

# **Report from the Swedish retail payments council**

The council's working group on payments in a crisis

A scenario analysis of payments at points of sale and withdrawals from ATMs in the event of disruptions to the card systems

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# **The payments council's working committee for payments in a crisis – Basic scenario – Payments at point of sale in the event of disruptions to the card systems**

## **1. Summary**

The Swedish payment market is in a state of transformation. Cash usage is declining rapidly and consumers and merchants are becoming increasingly dependent on being able to make card payments at points of sale.

At its meeting on 24 March 2017, the Swedish retail payments council said it was positive towards establishing a working group consisting of participants from the council's working group for payments in crisis and the Riksbank's Cash Handling Advisory Board for the purpose of investigating to what extent payments can be made at points of sale in connection with a serious disruption in the infrastructure for cards. The working group has identified a base scenario that is based on assumptions regarding access to cash, basic necessities and consumption needs for three types of household: single person, families with two parents and two children and families with one parent and two children. The conclusion from the base scenario is that the majority of households have a consumption need that is not met on the basis of their holdings of cash and basic goods in the case of a lengthy disruption. Off-line payments in shops and off-line withdrawals from ATMs, that is, transactions made without cover checks of funds on account or the credit to which the card is linked, could comprise a contingency solution for these households. Households with few cards in relation to their consumption requirement have a greater need of support for off-line consumption than households with more cards or smaller consumption requirements.

As there is limited knowledge of the existing support for off-line purchases and withdrawals, the payment council decided at its meeting on 24 October 2017 to make two in-depth studies regarding cash purchases in shops and withdrawals from ATMs in off-line situations. The first study regarding card purchases in shops shows that on the whole there is some possibility to implement card purchases in off-line situations. However, this support may differ between card issuers and it also depends on shops and the card acquirers they have agreements with accepting off-line purchases. The conclusion is that off-line purchases by card, together with holdings of cash and basic goods can cover the basic consumption need for the types of household in the scenario for a limited period of time. However, some card products completely lack off-line support and holders of these cards are thus more vulnerable in a serious disruption. The second study, which concerns withdrawals from ATMs in off-line situations shows that in principle there is no possibility to make withdrawals if all communication and internet connections between the ATM and card issuer are broken. However, individual card issuers may have contingency solutions for more limited disruptions.

In a comparison of the two payment measures in the scenario, card purchases in shops and cash payments, there seem to be worse conditions for conducting cash payments in a disruption than card payments as it is basically impossible to gain access to cash via off-line withdrawals via ATMs. Those households only having access to cards with no off-line support are particularly vulnerable as they are unable either to execute card payments or to make ATM withdrawals in an off-line situation.

At the council's meeting on 3 October 2018, it was expressed that it is of utmost importance to have clear information between card issuer and cardholder regarding limitations and possibilities for card payments in the event of disruptions in the card infrastructure. The council also encouraged the participants in the card market and the authorities concerned to continue to conduct a dialogue regarding contingency solutions for payments in the event of disruptions.

## 1.1 How will we pay if there are disruptions in the payment infrastructure?

The Riksbank took the initiative in 2015 to form a Swedish payments council and has supplied a secretariat function for the council since it was formed in 2015. The council is chaired by the Riksbank.

The council meets twice a year and consists of 13 sector organisations, public authorities and agents that play a central role in the Swedish payments market. There are 5 working committees under the auspices of the council and they are responsible for carrying out the activities defined in the council's work programme. One of the activities in the work programme concerns an investigation on payments in a crisis situation and a scenario based on it being impossible to pay by card to a normal extent (so-called off-line situation). This scenario is based on the following conditions:

- Telecommunications are not functioning and internet is not accessible
- There is electricity, so the off-line function is possible
- Purchases must be paid for at the point of purchase
- Mobile payment services are at present not generally acceptable alternatives for purchases in physical shops
- Households have a certain amount of basic goods at home
- Households in Sweden have around SEK 10 billion in cash
- No hoarding of basic goods has occurred
- Study the effects of the scenario after 3, 6 and 9 days

At the payment council's meeting on 4 October 2017, the participants agreed to give the secretariat the task of making a more in-depth investigation into what extent it is possible to pay by card in an off-line situation given that there have been disruptions in communications and internet connections.

With the assistance of Card Payment Sweden, the secretariat therefore undertook a survey in the first quarter of 2018 aimed at card issuers and card acquirers active on the Swedish market with the aim of collecting information on existing support for off-line payments.

## 2. Base scenario

The base scenario is described with the following points:

1. **No card payments or cash withdrawals from ATMs can be made on-line.**<sup>1</sup>
2. **Electricity is available, meaning that cards, terminals and ATMs function off-line in accordance with the definitions of the card issuers and card acquirers.** Off-line functionality is described in Annex 1.
3. **All purchases made in physical shops etc. must be paid for at the point of purchase.** The possibility of invoicing is discussed after the base scenario.
4. **Cheques are not available.**
5. **Mobile payment services are not a functioning alternative at present.** Swish currently has no point of sale (POS) service other than for small companies and other mobile payment services have very small market shares. Mobile payments are discussed after the base scenario.

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<sup>1</sup> Three different variants of communication problem can be imagined here: (1) the banks cannot be reached for coverage controls (the internet and technical subcontractors are accessible, however), (2) the technical subcontractors cannot be reached (the internet is accessible, however), and (3) the internet is not accessible.

6. **Households have a certain supply of basic goods, such as food and water, at home**, but an increasing need to buy both food and water arises over the first three days men. After three days, households need to buy their entire consumption requirement of basic goods.<sup>2</sup> This assumption is discussed after the base scenario.
7. **There is a cash buffer of SEK 10 billion among households**. This is approximately half of what previous interview surveys have suggested. We have assumed that approximately half of households' cash holdings were handed in and not replaced in conjunction with the banknote and coin changeover in Sweden.
8. **No hoarding of basic goods has occurred**. The possibility of hoarding is discussed after the base scenario.

The disruption is assumed to last for nine days. This is a very long time but our aim is to be able to study the consequences and dependencies.

## 2.1 Different households

For the sake of simplicity, it is initially assumed that all individuals are average individuals. The means analysis will then serve as a basis to discuss the consequences of differences in cash buffers, access to cards with off-line functionality and so forth.

### The average Swede

Assume that all individuals have the same average cash buffer, an average number of debit and credit cards, the same amount of basic goods at home and so on. This means that a larger household will have more cash, basic goods and cards than a smaller household, but only in proportion to its size. It is now easy to calculate the average. As for time, the situation after 3, 6 and 9 days is investigated. The above base scenario can be modified later by making one or two restrictive assumptions.

The following assumptions apply for the average individual: holding of 1 bank care, 1 credit card, cash buffer of SEK 1,000 and a standardised amount of basic goods at home.<sup>3</sup> The consumption requirement (POS) amounts to SEK 120 per day. This corresponds to about half of the normal daily consumption (see Annex) and assumes that the individual is able to do without about half of his or her consumption.

The base scenario assumes that the average Swede has food and water for 72 hours. After this, he/she consumes SEK 120 per day. The SEK 1,000 he/she has at home then lasts eight days, covering the entire 'crisis period'. The average Swede is not dependent on off-line functionality.

The average Swede represents households without children, regardless of whether these consist of one or more adults.

### Family 1 – two adults and two children

All households are not the same. In families with children, adults have responsibility for supporting the children and the hypothesis is that children do not have average cash buffers (even if there may still be piggy banks) or access to debit cards with off-line functionality (people under the age of 20 usually have a card which only works on-line). The adults are thus responsible for the children's consumption requirements.

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<sup>2</sup> The Swedish Civil Contingencies Agency (MSB) recommends that households store 72 hours' worth of food, water etc. We have based our scenario on this.

<sup>3</sup> If the households' SEK 10 billion is allocated evenly among all adults (8 million persons are aged 18 or older), each adult will have just over SEK 1,000. We have rounded this down to SEK 1,000 for simplicity's sake. An alternative way of calculating would be to allocate the cash evenly across the number of households. This would not significantly affect the result, as the analysis shows that it is primarily households without cash that are vulnerable.

All else being equal, a family consisting of two adults and two children will thereby usually have a higher consumption requirement per adult than a household without children. In our example above, such a family has a consumption requirement of about SEK 500 per day (SEK 120 x 4). The household’s two adults have a cash buffer totalling SEK 2,000 plus two debit cards and two credit cards. Their basic goods cover days 1–3 and their cash covers their consumption requirement for days 4–7. After this, which is to say days 8-9, the household is dependent on off-line functionality or withdrawing cash over the desk at a bank branch. If off-line functionality is available, there must be scope for SEK 1,000 to cover days 8-9, which is probably provided by most cards with off-line functionality.

### Family 2 – one adult and two children

For a family of two children and a single adult, the consumption requirement is about SEK 350 per day. The household has basic goods for three days, after which the SEK 1,000 cash buffer lasts for three days. Dependence on off-line functionality starts after day 6 and the consumption requirement is just over SEK 1,000 for days 7-9. As for Family 1 with children, this need is assumed to be met for most cards with support for off-line functionality.

The table below gives an overview of the need for access to off-line functionality given the size of the household, cash buffer and consumption requirement.

## 2.2 Enlargement of the base scenario

The cash holding is unevenly distributed throughout the population and it appears that more than four in five do not have a cash buffer. Similarly, isolated but necessary purchases, such as filling the car with petrol for people living in sparsely-populated areas, can use up a large part of the cash buffer. The extent to which households have food and water for 72 hours should also vary. Households with little or no cash buffers, greater consumption requirements or few basic goods at home risk quickly becoming dependent on making off-line purchases.

We study the effects on the three households of having or not having SEK 1,000 as a cash buffer, having or not having SEK 1,000 extra consumption requirement and having or not having basic goods at home. In Table 1, we show which day the need for off-line functionality arises and how large a consumption requirement it needs to cover.

**Table 1:** Cash buffer, access to basic goods, extra consumption needs and need of off-line functionality

		<b>The average Swede (1 adult)</b>	<b>Family 1 (2 adults, 2 children)</b>	<b>Family 2 (1 adult, 2 children)</b>
<b>Cash buffer SEK 1,000 per adult</b>	Basic goods, nothing extra	No off-line requirement	Days 8-9, 1,000	Days 7-9, 1,000
	Basic goods, extra 1,000	Days 4-9, SEK 700	Days 6-9, 2,000	Days 4-9, 2,000
	No basic goods, nothing extra	Day 9, SEK 100	Days 5-9, 2,500	Days 4-9, 2,000
	No basic goods, extra 1,000	Days 1-9, SEK 1,100	Days 5-9, 3,500	Days 1-9, 3,000
<b>Cash buffer 0 per adult</b>	Basic goods, nothing extra	Days 4-9, SEK 700	Days 4-9, SEK 3,000	Days 4-9, SEK 2,100
	Basic goods, extra 1,000	Days 4-9, SEK 1,700	Days 4-9, SEK 4,000	Days 4-9, SEK 3,100

	No basic goods, nothing extra	Days 1-9, SEK 1,100	Days 1-9, SEK 4,500	Days 1-9, SEK 3,200
	No basic goods, extra 1,000	Days 1-9, SEK 2,100	Days 1-9, SEK 5,500	Days 1-9, SEK 4,200

## 2.3 Discussion of assumptions in the case scenario

Some assumptions in the base scenario affect households' dependence on off-line functionality. One central assumption is that payment takes place at the point of sale. In some cases, purchases can be made against invoices. However, there is no infrastructure to support a more comprehensive use of invoices at the point of sale and invoice purchases are handled manually outside ordinary routines. Cases in which invoices can occur probably involve situations in which shop and customer have relatively strong knowledge of each other. It is possible that there will be better support for invoice purchases in the future, but the extent towards which this would function during a disruption would depend on the type of disruption. Similarly, there may be mobile services that function (this depends on the type of disruption occurring). However, mobile payment services are not particularly common in shop environments although it is likely that they will become more common in time.

One way for households to avoid the off-line problem is to withdraw cash over the desk at a bank branch, checkout in the trade sector and so on, assuming that this system is accessible. The opportunity for manual processing is declining, however, as fewer bank branches offer this service and the assessment is that even in the event of a disruption in the card system, withdrawal terminals will be the main distribution channel. It is therefore necessary to have off-line capacity between card issuers and owners of ATMs in place for this to work and the agreements between them are made individually. One possibility that should be taken into account is that households may not be aware of the off-line possibility and may therefore try to get to banks and ATMs to withdraw money. The media can play a calming or encouraging role depending on how they report on the disruption.

As long as cash-in-transit companies can transport money, there is the possibility to make withdrawals and deposits at offices and shops that deal with cash. The shops' capacity to accept cash depends on what extent they can pass on their daily takings and get change. If daily takings cannot be passed on, there is a limit to how much cash a shop can accept, for example due to insurance terms. A lack of change also reduces the possibility for cash purchases. Even if a little 'extra' could be purchased to come up to an amount corresponding to the banknote's denomination, the customer will not always be willing to do this. The cash-in-transit companies' ability to collect and deliver daily takings and change is therefore fundamental. However, this assumes that the cash-in-transit companies can credit their customers' accounts so that incoming cash can be recirculated, which could assume manual routines in cases where crediting cannot take place electronically. If no recirculation is possible, cash will accumulate among the cash-in-transit companies, who will be forced to stop accepting daily takings at some point. At present, the cash-in-transit companies have reserve routines for crediting. The Riksbank's stocks will be available and it will therefore be possible to load ATMs and the like with new banknotes. However, this will only ease the situation as long as other actors can accept and recirculate cash.

For an off-line purchase to be made, a number of preconditions must be fulfilled. Firstly, agreements and regulations must be in place to support off-line purchases. Secondly, the card-issuing bank must give the card off-line functionality. Thirdly, the shop's terminal must support off-line transactions, which means that the card acquirer owning the terminal must also allow off-line functionality. It is up to each individual card issuer, acquirer and shop to decide how to proceed. Today, there is no united

view of the extent towards which cards have off-line functionality, the amounts that can be accepted and the number of transactions that can be made. Neither is there any united view of the extent to which shops may accept off-line payments. There may be a link between a household's income and access to off-line functionality. It is possible that those who are most dependent on this function are those with the least access to it. It is also important that some types of retail, perhaps primarily chemists, can accept off-line payments.

The need to be able to make card payments off-line increases as the household's access to basic goods and cash decreases. Extra consumption needs also increase this dependence. It is reasonable to assume that households with single parents in particular are more dependent on off-line functionality than households without children.

Finally, we would like to remind the reader that the base scenario assumes that households and other players act rationally. This makes the scenario quite well-behaved. However, households and companies are not always rational and it is not inconceivable that things such as hoarding of goods and cash could occur, leading to complications. We have chosen to disregard such speculation here, but the reader should be aware of this uncertainty.

## **2.4 Conclusion from the base scenario**

Most households do not have cash at home. In the event of a lengthy disruption in the card system, the majority of households will have a consumption need that is not met, based on their holdings of cash and basic goods. Off-line purchases in shops and off-line withdrawals from ATMs could comprise a contingency solution for these households. Households with few cards in relation to their consumption requirement will need a larger scope for consumption off-line per card than households with more cards or smaller consumption requirements. At present, there is no overall view of the extent to which it would be possible to conduct off-line transactions. This is partly because off-line functions have to be accepted by the participants in the card market (card issuers, card acquirers, shops and ATMs) and must comply with regulations. It is also up to individual participants to set terms for the off-line function. The dependence on a contingency solution for payments in connection with disruptions will probably increase as cash becomes used less and less frequently and the ability to handle cash in different parts of the retail chain will probably decrease as a consequence of this.

There is a need to chart the existing support for off-line functionality to better understand whether it is sufficient or whether there are decisive limits. In the latter case, pressure on bank branches with manual cash services and ATMs could be very high in conjunction with a major disruption or a crisis situation.

## **2.5 Continued work**

The payment council decided at its meeting on 4 October 2017 to carry out in-depth studies for to chart the existing support for implementing card purchases at points of sale and withdrawing cash in off-line positions. This work was carried out in two separate studies.

With the assistance of Card Payment Sweden, the council secretariat undertook a survey in the first quarter of 2018 aimed at card issuers and card acquirers active on the Swedish market with the aim of collecting information on existing support for off-line payments. A report (appendix 1) based on the conclusions of the survey was presented to the payment council at its meeting on 3 October 2018. The payment council secretariat has made a second survey during Q1 and Q2 2018 in the form of a questionnaire to owners of ATMs to gather information on existing support for cash withdrawals from ATMs in off-line positions. A report (appendix 2) based on the conclusions of the survey was presented to the payment council at its meeting on 3 October 2018.



The outcome of the in-depth studies was presented to the payment council at its meeting on 3 October 2018. In connection with the meeting, the council emphasised the importance of clear information between card issuers and cardholders regarding the limitations and possibilities of card purchases and withdrawals from ATMs in the case of disruptions in the card infrastructure. The council also encouraged the participants in the card market and the authorities concerned to continue to conduct a dialogue regarding contingency solutions for payments in the event of disruptions in the card infrastructure.

### 3. Annex 1 - Basic facts

Household consumption expenditure for the first quarter of 2017 is shown in the first column of Table 1. With this as a starting point, the committee can make a rough estimate of the value of payments at points of sale (POS). As a first attempt, the secretariat enters a 1 in the column 1=POS for such goods categories where payments can primarily be expected to be made at the point of sale. The third column therefore gives an estimate of the POS turnover, which is calculated at almost SEK 217 billion in Q1 2017.<sup>4</sup> Part of these purchases take place on-line or elsewhere, but this is assumed to be balanced out by some of the goods and services not specified as POS being paid for at the point of sale.

**Table 1.** Household consumption expenditure (ENS2010), current prices, SEK billion after purpose and quarter (source: Statistics Sweden).

	2017K1	1=POS	Skattad POS-konsumtion
01 livsmedel och alkoholfria drycker	56,1	1	56,1
02 alkoholhaltiga drycker och tobak	14,8	1	14,8
03 kläder och skor	20,0	1	20,0
04 bostad, elektricitet, gas och uppvärmning	133,9	-	-
05 möbler, inredningsartiklar, hushållsutr. o förbrukn.varor	23,6	1	23,6
06 hälso- och sjukvård	18,9	1	18,9
07 transporter och fordon	56,4	-	-
08 post- och telekommunikationer	13,4	-	-
09 rekreation och kultur, varor och tjänster	49,8	-	-
10 utbildning	1,7	-	-
11 restauranger, caféer, hotell o annan övernattningsservice	31,3	1	31,3
12 övriga varor och tjänster	52,0	1	52,0
Summa ändamålsfördelat	471,6		216,6
Hushållens konsumtion i utlandet	25,8		
Utländsk konsumtion i Sverige	- 25,3		
Hushållens totala konsumtionsutgifter	472,1		
Hushållens icke-vinstdrivande organisationer	14,6		
Total konsumtion	486,7		

The SEK 217 in POS turnover in Q1 2017 can be converted to a daily POS turnover of SEK 2.4 billion by dividing 217 billion by 90 days and then dividing the sum by the number of citizens in Sweden, 10 million, which gives SEK 240 per person and day for Sweden as a whole – for an average citizen.

In 2015, there were 3,285 ATMs and 183,818 card terminals. The average card purchase was for SEK 322 and the average cash withdrawal was for just under SEK 1,000. There were 10.4 million debit cards and 10.6 million credit and charge cards.<sup>5</sup>

About 15 per cent of payments at points of sale were made in cash and the rest almost exclusively by card. Surveys on cash in the retail trade suggest that cash's share of payments and turnover is the same.<sup>6</sup> The average cash payment should therefore be about as large as the average card payment.

#### Different participants' cash holdings

We chart here how much cash the different participants hold. The idea is that the initial allocation of cash will affect the extent to which it will be used and how it can be distributed.

<sup>4</sup> An interval of between SEK 200 and 250 billion can be assumed to be reasonable and can be used as an upper and lower limit.

<sup>5</sup> Source: The Riksbank

<sup>6</sup> Andersson, Hedman and Segendorf (2018), "Cashless Society: When will Merchants Stop Accepting Cash in Sweden. A research model."

At the end of July 2017, there was about SEK 47.6 billion in circulation (valid banknotes amounted to 44.9 and valid coins to 2.7).<sup>7</sup>

## Banks

The banks' cash holdings amount to about SEK 1.6 billion.<sup>8</sup> At the end of 2016, there were 1,514 bank branches and, in 2014, slightly over half of all branches did not provide manual cash services. On the other hand, there may be ATMs and/or service boxes.<sup>9</sup>

## Cash-in-transit services and Bankomat

Both Bankomat and the cash-in-transit services have depots/counting centres. There is also cash in ATMs. The total value of these holdings is tentatively estimated at 10 per cent of the cash volume, i.e. SEK 4-5 billion. [How much of the banks' 1.6 billion and the shops' holding is included remains to be checked.]

## Consumers

Unlike the cash holdings of banks, cash-in-transit services and Bankomat, there are no reliable statistics over households' cash holdings, but it is not unreasonable to believe that this holding, up until autumn 2016, was about SEK 20 billion. This estimate is based on two interview surveys.

An investigation carried out by YouGov on behalf of FOREX Bank in 2013 showed that six of ten people in Sweden had cash saved at home to a total value of about SEK 18 billion. Half of those with cash at home had over SEK 1,000. One person in twenty has SEK 20,000 or more. Only 15 per cent of those asked stated that they had no cash at all at home.

In the Riksbank's interview survey (September 2016), 13% answered that they save in cash. Of these, 45% stated that they had less than SEK 10,000, about 25 % that they had between SEK 10,000 and 100,000, and about 25 % declined to answer. It is also uncertain whether they were describing their private savings or the household's savings. Given this, it is not unreasonable to assume that consumers had SEK 15-20 billion saved in cash in 2016. The Riksbank's interview survey also showed that 15% had no cash in their wallets, 23 % had less than SEK 100, 42% had SEK 100-500 and 19% had over SEK 500.<sup>10</sup> In total, the Swedish people should have SEK 3-3.5 billion in their wallets, in addition to cash saved at home.

In 2017, the final part of the banknote and coin changeover in Sweden was implemented, whereby a part of the cash kept at home by households should have been returned, without being replaced by new banknotes. The value of cash in circulation has continued to decrease. It should therefore be considered a very open question how much cash savings households have. Invalid cash could be deposited in bank accounts until 30 June 2018.

## The trade sector and other companies

It is reasonable to expect that the cash not held by banks, cash-in-transit services, Bankomat or households is held by the corporate sector, primarily the trade and restaurant sectors. If, for example, we assume that households have SEK 15 billion in savings and SEK 3.5 billion in their wallets and that banks, Bankomat and the cash-in-transit services have a total of SEK 6 billion, the corporate sector should have about SEK 23 billion. This amount is linked to cash turnover in shops and should be relatively stable but with a declining trend. However, small-change cash should not amount to

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<sup>7</sup> Source: The Riksbank.

<sup>8</sup> Source: Statistics Sweden, Financial market statistics, table 5.1.1

<sup>9</sup> Source: Swedish Bankers' Association, bank and finance statistics 2016 and 2014.

<sup>10</sup> Source: Payment patterns in Sweden, Sveriges Riksbank, 2016

more than SEK 1 billion, so the greater part of the trade sector's holdings should consist of daily takings.<sup>11</sup> But this should not amount to more than a couple of billion at most, even if some traders do not deposit daily takings every day but wait a couple of days.<sup>12</sup>

Cash is not only used in the trade sector but also in the restaurant and tourist sectors, parking meters, some public transport and so on. However, these are often less cash intensive or have significantly smaller amounts in turnover. It is therefore not reasonable to believe that the corporate sector's holdings amount to more than a handful of billion kronor.

## The black economy?

Cash holdings of households and the corporate sector are based on uncertain calculations. However, it seems as if demand for cash is greater than can be explained above. It is likely that cash is also held by participants in the black economy. It is uncertain to which extent this cash would circulate in the scenario studied.

## Off-line functionality

Swedish debit, charge and credit cards have an EMV chip<sup>13</sup> and are generally linked to Visa or MasterCard. In debit card payments or ATM withdrawals, a cover check and reservation is usually made in the customer's account on-line. The chip gives the card-issuing bank the possibility of allowing the payment to be made without making these checks, which is to say that the card issuer can allow payments to be made off-line. Selecting the values of the parameters in the chip allows the card issuer to restrict the number of off-line purchases and the value of these. Similarly, the payment recipient and the card acquirer also have different possibilities that govern whether payments can be made off-line. It is not possible to make an accurate approximation of the proportion of card payments that could be made off-line.

At present, there is no general off-line functionality in Swedish ATMs. Off-line can be supported during some types of disruption but not during others.

On occasions in which a payment or an ATM withdrawal is made off-line, the transaction is stored in the card terminal /ATM and transmitted to the card scheme next time the terminal comes on-line. Terminals that are not linked to the cashdesk often have a memory capacity of 192 MB, which means that relatively many transactions can be stored. Terminals linked to a checkout terminal store transactions in the cashdesk. No transactions are stored in the card's chip.

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<sup>11</sup> An average holding of small-change cash amounts to SEK 2,500-3,000. There are about 220,00 card terminals, so assume that the number of cash desks is between 200,000 and 300,000. This means that the total value of small-change cash does not amount to more than SEK 0.4-0.6 billion.

<sup>12</sup> The trade sector has a turnover of about SEK 750 billion per year, about 15-18% of which is cash (current survey). Average daily cash sales in the trade sector thus amount to less than SEK 0.4 billion. Even if all traders were to wait a couple of days to deposit their daily takings, this would not amount to more than maybe SEK 2 billion.

<sup>13</sup> EMV stands for "Europay International, MasterCard and VISA" and is a security standard for cards, <https://www.emvco.com/about/overview/>

## **Appendix 1 - Scenario planning for payments in a crisis situation – off-line payments by card**

The Riksbank took the initiative in 2015 to form a Swedish payments council and has supplied a secretariat function for the council since it was formed in 2015. The council is chaired by the Riksbank.

The council meets twice a year and consists of 13 sector organisations, public authorities and agents that play a central role in the Swedish payments market. There are 5 working committees under the auspices of the council and they are responsible for carrying out the activities defined in the council's work programme. One of the activities in the work programme concerns an investigation on payments in a crisis situation and a scenario based on it being impossible to pay by card to a normal extent (so-called off-line situation). This scenario is based on the following conditions:

- Telecommunications are not functioning and internet is not accessible
- There is electricity, so the off-line function is possible
- Purchases must be paid for at the point of purchase
- Mobile payment services are at present not generally acceptable alternatives for purchases in physical shops
- Households have a certain amount of basic goods at home
- Households in Sweden have around SEK 10 billion in cash
- No hoarding of basic goods has occurred
- Study the effects of the scenario after 3, 6 and 9 days

At the payment council's meeting on 4 October 2017, the participants agreed to give the secretariat the task of making a more in-depth investigation into what extent it is possible to pay by card in an off-line situation given that there have been disruptions in communications and internet connections.

With the assistance of Card Payment Sweden, the secretariat therefore undertook a survey in the first quarter of 2018 aimed at card issuers and card acquirers active on the Swedish market with the aim of collecting information on existing support for off-line payments.

### **1. Outcome of survey aimed at card issuers and card acquirers active on the Swedish market**

In cooperation with Card Payment Sweden, the payment council secretariat has produced a questionnaire with questions regarding opportunities and limitations when making payments in an off-line situation. Six major card issuers and card acquirers on the Swedish market responded to the survey.

## 2. Agreements and regulations

### Four-party model

The Swedish infrastructure for card payments is primarily based on what is known as the four-party model. The model describes players in the Swedish card market and the relationships between these actors. The central actors are card issuers, card acquirers, cardholders (payers) and merchants (payment recipients).<sup>14</sup>

#### *Payment guarantee and responsibility*

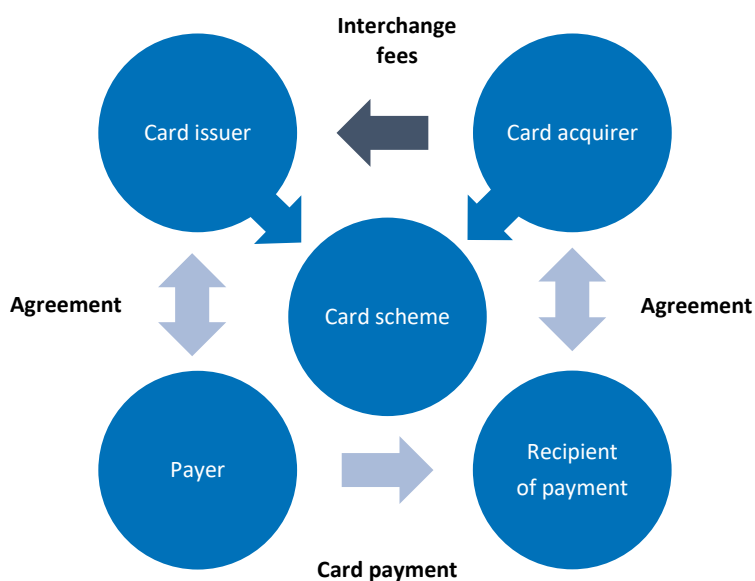
In general, the model is based on the card issuers guaranteeing all shop payments to the card acquirers if these comply with the rules for accepting cards that each card scheme currently applies. The card acquirer usually passes these requirements on to its shops, as it does with the payment guarantee, so that the shops can always feel certain they will be paid for the card purchases they accept in their terminals.

#### *Transaction management and crediting of card payments to shops*

The card acquirer gathers up the card transactions made by customers during the day and credits the retail outlet for these payments. Finally, the card acquirer directs a claim towards the respective card issuer for remuneration for card payments implemented, after which the card issuer remunerates the card acquirer for expenses for the payments made. The shop pays transaction-based remuneration to the card acquirer. In turn, the card acquirer pays transaction-based remuneration to each card issuer for the card transactions that have been redeemed.

The card issuer, for instance a bank, has a contractual relationship with the holder of the card, that is the natural person or legal entity that makes card payments. The card issuer issues and distributes the card to the cardholder and also guarantees the purchases that its cardholders carry out towards the card acquirers in accordance with the applicable regulations for the card.

Both card issuer and card acquirer have signed agreements with the agents providing the regulations for card payments, the so-called card scheme. It can be noted that there is no national card scheme for the Swedish card market. All cards on the Swedish card market are connected to international card scheme and their regulatory frameworks.<sup>15</sup>



<sup>14</sup> Organisations and associations can also be payment recipients. Card issuer and card acquirers can be located outside Sweden.

<sup>15</sup> Examples of international card schemes are VISA and MasterCard.

Figure 1. Four-party model<sup>16</sup>

### **The four-part model for cards and its effect on off-line payments**

Having analysed the survey responses, the payment council secretariat considers that the agreements signed by card issuers and card acquirers with the international card schemes on compliance with their regulations largely set up the frameworks for the execution of off-line payments. The survey responses refer both to the international card scheme regulations and to local Swedish card scheme regulations in accordance with international regulations. The secretariat considers that the international card schemes allow off-line payments but that there are limitations. These limitations mean that only some card products allow off-line purchases, while other products do not allow off-line purchases at all. It would appear that credit cards overall have a greater capacity for off-line purchases than debit cards linked to bank accounts. Some cards, so-called on-line only cards, are completely blocked for off-line purchases, meaning that they do not work if it is not possible to carry out coverage controls against the account to which the card is linked.

The main rule is that the card issuer, card acquirer and shops have the possibility but not the obligation to allow off-line purchases.

## **3. Possibilities for off-line purchases by card on the Swedish market**

In general, there seems to be room for manoeuvre for card issuers for the card products that allow off-line purchases. Card payments with cards equipped with chips can be made off-line under the condition that:

- The equipment used at the point of sale has a power supply, either via network or battery
- The transaction amount is below the limit at which the acquirer/terminal must authorise the purchase on-line with the card issuer to maintain protection against fraud.<sup>17</sup>
- The chip used at the moment of payment allows off-line payments, which is to say it is equipped with parameters for off-line purchases, and:
- The chip used at the moment of payment does not exceed the limits that each card issuer has set in the chip for off-line payments, for example the maximum allowed transaction amount off-line and/or total allowed accumulated amount off-line.

It thus seems that local card scheme regulations for the Swedish market in accordance with the card scheme regulations allow off-line purchases with such chip cards.

### **3.1 Technical support for off-line purchases in shops**

Survey responses indicate that there exists technical support for off-line transactions in the shops' card terminals, which are usually provided by the card acquirer with whom the shop has an agreement. However, there is a limitation in the terminals' hardware regarding the number of transactions that can be stored. Another limitation is set by the terminals' battery capacity in the event of a power failure. One further limitation comes from the card's chip, as the chip contains information on the type of card as well as possibilities and restrictions for off-line purchases. The card issuer is responsible for the information on the chip, which means that the card issuer determines which support shall be available for off-line purchases with the card. One challenge in this context is that changes in the information on the card's chip, such as parameters in the chip that govern the possibility to make off-line purchases, may require the issue and distribution of new

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<sup>16</sup> SOU 2016:53, Payment services, interchange fees and basic payment accounts, p. 636.

<sup>17</sup> This limit is known as the "floor limit"

physical cards. In general, the possibility of carrying out rapid changes to the cardholder's ability to make off-line purchases seems to be limited due to the dependence on issuing and physically distributing new cards.

### **3.2 Business assessments and distribution of risk**

The distribution of the risks arising in conjunction with off-line purchases for card issuers, card acquirers and shops is governed by the agreements between:

- card issuers and card schemes
- card acquirers and card schemes
- local regulations on the Swedish market between card issuers, card acquirers and card schemes.
- card acquirers and shops

The international card scheme regulations and local regulations for the Swedish market allow off-line purchases for the majority of debit cards and credit cards. The card issuers determine the extent to which the cards they issue will allow off-line purchases within the framework of what is permitted by the card scheme regulations. The card issuer is responsible for the risk inherent in card purchases executed without coverage existing in the account or the credit linked to the card as regards the card acquirer and shop, under the condition that the card issuer allows off-line purchases and the amounts involved are within the framework allowed by the card scheme. In this case, the card issuer may the cardholder on the basis of the terms and conditions of the agreement between card issuer and cardholder. The card acquirers' agreements with the card scheme give them the right to accept off-line purchases within the specified framework without being responsible for any risk as long as the card purchases stay within the framework of the card scheme regulations and the technical parameters of the cards' chips as set by the card issuers. However, some cards, so-called on-line only cards, are excepted. The chips in these cards contain parameters that technically require coverage controls against accounts and credit to be made.

Shops' responsibility for off-line purchases is regulated by the agreements between shop and card acquirer. The agreements seem to allow off-line purchases on the condition that they are made under the framework set up by the card regulations and the card issuers. This means that the shop is responsible for ensuring that off-line purchases stay within the specified amount limits. The payment council secretariat's understanding is that the possibility for the shop's customers to make off-line purchases is technically determined by the shop's card terminals. This means that the parameters set by the card issuer on the card's chip are read by the terminal and, in cases where the purchase is within the boundaries set by the card issuer, the shop's terminal will allow the purchase. In cases where the shop allows off-line card purchases that deviate from what is allowed under the shop's agreement with the card acquirer, the shop carries the risk for the transaction.

Based on the above, it is possible to identify three scenarios for the distribution of risks arising in conjunction with off-line purchases.

#### Scenario 1 – full support for off-line purchases

The card issuer and the card acquirer accept off-line purchases under the framework for the amount limits allowed by the card schemes. Off-line purchases are covered by agreements between card acquirer and shop. This means that off-line purchases can be carried out in shops and that the card issuer accepts the risk involved in off-line purchases within the amount limits set by the card regulations and the card issuers. Otherwise, the card acquirer or shop is responsible for the risk. In cases where the shop allows off-line card purchases that deviate from what is allowed under the



shop's agreement with the card acquirer, the shop carries the risk for the transaction towards the card acquirer. In turn, the card acquirer bears the risk towards the card issuer and bears any costs for the invalid transaction.

#### Scenario 2 – limited support for off-line purchases

The card issuer has a limited possibility for off-line purchases, either by: allowing lower amounts than the card schemes' amount limits, restricting the number of off-line transactions or by restricting the total amount for off-line transactions or the number in a delimited period of time. Subject to the above restrictions, off-line purchases are covered by agreements between card acquirer and shop. This means that off-line purchases can be carried out in shops and that the card issuer accepts the risk involved in off-line purchases within the framework of what is accepted by the card regulations and the card issuer. In cases where the shop allows off-line card purchases that deviate from what is allowed under the shop's agreement with the card acquirer, the shop carries the risk for the transaction towards the card acquirer. In turn, the card acquirer bears the risk towards the card issuer and bears any costs for the invalid transaction.

#### Scenario 3 – off-line purchases are not permitted

The card scheme regulation have excluded certain card products from the possibility of allowing off-line purchases, which means that the card issuer has set parameters in the card's chip meaning that off-line transactions are technically impossible to perform. The consequences of this, in all cases, are that it will be impossible to conduct coverage controls of underlying accounts or credits and so purchases will be refused.

### **3.3 Current support for off-line purchases in relation to the payment council's scenario for disruptions in the card infrastructure**

In 2017, the payment council's working committee against crises and vulnerabilities in the payment system drew up a scenario for payments in a crisis based on a situation in which it is impossible to carry out card payments to a normal extent due to disruptions to communications and internet connections. This scenario includes an analysis of how a variety of typical households would be affected by disruptions to the payment infrastructure for card payments over a period of time of up to 9 days. The scenario assumes that each household has access to one credit card and one debit card.

The analysis shows that households are affected to varying extents depending on their access to cash and food and their fuel needs. Those households lacking cash and food naturally have the greatest consumption requirement and thereby a greater need for access to off-line payments as a continuity solution in the crisis scenario described.

#### **The card issuers' view of off-line purchases as a continuity solution**

The majority of card issuers in the survey consider that existing possibilities for off-line purchases are sufficient to meet the need for purchases of basic necessities in the scenario. However, some card issuers point out that they have introduced amount limits for off-line purchases meaning that the scope for off-line purchases they provide is not sufficient to cover the necessary purchases of basic necessities for all households in the scenario. Some card issuers emphasise that technical limitations in the card readers concerning the number of stored transactions could be a problem as there is a risk that this storage room could be filled rapidly in a crisis situation. Major demands could also be made for shops to carry out identity checks of customers if the card terminals cannot authenticate cardholders to the normal extent.

#### **The card acquirers' view of off-line purchases as a continuity solution**

Survey responses from card acquirers showed a more sceptical attitude towards typical households' ability to manage purchases of basic necessities according to the scenario, as they emphasise that different card issuers have different tolerances of off-line purchases. Some card acquirers

emphasised that shops have the possibility of allowing off-line purchases even after the terminal's storage capacity has been filled by registering purchases afterwards. This means that the customer receives the goods or services even though the purchase has not yet been registered by the terminal. The risk for these transactions lies with the shop. The card acquirers pointed out that increased storage capacity in card terminals and increased battery capacity are technical measures that could allow more off-line transactions to be carried out over a longer period.

## 4. Conclusions

Considering the responses submitted to the survey, the payment council's secretariat deems that there exist the technical conditions to conduct card payments off-line among card issuers, card acquirers and shops in the scenario used by the working committee for the Swedish market. However, support for off-line purchases is dependent on the type of card and the card issuer's risk appetite/willingness to adapt to the frameworks for off-line purchases set by the international card scheme regulations, as well as national regulations linked to the international card regulations. In Sweden, this means, in concrete terms, that holders of bank cards and credit cards to various extents have the possibility of making off-line purchases with cards.

The scenario from which the working committee proceeds shows that those households lacking cash and food and that are dependent on fuel are the most vulnerable and are thereby most in need of a continuity solution for payments in a crisis situation over a period lasting for nine days.

Those typical households that are customers of card issuers who allow off-line purchases in the card's chip in accordance with the card scheme regulations without further restrictions should be able to meet their consumption requirements in the scenario described. However, there is uncertainty over whether those typical households who are customers/cardholders of banks and credit cards among card issuers who have introduced stricter limits to their chip cards than required by the regulations will be able to carry out off-line purchases over the entire period described and with the consumption requirement specified.

Households only having access to cards allowing on-line purchases will not be able to meet their consumption requirements according to the scenario. However, the scenario is based on the assumption that households have access to both a debit card and a credit card. This means that the credit card can cover the consumption requirement, albeit subject to possible restrictions regarding off-line purchases from the card issuer's side.

The payment council's secretariat considers that knowledge among the general public and government agencies on the conditions for making card purchases off-line is low. Considering the declining cash usage in society since 2007 and the ongoing process of urbanisation with increased migration to cities, the likelihood is increasing that ever greater numbers of households will not have cash or food to a sufficient extent to meet their basic consumption needs in a crisis situation. From this perspective, it is important that citizens are aware of the possibilities and limitations applying in the event of a crisis negatively affecting the infrastructure for payments.

## 5. Proposals for continued work

The respondents have submitted a number of proposals for activities with the aim of improving the possibilities for carrying out off-line purchases in a crisis situation. Some of these proposals are based on voluntary collaboration between the participants on the card market, while other proposals are based on central government participation. It should also be pointed out that some respondents see difficulties in further increasing support for off-line purchases.

*Proposals based on voluntary cooperation between market parties.*

- Work out a plan for managing purchases with cards in a longer off-line situation. This is based on card acquirers and card issuers agreeing on manual handling (but with the help of modern technology) to enable purchases even if either the chip or the terminal rejects the purchase.
- Ensure that all card issuers introduce off-line parameters to their chip cards for the card products that have off-line capacity according to the card brand's regulations.
- Ensure to upgrade customers, more or less automatically, from 'on-line only' cards to cards with off-line functionality when the customer is qualified for this.
- Also continue to ensure that the terminal's threshold for off-line payments can be kept on the current level.

*Proposals submitted by respondents and based on participation by central government:*

- Investigate the conditions for a guarantee (state?) with the aim of giving shops the possibility, in an extreme crisis situation, of allowing purchases regardless of limits in chips and terminals.

*Opinions identifying challenges in continued work*

- There is currently a trend towards all transactions being executed on-line, which could lead to it becoming impossible to maintain local card scheme regulations for the support of off-line payments.
- Regulations and directives from the EU regulate the European card market. Possible national deviations must be compatible with European legislation and, in this context, it is particularly important to ensure that there is no discrimination against foreign card issuers and card acquirers active on the Swedish card market.

*Recommendation:*

The payment council's secretariat considers that a reasonable breakdown of the continued work would be to investigate the conditions for voluntary cooperation through discussions between the actors on the card market, primarily card issuers and card acquirers. An initial stage could consist of the actors investigating the conditions for further communication to customers around the possibilities and limits that apply to off-line purchases with cards. In both cases, it is important to consider the challenges identified and that work must be done in line with existing legislation.

## **Appendix 2 - Scenario planning for payments in a crisis situation – off-line withdrawals by card**

### **1. Scenario analysis regarding disturbances to the payments infrastructure**

The Riksbank took the initiative in 2015 to form a Swedish payments council and has supplied a secretariat function for the council since it was formed in 2015. The council is chaired by of the Riksbank.

The council meets twice a year and consists of 13 sector organisations, public authorities and agents that play a central role in the Swedish payments market. There are 5 working committees under the auspices of the council and they are responsible for carrying out the activities defined in the council's work programme. One of the activities in the work programme concerns an investigation on payments in a crisis situation and a scenario based on it being impossible to pay or make withdrawals by card to a normal extent (so-called off-line situation). This scenario is based on the following conditions:

- Telecommunications are not functioning and internet is not accessible
- There is electricity
- Purchases must be paid for at the point of purchase
- Mobile payment services are at present not generally acceptable alternatives for purchases in physical shops
- Households have a certain amount of basic goods at home
- Households in Sweden have around SEK 10 billion in cash
- No hoarding of basic goods has occurred
- Study the effects of the scenario after 3, 6 and 9 days

At the payment council's meeting on 4 October 2017 the participants agreed to give the secretariat the task of making a more in-depth investigation into what extent it is possible to pay by card in an off-line situation and to make withdrawals by card from ATMs given that there have been disruptions in communications and internet connections.

The payment council secretariat has therefore made a survey during Q1 and Q2 2018 in the form of a questionnaire to owners of ATMs to gather information on existing support for cash withdrawals from ATMs in off-line positions.

### **2. Outcome of survey aimed at owners of ATM networks active on the Swedish market**

The payment council secretariat has produced a questionnaire with questions regarding opportunities and limitations when making cash withdrawals from ATMs in off-line position. One national owner of ATMs on the Swedish market responded to the survey. A further two owners of ATM networks on the Swedish market have examined and commented on a draft compilation of the survey.

### 3. Agreements and regulations

#### The four-party model

The Swedish infrastructure for card payments is based on what is known as the four-party card scheme. The scheme describes agents in the Swedish card market and the relationships between the agents. The central agents are card issuers, card acquirers, cardholders (payers) and retail outlets<sup>18</sup> (payment recipients).

Card acquirers guarantee that the retail outlets that accept card payments are paid for these payments. The card acquirer has an agreement with the retail outlet that accepts the card payment. The card acquirer gathers up the card transactions made by customers during the day and credits the retail outlet for these payments. The card acquirer charges the retail outlet a fee per transaction redeemed. Finally, the card acquirer directs a claim towards the card issuer for remuneration for card payments implemented, after which the card issuer remunerates the card acquirer for the payments made. The card issuer, for instance a bank, issues and distributes cards to cardholders and has a contractual relationship with the holder of the card, that is the natural person or legal entity that implements a withdrawal of cash using the card.

Owners of ATMs act in the role of card acquirers (with the difference that they do not have any relationship with retail outlets) and they direct a claim on the card issuer regarding remuneration for cash withdrawals made with card, after which the card issuer remunerates the owner of the ATM for the disbursement. The owner of the ATM also charges a transaction-based fee to the card issuer. The owner of the ATM can either have a redemption agreement directly with the international card scheme or with a card acquirer that in turn has an agreement with the card scheme.<sup>19</sup> In the case that the ATM owner has an agreement with a card acquirer, the card acquirer is responsible for the withdrawals in the ATM owner's ATM taking place in agreement with the card scheme's regulations.

It is possible for the ATM owner to sign bilateral agreements with card issuers. Such agreements can give the card issuer access to added value services, such as customer-adapted dialogue in the ATM owner's interface. A bilateral agreement could also regulate the terms for off-line withdrawals in ATMs between ATM owners and card issuers. One condition for this type of agreement, however, is that the ATM owner and the card issuer have also established technical support for off-line transactions.

Characteristic to the Swedish card market is that there are no national regulations for cards; instead all cards on the Swedish card market are connected to international card schemes and their regulatory frameworks.

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<sup>18</sup> Organisations and associations can also be payment recipients

<sup>19</sup> Examples of international card schemes are VISA and MasterCard.

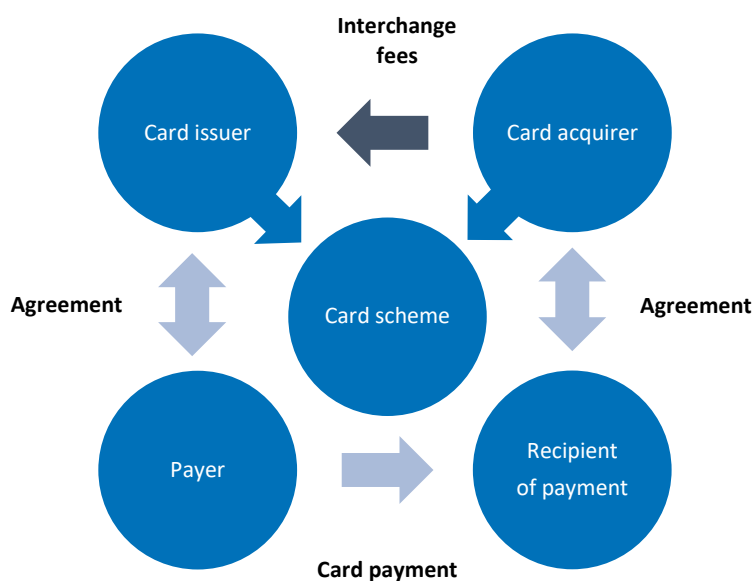


Figure 1. Four-party model<sup>20</sup>

#### 4. Possibilities for off-line withdrawals in ATMs by card on the Swedish market

The payment council secretariat's understanding is that the international card schemes' regulations generally give some scope for off-line transactions. A study carried out by the payment council secretariat in collaboration with Card payment Sweden in 2018 shows that it is possible within certain guidelines to make off-line purchases by card in retail outlets in the Swedish market and that there is also technical support for off-line transactions in card terminals. The risk linked to these transactions is regulated in the international card schemes regulations and in agreements between card issuers, card acquirers and merchants.<sup>21</sup>

With regard to ATM withdrawals, the card schemes require that they shall be made on-line and approved by the card issuer. The card schemes' regulations do allow, however, that card issuers and ATM owners, or the card acquirers acting as representatives of the ATM owner, sign bilateral agreements with one another regarding support for off-line transactions and the risk distribution for these. If no agreements exist, the card schemes' regulations apply. The payment council secretariat's understanding is that there are no bilateral agreements on the Swedish market between ATM owners and card issuers regarding off-line withdrawals.

There are card issuers who also have the role of ATM owner. These agents can decide for themselves with regard to the terms that shall apply to their customers and cardholders in their own ATMs in connection with technical problems according to the scenario described above.

Even if there are no agreements between ATM owners and card issuers, the card issuer and the international card schemes can agree bilaterally on a contingency routine that allows off-line transactions regardless of channel (for instance, purchases in retail outlets or withdrawals in ATMs) if

<sup>20</sup> SOU 2016:53, Payment services, interchange fees and basic payment accounts, p. 636.

<sup>21</sup> See the payment council's study on off-line card purchases, appendix 1.

the card issuer is suffering technical problems.<sup>22</sup> These agreements are based on the card issuer buying a service where the card issuer gives the card schemes power-of-attorney to act as representative for the card issuer and authorise card transactions with the card issuer's card on condition that these transactions meet the terms and conditions set by the card issuer. These terms and conditions can, for instance, concern amount limits, accumulated amounts and geographical location of ATMs. The ATM owner understands these transactions to be transactions that are authorised on-line. A condition for this contingency routine to function is that the ATM owner's IT system can communicate with the card schemes' IT system. In the above scenario, however, the internet and communications are down which means the contingency routine cannot come into force.

Some cards are what as known as on-line cards and, in accordance with the international card scheme regulations, they are entirely blocked for off-line withdrawals via information contained in the chip on the card. For holders of these cards, it is irrelevant whether there is an agreed support for off-line transactions, as these cards are exempted.

#### **4.1 Technical support for off-line withdrawals**

The payment council secretariat's understanding is that there is no general technical support for off-line withdrawals from ATMs, which is a consequence of there being no agreements between owners of ATMs and card issuers with regard to off-line withdrawals. The survey responses have indicated that this type of technical adjustment requires considerable resources and is difficult for ATM owners to justify financially. One example of a technical adjustment could be that the ATM owner supplies a solution that allows off-line withdrawals in accordance with the limits the card issuer has programmed into the chip on the card. Other possible technical adjustments are the establishment of special communications between ATM owners and card issuers. One challenge in this context is that changes in the information on the card's chip, such as parameters in the chip that govern the possibility to make off-line transactions, may require the issue and distribution of new physical cards.

The respondents indicate in the survey that a scenario with disruptions in communications and internet connection could mean that alarms and security services for ATMs would not function as normal. In this situation, special security systems can be activated and put the relevant ATMs out of action.

#### **4.2 Distribution of risk for withdrawals from ATMs**

The payment council secretariat's understanding is that the distribution of the risks arising in connection with withdrawals from ATMs for card issuers and ATM owners are distributed according to agreements between:

- ATM owners and card issuers
- ATM owners and card schemes
- Card issuers and card schemes
- Card issuers and cardholders

##### ATM owners and card issuers

The ATM owner has the possibility to sign an agreement with the card issuer regarding the use of the card issuer's card in the ATM owner's ATM. These can cover technical support that enables adapted interfaces and services for the card issuers' customers. Examples of this are marketing of the card issuer's services to the card holder and support for transferring funds between the card holders' accounts. In some cases, the ATM owner may also act in the role as card issuer and then has the

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<sup>22</sup> This routine is known as "Stand in processing".

opportunity to offer added value services.

Agreements between ATM owners and card issuers, or between the card acquirer acting as representative for the ATM owner and the card issuer, could also regulate the distribution of risk with regard to off-line transactions. However, judging from the responses to the survey, there do not appear to be agreements between owners of ATMs and card issuers regarding support for off-line withdrawals, which means that off-line withdrawals in ATMs are not possible to execute regardless of card type. When there is no agreement, the card schemes' regulations apply and these require the ATM withdrawals to be made on-line and authorised by the card issuer. The ATM owner bears the risk for possible off-line withdrawals made with the owner's knowledge and the owner may be liable to pay compensation to the card issuer. The ATM owner can also lose the right to commercial remuneration for withdrawals not approved by the card issuer.

#### ATM owners and card scheme

The ATM owner can sign an agreement with the international card schemes on acting the role of card acquirer. The ATM owner must then respect the regulations regarding off-line transactions stipulated by the card schemes. The international card schemes' regulatory frameworks make demands that all ATM withdrawals must be authorised on-line for card issuers to guarantee remuneration for the amount withdrawn and a transaction charge. The ATM owner can also sign an agreement with a card acquirer that the acquirer shall act as representative of the card scheme. In these cases the card acquirer is responsible for the withdrawals in the ATM owner's ATM taking place in agreement with the card scheme's regulations.

#### Card issuer and card scheme

A necessary condition for a card issuer to be able to issue cards to its customers is that it has agreements with the international card schemes and follows their regulations. These regulations allow off-line transactions to some extent and the card issuer has the possibility, but no obligation, to offer support for off-line purchases in shops. With regard to ATM transactions, the card scheme's regulations require that these transactions shall be authorised on-line unless otherwise agreed between the card issuer and the ATM owner, alternatively between the card issuer and the card acquirer acting as representative for the ATM owner.

#### Card issuer and cardholder

The card issuer enters an agreement with the cardholder that regulates the cardholder's rights and obligations regarding holdings and use of the card. To the extent that the cardholder executes off-line transactions without cover against account or credit, the cardholder assumes responsibility for these transactions towards the card issuer and becomes liable for compensation if there lacks cover on the account or credit to which the card is linked.

### **4.3 Scenarios for off-line withdrawals**

Based on the above, it is possible to identify three scenarios for the possibility of making ATM withdrawals on the Swedish market.

#### Scenario 1 – there are no agreements supporting off-line withdrawals

Card issuers and ATM owners do not have agreements that support off-line withdrawals. As there is no contractual support, neither is there any technical support for off-line withdrawals. All withdrawals must be authorised on-line in accordance with the card schemes' regulations. This means that the ATM owner cannot accept off-line withdrawals taking place with the owner's knowledge for any of the cards issued by the card issuer, regardless of with parameters with which the card issuer equipped the card's chip.



#### Scenario 2 – limited support for off-line withdrawals when the ATM owner acts as card issuer

The ATM owner plays the role of card issuer and, in this role, issues cards to its customers. The ATM owner allows off-line withdrawals according to its internal regulations for cardholders holding a card issued by the ATM owner in the role of card issuer.

#### Scenario 3 – limited support for off-line withdrawals

The card issuer has signed agreements with the international card schemes on a reserve routine allowing off-line transactions if the card issuer is facing technical problems. The card scheme then has power-of-attorney to act as representative for the card issuer and approve card transactions with the card issuer's card on condition that these transactions meet the terms and conditions set by the card issuer. A condition for this contingency routine to function is that the ATM owner's IT system can communicate with the card schemes' IT system. In the above scenario, the internet and communications are down which means the contingency routine cannot come into force.

### **4.4 Off-line withdrawals from ATMs in relation to the payment council's scenario for disruptions in the card infrastructure**

In 2017, the payment council's working committee against crises and vulnerabilities in the payment system drew up a scenario for payments in a crisis based on a situation in which it is impossible to carry out card payments and withdrawals by card to a normal extent due to disruptions to communications and internet connections. This scenario includes an analysis of how a variety of typical households would be affected by these disruptions over a period of time of up to 9 days. The scenario assumes that each household has access to one credit card and one debit card. The analysis shows that households are affected to varying extents depending on their access to cash, food and consumption needs. Those households lacking cash and food naturally have the greatest consumption requirement and thereby a greater need for access to off-line transactions as a continuity solution.

## **5. Conclusions**

Considering the responses submitted to the survey, the payment council's secretariat deems that conditions for making withdrawals off-line among owners of ATMs are absent. This is because there are no technical adaptations and bilateral agreements between ATM owners and card issuers.

The scenario from which the working committee proceeds shows that those households lacking cash, food and with an additional consumption need, for instance dependence on fuel, are the most vulnerable and are thereby most in need of a continuity solution for payments in a crisis situation. The payment council's secretariat assess that there is no possibility for the typical households identified in the scenario to make off-line withdrawals in ATMs to manage their consumption needs. Households only having access to cards that are limited to on-line transactions completely lack the conditions to fulfil their consumption requirements in the scenario, regardless of whether or not the ATM owner and card issuer agree on establishing support for off-line withdrawals. However, the scenario is based on the assumption that households have access to both a debit card and a credit card. This means that, assuming that the credit card is covered by agreements by card issuers and card schemes on support for off-line transactions, it may be possible to cover the consumption requirement.

There are, however, bilateral agreements between card issuers and the international card schemes in which the card schemes act as ombudsman for card issuers and authorise transactions in accordance with terms set by the card issuer in the event that technical disruptions occur for the card issuer. The

precondition for this is that there exists technical communication between the ATM owner's IT system and the international card schemes' IT system. However, the payment council's scenario assumes that both telecommunications and the internet will be disabled, meaning that this solution is irrelevant.

In a separate study with Card Payment Sweden, the payment council's secretariat has investigated to which extent card purchases can be conducted off-line to cover households' basic consumption requirements in the scenario.<sup>23</sup> The conclusion of this study is that the card issuers overall can provide support for off-line card purchases in shops to cover households' consumption needs. In a comparison of the two payment measures, card purchases in shops and cash payments, there seem to be worse conditions for conducting cash payments than card payments in the council's scenario, as it is basically impossible to gain access to cash via off-line withdrawals via ATMs. Those households only having access to so-called on-line cards will be particularly vulnerable as they will be unable either to execute card payments or to make ATM withdrawals in an off-line situation.

Considering the declining cash usage in society since 2007 and the ongoing process of urbanisation with increased migration to cities, the likelihood is increasing that ever greater numbers of households will not have cash or food to a sufficient extent to meet their basic consumption needs in a crisis situation. From this perspective, it is important that citizens are aware of the possibilities and limitations applying in the event of a crisis negatively affecting the infrastructure for payments.

## **6. Proposals for continued work**

The payment council's secretariat considers that there is a lack of agreements between ATM owners and card issuers on support for off-line withdrawals of cash in ATMs on the Swedish market and that the technical adjustments that ATM owners would face in setting up support for off-line withdrawals is seen as economically onerous. However, the secretariat is of the opinion that the card issuers have the possibility of signing bilateral agreements with the international card schemes on a reserve routine in which the card schemes act as an agent for the card issuer and authorise transactions if the card issuer should be affected by technical disruptions. This could make withdrawals possible despite an individual card issuer having technical problems. However, one precondition is that there exists technical communication between the ATM owner's IT system and the card issuer's IT system. Even if the payment council's scenario means that this reserve routine would not be applicable as it involves a complete breakdown in communications, the existence of bilateral agreements between card issuer and card schemes on reserve routines from a continuity perspective would entail an improvement for cardholders compared with the absence of such an agreement.

The payment council's secretariat considers that a reasonable precondition for this work would be to hold a dialogue with the card issuers to gain a view of how comprehensive bilateral agreements on reserve routines between card issuers and the international card schemes are.

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<sup>23</sup> See the payment council's study on off-line card purchases, appendix 1.