

Economic Commentaries

Money and monetary policy in times of crisis

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Central banks around the world have implemented extensive measures to alleviate the effects of the corona pandemic on the economy. Many of the measures involve creating large volumes of new money. But how is money created and who ends up holding it? In this commentary, we explain how money is created and destroyed in the current financial system, what roles the banks and the Riksbank have and how different course of action by the banks and the Riksbank influence the amount of money. At the end of the commentary, we use examples from the Riksbank's crisis measures to illustrate how monetary policy influences the economy and the amount of money.

In this Economic Commentary we explain that the Riksbank under normal circumstances does not try to control the volume of money in the economy. Contrary to what it says in many schoolbooks, the Riksbank does not try to control the volume of money, neither by issuing cash nor by setting a reserve requirement or similar. Instead, the Riksbank controls demand in the economy by changing the level of the repo rate. At a certain interest rate level, and given financial regulations, a certain amount of money will then be created in the private banking system.

However, in times of crisis, it does happen that central banks create new money when they intervene with various support measures. The main reason is not usually to create money however, but to resolve the problems that have impaired the normal functioning of financial markets. This has also happened during the ongoing corona crisis.

What is money?

The question of what money is has been widely discussed in the literature and it turns out to be surprisingly difficult to come up with an exact definition. Instead, dating back at least to Jevons (1875), economists usually list three functions that money has – and judge a particular proposal for money based on how well it serves these functions. We can then investigate how well various proposals for “money” fulfil these functions in a given society.

The three functions of money

The functions that money is to fulfil are that it is (a) a means of payment, (b) a unit of account and (c) a store of value. If money is “kronas” then function (a) means that a payment is considered to have been made when the customer has transferred the right amount of “kronas” to the seller. Function (b) means that the prices of goods and services are stated in “kronas”. Function (c) means that “kronas” can be saved and used to make future payments.

Why “kronas”?

But why is it that we use “kronas”? There are many other things that could function in the same way. One possible explanation as to why we use krona focuses on the state's powers of taxation. Quite simply, the state decides that citizens are obliged to pay tax in “kronas” and can then issue them as payment for public consumption, for instance. As citizens need to obtain “kronas” to be able to pay their taxes, they become interested in offering goods and services in exchange for such currency, and the state can therefore use them to buy goods and services. This practice is more efficient compared with the alternative of requiring citizens to deliver goods and services directly to the state. The governments tax-privilege is key in this argument, which leads some economists to instead to define money as the item that can be used to pay taxes (see Söderberg, 2018 for a more detailed description). Given that money can be used to pay tax, it also becomes

natural to let them fulfil functions a)-c), and it thereby becomes natural for “kronas” to be used as a means of payment in other contexts, too.¹

What is a “krona”?

One key question remains, what is the actual money unit? What is a “krona”?

Most of us think of the krona as a piece of paper or a coin that the Riksbank has manufactured, or as “money we have in the bank”. But why do we consider money valuable?

Historically, banknotes and coins were backed up by various precious metals. The idea is simple, in that case, a krona contains a certain amount of valuable materials (say, 1 gramme of gold). If the price of an ice cream is 10 kronas, it means that the ice cream costs 10 grammes of gold. Under this type of system we can say that a krona is a piece of paper or a coin that says that the holder owns a certain amount of gold that is stored with the central bank (if the banknote is issued by the central bank).

Nowadays, however, central banks have abandoned the link between money and precious metals. A banknote can no longer be redeemed for gold, for instance, or any other product at the central bank. But the banknote is still a valuable asset for the holder, as long as there is confidence that it can be exchanged for goods and services.² In today’s system, confidence does not come from any link to precious metals, but instead from the central bank’s mandate to provide a stable development for prices, and hence the value of the banknote.

However, banknotes and coins comprise only a fraction of the money in the economy. Most of what we perceive as money is holdings in private bank accounts. This type of money is created by the commercial banks and is called commercial bank money – or simply deposits.³ Commercial bank money is a *claim* on a bank – and we can see it as the bank owing us cash. Commercial bank money can, like central bank money (cash), be used to make payments and as a store of value.

We will now precede in a stylized fashion to explain how money is created and destroyed in conjunction with giving loans in the private sector. While these examples are simplified and stripped of details of actual bank practices, we do believe that they offer the crucial insights into how the system works.

Commercial bank money and central bank money: how the current system works

Commercial bank money is created when banks give loans

To understand what commercial bank money is and how it is created, we can look at an example that starts with a customer wanting a loan. The loan involves the customer signing a promissory note, that is, a promise to pay back the loan in the future as a certain amount of money to the bank. In return, the bank deposits a sum of money into the customer’s account with the bank.

But where did the bank get the money it credited the account of the borrower with? Did someone else deposit the money in the bank first? Or did the bank borrow money from the central bank? The answer to these questions depends on the circumstances, but what we can say is that if the volume of money in the economy increased as a result of the loan, it was “created” by the private bank. However, this does not mean that the bank created the money “out of thin air”, as the reason why the bank can provide a loan ultimately depends on the

¹ There are other explanatory models. Read more about the origins and functions of money in Tobin (1963, 2008).

² It is correspondingly a liability on the central bank’s balance sheet.

³ For a more detailed description of how money is created in the modern economy, see McLeay et al. (2014).









real economy – in this case on the borrower’s future possibility to repay the loan. Let us illustrate this with examples of how the process works, what we mean by “depends on the circumstances” and what can limit the bank’s scope to provide loans.

To explain how the current system works, we use balance sheets that are gradually built up from an initial stage where all assets are at zero. We assume that a central bank with an inflation target has established confidence in the “krona” as a unit of account and store of value, but not yet as a means of payment, as there are no means of payment in circulation (thus the conditions exist for the krona to function well once it has been created).

A balance sheet is an accounting structure with an asset side and a liability side that by construction is of equal size. We begin with a situation where the Riksbank has 0 in liabilities and 0 in assets. We have two banks, Alpha and Beta, and all of their customers. Both the banks and their customers have balances at 0.

Now the first customer comes into Alpha Bank and asks for a loan of Swedish Kronas (SEK) 10,000. If the bank first has to wait for a customer to deposit money, it would be impossible for Alpha Bank to give the customer a loan, as there is no money in circulation. Nevertheless, it is possible to give a loan – and without Alpha Bank receiving funding from the central bank. Let us assume that Alpha Bank assesses that the customer – Alfie – will be able to repay the loan in the future. Alfie signs a promissory note that states he is to pay back SEK 1,000 every year for 10 years. In return, Alpha Bank writes that Alfie has SEK 10,000 deposited in his deposit account. This is illustrated in Figure 1.

Figure 1. Balance sheets after granting loan to Alfie
Kronas (thousand)

 ALFA BANK		 RIKSBANKEN		 BETA BANK	
 Assets	Liabilities 	 Assets	Liabilities 	 Assets	Liabilities
(Loan Affe) 10	10 (Affe)				
10	10				

If Alfie is to experience any value of from the new money he received in a loan (his claim on the bank), some other person in the economy must be willing to take over the money – that is, to accept them as payment for something Alfie wants to buy.

Let us now return to our example and assume that Alfie wants to use his new money to buy an apartment. Anne, who also uses Alpha Bank, then sells her apartment to Alfie for SEK 10,000. The only thing that Alpha Bank needs to do is deduct SEK 10,000 from Alfie’s deposit account and deposit SEK 10,000 into Anne’s account. There is no need for external parties outside Alpha Bank to become involved to complete the payments between customers in the same bank, see Figure 2.

Figure 2. Balance sheets after Alfie has bought an apartment from Anne for SEK 10,000

Kronas (thousand)

ALFA BANK		RIKSbanken		BETA BANK			
+	Assets	Liabilities	-	+	Assets	Liabilities	-
(Loan Affe)	10						
		0 (Affe)					
		10 (Anne)					
	10	10					

Commercial bank money is destroyed when loans are repaid

Let us think about how it is possible for Alfie to repay his loan. If Alfie and Anne are the only individuals in our economy, then Alfie needs to sell goods and services to Anne for SEK 1,000 every year (or possibly receive SEK 1,000 as a gift from Anne). Anne's balance will then decline by SEK 1,000 and Alfie's loan will be reduced by SEK 1,000 each year. When the loan matures, we are back at the starting situation, with zero on all the accounts.

What happens if Alfie also pays interest to the bank? Then Alfie will have to pay a little more than SEK 1,000 a year, say another SEK 100. This SEK 100 will be a profit for the bank, which is paid in dividends to the bank's shareholders. Let us assume that the bank is owned by Anne. Then the development of the balance sheets will be similar to the case without interest (as Anne owns the bank), with the difference that Anne consumes more and Alfie will have to work more to get the money to pay the interest. Anne buys services from Alfie to a value of SEK 1,100 per year, Alfie pays SEK 1,000 on the loan and SEK 100 in interest to the bank, the bank pays SEK 100 in profits to Anne.

The banks use central bank money, known as reserves, when they pay one another

In the example above, everyone had accounts and loans with the same bank. How does it work when there are accounts and loans in different banks? To explain this we can expand the example above.

Let us assume that Anne decides to buy a boat for SEK 5,000 that is owned by Betty, who uses Beta Bank. How will this be done? We can envisage three alternatives:

- (i) Both Anne and Betty have accounts with both banks
- (ii) The banks have accounts with one another
- (iii) The banks have accounts with a third bank

If both Anne and Betty have accounts in both banks, as in alternative (i), the banks do not need to do business with one another. Each bank keeps track of the balance for each of its customers and transfers money between its own customers' accounts as in the example above. But of course it will be impractical for the customers to have accounts in all of the banks, which explains why this kind of system is not used in practice.

If the banks have accounts with one another, the banks need to do business with one another. In the example in Figure 2, where the starting point is at zero in Beta Bank, Beta Bank will receive a deposit of SEK 5,000 in its account with Alpha Bank, Anne's account will shrink by SEK 5,000 while Beta Bank will have assets of SEK 5,000 (Betty's deposit account). Note that this solution means that the banks are exposed to risk in one another. If Alpha Bank does bad deals and is forced to suspend payments to its customers, including other banks, Beta Bank will suffer a loss.

In practice, the banks have therefore found it practical to use the third solution, where accounts in a third bank are used to finalise payments between accounts in different banks. This is where the central bank and the central bank's reserves come into the picture. The banks have accounts with the Riksbank, and this is where the expression "the Riksbank is the

banks' bank" comes from.⁴ The central bank creates central bank money, which is called central bank reserves, in the same way that the banks create commercial bank money.

To show how a payment between accounts in different banks works in case (iii), we can continue our example. We now include the Riksbank which has an accounts/payments system called RIX. Let us first assume that both of the banks initially have a balance of 0 on their accounts in the RIX payment system with the Riksbank, which thereby contains neither assets or liabilities.

Now Anne instructs her bank to transfer SEK 5,000 to Betty. Alpha Bank reduces Anne's balance by SEK 5,000 and borrows 5000 kronas from the Riksbank which is credited to Beta's account at the Riksbank. At the same time, Beta bank credits Bettan's account with 5000 kronas. We can now see the following in Figure 3:

Figure 3. Balance sheets after Anne has bought a boat from Betty for SEK 5,000
Kronas (thousand)

ALFA BANK		RIKSBANKEN		BETA BANK			
+	Assets	Liabilities	-	+	Assets	Liabilities	-
(Loan Affe) 10		0 (Affe)		(Alfa bank) 5	(RIX) 5		
		5 (Anne)				5 (Bettan)	
		5 (RIX)			5 (Beta bank)		
	10	10		5	5	5	5

The volume of commercial bank money falls if the bank issues bonds

Let us now assume that Alpha Bank for some reason does not want to borrow money from the Riksbank.⁵ One measure that Alpha Bank can employ to reduce its deficit in RIX is to issue a bond. Alpha Bank offers the private sector a bond that matures in a few years' time in exchange for a transfer of money today. We note that the deficit on Alpha Bank's RIX account corresponds to the amount of money that was transferred to other banks (SEK 5,000). Let us assume that Alpha Bank issues a bond for SEK 5,000. In our economy there are only two people who can buy the bond, namely Anne and Betty. It would be inconsequential for the balance on Alpha Bank's RIX account if Anne buys the bond – in that case all that happens is a restructuring of the liability side of the balance-sheet where "deposits" are transformed into "bonds". But if Betty buys the bond (let us therefore assume this is the case!), we can see that Betty instructs Beta Bank to pay SEK 5,000 to Alpha Bank. This is done by Alpha Bank receiving SEK 5,000 into its account in RIX, which can be used to pay its liability in RIX, and we then have the following altered situation.

Figure 4. Balance sheets after Betty has bought a bond for SEK 5,000
Kronas (thousand)

ALFA BANK		RIKSBANKEN		BETA BANK			
+	Assets	Liabilities	-	+	Assets	Liabilities	-
(Loan Affe) 10		0 (Affe)		(Alfa bank) 0	(RIX) 0		
		5 (Anne)				0 (Bettan)	
		5 (Obligation)			0 (Beta bank)		
	10	10		0	0	0	0

⁴ An alternative would be to exchange some other asset like government bonds to settle payment between banks.

⁵ Reasons could include lack of acceptable collateral, wanting to avoid being perceived as "weak" by other market participants etc.

Now that Alpha Bank has issued a bond, the amount of funds in accounts in private banks has fallen from SEK 10,000 to SEK 5,000. Alpha Bank's decision to issue the bond therefore had the consequence that the volume of money was cut in half.

Given the above discussion, we can see that there are circumstances under which money is not created when banks grant loans. The first example is when the volume of new loans coincides with the repayments. It is of course still true that money is created when lending, but the total volume of money does not grow since the same amount of money is destroyed as a result of the repayments. We can see that the total effect on the volume of money depends on the balance between how many new loans are created and how many are repaid.

Another example is if the bank issues bonds in proportion to its lending. In reality, the banks of course do not manage their liquidity in relation to individual small loans; they act on the total flows arising between the banks. That is, the volume of bonds may be unchanged during a period of time, and then the volume of money grows as much as the loan. The bank can then decide to issue a larger volume of new bonds, for instance, if the outward flow of money from the bank has become unexpectedly large. Then the volume of money declines. If the bank has a strategy to keep the fraction of deposits on the liability side constant, we see that the stock of money (deposits) will only grow by that fraction of loans.⁶

The banks can create money to buy securities, goods and services

We will now finally see that the volume of money can also grow without anyone requesting a new loan. Let us assume that a bank wants to buy securities. Then the bank will pay the person selling the security with a deposit in this person's account. We will now see that the volume of deposits to banks grows irrespective of which bank's customer sells the security. Let us say that Anne and Betty both own half of the stocks in a company, and that Alpha Bank now wants to buy them for SEK 20,000. Then Alpha Bank transfers SEK 10,000 to Anne's account and SEK 10,000 to Betty's account. The latter is done by means of Alpha Bank instructing the Riksbank to transfer SEK 10,000 to Beta Bank in the RIX payment system.

Figure 5. Balance sheets after Alpha Bank bought stocks for SEK 10,000 from Anne and SEK 10,000 from Betty Kronor (thousand)

ALFA BANK		RIKSbanken		BETA BANK			
+	Assets	Liabilities	-	+	Assets	Liabilities	-
(Loan Affe)	10	0 (Affe)					
		15 (Anne)					
		5 (Obligation)					
(Aktier)	20	10 (RIX)	(Alfa bank)	10	(RIX)	10	(Betan)
	30	30		10	10	10	10

We now see that the volume of funds in accounts (commercial bank money) has increased by SEK 20,000, although no one has requested a new loan. In this case, new money is created when the banks exchange an asset (the share) for a liability (funds in accounts).

The banks can also create commercial bank money when they buy goods and services, as they can pay with a deposit in the seller's account. However, in this case the size of the balance sheet is unchanged. The liabilities item deposits grows and the liabilities item equity declines by the same amount, and on the bank's asset side nothing changes.

⁶ The Swedish banks have a structural "deposit deficit" of almost 3000 billion kronas which they finance by different types of market lending, mainly by issuing securities, see Forsman and Ünü (2020).

Monetary policy and legislation govern how much money the banks create

There are several factors that set limits as to how much money the banks can create. Perhaps the most important of these is demand; the banks cannot force their customers to take on new loans and most of the money is created from loans being granted. Another important factor is different forms of regulation, which are aimed at creating stability in the financial system. Some of the regulations concern various buffers. Finansinspektionen (the Swedish financial supervisory authority) requires that the banks have equity in proportion to the risk in their lending. If the bank is close to the regulated level, it must first go to the market and get more capital, or wait and refrain from paying dividends from the year's profits to increase the amount of equity before it can increase its lending further.

Another part of the regulations concerns different forms of liquidity regulation. In the example above, the banks have no equity (to simplify the examples) and all lending is financed through deposits and bonds. Sight deposits can rapidly disappear, and short-term bonds need to be constantly renewed. This means that the banks are exposed to what is known as liquidity risk, and the liquidity regulations are to ensure that the banks have scope to manage this risk. For instance, the Liquidity Coverage Ratios (LCR) mean that the bank should be able to manage a period of economic stress of 30 days without inflows of liquidity without suffering problems. This could mean that the bank must have a certain volume of deposits in RIX or with other banks to be able to provide new loans that create new commercial bank money.

The central bank may also have regulations that are linked to liquidity management that are in addition to the LCR requirements. These are known as reserve requirements and mean that a bank must have a certain volume of central bank reserves in accounts with the central bank. The reserves should be in proportion to the volume of deposits in the bank. If, for instance, the bank has SEK 100 billion in deposits from the general public and the reserve requirement is 10 per cent, the bank must have SEK 10 billion in its account with the central bank. The Riksbank's reserve requirement was set at 0 in 1994, and has remained the same ever since.

It is tempting to believe that the reserve requirement would limit the banks' lending. This might be the case if the central bank fixed the supply of central bank reserves. Then we would see that the banks could be limited by the access to central bank reserves. If, for instance, the reserve requirement was 10 per cent, and the Riksbank had created SEK 100 billion in central bank reserves, the maximum volume of lending the banks could hold is SEK 1,000 billion. If we stick to the narrow definition of money as funds in accounts, we can see that this volume cannot exceed SEK 1,000 billion. As we explained above, however, the banks can finance their lending by issuing bonds. That is, let us assume that they first create SEK 1,000 billion and convert SEK 700 billion of the deposits (commercial bank money they have created) into bonds. Then they can create a further SEK 700 billion (assuming there is demand). We thus see that the reserve requirements limit the volume of commercial bank money the banks can create, but not the volume of credit they can create.⁷

In practice, however, the reserve requirement does not comprise any limit as to how much money the banks can create, as most central banks with reserve requirements use them in a "soft" manner. One good example is the European Central Bank (ECB), which explicitly says that it adjusts the volume of central bank reserves to enable the aggregate banking system to attain its reserve requirements. This means that if the banking system as a whole creates more money, the central bank will adjust the volume of central bank reserves so that it is possible for the banks to attain the reserve requirement. There is nothing strange

⁷ If banks *have to* fund part of the loans with deposits, say, because the market requires a degree of over-collateralization when issuing bonds, there would be a limit to how much loans that can be created linked to the amount of available reserves and hence the maximum amount of deposits.

about this – it just shows that the purpose of the reserve requirement is not to limit the loan volume, but instead to ensure that the banks have some readiness to manage outflows in the same way as the LCR requirements.

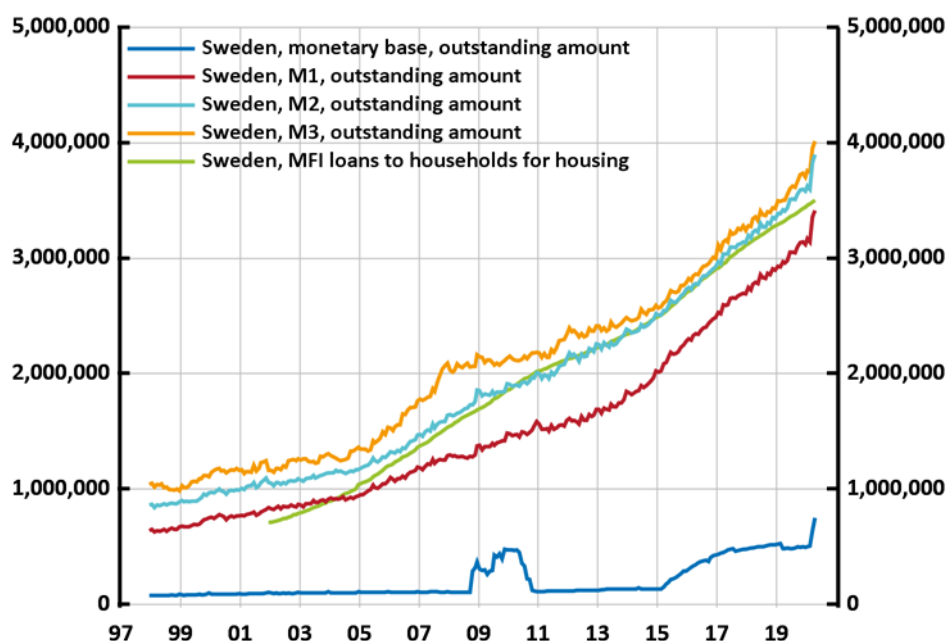
Many older textbooks have an unfortunate misrepresentation usually known as the “money multiplier”. This theory is based on the central bank first creating a banknote, say a krona, which it then gives to the state. The state consumes it and a private agent deposits SEK 1 into the bank. The bank can then lend $(1-r)$ to an individual, where r is the reserve requirement. This individual in turn uses the money and they return to the bank once more, which can then lend $(1-r)(1-r)$. The loop continues and comes to an end when total bank lending has grown by $1/(1-r)$. This theory probably originates from the American “vault cash” regulations, which required a bank to have a certain volume of cash in its vaults in relation to its deposits. But it has no relevance for today's situation in Sweden, where we do not have any reserve requirement.

One usually divides the volume of money into different so-called measures of the money supply. The “monetary base” consists of central bank money, that is, cash and central bank reserves. M1 includes money in sight deposits, while M2 is broader and also includes money that is locked into savings accounts for a longer period, and M3 includes a wider range of assets.

Note that there is normally little relation between central bank money and the amount of money the commercial banks can create. The volume of reserves could affect the volume of commercial bank money that can be created because of liquidity regulation and reserve requirements. However, -- and as explained above -- the latter would require that the Riksbank limits the volume of central bank reserves. There is no such limit today except from the collateral requirements for bank's lending of reserves at the Riksbank. In times of crisis, these collateral requirements may become limiting. Therefore, and as we explain below, one of the measures taken by the Riksbank during the crisis has been to ease these collateral requirements. Diagram 1 shows that in Sweden there is no clear correlation between the broader volumes of money and the volume of central bank money.⁸ We can also see clearly in the diagram how the volume of central bank money, first and foremost the volume of central bank reserves, increased during the financial crisis and now during the corona crisis.

⁸ When the Riksbank buys assets from other sellers than the monetary policy counterparts bank deposits will mechanically increase. This is explained in more detail in the section “Purchase assets” below.

Diagram 1. Different measures of money supply in Sweden



Monetary policy in times of crisis, examples of measures over and above steering interest rates⁹

The most important factor determining the volume of money is therefore the demand for loans. How big this demand will be is something that in normal times is governed by the interest rate level and the state of the economy. The interest rate level, in turn, is governed by monetary policy. However, in certain situations other measures than changes in the policy rate may be required, for instance, in times of crisis. In spring 2020, the Riksbank started a programme of loans to companies via the banks (funding for lending), eased the collateral requirements in its systems and purchased government bonds. One might ask why central banks would need to do these things when the banks themselves can create the money they lend.

To explain why other tools than the policy rate may be needed, we can take the example in Figure 3 as a starting point. In this example, Alpha Bank needs money and has therefore borrowed from the Riksbank. During the course of the day the banks – in this case Alpha Bank – can borrow interest-free in RIX. But overnight, the banks must pay interest if they borrow from the Riksbank. The banks then borrow from the Riksbank's so-called lending facility, where the interest rate is 0.2 percentage points higher than the repo rate, which is the Riksbank's policy rate. As explained above, the banks always need to pledge collateral when they borrow from the Riksbank. Let us now assume that Figure 3 represents the situation at the end of the day.

Alpha Bank now needs to decide what it will do. One alternative is to continue borrowing from the Riksbank overnight. Another is to borrow on the interbank market. The banks often prefer this, as under normal circumstances they can borrow overnight from one another at an interest rate that is below the lending rate in RIX. If Alpha Bank borrows from Beta Bank,

⁹ We only look at some examples. For a more detailed description of the the Riksbank's measures, see "The Riksbank's measures during the coronavirus Pandemic," article in the Riksbank Financial stability report 1/2020.

the balance sheets will look the way they do in Figure 6. Note that the volume of money is still SEK 10,000, even if the Riksbank's reserves have shrunk to zero as the banks can now manage without the intervention of the Riksbank.

Figure 6. Balance sheets after Anne has bought a boat from Betty for SEK 5,000 and Alpha Bank borrows from Beta Bank

Kronor (thousand)

ALFA BANK		RIKSBANKEN		BETA BANK	
+ Assets	Liabilities -	+ Assets	Liabilities -	+ Assets	Liabilities
(Loan Affe) 10	0 (Affe) 5 (Anne) 5 (Beta bank)	(Alfa bank) 0	0 (Beta bank)	(Alfa bank) 5	5 (Bettan)
10	10	0	0	5	5

However, in times of crisis the banks may be less willing to lend to one another, and the interbank market may stop functioning as normal. Interest rates on the interbank market can then rise to levels way above the repo rate. The possibility to borrow in the interbank market may even be entirely closed to certain banks.

In our example, we can assume that Alpha Bank is not able to borrow from Beta Bank, or that it becomes very expensive. If Alpha Bank does not have sufficient collateral, or for some other reason does not want to borrow from the Riksbank it has to sell off assets, such as securities and loans, or stop granting new loans when old ones fall due for payment. If many banks sell assets at the same time, the value of this potential collateral may also begin to fall. In a crisis, a form of negative spiral may arise, with falling asset prices, falling confidence and rising interest rates, which aggravates the crisis. This is why central banks often choose to implement measures to try to prevent this sequence of events. We will now look at what a central bank can do. Some of the alternatives we discuss here have been used during the corona crisis.

Ease the collateral requirements on the lending facility

For the banks to be able to borrow money from the Riksbank's standing loan facility (with a one-day maturity) they must meet the Riksbank's collateral requirements. In normal cases, the banks do not use the loan facility to any great degree and the collateral requirements are fairly high.¹⁰ If a situation were to arise where the banks need to borrow large sums from the Riksbank, the banks may "run out" of acceptable collateral and thus be limited as to how much they can borrow. The Riksbank can then ease the requirements for collateral in the Riksbank's loan facilities, which means that the banks' scope to borrow from the loan facility becomes much greater than before.

Purchase assets

There are two main reasons why central banks buy bonds on financial markets in times of crisis. The first concerns managing problems on specific markets, while the second concerns making monetary policy more expansionary.

The first type of measure is about breaking the negative spiral of market stress that we described above. Sometimes it is enough that the central bank announces that it is willing to buy one type of security for the market to function more as normal. An interesting development on the Swedish financial markets is that Swedish companies are increasingly borrowing money outside of the banking system. These markets have been significant in, for instance, the United States for a very long time, and they caused substantial problems during

¹⁰ For example, the banks cannot normally use their own covered bonds as collateral.

the financial crisis, when it suddenly became impossible for many agents to manage their short-term financing. A corresponding situation could occur in Sweden, and then the Riksbank could stabilise the markets by buying some of these assets. But buying commercial paper and bonds entails entirely different risks than buying government bonds, which is what the central banks have mostly done. It means that the central banks' risk buffers may need to rise to be able to cover future losses.¹¹ Alternatively, the purchases can be made in collaboration with the government, which then provides risk capital that can cover possible losses. One example of the latter is the collaboration between the US central bank Federal Reserve and the US Treasury to purchase risky assets as part of the work to alleviate the corona crisis.




When the purpose of the central bank's purchases is not primarily market management but instead to make monetary policy more expansionary, central banks usually purchase government bonds, with the aim of pushing down long-term interest rates. The idea is that if government bond yields fall, other market rates that are more directly linked to households' and companies' consumption and investment decisions will follow. These purchases become an important complement to the usual way of conducting monetary policy by adjusting the policy rate if the central bank assesses that further policy rate cuts are not possible, or not likely to lead to better target attainment.¹² Currently interest rates generally are low, which means that it can be difficult to lower the policy rate as much as required to obtain balanced resource utilization in the economy.¹³

How is the volume of money in the banking system affected when the Riksbank buys securities?

To explain this, we can first note that the Riksbank purchases bonds from the banks, which in their turn either sell the bonds on their own behalf or on behalf of their customers. The Riksbank pays by crediting the selling bank's account in RIX and then receives an asset in the form of the government bond and a liability to the bank in RIX. This is comparable to when a private bank buys a financial asset and pays by crediting the seller's account in the bank. One could say that the volume of "bank deposits" in RIX increases.

Let us return to our example and assume that a customer named Björn owns a government bond that is sold to the Riksbank for SEK 5,000. What happens then is that Björn's account balance increases to SEK 5,000 and the account balance for Beta Bank in RIX increases by SEK 5,000 as shown in Figure 7.

Figure 7. Balance sheets after the Riksbank has bought bonds from Björn for SEK 5,000
Kronor

 ALFA BANK		 RIKSBANKEN		 BETA BANK			
+	Assets	Liabilities	-	+	Assets	Liabilities	-
(Loan Affe)	10	0 (Affe)		(Alfa bank)	10	(RIX)	15
		15 (Anne)		(Bond)	5		
(Aktier)	20	5 (Obligation)					
		10 (RIX)					
	30	30		15	15	15	15

We see that it is not only the volume of central bank money that increases as a direct effect of the Riksbank's purchase; bank deposits/the volume of commercial bank money also increases. The Riksbank's purchase thus means that private money is also created. What

¹¹ See Kjellberg and Vestin (2019) for a discussion.

¹² For further information on how the Riksbank's purchases of government bonds affects the economy, see Alsterlind et al. (2015a).

¹³ For further information on the lower bound of the repo rate see Alsterlind et al. (2015b).

happens to them and whether this affects demand in the economy will depend on how the banks and their customers act. When the Riksbank supplies the system with more money and at the same time buys safe assets, liquidity is released and this can mean that investors choose to purchase other securities for their money. In this case, interest rates are held down on these assets, too. But it could also be the case that Björn had a bank loan that he chose to pay off instead, and then the money is destroyed. Of course, Björn might also decide to spend the money he has now received for the bond on consumption and the money will then stay in the system.

Where does the money (central bank reserves) that the Riksbank paid with come from? Well, they were created in connection with the purchase of the bond, just as the banks create money when they pay for financial assets or issue loans. Did the Riksbank create money from thin air? It is perhaps a question of semantics, but we can note that the reality is that the Riksbank has exchanged one promissory note for another. The Riksbank received a government bond and paid with central bank reserves. If we look at the entire government (consolidated) balance sheet, we can see that the immediate effect of the purchase is that the maturity on the government's aggregate liabilities declines somewhat. The Riksbank also pays interest to the banks on the reserves it creates to pay for the purchase of the bonds. In relation to the private sector, one interest-bearing liability where the interest rate is fixed for a long period (the government bond) is replaced with another (interest-bearing reserves) where the interest rate is fixed for only one day.

Lending directly to households and firms

If the problems in the financial sector rests with the banks, for instance because they have had big lending losses and therefore have low amounts capital, which limits their lending capacity, it becomes difficult with measures that are supposed to work through the banking system. Gertler and Karadi (2011) discuss if, in such a situation, the central bank should step in and help with the loan provision temporarily. They think that the central bank should not provide credit directly to the private sector in normal times because it makes inferior credit assessments compared to private banks. But in a crisis situation where the banks cannot expand their balance sheet the central bank by direct lending can contribute to ensuring that the credit levels do not become too low.

An untested measure: helicopter money

One idea to make monetary policy more expansionary that is being discussed more often is to “print money” and distribute it, either directly to citizens or as an extra dividend to the state. Such money is usually called “helicopter drops”, which is a concept minted by Milton Friedman back in the 1960s (see Friedman, 1969). Similarly, Galí (2020) have recently used a formal model to argue that fiscal policy stimulus financed with newly-printed money can be an appropriate measure in the current situation when interest rates are very low and the central banks have already purchased large shares of the outstanding government bonds. Galí's argument is based on the assumption that the newly-created money will not bear interest, either because it is cash or because the interest on it is zero. As it is more or less free for central banks to print money, the cost of this capital injection would be very low, which in turn is because cash in circulation does not bear interest nor must it be “repaid”. If one instead provides the same fiscal policy stimulus by increasing the national debt, the state would have to pay interest during the duration of the debt, and repay the debt by raising taxes further ahead. The economic effects of the stimulus will then be much lower.

But let us consider how helicopter money would function in our framework for the implementation of monetary policy. Let us assume that the Riksbank prints cash, say SEK 10 billion, and gives this money to the Ministry of Finance as an extra dividend payment. Please

note that this distribution method gets around the normal cash management method – normally the banks would order cash and be debited in the RIX system. This time the Riksbank instead sends truckloads of cash directly to the Ministry of Finance, nothing happens in RIX and the Riksbank brings down its balance sheet by SEK 10 billion of equity, while the banknotes and coins item increases by SEK 10 billion.

The Ministry of Finance then determines how the money will be distributed in the economy, hopefully in a way that makes the economic impact as large as possible, by prioritising households that want to increase their consumption. Households will of course be pleased at the extra cash, because no future tax increase will motivate them to save money. If the money is in cash and remains in circulation in the economy, then Galí's argument works. However, unless there is a change in households' preferences for holding cash, they will either use this money to buy something or deposit it in the bank. If they spend the money, they will be stimulating the economy, of course, but the question is whether the Riksbank having supplied the money provides anything more than a normal fiscal policy expansion.

Regardless of whether or not households spend the money directly, there is an impending risk that the banks will receive the cash back from households and companies and then they will turn to the Riksbank to redeem it. When the banks redeem cash, their balance in RIX increases. The balance is interest bearing, which means that the Riksbank will in the future have to pay the repo rate on the increased reserve volume. Now we see why it is appropriate even in our system to call banknotes and coins in circulation a claim on the central bank – they can be redeemed and become an interest-bearing claim, even if they can no longer be redeemed for gold. If all of the newly-printed cash returns to the Riksbank, it is reasonable to assume that it will be very similar to the case when the government finances a fiscal policy expansion by increasing the national debt. The increase in the total interest-bearing liability for the government becomes the same. The difference is that the liability has a very short interest-rate fixation period (up to one week) when the Riksbank creates helicopter money. It is therefore doubtful whether it would be more effective for the Riksbank to finance the payment in relation to the government borrowing money from the private sector, other than in cases where the national debt is so large that it may be impossible for the Swedish National Debt Office to borrow more on the market. Kloster (2020) considers on the basis of similar arguments that helicopter money is nothing more than a fiscal policy loan-financed stimulus. In order for helicopter money to give value added compared to government debt financed fiscal policy the interest rate that the Riksbank pays on its reserves must be significantly lower than the average interest rate on government debt. One possibility would be to let parts of the reserves be interest rate free. Such a solution would resemble a tax on the banking system, and in that case, the correct comparison is between a tax- and a government financed fiscal stimulus.

Concluding summary

In this commentary, we have explained that the Riksbank under normal circumstances does not attempt to control the volume of money in the economy, by issuing cash or setting a reserve requirement or similar. Instead, the Riksbank controls demand in the economy by changing the level of the repo rate. At a certain interest rate level, and given financial regulations, a certain amount of money will then be created in the private banking system.

However, in times of crisis, it does happen that central banks create new money when they intervene with various support measures. The main reason is not usually to create money, but to resolve the problems that have meant the financial markets have stopped functioning normally. This has also happened during the ongoing corona crisis. We have

explained the static mechanics of how money is created and destroyed in the current system. But for a complete understanding of how the central bank's measures influence the economy we also have to take into account that there are frictions, regulations and special circumstances that we have not considered in this commentary. There are, for instance, several interesting questions that we have not discussed like whether it matters who creates the money in or economy and if there are situations where money creation influences the price level through additional channels over and above the one discussed in this commentary.

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