

# SPEECH



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## The e-krona and the payments of the future

When did you last pay with cash? I suspect it was rather a long time ago. In Sweden, the Riksbank's money has been used for 350 years, so it entails a historical shift if you and all of us, completely stop using central bank money to make payments. Today we can buy food, pay our bills and receive medical prescriptions without needing to leave our homes. The more goods and services we purchase digitally, the more we need rapid and simple payment services that are adapted to our new way of shopping.

Is it a problem that cash is being used less and less? Yes, in a way it is. If the Riksbank is to fulfil its mandate, to ensure that Sweden has a payment system that is both safe and efficient, the means of payment we issue must also be used.

I believe that the arguments that once led to the central banks being allowed to issue money are still relevant, it is only the technology that has changed. This is why we at the Riksbank have decided to build a pilot version of a new type of Riksbank money – a digital krona, or e-krona. Today I intend to explain why we are doing this and how we imagine it might look. For those who are interested in more details, there is a newly-released report available to be downloaded from our website.<sup>1</sup>

### Why is an e-krona necessary?

The Riksbank has been issuing money since the 17th century.<sup>2</sup> And they have formed the linchpin of our payment system. But now cash is being marginalised in our society. Not only many restaurants and cafés, but also many shops, no longer accept cash. You cannot use cash to pay for parking your car, to pay your taxes or to buy a bus ticket. Several large department stores are testing cash-free stores. We must therefore prepare ourselves for a future where almost all payments are made electronically. And then the question arises whether it would make any dif-

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<sup>1</sup> See Sveriges Riksbank (2018a) and Sveriges Riksbank (2018b.)

<sup>2</sup> The Riksbank first issued coins and then began during the first half of the 18th century to also issue banknotes. For a more detailed description, see for instance Ögren and Edvinsson (2014).

ference if there was no electronic money issued by the Riksbank. Is there a particular reason why the state, in countries all around the world, throughout history, has played the leading role with regard to issuing money?

### **Central bank money creates confidence even in privately-issued money**

To find the answer to this question, we must go back in time. During the 19th century, banks in Sweden and several other countries were allowed to issue private banknotes that circulated together with the Riksbank's banknotes. One lesson we can learn from this episode is that it worked well in the countries where people could rely on the privately-issued money being converted to central bank money, while it did not work so well in the other countries.<sup>3</sup> It is therefore understandable that in the end central banks were given the monopoly on issuing banknotes and coins.

Since then the system we have has worked well, with private banks being able to create electronic money that can be converted into the Riksbank's money, cash. The state has also introduced guarantees and regulation, such as the deposit guarantee, which means that the general public can rely on its money being safe in the accounts with the private banks. During normal times, this all runs smoothly and we probably don't stop to think about it.

But let's imagine what might happen in a financial crisis if cash was no longer a viable payment alternative. If we want to take out money from a bank we consider uncertain, our only alternative will then be to move electronic money from one bank to another. But in times of financial unease, confidence in the entire banking system may be shaken and in that case it will not help to move money from one bank to another. You have probably seen pictures of bank runs – when queues form outside banks in crisis as people want to withdraw their money in the form of (safe) cash. This is why central bank money is still the linchpin of the system, even if it is rarely used in normal circumstances. The fact that it is available as an alternative acts as a kind of guarantee for the private bank money.<sup>4</sup>

It is also the case that some key systems for payments are increasingly concentrated to a few agents. See, for instance, the card payment market where two American companies are entirely dominant in Sweden. Unlike our neighbouring countries, we do not have any domestic card payment network. This means that we are dependent on foreign infrastructures to make the majority of households' payments. Without cash, therefore, an important part of the Swedish infrastructure would be completely in private ownership and dependent on foreign infrastructures and foreign companies. So if the use of cash continues to decline, it is not enough to say that this works fine at present, because the future will look rather different, regardless of whether we produce an e-krona.

Other functions that cash has performed include functioning as a back-up when there have been disruptions to other forms of payment. It has also helped ensure

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<sup>3</sup> See, for instance, Fung et.al. (2018) and Söderberg (2018).

<sup>4</sup> See, for instance, Tobin (1985).

that there have not been excessive monopoly gains and inefficiencies on the payment market, which otherwise tends to gravitate towards monopoly.<sup>5</sup>

### **The e-krona can fulfil the same function as cash has traditionally held**

An e-krona would mean that the functions of cash would remain, even in a digital future. On the other hand, if the Riksbank does not offer a new, modern, viable alternative, this means that we will be giving up a tradition and functionality that has worked well for 350 years. Over the years, it has been the state's role to standardise and guarantee all money in society. The basic condition for the e-krona is that it, like cash, will be broadly available to all members of society. It must work with the existing systems and be exchangeable one-to-one for cash or money in private bank accounts. At present, many private solutions on the market function so that services are offered that at the same time tie up customers into specific systems or to specific suppliers. Ultimately, this can lead to poorer competition and innovation. The advantage of central bank money is that there is no commercial enterprise behind it and it is therefore always fungible (freely exchangeable).

It is not only the Riksbank that considers it worth analysing the possibility of issuing central bank money in a new form to continue fulfilling their traditional role in a digital future; there are similar projects in several other countries. However, the analysis is less urgent in other countries, where they have not experienced the same rapid decline in the use of cash. While the value of outstanding cash as a percentage of GDP is just over 1 per cent in Sweden, it is 10 per cent in the Eurozone and a good 20 per cent in Japan. Our Nordic neighbours are also conducting similar analyses because of a decline in the use of cash. Norway and Denmark, for instance, have produced reports and analyses on digital central bank money. The Bank of England and the Bank of Canada have published research articles in this field that analyse, for instance, possible motives for central bank digital currencies and their consequences for monetary policy and financial stability.<sup>6</sup>

Central banks in some emerging market economies have also shown an interest in central bank digital currencies. These countries' motives for being interested in central bank digital currency differ somewhat from our own. One motive is that they see the opportunity to broaden access to fundamental financial services to all parts of the population, that is to say, financial inclusion. Other arguments concern reducing the use of cash, which may be regarded as costly and risky. They also point to the negative environmental aspects of cash and to the fact that it enables money laundering and makes it easier for the black economy.<sup>7</sup> The work that is done is not solely theoretical. Uruguay, for instance, has already carried

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<sup>5</sup> As the payment market is a natural monopoly with network externalities, it has a strong tendency towards concentration. For a more detailed description, see Ingves (2018).

<sup>6</sup> See, for instance, Engert and Fung (2017), Davoodalhosseini (2018), Kumhof and Noone (2018) and Meaning et.al. (2018).

<sup>7</sup> See, for instance, Rogoff (2016) for a more detailed discussion on problems associated with cash usage.

out a successful pilot project with a digital peso. In Canada, Singapore and the Eurozone, prototypes have been produced and tested in limited environments to learn more.<sup>8</sup>

**The pilot version of the e-krona will be simple, but we are still some time away from a possible launch**

Now that I have explained why we think it is worth analysing an e-krona, I would like to move on to talk a little more about what form it might take. If we construct an e-krona, there are in principle two models we could base it on. In one of them, the e-kronas would be held in an account with the Riksbank and in the other the e-kronas would be in the form of digital units of value (tokens) stored locally, for instance on a card or in a mobile app. Both models would mean that the general public had the opportunity to hold money with the Riksbank, so the difference between the two possible e-kronas is not really so great.

To allow households and companies to use e-krona to save and make payments, it is necessary to have user applications or bearers of value, for instance in the form of a mobile app. But we believe that the market is better at producing this type of alternative than we are. The Riksbank therefore does not necessarily need to supply e-krona to households and companies itself, it can instead offer an open infrastructure where other agents can create payment services that they offer to the general public.

What we have decided to develop, build and test is a concrete proposal for a viable e-krona. Based on the Riksbank's current mandate, we will test a pilot version of the simpler, value-based version of an e-krona. This means that it will be a digital unit of value (token) that can be stored centrally or locally. It will at least not initially be interest-bearing, but will be fairly similar to cash. We also think there should be the possibility to make payments offline. By beginning development work, the Riksbank will increase its preparedness to maintain the central bank's traditional role in a future digitalised payment market. It will take a few years to develop an e-krona system. Once we have tested the pilot version we can choose to issue, or not to issue, a digital krona to the general public.

With regard to the account-based version, we consider that further analysis is needed, but that legislative amendments would also be required if it is to be realised. To make the choice of path regarding digitalisation of the payment market easier, we need a clear Swedish stance that is based on political priorities and decisions. This includes a review of the Sveriges Riksbank Act that clarifies the Riksbank's mandate. It is also important to cooperate with other public authorities. The e-krona would have points of contact with many other authorities, for instance the tax account, to which all those who are to pay tax receive access, functions as a form of state money. It is possible that the best solution would be to build an e-krona system together with other authorities.

It would also be good if the legislation in this field in Sweden was updated to take into account the fact that payments will in future be made digitally. If the means

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<sup>8</sup> See, for instance, Project Jasper [https://www.payments.ca/sites/default/files/29-Sep-17/jasper\\_report\\_eng.pdf](https://www.payments.ca/sites/default/files/29-Sep-17/jasper_report_eng.pdf), Project Ubin <http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/Project-Ubin.aspx> and Project Stella [https://www.ecb.europa.eu/pub/pdf/other/stella\\_project\\_leaflet\\_march\\_2018.pdf](https://www.ecb.europa.eu/pub/pdf/other/stella_project_leaflet_march_2018.pdf).

of payment issued by the Riksbank is not generally accepted, it will be difficult for the Riksbank to perform its task of promoting a safe and efficient payment system. According to the Sveriges Riksbank Act, the Swedish krona, in the form of cash, is legal tender. But at the same time, it is possible to waive the obligation to accept cash by, for instance, putting up a sign that cash is not accepted. As the use of cash is declining rapidly, it is urgent that the legislator takes a stance on what status in the law legal tender shall have. This would clarify the position of cash as legal tender. It is also important that the legislator takes a stance on the issue of what, in addition to cash, may comprise legal tender and how this relates to the Swedish krona as a currency. Legislation on legal tender should be as technology-neutral as possible so that it will also be applicable to future means of payment issued by the Riksbank. All in all, it would therefore be good if the means of payment issued by the Riksbank is given a stronger position in the future than it has at present.

### **The e-krona will have only minor consequences for the banking system**

Some critics of central bank digital currencies claim that they create risks that affect the financial system. Some are worried that the Riksbank will compete with the banks and that credit granting might be affected.<sup>9</sup> But this is not true.

With regard to supplying money, the Riksbank, like other central banks, has always competed with the banks. We have been offering cash as an alternative for 350 years now. One difference is of course that a digital form of cash in one way or another, such as an e-krona, would be a more effective competitor to the current supply of digital payment services than physical cash is.

However, our analysis shows that the consequences for the banks would be very small under normal circumstances. It is possible that the e-krona could increase competition for household deposits on the margin, but this does not mean that lending need be affected. New loans are not created solely from new deposits in the modern economy. For instance, the Swedish bank have around SEK 6,000 billion in loans issued on their balance sheets, and just under half of this in deposits, around SEK 2,800 billion.<sup>10</sup> Another way of putting it is that Swedish banks get around half of the financing for their loan portfolios on the market. This is more than the banks in the rest of Europe, and it has not prevented Swedish credit granting from growing at a faster pace. Deposits are thus not necessary to create lending. On the other hand, they have traditionally been a source of cheap financing for the banks. If deposits were to decline somewhat as a result of the e-krona, the banks would have to replace this with wholesale funding, which tends to be somewhat more expensive. Alternatively they can raise the interest on deposits.

Another question that often arises is whether central bank digital currency can increase the risk of bank runs. The idea is then that in times of unease a bank can rapidly lose its deposits, as it is easier to move electronic money than withdraw cash.<sup>11</sup> However, it is questionable whether cash is the relevant point of comparison in this context. It is already easy to open an account with another bank and to

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<sup>9</sup> See, for instance, BIS (2018).

<sup>10</sup> See Juks (2018).

<sup>11</sup> This is highlighted by among others the BIS (2018) and Camera (2017).

rapidly transfer money there electronically, so this risk does not increase with an e-krona. Another possibility is of course to invest the money in short-term government securities.

If people stop trusting the banking system as a whole, it is of course more attractive to invest in an e-krona than in cash, which is the only alternative today in such a situation. However, the Riksbank already has a large toolbox to manage situations with a confidence crisis in the banking system. An e-krona would moreover make it possible to rapidly deal with such a situation by supplying e-kronas to those who want to withdraw money from their bank accounts. This would be more effective than it is with cash today, which could reduce the contagion risk between banks.<sup>12</sup> If people know that it is easy to withdraw their money, the risk of a bank run should decline. It may also be the case that the banks become less likely to take risks if they know that they must take better care of their deposits.<sup>13</sup>

Many people react at the very idea of a central bank being able to issue digital money. They are afraid that it would entail a major change, a new role for the Riksbank. But I would claim that the major change would instead be if the Riksbank does *not* issue any money that is used. The payment market is an important part of a country's infrastructure. Just think about how often you pay for something, and how difficult it would be if it didn't work! Would it really be the right thing to allow part of the infrastructure to be completely privatised without any analysis or discussion?

What our analysis clearly shows is that the effects of an e-krona on the financial sector as well as monetary policy and the economy as a whole largely depend on how the e-krona is designed. It is therefore appropriate to begin with small steps forward and to learn along the way.

### **The e-krona makes the Swedish payment system more stable and inclusive**

Cash does not function as a good alternative if we were to have no electricity in a crisis situation, as electricity is required to withdraw cash from an ATM.<sup>14</sup> Sweden may therefore need several alternative means of payment that can function in crisis situations. The more different systems and alternatives that are available, the less vulnerable we will be. An e-krona system would be a parallel, independent system to the card payment systems offered by the private sector, which reduces vulnerability in relation to having only one system.

The e-krona must also be designed with consideration for the fact that there are certain groups who risk a type of financial exclusion when cash disappears, as for various reasons, they find it difficult to use digital solutions. This is a different type of financial exclusion than is often discussed internationally. In Sweden, all adults have the right to a payment account with basic functions so we have no problems with what is normally called financial inclusion. The elderly, those with disabilities and people who find it difficult to manage digital solutions risk encountering problems when cash disappears, despite having access to a bank account, because they are not able to manage digital technology. It is the state's job to ensure that

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<sup>12</sup> This argument has been highlighted by Kumhof and Noone (2018).

<sup>13</sup> This reasoning has been developed, for instance, in Engert and Fung (2017).

<sup>14</sup> This is also one of the conclusions in the Icelandic central bank Sedlabanki's report, see Sedlabanki (2018).

these people can manage their day-to-day payments. We cannot expect the private market to take full responsibility for this on its own initiative.

### **The future payment market is already here**

In today's digitalised world, rapid and digital payments are in great demand. In a world where we can send information around the world in real time, it may appear strange that it takes such a long time and is so difficult to move digital money. At present, it can take anything from three hours to three days to transfer money between two banks in Sweden. How long the payment takes depends on the time and day that it is initiated. A payment made on a Tuesday afternoon, for instance, will reach its destination around three hours later, while a payment made on a Friday afternoon will not go through until Monday morning. With inter-bank payments to a country outside of the EU it gets even more complicated. This type of payment currently takes 2-7 days to go through. They can be made more quickly, but this can be expensive. There is thus a major difference between what a consumer expects, given the technology available, and how the systems actually work and I believe that the two must converge soon.

Within Sweden there are already instant payments available for individuals through the Swish mobile app. But this system cannot cover all Swedish payments. As the demand for instant payments will increase in the future, the systems must be adapted to manage them better. The Riksbank currently runs the central payment system for large-value payments between the Swedish banks and other major agents. The system has been constructed to manage large-value payments in a secure manner. Individuals' payments are lumped together into larger amounts before they pass through the system. The Riksbank also has regular contact with all of the participants. As the Riksbank and the banks must have personnel in place, the system is only open during normal office hours, and even if these can be extended by an hour or so, it is not likely that we will operate it 24 hours a day.

At the same time, we want all payments in Swedish krona to be settled in Riksbank money. This reduces counterparty risk in the financial system. If, for instance, a private bank were to run such a system, all participants would have a claim on that bank before the payments are settled. If that bank were to go bankrupt, all of the money would be lost. That risk does not exist if the central bank runs the system. Additionally, it would be preferable if the system were run by a competition neutral actor in the form of the central bank. We therefore want to ensure that all payments in Sweden will continue to be settled with us.

However, instant payments require systems that can manage payments around the clock. The European Central bank, ECB, is in the process of developing a new technical platform called "Target Instant Payment Settlement" (TIPS). This will enable instant payments around the clock and it will be operational at the end of 2018. It will also be prepared to handle other currencies than the euro, for instance the krona. The Riksbank would thus have an account in the ECB's system so that settlement can be made in Riksbank money without having to keep the Swedish large-value payment system open 24 hours a day. The vision is simply that payments can be made immediately, regardless of what time of day they are made, and that settlement shall be in Riksbank money. In this vision, the e-krona

would be a national back-up to the private payment system and it would enable both instant payments and settlement in central bank money.

## **Conclusion**

Let me conclude by summarising what I have said. I believe that it is important to update the money the Riksbank issues to a format that suits the modern economy. We will therefore develop a pilot version of a central bank digital currency – an e-krona. Once we have tested the pilot version we can choose to issue, or not to issue, a digital krona to the general public.

I have also talked about the rapid changes in the payment market, where rapid real time alternatives will be important in the future. In my opinion, payments ought to be made as quickly as we exchange information in the current digital society. It should be possible to make payments instantly 24 hours a day and to settle them in Riksbank money. A connection to the ECB's technical platform, TIPS, would be one way of doing this.

I think that we need to develop a Swedish stance on the digitalisation of the payment market and that the Sveriges Riksbank Act needs to be adapted to a digital future. The e-krona could mean that we gain a domestic infrastructure for real time payments and at the same time enable all groups in society to continue to make their payments without problems.

I hope I have succeeded in providing a picture of how the pilot version of the new e-krona might look and succeeded in convincing you that it will work as a modern form of cash. And I hope that some of you will be involved in helping us develop it!



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