, but their sole purpose is to facilitate the circulation of the digital euro among the public, but not its issuance (European Central Bank, 2021b).

The aim of the article is to define the relationship between the characteristics of consumers (individual users of money as a product of the central bank) from France and Germany and their acceptance of using the digital euro. The analysis used data from a survey conducted using the CAWI method in August 2021 by a specialized public opinion research agency PBS Pracownia Badań Społecznych (Agency of Social Research) Sp. z o.o., which was selected under a public procurement procedure. This agency carried out the survey in cooperation with its counterparts from Germany and France.

The study was conducted on a group of adult internet users representative in terms of gender, age and place of residence, including 638 German and 646 French respondents (full responses).

The article poses the following hypotheses:

H1: The demographic characteristics of German and French consumers have an impact on their readiness to use the digital euro.

H2: The use of existing cashless payment methods by German and French consumers has an impact on their readiness to use the digital euro.

H3: German and French consumers' trust in banks has an impact on their readiness to use the digital euro.

Logit models were used to verify the above hypotheses.

On January 12, 2021 the ECB completed collecting the opinions of potential users (understood as natural persons) and representatives of companies, institutions and experts on their expectations for the future digital euro. However, the survey only asked a few questions about the preferred features of the digital euro. The questionnaire form was only available on the website of the ECB, which made the respondents a specific group as only those who were interested in visiting the website replied. Representatives of companies, institutions and experts also provided answers from the user's point of view. The questions did not take into account the characteristics of the respondents ensuring the representativeness of the research sample. The results of the ECB survey were published in a report from April 2021 (European Central Bank, 2021a).

To the authors' knowledge, by the time this article was prepared, no study of willingness to accept the digital euro by consumers had been carried out on a representative group of adult internet users, which would allow comparing the acceptance factors in Germany and France. It is therefore the first survey in the world to be conducted on a representative sample of respondents from two euro area countries. Therefore, it fills the research gap in this area and may serve as the basis for the development of further research, more broadly designed in terms of geography, problem and methodology.

Literature review

CBDC and its importance to consumers

In the publications of central banks, CBDC is presented primarily as a digital equivalent of cash (banknotes and coins). The justification for the digital issue of money by central banks is to be the rapidly progressing dematerialisation and digitalization of payments (Bank for International Settlements, 2020). At the same time, ordinary money users usually do not realize that the money in bank accounts is the money of commercial banks and that only physical cash is the central bank money available to them. Even if consumers know that it is not the central bank that secures the return of their money paid to banks, but a special deposit guarantee institution or bank guarantee fund, they do not associate this fact with the nature of money deposited in bank accounts (Panetta, 2022).

The fact that, like cash, the money of the central bank (i.e. its liability) is also the funds accumulated by commercial banks on their accounts with the central bank, especially in the form of required reserves, has no practical significance for consumers as ordinary money users. Commercial bank money is 1-in-1 redeemable among

themselves only because it is anchored with the value of the monetary unit in central bank money, all of which must be redeemable in a given system (Bindseil et al., 2021).

Consumers using bank accounts and transferring money using the Internet do not currently have an alternative form of non-cash money for which the central bank or, more broadly, the state would be responsible. The creation of such a form of money would prevent the paralysis of the economy and social life in emergency situations, such as crises, natural disasters or war threats, i.e. whenever there is a risk of a decrease in consumer confidence in banks and the withdrawal of money from them (Mersch, 2017).

The issue of CBDC by the central bank is to ensure consumers that such money will function regardless of the financial situation of banks. The advanced digital and cryptographic form of CBDC is to guarantee the technical security of using such money, provide the speed of settlements and the development of functionalities (Ward & Rochemont, 2019).

For the record, it should be emphasized that some of the central banks are considering the introduction of both retail CBDC and wholesale CBDC (Auer et al., 2021). However, digital money for the purposes of settlements between banks and possibly other financial institutions is taken into account mainly in countries with unsatisfactorily developed systems of instant interbank settlements. Wholesale CBDC is not considered digital cash. In any case, much more attention in the publications of central banks (Pfister, 2019) and academic publications (Mondello et al., 2020) is devoted to the retail CBDC intended primarily for consumers and non-bank payment intermediaries and merchants serving them.

However, the cryptographic structure of CBDC, including the digital euro, allows for the incorporation of additional functionalities into this form of dematerialized money, which physical cash cannot have. An example of such functionality is the possibility of introducing remuneration or interest-bearing CBDC (Assenmacher et al., 2021).

CBDC can function through consumer accounts at a central bank or other institution controlled by it, or as digital wallet content stored on appropriate devices, from computers to tablets and smartphones or smartwatches. In both cases, the Internet connection plays an important role in the flow of CBDC. Although other forms of communication (NFC, Bluetooth) may be used between digital wallets for some time, the confirmation of settlements still requires a periodic connection with the central register of transactions (European Central Bank, 2021b).

Central banks working on the CBDC project often stress that a properly designed CBDC should reduce financial exclusion. Consumer use of mobile phones is very widespread not only in advanced economies and is increasing with new generations. Even providing devices with basic functionality that allows the use of CBDC to those who currently cannot afford a mobile phone does not constitute a significant cost, especially against the background of the costs related to the distribution of physical cash (banknotes and coins) and maintaining its appropriate quality (Didenko & Buckley, 2021). This would be a way of digital inclusion of people who only use

cash, provided that the operation of the device enabling consumers to use CBDC would be as intuitive as possible.

According to the Atlantic Council Geoeconomic Centre, in the second quarter of 2024, 130 countries were in the process of developing CBDCs with various statuses (Table 1).

Table 1. Number of countries with different levels of advancement of work on CBDC

Status	No. of countries
Launched	3
Pilot	36
Development	30
Research	44
Inactive	17
Canceled	2

* currency unions like the eurozone or the Eastern Caribbean Monetary Union counted as the equivalent of one country

Source: (Atlantic Council. Central Bank Digital Currency Tracker, 2024).

Countries where CBDC already operates to some extent are the Bahamas, Nigeria and Eastern Caribbean Currency Union (Smith, 2022). Among the countries that test CBDC as part of pilot projects are Sweden, China, and Ukraine (until the Russian military invasion on February 24, 2022). In addition to the eurozone, India and the United States are the large currency areas that do research on CBDC.

Most central banks that are still working on the CBDC concept stipulate that they have not yet prejudged the introduction of CBDCs into circulation. As shown in Table 1, currently CBDC programs are inactive in seventeen countries, and in two countries the existing programs have been cancelled.

The specificity of the digital euro as a product of the ECB offered to consumers

As already indicated, the digital euro is so far in the conceptual stage and it is not known when it can be tested. The technical parameters and functionality of the digital euro are yet to be decided. Combined with the other features of the digital euro below, it causes difficulties in modelling research into its acceptance and use.

Characteristic for the concept of the digital euro presented by the ECB is the emphasis on the importance of the strategy of introducing the digital euro, which will help reduce the financial exclusion, while at the same time worrying about the effects of the excessive popularity of the new form of the common currency (digital euro as an investment, disintermediation of the banking sector, foreign demand). If we treat the digital euro as a product that the ECB wants to offer to consumers, a unique combination of priorities appears here, because such restrictions are not imposed by market entities. The ECB, as befits a central bank, is not profit-oriented (European Central Bank, 2020).

The ECB wants to target, manage, and not maximize consumer demand for digital euro. In the case of the digital euro, only moderate success will be real success. Such an approach may lead to a specific manipulation by the ECB of the acceptance and resistance of consumers to the digital euro. The key tools for such manipulation are the amount or amount-time limits considered by the ECB for consumers to hold a digital euro and interest (remuneration), possibly even negative, which in the case of the digital equivalent of cash seems surprising. It is also considered limiting the use of the digital euro only to residents of the euro area (European Central Bank, 2021b).

Central banks may prefer a situation where a large part of the population regularly uses the digital euro for a small part of their payments, rather than a situation where a minority of the population regulates the overwhelming majority of their day-to-day transactions with the digital euro (Bindseil et al., 2021). Such a situation can be well paraphrased in a sentence: May we be successful, but God forbid, not too much.

For the ECB, it is not a problem whether it will be able to provide a supply that meets the demand for digital euro, but what the effects of a given size of supply will be. This approach is opposite to that dominating among market entities. Car manufacturers do not consider the fact whether roads and parking lots will accommodate the number of cars they supply to the market.

It should also be emphasized that the ECB would be a monopolist in the creation of a digital euro. The ECB wants to be a monopoly, because the digital euro is also designed to inhibit the expansion of private substitutes for digital money in the form of cryptocurrencies (Ferrari et al., 2020). This applies especially to stablecoins, as cryptocurrencies with a purchasing power stabilized to the state money (ECB Crypto-Assets Task Force, 2020).

Importantly, the problem of the digital euro is not only the problem of the technical form of the monetary unit, but also the problem of the payment system keeping such money in circulation. The ECB may try to induce an accelerated development of the network effect to make the digital euro quickly and universally adopted by consumers, and this requires appropriate, anticipatory readiness of the entire payment system (Bindseil et al., 2021). Distribution channels, however, must be constructed taking into account the specificity of consumers.

Material and methods

In the study, the data from an empirical survey (designed by one of the authors) was used to assess the impact of selected determinants on the willingness of consumers from Germany and France to use the digital euro issued by the European Central Bank. The survey was conducted in August 2021 on a nationwide sample of adult internet users aged 18 and over from Germany (638) and France (646), representative in terms of age, gender and place of residence. The data was collected using the CAWI (computer-assisted web interview) method by a professional research agency (PBS Sp. z o.o.)

The description of the variables used in the analysis and the frequency distributions are presented in Tables 2 and 3.

Table 2. Variables used in the empirical analysis

Y	The respondent would like to use the digital euro issued by the ECB: 1 – yes, 0 – no
Gender	Gender: 1 – female, 0 – male
Age	Age of the respondent in ranges (dummy variable): A_18-29, A_30-39, A_40-49, A_50-59, A_60+,
Education	Educational attainment of the respondent: 1 – primary education, 2 – lower secondary, 3 – upper secondary (high school, technical secondary school and equivalent), 4 – post-secondary, 5 – short cycle studies, 6 – bachelor's degree and incomplete master's degree, 7 – master's degree, 8 – PhD and higher education
Income	Monthly net income of the respondent (in euro):1 – below 1,000, 2 – from 1,001 to 2,000, 3 – from 2,001 to 3,000, 4 – from 3,001 to 4,000, 5 – from 4,001 to 5,000, 6 – from 5,001 to 10,000, 7 – 10,001 and more
Bank card	The respondent uses a bank card: 1 – yes, 0 – no
Crypto	The respondent uses cryptocurrencies: 1 – yes, 0 – no
Internet banking	The respondent has access to the bank account via the Internet: 1 – yes, 0 – no
Mobile banking	The respondent accesses the bank account via the bank's smartphone application: 1 – yes, 0 – no
Trust	The respondent believes that the money deposited on bank accounts is safe: 1 – definitely yes, 2 – probably yes, 3 – I don't know / it is difficult to say, 4 – probably not, 5 – definitely not

Source: Authors' own study.

Table 3. The frequency distribution for variables in the sample (in %)

Variable	Percentage of response	
	Germany	France
Dependent variable		
yes	34.2	39.5
no	65.8	60.5
Age		
A_18-29	16.8	19.0
A_30-39	14.3	17.0
A_40-49	20.2	19.0
A_50-59	17.1	16.9
A_60+	31.7	28.0
Gender		
female	50.8	51.5
male	49.2	48.5
Education		
1 – primary education	10.2	2.3
2 – lower secondary	9.6	5.6
3 – upper secondary (high school, technical secondary school and equivalent)	32.1	24.6
4 – post-secondary	10.2	7.3
5 – short cycle studies	6.1	18.0
6 – bachelor's degree and incomplete master's degree	15.8	17.0
7 – master's degree	13.2	16.7

Variable	Percentage of response	
	Germany	France
8 – PhD and higher education	2.8	8.5
Income		
1 – under 1,000	11.6	14.6
2 – from 1,001 to 2,000	34.3	35.4
3 – from 2,001 to 3,000	25.9	25.4
4 – from 3,001 to 4,000	15.2	14.1
5 – from 4,001 to 5,000	7.2	6.3
6 – from 5,001 to 10,000	4.7	3.3
7 – 10,001 and more	1.1	0.9
Bank card		
yes	91.4	94.9
no	8.6	5.1
Crypto		
yes	7.8	10.7
no	92.2	89.3
Internet banking		
yes	88.7	93.2
no	11.3	6.8
Mobile banking		
yes	60.7	68.1
no	39.3	31.9
Trust		
1 – definitely yes	18.3	14.7
2 – probably yes	49.5	44.7
3 – I don't know / it is difficult to say	19.6	28.2
4 – probably not	9.2	9.0
5 – definitely not	3.3	3.4

Source: Authors' own study.

Kendall's tau-b coefficients (see Appendix A, Appendix B) were calculated to examine the correlation between the independent and dependent variables.

In the study, the logit model was used to assess the impact of selected determinants on the respondents' willingness to accept the digital euro issued by the ECB. The logit model allows for determining what factors, and in what way, influence the studied phenomenon expressed as numbers in a dependent variable (Kochaniak & Ulman, 2020). It has the form of the equation:

$$ln\frac{P}{1-P} = \sum_{j=0}^{k} \alpha_j X_j,$$

where: $ln\frac{P}{1-P}$ is the logit of probability and takes values from the set of real numbers. Probability logit is the logarithm of the ratio of the odds of accepting and not accepting a value of 1 by the variable *Y*. In the case of equal odds (i.e. $P_i = 0.5$), logit is 0. Logit is positive when $P_i > 0.5$, and negative – for $P_i < 0.5$ (Maddala, 1992, p. 331).

In the case of unbalanced samples, i.e. when there is a significant predominance of observations for one of the categories we deal with in the above study, it is justified to apply a forecasting rule other than the standard rule. In this study, the rule of Cramer (1999) was applied:

$$\hat{y}_i = 1, \text{ if } \widehat{P_i} > P^*$$
$$\hat{y}_i = 0, \text{ if } \widehat{P_i} \leq P^*,$$

where: P^* is the limit value, determined on the basis of the given sample.

Cramer proposed the so-called optimal cut-off value, which is set as the proportion of ones in the sample. The cut-off value determined in this way allows to increase the accuracy of forecasting those variants that are poorly represented in the sample (Cramer, 1999).

The measures of matching models with the dichotomous dependent variable are most often measures that are equivalent to the classic R-square determination coefficient and measures based on the predictive properties of the models. In the case of models estimated by the maximum likelihood method (MLE), you can calculate quality measures based on the likelihood function, e.g. McFadden's R-square.

In binominal models, based on large sets of microdata, low values of the matching measures are characteristic (Gruszczyński, 2021, pp. 55–56). This is not a bad model. In this case, the results of the likelihood ratio test are of key importance, as it allows to assess the significance of the entire model. Nevertheless, an extremely important, and often the most important measure in the case of dichotomous models is their predictive ability.

In the article, the quality of the estimated models was assessed using the McFadden R-square and the following measures of forecasting accuracy: percentage forecasting accuracy, odds ratio (OR), Ben-Akiva and Lerman's R-square.

Odds ratio (OR) is a measure calculated as the ratio of the product of the number of correctly classified cases to the product of the number of incorrectly classified cases. Model-based classification is better than purely random classification if OR is greater than one. Ben-Akiva and Lerman's R-square informs about the mean value of the correct probability forecast.

Results

The results of the estimated models for Germany and France are presented in Tables 4 and 5.

Table 4. The results of the estimated logit model ($N = 638$), Germany

Dependent variable Y						
	Coefficient	Std. Error	z	Marginal effect	*p*-value	Significance [a)]
const	-.7034	.5786	-1.2160		.2241	
Gender	-.4679	.1818	-2.5740	-.1026	.0101	**
A_30-39	.1973	.3089	.6387	.0443	.5230	
A_40-49	.1945	.2836	.6860	.0435	.4927	
A_50-59	-.2789	.3144	-.8872	-.0591	.3750	
A_60+	-.2616	.2788	-.9383	-.0564	.3481	
Education	-.0644	.0477	-1.3500	-.0141	.1771	
Income	.0253	.0702	.3601	.0056	.7188	
Bank card	.5501	.3561	1.5450	.1101	.1223	
Crypto	1.0941	.3312	3.3040	.2625	.0010	***
Internet banking	.5641	.3578	1.5770	.1133	.1149	
Mobile banking	.3789	.2124	1.7840	.0819	.0744	*
Trust	-.3722	.0982	-3.7920	-.0817	.0001	***

[a)] the statistically significant variable at the level of *** 1%; ** 5%; * 10%

Source: Authors' own study.

Table 5. The results of the estimated logit model ($N = 646$), France

Dependent variable Y						
	Coefficient	Std. Error	z	Marginal effect	*p*-value	Significance [a)]
const	-2.1943	.8956	-2.4500		.0143	**
Gender	-.4822	.1746	-2.7620	-.1123	.0058	***
A_30-39	-.0605	.2862	-.2112	-.0140	.8327	
A_40-49	-.0822	.2948	-.2789	-.0191	.7803	
A_50-59	.1930	.3030	.6369	.0457	.5242	
A_60+	-.0165	.2977	-.0553	-.0038	.9559	
Education	.0465	.0523	.8894	.0109	.3738	
Income	.1507	.0736	2.0480	.0352	.0405	**
Bank card	1.9408	.7529	2.5780	.3087	.0099	***
Crypto	.1802	.2829	.6369	.0427	.5242	
Internet banking	-.1702	.4180	-.4073	-.0404	.6838	
Mobile banking	.8125	.2188	3.7140	.1799	.0002	***
Trust	-.4091	.0986	-4.1490	-.0954	<.0001	***

[a)] the statistically significant variable at the level of *** 1%; ** 5%; * 10%

Source: Authors' own study.

Likelihood ratio test results for both the model for Germany (chi-square = 65.7241, *p*-value = 0.0000) and the model for France (chi-square = 83.5283, *p*-value = 0.0000), indicate the significance of both estimated models.

Classification results

The results of the classification based on the estimated logit models for Germany and France are presented in the Table 6 and Table 7. Due to the presence of an unbalanced sample (Table 3), the classification was based on Cramer's prediction rule (Cramer, 1999).

Table 6. Classification matrix (model for Germany)

Actual values of the dependent variable	Projected values of the dependent variable		Sum
	Y = 1	Y = 0	
Y = 1	142	76	218
Y = 0	161	259	420
Sum	303	335	638

Source: Authors' own study.

The overall accuracy of the classification (the so-called count R^2) was 62.85% (OR = 3.0057). Better results of the classification were obtained in the group of respondents declaring a propensity to use the digital euro issued by the ECB (accuracy at the level of 65.14%) than in the group of respondents who would not like to use the digital euro issued by the ECB (accuracy at the level of 61.67%) . Ben-Akiva and Lerman's R-squared ratio was 0.5945.

Table 7. Classification matrix (model for France)

Actual values of the dependent variable	Projected values of the dependent variable		Sum
	Y = 1	Y = 0	
Y = 1	179	76	255
Y = 0	156	235	391
Sum	335	311	646

Source: Authors' own study.

In the logit model estimated for Germany, the following explanatory variables turned out to be statistically significant (at a significance level of 0.05): gender, use of cryptocurrencies, and the respondent's opinion on the safety of funds deposited with banks.

In Germany, women are less willing to use the digital euro than men. The use of cryptocurrencies increases the likelihood of using the digital euro. As confidence in bank deposits decreases, so does the readiness to use the digital euro.

In the logit model estimated for France, the following explanatory variables turned out to be statistically significant (at a significance level of 0.05): gender, income, use of a payment card, use of mobile banking and the respondent's opinion on the safety of funds held in bank deposits.

In France, women are less willing to use the digital euro than men. As income grows, so does the readiness to use the digital euro. Using a bank card increases the likelihood of using the digital euro. Using mobile banking increases the likelihood of using the digital euro. As confidence in bank deposits decreases, the chance of using the digital euro also diminishes.

Discussions

The issue of the attitude of potential users of retail CBDC towards selected features and functionalities of this new form of money from an empirical perspective is the subject of a small number of studies at the time of writing this article. Even more so, after deducting studies on the Chinese digital yuan (e-CNY), there remains a modest number of articles, of which only a few can be cited concerning the digital euro. This group includes the works of Abramova et al. (2023), Tronnier et al. (2023), and Mehlkop et al. (2023). However, even this modest group of studies corresponds interestingly with the research presented in this article.

Abramova et al. (2023) examine the attitude of Austrian residents towards the digital euro and its selected functionalities based on a survey involving 2,006 respondents. Only about half of the respondents expressed any interest in the digital euro, and interestingly, in this group, security issues turned out to be more important than the anonymity of digital euro transaction data. The offline functionality of digital euro payments was also considered by respondents to be more important than the possibility of direct payments between people. This suggests the specific nature of the trust of potential Austrian digital euro users towards the institutional framework for digital euro payments. The authors' comment on the need to conduct this type of research either in the entire euro area or in selected euro area countries with specific payment habits is important. This is a strong signal of the potential significance of differences between the societies of euro area countries, which may influence differences in the degree of adoption of the new form of money in these countries. There is some convergence between the characteristics of respondents studied by Abramova et al. (2023) and by the authors of this article, such as age, education, or previous experience of respondents with the use of new payment technologies. However, calculations in Abramova et al. (2023) are based on the distinction between three groups of respondents (Cash-affine, Cryptocurrency owners, and Tech-savvy) when in this article the emphasis is placed on the respondents' use not only of cryptocurrencies but also of specific financial solutions (bank card, internet banking, mobile banking).

Research conducted by Tronnier et al. (2023) based on expert and non-expert interviews focuses on the use of the attitude formation theory (EAFT) as described by Harborth and Kreuz (2020) to build an attitude formation model adapted to examine the adoption of CBDC by potential users. At the same time, these authors question the usefulness of typical technology adoption models, such as UTAUT or TAM,

for CBDC research, while pointing out the difficulties in comparing results from different countries about a solution that has not yet been implemented in practice. As a result, it can vary significantly between countries, depending on the preferences of a country's central bank regarding the details of institutional design and functionality. Therefore, user attitudes towards existing alternatives to CBDCs play a key role in this study. However, this work does not take into account the assumed design specificity of the digital euro, as is the case in the study by Abramova et al. (2023), and this is probably why the authors rarely use the term digital euro and usually CBDC as a more general term. A common element of both studies outlined above and ours is the consideration of the current experiences of potential users of the digital euro with digital finance. These studies also raise the question of what the competitive advantage of the digital euro compared to existing solutions is. This signals potential problems for central banks in persuading societies to use central bank digital money unless it is made more attractive thanks to new functionalities while lacking the disadvantages of existing alternatives.

Mehlkop et al. (2023) researched the factors motivating users to accept centralized digital currencies (CBDC) in the U.S., India, and Germany, but primarily emphasized the issue of privacy. The study focused on a survey experiment to investigate the acceptance of an app-based monthly digital payment similar to a Universal Basic Income and investigate its adoption across income levels. It is worth to remark, that we also introduced income as a factor of digital euro acceptance, but it proved to be significant only in the case of France, and not in the case of Germany. The key turned out to be who provides the application: an international Internet corporation, a national government, or a central bank. The results indicated a different sensitivity of German and American respondents compared to Indian ones. Respondents from Western civilization countries turned out to be generally more sensitive to privacy issues than residents of India. However, it is important that Indian respondents were aware of the existence of a similar payment application offered by their government. This may suggest that in other countries (including the eurozone) the attitude towards central bank digital money will change along with the conclusions from observations of its functioning. Therefore, trust in the institutional framework for the functioning of CBDCs turns out to be an important issue in this study as well.

Among the studies on the adoption of CBDC by potential users that do not concern eurozone countries, it is worth mentioning the article by Fadli et al. (2023). Contrary to the objections to the UTAUT method formulated by Tronnier et al. (2023), this method is the basis of the reported study in combination with the Institutional Trust Theory (ITT). However, the authors do not refer to users' trust in the institutions providing the technology, but to trust in the technologies themselves, which suggests that ITT was not properly implemented in the study and the entire weight of the study rests on UTAUT. An important conclusion from this study is that the influence of people (e.g. colleagues, family, people who are valued in the community) can encourage the use of CBDCs and that social influence has the strongest and

most important influence in building CBDC adoption intentions. This article also emphasizes the importance of building in CBDC functional features that give it an advantage over previously available alternatives, so that central banks can count on the quickest and widespread adoption of this new form of money.

Against the background of the above review of research on the factors of adoption of the digital euro, it should be emphasized that the research described in our article is distinguished by a comparative approach, juxtaposing the attitudes of potential users from France and Germany towards the new form of money. The differences observed in the example of only these two countries support the conclusion of Abramova et al. (2023) about the need to conduct this type of research either in the entire eurozone or in selected eurozone countries with specific payment habits. However, in such a case, it would be advisable to take a broader approach to the personal characteristics of respondents and the list of factors that may shape the readiness to use the digital euro by ordinary people.

Conclusions

The research presented in this article sought to capture the factors that may influence consumer acceptance of the retail digital euro. What is important in the research conducted is that it covered adult internet users from the two largest countries in the euro area in terms of population and area, i.e. France and Germany. The samples of 700 respondents from both countries are representative in terms of gender, age and size of the place of residence.

Bearing this in mind, the obtained results of the research are interesting. They show that in both countries the consumers most willing to accept the digital euro are men rather than women, consumers already taking advantage of the opportunities offered by mobile banking, and consumers who believe that the money entrusted to banks is not safe. Only in Germany, the use of cryptocurrencies turns out to be related to the readiness to accept the digital euro. In France, by contrast, such acceptance is often shown by high-income consumers and by consumers who use bank cards.

Compared to intuitive expectations, the surprising result of the research is the lack of both positive and negative links between age, education, use of internet banking and the willingness to accept the digital euro.

The above results mean that in both analysed countries the H1 hypothesis that 'demographic characteristics of German and French consumers have an impact on their readiness to use the digital euro' was only partially confirmed in terms of gender. However, it has not been confirmed as to age and education. The H2 hypothesis, assuming that the use of existing non-cash payment methods by German and French consumers has an impact on their readiness to use the digital euro has not been clearly verified, because only the use of mobile banking turned out to be important in both countries, the use of a bank card only in France, and the use of online banking showed

no significance in either Germany or France. The verification of the H3 hypothesis assuming that German and French consumers' trust in banks has an impact on their readiness to use the digital euro showed a negative relationship between this trust and the acceptance of the digital euro. In Germany and France, people who believe that money entrusted to banks is not safe show more interest in using the digital version of the single currency.

Summarizing the results of the research presented above, it is important to underline the potential problem that the ECB will probably have to face when it decides to introduce the digital form of the single currency. There are currently 20 countries in the euro area, and Bulgaria and Romania are making efforts to join as soon as possible. First, the degree of acceptance or resistance to the digital euro may vary significantly between euro area countries, both in terms of level and causes. Secondly, in order to efficiently disseminate the use of the digital euro in all euro area countries, the ECB should appropriately differentiate its approach to the societies of individual countries. In order to determine the scale and nature of the correct differentiation of the digital euro promotion, it would be necessary to conduct, separately in all euro area countries, extensive research into the attitude of consumers as future users of this form of money.

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Appendix A

Kendall's tau-b correlation matrix (Germany)

	Y	Gender	Age	Education	Income	Bank card	Crypto	Internet banking	Mobile banking	Trust
Y	1.000									
Gender	-.137**	1.000								
Age	-.104**	.049	1.000							
Education	-.005	-.082*	-.069*	1.000						
Income	.093**	-.202**	-.052	.218**	1.000					
Bank card	.080*	-.012	-.059	.055	.104**	1.000				
Crypto	.183**	-.086*	-.208**	.029	.093**	.027	1.000			
Internet banking	.121**	-.054	-.093**	.027	.082*	.085*	.104**	1.000		
Mobile banking	.168**	-.119**	-.267**	.045	.111**	.130**	.151**	.433**	1.000	
Trust	-.103**	.061	-.100**	-.045	-.085*	.049	.031	.063	.034	1.000

** significant correlation at the level of 1%; * significant correlation at the level of 5%

Source: Authors' own study.

Appendix B

Kendall's tau-b correlation matrix (France)

	Y	Gender	Age	Education	Income	Bank card	Crypto	Internet banking	Mobile banking	Trust
Y	1.000									
Gender	-.155**	1.000								
Age	-.037	.066	1.000							
Education	.081*	.000	-.237**	1.000						
Income	.120**	-.094**	.102**	.241**	1.000					
Bank card	.159**	-.056	.018	.034	.048	1.000				
Crypto	.090*	-.146**	-.222**	.098**	.107**	.035	1.000			
Internet banking	.093*	-.078*	-.094**	.117**	.115**	.272**	.093*	1.000		
Mobile banking	.213**	-.125**	-.324**	.150**	.111**	.158**	.194**	.303**	1.000	
Trust	-.190**	.057	-.093**	.031	-.066*	-.115**	.000	-.068	-.040	1.000

** significant correlation at the level of 1%; * significant correlation at the level of 5%

Source: Authors' own study.