Exchange Rates and Open Economy Macroeconomics

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This lesson should teach you:

- What is ER
- Types of ER
- How it is determined
- How its movements affect economies

What is an Exchange Rate?

- Value of one currency expressed in terms of another
- It is customary to use foreign currency in terms of the domestic currency. i.e.: 1EUR = 25.24CZK
  - When speaking about the movement of the Exchange Rates, it is necessary to be careful about increases and declines because the meaning will be opposite depending on from what country one looks at it

Exchange Rate Chart

Currency			Spot	Chart
USD	US dollar	↑	1.0522	
JPY	Japanese yen	↓	161.13	
BGN	Bulgarian lev	=	1.9558	
CZK	Czech koruna	↓	25.294	
DKK	Danish krone	↓	7.4585	
GBP	Pound sterling	↑	0.83480	
HUF	Hungarian forint	↑	410.98	
PLN	Polish zloty	↓	4.3105	
RON	Romanian leu	↑	4.9771	
SEK	Swedish krona	↑	11.5230	
CHF	Swiss franc	↓	0.9314	

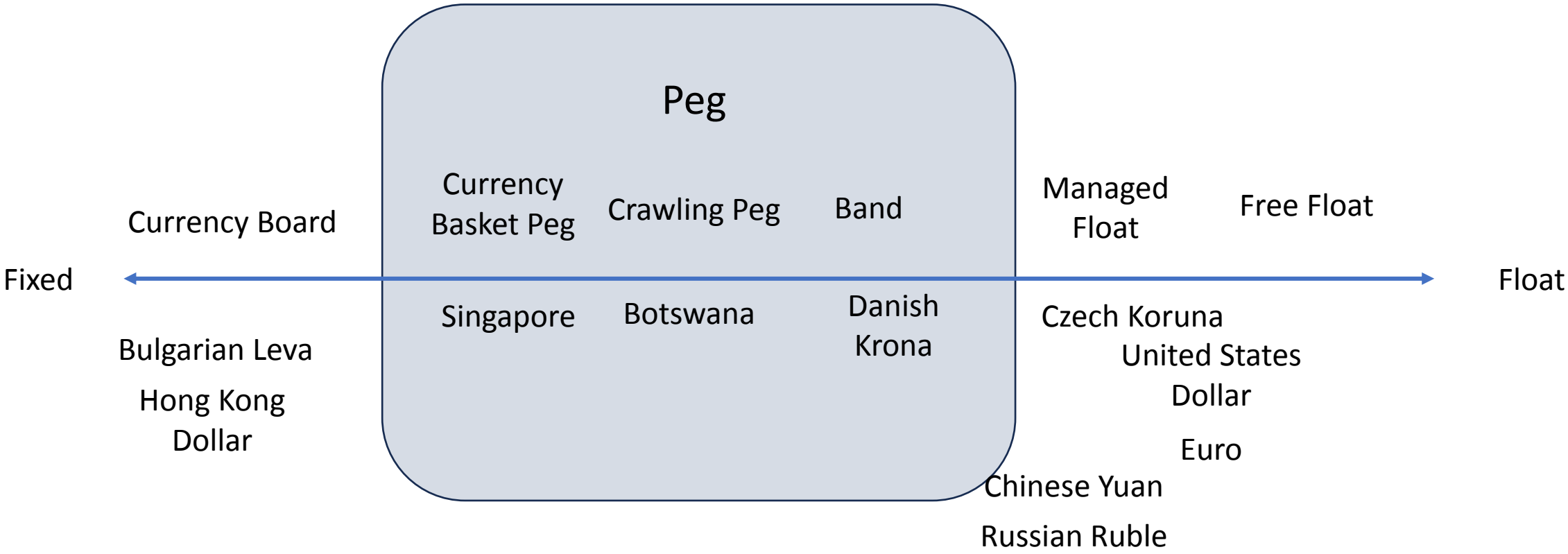
Foreign eXchange (FX) Market

- Worldwide
- The most traded currency is USD
  - Also functions as intermediary currency
- Retail clients, commercial banks, FX Brokers and central banks
- FX arbitrage: financial centers/cross currency arbitrage
- The spot vs forward

Types of ER

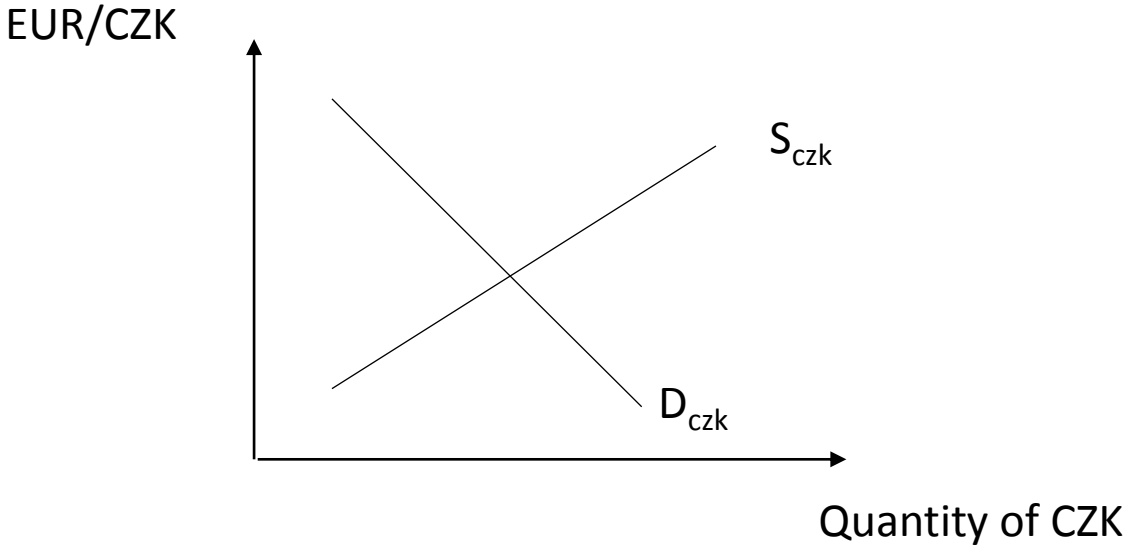
- Nominal
  - The value displayed in exchange rate charts
- Real
  - Adjusted for inflation
- Effective
  - An index that describes the strength of a currency relative to a basket of other currencies.

Types of ER regimes



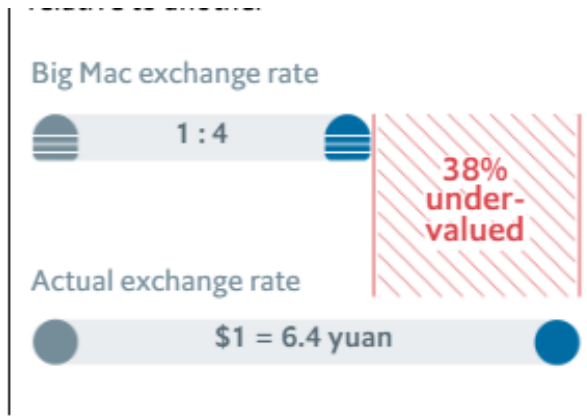
Determination of the spot ER

- Many theories
- The most simple model is here:
  - Demand for domestic currency is derived from demand for the Export
  - Supply domestic currency is derived from demand for the Import



Power Purchasing Parity

- **Absolute**
  - **Prices ratio of the same baskets of goods in two countries**
  - $E_{CZK/EUR} = \frac{P_{czk}}{P_{eur}}$
- **Relative**
  - $\Delta E_{CZK} = \pi_{czk} - \pi_{eur}$



Interest Rate Parity

- **Parity in price of money**

- $F_0 = S_0 * \frac{1+IR_{czk}}{1+IR_{eur}}$; F_0 –forward rate, S_0 - spot rate

Determination of forward ER

- The exchange rate at which a bank agrees to exchange one currency for another at a future date when it enters into a forward contract with an investor.
- Parity relationship among the spot exchange rate
- Differences in interest rates between two countries

Central Banking

What to expect in this lesson

- Brief history od central banks
- Goals of central banks
- Main theories underlying the central banks' policies
- Their operational regimes
- Monetary policy implementation

Central Banking

- Prior to Central Banking
- Coin sorting and storing
- Banknote Issuance
- Banker to the government
- Banker to the banks
- Lender of last resort
- Banks supervisor
- Monetary policy conductor

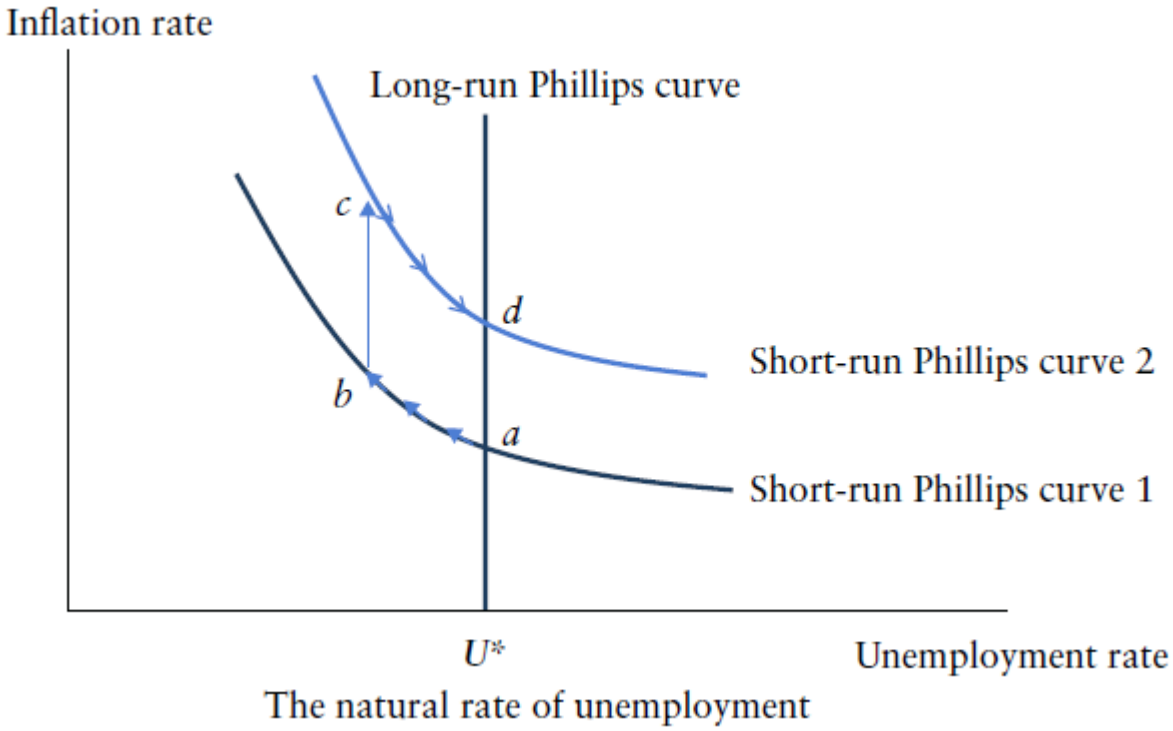
Central Banks goals

- Monetary and price stability
- Financial Stability
- Full employment

Central Banks - Theory

- The Quantity Theory of Money
- $M \times V = P \times Q$

The Phillips Curve and NAIRU



The Rational Expectation Theory

- It assumes that individuals' actions are based on the best available economic theory and information.

- Departure from Adaptive Expectation Theory
  - Under adaptive expectations, expectations of the future value of an economic variable are based on past values

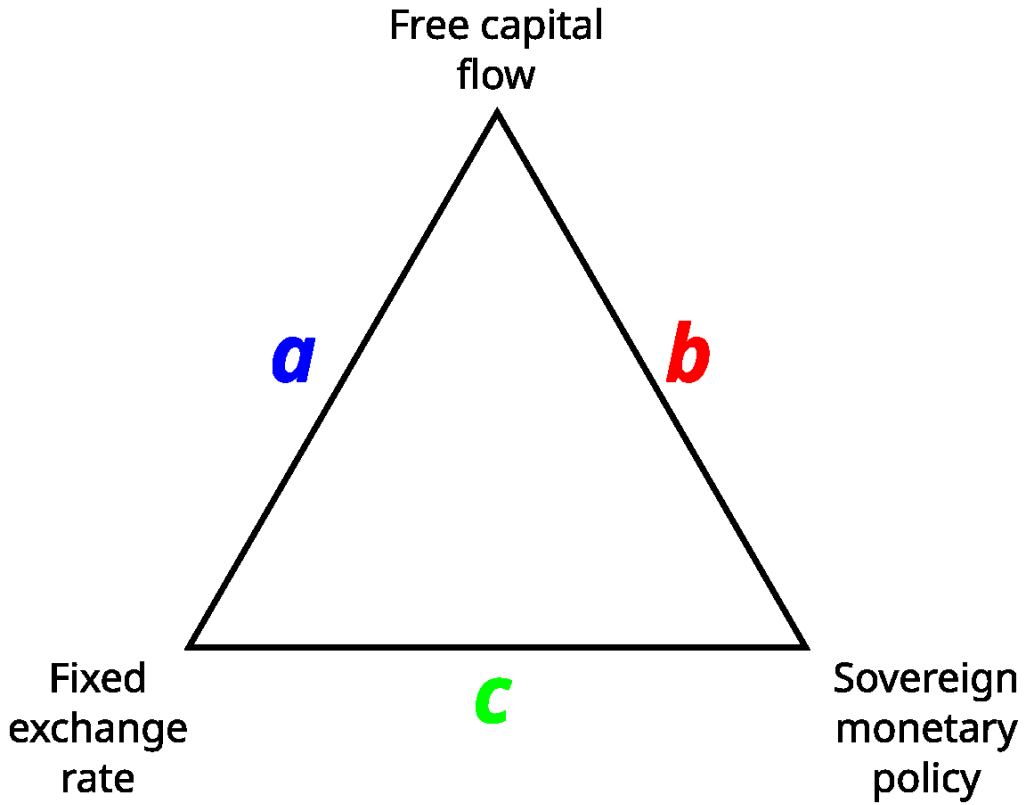
The impossibility trinity aka Trilemma

Why:

a?

b?

c?



Oxelheim, L. (1990)

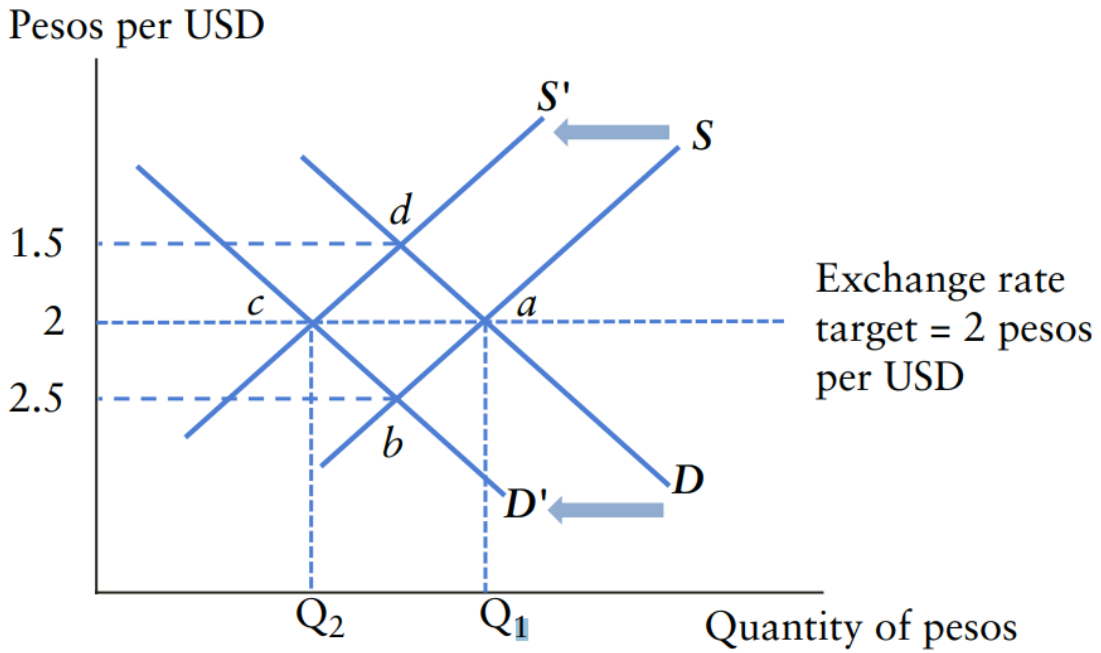
Monetary policy regimes

Monetary policy regimes

- To follow a particular monetary policy rule is to adopt a monetary policy regime
- Since the demise of Bretton-Wood system (1971), these monetary rules were pursued:
  1. Exchange Rate Targeting
  2. Money Supply Growth Targeting
  3. Risk Management Approach
  4. Inflation Targeting
  5. Unconventional Monetary Policy

Exchange Rate Targeting

- CBs influence the supply curve at FX market to adjust for changes in the demand
- Thus influencing also supply of the currency at the domestic market
- In small open economy, international capital movements may easily overwhelm the CB' s ability to keep the ER target



Money supply growth targeting

- Coming from quantitative theory of money
- $M \times V = P \times Q$
- The relationship does not always hold as V happens to be unstable (1980’s FED experience)

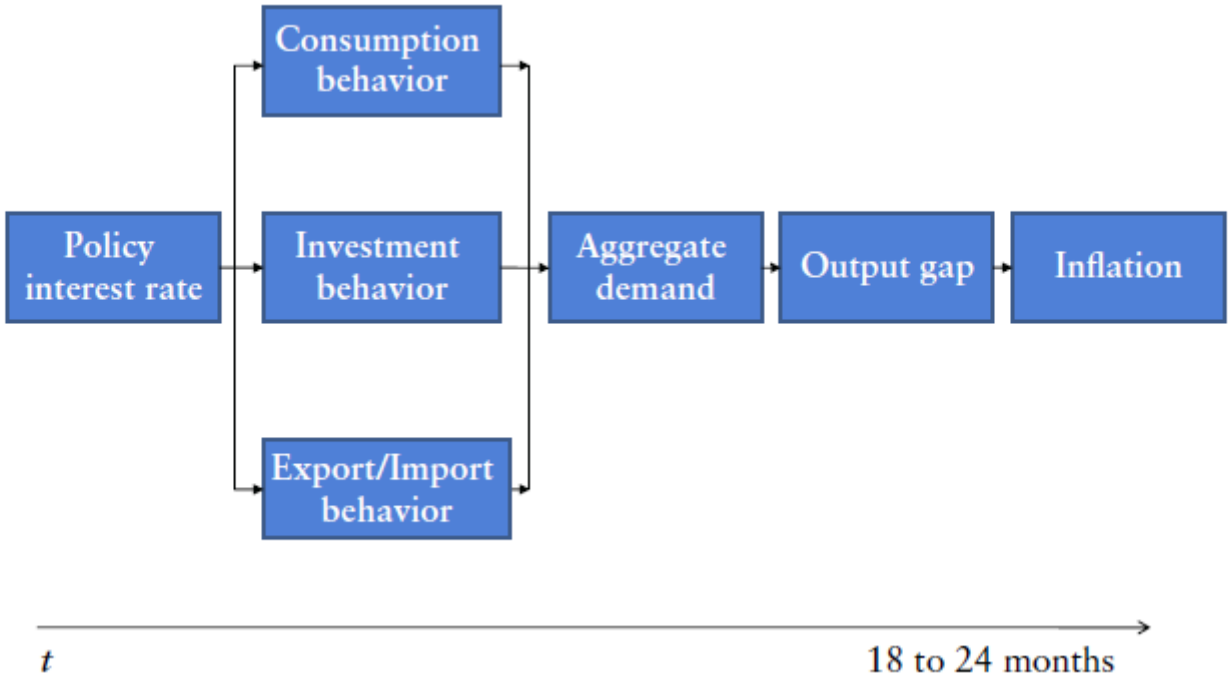
Risk Management Approach

- no announced specific targets for money supply growth or the inflation rate
- **Taylor' s rule:**

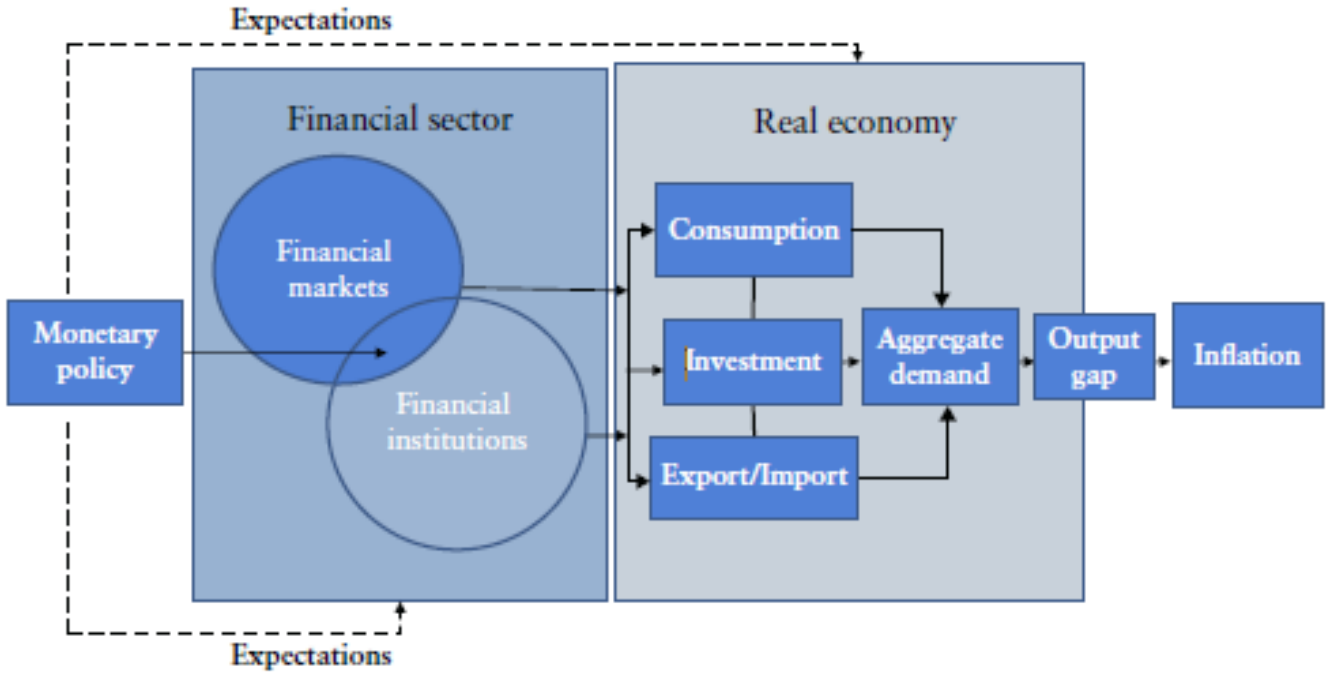
$$i_t = r_t^* + \pi_t + a_\pi(\pi_t - \pi_t^*) + a_y(y_t - y_t^*)$$

- I_t…. Policy interest rate at time t
- π_t… Inflation at time t
- π_t^*… Desired inflation at time t
- r_t^*… Equilibrium interest rate at time t
- y_t … The actual GDP growth rate at time t
- y_t^*… GDP growth rate at full potential at time t
- a_y , a_π … Relative weights given to GDP growth and inflation growth rate

Inflation Targeting



Monetary Policy Implementation



Types of Financial markets

Type of Financial Market	Transactions Handled	Central Bank Operations or Involvement
Money market	Short-term (less than one year) liquidity funding	Operations in the money market are done to manage the policy interest rate, which is a key reference rate for other short-term interest rates.
Foreign exchange market	Foreign exchange funding	Foreign exchange interventions are done to smooth out excess exchange rate volatility, or to keep the exchange rate within target.
Government securities market	Government funding	Transactions in the (secondary) government securities market are done to inject or absorb liquidity in the longer term.
Credit market	Corporate funding, housing market funding	Part of unconventional monetary policy used in the United States, under which the central bank targets specific liquidity shortages in the system.

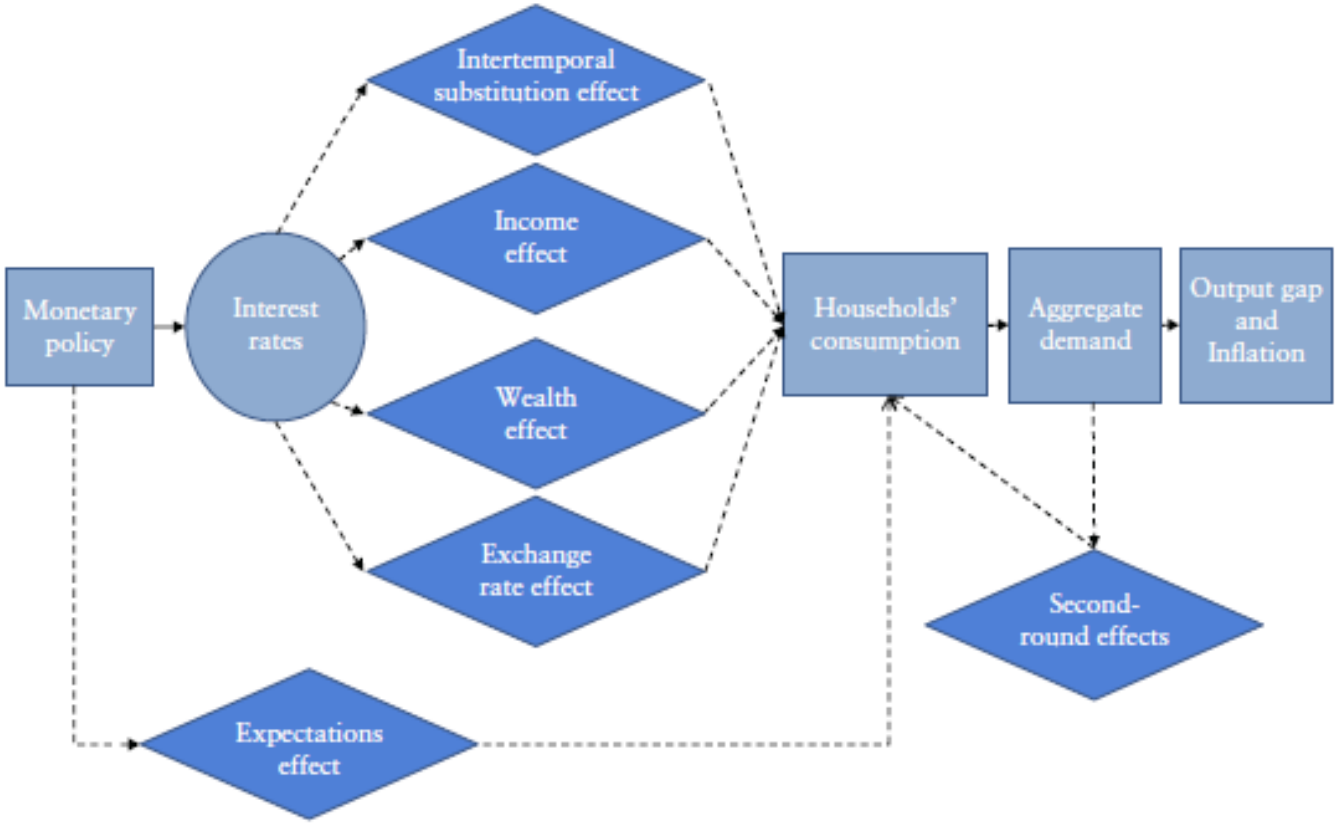
Monetary policy through money market 1

- Borrowing and lending funds with short maturity (<1 year)
- At the core is interbank lending
  - Commercial banks lend and borrow among themselves
  - CBs affect the accessibility of the funds by changing the interest rates
  - Commercial banks wat to hold as little cash as possible since it does not yield interest, unlike loans. Although they need to hold minimum reserves.
  - Commercial banks demand the funds for example if unexpectedly high settlement occurs. Also government, and other financial institution might demand funds on this market
  - On the other hand, if commercial banks find out, that they have too much cash, they supply it to the market
  - EURIBOR, LIBOR, SOFR, PRIBOR….

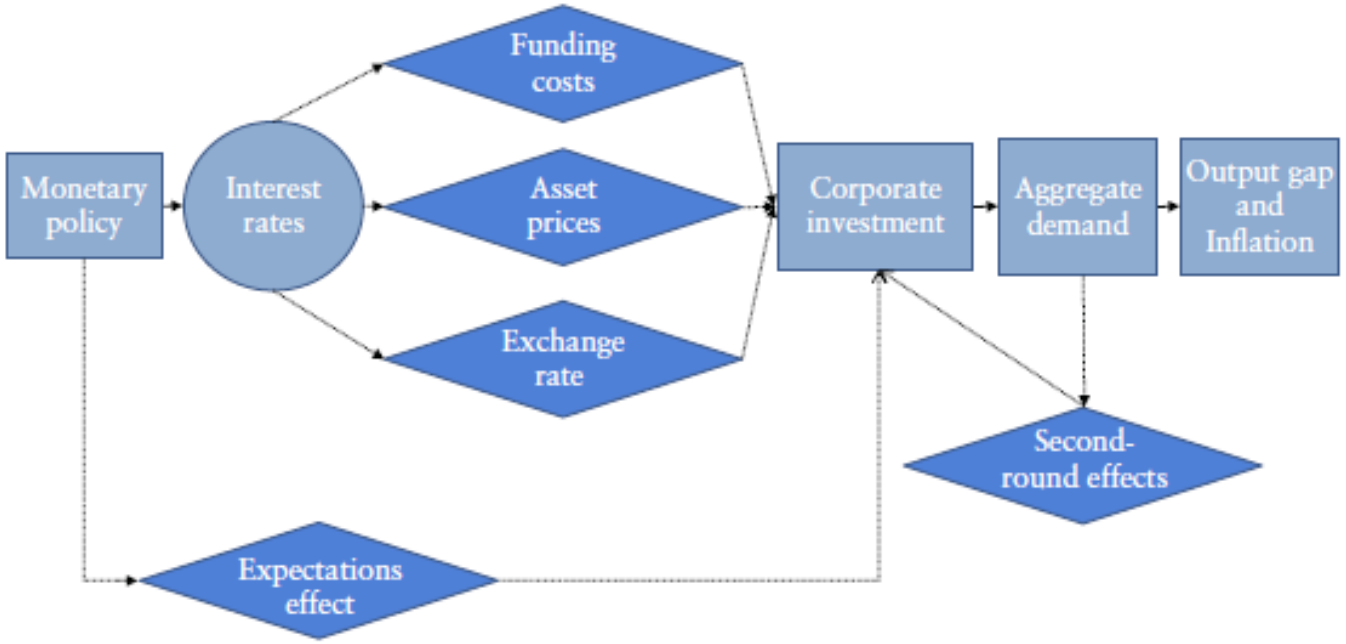
Monetary policy through money market 2

- Policy Interest Rates
- Open market operations
- Reserve requirements

Monetary Policy Transmission - Households



Monetary Policy Transmission- Firms



Central Bank’ s Balance Sheet

Assets	Liabilities
Foreign Reserves	Currency in Circulation
Domestic Government Bonds	Reserves of Commercial Banks
Loans to Commercial Banks	Government Deposits
Other Financial Assets	Other Liabilities
	Capital (Equity)

Balance of Payments

- One of the most important macroeconomics indicator
- Difference between all money flowing into the country in a particular period of time and the outflow of money to the rest of the world.

$$\text{current account} + \text{broadly defined capital account} + \text{balancing item} = 0.$$

Current Account	Capital and Financial Account
Trade in goods and services	Direct Investment (inflows/outflows)
Income from abroad	Portfolio Investment (stocks, bonds)
Current transfers (e.g., aid)	Loans, reserves, other financial flows
	Capital Transfers (e.g., grants, patents)

Current Account

- Trade Balance
- Income from abroad

Capital Account

- Direct Investments
- Portfolio Investments
- Loans

BoP examples… assuming ER 2USD/1GBP

Example 1 Boeing of the United States exports a $100 million aircraft to the United Kingdom which is paid for by British Airways debiting its US bank deposit account by a like amount.

US balance of payments		**UK balance of payments**	
current account		**current account**	
Exports of goods	+$100m	Import of goods	–£50m
Capital account		**Capital account**	
Reduced US bank liabilities to UK residents	–$100m	Reduction in US bank deposit assets	+£50m

Example 2 The US exports $2,000 of goods to the UK in exchange for $2,000 of services.

US balance of payments		**UK balance of payments**	
current account		**current account**	
Merchandise exports	$2,000	Exports of services	£1,000
Imports of services	–$2,000	Imports of goods	–£1,000

Example 3 A US investor decides to buy £500 of UK Treasury bonds and to pay for them by debiting his US bank account and crediting the account of the UK Treasury held in New York.

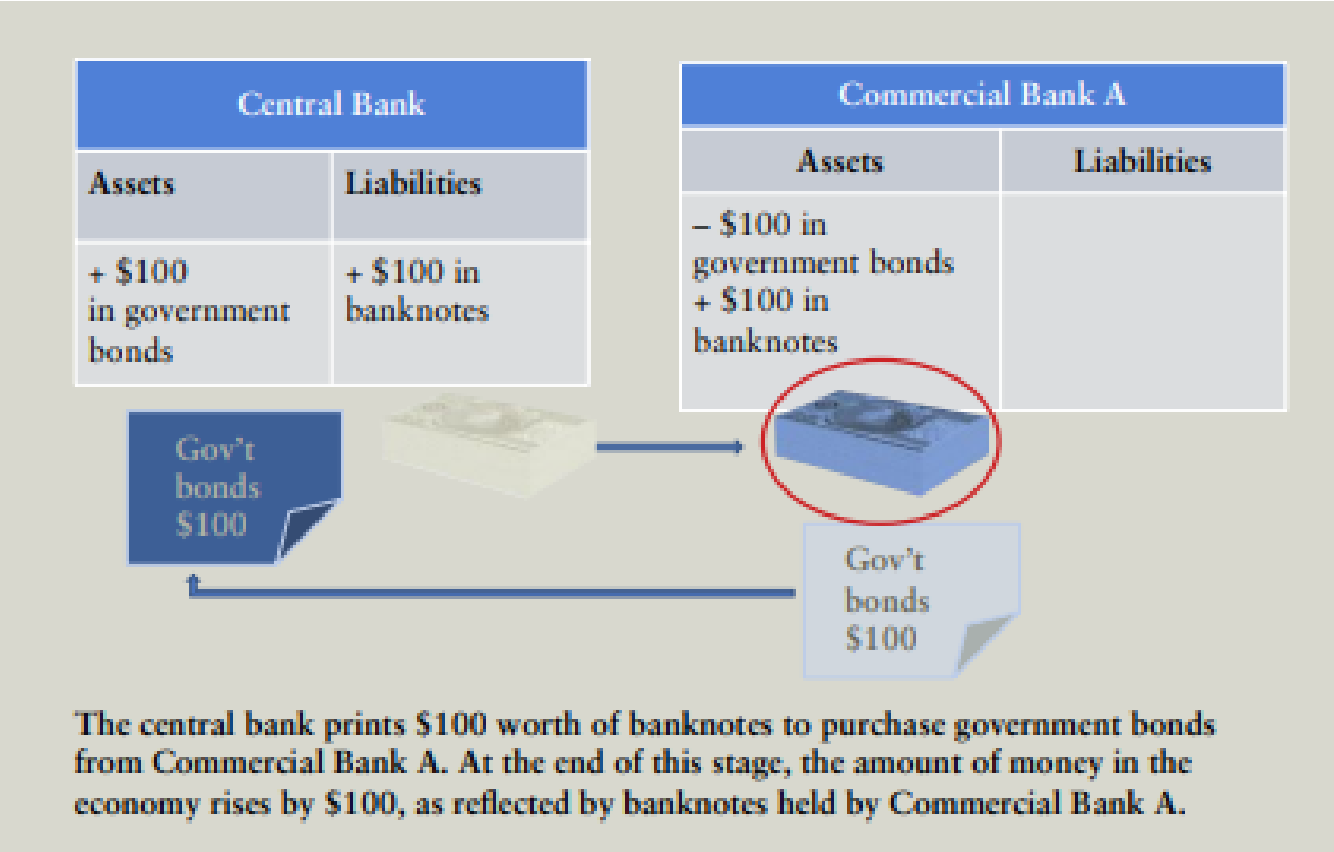
US balance of payments		**UK balance of payments**	
capital account		**capital account**	
Increase in UK treasury bond holdings	–$1000	Increased bond liabilities to US residents	£500
Increased in US bank liabilities	+$1000	Increased US bank deposit	–£500

Current Account Imbalances…Do they matter?

- Obviously it does to

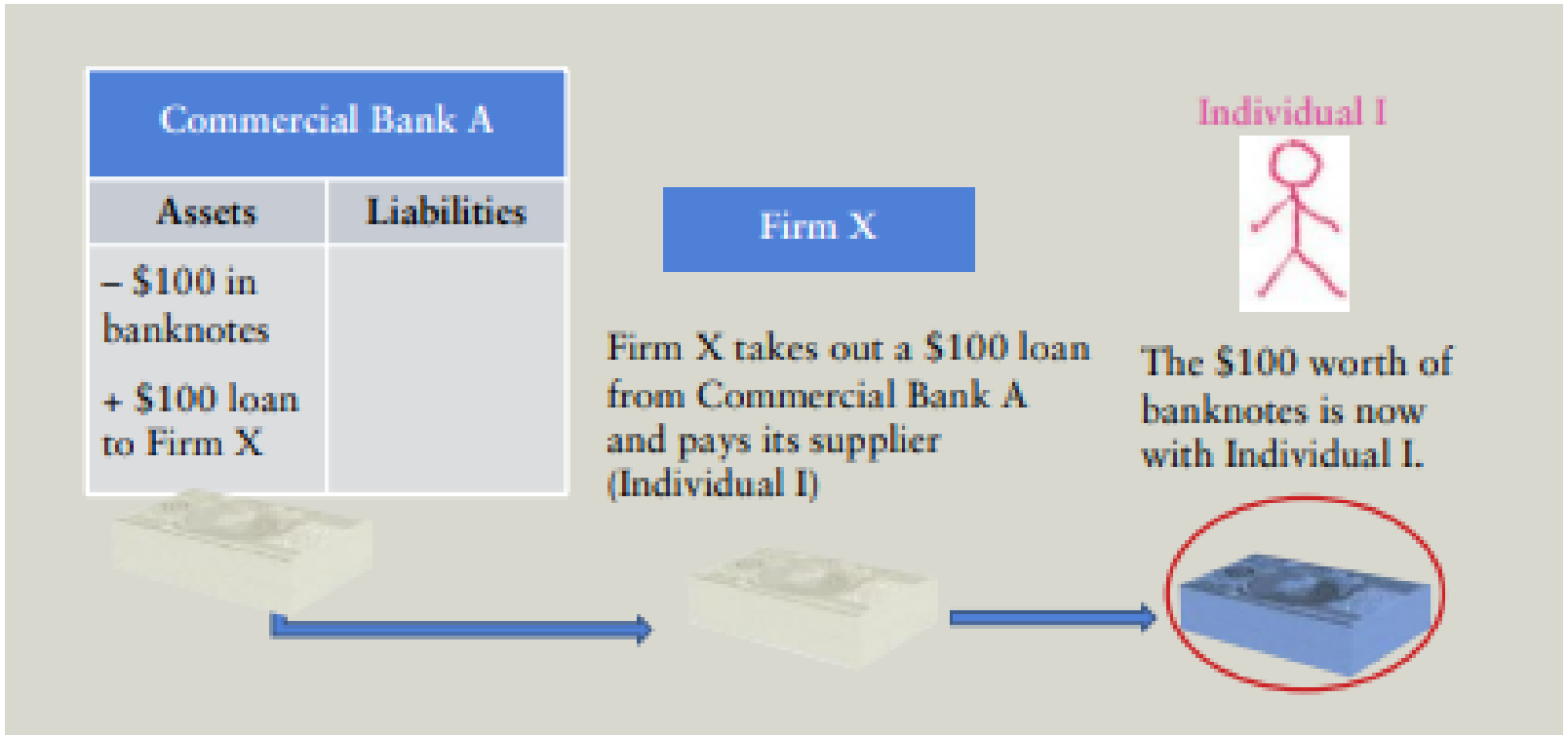
Some Macroeconomics Identities with CA

Money Creation 1

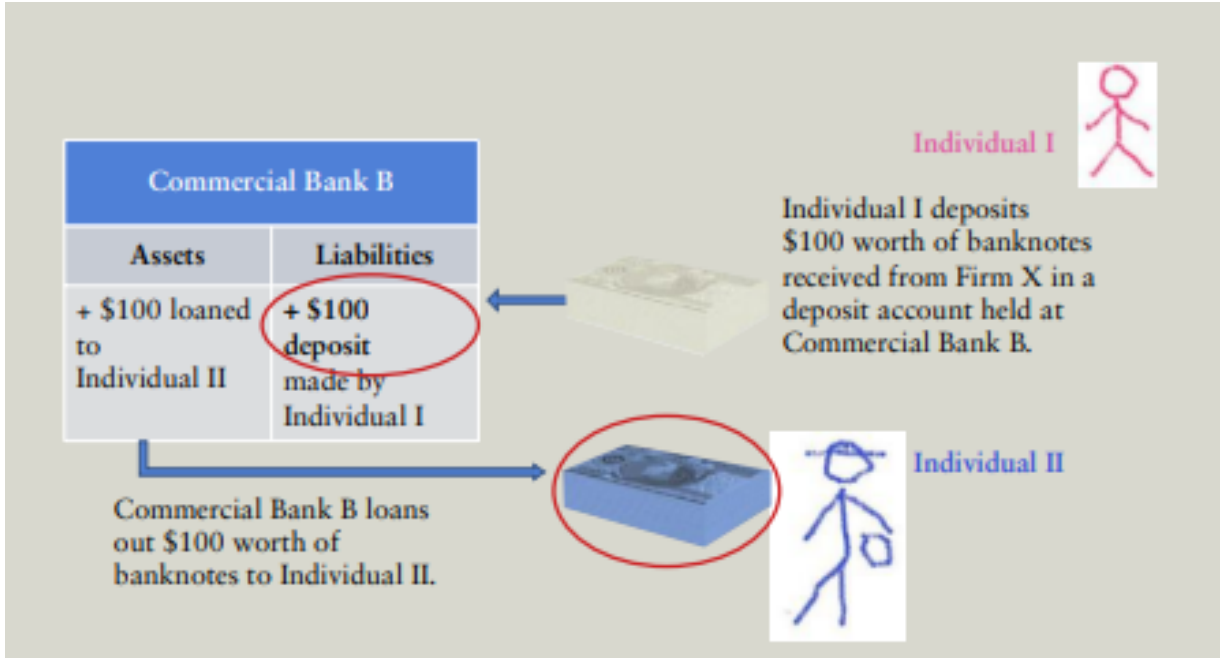


The central bank prints $100 worth of banknotes to purchase government bonds from Commercial Bank A. At the end of this stage, the amount of money in the economy rises by $100, as reflected by banknotes held by Commercial Bank A.

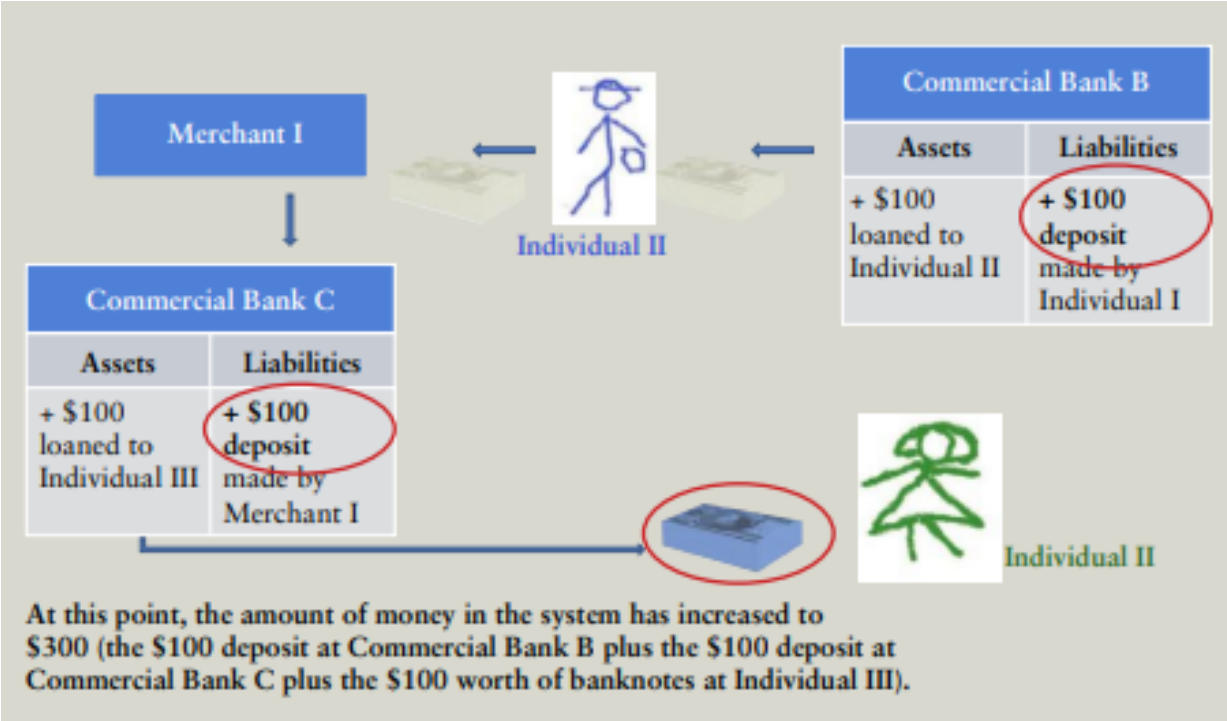
Money Creation 2



Money Creation 3



Money Creation 4



However, this is not how it is done in real world…

- CBs mostly do not set targets on money supply, but rather on inflation
- Reserve requirements(RR) are mostly not used to affect the economy
  - For example: In case of hike in RR, it would be very costly for banks and economy to call in the loans from the banks customers
- Therefore the CBs prefer to impact conditions on money market by changing interest rates and direct market operations

- Oxelheim, L. (1990), International Financial Integration, Heidelberg: Springer Verlag. ISBN 3-540-52629-3