Principles of Money, Banking and Finance

Monetary Policy Tools and Objectives and Central Bank Digital Currencies

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Learning objectives

- Understand the goals of monetary policy
- Understand monetary policy tools
- Understand QE and money printing
- Understand central bank digital currencies

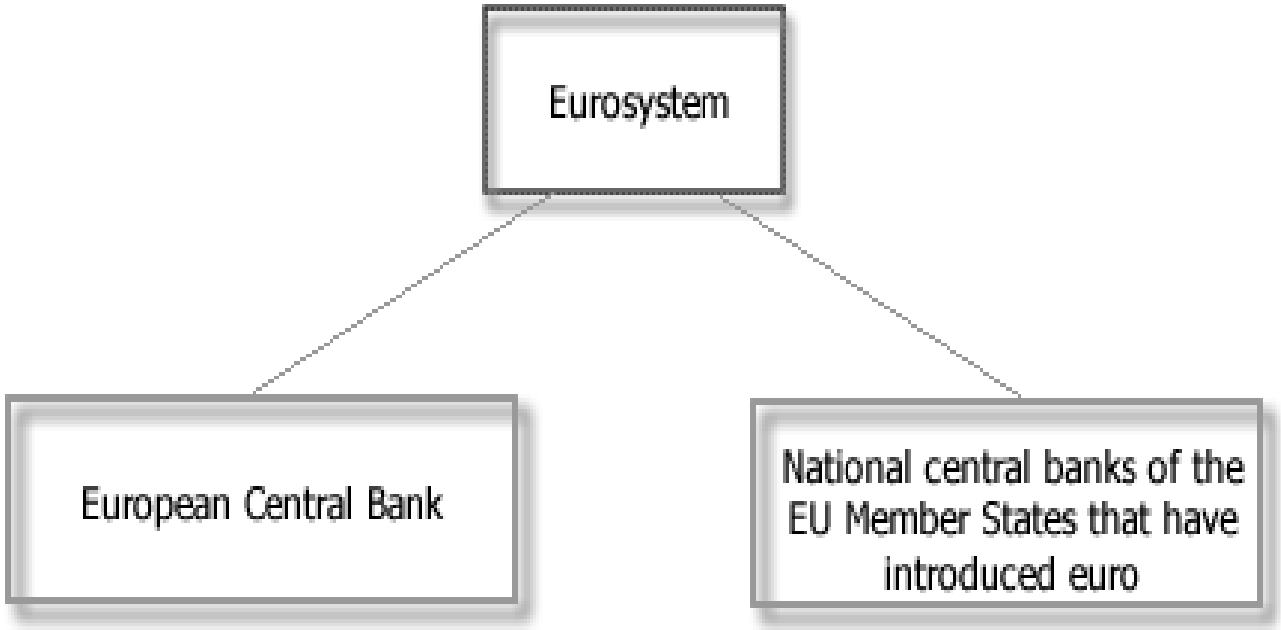
Session outline

- Goals of monetary policy
- Open market operations
- Quantitative easing
- Central bank digital currencies

Section 1: Monetary Policy Goals and Tools

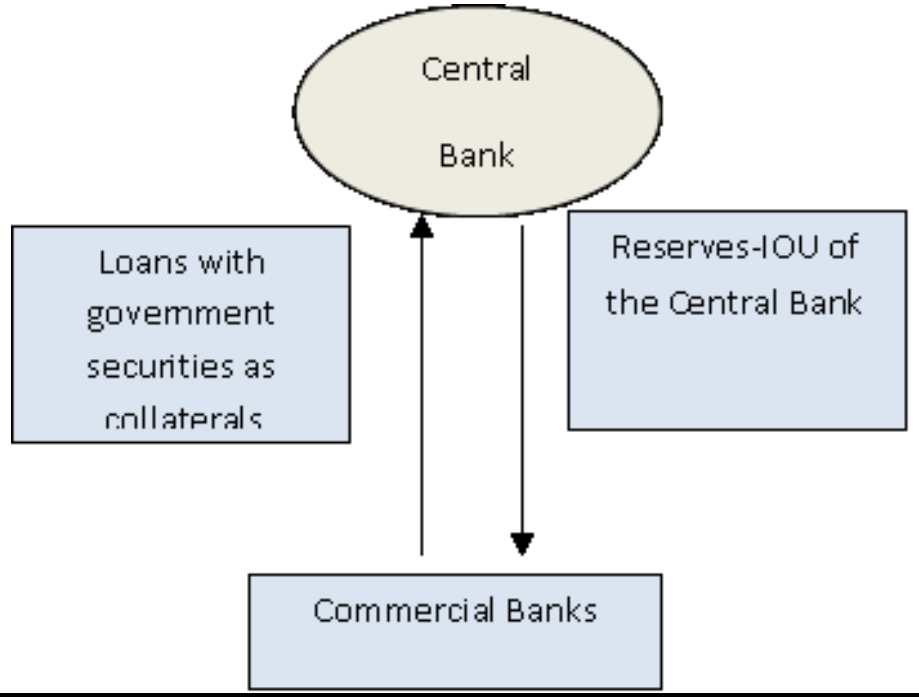
What is the Eurosystem;

- The Eurosystem is the monetary authority of the Eurozone, whose primary purpose is to maintain price stability. The Eurosystem consists of the European Central Bank and the National Central Banks of the euro area member countries. It acts as the principal authority for ensuring financial stability and promoting financial integration in Europe.

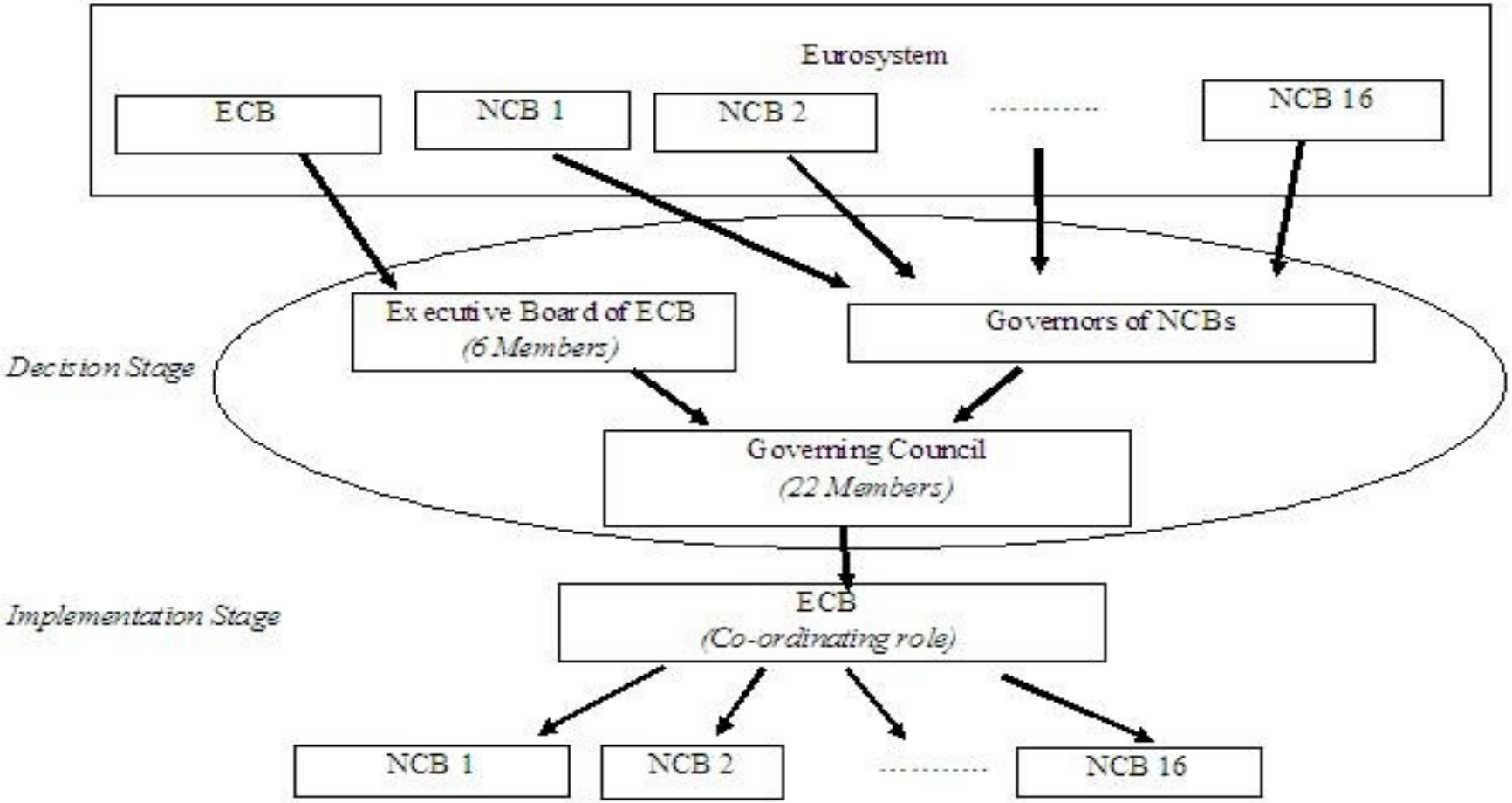


Monetary Policy Goals

- Monetary policy is pursued by the Governing Council of the European Central Bank, with the aim of targeting an inflation rate of 2% over the medium term. Monetary policy is the policy of fixing the ECB's key interest rates. The most important tool of monetary policy is open market operations. Open market operations increase or absorb liquidity from the banking system in order to influence short-term interest rates. Open market operations are a form of collateralized short-term lending by the ECB to commercial banks.



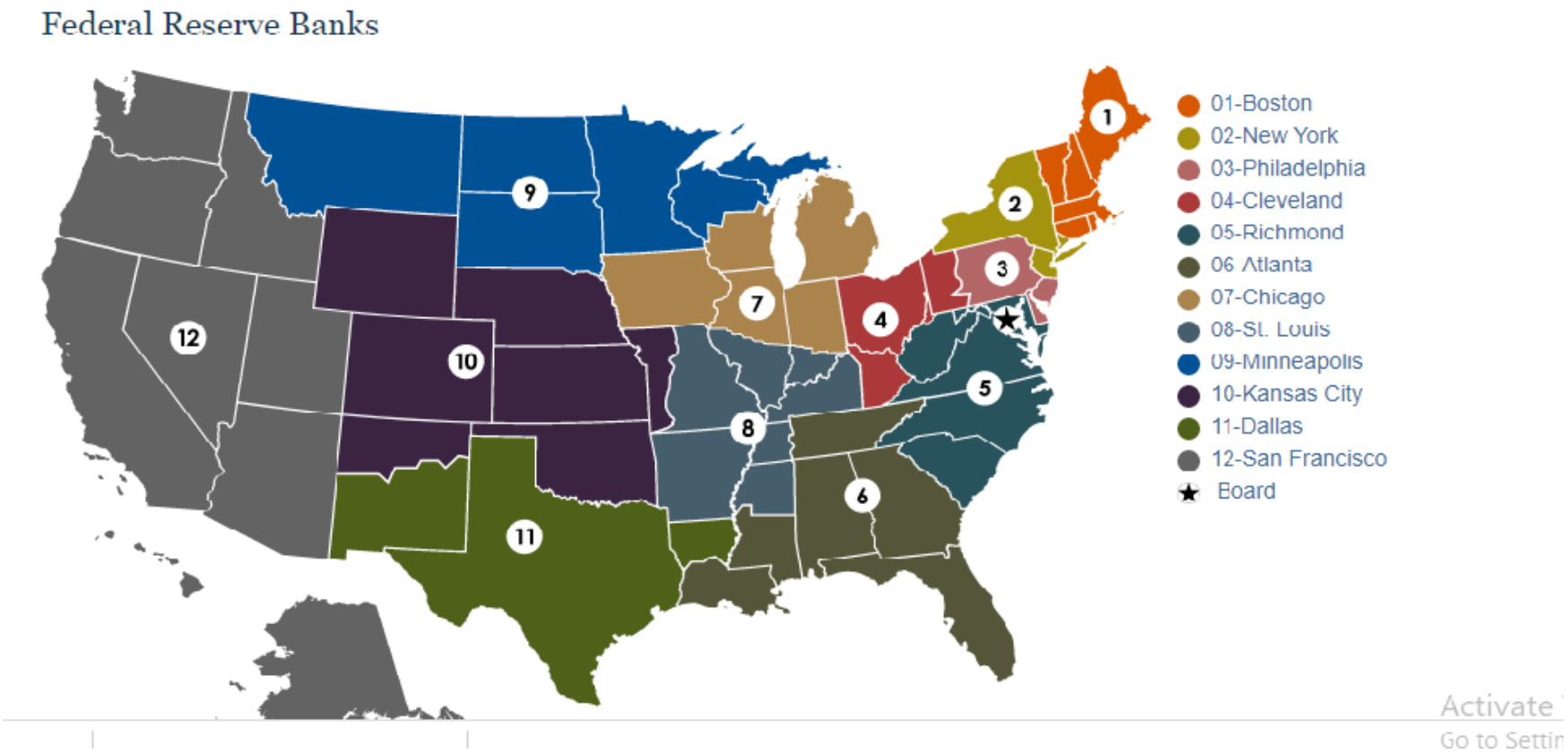
Eurosystem structure and decision-making bodies



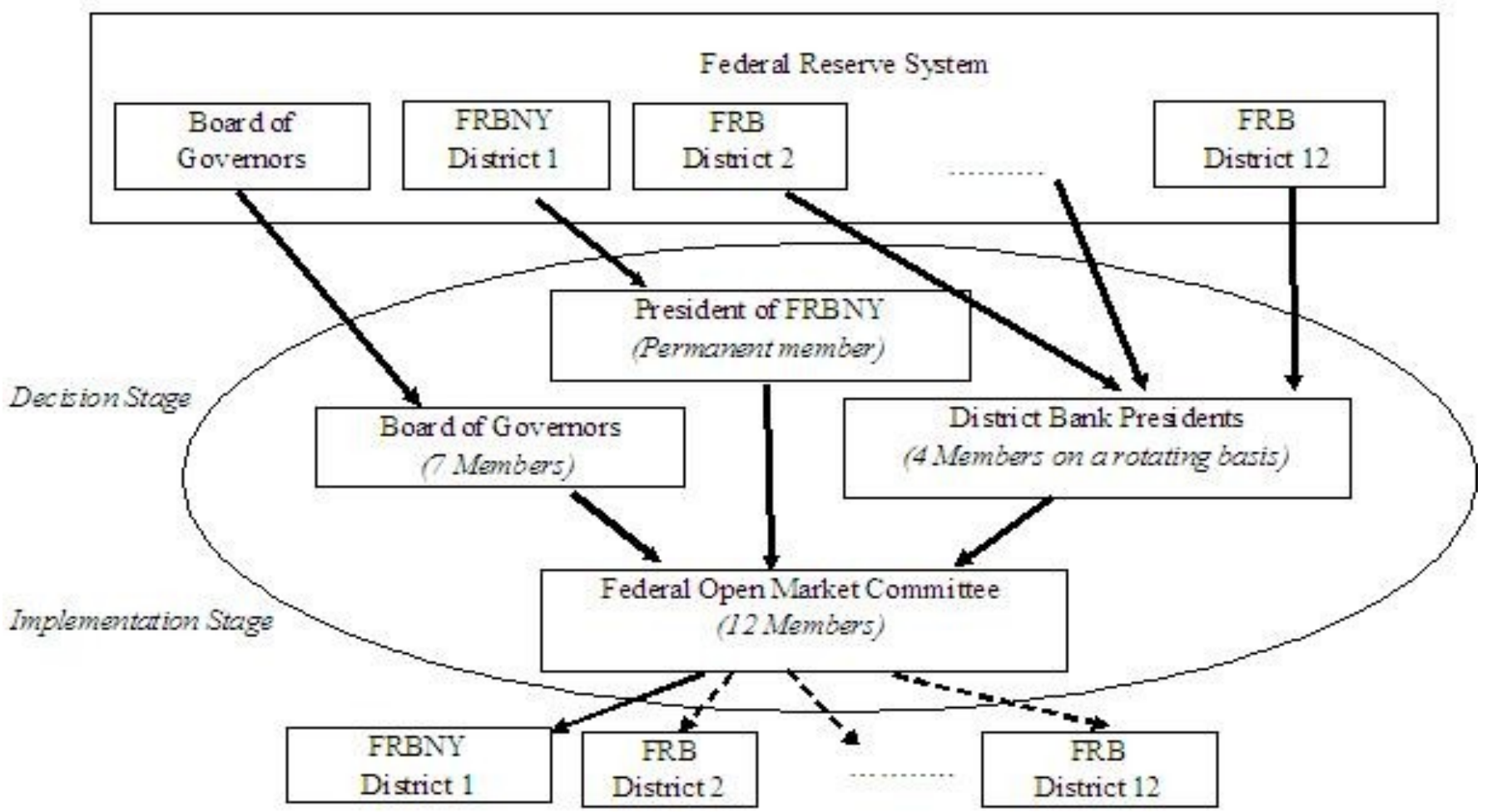
Federal Reserve System

- The Federal Reserve System is the central bank of the United States and was founded on December 23, 1913.
- “conducts the nation’s monetary policy to promote maximum employment, stable prices, and moderate long-term interest rates in the U.S. economy;
- promotes the stability of the financial system and seeks to minimize and contain systemic risks through active monitoring and engagement in the U.S. and abroad;
- promotes the safety and soundness of individual financial institutions and monitors their impact on the financial system as a whole;
- fosters payment and settlement system safety and efficiency through services to the banking industry and the U.S. government that facilitate U.S.-dollar transactions and payments; and
- promotes consumer protection and community development through consumer-focused supervision and examination, research and analysis of emerging consumer issues and trends, community economic development activities, and the administration of consumer laws and regulations.”

Federal Reserve System

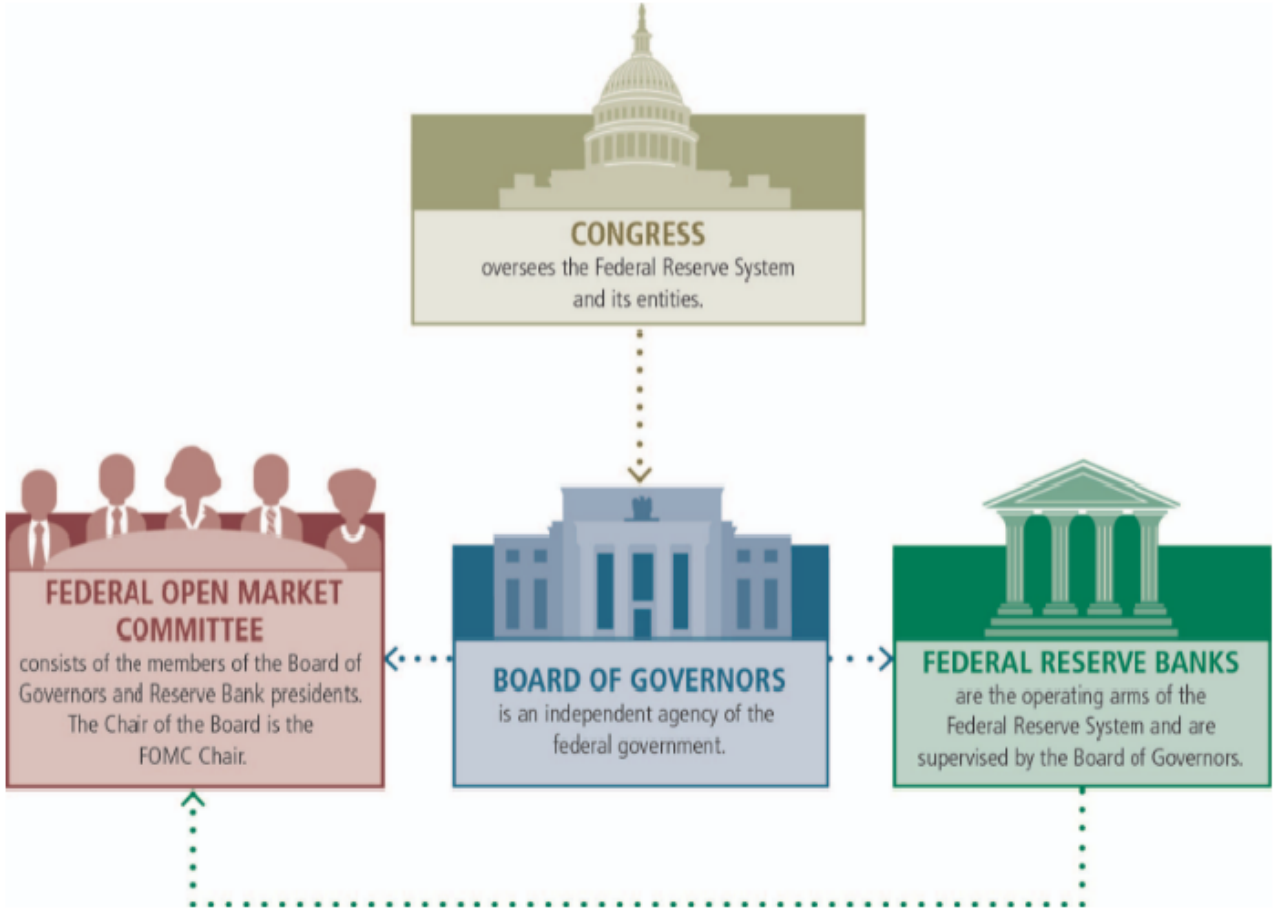


Federal Reserve System



Who Owns Reserve Banks?

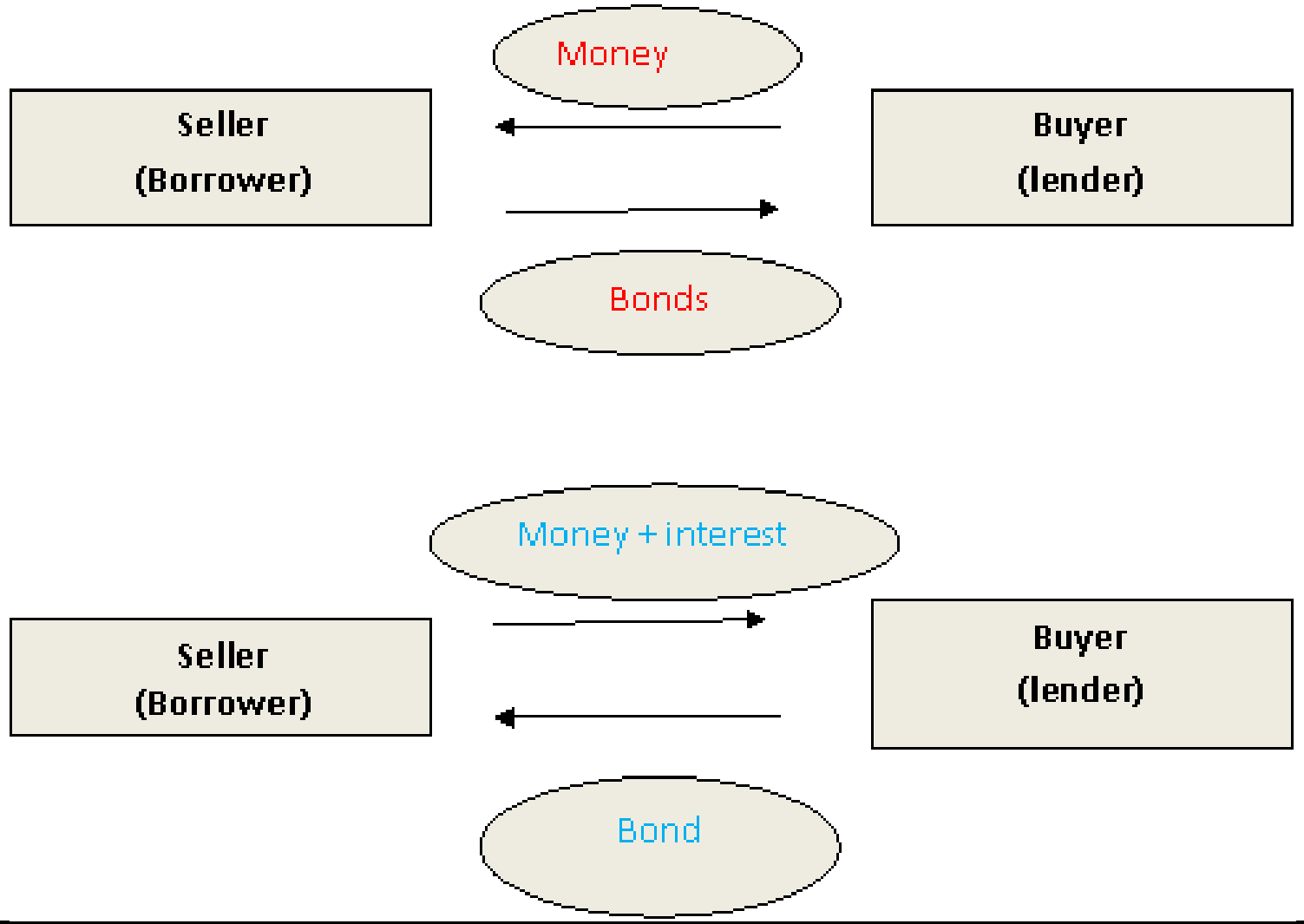
- The Federal Reserve Banks are *not* a part of the federal government, but they exist because of an *act of Congress*. Their purpose is to serve the public. So is the Fed *private* or *public?*
- **The answer is *both*.** While the Board of Governors is an independent government agency, the Federal Reserve Banks are set up like private corporations. Member banks hold stock in the Federal Reserve Banks and earn dividends. Holding this stock does not carry with it the control and financial interest given to holders of common stock in for-profit organizations effects on interest rates caused by unexpected liquidity fluctuations in the market.



Monetary Policy Operations in the Eurosystem

- **Main refinancing operations** are the most important open market operations conducted by the Eurosystem and play a key role in fulfilling its goals.
  They are conducted on a weekly basis and provide liquidity with a maturity of one week to commercial banks. These operations are executed by the national central banks on the basis of standard tenders.
- **Longer-term refinancing operations** aim to provide the financial sector with additional longer-term refinancing. They are conducted on a regular basis and usually provide liquidity with a maturity of three months. In these operations, the Eurosystem acts as a rate taker, not intending to send signals to the market regarding the level of interest rates.
- **Fine-tuning operations** are executed on an ad hoc basis to manage the liquidity situation in the market and in particular to smooth the effects on interest rates caused by unexpected liquidity fluctuations in the market.

Open Market operations via Repos



Increase/decrease monetary base via open market operations

Central Bank	
Assets	**Liabilities**
Loans to commercial banks ↑	Bank reserves ↑

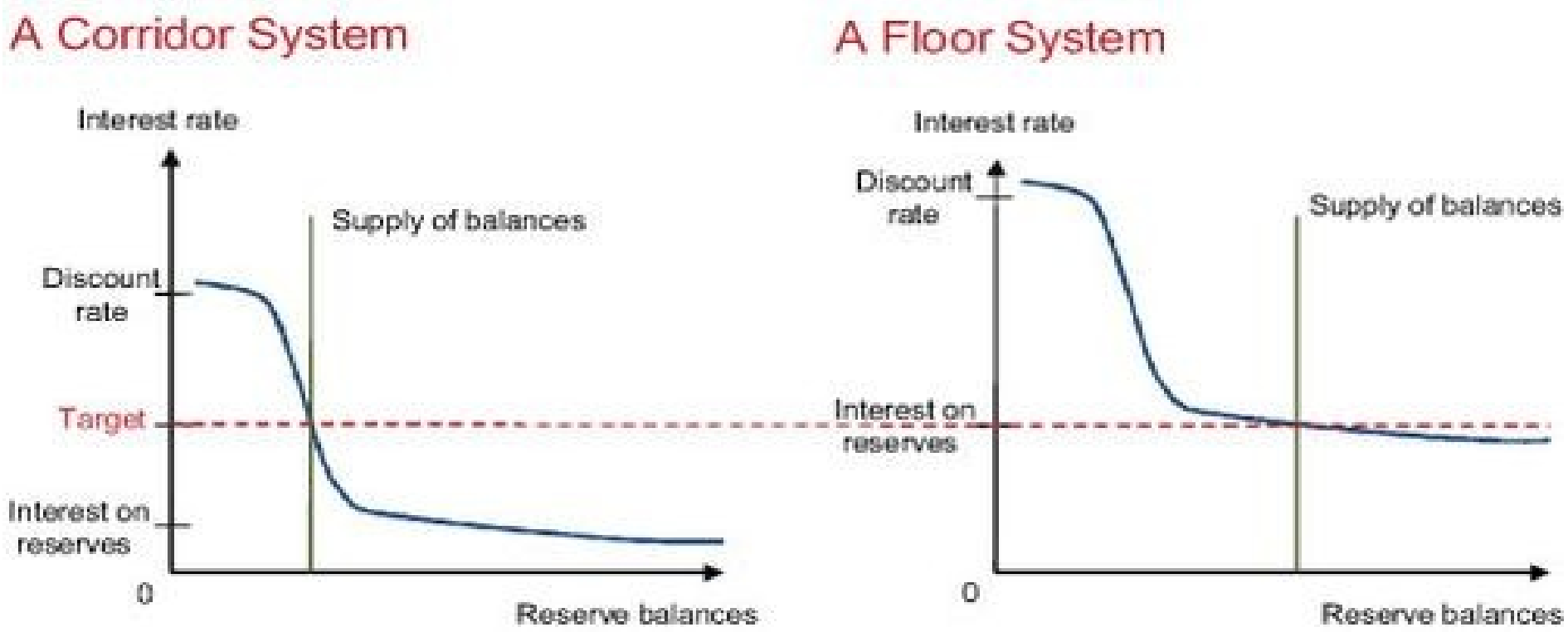
Commercial Banks	
Assets	**Liabilities**
Reserves at the CB ↑ Government bonds (collaterals	Loans from CB ↑

Central Bank	
Assets	**Liabilities**
Loans to commercial banks ↓	Reserves of commercial banks ↓

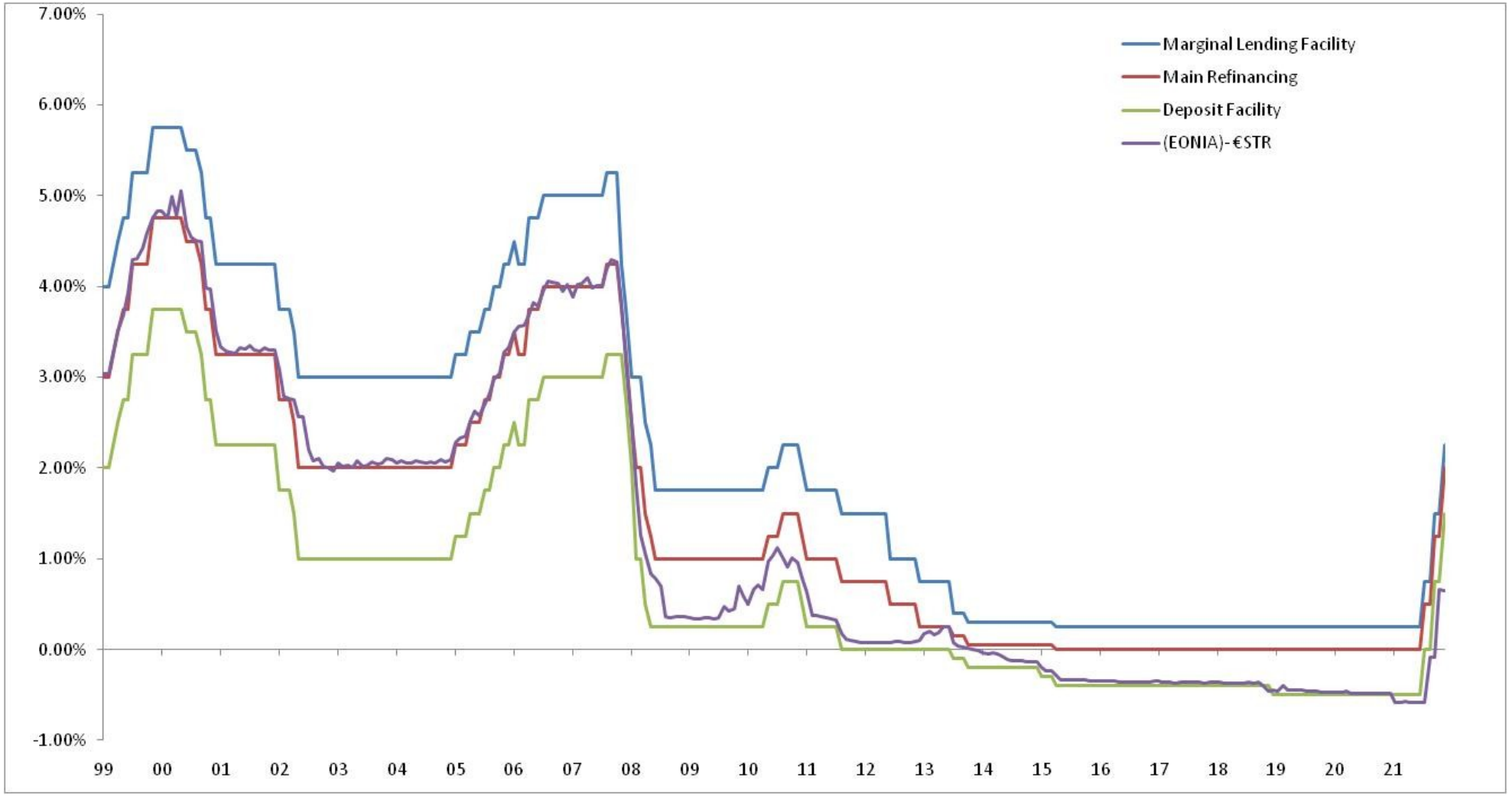
Commercial Banks	
Assets	**Liabilities**
Reserves at the CB ↓	Loans from the CB ↓

Corridor System and Floor System

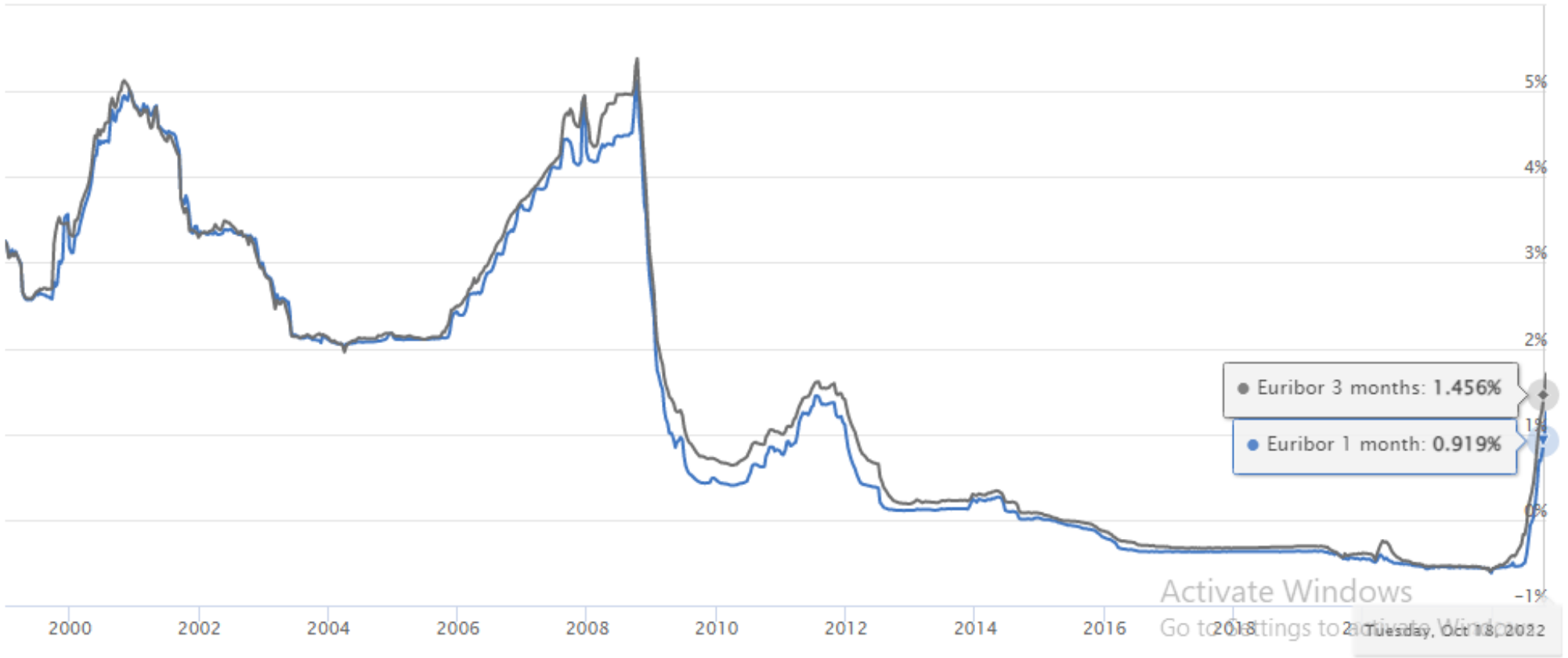
- Demand for reserves is a negative function of the interest rate due to the opportunity cost. The upper limit of the interbank rate is the marginal lending rate, and the lower limit on the interbank rate is the deposit rate at reserves.



ECB rates (deposit rate=1.5%, main refinancing=2%, marginal lending=2.25%).De facto conversion to a floor system. Target is the Euro short-term rate (€STR)

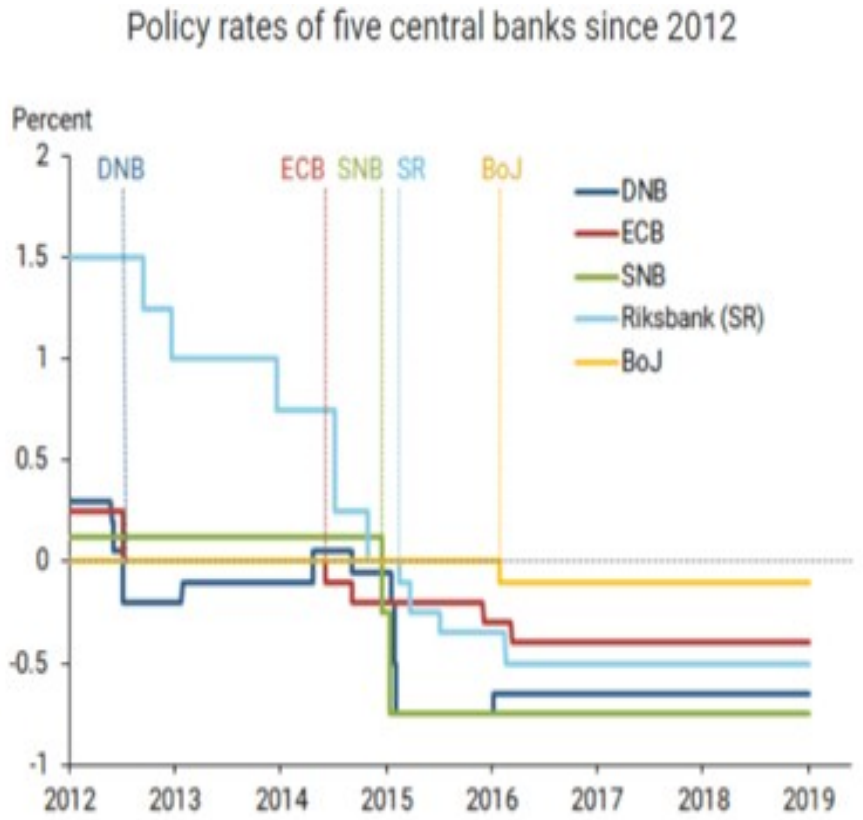


Euribor rates



Euribor-12m (red), 3m (blue), 1w (green) value

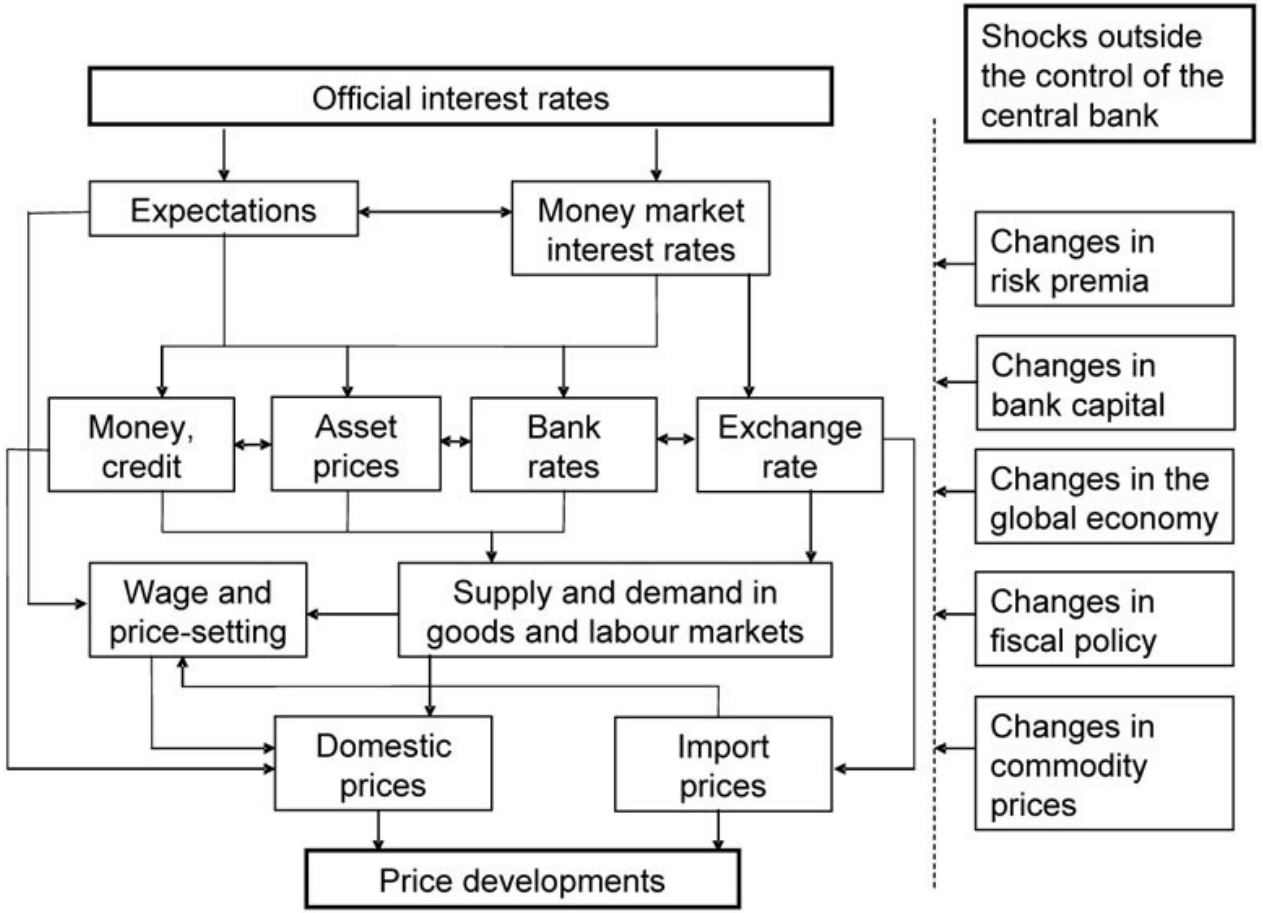
Negative Interest Rates



Note: Central banks depicted are Danish National Bank (DNB), European Central Bank (ECB), Swiss National Bank (SNB), Swedish Riksbank (SR), and the Bank of Japan (BoJ).

Transmission mechanism of monetary policy

- ECB: This is the process through which monetary policy decisions affect the economy.



Taylor rule

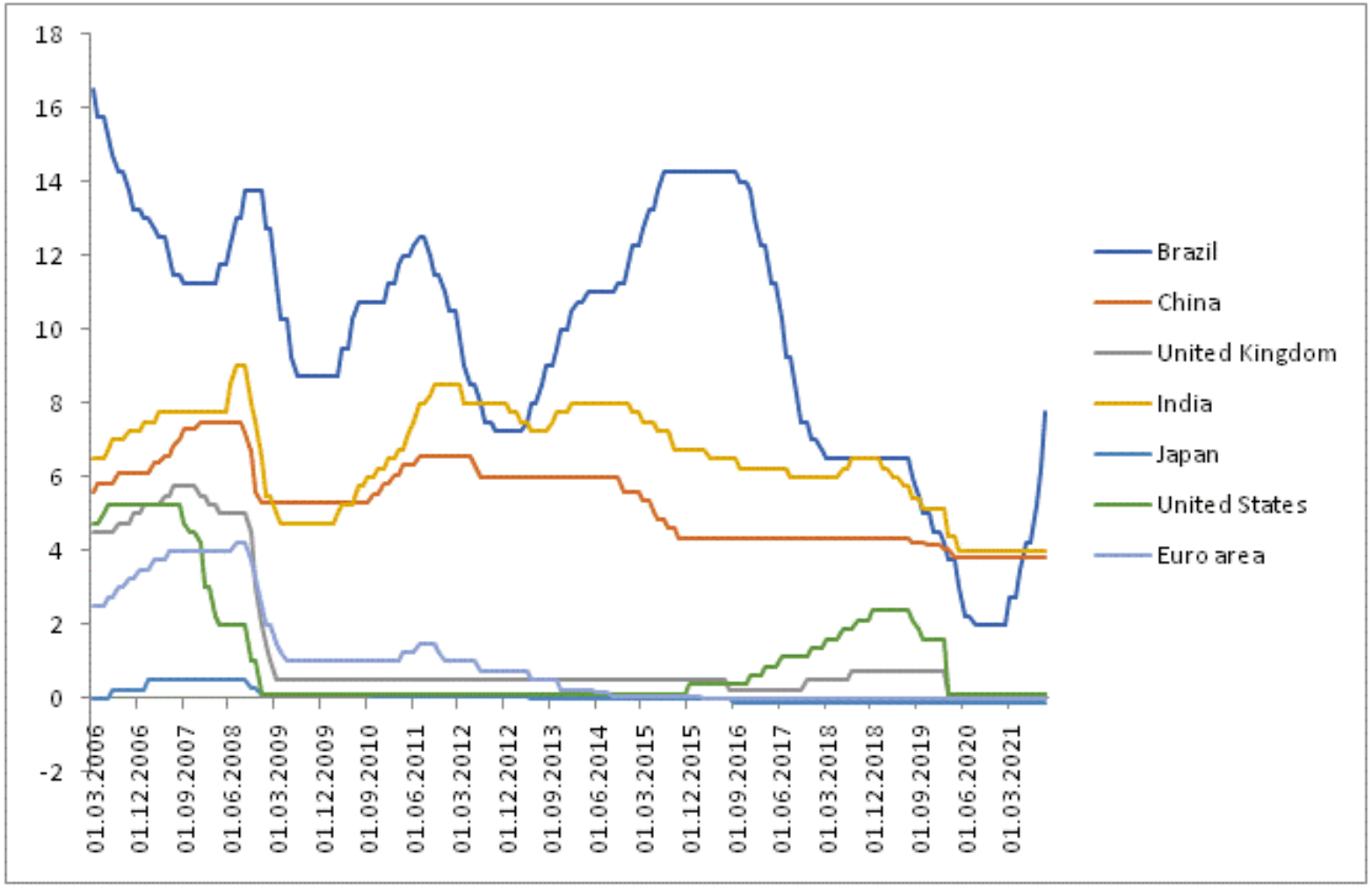
- How to set interest rates in response to changes in economic

$$i^p = \bar{r} + \pi + h(\pi - \pi^*) + b(y - \bar{y}), \qquad with\ h > 0, b > 0$$

where

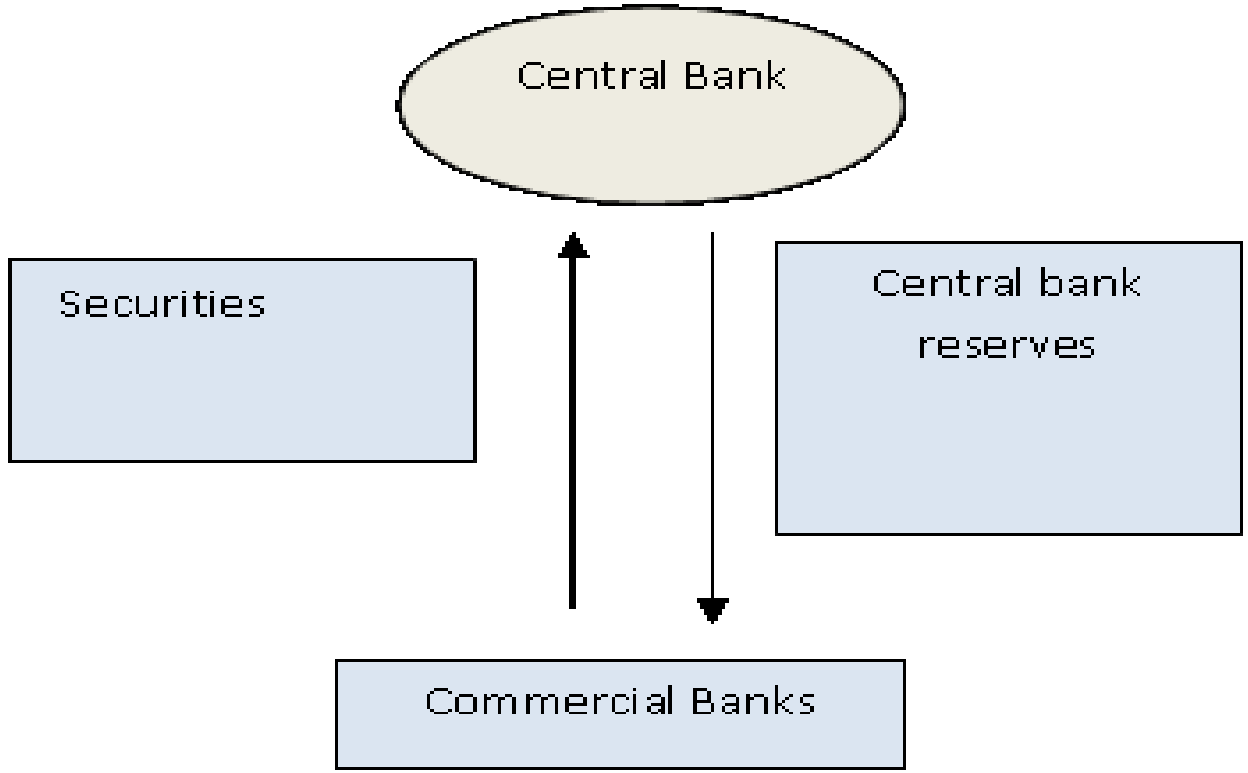
- i^p is the policy interest rate set by the Central Bank
- $\bar{r}$ is the economy's long-run real interest rate
- π is actual inflation and π^* is the Central Banks inflation target
- y is actual output and $\bar{y}$ is potential output
- h and b are constant coefficients that have to be bigger than 0

Policy rates



Quantitative Easing

- A form of unconventional monetary policy when interest rates hit the lower bound. The central bank buys assets in the secondary market from banks, insurance companies, pension funds etc. The main purpose of the QE is to increase the price of assets and reduce yields. QE is an **asset swap.**



Forward guidance

- If a central bank gives forward guidance, it means it is providing information about its future monetary policy intentions, based on its assessment of the outlook for price stability.
- The central bank makes a statement about its future monetary policy intentions, for example that key interest rates are likely to remain low in the future.
- As a result, commercial banks are more likely to set the interest rate for long-term loans at a lower level. This is because they know that, when needed, they will be able to borrow money from the central bank at lower rates – so they can be comfortable setting lower rates themselves.
- This means businesses can get cheaper loans and individuals are in a better position to make major purchases, such as property. Forward guidance can therefore help to encourage investment and spending, stimulating economic growth, and thus bringing inflation to values consistent with price stability.

Buying securities from MFIs and non -MFIs

Quantitative Easing – Buying securities from MFIs

Central Bank	
Assets	**Liabilities**
Securities ↑	Reserves MFI ↑

MFIs	
Assets	**Liabilities**
Reserves at the CB ↑ Securities ↓	

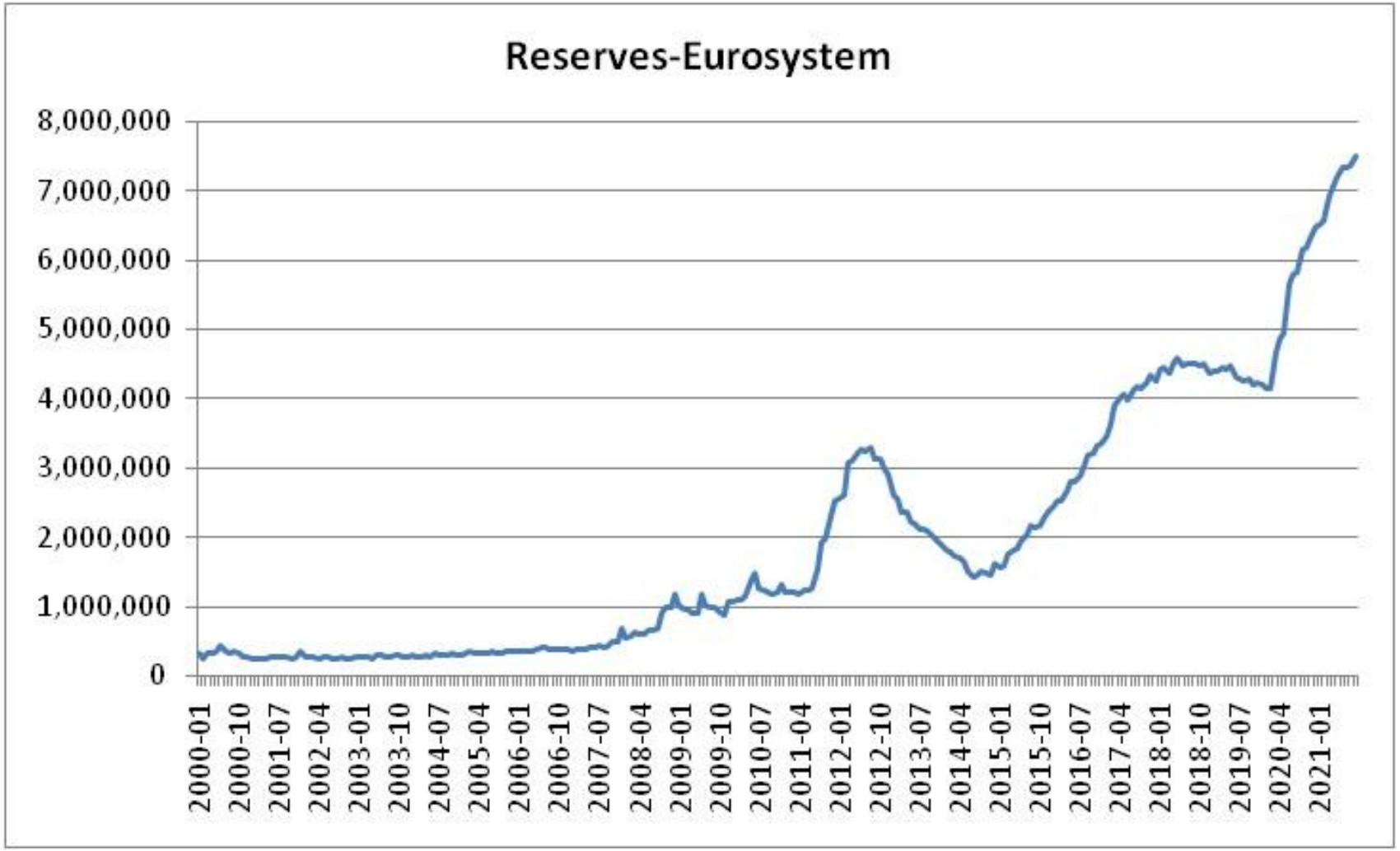
non MFIs	
Assets	**Liabilities**

Central Bank	
Assets	**Liabilities**
Securities ↑	Reserves MFIs ↑

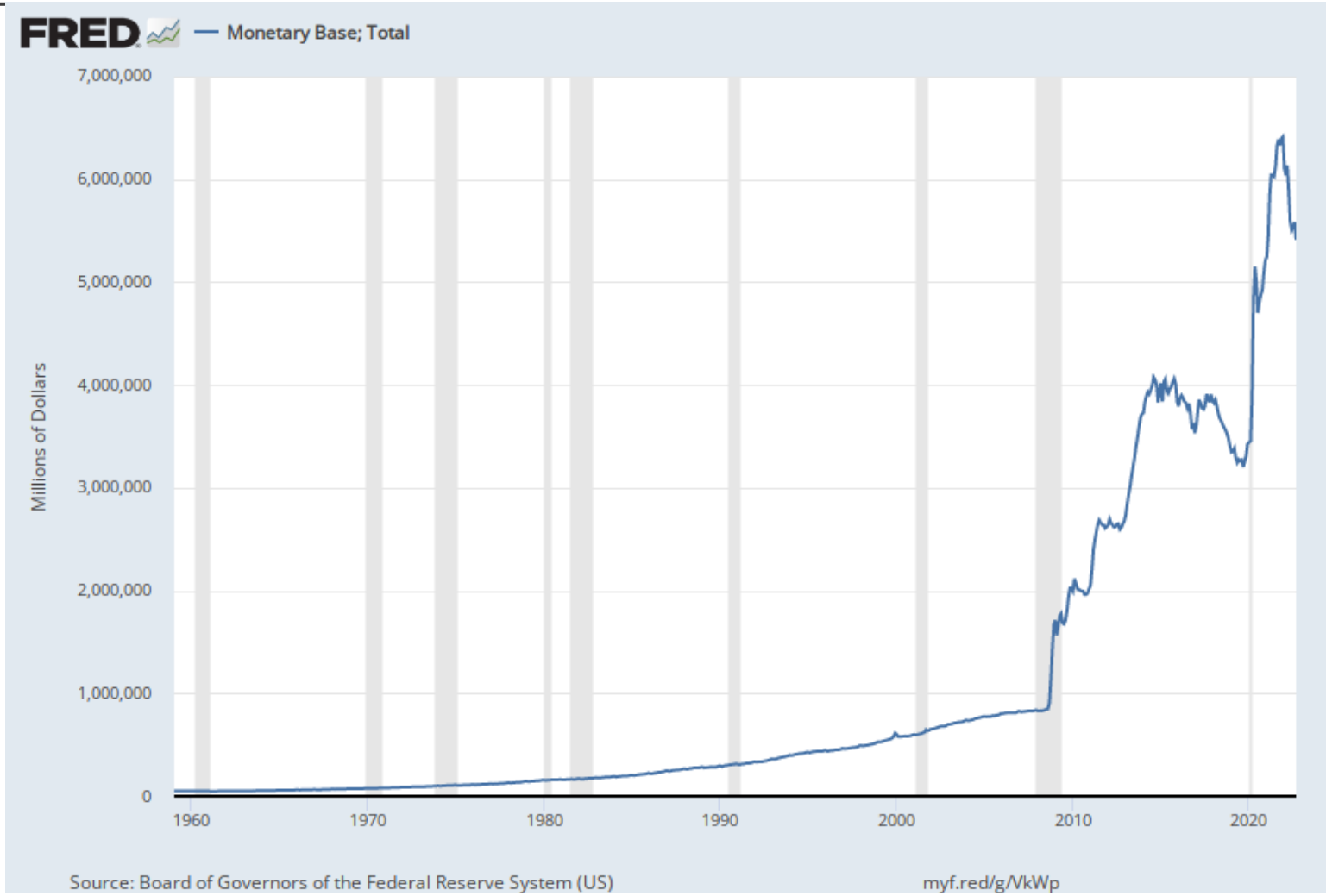
MFIs	
Assets	**Liabilities**
Reserves at the CB ↑	Non MFIs Deposits ↑

non MFIs	
Assets	**Liabilities**
Securities ↓ **Deposits** ↑	

Buying securities from MFIs and non -MFIs



Reserves in US



Money Multiplier **Myth** (if required reserve ratio (RR)=10%)
Change in Deposits = (1/RR)* Change in Monetary base

Bank	Reserves	Required Reserves	Excess Reserves	Loans	Demand Deposits
A					$10000
		$1000		$9000	
B					$9000
		$900		$8100	
C					$8100
		$810		$7290	
D					$7290
		$729		$6561	
E					$6561
		$656		$5905	
F					$5905
		$590		$5315	
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.		.		.	.
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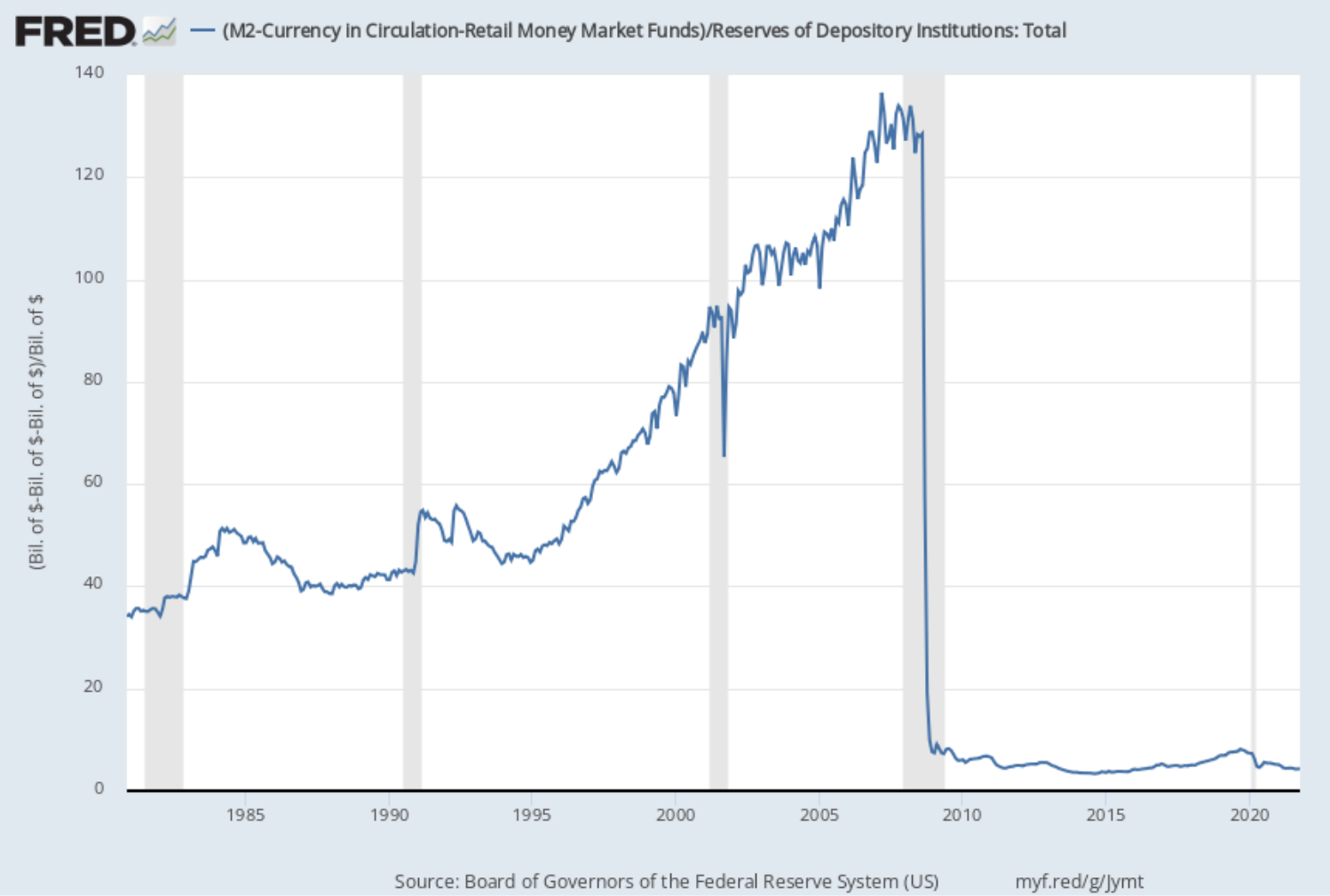
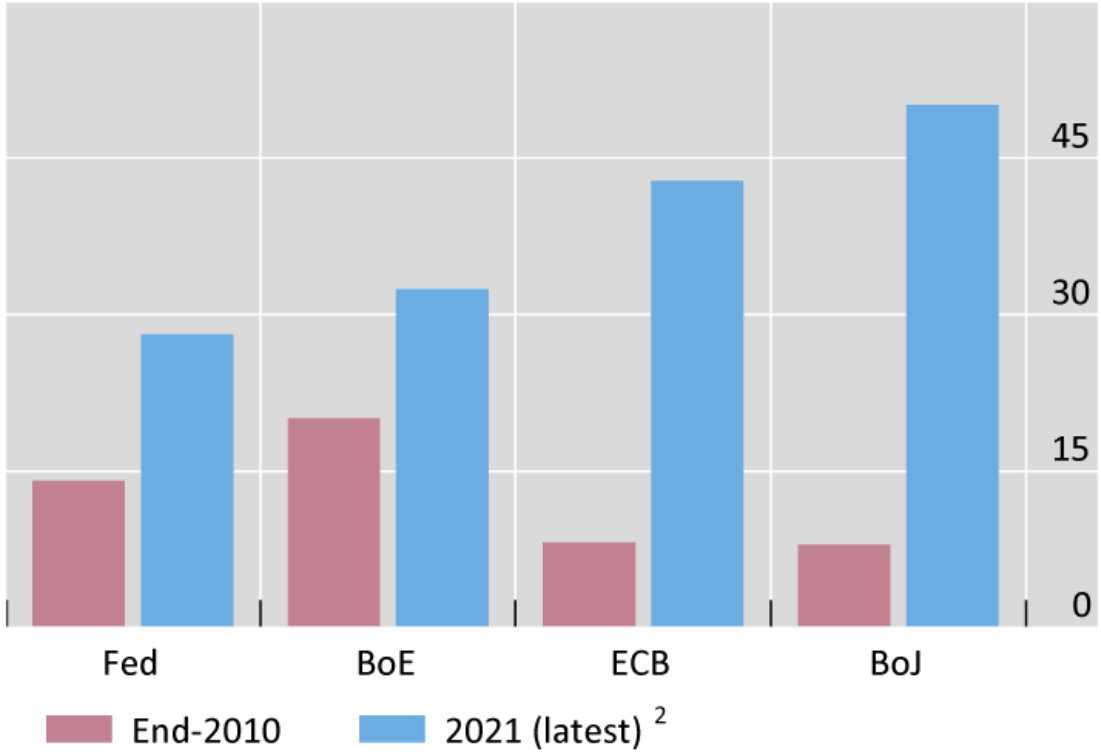
Total		$10,000		$90,000	$100,000

(M2-Currency in Circulation-Retail Money Market Funds)/Reserves of Depository Institutions: Total

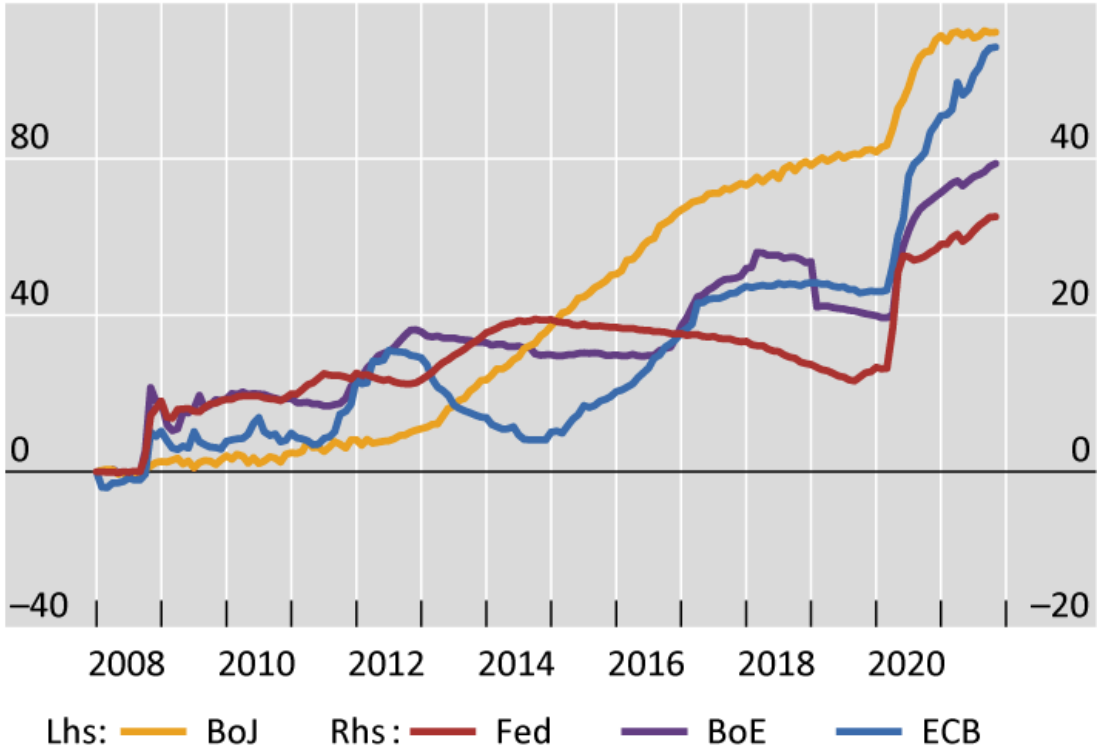


Central Banks' Balance Sheet Size

A) Central bank holdings of long-term government debt[1] (%)



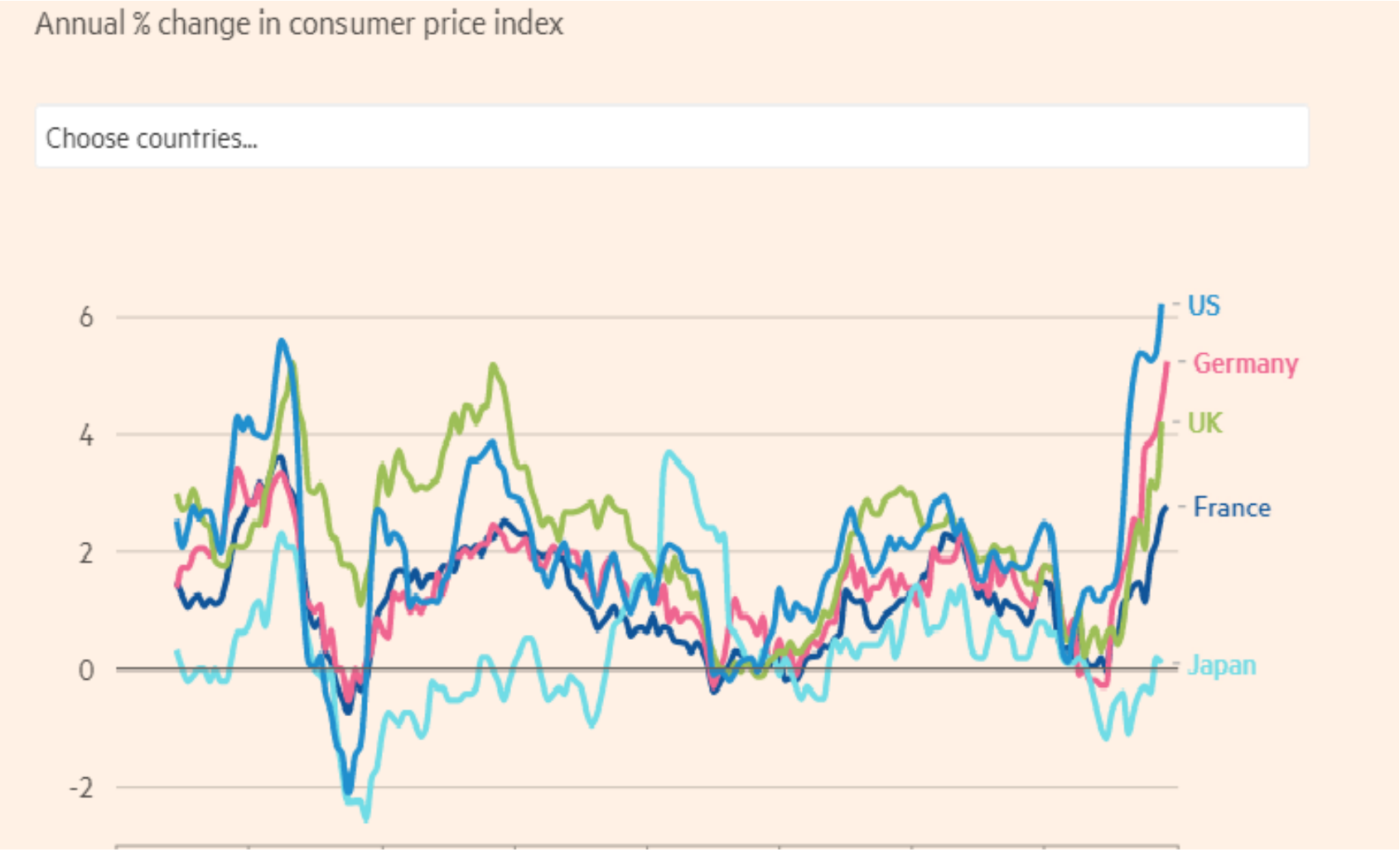
B) Central banks' balance sheet size[3] (% of GDP)



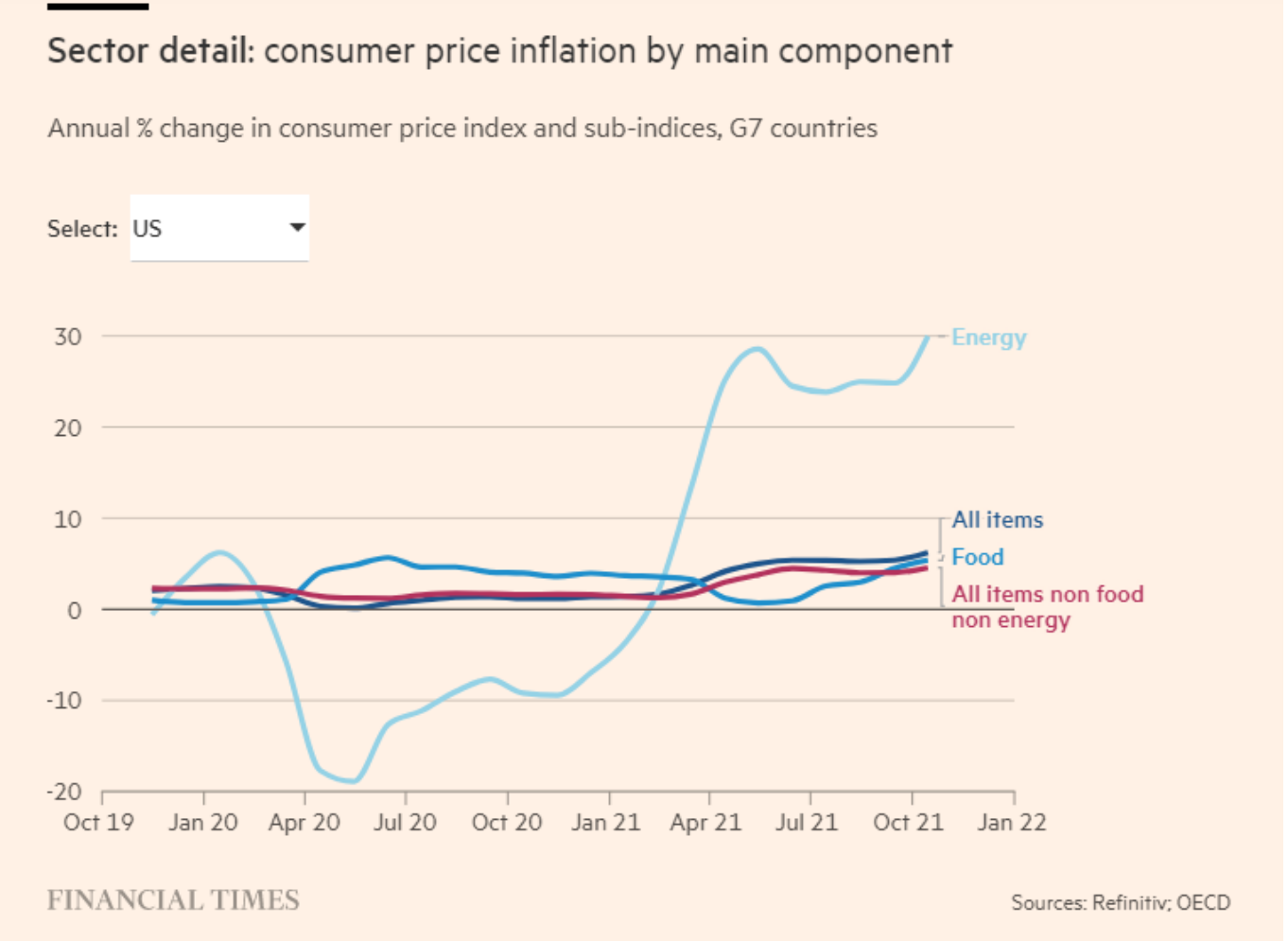
Implicit Debt Mutualization in Eurozone

(EUR millions)	Cumulative net purchases as of August 2021 (PSPP)	Cumulative net purchases as of July 2021 (PPEE)	Q1 2021 General government gross debt (source: Eurostat)	% of gross debt
Austria	72,800	33,219	326,880	32.43%
Belgium	91,544	41,621	537,402	24.78%
Cyprus	3,900	2,201	26,023	23.44%
Germany	618,000	301,191	2,366,746	38.84%
Estonia	399	255	5,103	12.82%
Spain	299,457	140,702	1,392,733	31.60%
Finland	39,050	20,955	165,685	36.22%
France	504,461	220,705	2,739,165	26.47%
Greece	0	29,397	344,156	8.54%
Ireland	39,925	19,346	230,467	25.72%
Italy	426,748	208,774	2,651,125	23.97%
Lithuania	5,133	2,597	22,563	34.26%
Luxembourg	3,587	1,847	18,424	29.49%
Latvia	3,022	1,403	13,430	32.95%
Malta	1,222	323	7,478	20.66%
The Netherlands	121,970	66,946	439,241	43.01%
Portugal	48,223	27,288	275,285	27.43%
Slovenia	9,737	5,556	40,154	38.09%
Slovakia	16,392	6,707	55,322	41.75%
Total	2,305,570	1,131,033	11,657,381	29.48%

Inflation Rates



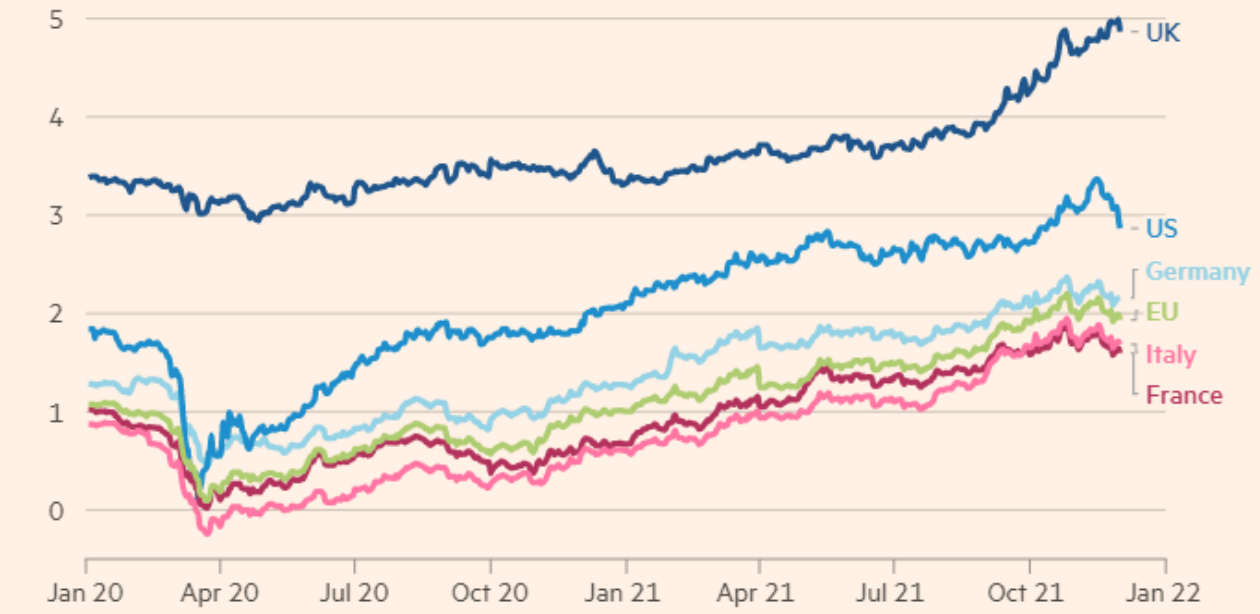
Main Components



Market expectations of average inflation over the next five years* (%)

Future shock: 5-year inflation swaps

Market expectations of average inflation over the next five years* (%)

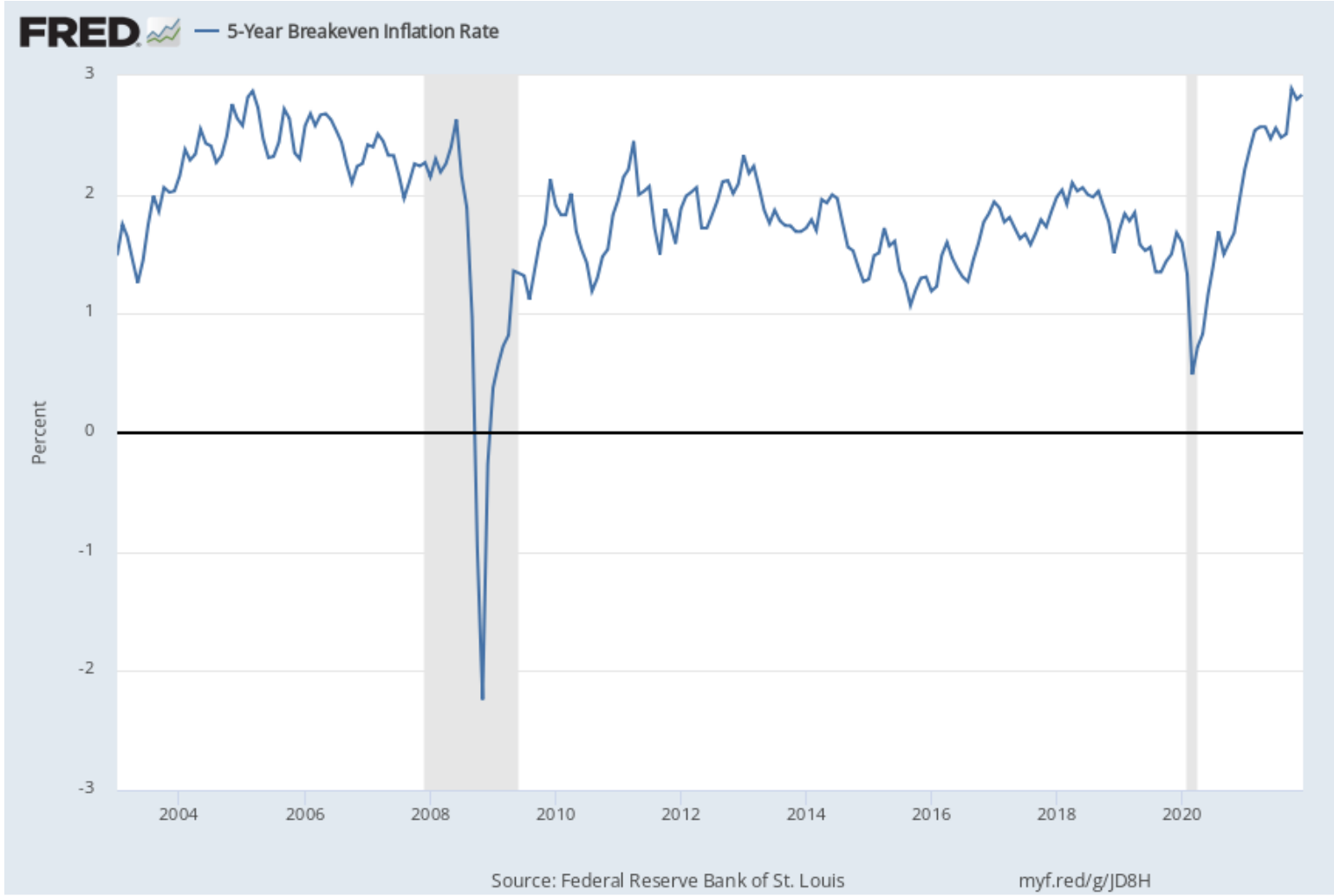


FINANCIAL TIMES

Sources: Refinitiv; ICAP

*UK data not directly comparable as linked to the retail price index rather than the consumer price index

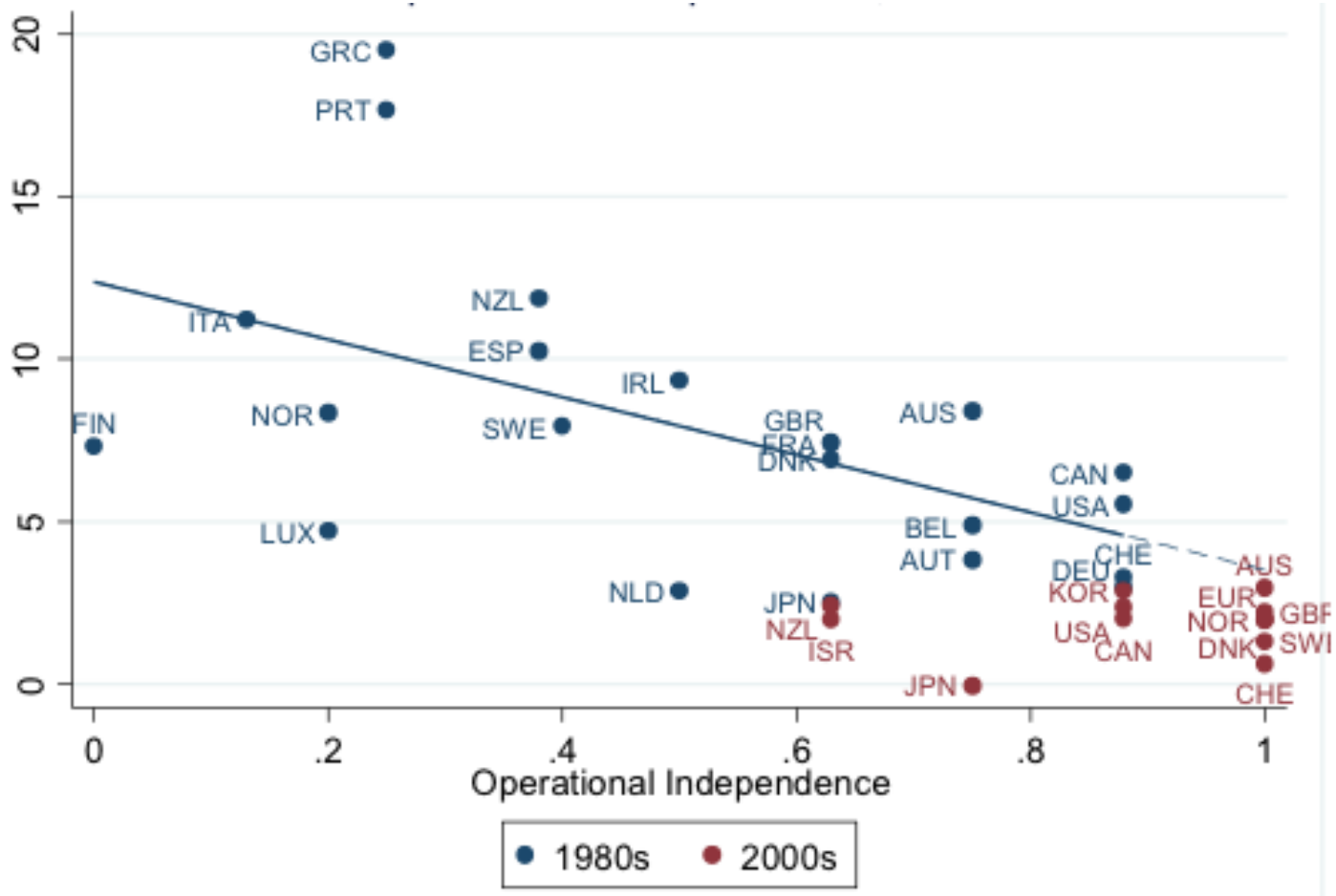
5-Year Breakeven Inflation Rate



Permanent or transitory?

- “Supporters of “team transitory” believe this year’s price spikes are due to a one-off surge in consumer demand bumping against a one-off rise in supply chain disruptions.
- Supporters of “team permanent” point to a broadening pattern of price rises, especially in countries where a shortage of workers is pushing up wages.” from FT.
- My own view: Inflation is dynamic process and requires cost-push feedback that comes either from increases in wages or from currency depreciations and prices of raw material go up.
- It depends on the institutional framework and the bargaining power of workers.

Central bank independence and inflation



Section 2: Stable Coins

Central Bank Digital Currencies (CBDC)

- Central Bank Digital Currencies (CBDC) are the digital equivalent of cash. In the current institutional framework, only monetary financial institutions are allowed to hold accounts with the central bank. CBDCs will be stored in deposit accounts of households and corporations held at the central bank.

Central Bank	
Assets	**Liabilities**
Gold FX reserves Loans to banks Securities Other assets	Corporations and households' deposit accounts (CBDC) Commercial bank reserves Banknotes Other liabilities Net worth

Central Bank Digital Currencies (CBDC)

- Many central banks are currently considering the introduction of CBDCs. Note that money is already mostly in digital form (bank deposits), hence CBDC can best be viewed as the digital equivalent of banknotes. Banknotes are a liability of the central bank, while deposits are a liability of the banking sector and under normal circumstances, banknotes and bank deposits are almost perfect substitutes.
- Swedish Rijksbank: “For a long time, the state has provided the general public with banknotes and coins to use for payments. Cash has enjoyed the confidence of the general public and facilitated trade in goods and services. Today's digital payment market means that we face a new situation in which all means of payment accessible to the general public are issued and controlled by private agents. If the state, via the central bank, does not have any payment services to offer as an alternative to the strongly concentrated private payment market, it may lead to a decline in competitiveness and a less stable payment system, as well as make it difficult for certain groups to make payments. Ultimately, it may also risk eroding basic trust in the Swedish monetary system. Some of these problems could be neutralised or mitigated by an e-krona.”

https://www.riksbank.se/en-gb/payments--cash/e-krona/e-krona-reports/e-krona-project-report-2/

Typology of CBDCs

		Retail: CBDCs for anyone	*Wholesale*: CBDCs restricted to companies and providers of payments platforms
Token based CBDCs: for peer-to-peer payments		Prepaid cash cards ('e-money')	—
Account-based CBDCs	Means of payments and store of value	All-purpose CBDCs	All-purpose CBDCs
	Store of value only	Store-of-value CBDCs ('safe assets')	Synthetic CBDCs ('safe assets')

Source: Bofinger (2019)

Central Bank Digital Currencies (CBDC)

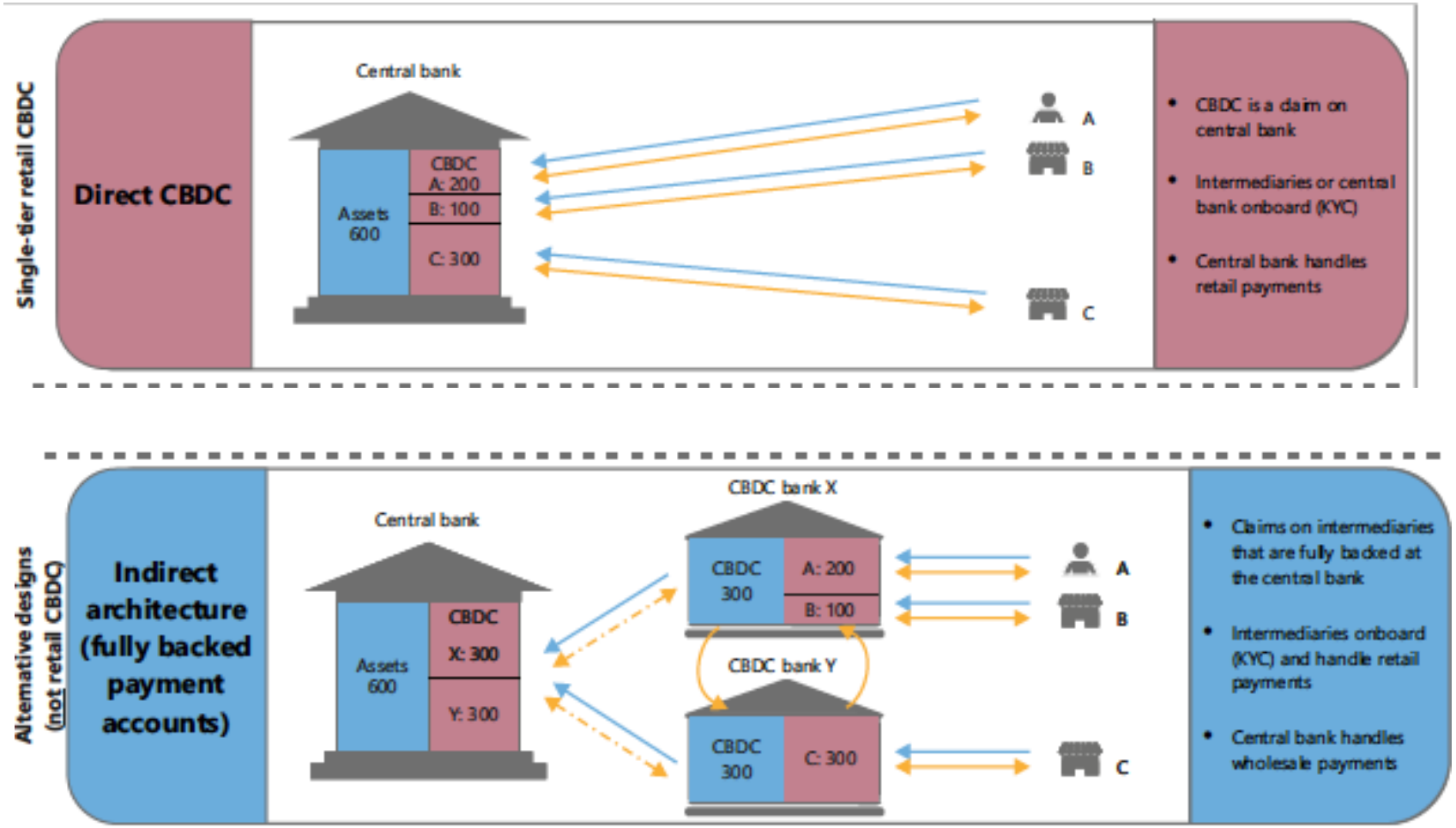
- *Account-based CBDCs.* Private households and non-financial corporations will have the right to hold a deposit account with the central bank. The deposit account could be used as a means of payment to process transactions and as a store of value (all-purpose CBDC). The CBDCs could be used purely as financial assets only for investment purposes and not as means of payment. In this case only transactions between the central bank and bank accounts will be allowed- not transactions within central bank accounts. CBDC accounts could only be wholesale, i.e., restricted to certain types of investors and providers of payments platforms.

✓ *This type of CBDC would compete with demand bank accounts, deposits accounts and government bonds.*

- *Token-based CBDCs* (digital cash). This type of CBDC would be in the form of a prepaid cash card issued by the central bank without the users having an actual account at the central bank.

✓ *This type of CBDC would compete mainly with payment platforms like, Paypal and Alipay.*

Central Bank Digital Currencies (CBDC)



“Digital Run”-Potential Threat to Banking Stability

Central Bank	
Assets	**Liabilities**
Gold	
FX reserves	Deposit accounts (CBDC) ↑
Loans to banks ↑	Commercial Bank reserves ↓
Securities	Banknotes
Other assets	Other liabilities
	Net worth

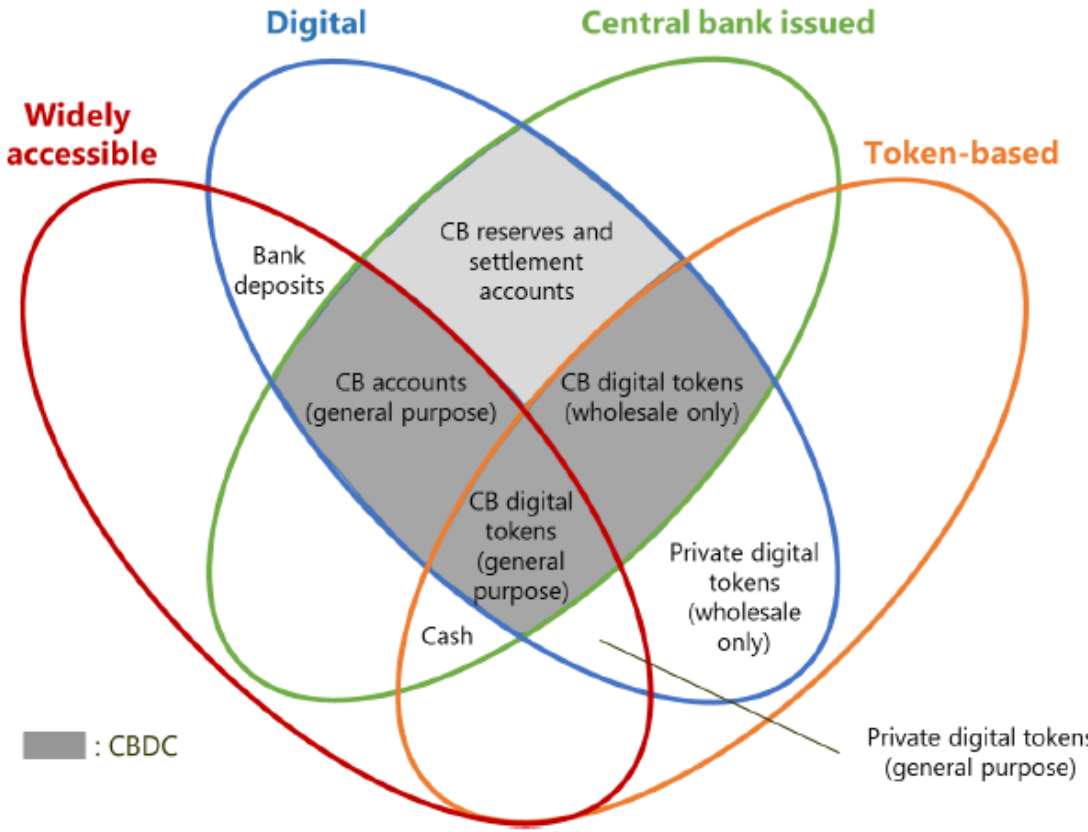
Commercial Banks	
Assets	**Liabilities**
Deposits at the CB ↓	Deposits ↓
	Loans from CB ↑
Loans	
Other assets	Net worth

“Digital Run”-Potential Threat to Banking Stability

- In times of systemic bank crisis a “digital run” could cause a gigantic refinancing of commercial banks from the central bank using loans and other securities as collaterals, implicitly converting the commercial banking system to 100% reserve system. The likelihood of such event could hinder the ability of commercial banks to create money and would force the central bank to monitor and exam the credit quality of all individual assets (loans, securities etc) held by commercial banks. I could also create problems in the implementation and transmission of monetary policy.
- With store-of-value CBDCs (safe asset) the central bank would not compete with payments providers. The competition with commercial banks would be limited to short-term time and saving deposits.
- Zero interest rate if CBDC is viewed as a substitute for cash. In this case, the substitution processes from traditional bank deposits to CBDCs would be limited. A lower limit of €100,000 for CBDCs given the existence of a deposit guarantee scheme.
- The narrowest version of CBDCs is store-of-value CBDCs restricted to providers of payments services as a collateral for their depositors (‘stable coins’).

The money flower: a taxonomy of money-

https://www.bis.org/cpmi/publ/d174.pdf



Notes: The Venn-diagram illustrates the four key properties of money: *issuer* (central bank or not); *form* (digital or physical); *accessibility* (widely or restricted) and *technology* (account-based or token-based). *CB* = central bank, *CBDC* = central bank digital currency (excluding digital central bank money already available to monetary counterparties and some non-monetary counterparties). *Private digital tokens (general purpose)* include crypto-assets and currencies, such as bitcoin and ethereum. *Bank deposits* are not widely accessible in all jurisdictions. For examples of how other forms of money may fit in the diagram, please refer to the source.

Conclusions

Conclusions

- The main objective of monetary policy is price stability
- Central banks have monopoly power over short-term interest rates
- QE is an asset swap that replaces bonds with reserves
- CBDC can improve payment efficiency but they may also create some threats with respect to financial stability

Further reading

Further reading

- Dotsis G., IOU, Money, Banking and Cryptocurrencies, lecture notes.
- Rule, G. (2015), “Understanding the Central Bank Balance Sheet”, CCBS Handbook of the Bank of England, no 32.

Further reading (optional)

- Teaching the Linkage Between Banks and the Fed: R.I.P. Money Multiplier
- Haldane, A, M Roberts-Sklar, T Wieladek and C Young (2016) “QE: the story so far”, Bank of England Staff Working Papers, no 624.
- Krishnamurthy, A. and A. Vissing-Jorgensen (2011) “The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy,” Brookings Papers on Economic Activity, Fall, pp. 215–265.

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