

Staff memo

The digital euro and its potential consequences for Sweden

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Staff Memo

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Summary

A central bank digital currency in euro is taking shape. The Eurosystem central banks have come far in the work on a digital euro, and in October 2023, the Governing Council decided to enter into the next phase of the project, the preparation phase. Moreover, in June 2023, the European Commission published a proposal for a regulation, which sets out the legal framework for a digital euro.

A digital euro is primarily intended for use within the euro area. However, the proposal for a regulation suggests that a non-euro area Member State may enter into an agreement with the ECB, allowing its residents and businesses to access digital euro services on the same terms as euro area residents and businesses. In that case, a digital euro may obviously have implications beyond the euro area.

We argue, however, that if Sweden enters into such an agreement, the effects will probably be limited. In principle, a digital euro may strengthen the resilience of the Swedish payment system and increase competition. It may also lead to some flight away from bank deposits, but this will be curbed by the suggested cap on digital euro holdings. Exchange rate and monetary policy effects are also likely to be small.

This is based on the assumption that the use of a digital euro in Sweden will not pass a tipping point, accelerating a crowding-out of the Swedish krona. We believe that certain institutional factors make such a scenario highly unlikely. They include the fact that payments to and from the public sector are made in Swedish kronor, which tends to anchor the latter as the dominant currency in Sweden.

Finally, a digital euro is of relevance for the decision on whether to issue an e-krona. Firstly, if a digital euro is issued, an e-krona will help to secure the current role of the Swedish krona in Sweden. Secondly, by leaning on the technical and regulatory set-up of a digital euro, the costs and complexities of launching an e-krona can be reduced. Thirdly, a co-existing digital euro and e-krona may improve cross-border payments.

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1 Introduction

The Eurosystem has come far in the work on a digital euro. Moreover, the European Commission has published a proposal for a digital euro regulation. A digital euro may have implications beyond the euro area, depending on the rules that govern its usage in other countries. This staff memo analyses the potential consequences for Sweden of a digital euro, including for a possible e-krona.

Central banks around the world are exploring the concept of a central bank digital currency for everyday use, a retail CBDC. In the euro area, the ECB and the national central banks, i.e. the Eurosystem, have come far in the work on a so-called digital euro. Reflecting its complexities and widespread implications, launching a digital euro warrants a thorough analysis and planning with substantial lead-time.

A digital euro also requires a legal framework. In 2023, the European Commission published a proposal for a regulation on the establishment of the digital euro, which is now subject to negotiations in the European Council and the European Parliament. Following the adoption of the regulation and concluding its current preparatory phase, the ECB will formally decide whether to issue a digital euro.

A digital euro may have implications beyond the euro area. According to the legal proposal, visitors, e.g. tourists, and previous residents of the euro area will also have access to digital euro services. More importantly, a non-euro area Member State may enter into an agreement with the ECB to allow its households and businesses to open a digital euro account and pay and receive payments in digital euro.

For Sweden, specifically, a digital euro is also of relevance for the decision on whether to issue an e-krona, the possible Swedish version of a CBDC. A digital euro could affect the need for an e-krona and the costs and complexities of introducing it. Further, a digital euro may add to the benefits of an e-krona if the two CBDCs can be connected in a way that improves cross-border payments.

This staff memo analyses the potential consequences for Sweden of a digital euro, based on the publicly available information about its design and legal framework. We distinguish between two scenarios, with or without an agreement with the ECB giving Swedish households and businesses access to digital euro services. In addition, we discuss the possible consequences for an e-krona of a digital euro.

The structure of the staff memo is as follows: In Section 2, we provide a short introduction to the work on a digital euro and the proposal for a regulation. In Section 3, we describe the possible consequences for Sweden of a digital euro. In Section 4, we assess what a digital euro can mean for an e-krona and its pros and cons. In Section 5, we briefly conclude.

2 A digital euro taking shape

Following a two-year investigation phase, the Eurosystem has started the preparation phase of its digital euro project. In June 2023, the European Commission published a proposal for a legal framework, broadly in line with the target picture of a digital euro. According to the proposal, Swedish residents and businesses will have limited access to digital euro services. However, if Sweden enters into an agreement with the ECB, referred to as an Article 18 agreement, they will be allowed to pay and receive payments in digital euro in Sweden.

2.1 A digital euro – what, why and how?

A central bank digital currency, a CBDC, is a digital means of payment, denominated in the national unit of account, and a liability of the central bank.² This can be a broadly available, general purpose CBDC, a retail CBDC, or a CBDC used only for financial market payments, i.e. wholesale transactions. The digital euro, as well as the e-krona, are examples of a retail CBDC. In a nutshell, a retail CBDC can be likened to cash in digital form, see Box 1.

Box 1: Retail CBDC versus other types of money

A retail CBDC, cash and bank deposits are different types of money. They differ with respect to certain characteristics and are equal in others, see the table below. For instance, the digital euro will be a claim on the central bank, legal tender and will not earn interest. A bank deposit, on the other hand, is a claim on a commercial bank, i.e. 'private money', does not have legal tender status, but usually pays interest. Both are digital in nature and traceable when used online. In comparison, cash is more similar to the digital euro, deviating mostly by being money in physical form.

Table 1. Comparing retail CBDC (digital euro) with cash and bank deposits

Characteristics	Digital euro	Cash	Bank deposits
Liability of ...	Central bank	Central bank	Commercial bank
Legal tender	Yes	Yes	No
Form	Digital	Physical	Digital
Traceability	Online: yes/Offline: no	No	Yes
Interest	No	No	Yes

Source: Sveriges Riksbank.

² See for instance Group of seven central banks and the BIS (2020). See also Auer et al. (2020) for an overview of CBDC projects across the world.

The ECB and the national central banks of the euro area have been studying the prerequisites for a digital euro and its design for some time. In October 2020, the ECB published a report on a possible digital euro that was subject to a public consultation.³ In July 2021, the ECB launched a formal project on a digital euro, and in October 2023, following a two-year investigation phase, the Governing Council of the Eurosystem decided to start the digital euro preparation phase.⁴

According to the ECB, a digital euro may have several benefits. It will provide households with a payment option based on central bank money, tailored for today's digitalised society. Further, a digital euro will be universally accepted throughout the euro area for payments in shops, online and person-to-person. Moreover, it may strengthen the strategic autonomy and monetary sovereignty of the euro area and has the potential to make the payment system more robust and foster innovation.

These benefits will depend on the design of a digital euro, which was analysed during the investigation phase. In a stocktake report, the ECB presented its target picture of a digital euro.⁵ This included how the digital euro would work from an end-user perspective and be distributed through payment service providers. The report also described how limits on end-users' holdings of digital euro should address concerns about financial stability and how privacy and data protection would be ensured.

Although considerations about a digital euro have intensified with decreasing cash usage, the aim is not to replace banknotes and coins. The ECB and the national central banks will continue issuing euro notes and coins and on several occasions have requested measures to protect the accessibility of cash.⁶ The intention with a digital euro is to give people an additional payment option – one that is better in situations where cash is less suitable.

2.2 A legal framework

In parallel, the European Commission has been working on the legislative foundation for a digital euro. In June 2023, the European Commission presented a proposal for a 'legal package' with a digital euro regulation as its core act.⁷ In addition, the package included a proposal for a regulation on the legal tender status of euro notes and coins. The purpose of the latter was to bring the legal tender status of cash formally in line with the one that will apply for the digital euro.⁸

The proposal for a digital euro regulation covers a broad range of aspects. As to the legal tender status, it obligates retailers to accept payments in digital euro, unless

³ See ECB (2020).

⁴ See ECB (2021) and ECB (2023a).

⁵ See ECB (2023b).

⁶ See for instance Zamora-Pérez (2022).

⁷ See European Commission (2023). The draft digital euro regulation was published together with a proposal for a regulation on the provision of digital euro services by payment service providers incorporated in Member States whose currency is not the euro.

⁸ Today, the legal tender status of cash in the euro area is set out in the European Commission Recommendation of 22 March 2010 on the scope and effects of the legal tender status of euro banknotes and coins.

they only accept cash payments. The proposal then empowers the ECB to monitor fees paid by retailers and to set maximum fees according to payment service providers' costs and fees on similar payment instruments. For households, access to basic digital euro services should be free of charge.

The draft regulation is broadly in line with the ECB's target picture of a digital euro. For instance, the proposal mandates the ECB to set limits on end-users' holdings of digital euro. It also requires payment service providers to enable 'waterfall functionalities' to ensure that the limits do not prevent payments in digital euro.⁹ Further, the proposal states that the digital euro should not earn interest, and that the ECB, to the extent possible, should not have access to data on individual end-users.

Distribution and access

Specifically regarding the distribution of digital euro services, the proposal says that all payment service providers in the EU will be *allowed* to offer digital euro services. This includes payment service providers in non-euro area Member States like Sweden. However, only euro area banks will be *obliged* to offer these services when requested by their customers. Moreover, only euro area banks will be required to provide 'special support' to elderly and people with disabilities, functional limitations, etc.

The proposal also defines the possible end-users. As a general rule, (i) households and businesses residing in or established in the euro area, (ii) visitors, for instance tourists, and (iii) households and businesses that have previously resided or been established in the euro area will have access to digital euro services. As regards (ii) and (iii), it will be up to the ECB to detail the provisions, e.g. to decide on possible limits and the timeframe for visitors redeeming their holdings of digital euro.

Hence, in the 'default scenario', Swedish households will only be allowed to hold digital euro as visitors to, or former residents in, the euro area. Yet, their usage of digital euro is not expected to be restricted by location. In practice, this would require that online payments in digital euro were abandoned for non-residents. No such intentions have been indicated, which would run counter to the purpose of establishing a payment means for the digital age.

Similarly, there will not be much scope for retailers in Sweden to accept payments in digital euro. An open question is whether non-euro area retailers could potentially enter into an agreement with a payment service provider to receive such payments without having a digital euro account. If so, the retailer would receive the funds on a bank account in euro or Swedish kronor. In some respects, this would be similar to the widespread practice of dynamic currency conversion for card payments.¹⁰

⁹ The 'waterfall functionalities' are the design features allowing end-users to pay and receive payments in digital euro despite the holding limits. If, for instance, the end-user wants to pay for a good or service, which is priced above the holding limit, they ensure that the difference is immediately withdrawn from the end-user's bank account. And vice versa, if the end-user receives a payment bringing the holdings of digital euro above the limit, the excess amount is immediately transferred to the end-user's bank account.

¹⁰ In the case of dynamic currency conversion, the retailer gives the foreign card-holder the option of paying in the latter's own currency. Typically, the retailer does not hold an account in the card-holder's currency, but receives the funds in the retailer's own currency following a currency conversion by the card acquirer.

Another ‘grey area’ concerns branches in Sweden of retailers established in the euro area. For instance, it is not clear if such branches will be allowed to receive payments in digital euro that are channelled through a euro area-based entity. Moreover, when these retailers receive payments through their online stores, questions arise as to when they can be made in digital euro. The legal proposal does not go into detail on these matters, which are therefore currently open to interpretation.

Article 18 agreement

Importantly, the draft digital euro regulation also provides the option for non-euro area countries to enter into an agreement with the ECB allowing distribution and usage of digital euro in that country. For non-euro area Member States, the conditions of such an agreement are described in Article 18 of the legal proposal. Accordingly, in the remaining part of this staff memo, we refer to such an agreement as an Article 18 agreement.¹¹

If Sweden entered into an Article 18 agreement, Swedish residents and businesses established in Sweden would have the possibility of setting up a digital euro account with a payment service provider offering such a service. This would allow them to pay and receive payments in digital euro. Basically, an Article 18 agreement would mean that digital euro could be distributed to, and used by, Swedish residents and businesses in Sweden in the same way as in the euro area.

An Article 18 agreement comes with certain obligations. A Member State that enters into such an agreement would have to adjust its national legislation to relevant requirements in the digital euro regulation. Moreover, the Member State’s central bank would have to abide by rules set by the ECB. However, the legal tender status of the digital euro would not apply to countries outside of the euro area, that is, Swedish retailers would not be obliged to accept payments in digital euro.

In a sense, an Article 18 agreement opens up access to digital euro in a similar way as for other types of money in euro. It removes the basic legal restrictions for end-users in Sweden to transact in digital euro, just as there are no such restrictions for bank deposits and cash in euro, see Box 2. Yet, whether to enter into an Article 18 agreement is a complex matter, covering a broader set of aspects than just access to money. This requires a careful assessment of pros and cons before a decision is made.

Box 2: Access to euro

To some extent, an Article 18 agreement would ratify for a digital euro the ‘access rules’ that apply to other types of money. Today, no legislation prohibits Swedes from opening bank accounts in any currency they wish, including euro, and paying with the funds available to those who accept such payments. Similarly, they may hold euro

¹¹ The conditions for countries outside the EU to enter into such an agreement are described in Article 19 and 20 of the draft regulation.

notes and coins and pay with them wherever they like, subject to the payee's acceptance as well as limits for carrying cash across borders and the payment amount.

What is more, other EU legislation even ensures Swedish households access to 'private money' in euro or other EU currencies. Following the Payment Account Directive, banks are obliged to offer residents in the EU, like Swedes, a basic payment account in the local currency, including services such as a payment card, at a reasonable cost. No statistics on this are publicly available, though, the number of Swedish households that have obtained such an account is thought to be fairly small.

Similarly, retailers in Sweden are free to accept payments in euro and other currencies in cash or based on bank deposits. Possible restrictions may come from the commercial agreement between a retailer and its payment service provider. However, this agreement may also allow the retailer to receive the funds on a bank account exchanged into Swedish kronor. Thus, to summarise, an Article 18 agreement will open up access to digital euro, similar to bank deposits and cash.

3 Possible consequences for Sweden

If Sweden does not enter into an Article 18 agreement, a digital euro will have limited consequences for Swedish households and businesses. Even with such an agreement, however, we do not expect that a digital euro will have major effects in Sweden. This is based on the assumption that the use of a digital euro in Sweden does not pass a tipping point, accelerating a crowding-out of the Swedish krona. Strong institutional factors, like the fact that all payments to and from the public sector are in Swedish kronor, make this unlikely, we believe.

3.1 Without an Article 18 agreement

As explained in the previous section, without an Article 18 agreement, Swedish households will only be able to obtain and pay in digital euro as visitors to, or former residents in, the euro area. The scope for Swedish retailers to accept payments in digital euro will also be limited, restricted to a few grey areas where further clarification would be useful. Of course, the regulation is still under negotiation, and some of these provisions could be changed in the final legal act.

In this scenario, we can reasonably assume that the consequences for Swedish households and businesses will not be very large. Many of the stipulated benefits of a digital euro, such as increased competition and a more resilient payment system, will mainly be relevant for euro area residents rather than visitors or former residents. And visitors in Sweden from the euro area will probably continue to bring their international payment cards and use them for payments of goods and services exactly as today.

It is difficult to predict the extent to which Swedes will acquire digital euro when they visit a euro area country. This will likely depend on individual factors such as how often people travel to the euro area and their type of expenditures. It will also depend on how easily they can obtain digital euro and transfer them back to other funds upon returning to Sweden. The costs of exchanging currencies will matter as well, especially as these costs will be incurred twice.¹²

That said, convenience when paying in digital euro could be the most important determinant for its attraction to Swedish households. For instance, the relative ease of making person-to-person payments with euro area residents in digital euro compared to existing solutions could stimulate Swedes' interest. A user-friendly pan-European

¹² Swedes also face currency exchange costs when they use their payment card abroad. However, in this case they normally only exchange currencies once, from Swedish kronor to the foreign currency.

digital ID solution accompanying the digital euro and facilitating the initiation of certain online payments could have a similar effect.¹³

Further, it will be a mistake, we believe, to infer from the limited number of Swedes that have obtained a bank account in euro, see Box 2, a lack of interest in the digital euro. Rather, this may reflect that the benefit of opening a bank account in another currency in most cases is fairly small. For instance, the payment card issued is typically the same as for a bank account in Swedish kronor.¹⁴ This may be different with a digital euro, which could be particularly useful in specific payment situations.

Moreover, it is likely that Swedes' interest in the digital euro will grow over time. They will learn how it works and see the use cases unfold. Further, the process of obtaining digital euro when visiting the euro area may also become simpler if they only need to *re-activate* their digital euro account. Overall, without an Article 18 agreement, the main effect of a digital euro could be the benefits derived by Swedish households from a new and efficient payment instrument when travelling in the euro area.

3.2 With an Article 18 agreement

With an Article 18 agreement, the assessment of pros, cons and risks of a digital euro becomes more complex. As described earlier, in this scenario Swedes will also be allowed to hold and use digital euro without being visitors to, or former residents of, the euro area. In addition, retailers in Sweden may accept payments in digital euro. However, they would have to transfer the digital euro received directly to a bank account, in line with the rules that will apply to retailers in the euro area.

In the Article 18 scenario, some uncertainties about the modalities also prevail. One of them concerns the size of the limit on the digital euro holdings. According to the proposal for a digital euro regulation, this will be set by the ECB. Without prejudice to this decision, the ECB has indicated that a limit of EUR 3 000 could be appropriate.¹⁵ Presumably, the limit will be the same for residents of Member States with an Article 18 agreement as for residents in the euro area.

Furthermore, the functional requirements for transfers between bank accounts and digital euro accounts are yet to be specified. Operating the waterfall functionalities requires that end-users, both households and businesses, connect a bank account to their digital euro account. Particularly for Member States with an Article 18 agreement, an important question is whether this bank account ought to be in euro or could be denominated in other currencies, e.g. Swedish kronor.

¹³ Paving the way for such a solution is the objective of the recently adopted EU Regulation (2024/1183) on a European digital identity framework. A number of large-scale projects are underway to test technical specifications and software prototypes for an EU digital identity wallet.

¹⁴ The payment card connected to a bank account in euro, opened with a bank in the euro area, would normally be a Visa or Mastercard. Hence, it will typically not differ from the payment card issued by a bank in Sweden in terms of functionality and possible use.

¹⁵ See for instance ECB (2020).

Possible uptake

Below, we argue that in the Article 18 scenario the consequences in Sweden of a digital euro will depend on its adoption among households and businesses. Yet, some ‘institutional factors’ may tend to limit the uptake of a digital euro in Sweden.

Institutional factors restricting uptake

First and foremost, the status of Swedish kronor as the official currency in Sweden serves to effectively anchor its usage for payments. In particular the fact that all transfers to and from the public sector are in Swedish kronor is key in this respect. For instance, given we pay our taxes in Swedish kronor, we also prefer to receive our salary in Swedish kronor. And when businesses pay salaries, their main expenditures, in Swedish kronor, they prefer to charge customers in Swedish kronor.

In addition, Swedes hold the lion’s share of their wealth, including what we normally regard as ‘money’, i.e. cash and bank deposits, in Swedish kronor. Thus, for them to pay with digital euro will require a currency conversion, which comes with a cost, as explained above. It seems unlikely that Swedes would convert a large share of their wealth to euro simply due to the digital euro. Hence, the currency costs are likely to curb the tendency to pay with digital euro.

The exchange-rate regime may also play a role. While in Denmark, for instance, the exchange rate vis-à-vis the euro is fixed, in Sweden euro positions entail a currency risk. In principle, this should dampen the interest among households in holding digital euro. In addition, some retailers could be less inclined to price goods and services in both Swedish kronor and euro, as they will more often have to adjust prices to avoid the risk of currency arbitrage by their customers.

Risk factors

On the other hand, certain factors can be identified which may increase the likelihood of a digital euro crowding out the Swedish krona. These can be categorised as ‘risk factors’.

One such risk factor concerns monetary stability. With high inflation, prices fluctuate more. If this became relevant in Sweden, retailers might start to price more goods in euro, and households could ‘fly to quality’ and keep more of their wealth in other currencies, including euro, they viewed as more stable. In history, there are many examples of such ‘dollarisation’. In Sweden, however, a sound monetary policy framework and strong public finances help to protect against this risk.

The overall ‘quality’ of the Swedish payment system is also a risk factor. If banks in Sweden fail to deliver attractive payment services, end-users may turn to the digital

euro. We know from surveys of retailers that they would like more alternatives for instant payment services.¹⁶ Also, if existing services are viewed as too costly, or if downtimes are frequent or long, households and retailers could resort to the digital euro as a cheaper and more reliable payment solution.

Internationalisation may also be a risk factor. When tourists from the euro area ask to pay with their digital euro, more retailers in Sweden will start accepting it as a payment instrument. That again will make the digital euro more interesting to Swedish households and further increase its usage in Sweden. Similarly, when more Swedes visit the euro area or make purchases online from euro area retailers, they are more likely to open a digital euro account and start using digital euro in Sweden.

A possible tipping point

The latter risk factor follows from the strong two-sided market dynamics in payments. Retailers are only interested in accepting a payment instrument, say the digital euro, if households want to pay with it. Similarly, households will only obtain a specific payment instrument, if retailers accept it. This holds true, in particular, if gaining access to the payment instrument requires a certain effort or entails currency risks, as is the case with the digital euro for residents in non-euro area Member States.

These effects make it relevant to consider the possible existence of a *tipping point*. Is there a critical point at which usage of a digital euro would take off, with market forces accelerating the process? And how would this potentially affect the broader usage of the euro in Sweden? These are important questions to bear in mind, although we also believe that the institutional factors above will continue to protect the role of the Swedish krona as the country's main currency.

Payment system

A digital euro may affect the Swedish payment system in different ways. Some of the consequences would be similar in nature to introducing a Swedish central bank digital currency, an e-krona. However, the effects from the latter would likely be stronger, and an e-krona would help preserve the trust in Swedish kronor as a currency and the singleness of money in Sweden.¹⁷

First, a digital euro, like an e-krona, could make Sweden less vulnerable to payment system incidents. This argument hinges on a certain level of adoption. In that case, a digital euro, processed by its own infrastructure, could provide redundancy and reduce the number of situations where no payment instruments are available. The relevance of this argument depends on the correlation of incidents affecting the infrastructures of the existing payment instruments and the digital euro.

¹⁶ See Sveriges Riksbank (2023). Today, only Swish, the banks' mobile payment solution, allows retailers to receive instant payments in Sweden.

¹⁷ See for instance Skingsley (2021) for an overview of the assumed benefits of a possible e-krona.

Secondly, a digital euro that became available for payments in Sweden could increase competition on the payment market. This would be the case if payment service providers, including banks, in Sweden came under increased pressure to offer more customer-friendly payment solutions that could compete with the digital euro. Further, a digital euro may also help curb any excessive fees charged to e.g. retailers. These effects, however, are likely to be much stronger in the euro area than in Sweden.

While these potential implications are positive in nature, there may also be a negative effect on the social cost of payments. The latter is the overall resource consumption from payments, including the time spent by the parties involved. Adding another payment instrument usually comes with certain costs, especially for retailers. Moreover, the fact that also another currency is involved may amplify this, as retailers will have to set prices, or at least state the final amount, in euro as well.

Besides these effects, a digital euro may also impose certain requirements on payment systems in Sweden. These follow from the waterfall functionalities and the need for instantaneous funding and defunding of digital euro accounts. As mentioned, the procedures for this are still to be clarified, including whether the bank account to be connected with a digital euro account can be denominated in currencies other than the euro.

In case the bank accounts for funding and defunding digital euro can be held in Swedish kronor, instant conversion to euro will be required. This includes determining the exchange rate between Swedish kronor and euro. The conversion can be made by banks or other payment service providers offering digital euro services. However, there could also be a demand for a joint infrastructure service facilitating the currency conversion.¹⁸

Financial stability

A concern raised is that the digital euro may affect financial stability in the euro area. If the digital euro catches on in Sweden, the underlying reasoning could be applied also to Swedish banks. The consequences for financial stability may come through different channels. The one most often referred to is the 'deposit flight channel', i.e. the risk of a large movement of funds from bank deposits to digital euro. In addition, there could be an effect through banks' loss of revenue from payment services.

The deposit flight channel works like this: households keep deposits on current accounts to make payments. If they see the digital euro as an attractive means of payment, they will move part of their deposits on these accounts to their digital euro account. As a consequence, banks lose funding and will have to trim their balance sheet, for instance by reducing their loans. This affects banks' earnings and could end up having significant economic implications.

¹⁸ Together with the ECB and other central banks, the Riksbank is currently exploring a settlement service for instant cross-currency payments. It is too early to say if such a service could play a role in ensuring this instant conversion between digital euro and commercial bank accounts across currencies.

However, there are several important nuances to this line of reasoning. Firstly, banks can finance themselves in other ways than via deposits, e.g. through wholesale funding. This includes borrowing from other banks. They may also decide to fight for their deposits by increasing interest rates or offering more attractive payment services. These options, however, usually come with a cost for the banks in the form of higher financing costs or perhaps lower revenue from payment services.

Secondly, deposits will not be allowed to flee freely into the digital euro. As already mentioned, the amount of digital euro that each individual is permitted to hold will be capped, which serves to restrict the volume of deposits that banks risk losing. Furthermore, although the holding limits may be subject to changes over time, a precautionary principle is likely to prevail. The ECB has also stated that businesses will not be allowed to hold digital euro on their account.¹⁹

As a proportion of bank deposits, a holding limit of EUR 3 000 seems low. This holds true also in a Swedish context. If we make the extreme assumption that all Swedes over the age of 15 held deposits at or above the limit and transferred the maximum amount into digital euro, this would equal a deposit shortfall of around 11 per cent of bank deposits from households and slightly more than 2 per cent of their total assets. However, in a more likely scenario, it will be much less than this.

The holding limit also eases the concern that a digital euro could accentuate a run on a crisis bank. A bank run occurs when customers become worried about their deposits and start to withdraw them *en masse*. Yet, with the holding limit and taking into account the insurance deposit guarantee, such runs seem less rational.²⁰ Unless the crisis is *systemic*, that is, broadly based, customers may also find it more attractive to move their deposits to another bank, thereby avoiding the currency exchange.

Finally, the possible threat to financial stability from ‘the revenue channel’ is also rather low, we believe. The part of banks’ revenue that would be most at stake is their income from card payments, which has grown significantly in recent years.²¹ However, banks may also earn fee income from digital euro services, although these will be capped.²² Moreover, banks could have additional income from currency conversion, i.e. when they exchange euro for Swedish kronor and vice versa.

Macroeconomic effects

Any wider macroeconomic consequences of a digital euro will also depend on its uptake. If the digital euro is mainly used by tourists and not by Swedish households, the financial and economic implications will be limited. On the other hand, if the digital

¹⁹ See ECB (2023b).

²⁰ In Sweden, the insurance deposit guarantee is SEK 1,050,000, the equivalence of approximately EUR 100,000, that is, much higher than the indicated cap on digital euro holdings.

²¹ See Engström and Pedersen (2024). Between 2009 and 2021, banks net income from card payments increased tenfold from SEK 420 million to more to SEK 4.1 billion.

²² According to the proposal for a digital euro regulation, the ECB will define caps for the fees charged to retailers and interchange fees. In addition, banks may earn income from value-added digital euro services on top of their basic offerings.

euro becomes popular for payments among Swedes, it may affect the demand for euro versus Swedish kronor and, hence, the exchange rate. In addition, it may also have implications for monetary policy, at least theoretically.

Exchange rate

To describe the possible effect on the exchange rate, we can go through different scenarios, see also Table 2 below.²³

Let us assume first that retailers start to accept payments with digital euro on a large scale. In line with the ECB's draft rules, these payments would immediately be transferred to a bank account assumed to be in Swedish kronor. We further assume that the digital euro in Sweden is used exclusively by tourists. In this case, there would be no difference to a base scenario where the tourists pay for goods and services in Swedish kronor with their payment card. The effect on the exchange rate would be zero.

Now, let us assume that Swedish households also start to pay with digital euro in Sweden. Then, for each such payment there would first be an increase in the demand for euro as a Swedish kronor deposit is exchanged into digital euro. This will be followed, though, by an increase in the demand for Swedish kronor as the retailer exchanges the received euro back into Swedish kronor. Again, compared to a base scenario where households pay in Swedish kronor, the effect on the exchange rate will be zero.

Finally, let us assume that retailers decide to keep the received digital euro on a bank account in euro. This could be the case if we have passed the tipping point, and retailers want to pay their suppliers in Sweden in euro as well. In this scenario, each payment in digital euro will generate a demand for euro, and the Swedish krona will tend to depreciate. This could even turn out to be self-reinforcing as a constant depreciation of Swedish kronor may encourage further use of the euro in Sweden.

What are then the magnitudes at stake? As an indication, the value of all payments with cash, cards and Swish at retailers in Sweden amounts to approximately SEK 4 billion a day.²⁴ This can be compared to a daily turnover of Swedish kronor on the FX spot market of around SEK 400 billion. However, as the increase in demand for euro would be a one-sided, constant flow, this may still have a persistent and long-term effect on the exchange rate.

Table 2. The effect of a digital euro on the exchange rate

Scenario	With digital euro	Without digital euro	Effect on the exchange rate
1. Tourists only	Tourists pay in digital euro. Retailers transfer received digital euro to a bank account in Swedish kronor.	Tourists pay in Swedish kronor ('private money'), e.g. with payment cards.	Zero effect.

²³ It should be mentioned that in the scenarios below, even if the net effect on the exchange rate is zero, there could still be an increase in exchange-rate volatility if the offsetting flows do not match perfectly in time.

²⁴ See Sveriges Riksbank (2022).

Scenario	With digital euro	Without digital euro	Effect on the exchange rate
2. Swedish households as well	Swedish households also pay in digital euro. Retailers transfer the received digital euro to a bank account in Swedish kronor.	Swedish households pay in Swedish kronor ('private money').	Zero effect.
3. Retailers keep received funds in euro	Both tourists and Swedish households pay in digital euro. Retailers keep the received digital euro in a euro account, using it for expenditures.	Tourists and Swedish households pay in Swedish kronor.	A slight depreciation pressure on the Swedish krona.

Source: Sveriges Riksbank.

Monetary policy

In Sweden, the objective of monetary policy is to maintain low and stable inflation, defined as an annual increase in consumer prices of 2 per cent. The Riksbank's Executive Board sets the policy rate, and through its monetary policy instruments, the Riksbank aims to steer market interest rates accordingly. Market interest rates affect demand and ultimately economic activity and inflation. Could a digital euro have an effect on inflation or monetary policy implementation or transmission?

Let us consider inflation first. A steady depreciation of the Swedish krona against the euro, all else equal, will lead to inflationary pressures. To avoid second-round effects on prices, monetary policy tightening may be needed *in principle*. However, taking into account that the effect on the exchange rate would most likely be modest and could be counter-balanced by other currency flows, the consequences for the monetary policy stance are expected to be negligible.

Neither do we expect that a digital euro will hinder monetary policy implementation. Monetary policy is carried out through the Riksbank's standing facilities and market operations. Its implementation depends on the banks' needs to be counterparties of the Riksbank and the efficient functioning of the short-term money market. Both will likely stay more or less unaffected by the digital euro as long as we are below the tipping point where the euro has not come into widespread use in Sweden.

The same conclusion applies to the possible effect on monetary policy transmission. Monetary policy will continue to affect consumption and investment in Sweden as long as households and businesses still borrow in Swedish kronor. This will be the case providing we have not passed the tipping point. However, if use of the euro starts to grow in the Swedish economy, also as a loan currency, the transmission of monetary policy will gradually weaken.

4 Implications for a potential e-krona

The Riksbank has been studying a Swedish CBDC, an e-krona, for several years. A digital euro will be of relevance for the decision in Sweden on whether to issue an e-krona. Firstly, a digital euro could affect the need for an e-krona. Secondly, it may reduce the costs and complexities of introducing a Swedish CBDC. Thirdly, a digital euro may complement the benefits of an e-krona if the two CBDCs can be connected in a way that improves cross-border payments.

The Riksbank started its project on an e-krona in 2017, focusing initially on the analytical aspects and the possible need for a Swedish CBDC. In 2020, the Riksbank entered into a more practical phase of the project by launching a pilot with the purpose of learning more about a technical solution. The pilot was completed in 2023. The Riksbank's work on the e-krona continues and is now focusing on design and preparations for legal adjustments.²⁵

No decision has yet been taken on whether to issue an e-krona or not. However, the Riksbank sees an e-krona as a possible component in a long-term plan to address the challenges of digitalisation, including the marginalisation of cash which is likely to continue without further measures.²⁶ The Riksbank has also made it clear that the preparatory work should not be postponed, in order to avoid a significant lead time following a decision by the Riksdag, the Swedish parliament, to issue an e-krona.

One of the factors that may affect a decision on a possible e-krona is the launch of a digital euro. This was also acknowledged by *Betalningsutredningen*, the Swedish Payments Inquiry, presented in March 2023.²⁷ While the Payments Inquiry came to the conclusion that an e-krona is not needed in Sweden today, it explicitly stated that this could change with the introduction of a digital euro. Thus, the Riksbank was urged to continue its work investigating the case for an e-krona.

A digital euro may affect the decision on whether to issue an e-krona in different ways. First, a digital euro could have a bearing on the *need* for an e-krona. Although we argue that a number of institutional factors will help to safeguard the current role of the Swedish krona, an e-krona may be an additional such factor. By providing the same benefits as a digital euro, and relieving the end-users of the costly currency conversion, an e-krona may cement the Swedish krona as *the* currency in Sweden.

Secondly, a digital euro may reduce some of the *costs and complexities* of launching an e-krona. With a digital euro in place, the Riksbank could draw on the experiences

²⁵ During the project, the Riksbank has published a large number of reports and other documentation, see <https://www.riksbank.se/>, Payments & cash, e-krona.

²⁶ See Bunge (2023).

²⁷ See the Payment Inquiry (2023).

gained by the Eurosystem, not having to reinvent the wheel. Furthermore, the ECB has floated the idea of sharing its CBDC platform with central banks in other jurisdictions.²⁸ This could bring common standards and shared costs to the development and maintenance of the platform.

Platform-sharing with the Eurosystem will not be a new occurrence. Central banks outside the euro area, including the Riksbank, have already introduced new settlement services, or are in the process of implementing such services, based on the Eurosystem's platforms for payment and settlement systems. Any central bank considering this should analyse thoroughly the pros and cons, including the possible cost savings and lack of flexibility in supporting national preferences.

In that respect, such platform-sharing may be a reasonable option only if the central bank in question is still able to issue a CBDC that fulfils its objectives and has no adverse effects on financial stability and monetary policy. In addition, there may be other national aspects to consider. As far as Sweden is concerned, sharing platform with the Eurosystem is likely to fall under the Swedish protective security regulatory framework and would have to be dealt with accordingly.

Thirdly a digital euro could *add to the benefits* of an e-krona if the two CBDCs became able to function together in a way that could improve cross-border payments. The malaise of cross-border payments has attracted much attention internationally in recent years.²⁹ One of the solutions brought forward has been to connect the possible future CBDCs of different jurisdictions. This was explored in a successful project involving the Riksbank together with Norges Bank, Bank of Israel and the BIS.³⁰

The main argument for addressing the problems of cross-border payments by connecting CBDCs is to leverage from the 'clean slate' offered by CBDCs under development. With respect to the digital euro, the argument makes particular sense if the former inspires the design of a possible e-krona and if the two CBDCs eventually share platform. The fact that Sweden and the euro area are highly integrated economic areas with a large number of cross-border payments makes it even more relevant.

²⁸ See ECB (2023b).

²⁹ See for instance Cunliffe (2020).

³⁰ See BIS et al. (2023).

5 Concluding remarks

Even if Sweden enters into an Article 18 agreement, the overall effect of a digital euro on Swedish residents and businesses will likely be modest. This is based on the assumption that the use of the digital euro in Sweden does not pass a tipping point and starts to accelerate. A digital euro strengthens the case for an e-krona. A possible Swedish Article 18 agreement should be subject to a thorough analysis following certain clarifications regarding the legal framework and the design of a digital euro.

A digital euro will have implications beyond the euro area. For a non-euro area Member State like Sweden, the consequences depend on whether or not it enters into an Article 18 agreement with the ECB allowing the distribution of digital euro in Sweden. Without an Article 18 agreement, Swedish residents and businesses will find their access to digital euro services restricted. In this scenario, the effect of digital euro in Sweden will be limited.

With an Article 18 agreement, Swedish residents and retailers will be allowed to hold digital euro accounts, as well as to pay and receive payments in digital euro. In this scenario, a digital euro may have minor, but most likely positive implications for the Swedish payment system. Furthermore, any effects on financial stability will probably be modest due to the expected limit on holdings of digital euro, and other macroeconomic effects are expected to be small as well.³¹

These conclusions are based on the assumption that the use of a digital euro in Sweden does not pass a tipping point, at which a crowding-out of the Swedish krona will gain momentum. A number of institutional factors are likely to limit the uptake of a digital euro in Sweden, increasing the probability of this scenario. At the same time, risk factors, such as increasing inflation, a lack of development of payment services in Sweden and internationalisation, should be acknowledged.

Finally, a digital euro will be of relevance also to the decision in Sweden on whether to issue an e-krona. Firstly, with a digital euro 'in use' in Sweden and an Article 18 agreement in place, an e-krona will serve to safeguard the current role of the Swedish krona. Secondly, a digital euro may reduce the cost and complexities of launching an e-krona. Thirdly, a co-existing digital euro and e-krona could improve cross-border payments through interoperability.

In this staff memo, we have avoided taking any stance on a possible Swedish Article 18 agreement. Following the adoption of the digital euro regulation, this should be subject to a thorough analysis, in which the implications for a possible e-krona are

³¹ In an analysis of the possible consequences of the digital euro in Denmark, staff members at Danmarks Nationalbank come to conclusions that are very similar to these, see Andersen et al. (2023).

also taken into account. Prior to this, focus should be on clarifying the many remaining uncertainties regarding the interpretation of the legal proposals and the design of the digital euro.

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