Is a Cashless Society Achievable?
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Is a Cashless Society Achievable?

Kevin Rutter, Morten Wilhelm Winther

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Abstract

Given increasing physical cash in circulation in many areas, a cashless society is likely not achievable soon for most countries. However, there are certain countries, particularly the Nordics, where the rise of digital payments is accompanied by a decrease in physical cash. While consumer preferences may drive towards a near-cashless society in these countries, a fully cashless society is not possible without first addressing several obstacles. First, a credible technical solution would need to exist as a substitute for physical cash, given the risks to consumers of strictly holding money with defaultable private sector institutions. Second, laws and regulations regarding the use of physical cash would have to change. We discuss high-level designs for how a retail-facing central bank-issued digital currency (CBDC) could be built on R3’s Corda and evaluate legal changes in Norway.

1 Introduction

1.1 Alternatives to Physical Cash

More and more consumers are making digital payments – with the advent of computers and the internet the private sector has evolved solutions to meet customer’s demands. Commercial banks have always offered customers deposit accounts, but customers now access digital account balances through online banking. Globally, credit and debit card networks such as Visa or Mastercard have adapted well to a digital world. Card use is increasing in many countries. Figure 1 shows transaction volume increases with cards in Norway for internet payments.

Figure 1: Internet Payments with Norwegian Payment Cards 2007 - 2016 (Millions of Transactions)

Source: Norges Bank
New entrants are providing payment services as well. Today, emerging digital payment innovations can grow their user base and payment volumes on an unprecedented scale. Payment innovations such as Swish, Venmo, Vipps, Paypal MobilePay, and Velle have seen exponential volume increases in recent years. Swish launched as a smartphone application in 2013 led by seven large Swedish commercial banks and allows transfers between bank accounts in real time for consumers. Figure 2 demonstrates Swish’s payment volume increases.

Figure 2: Swish Payments 2013 - 2017 (Millions of Transactions)

Most payment innovations have been built on top of existing payment infrastructure. Cryptocurrencies offer a novel approach by providing entirely new payment rails. Bitcoin first emerged in 2008, and today more than a thousand alternative cryptocurrencies facilitate value transfer digitally. Cryptocurrencies settle (though many are probabilistic) generally within an hour, without involving a primary defaultable party. In this sense they are more like the exchange of physical cash than many traditional payments products, given the many layers of messaging and netting between multiple participants in our modern payment system. Cryptocurrencies have not yet achieved either the volume or scale of other digital approaches, but the technology and it’s adaptations are likely to shape payments in the years to come.

One manifestation of blockchain technology that may shape payments is central bank digital currencies (CBDCs). A CBDC could offer a new digital payment rail for real-time settlement between individuals, in a similar niche that physical cash has today. Digital central bank-issued money already exists, as central banks facilitate digital payments between commercial banks.

Central banks are preliminarily exploring expanding digital central bank money beyond account-holding commercial banks out to people or companies. One way to approach this would be by allowing private sector non-bank payment service providers access to digital central bank-issued money systems. In 2016, Mark Carney, the Bank of England governor, discussed the Bank of England’s willingness to allow this option, and he recently reiterated it in a March speech in 2018. Another approach would involve central banks actively issuing a CBDC themselves. Many central banks are in the early stages of researching issuing CBDCs. Most work thus far has involved experimentation with wholesale, interbank payments. Others, such as the Hong Kong Monetary Authority, have built prototypes of systems that expand access to digital central bank-issued money

to corporates. Additionally the Riksbank is preliminarily examining technical solutions for digital central bank-issued money the general population.

1.2 Cash Use is Growing

Digital payments and digital account balances may be growing, perhaps at a higher rate, but there is a large and growing demand for physical cash as well. Physical cash in circulation is in response to consumer demand. If there is more demand for physical cash, central banks provide commercial banks with more, and as customers withdraw cash there will be more in circulation.

Cash use today varies based on the country, and transactions are notoriously difficult to collect data on – still, the value of cash in circulation increases year-on-year, for almost all large countries. A 2017 Bank for International Settlements (BIS) CPMI Red Book report showed 22 of the 24 countries examined had the outstanding value of cash and coins increasing every year from 2012 to 2016. Much of this is due to a combination of inflation and economic growth.

Table 1 and 2 reflect this trend in the European Union and the United States. In both of these tables, the narrow money supply (M1) is increasing, demand and overnight deposits are increasing, and notes and coins in circulation are increasing.

Table 1: Settlement Media Used by Non-Monetary Financial Institutions– EUR Billions, End of Year

<table>
<thead>
<tr>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes and coin in circulation outside MFI's</td>
<td>876.8</td>
<td>901.2</td>
<td>908.6</td>
</tr>
<tr>
<td>Value of overnight deposits held by non-MFI's</td>
<td>4,562.3</td>
<td>4,822.8</td>
<td>5,348.1</td>
</tr>
<tr>
<td>Narrow money supply (M1)</td>
<td>5,131.4</td>
<td>5,426.9</td>
<td>5,957.9</td>
</tr>
<tr>
<td>Notes</td>
<td>325.7</td>
<td>356.0</td>
<td>449.6</td>
</tr>
<tr>
<td>Outstanding value on e-money storage</td>
<td>4,633</td>
<td>4,699</td>
<td>5,708</td>
</tr>
<tr>
<td>on cash-based products</td>
<td>2,381</td>
<td>2,648</td>
<td>3,003</td>
</tr>
<tr>
<td>on software- or network-based products</td>
<td>1,856</td>
<td>1,929</td>
<td>2,580</td>
</tr>
</tbody>
</table>

1. Held at monetary financial institutions (MFIs). The counterpart sector “non-MFIs” includes the component sectors “Central government” and “Rest of the world”. This indicator is not synonymous with the same term used in the ECB concept of M1. 2. Cannot be calculated from the above two items in this table (see also footnote 1). 3. Includes small institutions excluded from subsector. Source: ECB. Data as of 9 December 2016

Source: ECB
Table 2: Settlement Media Used by Non-banks – USD Billions, Average for December

<table>
<thead>
<tr>
<th>Year</th>
<th>Notes and coin in circulation outside banks(^1)</th>
<th>Value of transferable deposits(^2)</th>
<th>Narrow money supply (M1)(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>1,099.40</td>
<td>1,413.20</td>
<td>2,459.70</td>
</tr>
<tr>
<td>2013</td>
<td>1,159.80</td>
<td>1,547.70</td>
<td>2,660.70</td>
</tr>
<tr>
<td>2014</td>
<td>1,254.10</td>
<td>1,731.40</td>
<td>2,932.90</td>
</tr>
<tr>
<td>2015</td>
<td>1,340.40</td>
<td>1,704.40</td>
<td>3,003.40</td>
</tr>
<tr>
<td>2016</td>
<td>1,422.40</td>
<td>1,554.10</td>
<td>3,326.70</td>
</tr>
</tbody>
</table>

\(^1\) Currency in circulation less amount held by the US Treasury, Federal Reserve Banks and depository institutions. \(^2\) Transferable deposits consist of demand deposits and other checkable deposits. \(^3\) Composition of M1 = currency and coin + traveller’s cheques + demand deposits + other checkable deposits. \(^4\) Averages for the week beginning on the third Tuesday in December and ending the following Monday.

Source: Federal Reserve

Physical cash is also crucial and growing in developing countries as well. For example, China’s ATMs with cash withdrawal functions increased from 415,600 to 924,200 from 2012 to 2016 (BIS, 2017).

1.3 Except in . . .

There are several notable outliers to this global trend. India was following a similar trend until 2016. On November 8th, 2016, India’s government announced that high denomination banknotes would be demonetized, in order to reduce funding for illegal activity. This policy decision explains India’s abrupt decrease in the value of cash in circulation in Figure 3. This action demonstrated the potential disruptive role of government policy.

Further, the Nordic countries present a particularly interesting situation. The Nordic countries have extremely high GDP per capita, but as shown in Figure 4, Norway ($1,072) and Sweden ($712) have a particularly low amount of currency per capita, when compared to other countries of similar economies (Rogoff, 2016).

![Figure 4: Local Currency Per Capita in US Dollars](source)

Source: International Monetary Fund, World Economic Outlook Database, United Nations

Unlike all of the other countries in the CPMI Red Book, Sweden’s value of notes and coins in
circulation have decreased significantly year on year, since 2008. These decreases have been accompanied by fewer ATMs with a cash withdrawal function, and a sharp decrease in the banknotes and coin held by banks from 8.44 billion in 2012 to 1.67 billion in 2016 (BIS, 2017). Figure 5 shows the year-on-year decrease in the average value of banknotes and coins in circulation.

![Figure 5: Average Value of Banknotes and Coins in Circulation (Billions SEK)](source: Riksbank)

The decrease in physical cash in circulation has come as Sweden’s economy is doing well and the narrow money supply is expanding, with inflation slightly positive. Table 3 below shows healthy growth in transferable deposits year-on-year.

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Notes and coin in circulation outside banks</td>
<td>88.3</td>
<td>82.5</td>
<td>81.1</td>
<td>71.5</td>
<td>69.7</td>
</tr>
<tr>
<td>Value of transferable deposits</td>
<td>1,596.3</td>
<td>1,746.4</td>
<td>1,993.8</td>
<td>2,221.1</td>
<td>2,422.5</td>
</tr>
<tr>
<td>Other</td>
<td>15.2</td>
<td>16.1</td>
<td>16.9</td>
<td>0.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Narrow money supply (M1)</td>
<td>1,692.5</td>
<td>1,844.9</td>
<td>2,025.8</td>
<td>2,212.6</td>
<td>2,483.2</td>
</tr>
<tr>
<td>Memo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferable deposits in foreign currencies</td>
<td>99.1</td>
<td>103.5</td>
<td>127.8</td>
<td>130.7</td>
<td>148.3</td>
</tr>
<tr>
<td>Outstanding value on e-money storage</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
</tr>
<tr>
<td>on card-based products</td>
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<tr>
<td>on software- or network-based products</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
<td>nav</td>
</tr>
</tbody>
</table>

Source: BIS

As represented in Figure 3, Norway is seeing a similar but less pronounced trend in the total amount of physical cash in circulation. In Norway, other types of payments are much more prevalent than cash, as shown in Figure 6. Figure 7 demonstrates that the percentage of cash payments relative to other forms of payments continue to sharply decline.
1.4 What Needs to be Done to Arrive at a Cashless Society?

A near-cashless society is achievable, and we may be headed in that direction in the short-to-medium term in Sweden, and perhaps in the medium term in Norway. But an entirely cashless society is not, unless several barriers are addressed. Below we evaluate two barriers to achieving a cashless society — the development of a technology that meets the requirements for a central bank-issued physical cash substitute, and the required legal changes.

Without a CBDC, countries headed towards a cashless society would strictly have money represented by the private sector. We don’t believe central banks will ultimately allow this to happen — money held within the private sector has default risk, and central bank-issued money does not have this risk. Having all money available to consumers entirely reliant on the private sector likely would not fulfill central banks’ mandate to consumers to provide a safe and efficient payment system. Therefore, for a cashless society to truly exist, we believe that central banks will offer an alternative technical substitute for consumers. We discuss and describe preliminary approaches towards a retail-facing CBDC, by discussing Corda, R3’s distributed ledger platform. While we discuss Corda in this paper, other blockchain (or more centralized) platforms could be used for the analysis.

To make the analysis tangible, we review the legal system in Norway. We discuss different provisions in Norwegian legislation that would need to be amended or altered before a society becomes cashless. The analysis likely is relevant to the legal systems in different jurisdictions as well.
2 Three CBDC Approaches on Corda

The architecture for a CBDC would likely be different based on each central bank’s own design preferences around identification for access, privacy/anonymity, interest rates, transaction limits, etc. Rather than focus on specific design decisions, in this paper we look at high-level designs that consider different levels of information sharing regarding identities and transactions.

Centralized technologies, such as those run by a single operator, generally involve book entry adjustments between different balances on the operator’s ledger. With this approach, the central bank has access to all payment information.

The 10-year existence of Bitcoin shows that a decentralized implementation of digital money (at least on a limited scale), is technically possible. A CBDC could be inspired by the architecture of cryptocurrencies, but would likely have substantial architectural departures. Bitcoin involves a peer-to-peer transactional approach. However, Bitcoin’s public broadcast of this ownership information to all parties, would not be suitable for a central bank. Probabilistic (not definitive) settlement, and energy consumption through mining would likely not be acceptable as well.

Enterprise blockchains, like Corda, have architectures to aim to address these shortcomings. Corda offers a peer-to-peer transactional approach that allows enhanced data privacy regarding payments. Below, we discuss different ways of structuring a Corda network that allows different levels of data sharing with counterparties, commercial banks, and central banks. We start with a basic introduction to Corda’s architecture.

2.1 Introduction to Corda’s Architecture

Corda covers a range of cash and obligation usage patterns. The architecture assumes that accounts and nodes are onboarded to the network and that banks and individuals do not wish globally broadcast and duplicate their data to all parties. Given these requirements, Corda has a one-to-one mapping of private-public key accounts attached to a Corda node, and uses point-to-point messaging and negotiation through flows to coordinate the saving and sharing of data.

Figure 8 demonstrates the building blocks of Corda which consists of states, contracts, transactions, and flows.\(^2\) A state represents the shared data object moved between Corda nodes. The transactions are the proposed changes to the state sent between Corda nodes for signature and verification. Flows are the asynchronous mechanism of reaching consensus on which transactions to commit between all parties. The specific set of transactions are processed by nodes and the notary cluster. The notary cluster is used for uniqueness, verification, and timestamping – these three mechanisms prevent double-spend of states.

\(^2\)The following description of Corda is simplified for brevity. Corda’s technical whitepapers describe Corda’s architecture in greater depth.
In Figure 8, the top layer is the physical connected network consisting of Corda nodes fully owned either on-premise or cloud-hosted. The second layer examines a single node, showing that the node mainly consists of the vault, the database that stores all the current states. The third layer examines installed CorDapps, or applications running on the platform applications.

## 2.2 Three Approaches

### 2.2.1 A Register-based Solution

The key distinction between the register-based model and the other models proposed is that the wallet balance is tied to rights and claims against an individual account at the central bank. While users could transact just as they would with any card or mobile payment service, the funds supporting these payments would be held centrally on the central bank account. In the event of a loss of the card or phone, the user would have recourse to recover their remaining balance. The rights to the balance could be re-established on a new mobile wallet or card and previously issued receipts on a lost wallet or card could be deactivated.

In this model, we presume a network of Corda nodes including (at a minimum) a central bank node, a notary, and one or more payment service or wallet provider nodes. These wallet provider nodes could be operated by payment service providers, commercial banks, a telecommunications company or some other institution.

From a technical architecture perspective, the point of sale application, demonstrated in Figure 9, would contact the wallet provider and propose debiting the amount from the user’s wallet. The balance would be validated and signed by the notary and then accepted (signed) by the receiver.

Once an individual has funded their wallet by depositing funds to an account at the central bank, a central bank would issue a depository receipt and digitally sign the balance on the ledger. The record of the balance would be maintained and updated on the central bank node.

For a phone “back up,” pre-paid cards or papers with QR codes could be printed out from ATMs, commercial banks, or other cash points to collect and eventually transfer redeemable balances. The implementation must ensure that the phone or electronic system “back-up” interacts with the distributed ledger in a way that prohibits double-spend. In the electronic model, the notary node on the network (which may or may not be operated by the central bank) would verify each transaction for uniqueness within a given time period, preventing individuals from using the same funds to make multiple payments.

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3 These three responses were adapted from an original preparation for the Riksbank. They build upon ideas first presented in Mike Hearn’s post, “Mobile/consumer payment experiences with Corda on-ledger cash,” and with Clark Thompson.
Depending on the privacy and anonymity policy elected upon by the central bank, the transaction could be individually reported to the regulatory reporting or taxation authority nodes. Perhaps this information could be held only by the sender and receiver node and transmitted in aggregate to allow the central bank to obtain valuable real-time information about payment flows and velocities without revealing the identity of the individual actors involved. Because Corda is a true peer-to-peer permissioned system, these choices would be implementation details, and are not dictated by the architecture of the platform.

**Figure 9: CBDC Entry Points**

Sources: R3

### 2.2.2 A Value-based Solution

In the value-based solution, the wallet balance, once established, exists as a claim to cash held at the central bank, but the evidence of that claim is only maintained in the wallet or card and not held on the central bank node. The record of the updated depository receipt balance would be maintained and updated on the user’s device, and not a central registry as transactions occur. The record of each transaction was decentralized, similar to how physical cash exists today.

While users can transact with the CBDC just as they would with any card or mobile payment service, the funds allocated to support these payments would only be definitively recorded on the card or mobile device. In the event of a loss of the card or phone, the user would have limited recourse to recover their remaining balance, similar to losing a physical wallet today. In such an implementation, it is likely that consumers would choose to keep balances on the wallet relatively low.

It is possible that a key escrow service could be established that would maintain a link to unique identifiers of the card or wallet balance, much like a bill serial number on physical cash. Corda’s technology would not prohibit a key escrow service or similar recovery service from being designed, if the user could present evidence in the form of a receipt or key showing they had made the deposit, and show evidence of transactions made to justify the remaining balance. Technical solutions to prevent the local store of value from being duplicated are essential. A key escrow service could be established that would maintain a link to unique identifiers of the notes by wallet, although this service would either need to be solely accessible by the individual or privacy would be compromised.

In this model, we presume a similar network to the one discussed in section 2.2.1. From a technical architecture perspective, the point of sale application (which could use existing card reader or mobile payment hardware) would debit the amount from the user’s wallet directly on the mobile or card. Whether the balance would be validated and signed by the notary and then accepted (signed) by the receiver would be dictated by privacy considerations and policy choices.
2.2.3 A Denominated Solution

The denominated solution uses the value-based model with an important distinction: the CBDC are issued in denominated amounts, each “note” associated with a unique identifier (hash) equivalent to the unique serial number of a paper note today. In the denominated solution, the wallet balance is only maintained in the wallet or card, and not held on the central bank node.

Once validated by the central bank, a participant node can conduct follow-on transactions with the “note” within their node without needing to go back to the central bank to re-validate each time. This reduces traffic to the notary, and assure that peer-to-peer transactions within a single node’s wallets are completely anonymous from the central authority. Since the units are individual denominations, not balances, the receiver will need to actively “make change,” but this process may be automated.

These “notes” could be created on a one for one basis as physical cash is removed from circulation. The denominated model corresponds with to the type of physical bank notes that individuals are used to today, potentially easing integration and adoption.

Where a transaction crosses a node boundary, the receiving institution could either elect to trust the validity of the e-notes, or re-validate them with the notary. Typically, we would assume that any node-to-node transactions would be validated by the notary. Depending on the implementation design, and dictated by policy decisions, this model could provide a greater degree of anonymity, given that not all transactions would be notarized (“seen”) by any central authority, much as physical cash transactions are anonymous until the cash re-enters the banking system as a deposit.

While users can transact with CBDC just as they would with any card or mobile payment service, the funds allocated to support these payments are definitively recorded only on the card or mobile device. As with the value-based solution, in the event of a loss of the card or phone, the user would have limited recourse to recover their remaining balance, though a key escrow service could be established.

Figure 10: Solution Business Capabilities

3 Legal Changes in Norway

Many market participants in Norway are eager to completely remove cash from the economy. Industry organisations have come out in favour of the proposition, including Finance Norway, The Finance Sector Union of Norway and the Enterprise Federation of Norway (Virke). The Norwegian Tax Administration and the Norwegian Consumer Council also support removing cash from the economy.

A committee appointed by the Norwegian Conservative party stated in an interview 7 January 2017 that in their view Norway should aim to become a cashless society by 2030. The committee proposes that the current right to pay with central bank notes and coins (legal tender) be abolished.
by 2020, followed by further steps to complete the transition and make Norway a cashless society by 2030.

The Norwegian legislative body, the "Storting," on the other hand, has expressed a desire to strengthen the framework for cash payments, and recently presented a proposal to this effect, hereunder a draft for new regulation on the banks' handling of cash. Furthermore, several of the Norwegian financial authorities have in recent years on occasion expressed their opinion on the matter.

A great many administrative and legal changes would be necessary to turn Norway into a cashless society. Below is an overview of the current Norwegian legislation on cash payments and a brief description of some of the legal challenges associated with removing cash from the economy. For instance, a move to a cashless society would require amendments to the legislation regulating the Norwegian monetary system and giving cash status as legal tender (Sentralbankloven section 14; the Norwegian Central Bank Act (NCBA)), the requirements on banks to offer cash (Finansforetaksloven section 16-4; the Financial Entities Act (FEA)) and the consumer’s right to make cash payments (Finansavtaleloven section 38; the Norwegian Financial Agreements Act (NFAA)). There are also other areas where careful considerations would be necessary if such amendments were to be made, such as data protection and money laundering issues. If a CBDC is introduced as either a complement or a substitute to existing physical cash, the following legislation would need adjustment.

3.1 Main Provisions

3.1.1 The Norwegian Central Bank’s Issuance of Money - Legal Basis

Pursuant to section 1 of the NCBA, the Norwegian central bank, or Norges Bank, is charged with the issuance of the official currency of the Kingdom of Norway, the Norwegian krone. This includes the production of cash (notes and coins) and the issuance of digital central bank money (central bank reserves). The central bank is by law the sole issuer of Norwegian cash (notes and coins), cf. section 13 of the NCBA.

Pursuant to section 14 of the NCBA, the central bank’s notes and coins are legal tender in Norway (This statute must be interpreted in conjunction with section 38 of the NFAA.)

The central bank is also charged with ensuring that Norway has an effective payment system. This responsibility includes, among other things, ensuring sufficient production of cash to meet the public’s demand, and ensuring that cash is available to the public. The latter obligation only extends to making cash available to the banks. Once cash has been made available to the banks, further accessibility to cash by the public is presumed to be the responsibility of the banks.

The central bank manages its obligation to supply cash through five central bank depots across Norway, from where the commercial banks can pick up cash.

3.1.2 Customer Agreements and Cash Payment

Section 38 of the NFAA sets forth general obligations pertaining to cash settlement. Section 39 of the act stipulates additional requirements regarding the time and place of payment. Although the NFAA in general is concerned with the relationship between financial institutions and customers, these two provisions also apply to cash payments directly from the payer (customer) to the payee (recipient), cf. its section 11 (2).

The aforementioned provisions of the NFAA must be read in conjunction with the NCBA, in particular its section 14, in order to fully understand what is the current legal situation as regards cash payments. In the event of a conflict between the two acts, the NFAA will in our view take precedence in accordance with the so-called "lex posterior" principle.

Section 38 (1) of the NFAA provides the party entitled to receive payment with the right to demand settlement in cash: "Payment may be effected by transfer of the amount to the payee’s account unless otherwise agreed or the payee has requested payment in cash". Pursuant to section 38 (2),
the payee may give further instructions concerning the method of payment, provided this does not entail a substantial additional expense or other inconvenience to the payer.

A consumer, however, may always elect to pay with cash, cf. section 38 (3): "A consumer is in all cases entitled to effect settlement with the recipient of the payment in legal tender". However, the creditor is not obligated to accept more than twenty-five coins of each coin unit, cf. the section 14 (1) second sentence of the NCBA.

3.1.3 Requirements Pertaining to Taking Deposits and Handling of Cash

A banking license pursuant to the section 2-7 of the NFEA is required for a Norwegian bank to be permitted take deposits.

Licensed banks have an exclusive right to take deposits from the public. This right entails a corresponding right to offer services relating to deposits and withdrawals of cash and payment services adjusted to the customer’s needs, cf. the preparatory works, Prop. 125 L (2013-2014) p. 104.

Pursuant to section 16-4 of the NFEA, banks not only have a right, but also an obligation, to take deposits, and to make cash available to deposit holders upon request in accordance with the "expectations and needs" of its customers. Section 16-4 does not exclude banks from charging fees for these services, and it does not require that banks necessarily must carry out the actual cash handling.

The preparatory works to the NFEA state that it is at the discretion of the banks to assess whether the customers’ need for cash deposits and cash withdrawals is met, cf. Prop. 125 L (2013-2014) p. 105. Today, many banks operate with cash-free physical branches and so called "advisory" offices, and will refer the customers to "bank in store" or post offices if they wish to withdraw cash. Whether such branches/offices comply with the requirements set forth in section 16-4 is not clear.

Section 16-4 does, however, not preclude that a bank in exceptional cases would be permitted to refuse to establish a customer relationship with a person or an entity as a result of special circumstances relating to the customer, e.g. under the rules of money laundering or because the client lacks credentials, cf. the Banking Law commission Report no. 1, NOU 1994: 19 financial Agreements and financial assignments p. 113.

Pursuant to the section 16-4 (2) of the NFEA, the Ministry of Finance may introduce "Regulation on the banks’ obligation to accept and to make cash available to customers". The Norwegian central bank and the Norwegian Financial Supervisory Authority ("Norwegian FSA") have published a proposal for such regulation in a document dated 29 September 2016.

The banks’ handling of cash incurs costs and part of such costs is charged to its customers. In a memo from 2014 the central bank estimates that the total cost associated with cash payments in 2013 were approximately NOK 3 billion. Most of the costs are evenly split between the customers and the banks. The average cost per cash transaction is estimated to be NOK 7.1 compared to NOK 4.14 for card transactions. The industry organisation Finance Norway, and others, argue that replacing cash with less costly alternatives would thus bring efficiency gains to the economy.

3.2 The Consumer’s Right to Pay in Cash in Practice

In recent years, the consumer’s right to pay with cash, in cf. section 38 (3) of the NFAA, has been debated and tested on several occasions. There are numerous instances where service providers have required that customers pay electronically and refused to accept cash payment. However, in those cases that have been brought before the legislation department at the Norwegian Ministry of Justice (NO Lovavdelingen), the right of the consumer to pay in cash in accordance with the NFAA has been affirmed.
3.2.1 The Norwegian Ministry of Finance

In March 2012, NHO Service, the industry organization, sent a request to the Ministry of Finance asking whether two public transportation companies legally could refuse to accept cash as payment. The Ministry of Finance responded that the payment solutions offered by the transportation companies must comply with section 38 of the NFAA and section 14 of the NCBA, i.e. a consumer "always has a right to make settlements with legal tender at the recipient’s location". (The Ministry of Justice considered the matter in April 2013 and their response was the same as the Ministry of Finance.)

In its 2017 annual report to the Norwegian parliament, the Ministry of Finance discusses strengthening the framework for cash payment, including giving the government a mandate to ensure that the right to pay with cash is preserved. The report advises that the government should consider the consequences for personal data protection and the society’s safety if cash is removed completely. This is an indication that the Ministry currently does not support the complete removal of cash.

3.2.2 The Ministry of Justice

In a statement dated 12 April 2013, the Norwegian Ministry of Justice discusses section 38 of the NFAA and the extent to which the right to make cash payments applies when the sale of goods is not "over the counter", e.g. when a service is provided at various locations and the consumer desires to pay with cash at one such location.

The Ministry of Justice is of the opinion that the expression "at the recipient’s location", as used in section 38, must be interpreted quite narrowly, meaning the recipient’s place of business only, i.e. the physical location where the business activities generating the claim takes place, cf. section 3 of the Norwegian Promissory Note Act. If the claim is not related to the recipients business activities, "at the recipient’s location" means the "recipients’ residence", cf. Prop. No. 41 (1998-1999) p. 106. Thus, as a rule, a consumer has the right to pay with cash at "the recipient’s place of business".

In a statement by the Ministry of Justice dated 18 October (2010 No. 5585/2010), the issue at hand was whether the municipality of Trondheim could set up a parking lot payment machine not permitting payments in cash. The Ministry opined that section 38 may not be derogated from in a manner detrimental to a consumer, cf. section 2 (1) of the Financial Contracts Act. Hence, the NFCA prevented the setting up of a parking meter without offering settlement in cash.

3.2.3 Other Financial Governmental Bodies’ Opinions

The Norwegian FSA and the Norwegian Central Bank have collectively proposed new regulation pertaining to the banks’ handling of cash as described above in 3.2.

In the proposal, the Norwegian FSA and the Norwegian central bank write that they have previously (in letters of 31/01/12 and 30/11/12) indicated that cash is the most appropriate payment method in the event that the public electronic payment system shuts down. They propose not to make any changes to the right to pay with cash at this point. It is conceivable that in the future several alternative and technically independent electronic payment systems will co-exist, and could thus serve as contingency arrangements in the event of a failure of the normal electronic payment system. However, according to the Norwegian FSA and the Norwegian central bank, there are currently no alternative electronic payment systems to the ordinary payment system that could act as a back-up system in the event of an emergency.

3.2.4 Public Discussions and General Considerations

In November 2011, the Ministry of Finance was asked to review the advantages and disadvantages of giving cash and digital payment equal legal status as a form of payment. In the opinion of the industry organisations, businesses should be permitted to decide for themselves whether to accept cash or digital payment from the private sector when providing services or selling goods.
In its response on 22 January 2012, the Ministry of Finance refers to section 14 of the NCBA, which mandates that the consumer always has the right to settle with cash. Furthermore, the Ministry points out that permitting businesses to refuse cash from consumers would weaken the predictability to consumers with respect to settlement, and could create significant obstacles to people who do not have the ability to make settlement in other forms than cash. The Ministry agrees that mandating the use of digital payment could reduce crime, and that in some circumstances electronic payments could represent a more cost-effective payment form than cash. However, the Ministry concludes that it will not conduct an analysis of the requirements pertaining to settlement in cash.

3.3 Other Legal Considerations

3.3.1 Data Protection Legislation

There is a general concern that protection of privacy will become difficult if cash is removed from circulation without offering customers a new option, as banks or other operators in principle then could have access to personal data information about every purchase and transaction that a customer makes.

The Norwegian Data Protection Authority ("Norwegian DPA") grants the banks a general license to process personal data. The banks are allowed, in accordance with the section 33 (1) and (3) of the Personal Data Act and section 7-3 of the Personal Data Regulations, to process personal data for the following purposes: Customer management, invoicing and in relation to general banking and financial services, marketing and customer care, risk classification of customers and credit portfolios, prevention and detection of crime. The banks are obligated to delete personal data when the objective of the use has been met, cf. sections 28 and 11of the Personal Data Act.

The Norwegian DPA is working towards more anonymous solutions on electronic payments, such as anonymous travel payment cards, re-fill cards etc. The Norwegian DPA is of the opinion that privacy should be better protected as electronic solutions become more widespread. The director of information at the DPA has stated that money transfers between people should be possible without having to leave electronic traces behind. A general concern from a privacy perspective is that if every small and big financial transaction is traceable, this information will in aggregate provide a detailed picture of who you are, your relationships, what interests, attitudes and behaviours you have.

In a speech on 25 April 2017, the Norwegian central bank underscored the dependency on a third party when making electronic payments, in contrast to cash payments where payment is made directly between two parties.

The challenges related to the DPA concerns will require careful review.

3.3.2 Criminal Legislation

One of the main arguments in favour of a cashless society is that it will make it more difficult to commit white collar crime. These arguments are mostly related to money laundering and tax.

3.3.3 Money Laundering

The purpose of the Norwegian Anti Money Laundering Act is to prevent criminal acts and identify transactions in connection with criminal acts or acts connected to terror, cf. its section 1. Pursuant to section 6 of the Norwegian Anti Money-Laundering Act, banks and other financial institutions are required to identify customers and to control and report suspicious transactions to the authorities. An overarching principle in this regulatory framework is the "know your customer" principle and the obligation to report transactions that could relate to criminal- and terrorist activity. An important aspect in this regard is to trace the origins of funds that are involved in customer transactions.
Removal of cash from the economy would make it easier for financial institutions to fulfil their obligations pursuant to the anti-money laundering rules and could potentially also make it more difficult to launder proceeds from criminal activity through financial institutions.

In addition to applying to banks and other financial institutions, these rules also apply to businesses selling goods when they receive cash payments in excess of NOK 40,000, cf. the section 4 (2) of the Anti-Money Laundering Act. Thus, this requirement compels retail stores and businesses to have in place costly and time-consuming systems and controls. Removing cash could, according to the industry organization NHO in a statement of 6 November 2015, ease the burden on small and medium sized businesses in the retail segment.

3.3.4 Tax Legislation

The Norwegian tax authorities support the proposals for a cashless society. Many of the typical crimes related to tax evasion, such as the underground job market, are expected to become less of a problem if cash is removed from the economy. The tax authorities have proposed three solutions to make it more difficult to evade taxes by the use of cash: 1) to remove the NOK 500 and NOK 1000 bank notes, 2) a maximum permitted amount for cash payment, for example between NOK 20,000 to 40,000, and 3) amendment of the current legislation and replace the right to pay with cash with a right to use electronic solutions.

3.3.5 General Amendments

In the event Norway would remove cash from the economy, many Norwegian laws would have to be amended. However, implementing such amendments are unlikely to be overly burdensome, as they could be implemented by adjusting the relevant statutes to refer to payment in general. This includes provisions in the Accounting Procedures Act, the Debt Settlement Act, the Securities Trading Act, the Work Environment Act, the Law on Alternative Investment Funds among others.

4 Conclusion

Physical cash remains a crucial part of most global economies, and if consumer preferences remain as they are today, cash will have a role in most economies for the foreseeable future.

Still, there are certain jurisdictions where a cashless society is more likely. In Sweden, the Riksbank is evaluating issuance of a digital e-krona, and will decide whether to build a technical prototype by end of 2018. Such an action is likely in response to consumer preferences for digital payments over physical cash in that country.

In Norway, some governmental bodies support removing cash from the economy, while other governmental bodies support strengthening the right to use cash as payment. In light of recent statements and proposals by the Norwegian financial authorities and the parliament, it is unlikely that the consumers’ right to make payment in cash will be removed by 2020. Though, further developments with consumer preferences and new technologies will likely affect future consideration, and any legal changes would need to develop accordingly.

The case for a retail-facing CBDC is likely more compelling in Sweden, Norway, and other similar countries that may need a substitute for physical cash. However, exploration of a retail-facing CBDC should not necessarily be limited to regions where there is pressure to offer a cash substitute. In countries with robust physical cash use, central banks may still ultimately decide to introduce a CBDC as a complement. A new digital payment rail in central bank-issued money could offer consumers a payment option default-free money competitive with emerging private sector solutions.

The relationship between private sector and central-bank issued money has always evolved and changed, and continues to evolve to this day due to consumer preferences. A common critique of retail-facing CBDCs is the risk of digital bank runs and the impact on private sector money. But, in some countries, the ratio of private sector money to central bank-issued money is already changing, because the use of paper is no longer competitive with many types of digital payments.
In other countries, despite physical cash use growth, digital payments and digital accounts are growing much more quickly because they offer consumers a better and more efficient payment option than physical cash. There are also design decisions for a CBDC such as account caps, interest rate policy, and transaction limits which could mitigate the risks to the private sector. Disruption to the current distribution system could be limited - in the three models described in section 2, commercial banks would remain actively involved in money distribution in the same way they are with physical cash today.

Consumer preferences are changing, and new emerging technologies have the potential to help both the banked and unbanked. Private sector innovation is great – but central banks are at the heart of the modern financial system – they too should continue to examine and develop these technologies. It is easier to strike down an initial implementation of a new technology based on the past than to iterate it to bring adaptations and benefits in an evolving and digital future.
References


**R3** is an enterprise software firm using distributed ledger technology to build the next generation of financial services infrastructure.

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