UNIVERSITY *of* NICOSIA

Department of Digital Innovation

MSc in Blockchain and Digital Currency

BLOC 526 – Emerging topics in fintech

Session 5 – Money and monetary theory for fintechs

Dr. Periklis Thivaios CFA, FRM, BTRM

Learning objectives and expected learning outcomes

Summary

Session 5 introduces money and its evolution in the world economy as a basis for understanding fintech operations in the monetary universe. This session aims to dispel the textbook myths surrounding monetary theory and offer an appropriate theoretical framework for understanding the role of fintechs in the context of the financial system, including Central and Commercial banks.

Learning objectives

- Introduction to money definitions and parameters
- Introduction to reality-based monetary theory in contrast to standard textbook definitions
- The role of Central Banks, Commercial banks and fintechs in the financial system

Expected learning outcomes

- Understand the definitions and primary parameters underlying money and monetary operations
- Understand the role of Central Banks, Commercial banks and fintechs in the context of real world monetary theory

Agenda

- Introduction and recap
- Introduction to ‘money’
- A deeper dive into money
- Modern monetary theory and the fallacy of financial intermediation
- Concluding remarks

Agenda

- **Introduction and recap**
- Introduction to ‘money’
- A deeper dive into money
- Modern monetary theory and the fallacy of financial intermediation
- Concluding remarks

Takeaways from previous sessions

Session 3

2. Maturity transformation is an integral aspect of banking

- Banks transform shorter term deposits to longer term loans
- Maturity transformation gives rise to risks; but banks have to manage a lot more risks

"The key function of banks is money creation, not intermediation"

The Bank of England

Agenda

- Introduction and recap
- **Introduction to ‘money’**
- A deeper dive into money
- Modern monetary theory and the fallacy of financial intermediation
- Concluding remarks

Question: What is money?

Money is an asset (a resource with economic value) that satisfies three roles

A medium of exchange

- An asset that can be used as an exchange for another asset
- Money is a more convenient medium of exchange than barter
- An asset that acts as a medium of exchange is not acquired for its own properties but for its saleability

A unit of account

- A consistent means of measuring the value of things
- In other words, a fixed frame of reference with which to compare the value of different objects

A store of value

- An item that holds value over time
- Money differs from other stores of value (e.g. assets, land, property) in that it can be readily exchanged for other assets
- In other words, its role as a medium of exchange makes it a convenient store of value

"Money is a lot more than a convention; it is a social institution" (Claudio Borio)

Question 2: Can you identify different types of money?

Takeaways

1. Money is any asset that satisfies three properties

- Medium of exchange
- Unit of account
- Store of value

"Everyone can create money; the problem is to get it accepted"

Hyman Minsky, 1986

Agenda

- Introduction and recap
- Introduction to ‘money’
- **A deeper dive into money**
- Modern monetary theory and the fallacy of financial intermediation
- Concluding remarks

Important definitions

Asset

A resource with economic value

Money

An asset that satisfies 3 roles:

- *Unit of account*
- *Medium of exchange*
- *Store of value*

Currency

A widely accepted form of money

Fiat currency

A currency that is issued by and constitutes a liability of a Central Bank

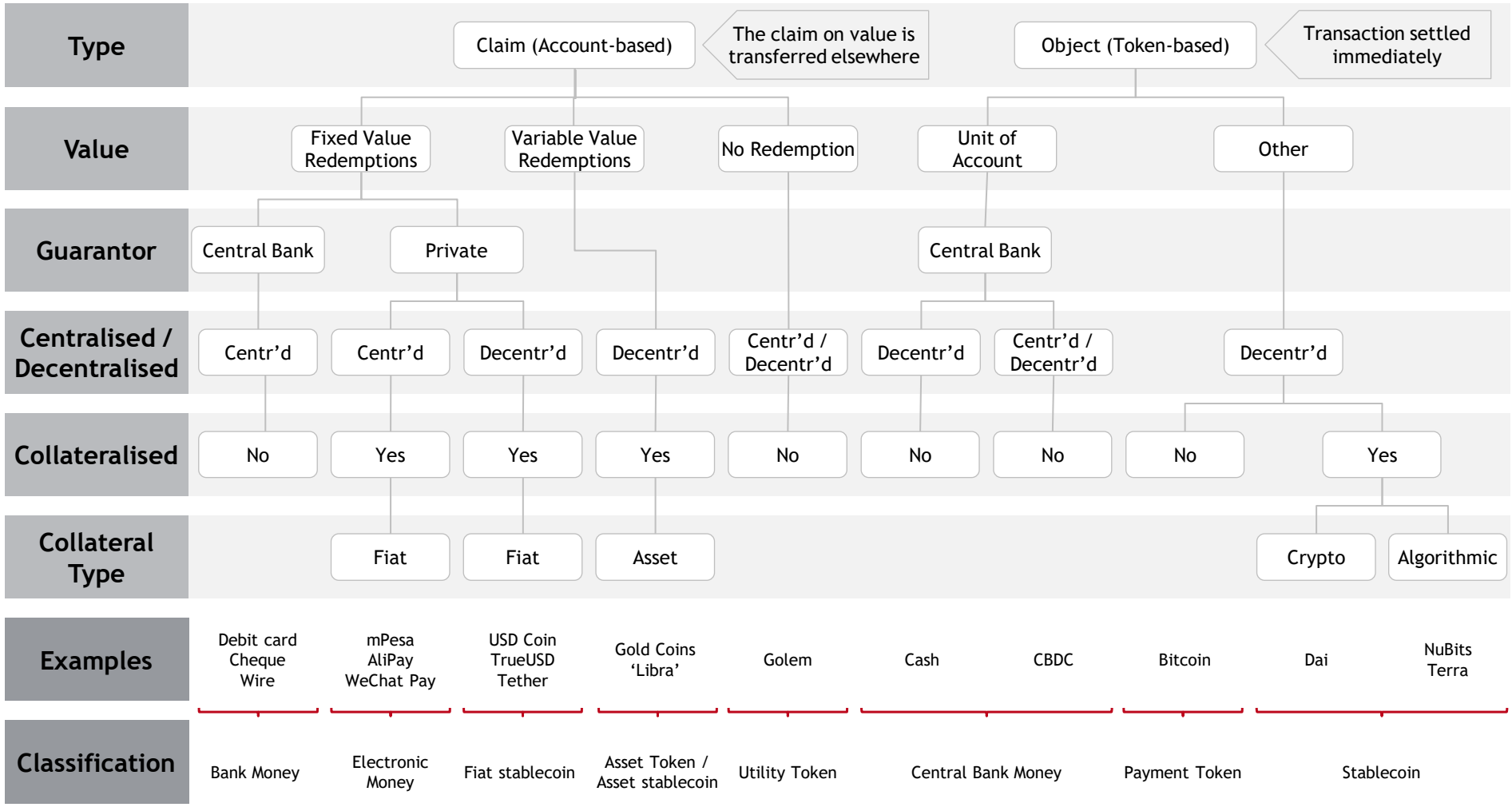
Digital currency

A currency that exists in digital form. Can be Central Bank issued or not

Crypto

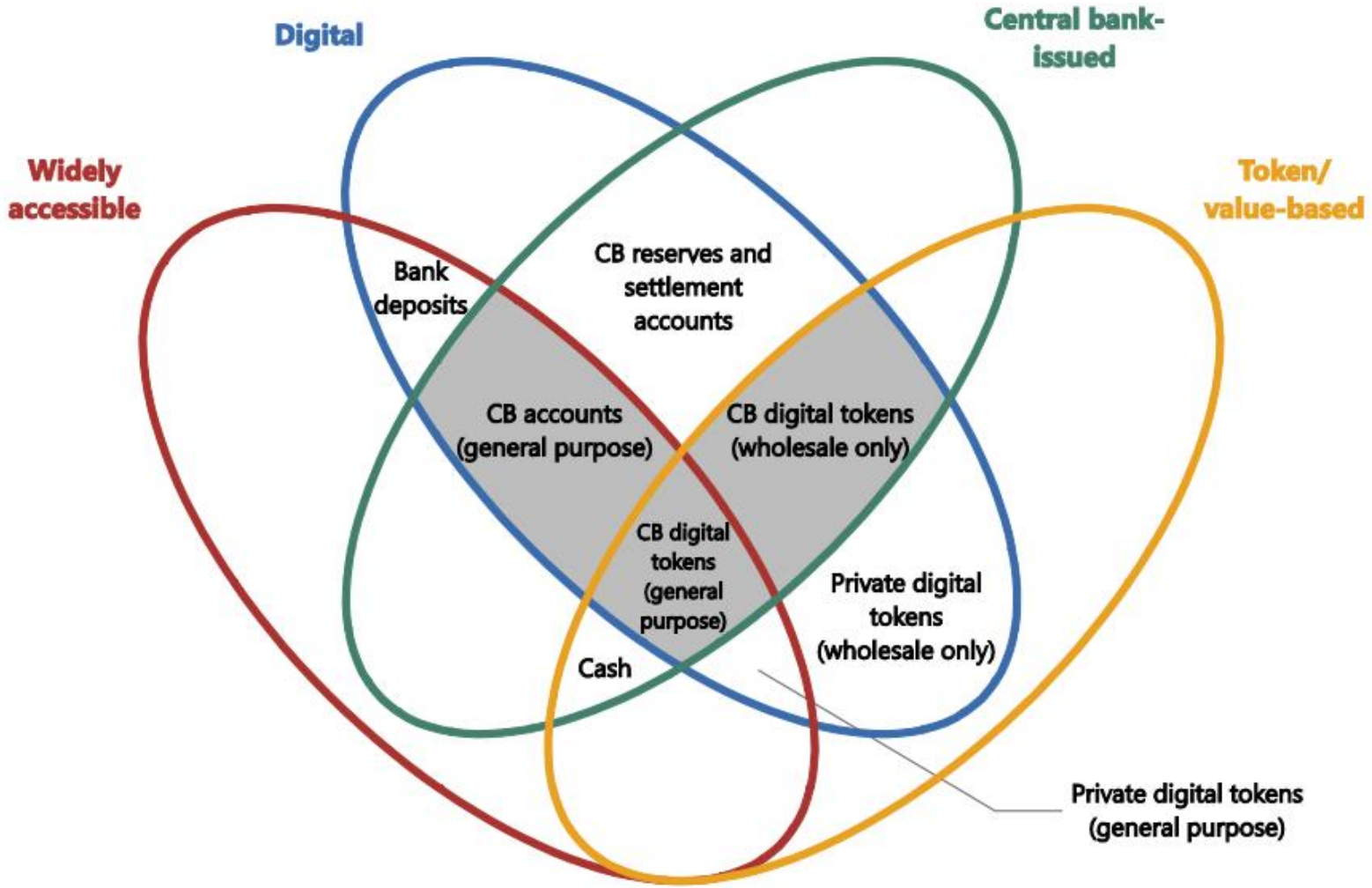
A cryptographic based, digital asset or currency. Not issued by a Central Bank

An elaborate taxonomy of money



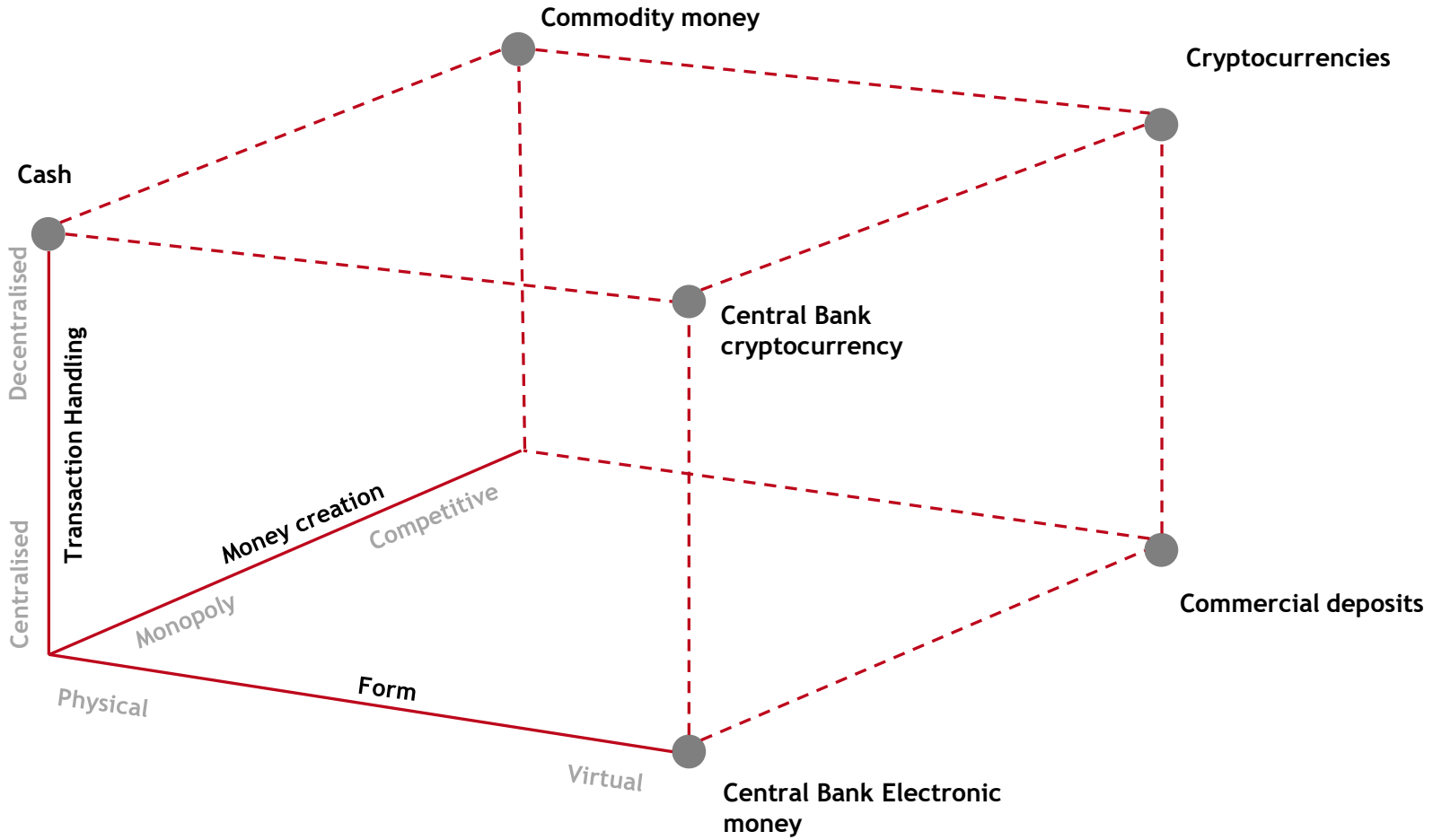
With the exception of cash, all other token-based money still may require some form of identification

A taxonomy of money: the money flower



Source: CPMI-MC (2018); Bech and Garratt (2017); BIS (2019)

And yet another taxonomy - Control structure of currencies



Source: Berentsen and Schaer (2017)

Takeaways

2. Money comes in various taxonomies	▪ Most important for us are whether they are a liability of someone, and whether peer to peer or centralised

"It is an erroneous belief that the value of gold or any metallic basis determines directly the value of money"

Friedrich Hayek (1937)

Agenda

- Introduction and recap
- Introduction to ‘money’
- A deeper dive into money
- **Modern monetary theory and the fallacy of financial intermediation**
- Concluding remarks

In a previous session we discussed banks as financial intermediaries

Banks can be visualised as financial intermediaries between depositors (savers) and borrowers

Banks take deposits from savers (individuals, businesses, governments, etc.)

Banks use the funds from deposits in order to extend loans to borrowers

However, a competing interpretation is gaining traction in our understanding of banks…

Banks are not intermediaries; they create money!

- Instead of intermediating between savings (deposits) and loans, commercial banks actually create money by deposits…
- In other words, deposits do not by themselves increase the funds available for banks to lend
- When a bank issues a loan, it deposits money in the borrower's account, therefore creating money

Central Banks do not control money supply

- The 'money multiplier' concept holds that Central Banks determine the quantity of loans and deposits in the economy by controlling the quantity of Central Bank money (the amount of reserves)
- In reality, banks decide how much to lend based on the interest rates set by the Central Bank, which influences the amount of money banks hold in reserve, to meet withdrawals and regulatory liquidity requirements
- Reserves are supplied on demand by the Central Bank

Note that this interpretation (theory) is not considered the orthodoxy, and is often disputed

Question: How many of you have studied basic accounting?

The double entry book-keeping system has been the standard for centuries

Step 0

Borrower		Lender	
Assets	**Liabilities**	**Assets**	**Liabilities**
▪ Cash: 20	▪ Liabilities: 0 ▪ Equity: 20	▪ Cash: 100	▪ Liabilities: 0 ▪ Equity: 100

Step 1

Lender lends 60 to borrower

Borrower		Lender	
Assets	**Liabilities**	**Assets**	**Liabilities**
▪ Cash: 80	▪ Liabilities: 60 ▪ Equity: 20	▪ Loan: 60 ▪ Cash: 40	▪ Liabilities: 0 ▪ Equity: 100

Commercial banks are licensed to create money out of thin air, at the press of a button…

When a commercial bank issues a loan, it creates an equally sized deposit on its liability side

Step 0

Before loan is made

Borrower

Assets	Liabilities
▪ Cash at hand: 20 ▪ Cash on deposit: 0	▪ Liabilities: 0 ▪ Equity: 20

Commercial Bank

Assets	Liabilities
▪ Cash: 20 ▪ Reserves: 80	▪ Deposits: 0 ▪ Equity: 100

Step 1

Commercial Bank lends 60 to borrower

Borrower

Assets	Liabilities
▪ Cash at hand: 20 ▪ Deposit: 60	▪ Liabilities: 60 ▪ Equity: 20

Commercial Bank

Assets	Liabilities
▪ Cash: 20 ▪ Reserves: 80 ▪ New loan: 60	▪ Deposits: 60 ▪ Equity: 100

Sounds crazy, right?

"Bank deposits are simply a record of how much the bank itself owes its customers. So they are a *liability* of the bank, not an *asset* that could be lent out"

Bank of England (2015)

Obviously, commercial banks face limits on how much money they can create (lend)

Behaviour of money holders	▪ Borrowers may move the newly created deposit to another bank account (e.g. a car seller's) ▪ Or, borrowers can 'destroy' money by paying back other loans
Market forces and profitability	▪ To attract new loans, a bank would have to drop its lending rates to make them more competitive ▪ To avoid depleting its reserves, the bank would have to attract deposits offering higher rates ▪ Both actions would dent the commercial bank's profitability
Risk management	▪ As banks expand lending, they increase their expected losses due to client delinquency ▪ In order to reduce liquidity mismatches (long term loans versus shorter term deposits), banks issue more expensive long term deposits. This links to the previous point on profitability
Regulatory constraints	▪ Prudential frameworks such as Basel III impose limits on the amount of loans a bank can issue, given its liability profile ▪ Capital constraints also limit the amount of credit risk that a bank can take on
Monetary policy	▪ Central Banks set the *price* of reserves, i.e. the interest rate to be paid on money at the CB ▪ The higher the policy rate (interest rate on reserves), the higher the banks' funding costs and therefore the interest rate at which they are willing to extend loans to customers

Takeaways

3. Commercial banks are not financial intermediaries	▪ Commercial banks are licensed to create money through the process of lending ▪ The amount of money creation is balanced by a number of competitive, regulatory and monetary policy constraints

All theories are by definition wrong!

Some of them can be useful…

Agenda

- Introduction and recap
- Introduction to ‘money’
- A deeper dive into money
- Modern monetary theory and the fallacy of financial intermediation
- **Concluding remarks**

Summary of takeaways

1. Money is any asset that satisfies three properties	▪ Medium of exchange ▪ Unit of account ▪ Store of value
2. Money comes in various taxonomies	▪ Most important for us are whether they are a liability of someone, and whether peer to peer or centralised
3. Commercial banks are not financial intermediaries	▪ Commercial banks are licensed to create money through the process of lending ▪ The amount of money creation is balanced by a number of competitive, regulatory and monetary policy constraints

Unless fintechs get a banking license, they can only be financial intermediaries.

Any questions?

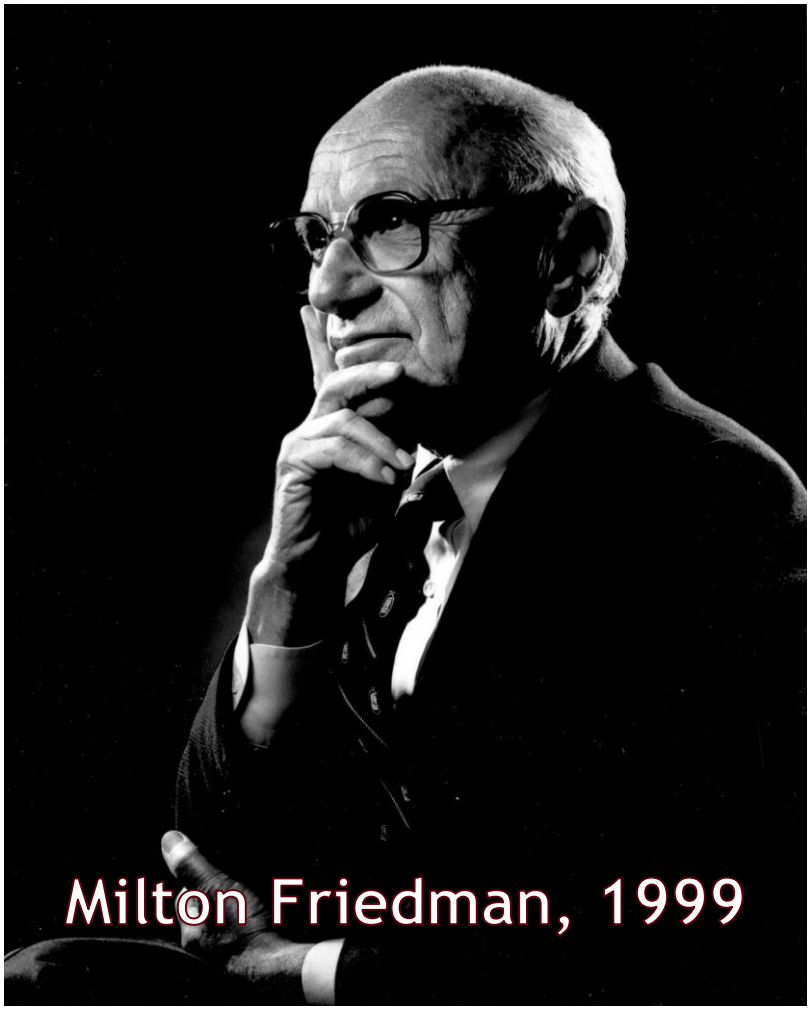
UNIVERSITY of NICOSIA

Questions?

Contact Us:

Twitter: **@mscdigital**
Course Support: digitalcurrency@unic.ac.cy
IT & Live Session Support: dl.it@unic.ac.cy

Pre-history starts in the late 1990s…



I think the ***Internet*** is going to be one of the major forces for *reducing the role of government*.

The one thing that's missing but that will soon be developed, is **a reliable e-cash**, a method whereby on the Internet you can *transfer funds from A to B without A knowing B or B knowing A*.

That kind of thing will develop on the Internet and that will make it even easier for people using the Internet.

Of course, it has its negative side. It means the gangsters, the people who are engaged in illegal transactions, will also have an easier way to carry on their business.

10 years (two internet centuries) later

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main benefits are lost if a trusted third party is still required to prevent double-spending. We propose a solution to the double-spending problem using a peer-to-peer network. The network timestamps transactions by hashing them into an ongoing chain of hash-based proof-of-work, forming a record that cannot be changed without redoing the proof-of-work. The longest chain not only serves as proof of the sequence of events witnessed, but proof that it came from the largest pool of CPU power. As long as a majority of CPU power is controlled by nodes that are not cooperating to attack the network, they'll generate the longest chain and outpace attackers. The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

1. Introduction

Commerce on the Internet has come to rely almost exclusively on financial institutions serving as trusted third parties to process electronic payments. While the system works well enough for most transactions, it still suffers from the inherent weaknesses of the trust based model. Completely non-reversible transactions are not really possible, since financial institutions cannot avoid mediating disputes. The cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions, and there is a broader cost in the loss of ability to make non-reversible payments for non-reversible services. With the possibility of reversal, the need for trust spreads. Merchants must be wary of their customers, hassling them for more information than they would otherwise need. A certain percentage of fraud is accepted as unavoidable. These costs and payment uncertainties can be avoided in person by using physical currency, but no mechanism exists to make payments over a communications channel without a trusted party.

What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party. Transactions that are computationally impractical to reverse would protect sellers from fraud, and routine escrow mechanisms could easily be implemented to protect buyers. In this paper, we propose a solution to the double-spending problem using a peer-to-peer distributed timestamp server to generate computational proof of the chronological order of transactions. The system is secure as long as honest nodes collectively control more CPU power than any cooperating group of attacker nodes.

A purely peer-to-peer version of ***electronic cash would allow online payments*** to be sent directly from one party to another without going through a financial institution.

We propose a solution to the double-spending problem using a peer-to-peer network.

The network itself requires minimal structure. Messages are broadcast on a best effort basis, and nodes can leave and rejoin the network at will, accepting the longest proof-of-work chain as proof of what happened while they were gone.

What digital currencies imply about money?

1 **Money functions (store of value, unit of account, medium of exchange) may be un-bundled**	▪ Different currencies may take on different functions (e.g. fiat as unit of account but e-money as medium of exchange) ▪ Gresham's law (bad money drives out good) is re-enacted, 5 centuries later
2 **Monetary and payment functions come closer together**	▪ A payment mechanism becomes innate in digital monetary instruments ▪ The need for 3rd party PSPs diminishes to that of cross currency execution (currency in the non-national sense)
3 **Data content is embedded in monetary instrument**	▪ Instead of the Bank and the PSP holding and processing customer data, this is now done by the private currency issuer

Money functions

1. Money functions un-bundled
2. Monetary and payment functions come closer together
3. Data content embedded in monetary instrument

Function	Definition	Currently	Scenario
Store of value	Holds its value over time	Fiat Currency 2	CBDC 1
Unit of account	A common measure of value	Fiat Currency	Libra Coin 1
Medium of exchange	A commonly accepted method of payment	Fiat Currency	WeChat Pay 1
(Store of data)	A depository of transactor and transaction data	Bank / Payment Service Provider 3	Currency Service Provider

What should payment firms consider?

- What is our core offering? Payments or service data provision?
  - If both, how do we bundle them in a way that makes a payment service attractive in light of digital currencies?
- How do we address the issue of interoperability between different digital currencies?
  - Is there room to process payments between CBDC and private stablecoins?
- Do merchant discounts, interchange fees and card scheme fees make sense in a data driven world?
  - Can payment data collection be the new price of payments? In other words, could the payment service be free, if customers accept to have their data processed further?
- What is the role left to play in a digital currency world whereby access to Central Bank RTGS is limited to a handful of (banking) players?
  - What do we do if CBDC becomes the fiat reserve for private currencies?
  - What do we do if large payment processors (like AliPay) gain access to Central Bank RTGS?

UNIVERSITY *of* NICOSIA