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The money creation paradox

Banks create money, but also have to borrow it

Economists frequently assert that banks can create money out of nothing. Bankers have a different opinion: for every loan they need to attract money. And, strangely, they are both correct. How can this be reconciled?

Banks are not just intermediaries, passing on savings to investors

The vast majority of money in the economy is held in the form of bank deposits. But the creation of money does not, as is often popularly imagined, arise from people choosing to save rather than spend, with banks then lending the money on to others to invest. Banks are not mere intermediaries. Instead, their decisions to lend create the deposits.

The banking sector creates money. But individual banks still have to finance each loan

Indeed, amongst economists, it is a generally accepted fact that banks make money 'out of nothing' the moment they provide a loan. There is a good reason why economists refer to banks as "money creating institutions". The simplest textbook depiction of what happens is as follows: with one click of a button, a bank creates a loan on the assets side of its balance sheet while, on the liabilities side, a corresponding monetary amount simultaneously appears in a bank account.[1] This simplistic and abstract explanation is the source of the lack of understanding about how money creation actually works and what its consequences are. Money creation is, in fact, far more subtle.

Alternative definition...

- Money = Coins and banknotes in circulation and accounts with banks.[2]
- Money in the form of a deposit in a bank account is a debt of the relevant bank. Banknotes in a bank's safe and accounts the bank itself has with the central bank form the bank's assets and are not classified as "money".
- Creating money does not therefore mean that a bank can buy anything it wants with free money it has created itself. Money creation actually means the creation of bank debts, not bank assets.
- Different definitions of money (M1, M2, M3) include different sorts of bank accounts (payable on demand or frozen for a specific period). Broader definitions of money (such as M3) also include bank bonds with a maturity of up to two years.
- When money is held in deposits with a bank, the bank holds (and must hold) parts of these balances as cash, in its account with the central bank (reserves) and in liquid assets, so that clients can, if they wish, immediately withdraw their money or transfer it. Banks have to meet a "reserve requirement", which is a percentage of the bank's deposits, and a "liquidity coverage ratio" (LCR), specifying the amount of liquid assets that should be available for sale in order to meet outflows of deposits and other short term liabilities.

In the simplest explanations of money creation, banks are usually analysed as a sector. But what applies to all banks collectively, does not necessarily apply to an individual bank. In this article, we will demonstrate that, on a macro level, the banking sector creates money by extending credit, but that does not mean each individual bank can

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[1] This simplified explanation can e.g. be found in the 2014Q1 issue of the Bank of England's Quarterly Bulletin. See the article "Money creation in the modern economy" and in particular p.19. Martin Wolf has also written in the Financial Times about money creation in two articles entitled 'Only the ignorant live in fear of hyperinflation' and 'Strip private banks of their power to create money'.

[2] See e.g. the ECB.

The fact that banks can create money does not mean that banks can lend without limitations

create unlimited supplies of money. A bank actually has to look for financing when it wants to provide a loan. We refer to this as the "money creation paradox". It simply isn't true, as is sometimes concluded, that because a bank creates its own liabilities (deposits) when extending loans, it can therefore extend credit and create money without bounds.

Creating money in a few simple steps

Standard economics textbooks argue that the constraint on money creation arises from the reserve constraints that central banks impose on the banks. While that is not how monetary policy is conducted in modern times, we start with this textbook explanation for clarity.[3]

1) Suppose: the reserve requirement imposed by the central bank (the reserves to be held divided by the deposits in bank accounts) is 10%.

2) Suppose: bank A complies with this requirement, but has no excess reserves over this amount. This is bank A's balance sheet:

Bank A

Assets		Liabilities	
Reserves	100	Deposits	1000
Required reserves	*100*	Other liabilities	500
Loans	1000		
Bonds	400		

3) Client K wishes to borrow money from bank A in order to purchase a house from seller S, and the bank is willing to provide the loan. According to standard economic text books, the bank now has a claim on client K of 100 (appearing on the left-hand side of the bank's balance sheet) and, simultaneously, a deposit on the right-hand side. This new deposit is 100 of new money and is, therefore, new money created by bank A.

The central bank ultimately controls money creation

In the first instance, this suggests that banks can extend unlimited loans and create money. After all, the loan finances itself through a deposit! But it isn't that simple. Firstly, the reserve requirement, monitored by the central bank, sets a cap on the money that can be created. A new loan creates a new deposit, but the bank must hold a percentage of that balance as a reserve (in this example 10%). The central bank determines the reserve requirement and also has control over the actual reserves the banking sector holds with the central bank.

A bank has to finance the majority of the new credits...

But even leaving aside the reserve constraint, bank A, which is lending the money, has to find the actual financing. In practice, for example, a bank immediately deposits the money created with a mortgage loan in the account of the house seller; and this account will frequently be with a different bank. The fact that the deposit is with another bank and not with the lending bank is, from a macroeconomic perspective (which looks at the entire banking sector), irrelevant: the balance sheet of the banking sector *as a whole* is the same as it would have been had the deposit been created in an account with the lending bank. But from the perspective of the banks concerned there is a huge difference. This is what happens when bank A grants credit to client K:

4) Bank A transfers 100 from its account with the central bank to bank B's account with the central bank. Bank B credits 100 to seller S's bank account.

[3] In practice, central banks prefer the interest rate as the policy tool over managing bank reserves, supplying reserves on demand (see p.6). Although the mechanics are different and more indirect, the effect is the same: the central bank influences bank lending. Banks create money, but central banks have ultimate control, if they choose to exercise it.

Bank A

Assets		Liabilities	
Loans to K	+100		
Reserves	-100		

Bank B

Assets		Liabilities	
Reserves	+100	Deposit with seller S	+100

…because the money created ends up with a different bank

After making the loan, bank A's balance sheet looks as follows:

Bank A

Assets		Liabilities	
Reserves	0	Deposits	1000
Required reserves	*100*	Other liabilities	500
Loans	1100		
Bonds	400		

Bank A now has a reserve shortfall of 100, the entire amount of the loan. The bank will have to supplement the reserves. Even if the bank's reserves were still above the requirements, the bank will want to restore its original portfolio mix of assets, in particular the share of liquid assets (of which reserves form part) on its balance sheet. After all, it wants to maintain a comfortable liquidity buffer and has to comply with the LCR. (to maintain a comfortable liquidity buffer and to comply with the LCR). To achieve this, bank A can:

a. Arrange an interbank loan of 100 and use this to make up the reserve shortfall. It will have to find another bank that has excess reserves available to lend;

b. Sell 100 worth of bonds and use the money to make up the reserve shortfall[4];

c. Attract deposits. When deposits flow in, the reserves also increase, enabling the reserve shortfall to be made good. In the current example, the bank has to attract 111.11 worth of deposits. The deposits will then rise to 1111.11, the reserves to 111.11, and reserves will once again have reached 10% of deposits;

d. Borrow from the central bank to top up reserves.

Creating money doesn't mean a bank gets "free money"

In practice, banks will opt for a combination of these options. Therefore, creating money is neither "free" nor without consequences for the bank concerned. Bank A actually has to finance the 100 it is lending, in contrast to the simple explanation given in step 3. It's true that, in this example, bank B has surplus reserves, and the banking sector as a whole amply complies with the reserve requirement. Yet that does not diminish bank A's financial requirements.

5) In cases where bank A can add the deposits to its own balance sheet (for example, because the seller coincidentally has an account with bank A), the situation is different. As soon as the loan has been concluded, the bank's balance sheet will look as shown below.

But, even in these circumstances, the bank must take action. The actual reserves are, it is true, unchanged, but the deposits have risen. Given the reserve requirement of 10%, the reserves required will also have increased and the bank will have a reserve shortfall of 10.

[4] Note that if the purchasing party is a non-bank, the sale of bonds will result in money being destroyed, as the bank balances of the purchasing party are reduced by the purchase price paid for the bonds (100).

Bank A

Assets		Liabilities	
Reserves	100	Deposits	1100
Required reserves	*110*	Other liabilities	500
Loans	1100		
Bonds	400		

And even if reserves are still high enough, the bank's portfolio of assets now deviates from the desired mix (assuming the portfolio was as desired before the loan was made). This calls for responses similar to those shown in step 4 above. The amounts involved in this case are smaller but, even so, creating money still has consequences for the bank.

Several factors put a brake on the banking sector's ability to create money

Moreover, in practice, it is not only reserve requirements and portfolio considerations that restrict banks; there are other factors which affect a bank's ability and willingness to create money, in particular the assessment of the risks and returns attached to the loan and the solvency requirements.

Conclusion 1: It isn't possible for banks to create an endless supply of money for nothing. While banks collectively create deposits by making loans, each bank has to finance each loan. Even if central banks choose to supply reserves on demand, banks have to consider profitability, risk and regulatory ratios in deciding to make loans.

Conclusion 2: Creating money is a characteristic of the banking sector, not of an individual bank. A loan issued by bank A can lead to a deposit in bank B.

Conclusion 3: Banks do not consider the creation of money as an operational target. It is a by-product of the banking sector's business operations. However, it is of great economic and social relevance.

Not every loan results in the creation of money

It is important to distinguish between gross and net money creation. In macroeconomic terms, extending bank credit leads, by accounting necessity, to money creation. But whether there is still more money in circulation at the end of the day depends entirely on what is done with the money. In the above example of mortgage lending, we went no further than depositing the money into the seller's account. In practice, the vendor will immediately use the money to pay off his or her own mortgage. And this is the same as destroying money. In *net* terms, money is only created at the end of the day if the mortgage being redeemed by the house vendor is lower than the mortgage taken out by the buyer. Suppose, in outline:

Only *net lending* ultimately results in money creation

- A new mortgage of 100 is taken out by buyer K = gross money creation of 100
- Vendor V redeems a mortgage of 80 = destruction of money of 80
- Net lending = net money creation = 100 – 80 = 20

In practice, the majority of loans are used to redeem other loans. This applies to mortgages (both in the case of new purchases and the refinancing of existing mortgages), but also, for example, to business credit which is "rolled over".

Conclusion 4: Not every loan ultimately results in new money. The majority of new lending is used to redeem existing loans. On balance, money is only created to the extent the gross lending exceeds the value of the existing loans being redeemed.

Money can be created without loans being made

Not all money creation originates from bank lending...

Just as not every loan ultimately results in the creation of new money, it is also important to recognise that money can be created (or destroyed) without loans being made (or redeemed). Banks can also create (destroy) money by buying (selling) other assets from outside the banking sector. For example, if they buy bonds on the secondary market from an institutional investor, they will credit the investor's deposit account. Banks may buy government bonds to build liquidity buffers, since such bonds are readily saleable (see p.3). Moreover, banks can also create (destroy) money by reducing (increasing) other liabilities that are not counted as money, such as long-term bank deposits, bank bonds or bank equity. For example, a bank could redeem their own long-term bonds (not counted as money) by crediting the bond holders' deposits (creating money).

...and extraordinary post-crisis central bank policy also results in money creation

"Quantitative easing" also shows how central banks can in a similar vein create money by buying assets from the non-bank private sector. In buying e.g government bonds from investors, the sellers' bank deposits rise, increasing the money supply, while banks' reserves at the central banks rise correspondingly. But note that this does not directly lead to more lending by the banks. Indirectly, lending may rise in response if higher asset prices, fuelled by central bank buying, encourage more spending. But investors might use the proceeds of their sales to central banks to pay-off bank loans.

Conclusion 5: New money does not depend solely on banks making loans. Banks also create money when buying assets such as bonds from non-banks, thereby increasing the latter's deposits. Central bank asset purchases, or quantitative easing, may have a similar effect. But while such purchases increase the banks' reserves, this will not necessarily increase their lending.

Banks create money, but central banks have ultimate control

In practice, central banks use interest rates instead of reserves as policy tool

In principle, central banks could control the money supply via strict control of the supply of bank reserves. As outstanding credit rises, bank balances also rise. And as bank balances rise, required reserves rise.[5] If the central bank determines both the required reserve ratio and the available reserves, it can set a cap on the extension of credit: if the banking sector no longer holds sufficient reserves, it can no longer extend credit.

But controlling reserves in this way could lead to 'sudden stops' in bank lending. This would introduce undesired volatility into the financial system, which is why in practice, central banks prefer to control the price, and not the quantity of reserves. They therefore use interest rates as the primary tool of monetary policy. By, inter alia, lending to banks and buying and selling bonds, the central bank manages the banks' reserves in such a way that the interest rate in the money market remains near the level aimed at by the central bank. This could achieve the same goals as controlling reserves: higher policy rates feed through in higher bank lending rates, thus decelerating credit growth. Targeting rates has a somewhat slower and more indirect effect on bank lending than reserve control, but this is an acceptable sacrifice as it eliminates the volatility that comes with direct reserve control.

Nowadays the central bank considers the extension of credit from both a "micro" and "macro" perspective

But more importantly, regulating credit has not been a policy goal for most central banks in recent decades, although they often had the tools and the authority to do so. Central banks have in the two decades up to the financial crisis generally neglected

[5] The ECB's reserve requirements can be found here.

credit developments, in favour of a narrow focus on price stability.[6] It is now quickly becoming accepted that central banks should pay attention to both the risks a credit portfolio poses for an individual bank (microprudential supervision), and to the desired scope and growth of credit within an economy (macroprudential supervision). In addition to the reserve requirement, there are other regulatory tools, including solvency (capital) ratios, the already mentioned liquidity coverage ratio and requirements regarding the duration of bank debts in relation to assets.

In addition, banks must, in the first place, make their own decisions about the desired scope of their credit portfolios in respect of duration, type, counterparty and country; moreover they must take account of the risks involved in extending credit. An individual bank has to assess whether its own balance sheet will be able to bear this risk.

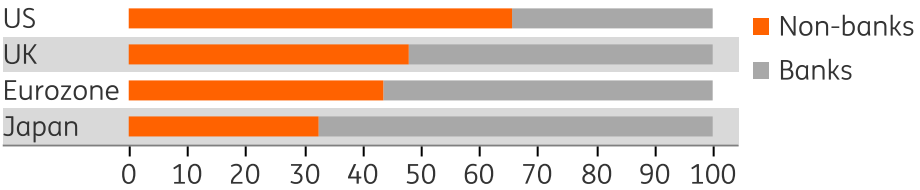
Conclusion 6: Extending credit is, ultimately, a joint decision taken by the bank and the client. However, central banks have ultimate control, if they choose to use it. In the wake of the financial crisis, there is a growing desire to look beyond using interest rates to influence price stability. In addition to quantitative easing, central banks are intensifying their supervision of lending activities by individual banks and they are now developing "macroprudential" tools with which they can influence the scope and growth of credit across the economy.

Loans can be made without money being created

The importance of non-bank lending is hard to underestimate

Another major consideration is that just as money can be created without loans being made, loans can be made without money being created. This is not just because banks can fund loans, as we saw earlier without necessarily creating deposits. Loans can also be extended by non-financial companies and individuals. Within the financial sector, The 2008 crisis has put lending by non-bank financial institutions ("parallel banking" or "shadow banking") into focus. As these loans are not made by banks, they do not involve money creation and bank regulation does not apply. Yet parallel banking is an important channel (see Figure 1). In the US, 65% of credit outstanding is lent by non-banks and hence does not involve money creation. In the eurozone, still 44% of credit is lent by non-banks. A further discussion of non-bank credit is outside the scope of this report. In any case, given the importance of non-bank credit, the macroprudential supervisor arguably should take it into account.[7]

Fig 1 Share of banks in total credit to the private non-financial sector (%)



Shares ultimo 2017Q3. Source: BIS, Macrobond, ING-calculations

Conclusion 7: Loans can be extended without money being created. Non-banks have become increasingly active in extending credit, especially in the US, where banks account for only a minority of the total.

[6] Mark Carney, Governor of the Bank of England said in a speech recently that "the reductionist vision of a central bank's role that was adopted around the world was fatally flawed".

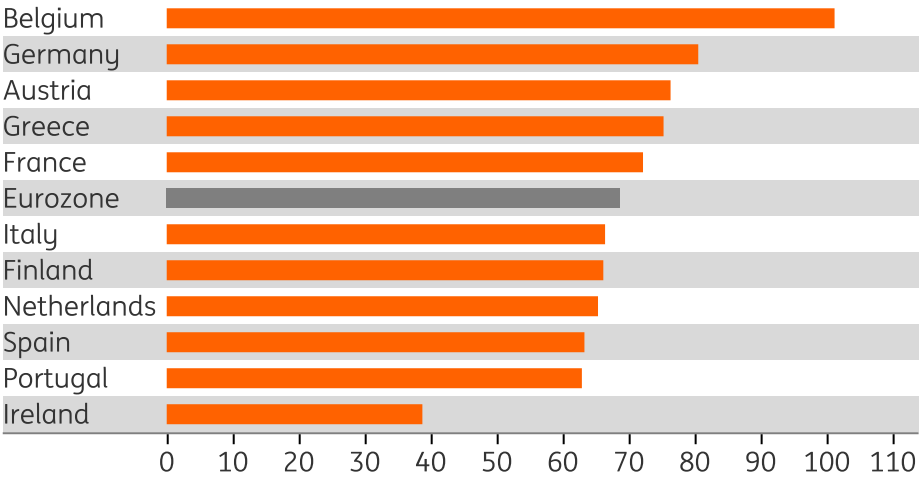
[7] See e.g. the FSB on shadow banking.

Money flows across borders

From a macroeconomic perspective, net lending in a country leads to money creation, mainly in the form of deposits in bank accounts. But cross-border banking means that money and credit can flow between countries. Moreover, this means that money and credit are created not just by domestic banks. Lending or asset purchases by a bank in one country can increase the money supply in another country. This can be the case in countries with different currencies, but also within a currency area. The chart below shows domestic money (M3) as a percentage of domestic credit (defined here as loans, bonds and shares held by banks, as these three form the counterparts of money on the banking sector's balance sheet) for selected Eurozone countries.

Money and credit easily flow across borders

Fig 2 Domestic money as % of domestic credit in Eurozone countries (%)



Data for March 2018. Following ECB-definitions, "credit" includes loans to and securities and shares from the non-bank sector held by both commercial and central banks. Money is defined as M3. Source: Macrobond, ING-calculations

The chart shows considerable variation across countries. Belgium has slightly more money than credit. All other eurozone countries shown have less money than credit. These differences may partly be explained by different portfolio preferences across countries. They can also have institutional causes. In the Netherlands, for example, mortgage lending has been relatively high. Money in the Dutch economy on the other hand partly flowed to pension funds that in turn invested it in equity and bonds, both domestically and abroad. This reduced money in the Dutch economy compared to the outstanding credit. Subsequently, Dutch banks have to fill this domestic "funding gap" by borrowing on capital markets and attracting foreign deposits.

National differences between loans and money are no reason for concern by themselves. With the right policy tools, it will still be possible for national authorities to regulate national lending, as long as they are willing to accept that the public choose how and in what form they hold their financial assets. These preferences may in turn affect domestic banks' ability and willingness to lend.

Conclusion 8: Money flows across borders, as loans in one country can create money in another. This emphasises the importance of international coordination when regulating financial flows and domestic credit, especially within a monetary union.

Is creating money useful?

Money creation is important if deflation is to be avoided

Sometimes, it's suggested that money creation serves no purpose for society. It is merely air being pumped into the system. However, given the continuously increasing

production possibilities, it is important that the supply of money grows sufficiently. If the supply of money is constrained, the economy could experience falling prices, wages, output and employment.[8]

Consequently, money creation is useful, but it can, of course, go too far

However, in the wake of the financial crisis, not so much money itself should be the centre of attention, but the lending that created it. The crisis is generally seen as being precipitated by excessive lending, and the subsequent lacklustre economic recovery as being held back by deleveraging.

Aside from the role of lending in exacerbating the economic cycle, there is also a debate about to what extent credit meets social needs. This goes beyond the factual question whether lending is profitable, but asks the normative question whether it serves a "useful" purpose. It depends entirely how the client who has been lent the money spends it:

- Investing in new means of production and assets is, in general, useful. Infrastructure, factories and houses: these are all necessary and they enhance economic growth.

  However, not all investments in new means of production are useful. Sometimes too much is invested, resulting in overcapacity, low returns and bankruptcy.

- Investing in an existing asset, for example, the purchase of a house. A mortgage enables people to buy houses without them having to have saved for years beforehand. Mortgages are in fact advances on future incomes. In this case, credit can be considered to serve a useful function.

  Credit facilitates investment, the purchase of existing assets and expands financial capacity

  However, it is possible to have too much of a good thing. High levels of speculation and excess lending can result in unsustainable house price bubbles that are followed by economically and socially damaging busts. In the process, they may lead to a misallocation of resources into real estate development, starving other sectors of investment. Moreover, these price rises tend to redistribute wealth instead of adding to wealth of society.

- Finally, credit can be used to smooth out a person's spending pattern; consumer credit and credit cards are examples of this. This way of using money creation can be useful, but it can also get out of hand.

Evaluating credit quality is a traditional, core function of banks...

Money and credit can, therefore, be used in both useful and less useful ways. Frequently, it's difficult to assess in advance whether the consequences of a certain investment will be good or bad. This raises the question of the role of the banks in evaluating credit quality. This is a traditional, core function of banks, based on long-term client relationships and experience. Although recurrent crises show that banks individually and collectively periodically make catastrophic errors in assessing the ability of borrowers to repay their loans, it is far from clear that capital markets, or the state, would do much better.[9] Nevertheless, in the wake of the financial crisis there is a increased recognition that it is the task of the macroprudential supervisory body to monitor developments in respect of lending, the corresponding creation of money and the relationship with the economy; and, if necessary, place restrictions on those extending the credit.

...can the markets or the state do much better?

[8] The quantity theory of money holds that the price level is related to the supply of money in the long run, because the speed with which money circulates through the economy is assumed to be stable. This has been the subject of long-running debate between monetarist and Keynesian economists. The latter generally argue that the supply of money is both driven by demand and unstable.

[9] Research shows that state bank ownership is associated with low bank efficiency, higher loan loss provisioning, slower economic growth, greater financial instability and politically motivated lending. See e.g. "Bank ownership and credit over the business cycle: is lending by state banks less procyclical?" by Bertay et al. (2012) for a review of the literature.

Conclusion 9: The creation of money and the extension of credit make growth and prosperity possible. However, as is often the case, it is possible to have 'too much of a good thing'. The competence of banks in performing their key role in credit evaluation is under the spotlight, which has led to an emerging consensus on the need for more sophisticated macroprudential supervision.

Conclusion

In the debate about the role of banks in money creation, remarkably little attention is given to the money creation paradox. This is the paradox that, on the one side, the banking sector creates money when it extends credit while, on the other, banks actually have to attract money to finance their lending. The paradox reflects the fact that money creation takes place at a system level, and individual banks are only one component of this. Money creation is not, therefore, an aim in itself for banks, but is merely a by-product of their lending, one of their core tasks.

Banks cannot extend unlimited credit and, in so doing, create unlimited money. They have to weigh the risks and keep an eye on their reserves, liquidity and solvency. But ultimately policymakers are in control. The financial crisis has led to a recognition that monetary policy focused on using interest rates to achieve price stability is no longer enough. New monetary policy tools such as quantitative easing have a bearing on money and credit creation, and there is a consensus that macroprudential supervision should monitor and, when necessary, adjust credit extension and money creation at system level. As a point of departure, macroprudential policy assumes that credit and money are necessary and useful sources of economic growth and prosperity, but that excesses must be avoided.

Sadly, economists have, to date, offered very few points of reference to determine what exactly a prudent pace of lending and money creation is. This is perhaps not surprising given the widespread lack of understanding of the money creation paradox.

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