



WHAT IS MONEY, EXACTLY?

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Oslo, 15 May 2018

The first banknotes in Europe



Many have tried to make money

- preferably out of as little as possible

- Technology has always been key
- The alchemists attempted to turn base metals into gold
- Thanks to Johan Palmstruch, Sweden became the first country to use modern cash
 - Lending was to be funded by deposits
 - The cash was to be backed by copper and silver coins
 - The temptation to issue too much cash became too great
- Attempts have often gone wrong



So what is money exactly?

- The simple answer is that money is a means of payment.
- It is also a universally recognised unit of account.
- People will only accept money if they believe they can use it as a means of payment in the future
 - For that reason, money must also serve as a store of value
 - Money is an interest-free security



Trust

- Money has value because – and only because – everyone believes in its value.
- Common to all forms of money is confidence.
- The guarantor of a stable monetary value is the Norwegian government
 - This task has been delegated to Norges Bank
- Norges Bank has a clear mandate with an independent position
 - This fosters trust in the Bank's ability to do its job.



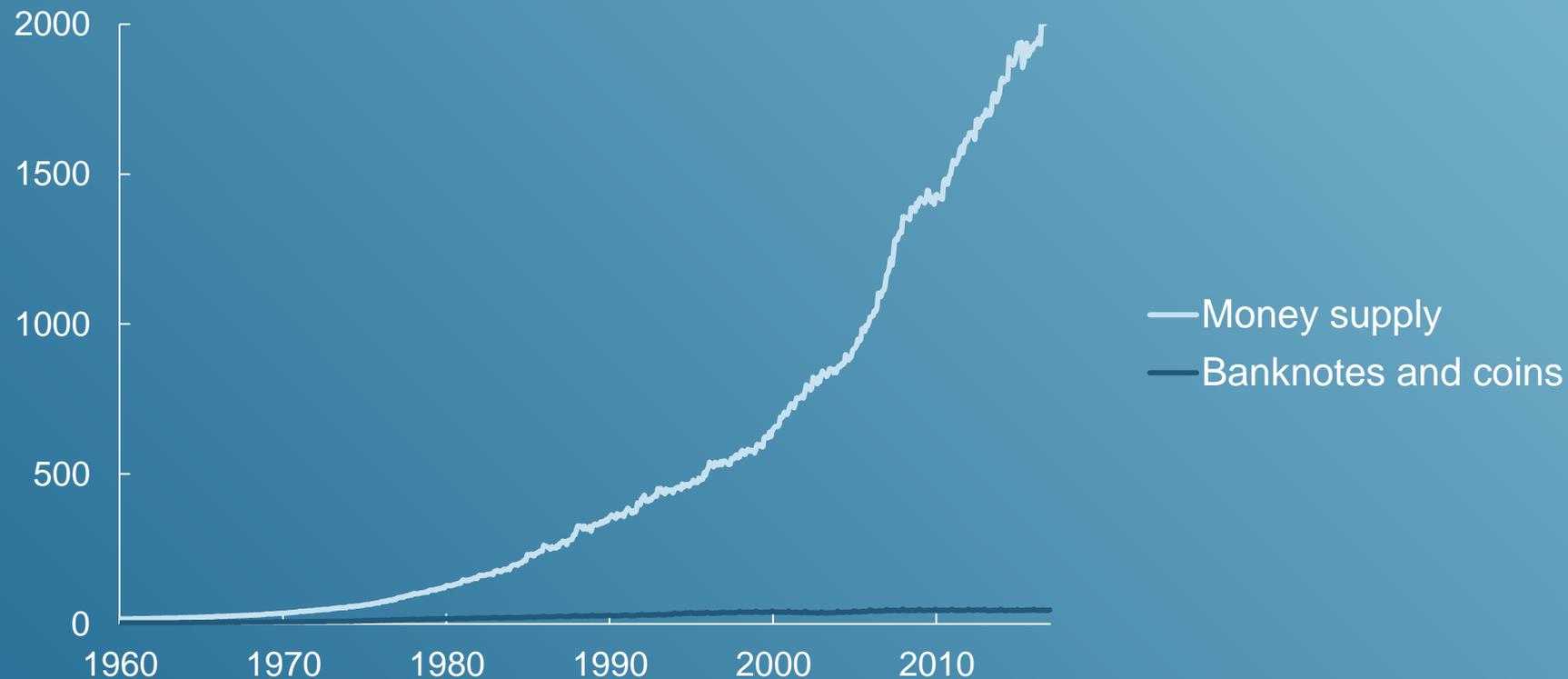
How is money created?

- Today, there are two forms of central bank money
 - Banknotes and coins
 - Bank reserves at Norges Bank
- Only banknotes and coins are available to the general public
- The total amount of money is much larger than this
- Ordinary bank deposits are also money



Money supply and cash

In billions of NOK



Sources: Statistics Norway and Norges Bank



How do banks create money?

- When a bank issues a loan, a deposit is credited to the borrower's account.
- This money is created by the bank the moment it issues the loan.
 - When the money is used to make a payment, it will be transferred to the payee's account
 - When aggregate credit increases, the money supply also increases
- However, the Norwegian public still has confidence in bank money
 - Risk and regulations limit banks' money creation
 - Regulation and the deposit guarantee ensure the safety of bank money within certain limits

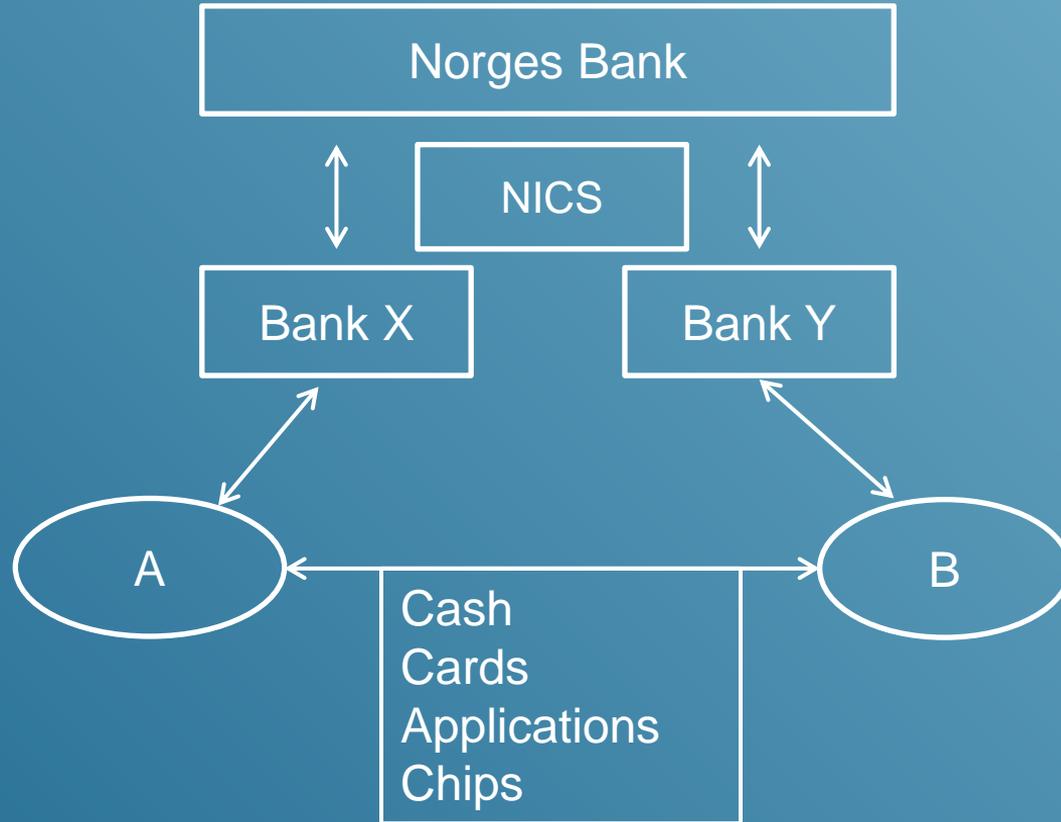


Payment system

- Trust in money is necessary, but not sufficient
- The use of money must also be efficient and safe
- When we pay using a bank card, we set in motion one of the most complex systems there is



Payment system



New forms of payment

- Technology is constantly giving us new ways to pay
- We use smartphone payment apps to “zap” money to friends
- Major tech players like Apple, Samsung and Google are entering the market
- Payment cards are still the underlying instrument
- New regulations make possible account-to-account payments



New kinds of money

■ E-money

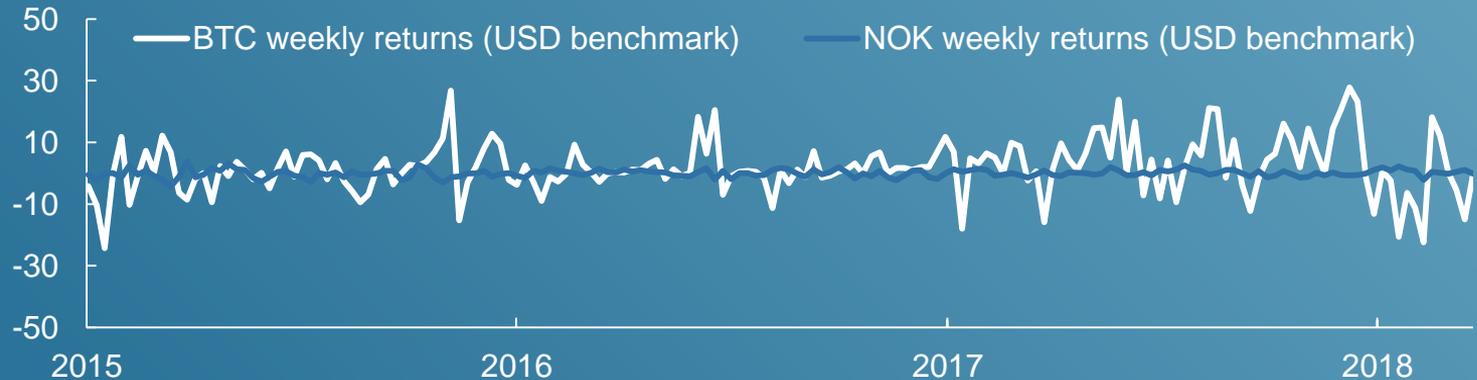
- E-money is issued by an e-money company and is a claim on that company
- E-money has been around for a long time, but new technology can make it more relevant

■ Cryptocurrencies

- Cryptocurrencies are intended to serve as separate monetary units, payment systems and sometimes service platforms
- Mostly without institutional backing
- Their value has fluctuated substantially



Exchange rate and volatility of Bitcoin and NOK In USD and percentage terms, respectively



Cryptocurrencies or crypto-assets?

- Cryptocurrencies may be better labelled “crypto-assets”
- They do not meet all the criteria for money
- ... but could they be useful as transferrable assets?
 - For cross-border payments?
 - For niche payments and smart contracts?
 - Can the technology complement existing infrastructure?



Trust

“In Cod We Trust”



“In Code We Trust”

```
1 library(sodium)
2 library(openssl)
3
4 key <- keygen()
5 pub <- pubkey(key)
6
7 # Create hash
8 msg <- ("I declare I transfer A to B")
9 hash=md5(msg) #charToRaw(md5(msg))
10
11
12 # Encrypt message for receiver using his/her public key
13 ciphertext <- simple_encrypt(charToRaw(hash), pub)
14
15 # Receiver decrypts with his/her private key
16 out <- rawToChar(simple_decrypt(ciphertext, key))
17
18 #Check validity
19 hash==out
```



A fortuitous combination of confidence and fascination?

- It is easy to become fascinated by cryptocurrencies
 - The desire to create money out of nothing has been around for centuries
- What really creates trust in cryptocurrencies?
 - The code?
 - That a sufficient number of people follow the agreed-on rules of the game?
- Both the code and the rules of the game have come under pressure



Regulation of crypto-assets

- *“A better path would be to regulate elements of the crypto-asset ecosystem to combat illicit activities, promote market integrity, and protect the safety and soundness of the financial system”*

Mark Carney, Governor, BoE

- Cryptocurrencies must be regulated, but we must not stand in the way of useful innovation



What shall our money be?

- Cash usage is declining
 - But cash has some attributes that may be worth keeping
- Cryptocurrencies illustrate a number of new needs and opportunities for improving the financial system
- A number of central banks are studying central bank digital currencies (CBDCs)
 - A digital form of central bank money for use by the general public



Central bank digital currencies (CBDCs)

- Norges Bank will soon publish a report on CBDCs
- The report identifies potential goals of a CBDC in Norway
 - Credit risk-free alternative to bank deposits
 - Back-up solution
 - Legal tender
- Other possible benefits of CBDCs noted in the international debate
 - Privacy, immediate settlement, platform for innovation, financial inclusion, monetary policy instrument
- A CBDC can also have negative consequences – cost-benefit analysis



Summary

- Trust is necessary for money to function
- Use of money must also be efficient and safe
- New kinds money can perform some functions
 - But regulation is necessary
- Falling cash usage and new needs prompt us to consider issuing a central bank digital currency (CBDC)





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