

Developments in cashless payments in the EU and the introduction of a digital euro

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summary

Cashless payments in the EU have developed in recent years, although not uniformly across regions and countries. Contactless payments are also on the rise, driven by the spread and improved performance of smartphones. This has been accompanied by a decline in the number of branches and ATMs of banks and other financial institutions, while the development of cashless payments in the EU has been card-led, partly due to the introduction of a cap on interchange fee for card payments from 2015 onwards. In line with the increase in non-cash payments, the introduction of a central bank digital currency, a digital euro, is being considered, with a decision on the implementation period scheduled for July-September 2023.

Keywords: cashless payments, contactless payments, interchange fees, central bank digital currency, digital euro

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1 Introduction

This paper identifies the progress of cash-

less payments, particularly in the Nordic countries, and, as an extension, looks ahead to the introduction of a digital euro, a central bank digital currency in the euro area.

Even within the EU countries, there are considerable disparities in the progress of cashless payments between countries. As a general trend, the proportion of cash payments is high in southern European countries, and cashless payments are not yet well developed. In Germany, the centre of the EU economy, the proportion of cash payments has traditionally been high and cashless payments have lagged behind. Despite these circumstances, cashless payments are rapidly progressing in Finland and the Netherlands as euro participants, and in Denmark and Sweden as EU member states that do not participate in the euro. Cashless payments are also progressing in the three Baltic states that participate in the euro, namely Estonia, Latvia and Lithuania. Thus, among the EU countries, the Southern European countries tend to have a high proportion of cash payments and lag behind in cashless payments, while the Nordic countries have a low proportion of cash payments and are making progress in cashless payments. The question of why cashless payments are progressing in the Nordic countries and how the development of cashless payments will affect bank management is first of all the focus of this paper.

As cashless payments progress, the need for cash decreases. As a result, the need for cash withdrawals will also decrease, which will lead to a decrease in the number of bank branches and ATMs. As a precondition for this, the num-

ber of banks will also tend to decrease. The development of a cashless society will also place an increased burden on banks to invest in information technology (IT). A report by the Finnish Central Bank states that investment in digitalisation is positive for bank management in the long term, as it is an investment in the future.

2 Developments in cashless payments in the EU

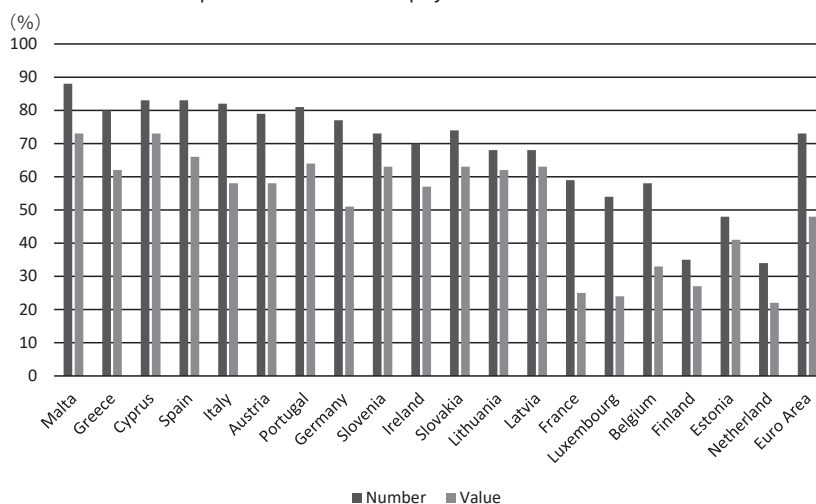
2.1 Cash and cashless payments in Europe

First, the current status of cashless payments in Europe is clarified. Cashless payments are defined below as payments (settlements) that do not involve the use of cash. Strictly speaking, payments by cheque or credit card are not final settlements. This is because the debit from the bank account is the final settlement. However, this is not a question and payments by cheque or credit card are also cashless payments.

On average (as of 2016) across the euro area, in terms of number of cases, 78.8% were in cash, 19.1% in cards and 2.1% in others. In terms of value, 53.8% were cash, 39% were cards and 7.2% were other.¹⁾ By country, the country with the highest proportion of cash transactions was Malta, with 92% of transactions by number and 74% by value. Greece also had, in the same order, 88% and 75%.

1 ECB (2017), p19

Graph 1 Share of cash payment at POS and P2P



(source) ECB (2020a)

Spain 87% and 68%, and Italy 86% and 68%. Thus, in the south countries, the proportion of cash transactions tended to be higher in European countries. Graph 1 shows the proportion of cash payments at the point of sale (POS) and P2P (person-to-person) in each country as of 2020. On average across the Eurozone as a whole, 73% of payments by number and 48% by value are cash payments, a decline of around 5 percentage points in both number and value terms over a four-year period. Firstly, it can be seen that the proportion of cash payments has decreased in the euro area as a whole. For southern European countries, the cash payment ratio also generally decreased in 2020 compared to 2016. In Greece in particular, the cash payment ratio in value terms fell by 13 percentage points

from 75% (2016) to 62% (2020), but as discussed below, the increase in contactless payments appears to have contributed to this.

On the other hand, as of 2016, the country with the lowest proportion of cash transactions was the Netherlands, at 45% by number and 27% by value. In the Netherlands, the proportion of cash used by households was less than half in terms of number and less than a third in terms of value. In Finland, in the same order, the basic proportions were 54% and 33%, slightly higher than in the Netherlands, but at the same basic level. The Baltic States, including Estonia, Latvia and Lithuania, also had low cash ratios, especially in Estonia, which was almost at the same level as the Netherlands and Finland.²⁾ The Baltic States are geographically adjacent to Fin-

2 (<https://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tec00114&plugin=1>) Estonia, Latvia and Lithuania introduced the euro in 2011, 2014 and 2015 respectively. However, the economic level was not high, with a GDP per capita of 81 in Estonia, 81 in Lithuania and 70 in Latvia (both indexed to the EU average of 100).

land and other Nordic countries and have a lot of human interaction, which appears to have been influenced by Estonia and other countries.

As of 2020, as Graph 1 shows, the proportion of cash payments in the Netherlands has further decreased to 34% by number and 22% by value. In Finland, the ratios were 35% and 27% in the same order, and in Estonia they also fell to 48% and 41%. The proportion of cash payments (by value) has also fallen to 25% in France and 24% in Luxembourg. It can be said that non-cash payments are spreading across the euro area.

Across the euro area as a whole, including non-cash, the average value in payment instruments (2016) is EUR 12.8 for cash, EUR 36.9 for cards and approximately EUR 61.9 for 'other'. 'Other' includes cheques, direct debit and bank transfers (credit transfer). Cash tends to be used for smaller payments, while cards and other means are used for larger amounts.

The 'financial exclusion' ratio has been highlighted as a factor that defines a high or low cash payment ratio, or a high or low cashless payment ratio.³⁾ Financial exclusion ratios are measured by the number of bank accounts and non-cash transactions per capita. According to the European Commission, financial exclusion refers to difficulties in accessing financial services and products. Therefore, specifically, the lower the number

of bank accounts per capita, etc., the more difficult it is to access financial services and the higher the financial exclusion ratio. A high financial exclusion ratio means a low cashless payment ratio and a high cash payment ratio.

As discussed below, this argument is valid for developing and emerging countries, but not for developed countries such as Japan and Germany. However, the counter-concept to the financial exclusion ratio is the financial inclusion ratio, and it is true that the financial inclusion ratio tends to be higher in Nordic countries such as Finland and Sweden, and that the cashless payment ratio is higher in the Nordic countries.

The specific characteristics of cash payments are, first, that the social costs of cash transactions are borne by the central bank and commercial banks. The social costs of cash transactions are related to the issuance of banknotes and coins (including their disposal) and the maintenance and distribution of cash transaction infrastructure. The central bank is responsible for the issuance and disposal of central banknotes, but bears the costs. Private commercial banks are responsible for cash operations at their branches, as well as the installation and maintenance of ATMs and the costs of cash transportation.

The second of the qualities of cash transactions is their anonymity, an advantage highly valued by consumers. Anonymity is a characteristic of cash that distinguishes it from other

3 Jakub Gorka (2016), p38

means of payment: cash transactions cannot be traced. For those who wish to protect their anonymity, cash transactions are the best option. With credit card payments, individuals can be identified, but not with cash.

The third characteristic of cash transactions is the speed of payment. Whereas credit cards take time to debit a bank account, cash payments are completed instantly. Another important factor for cash transactions is the fact that cash is a perceived possession and can be used at any time.

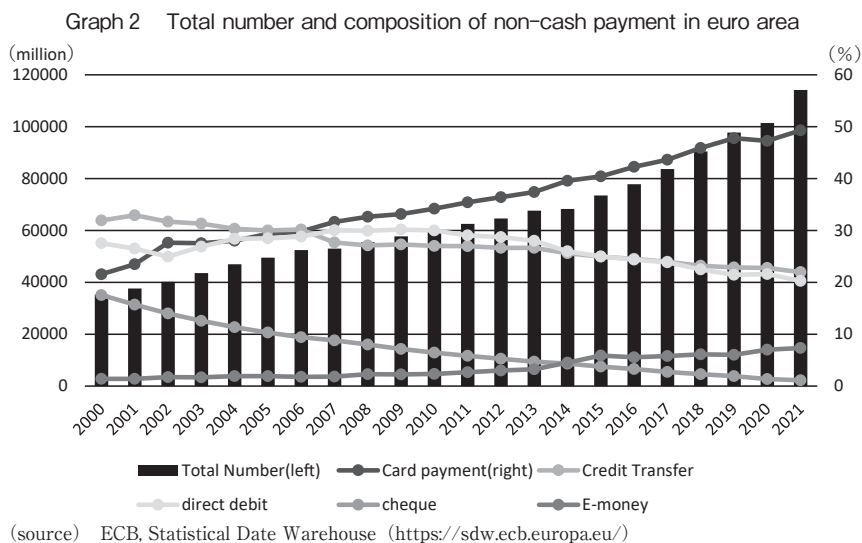
The fourth characteristic of cash transactions is that the costs of cash transactions are multifaceted and depend on the position in the cash transaction, i.e. whether one is a consumer or a seller. Consumers consider cash transactions to be free (zero cost), due to the fact that there are no costs imposed on non-cash transactions (e.g. costs with credit cards). However, this understanding is incorrect. The price of goods and services hides payment costs (e.g. fees on credit cards incurred by the seller). Thus, consumers who pay in cash indirectly bear the costs of non-cash transactions.⁴⁾

Cashless payments are making progress in Europe. Graph2 shows the number and composition (by number) of cashless (non-cash) payments in the euro area. The number of non-cash payments increased from 35.28 billion in 2000 to 114.18 billion in 2021. Card payments (credit and regular debit cards) are

the main source of non-cash payments in the euro area, rising from 21.6% of the total number of non-cash payments in 2000 to 49.3% in 2021. This was followed by bank transfers (credit transfers), which accounted for 31.9% of non-cash payments in 2000, but had fallen to 22% by 2021. This may be due to a shift from bank transfers to card payments, as the maximum payment limits for credit card payments were raised. For debit cards (direct debit), the share was 27.5% in 2000, but fell to 20.3% in 2021. Card payments include regular debit cards (debited from bank accounts via credit companies rather than the direct type, which debits directly from bank accounts), which appears to have shifted towards regular debit cards. On the other hand, cheques, the traditional non-cash means of payment, fell from 17.6% in 2000 to 1.13% in 2021. Cheques, along with bills, are paper-based and are seen to have been shunned due to the need to carry them around.

However, Graph 2 is a Eurozone total, and there is considerable variation across countries. First, in terms of card payments (based on number of payments), the percentage in Estonia fell from 67% in 2017 to 63.9% in 2021, also in Latvia, rising from 59.7% to 62.8%, and in Finland, falling from 63.5% to 61.6%, although the percentage is still quite high. These baltic sea countries are advanced in fintech. On the other hand, card payments rose from 21.1% to 30.3% in Germany, but at a

4 Jakub Gorka (2016), p41



lower level.⁵⁾ As for debit cards, they accounted for 43.1% (2021) in Germany, but were rarely used in Finland and other Baltic countries. For bank transfers, the share was 26.1 % in Germany and 32.4 % in Finland in 2021.

In value terms, bank transfers rose from a euro area average of 91.6% in 2017 to 93.5% in 2021. On the other hand, card payments and debit cards (direct debits) accounted for only 1.1% and 3.7% respectively in 2021. In terms of number of payments, bank transfers account for only 22% on average in the euro area, card payments for 49.3% and direct debit cards for 20.3%. This means that bank transfers are used for high value payments, while credit and debit cards are used for relatively small payments. Bank transfers are used for high value transactions such as cars

and houses, while cards are seen to be used for meals etc. Credit cards usually have a maximum spending limit and cannot be used for high value purchases.

Recently, there has been a flurry of research on payment methods and costs in Germany and elsewhere in Europe. According to Deutsche Bundesbank, in Germany, 76.1% of the 2 million payments in 2017 were cash payments and 22.8% were card payments.⁶⁾ The breakdown of card payments was 14.3% for girocards (in Germany, the payment account for everyday life is called girokonto, and cards settled from this account are seen as debit cards), 4.9% for debit cards (direct debit, SEPA), 2.9% for credit cards, and others 0.7%. In terms of payment method in terms of value, the proportion of non-cash payments is higher, with cash and card payments account-

5 ECB (2018), ECB (2022e)

6 Deutsche Bundesbank (2019), p66.

ing for 48.3% and 48.6% respectively. The breakdown of card payments is 30.1% for giro cards, 10% for debit cards and 6.9% for credit cards.

According to Deutsche Bundesbank, there are three factors for cash and four for non-cash as costs of payment. In common with cash and non-cash, the first factor is time at the cashier. The time involved in payment at the point of sale matters and is a labour cost for employees. The second factor is the background factor at the point of sale (POS) : preparing cash, organising receipts for card payments, preparing change, etc. In the case of cash payments, the third factor is to organise and store the cash (e.g. in a safe). In the case of card payments, transaction costs are the third factor. The fourth cost is specific to cashless payments and is terminal costs, including maintaining and updating software.

Deutsche Bundesbank estimates the above costs for cash, girocards, debit cards, credit cards (PIN number) and credit cards (signature) : per transaction, cash costs EUR 0.24, girocards EUR 0.33, debit cards EUR 0.34, and credit card (PIN number) costs EUR 0.97 and credit card (signature) EUR 1.04. However, if this is converted into a sales ratio, cash costs 1.8%, giro cards 0.67%, debit cards 0.97%, credit cards (PIN number) 1.7% and credit cards (signature) 1.82%.

In Germany, payment costs totalling approximately EUR 5.4 billion per year are incurred, of which approximately EUR 3.77 billion are cash payment costs, or EUR 0.24 per

payment, which is 1.8% of sales as a percentage of turnover. On the other hand, the total cost of girocard payments is approximately EUR 600 million, but 0.67% as a percentage of turnover. Therefore, as a retailer, cash is cheaper in terms of value, but the girocard is the cheapest as a percentage of turnover.

One of the reasons behind the decline in cash transactions and increase in non-cash transactions in Europe is the introduction of a cap on cash payments. Table 1 shows the limits on cash payments in Europe. The earliest cash payment cap was introduced in France in 2002. In France, the ceiling for resident and non-resident traders (traders) is €3,000 and for non-resident consumers €15,000 . Outside France, cash payment caps have been introduced relatively recently, in most cases between 2011 and 2014. In Greece, it was introduced in 2011 and is €1,500 between consumers and entrepreneurs and €3,000 for BtoB (companies paying companies). In Italy, introduced in 2012, cash payments are only allowed up to a flat rate of EUR 1,000 . The same applies to Portugal. In Spain, introduced in 2012, residents are only allowed to pay EUR 2,500 .

With the exception of France, Greece, Italy, Portugal and Spain are all countries with a high proportion of cash transactions, as also shown in Graph 1. In countries with a high proportion of cash transactions, cash payment caps are set, and, like Italy and Portugal, these caps are as low as EUR 1 000.

The background to the introduction of cash payment caps in Europe has been linked to

Table 1 Cash Payment restrictions in European countries :an overview

Country	Cash limits	Date of introduction	Reporting entities
Belgium	3000EUR	Jan-22	
Bulgaria	15000BGN	Feb-22	Natural persons and entrepreneurs
Czech	350000CZK	Jan-22	Natural persons and entrepreneurs
Denmark	10000DKK	Jul-22	Natural persons and entrepreneurs
France	3000EUR	Jan-22	Residents and non-resident trader
	15000EUR		Non-residents consumers
Greece	1500EUR	Jan-22	Payments between entrepreneur and consumer
	3000EUR		B2B payments
Hungary	1500000HUF	Jan-22	Legal persons
Italy	1000EUR	Dec-22	
Portugal	1000EUR	May-22	
Slovakia	5000EUR	Jan-22	Natural persons
	15000EUR		
Spain	2500EUR	Nov-22	Residents
	15000EUR		

(source) Jakub Gorka (2016) p62

money laundering.⁷⁾ As already noted, a special quality of cash is its anonymity. Therefore, cash is more likely to be used for funds involved with crime and fraud. Against this background, cash payments have been capped in Europe. Cash payment limits were introduced not only to prevent money laundering, but also to prevent tax evasion and tax avoidance. As cash transactions are not recorded, they were seen as easy to use for tax evasion and tax avoidance.

2.2 Increase in contactless payments

Contactless payments are increasing in line with the rise in cashless payments. Contact-

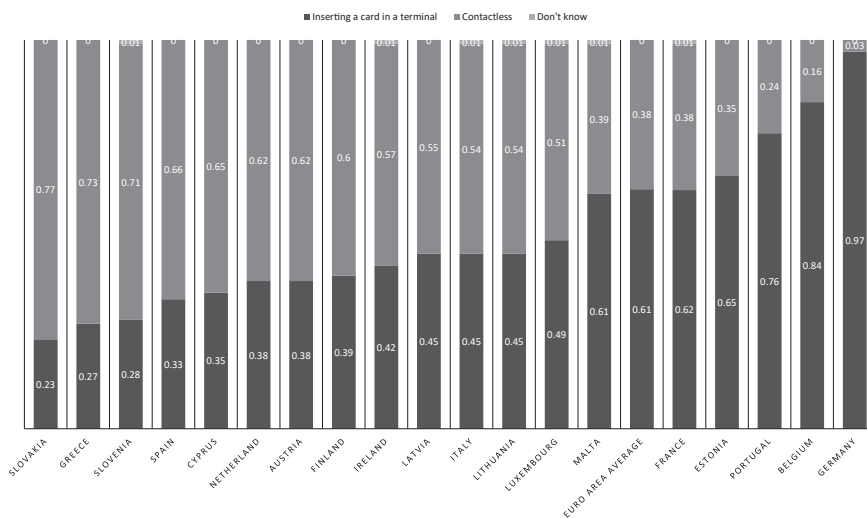
less payments are made using near-field communication technology with a card (debit or credit card) or smartphone in your possession. In this case, a PIN (Personal Identification Number) is not required up to a certain amount; as of 2020, in Germany, PIN entry is not required up to EUR 25. In France, PIN entry is also not required up to EUR 20, but this will be increased to EUR 30.

An advantage of contactless payment is the time savings in the payment process. Contactless card payments can be made without inserting the card into a card reader. The average payment time is considered to be 10-15 seconds and no identification is required.⁸⁾

7 Jakub Gorka (2016), p62

8 Deutsche Bundesbank (2019), p66.

GRAPH 3 COMPOSITION OF CARD PAYMENTS (NUMBER OF TRANSACTIONS)



(source) ECB (2020a)

Payment is completed simply by holding the phone over the reader.

In the euro area as a whole, the breakdown of contactless payments by value shows that 35% are under €5, 29% are between €5 and €10, 20% are between €10 and €15, 10% are between €15 and €20 and 6% are between €20 and €25.⁹⁾ 35% spend less than €5 and a total of 65% spend less than €10, with small purchases taking centre stage. Coffee or beer in town is the main focus, with lunch at most the upper limit.

Looking at the demographics of those who use contactless payments, the index is higher for men (1.11) and women (0.89) (with the average consumer in the Eurozone being indexed as 1). By age, the index is 0.95 for those aged 18-24, 1.25 for those aged 25-39,

and declines with increasing age, with 0.85 for those aged 65 and over. It is still higher in the younger age groups. By educational attainment, the figure is 0.75 for those with a low level of education, compared with 1.32 for those with a high level of education. It appears that education background correlates with income levels and is reflected in the use of credit cards and smartphones.¹⁰⁾

When looking at contactless payments by country, the proportion is considerably higher in the Netherlands. When looking at contactless payments by country (as of 2016), they amount to 9.6% of payments at the point of sale in the Netherlands. Slovakia follows with 4.3% (EUR 25 or less) and Austria with 2.5% (same). On the other hand, contactless payments are low in countries with a high pro-

9 ECB (2017) p30

10 In this context, academic qualifications mean secondary school, high school and university degrees. In Germany, for example, the so-called pecking order between universities is basically non-existent.

portion of cash payments in Southern Europe - 0.5% in Spain, 0.4% in Italy and 0.3% in Portugal.

Although the same data is not available as of 2021, Graph 3 shows the composition of card payments (2021). It shows that the proportion of contactless card payments is 77% in Slovakia, 73% in Greece, 71% in Slovenia and 66% in Spain, and is rapidly increasing in southern European countries where cash payments have traditionally been the norm. Traditional card insertion payment used to require expensive card-reading machines, but contactless payment is seen to be increasing rapidly due to the widespread use of smartphones and other factors.

However, in Graph 3, more than 60% of contactless payments are also made in the Netherlands and Finland. The Netherlands, Finland and other Nordic countries are among the most cashless and fintech-advanced countries in Europe. As shown in Graph 1, the Netherlands and Finland have the lowest proportion of cash payments. And, as Table 2 below shows, the number of banks in the Netherlands has decreased by about a third since 2010. The Netherlands and Finland also have the lowest number of bank branches and ATMs in Europe. Therefore, it can be said that the development of cashless payment and fintech will have a significant impact on bank management.

It has been pointed out that one of the rea-

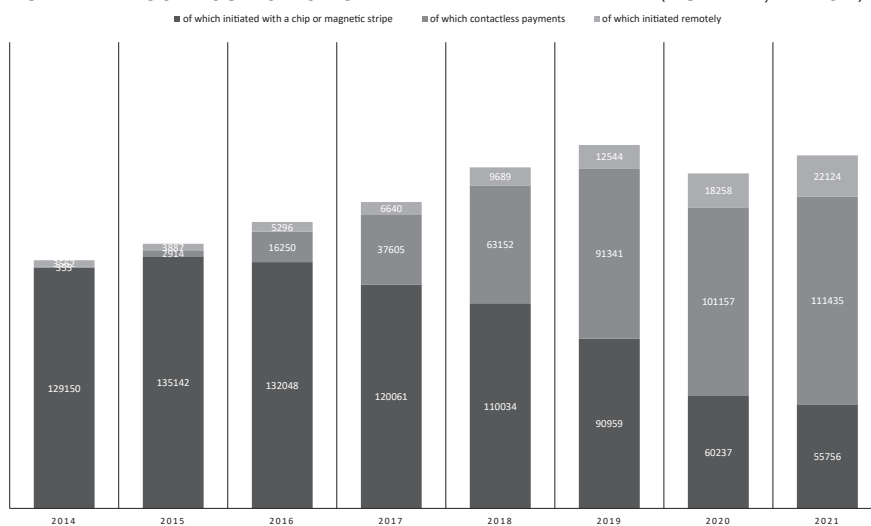
sons for the development of fintech and cashless transactions in the Nordic countries is that labour shortages have necessitated the introduction of fintech at retail checkouts and other points of sale. As already noted, fintech has enabled time savings at the point of sale. It is also noted that in the Nordic countries, snow in the winter months makes cash transport difficult. However, the biggest factor appears to be that the Nordic countries are highly digitalised and the digitalisation of society as a whole has affected the financial domain.

Bank of Finland, the central bank of Finland, publishes Payment statistics annually.¹¹⁾ According to this, approximately 3 billion payments were made in Finland in 2021. Of these, card payments and bank transfers accounted for 99%. Card payments continue to be the main form of payment, but contactless payments have increased rapidly in recent years. The use of cash continues to wane, reflecting the decline in cash withdrawals: in 2018, cash withdrawals from Finnish ATMs amounted to EUR 11.4 billion, a decrease of more than 20% compared to 2014. They further declined to EUR 6.8 billion in 2021, a 40% decrease compared to 2018.

At the end of 2021, there were more than 10.5 million payment cards in Finland (with a population of 5.5 million). Of these, about a third have debit, credit or deferred payment debit functions combined. In 2021, 10.3 million

11 Finland Bank (2018), (2022)

GRAPH 4 COMPOSITION OF CARD PAYMENT IN FINLAND (NUMBER, MILLION)



(source) Bank of Finland (2022)

cards will have contactless payment functionality and almost all cards will offer contactless payment. Debit cards are the most central payment method in Finland, accounting for 99% of all card payments by number and 85% by value in 2021.¹²⁾

Graph 4 shows the breakdown of card payments in Finland. It shows that traditional contact payments - payments made by card chips or magnetic stripes - declined from 129.15 billion in 2014 to 110.034 billion in 2018 and 55.756 billion in 2021. Contactless payments, on the other hand, jumped from 355 million in 2014 to 63,152 million in 2018, representing 35% of all card payments. It further increased to 11.435 billion in 2021, making it the centre of card payments. Remote payments also refer to payments that utilise the

internet and distance communication technology (distance communication). Remote payments reached 22.1 billion in 2021, accounting for 11.7% of card payments.

PSD2 (The Revised Payment Services Directive)¹³⁾ made changes to online payments from September 2019 onwards. In Germany, Google had already been in the payment business since June 2018, Apple since December 2018, Amazon since 2011, Alipay since July 2016 and WeChat since November 2017. PSD2 lifted the ban on APIs from September 2019 and non-banking providers will be able to access bank account information.¹³⁾ In terms of payments, the changes currently include not only the opening of bank accounts to third parties. Instant payment, i.e. daily payments in seconds, or in other words, in real

12 Generally, in Europe and the US, there is no fee when money is transferred by debit card through PayPal. The spread of debit cards in Europe and the US is closely related to PayPal.

13 Deutsche Bundesbank (2019), p55

real time, is a challenge. The rapid spread of smartphones and the increasing market share of US and Chinese big tech giants will change the way payments are made, according to Deutsche Bundesbank.

2.3 Decrease in the number of branches and ATMs

As we have seen above, cashless payments and fintech are progressing in Finland and other Nordic countries and the Netherlands, but we will clarify how the number of banks, branches and ATMs is in these countries.

Table 2 shows the number of banks in Finland ,other Nordic countries, the Netherlands and the Baltic States. Denmark and Sweden are members of the EU but do not participate in the euro, while the Baltic States of Estonia, Latvia and Lithuania have joined the EU and then the euro. The Baltic states were former members of the Soviet Union, but are now independent and have close relations with the Eurozone countries and Finland.

Originally, Finland had 338 banks in 2010,

which fell to 271 in 2014 and to 198 in October 2022. Thus, there were 140 fewer banks in 12 years, a 41% decrease compared to 2010. The number of banks has also declined in the Netherlands more than in Finland, from 290 in 2010 to 84 in 2022, a decline of 206 banks in 12 years, also a decline of 71%. This is said to be due to the unification of the multiple banking licences previously issued for Rabo banks, which are co-operative financial institutions, in the Netherlands. In any case, however, the number of banks is rapidly declining in Finland and the Netherlands, where FinTech is progressing.

The number of banks has also decreased in other Nordic countries outside Finland, such as Denmark and Sweden. In Denmark, the number of banks fell from 161 to 92, and in Sweden from 173 to 157. Thus, a rapid decline in the number of banks can be observed in the Nordic countries, where fintech and cashless payments are progressing. In Estonia and Latvia, the number of banks increased between 2010 and 2019. This appears to be due

Table 2 Total number of credit insitutions in the northern european countries

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Estonia	18	17	16	31	37	39	38	36	37	40	39	40	35
Latvia	39	31	29	63	59	61	57	54	54	54	50	49	45
Lithuania	87	92	94	91	89	90	88	83	85	84	81	81	81
Finland	338	327	313	303	271	281	279	267	257	243	228	209	198
Netherlands	290	287	266	253	218	209	96	92	93	94	87	86	84
Denmark	161	161	161	161	119	113	110	100	98	98	100	94	92
Sweden	173	175	176	168	159	153	153	156	153	155	154	151	157

(Source) ECB Homepage (https://www.ecb.europa.eu/stats/ecb_statistics/escb/html/table.en.html?id=JDF_MFI_MFI_LIST)

(Footnote) Data is available at the end of callender year,but only 2022 October.

Table 3 The Banks in the northern european countries and Japan

(\$ million, %)

	Ranking	Tier 1 capital	Assets	Capital assets ratio	Pre-tax profit	ROE	ROA
Finland							
Nordea Group	66	32,968	648,128	5.09	5,609	13.2	0.67
OP Pohjola Group	136	13,597	197,852	6.87	1,281	7.55	0.52
Saving Bank Group	723	1,246	14,863	8.38	102	6.64	0.56
Denmark							
Danske Bank	78	26,199	599,975	4.37	2,526	7.52	0.33
Nykredit	139	13,208	255,103	5.18	1,635	10.23	0.53
Jyske Bank	257	5,729	98,647	5.81	614	8.45	0.49
Estonia							
Swedbank Estonia	FOS	1,725	18,769	9.19	248	12.43	1.14
Luminor Bank Estonia	620	1,625	15,133	10.74	94	5.22	0.56
SEB Pank	FOS	1,051	9,023	11.65	131	10.74	1.25
Latvia							
Swedbank Latvia	FOS	982	8,522	11.53	85	8.5	0.98
Japan							
MitsubishiUFJ FG	12	126,440	3,053,365	4.14	12,172	7.8	0.32
Sumitomo Mitsui FG	21	91,391	2,105,430	4.34	7,595	6.39	0.28
Mizuho FG	25	79,357	1,936,815	4.1	4,934	5.59	0.23
Netherland							
ING	40	58,773	1,081,042	5.44	7,698	9.47	0.51
Rabobank	48	46,278	726,790	6.37	5,542	9.07	0.58
ABN Amro	83	24,077	453,538	5.31	2,089	5.82	0.31
Sweden							
SEB Group	105	18,626	365,512	5.1	3,414	15.1	0.77
Svenska Handelsbanken	107	18,031	370,217	4.87	2,730	11.99	0.58
Swedbank	118	15,821	304,272	5.2	2,856	14.59	0.76

(source) *The Banker*, July 2022

to the expected economic growth in the emerging economies and the presence of foreign banks. As Table 3 shows, most major banks in Estonia and Latvia are foreign-owned.

Table 3 shows the management indicators of major banks in Finland, other Nordic coun-

tries, the Netherlands and Japan. First, the largest Finnish bank is Nordea Group, with a world rank of 66 and total assets of USD 648.1 billion, followed by OP Pohjola Group, with a world rank of 136 and total assets of USD 197.9 billion. These two banks are considered commercial banks; other foreign commercial

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banks include Danske Bank (Denmark) and Handelsbanken (Sweden), but on a smaller scale. The total assets of the savings bank group are also small at USD 14.9 billion.

As for Dutch banks, ING is ranked 40th in the world with total assets of USD 1.081 trillion, Rabobank is ranked 48th in the world with total assets of USD 726.8 billion and ABN Amro is also ranked 83rd with USD 453.5 billion.

When comparing Nordic and Dutch banks with their Japanese counterparts, there are marked differences in ROE. Nordea in Finland has a ROE of 13.2%, Swedbank Estonia also 12.43% and SEB Group in Sweden 15.1%. Profitable banks in Europe generally have ROEs of more than 10%. In contrast, the ROEs of Japanese banks are generally in the single digits, with Mitsubishi UFJ at 7.8%, Sumitomo Mitsui at 6.39% and Mizuho at 5.59%.

A possible reason for the low ROE is excessive equity capital. However, looking at the capital adequacy ratio (Tier 1 divided by assets), Japanese banks are generally in the 4% range, which is seen as low compared to Nordic banks. Therefore, it is not that European banks are undercapitalised and have higher ROEs.

It is likely that it is the profit to sales (revenue) ratio that defines the difference in ROE. Looking at expense ratios (2018), Nordic and Dutch banks are in the 40-50% range, while Japanese banks have higher expense ratios in

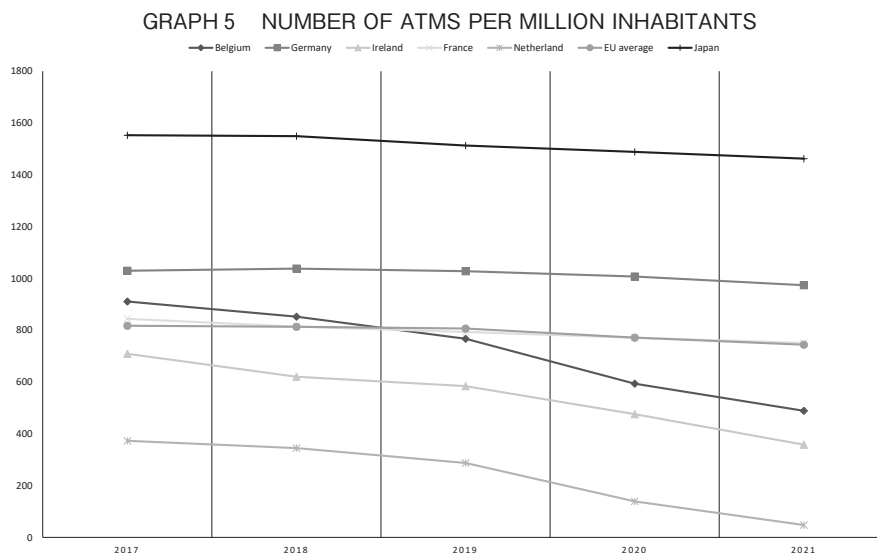
the 60-70% range.¹⁴⁾ The main expense items for Japanese banks are considered to be personnel and property costs, which, in addition to the large number of employees, are likely to be high in terms of branch costs. Computer-related costs are also significant.

Nordic banks are ahead in fintech and cashless payments, but are investing heavily in IT-related investments; IT-related investments are seen as a long-term driver of bank profitability, but a short-term drag. Transforming from a bank with many branches to a digitally agile bank requires a lot of effort. Nordic banks are allocating around 35% of their funds to IT investments, while European banks are allocating around 20%, with Nordic banks allocating more funds to IT investments. The Central Bank of Finland's report sees digitalisation symmetrically with the multi-store, multi-employee business as the business of private banks. This is because bank digitisation increases bank profitability in the long term, and reduces costs. This is because digitalisation leads to a reduction in branches and overheadcost, but automates much of the work. In this case, new technologies such as AI (artificial intelligence) and block chain are particularly important for banks.¹⁵⁾

However, the digitalisation of the banking sector brings new competitors. These are multinational digital banks and fintech startups. It also allows giant IT firms, IT compa-

¹⁴ *The Banker*, July 2019

¹⁵ Bank of Finland (2019)



(source) ECB (2022e)

(footnote) Japan includes convenience store ATM, which is calculated by author.

nies such as Apple, PayPal and Google, to supply financial services. Competition from giant IT companies is likely to reduce the prices of financial services provided by banks.

Look at the number of branches per million population for payment institutions. Payment institutions are not only banks in the narrow sense, but also financial institutions in the broader sense where payments can be made. According to this, the Netherlands had the lowest number of payment institutions branches in 2017 with 123, followed by Sweden with 164, Denmark with 206 and Finland with 221. 2021 saw a significant decrease in the number of payment institutions branches in the Netherlands with 78, Sweden with 123, Denmark with 168 and Finland with 157. The number of branches has all decreased significantly. In addition to this, Estonia had 420 branches in 2017, which fell significantly to 95

in 2021, while Latvia also saw a sharp decline from 452 to 63 branches. The low number of branches can be seen in the Nordic countries and the Netherlands, where fintech is more advanced. After all, fintech and other forms of financial digitisation are likely to move in the direction of fewer branches and fewer staff.

Graph 5 then shows the number of ATMs per million inhabitants. The lowest number of ATMs is still in the Netherlands, with a sharp decline from 373 in 2017 to 48 in 2021, a drop of around one-seventh. The decline is particularly significant from 2019 onwards. In Belgium, the number of ATMs has also halved, from 911 to 489, and in Ireland, the number has also almost halved. In Germany, on the other hand, the pace of reduction has been slower, falling only from 1,030 to 974 ATMs. The number of ATMs (including convenience stores) in Japan stands out, with only a de-

crease from 1553 to 1462.

The question is why has fintech advanced in the Nordic countries, such as Finland and the Baltic countries? It is thought that in the Nordic countries and elsewhere, the internet and smartphones are well established in society as a whole, and that this digitalisation has been reflected in the financial domain. It is probably not unconnected with the fact that Nokia, the world's leading smartphone manufacturer, was a Finnish company. Within Europe, there is considerable variation in the number of smartphones owned per population (as of 2018). The highest number is in Finland, with around 150 phones per 100 people. This is followed by Denmark and Sweden with around 120 phones per 100 people. On the other hand, Hungary has around 40 vehicles per 100 people and Portugal around 50. There is a fourfold difference between Finland, which has the largest number of smartphones, and Hungary, which has the smallest.¹⁶⁾ In Finland, tax returns and other tax payments are not filed on paper, but electronically. As part of this digitalisation of society as a whole, the financial sector is also being digitised. The digitisation of banks leads to a reduction in the number of bank branches.

The cost-to-income ratios of the major European banks show that Nordic banks such as Finland are generally low: Swedbank at around 40%, Handelsbanken at around 45%,

SEB and Danske at around 50% and Nordea at around 55%. On the other hand, Deutsche Bank, Commerzbank and UBS have high cost ratios, at around 90%, 85% and over 80% respectively. The Nordic banks are considered to be more efficient in their management and have lower cost-to-income ratios because of the IT-related investments they have made. However, low profitability and NPL problems do not allow them to invest more in IT and digital investments. This will further reduce the banks' profitability in the long term, as IT and digital investments will be a cost factor for the banks in the short term, but in the long term they will lead to increased management efficiency and profitability, according to a report by the Central Bank of Finland.

As already noted, Latvia ranks first in the euro area as a country with the lowest number of bank branches per population, and the Baltic countries are also among the countries where fintech and banking digitalisation is progressing. Already in Graph 1, Estonia was ranked second as a low country in terms of the proportion of cash transactions. In terms of the number of ATMs per million inhabitants, Latvia has 252.6 (in 2021), the lowest number in the euro area. Thus, the three Baltic states (Latvia, Estonia and Lithuania) are also cashless countries.

A number of fintech start-ups have emerged in the Baltic States. Estonia's TransferWise was founded in 2011, and in its seven

¹⁶ Bank of Finland (2018).

years of existence, has created a revolutionary way to send money abroad. It is one of the fastest growing companies in Europe and has successfully raised EUR 1.4 billion (November 2017.¹⁷⁾ Crassula, based in the Latvian capital, Riga, provides an API platform for banks and financial institutions; it was founded in 2015 by e-commerce and payments, banks, software engineers and others.¹⁸⁾ Latvian IT company easyBI is one of the 50 fastest growing companies in Central Europe, with a 442% increase in revenue over the past four years. easyBI provides a web-based service that extracts the necessary data from public data and generates reports and charts.¹⁹⁾ The Baltic countries, including Estonia and Latvia, have generally developed IT, not only in the financial domain, and as a result, fintech in finance is considered to have advanced.

As already seen in Graph 1, the proportion of cash payments in the Netherlands, Estonia and Finland is low and cashless payments are progressing. Contactless card payments are also advanced in the Netherlands and Finland, as seen in Graph 3. On the other hand, as seen in Table 2, the number of banks in Finland has decreased by 140, from 338 to 198, and in the Netherlands by 206, from 290 to 84. The number of branches per million people is also low, at 78 in the Netherlands and 63 in Latvia. Thus, an inverse relationship can be observed between the development of cash-

less and fintech technology and the number of banks, branches and ATMs. And, as seen in Table 3, Nordic and Dutch banks have higher ROE and higher profitability.

3 Cashless payments and digital currency

3.1 Card payments and interchange fee rates

The basis of cashless payments and fintech is card (credit and debit card) payments. As a fintech, payments are often debited from a deposit account via a card, even if the payment is made via a smartphone.

I indicates the number of card payments per capita. In Denmark, the number increased from 355 in 2017 to 392.6 in 2021. In Sweden, the number was 348.7 in 2017, increasing to 339.6 in 2021. In Finland, the number also increased from 298.3 to 341.6 cases. On the other hand, in the case of Malta (see Graph 1), where the proportion of cash payments is high, the number of card payments increased from 63.1 to 116.9. There is a nearly fourfold difference between the cases of Malta and the Nordic countries. Card payments are also well established in the Nordic countries.

European retail payments were originally disparate in different countries. The 28 countries, now integrated in the EU, used to oper-

17 *The Baltic Times*, February 26, 2019–March 26, 2019

18 *The Baltic Times*, January 29, 2019–February 26, 2019

19 *The Baltic Times*, 29 January 2019–February 26, 2019

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ate under different legal and technical systems. However, with EU integration, bank transfers and direct debit cards were largely harmonised across countries. For card payments, on the other hand, differences still remained in 2010.²⁰⁾

One of the remaining variances related to interchange fees for card payments. For card transactions, interchange fees are paid by the shop's credit card company to the consumer's credit card company. Differences in interchange fees affect the transaction fees paid by the shop and the consumer. Consequently, it is related to the payment habits of the consumer and the card authorisation of the shop. European Commission identified differences in interchange fees for card payments as an important factor explaining national differences in transaction fees and card payments.

The card payment process and the fees incurred are: for a debit card, (i) the consumer purchases the goods from the shop at a price P. (ii) The consumer agrees to pay, and the card payment company (bank in Europe) A checks the consumer's bank account balance and pays the product P plus a interchange fee F. However, banks rarely impose a clear amount for this transaction fee F. Nevertheless, banks regularly charge consumers a package of payment fees (including online banking, ATM fees, etc.). (iii) Card company A on the consumer side transfers the product P- (minus) fee (interchange fee) to the shop's

card company (bank) B. (iv) The shop receives the product P- fee from the transaction bank B.

With regard to this process, European shops (EuroCommerce members) have complained about bank fees (including interchange fees) for card payments. Shops have criticised banks for using fees to take rents from shops. National authorities and the EU Commission have investigated this in relation to antitrust law. In a number of cases, they concluded that interchange fee violate antitrust law.

After several years of litigation and research, a regulation on interchange fees for card payments was published by the EU in 2015. The aim was to lower the costs associated with card payments (for both shops and consumers) and remove barriers to card payments. It also sought to lower costs for shops by harmonising interchange fees across EU countries. Regulators outside the EU have also moved on this issue. The US FRB introduced a cap on interchange fees for debit and credit card payments in 2011.

Table 4 shows the average interchange fee rates for debit and credit cards in EU countries (as of 2010). Poland, Cyprus, Portugal and Romania were the countries in Table 4 with the highest card interchange fee rates, while Lithuania, Finland, Latvia and the UK had the lowest. In Finland, the fee rates are relatively low, ranging from 0.31~1.15% for

20 Jakub Gorka (2016), p149

Table 4 Overview of Interchange Fee Arrangements for Debit and Credit Card Payments in Europe

	Payment card scheme	Scope	Type of transaction	Interchange fee	
				Debit	Credit
Poland	Master	International	General trade	1.60%	1.45%
	Visa	International	General trade	1.45% + €0.05	1.50%
Cyprus	Master	International	General trade	1.75%	1.75%
	Visa	International	General trade	1.50%	1.50%
Portugal	Multibanco	Domestic	General trade	0.8% (€0.05~1)	na
Romania	Visa, Master, Amex	International	General trade	1 (online) ~ 1.5 (paper)	na
Lithuania	Visa	International	General trade	0.15~0.19% + €0.015	0.5~0.75%
	Master	International	General trade	0.1~0.13% + €0.05	0.14~0.18% + €0.05
Finland	International card	International	General trade	0.31~1.15%	0.9~1.125%
Latvia	Master, Visa	Domestic	General trade	0.5~0.6%	0.85~1%
UK	Master, Visa	Domestic	General trade	€ 0.107	0.90%

(source) ECB (2011)

debit cards and 0.9~1.125% for credit cards. In Lithuania, it was also considerably lower for MasterCard, ranging from 0.1~0.13% + €0.05 for debit cards and 0.14~0.18% + €0.05 for credit cards. It is still lower in the Nordic and Baltic countries, which are more fintech and cashless. Basically, card interchange fee rates are lower in countries where the number of card payments per capita is high and card payments are well established. As of 2022, credit card interchange fee rates are regulated at no more than 0.3% and debit card payment fees at no more than 0.2% in the EU.

3.2 Introduction of a digital euro

On 14 July 2021, the ECB issued a statement on its digital euro programme.²¹⁾ The main points of the statement were that the

digital euro programme would be studied over a period of two years, that a report on a digital euro had already been published, that a digital euro would complement and not replace cash, and that privacy would be guaranteed. It was further clarified that experimental work had been carried out in the past nine months and that this experimentation concerned areas such as the digital euro ledger, privacy and anti-money laundering measures, limiting the volume of digital euros in circulation and end-user access. The results of this work indicated that there were no significant technical obstacles.

Both choices, such as the small payment system by TARGET and the block chain, can process 40,000 transactions per second. Experiments have allowed for designs that combine centralised and decentralised elements.

21 ECB (2021)

Table 5 Task schedule of digital euro

Q 4 2021	Jul-21	<ul style="list-style-type: none"> · Governing Council decision to launch investigation phase · Project team on-boarding Governance set-up
Q 1 2022		<ul style="list-style-type: none"> · Use case prioritisation Report on focus groups with citizens and merchant
Q 2 2022		<ul style="list-style-type: none"> · On line/off line availability Data privacy level Transfer mechanism
Q 3 2022		<ul style="list-style-type: none"> · Design options to moderate take-up · Distribution model
Q 4 2022		<ul style="list-style-type: none"> Settlement model Amount in circulation Role of intermediaries Integration and form factor Prototype development
	Q 1 2023	<ul style="list-style-type: none"> · Compensation model Access to ecosystem Value added services Advanced functionalities Prototyping results
	Q 2 2023	<ul style="list-style-type: none"> · User requirements Preparation for possible project realisation phase decision making
	Q 3 2023	Sep-23
		<ul style="list-style-type: none"> Governing Council decision to possibly launch realisation phase

(source) ECB (2022c)

Digital euro was also environmentally sound, with 10,000 transactions per second consuming only a fraction of the power of crypto assets such as bitcoin.

Table 5 shows the timetable for the introduction of a digital euro, published in October 2022, with a start date of July 2021 and the above-mentioned statement: by the end of

2022, the settlement model, the balances in circulation, the role of financial intermediaries and the prototype of the digital euro are to be considered. A decision to enter the realisation phase is then expected by the third quarter of 2023.²²⁾

The first major issue in the design of CB-DCs, not just digital euros, is whether they

²² ECB (2022c).

should be direct-issue (one-tier) or indirect-issue (two-tier). In the case of direct issuance, the central bank issues directly. Traditionally, central bank notes are issued by the central bank but drawn via private banks, which represents a significant change. In the case of indirect issuance, it would be via private banks, but there are concerns about possible competition with traditional private bank deposits.

The second point is the question of whether the token type or the account type should be used. The token type has monetary value in the data itself. This is made possible by applying block chain technology (distributed ledger technology) and jointly managing the books of accounts. In the account type, the balance held by each person is managed in an account, similar to a deposit account in a private bank. As it is centrally managed by a central bank or similar, it is not anonymous and cannot be completed through face-to-face payments.

The third point is the question of whether or not to provide an offline payment facility. In the event of a disaster, it is important to be able to pay offline. Also of relevance, the question of whether to introduce card-based devices other than smartphones is also an issue. Measures for elderly people and others who are unable to use their smartphones are in mind.

The fourth point, already mentioned, is anonymity, or in other words, the issue of personal data and privacy protection. As discussed below, China's digital renminbi allows the cen-

tral bank to view transaction information.

In relation to the basic design described above, the impact of the introduction of CBDC has been discussed in various countries. First, there is a view that this may affect the conventional financial system and monetary policy. Related to the first point of the basic design, indirectly issued CBDCs compete with private bank deposits and the shift from deposits to CBDC will shrink the balance sheets of private banks. Second, to prevent the first point, capping CBDC holdings and transactions would be under consideration. In Bahama, there is a holding limit, Bahamian dollar 500 for small amounts and Bahamian dollar 5000 for medium amounts to individuals. Third, CBDCs can theoretically be attached to interest and can be either a sharp shift from the cash. On the other hand, there is also the view that it can be used as monetary policy.

CBDCs previously experimented with in various countries all share the commonality that they are indirect-issue and have no attached interest. However, they are divided as to whether they are account or token-based and whether they have an offline function. Pilot tests of CBDCs have been conducted in China since 2020 and are characterised by (i) a retail payment instrument, where the balance is managed through a smartphone wallet. Basically, it is account-based. (ii) It is an indirect issuance type, issued by the People's Bank of China and supplied through designated banks, etc. (iii) Offline payment function. Using short-range wireless communication

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technology, direct payment can be made even between smartphones. (iv) It is centrally managed and uses a block chain. (v) There is no interest attached, and it is a substitute for cash. Experiments have already been conducted in Shenzhen and other major cities (as of 21 April 2022), including Shanghai, and US companies such as Starbucks and McDonald's are also participating.

A report published by the ECB in October 2020, prior to its July 2021 statement, states that if the use of cash is decisively reduced, foreign digital money could replace current means of payment, in the case that other electronic means of payment become unavailable due to sudden incidents.²³⁾ This can be read as being wary of China's digital renminbi. It also mentions the possibility of both online and offline payments at this point. At the same time, there is mention of privacy protection, money laundering and the financing of terrorism. It further states that private financial institutions will play an important role in a digital euro.

In October 2022, a presentation by the ECB identified three factors that led many central banks to focus on CBDC. First, the emergence of crypto-assets and Covid-19. Second, concerns about the stability of the financial system. Third, the constrained time and length of the transaction chain of the current payment system.²⁴⁾

As an argument relating to the third point, it is noteworthy that the possibility and risks of using distributed ledger technology in securities settlement have already been examined by Deutsche Bundesbank for five years.²⁵⁾ Currently, T+2 is the dominant method of securities settlement worldwide, with settlement on the third day after the transaction. However, with the use of CBDC, securities settlement could become instantaneous, and CBDC is attracting attention from this perspective: with the rise of HFT (high speed trading), securities trading involves a billion trades per second, and there is a need to shorten settlement periods.

4 Conclusion

As seen above, cashless payments have increased in EU countries in recent years. Contactless payments are also on the rise, and non-cash payments are on the rise; card payments are at the heart of cashless payments in the EU, influenced by the regulation of fee caps on card payments since 2015. As an extension of cashless payments, the introduction of a digital euro is being considered. The basic design of digital euros is currently assumed to be a two-tier system, issued via private banks, token-based for privacy protection, with offline functionality.

²³ ECB (2020b)

²⁴ ECB (2022c).

²⁵ Deutsche Bundesbank (2017), (2018), (2019a)

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