EFOP-3.4.3-16-2016-00014

International Finance

Written by: Dr. habil. Gábor Dávid KISS, PhD

Methodological expert: Edit GYÁFRÁS

This teaching material was compiled at the University of Szeged and is supported by the European Union. Project identity number: EFOP-3.4.3-16-2016-00014

University of Szeged

Faculty of Economics and Business Administration

2020

Szegedi Tudományegyetem
Cím: 6720 Szeged, Dugonics tér 13.
www.u-szeged.hu
www.szechenyi2020.hu

Contents

Foreword

This book was written to support the lecture material within the *International Finance* course for students of the International Economy and Business MSc Programme **with intermediate financial knowledge**. Therefore, readers must gather and utilize their knowledge within the field of macro finance.

The chapters have to following structure: core concepts are introduced in the external balance and exchange rate regimes, their historical development and evolution is presented in the second chapter, while their practical relevance is shown through their appearance in the monetary policy. Later the international financial organisations are presented, to show the instruments of the global financial contingency measures. The last chapter summarizes the speciality of the developing countries. Each section ends with the lists of essential literature.

This learning material improves the **competencies** of an economist studying in the International Economy and Business MSc programme in the following ways:

a) Regarding knowledge, the student
   i. Has a firm grasp on the concepts, theories, processes and characteristics of economics and the economy in general on a micro and macro level; the student is up to date with the defining economic facts.
   ii. Is familiar with the process of European integration and the specific policies of the European Union.
   iii. Knows and utilises the decision theories and analysing methods of economics, international economics and world economics.
   iv. Besides being a proficient language user in his/her mother tongue the student has a good command of the linguistic terms used in economics both in his/her mother tongue and at least two foreign languages.

b) Regarding competencies, the student
   i. Can make independent and new deductions, formulate original thougths and solution methods, utilise sophisticated analitical and modelling methods. The student is capable of formulating solution strategies for complex problems and decisions within the organisational culture both in a domestic and an international setting;
   ii. Is capable of developing effective international business strategies. The student can analyse the geopolitical, social, cultural and religious aspects of international business settings;
   iii. Is capable of planning and organising economic activities in connection with foreign trade, finance and developmental policy along with employing previously learned methods, making deductions, suggestions and decisions. The student is capable of performing well in economic institutions, international and governmental organisations;

c) Regarding attitude, the student
   i. Takes a critical attitude towards the work and behaviour of his/her employees and also of himself/herself. The students exhibits an innovative and proactive attitude to solving economic problems;
   ii. Is committed to quality, sustainability and variety and has a critical attitude towards his/her own knowledge, work and behaviour along with the knowledge, work and behaviour of his/her employees. Feels responsible for correcting mistakes and developing the skills of his/her colleagues.

d) Regarding autonomy, the student
   i. Takes responsibility for his/her own work, the organisation or company he/she is leading and the workers he/she is employing. The student identifies, plans and organises his/her own and his/her employees' professional development and takes personal responsibility for them;
   ii. Displays an initiative, responsible attitude towards social and public affairs in connection with his/her coworkers;
   iii. Initiative in solving problems, creating strategies and in supporting the cooperation of coworkers both within the same organisation and between different institutions;

I. External balance and foreign exchange rates

1. Balance of Payments – current account, financial account, FDI Vs. portfolio investment, convertibility

a) *Balance of Payments, definition*

- „The balance of payments is a statistical statement that systematically summarizes, for a specific time period, the economic transactions of an economy with the rest of the world."
  - between residents and nonresidents
    - „An institutional unit has a center of economic interest and is a resident unit of a country when, from some location (dwelling, place of production, or other premises) within the economic territory of the country, the unit engages and intends to continue engaging (indefinitely or for a finite period) in economic activities and transactions on a significant scale. (One year or more may be used as a guideline but not as an inflexible rule.)"
    - „A country's economic territory consists of a geographic territory administered by a government; within this geographic territory, persons, goods, and capital circulate freely." + islands
  - transaction: an economic flow that reflects the creation, transformation, exchange, transfer, or extinction of economic value and involves changes in ownership of goods and/or financial assets, the provision of services, or the provision of labor and capital
    - Valuation: „basis of transaction valuations is generally actual market prices agreed upon by transactors." by invoice (FOB parity)
    - FOB: seller fulfils his obligation to deliver when the goods have passed over the ship's rail at the named port of shipment (or border). This means that the buyer has to bear all costs and risks of loss of or damage to the goods from that point. ? transportation and insurance costs till the border are in the „value"
    - Time: „transactions are recorded when economic value is created, transformed, exchanged, transferred, or extinguished. Claims and liabilities arise when there is a change in ownership. … record it in their books or accounts"
- IMF BoP Manual (5th edition, 1993):
  https://www.imf.org/external/pubs/ft/bopman/bopman.pdf

b) *Items of the Current Account and Financial Account*

- Current Account:
  - Export and import of goods and services (trade account)
    - Goods (1.A.a.)
      - Goods: General merchandise covers most movable goods that residents export to, or import from, nonresidents and that, with a few specified exceptions, undergo changes in ownership (actual or imputed)
      - Goods for processing: covers exports (or, in the compiling economy, imports) of goods crossing the frontier for processing abroad and subsequent re-import (or, in the compiling economy, export) of the goods, which are valued on a gross basis before and after processing.
      - Repairs on goods: covers repair activity on goods provided to or received from nonresidents on ships, aircraft, etc

- Goods procured in ports by carriers: covers all goods (such as fuels, provisions, stores, and supplies) that resident/nonresident carriers (air, shipping, etc.) procure abroad or in the compiling economy
- Nonmonetary gold: covers exports and imports of all gold not held as reserve assets (monetary gold) by the authorities.

▪ Services (1.A.b.)
- Transportation: freight and passenger transportation by all modes of transportation and other distributive and auxiliary services
- Travel: goods and services—including those related to health and education—acquired from an economy by nonresident travelers (<1y)
- Communications services: postal, courier, and telecommunications services
- Construction services: construction and installation project work
- Insurance services: the provision of insurance to nonresidents by resident insurance enterprises and vice versa (freight, other direct – life/non-life, reinsurance)
- Financial services (other than insurance and pension):
  - financial intermediation services: commissions and fees for letters of credit, lines of credit, financial leasing services, foreign exchange transactions, consumer and business credit services, brokerage services, underwriting services, arrangements for various forms of hedging instruments, etc.
  - auxiliary services: financial market operational and regulatory services, security custody services
- Computer and information services: hardware consultancy, software implementation, information services (data processing, data base, news agency), and maintenance and repair of computers/equipment
- Royalties and license fees
  - (i) the authorized use of intangible nonproduced, nonfinancial assets and proprietary rights—such as trademarks, copyrights, patents, processes, techniques, designs, manufacturing rights, franchises
  - (ii) the use, through licensing agreements, of produced originals or prototypes—such as manuscripts, films
- Personal, cultural, and recreational services: production of motion pictures on films or video tape, radio and television programs, and musical recordings, libraries, museums and sport
- Government services
- Other business services: merchanting and other trade-related services; operational leasing services; and miscellaneous business, professional, and technical services

○ Incomes: Compensation of employees, Investment income (interest, dividend)

▪ Compensation of employees: wages, salaries, and other benefits (of border, seasonal, and other nonresident workers)

▪ Investment income: direct investment income, portfolio investment income, and other investment income
- direct investment component:

        - income on equity (dividends, branch profits, and reinvested earnings) and
        - income on debt (interest)
    - portfolio investment income:
        - income on equity (dividends) and
        - income on debt (interest)
    - other investment income:
        - interest earned on other capital (loans, etc.) and, in principle,
        - imputed income to households from net equity in life insurance reserves and in pension funds
  - Current transfers (international cooperation, workers' remittances)
    - general government (e.g., current international cooperation between different governments, payments of current taxes on income and wealth, etc.),
    - and other transfers (e.g., workers' remittances, premiums—less service charges, and claims on non-life insurance)
    - do not involve
        - (i) transfers of ownership of fixed assets;
        - (ii) transfers of funds linked to, or conditional upon, acquisition or disposal of fixed assets;
        - (iii) forgiveness, without any counterparts being received in return, of liabilities by creditors
        - capital transfers!!!!!
- Financial account
  - Direct investment (FDI: equity capital, reinvested earnings, and other capital (intercompany transactions), share in equities >10%)
    - reflecting the lasting interest of a resident entity in one economy (direct investor) in an entity resident in another economy (direct investment enterprise)—covers all transactions between direct investors and direct investment enterprises.
  - Portfolio investment (transactions in equity securities and debt securities)
    - bonds and notes,
    - money market instruments, and
    - financial derivatives (such as options) when the derivatives generate financial claims and liabilities
  - Reserve assets: transactions in assets that are considered by the monetary authorities of an economy to be available for use in funding payments imbalances and, in some instances, meeting other financial needs
    - monetary gold, SDRs, reserve position in the Fund, foreign exchange assets
- Capital account
  - Capital transfers: involving transfers of ownership of fixed assets;
    - transfers of funds linked to, or conditional upon, acquisition or disposal of fixed assets; or
    - cancellation, without any counterparts being received in return, of liabilities by creditors.
    - (i) general government, which is subdivided into debt forgiveness and other, and
    - (ii) other, which is subdivided into migrants' transfers, debt forgiveness, and other transfers.

- Acquisition/disposal of nonproduced, nonfinancial assets: intangibles—such as patented entities, leases or other transferable contracts, goodwill, etc.

c) Convertibility

The free movement of capital, a liberalized financial account.
Article VIII: General Obligations of Members - Section 4. Convertibility of foreign-held balances

d) Current account (CA) deficit

- Lack of adequate goods/services for sale on global market – see Greece, Ukraine
- Price fluctuations at monocultures: one traded goods (oil, cocoa etc)- see Russia, Gulf countries, former colonies
- Internationalization of production chains: transnational companies are relocating their production overseas
  - Emerging economy: trade surplus & pays dividends
  - Tax haven (shell companies): dividends are directed here
  - Advanced economy: stocks are traded here, HQ is here, high added value is here but CA is not stabilized by income inflows due to „tax optimization"
- Are debt relief programs sustainable?
- Adjustments in surplus countries?

Literature:
IMF BoP Manual (5th edition, 1993): https://www.imf.org/external/pubs/ft/bopman/bopman.pdf

2. Exchange Rate System – fixed, floating, crawling, dollarization

e) Exchange Rate Regime

- Exchange arrangements with no separate legal tender („dollarized", 13)
  - *For example: Ecuador (USD), Panama (USD), Montenegro (EUR)*
- Currency board arrangements (13)
  - *For example: Hong Kong (USD), Bosnia and Herzegovina (EUR), Bulgaria (EUR)*
- Conventional peg (43)
  - *For example: Saudi Arabia (USD), WAEMU & CEMAC (EUR), Denmark (EUR), Kuwait (composite)*
- Stabilized arrangement (24)
  - *For example: Angola (USD), Croatia (EUR), Vietnam (composite), China (composite), Czech Rep. (EUR)*
- Crawling peg (3)
  - *For example: Honduras (USD), Nicaragua (USD), Botswana (composite)*
- Crawl-like arrangement (10)
  - *For example: Iran (composite)*
- Floating (38)
  - *For example: Switzerland, Hungary,*
- Free floating (31)
  - *For example: USA, Japan, Euro-zone, Russia, Sweden, UK*
- IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) reports: https://www.elibrary-areaer.imf.org/Pages/YearlyReports.aspx

f) Exchange rate anchor

- The monetary authority buys or sells foreign exchange to maintain the exchange rate at its predetermined level or within a range.
- The exchange rate thus serves as the nominal anchor or intermediate target of monetary policy.

- These frameworks are associated with exchange rate arrangements with no separate legal tender, currency board arrangements, pegs (or stabilized arrangements) with or without bands, crawling pegs (or crawl-like arrangements), and other managed arrangements

g) Conventional peg

- The country formally (de jure) pegs its currency at a fixed rate to another currency or basket of currencies,
  - where the basket is formed, for example, from the currencies of major trading or financial partners and weights reflect the geographic distribution of trade, services, or capital flows
- The anchor currency or basket weights are public or notified to the IMF
- The country authorities stand ready to maintain the fixed parity through
  - direct intervention (that is, via sale or purchase of foreign exchange in the market) or
  - indirect intervention (for example, via exchange rate related use of interest rate policy, imposition of foreign exchange regulations, and exercise of moral suasion that constrains foreign exchange activity or intervention by other public institutions)
- There is *no commitment to irrevocably keep* the parity, but the formal arrangement must be confirmed empirically:
  - the exchange rate may fluctuate within narrow margins of less than ±1 percent around a central rate
  - or the maximum and minimum value of the spot market exchange rate must remain within a narrow margin of 2 percent for at least six months

h) Stabilized arrangement

- Entails a spot market exchange rate that remains within a margin of 2 percent for six months or more (with the exception of a specified number of outliers or step adjustments) and is not floating
- Statistical criteria are met and that the exchange rate remains stable as a result of official action (including structural market rigidities)
- The classification does **not imply a policy commitment** on the part of the country authorities

i) Crawling peg

- The currency is adjusted in small amounts at a fixed rate
  - or in response to changes in selected quantitative indicators,
  - such as past inflation differentials vis-à-vis major trading partners or differentials between the inflation target and expected inflation in major trading partners.
- The rate of crawl can be set to generate inflation-adjusted changes in the exchange rate (backward looking)
- or set at a predetermined fixed rate and/or below the projected inflation differentials (forward looking)
- crawl-like arrangement: remain within a narrow margin of 2 percent relative to a statistically identified trend for six months or more
- pegged exchange rate within horizontal bands: value of the currency is maintained within certain margins of fluctuation of at least ±1 percent around a fixed central rate, or the margin between the maximum and minimum value of the exchange rate exceeds 2 percent

j) Pros and cons of the fixed (pegged) exchange rate regime

- Beneficial
  - exporters and importers could engage in international trade without concern about exchange rate movements of the currency to which their local currency is linked

- foreign currency as payment would be insulated from the risk that the currency could depreciate over time
- firms could engage in direct foreign investment, without concern about exchange rate movements of that currency
- investors would be able to invest funds in foreign countries, without concern that the foreign currency denominating their investments might weaken over time
- Intervention – devaluation – revaluation
- Devaluation is normally used in a different context than depreciation. Devaluation refers to a downward adjustment of the exchange rate by the central bank

- Disadvantages:
  - Its maintenance – direct (from FX reserves) and indirect (interest rates) interventions by monetary policy → never ended well…

k) Floating

- Largely market determined, without an ascertainable or predictable path for the rate
- intervention may be either direct or indirect, and such intervention serves to moderate the rate of change and prevent undue fluctuations in the exchange rate,
- but policies targeting a specific level of the exchange rate are incompatible with floating
- free floating: if intervention occurs only exceptionally and aims to address disorderly market conditions

l) Pros and cons of the floating exchange rate regime

- exchange rate values are determined by market forces without intervention by governments
- A freely floating exchange rate adjusts on a continual basis in response to demand and supply conditions for that currency
- Advantages
  - country is more insulated from the inflation of other countries
  - central bank is not required to constantly maintain exchange rates within specified boundaries
  - if exchange rates were not allowed to float, investors would invest funds in whatever country had the highest interest rate
- Disadvantages
  - FX exposure: impact on exporters and importers, profitability of transnational companies, investments → requirement of hedging (future, option, swap markets)
  - Interest rate will fluctuate too…

m) Currency Board

- currency board is a system for pegging the value of the local currency to some other specified currency.
- The board must maintain currency reserves for all the currency that it has printed
- large amount of reserves may increase the ability of a country's central bank to maintain its pegged currency
- Exposure of a Pegged Currency to Interest Rate Movements
- Exposure of a Pegged Currency to Exchange Rate Movements

n) Dollarization

- replacement of a foreign currency with U.S. dollars.
- This process is a step beyond a currency board because it forces the local currency to be replaced by the U.S. dollar.

- Although dollarization and a currency board both attempt to peg the local currency's value, the currency board does not replace the local currency with dollars.
- Cannot be easily reversed because the country no longer has a local currency.

o) Which regime could be adequate for a country?

- Floating regimes: market supply and demand ~ deep & no herding or sudden stop
  - CA deficit & Financial account (FA) surplus
  - CA micro-management: trade deficit but current transfers from the EU
  - FA at its finest: when FDI became mature – decreased inflow & reinvestment + CA is pressurized by dividends for parent company
    - Privatization can be one reason for mass inflow of FDI
- Pegging: currency unions or trade integration or anti-inflation
  - Later (see optimal currency area) – Later (see crisis) – Later (see crisis in Latin-America in the 1990s)
- Crawling peg: looking for the „equilibrium rate" till floating
  - Less ambitious as ordinary pegging, but it WORKS
  - CEE-4 in the 1990s: fall of SU → no export market (export=it is payid) → CA imbalanced + liberalized prices + establishing institutions of market economy + debt refinancing = high inflation & devaluation pressure & lack of long term funding & bank consolidation → pegging was unsustainable (random devaluations were bad for market confidence but they did it many times) → consolidation around 1995: crawling peg (transparent), CA is stabilized by FDI-based export capabilities (privatization & green-field), bank sector privatized to withstand domestic shocks and to import know-how (& discipline) → floating-like systems around 2000

Table 1. Exchange rate regimes in CE-4, 1994–2005

Country	Exchange rate regime	Period	Share of USD and DEM (EUR) in the currency basket or reference currency (RC): USD (%)	DEM (EUR) (%)	Band (%)
Czech Republic	Peg	01/94 to 02/96	35	65	±0.5
	Peg	02/96 to 05/97	35	65	±7.5
	Managed Float	05/97 to 12/98	–	RC: DEM	–
	Managed Float	01/99 to present	–	RC: EUR	–
Hungary	Crawling band	01/94 to 05/94	50	50	±0.3
	Crawling band	05/94 to 12/96	30	70 (ECU)	±0.3–1.25
	Crawling band	01/97 to 12/98	30	70	±2.25
	Crawling band	01/99 to 12/99	30	70 (EUR)	±2.25
	Crawling band	01/00 to 05/01	–	RC: Euro	±2.25
	Crawling band	05/01 to 10/01	–	RC: Euro	±15
	Fixed band	10/01 to present	–	RC: Euro	±15
Poland	Pre-announced crawling peg	01/94 to 05/95	45	35	–
	Crawling band	05/95 to 02/98	45	35	±7
	Crawling peg	05/95 to 12/98	45	35	±10–12.5
	Crawling peg	01/99 to 04/00	45	55 (EUR)	±12.5–15
	Independent float	04/00 to present	–	–	–
Slovak Republic	Peg	01/94 to 10/98	40	60	±3–7
	Managed float	10/98 to 12/98	–	–	–
	Managed float	01/99 to present	–	RC: Euro	–

Source: Authors' compilation from the information publicly available from the CE-4 Central Banks.

Source: Babetskaia-Kukharchuk O. – Babetskii I. – Podpiera J. 2008: Convergence in exchange rates: market's view on CE-4 joining EMU. *Applied Economics Letters*, 15, 385-390

p) How about appreciation?

- Good against inflation, bad for competitiveness (in case of productivity growth < appreciation)

- Chinese upward crawling peg – discrete revaluations of the Yüan to meet CA surplus and price competitiveness → feedback: sterilization to avoid inflation & enormous USD reserves
- It can kill even free floating regimes:
- Czech Republic – November 2013 CZK cannot be stronger than 0.24 CZK/EUR to avoid deflation
- Switzerland – September 2011-January 2015: 1.2 CHF/EUR to avoid deflation due to currency market herding (=escape from EUR and USD), abandonment was supported by the not so bright idea of EUR depreciation against USD (new course → 1.05)
- Funny spillovers: 2008 US monetary easing (interest rates → 0% & others) → weaker US dollar → emerging economies like Brazil or China had to intervene by purchasing US dollar for domestic currency to avoid appreciation against USD („currency war")

q) Asset price bubble – anomaly

- An asset price bubble can be interpreted as a sharp rise in the price of an asset and it is not related to future earnings capacity, which is determined by expected cash flows and discount rates. It is limited by the duration of the asset (Siegel 2003). Monetary policy can monitor this phenomenon with methods like the Ball-Svensson model for pre-emptive purposes (Robinson and Stone 2006), but the right interpretation of the so called "Greenspan put" acknowledges the limits of these actions and focuses mostly on crisis-management (Benati and Goodhart 2011). But what happens when a currency is affected by bubble bowing behaviour? This section summarizes the theoretical frameworks of this issue with an intention of focusing on the aspects of volatility and excessive appreciation.

r) Fear of floating - anomaly

- Small and open economies can be in the stage of "fear of floating", meaning the interest rate policy is set by indirect foreign exchange interventions to smooth exchange rate fluctuation regardless the de jure floating status (Calvo – Reinhart 2002, Frankel 2011, Mackiewicz-Lyziak 2016). Exchange rate exposure could be managed on micro level as well, but currency option pricing is also affected by the expected volatility and interest rate differentials.
- Countries that say they allow their exchange rate to flow mostly do not – observed exchange rate variability is quite low
- Je jure floating, de facto soft peg
    - Reserve volatility: high
    - Interest rate volatility: high
    - Monetary aggregates volatility: higher
- Trade shock are not/partially affecting the exchange rate
- Lack of credibility
    - Exchange rate & interest rate correlation: strong +
    - Exchange rate & reserve correlation: strong -

s) Exchange market pressure – anomaly

- Any excess demand for foreign exchange can be fulfilled through speculative attacks – a bubble bowing behaviour. If the speculative attack (currency pressure) is successful, then there will be a sharp depreciation of the domestic currency. This is what is termed as the Exchange Market Pressure (EMP) which Girton and Ropper (1977) measured using their proposed EMP index. The index is based on the idea that a country will fall on its reserves to ward off attack on the currency – a reason why more countries fear to maintain a floating currency regime. This theory is rooted in the monetary account of the balance of payments – the official view of intervention needed to maintain an exchange rate target to finance the current and the capital accounts. According to Girton and Ropper (1977), this view is not synonymous to a

measure of independence of monetary policy in a country. The adoption of IT – which is premised on an independent monetary authority – provided an opportunity for researchers to consider the policy rate (interest rate) as an indicator for capturing how monetary authorities react to attacks on their currencies – even though the IT framework espouses the adoption of a free-floating exchange rate regime. In recognising these facts, Girton and Ropper (1977) for instance adjusted reserve requirement changes with a measure of base money which Stavarek (2010) replicated in making a case for four euro-candidate countries (Czech Republic, Hungary, Poland and Slovakia), to participate in the Exchange Rate Mechanism II – a criterion to be fulfilled before entry into the Euro.

- The EMP index is meant to capture pressure on the currency as would occur under any normal depreciation or appreciation – which is often softened or diverted through monetary authority interventions and does not normally show in the nominal exchange rate dynamics. With countries practicing different monetary and exchange rate regimes – in an ever-increasing use of unconventional monetary policy instruments, the use of the index in its current form may lead to misleading conclusions as Stavarek (2010) for instance found no evidence of serious relationship between EMP and de facto exchange rate regime

$$EMP_t = \frac{1}{\sigma_{\Delta e}}(e_t - e_{t-1}) - \frac{1}{\sigma_{\Delta res}}\frac{\Delta RES_t}{Money_{t-1}} + \frac{1}{\sigma_{\Delta r}}\Delta\left(r_t - r_t^F\right)$$

t) Safe haven currency – anomaly

- An asset can be considered as a safe haven if it represents a refuge investment when political shocks hit financial markets as it bears a negative risk premium. The value of a safe haven currency appreciates when market risk and illiquidity increase – which can be influenced by macro factors like inflation, income growth or money supply with an impact on interest rates and currency market volatility. Swiss franc carries the strongest safe haven attributes, but the yen and euro have also been used as refuge currencies. (Ranaldo and Söderlind 2010)
- currencies' risk-return profiles to equity and bond markets
- depreciations of safe-haven currencies due to gradual erosions of risk aversion inherent in phases of equity markets upturns
- risk episodes of more extreme nature—when risk perception rises suddenly
- Low inflation, moderate interest rates, stable institutions

Reading: https://core.ac.uk/download/pdf/6710655.pdf

u) Carry trade – anomaly

- carry traders holding a short position in a safe-haven currency
  - (borrowing in CHF, JPY, EUR or USD)
- carry traders holding a long position in an emerging currency
  - (bonds in HUF, Turkish Lira, South African Rand)
- Profitable until low FX volatility, high interest rate differential
- Sudden increases in market participants' risk aversion fuel flight to safety that in turn, may lead to abrupt unwinding of carry trade—boosting safe-haven currencies' appreciations

v) Flight to safety – anomaly

- Flight-to-quality is an asset-allocation strategy during market uncertainty as assets are reinvested into higher-quality, less-risky instruments to minimize potential losses in the event of a market downturn and to reduce funds' exposure to systematic risk under high political uncertainty (Feng et al. 2018). Flight to safety can bias currency markets due to a sudden and excessive demand for safe assets which can be captured in portfolio investment changes.
- risk-performance payoffs

- of international currencies, equities and bond markets
- flight-to-quality: an increase in perceived riskiness engenders conservatism and demand for safety
- Contagion: risk and market crashes spill over across countries, international markets and, possibly, asset classes

w) Shocks – anomaly

- critical funding to be suddenly withdrawn,
- liquidity rapidly becomes concerns about solvency.
- struggle to reduce leverage in an environment of collapsing risk appetite,
- heightened counterparty risk and
- vanishing market liquidity,
- become reluctant, even unwilling, to transact with one another.
- result: situations of a drying-up in market and funding liquidity tend to correlate with surges in financial market volatility

x) Eurobond market

- not the EUR as currency but the non-domestic currency context!
- Loans/bonds of one year or longer (maturity of 5 years) extended by banks
- to MNCs or government agencies in Europe in USD (or other non-European currencies) are
- commonly called Eurocredits/Eurobonds
- floating interest rate:
  - London Interbank Offer Rate (LIBOR), which is the rate commonly charged for loans between banks
  - "LIBOR plus 3 percent." - premium paid above LIBOR will depend on the credit risk of the borrower
- reading: https://www.ecb.europa.eu/pub/pdf/ire/ecb.ire201806.en.pdf

Literature:

Benati, L. – Goodhart, C. (2011): Monetary Policy Regimes and Economic Performance: The Historical Record, 1979-2008. In Friedman, B., Woodford, M., (eds.): Handbook of Monetary Economics. North Holland: Elsevier

IMF (2017): Annual Report on Exchange Arrangements and Exchange Restrictions 2017. International Monetary Fund

Hossfeld, O. and Pramor, M., 2018. Global liquidity and exchange market pressure in emerging market economies. Discussion Papers 05/2018, Deutsche Bundesbank.

3. Exchange rate theories - PPP, IRP, Fisher rule, International Fisher rule, monetary approach, direct and indirect interventions

a) Purchasing Power Parity

- Prices in country A Vs. Prices in country B
  - St=Pt-P*t (S: current/spot exchange rate, P: price index, *: domestic, t: time)
  - Or 1+St=P*t-1(1+I*)/Pt-1(1+I) (I: inflation, change in the price levels since the last year) – relative approach
- Consumer price indices (similar goods and services) like HCPI in the EU

- Production price indices can be different!!!

b) Interest Rate Parity (covered/uncovered)

- Covered: exchange rate in the future and in the present depends on interest rate differentials:
  - rt-r*t=(F-S)/S (S: current/spot exchange rate, F: interest rate in the future at time t, r: interest rate, *: domestic, t: time)
- Uncovered: expected spot exchange rate n periods later to current exchange rate depends on interest rate differentials:
  - rt-r*t=(ESt+n)/S (S: current/spot exchange rate, ESt+n expected exchange rate n periods later, r: interest rate, *: domestic, t: time)

c) Fisher Rule

- Interest rate is highly correlated with inflation rate
  - Real interest rate=r+I
- International Fisher Rule
  - Exchange rate is dominated by interest rate differentials
  - 1+St=(1+r*t)/(1+rt)

d) Monetary approach

- exchange rate is dominated by money supply, income and interest rate differentials
- $s_t = (m_t - m_t^*) - \alpha(y_t - y_t^*) + \beta(i_t - i_t^*)$.
- mt domestic (mt* foreign) money supply, yt domestic logarithmic income (yt* foreign) and it domestic interest rate (it* foreign) differences to explain st spot currency rates with α and β weights

e) Government Intervention on FX market

- To smooth exchange rate movements
- To establish implicit exchange rate boundaries
- To respond to temporary disturbance
- Direct Intervention
  - "flooding the market with dollars"
  - most effective when there is a coordinated effort among central banks
  - Reliance on Reserves
  - potential effectiveness of a central bank's direct intervention is the amount of reserves it can use
  - The volume of foreign exchange transactions on a single day now exceeds the combined values of reserves at all central banks
- Nonsterilized versus Sterilized Intervention
  - Nonsterilized: CB intervenes in the foreign exchange market without adjusting for the change in the money supply
  - Sterilized: intervenes in the foreign exchange market and simultaneously engages in offsetting transactions in the Treasury securities markets. ? dollar money supply is unchanged
- Indirect Intervention
  - e= f(ΔINF, Δ INT, Δ INC, Δ GC, Δ EXP)
  - e: percentage change in the spot rate
  - Δ INF: change in the differential between U.S. inflation and the foreign country's inflation
  - Δ INT: change in the differential between the U.S. interest rate and the foreign country's interest rate

- Δ INC: change in the differential between the U.S. income level and the foreign country's income level
- Δ GC: change in government controls
- Δ EXP: change in expectations of future exchange rates

Literature:

Madura, J. (2008): *International Financial Management.* Thomson

Vargas-Silva, C. (2010): Exchange rates. In: Free, R. C. (ed.): *21st Century Economics – a Reference Handbook*. Sage

f) Forecasting exchange rates with uncovered interest rate parity with a VAR model (VAR forecasting)

Literature:

Ghysels E., Marcellino M. (2018): *Applied Economic Forecasting using Time Series Methods*. Oxford University Press

Definition:

- A VAR is a structure whose aim is to model the time persistence of a vector of *n* time series, y_t , via a multivariate autoregression.
- VAR equation: $y_t = const. + A_{t-p} y_{t-p} + \varepsilon_t$
  - assuming that we have *I* variables with *T* time length in an *Y* matrix:
    - $Y = \begin{bmatrix} y_{1,t} & y_{i,t} & y_{I,t} \\ y_{1,t-p} & y_{i,t-p} & y_{I,t-p} \\ y_{1,t-T} & y_{i,t-N} & y_{I,t-N} \end{bmatrix}$
  - with *p* lag

Properties:

- each variable a linear function of its **own past values** and the **past values of all other** variables: $y_t = F\, y_{t-1} + u_t$
- to do:
  - summarize the co-movements of variables
  - forecast the variables
- contemporaneous links among the variables: $Ay_t = By_{t-1} + e_t$
- to do:
  - effect of a policy-induced change in variables
    - require "identifying assumptions" that establish causal links
    - base on economic theory
- output:
  - impulse responses and forecast error variance decompositions

Forecasting steps:

- Specification of the model
  - variables (guided by theory, preferences)
  - deterministic component (constant, dummies or trends)
  - lags (AIC, BIC)
- Estimation
  - m equations, linked by correlation in errors and lags of variables in each eq

    - OLS estimation by equation, consistent and asymptotically efficient
- Diagnostic checks
    - errors White Noise (uncorrelated, homoskedastic)
        - Multivariate versions of LM test for no correlation, White test for homoscedasticity
    - Chow tests for breaks
- Forecasting
    - "Iterated" approach, calculate ^ yT +1, use to obtain ^ yT +2, keep iterating until obtaining ^ yT +h,

Considerations:

- The accuracy of forecasts can only be determined by considering how well a model performs on new data that were not used when fitting the model.
- When choosing models, it is common practice to separate the available data into two portions, training (~80%) and test (~20%) data, where
    - the training data is used to estimate any parameters of a forecasting method and
    - the test data is used to evaluate its accuracy.
        - Because the test data (in-sample data) is not used in determining the forecasts, it should provide a reliable indication of how well the model is likely to forecast on new data.
        - The test set (hold-out set, out-of-sample data) should ideally be at least as large as the maximum forecast horizon required.
- Attention:
    - model which fits the training data well will not necessarily forecast well
    - perfect fit can always be obtained by using a model with enough parameters
    - Over-fitting a model to data is just as bad as failing to identify a systematic pattern in the data
- forecast “error” is the difference between an observed value and its forecast
    - e_t=training_t-test_t
        - overshoot: e_t>0 since training_t> test_t
    - are different from residuals in two ways.
        - residuals are calculated on the training set while forecast errors are calculated on the test set
        - residuals are based on one-step forecasts while forecast errors can involve multi-step forecasts.
    - measure forecast accuracy by summarising the forecast errors
        - Scale-dependent errors: forecast errors are on the same scale as the data – we are looking for their minimum
            - Mean absolute error: MAE: mean(abs(e_t)) → forecasts of the median
            - Root mean squared error: **RMSE**: sqrt(mean((e_t)^2)) → forecasts of the mean
    - difference between the precision of a forecast and its **bias**[1]
        - Bias represents the historical average error. Basically, will your forecasts be on average too high (i.e. you overshot the demand) or too low (i.e. you undershot the demand)? This will give you the overall direction of the error.

[1] https://medium.com/analytics-vidhya/forecast-kpi-rmse-mae-mape-bias-cdc5703d242d

- bias=1/n sum(e_t)
- it should be low

- Precision measures how much spread you will have between the forecast and the actual value. The precision of a forecast gives an idea of the magnitude of the errors but not their overall direction.

- **Std Error** of the forecast
  - is used to build a confidence interval for the predicted value of the dependent variable.
  - The Std Error of the Est. is actually used to calculate the Std Error of the Forecast.
  - The Std Error of the Estimate is a measure of the variability of the actual values of the dependent variable compared to the models predictions of the dependent variable.
  - Std Error of the Estimate is found by taking the square root of the Mean Sum of Squared Errors in the ANOVA table.

Example:

- Let's assume that CZKHUF meets the requirements of the uncovered interest rate parity, az the changes of the exchange rates are reflecting the changes in the long term interest premium:
  - $diff(\log(CZKHUF)) \approx \Delta(r_{HUF} - r_{CZK})$
  - Model: $VAR(diff(\log(CZKHUF)), diff(r_{HUF} - r_{CZK}))$
  - data length: 2006Q2 2019Q4
- VAR generally prefers inputs with less than 100 observations, so we should convert of weekly data to quarterly
  - Matlab:

```
q=xlsread('currency_interest.xlsx','weekly');
for i=1:floor(734/(52/4))
    q(i,:)=w(i*(52/4),:);
end
```

- Inputs should be prepared:
  - Matlab:

```
dl_czkhuf=diff(log(q(:,2)));
r_prem=diff(q(:,4)-q(:,5));
```

- Exogenous dummy variables to represent shock and regime changes:
  - dummy to represent the temporary upper ceiling in the exchange rate regime of the CZK against EUR (2013 q4 – 2017 q1 =1)
  - dummy to represent recession in the Eurozone, from EABCN[2] database (2008 q2 – 2009 q2 =1; 2011 q4 – 2013 q1 =1)
- IMPORTANT:
  - for the forecast, we have to define the 2020q1 2020q4 dates as well
  - input variables are missing from here
  - exogenous dummy variables are set to zero

4. Optimum Currency Area

- a geographical region which, if sharing a single currency, would be able to maximize economic efficiency in that area
- optimal characteristics for the merger of currencies or the creation of a new currency
  1. labor mobility across the region;

[2] https://eabcn.org/dc/chronology-euro-area-business-cycles

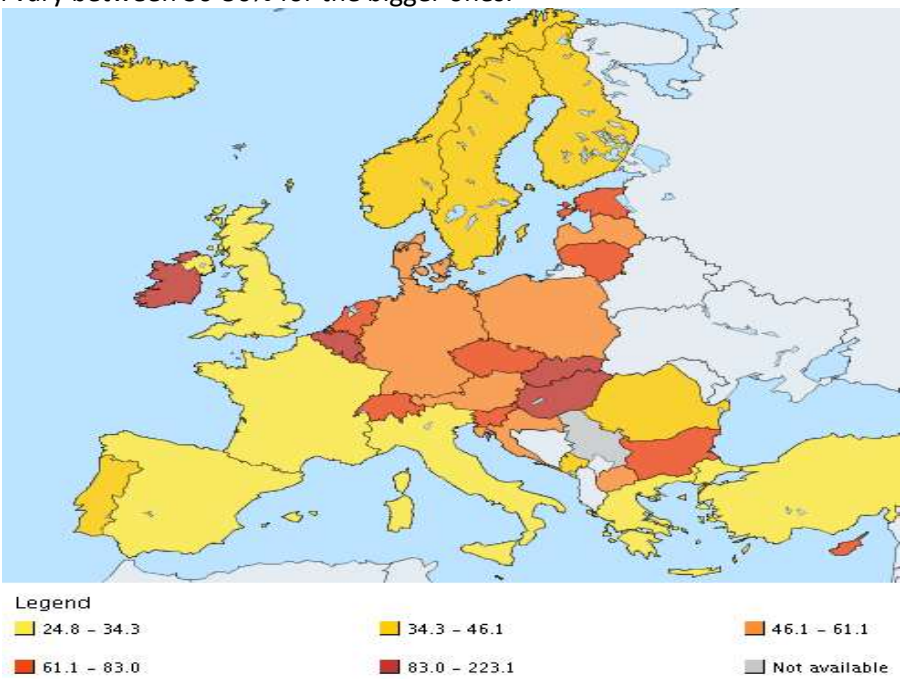
2. openness with capital mobility and price and wage flexibility across the region;
3. production diversification;
4. similar business cycles for participant countries;
5. fiscal transfer mechanism to redistribute income to areas/sectors which have been adversely affected by labor mobility and openness;
6. similar (homogeneous) preferences/ideologies;
7. solidarity.

a) Institutional structure of the European Union and the OCA

- Some points are focusing on trade and external balances (1-2-3), while others have a clear fiscal motivation (5-6-7) as one of these is necessary to run a single monetary policy (4).
- It is clear that the first two requirements were fulfilled by the well-known "four-freedoms" in the Maastricht treaty (Article 3, c) in 1992, which is the basis of the European Union: the free movement of capital, goods, services and labour force[3].
- The budget of the European Union focuses on the fifth point by the redistribution of the 1% of the GDP. The last points call for common crisis resolution mechanisms like the European Stability Mechanism that supports member states to avoid falling into public defaults and to overcome banking crises since the 2011 crisis.
- Monetary policy requires synchronized business cycles as otherwise some regions would be overheated while others would be in deep recession. Inter-regional redistribution via a common budget can help with that, but regional differences can't be eliminated completely.

b) Trade integration in the EU

- Trade has an important role for all member states as the "Export of goods and services to GDP" ratio-map shows it from 2017: it can reach 80% of the GDP in the smaller member states while it can vary between 30-50% for the bigger ones.

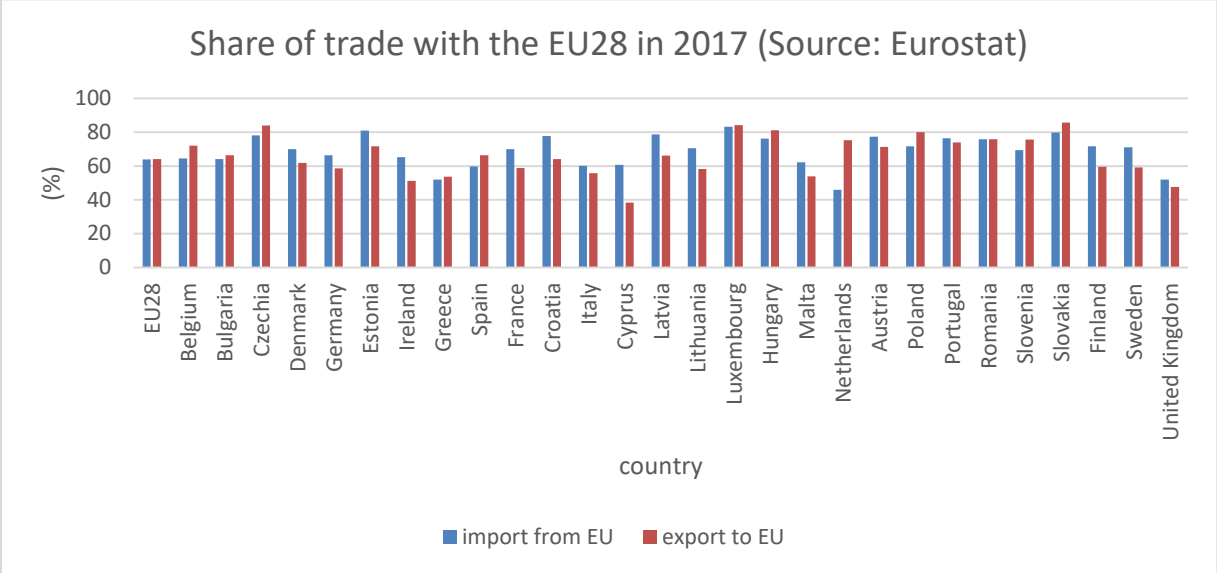


Source: Eurostat

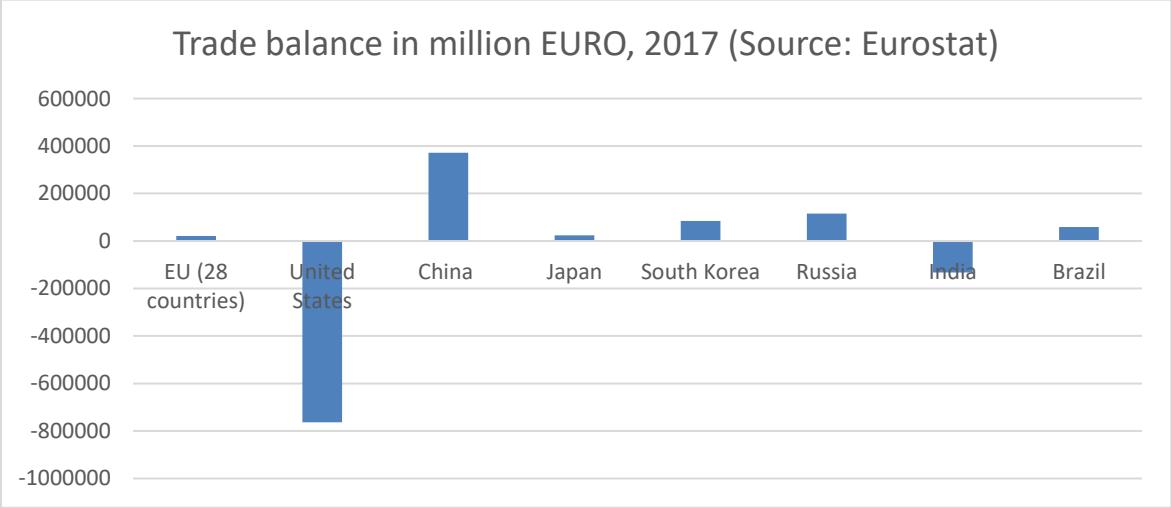
- Trade integration can be measured trough the percentage of foreign trade, which is done by other MSs. Intra-EU trade had 64% share among MSs in 2017 according to Eurostat data.

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:11992M/TXT&from=HU

Central-European and landlocked countries have the deepest integration by nearly 80% while maritime countries have less (~50%). Countries tend to focus more on foreign exchange stability when most of their trade is conducted "within club".



- The EU28 is a major player in world trade: it was responsible for 16% and 15% of global export and import in 2017. Only China (17%, 13%), the US (11.5%, 17%) and Japan (5%, 5%) had a similar magnitude. Meanwhile, the EU28 had a modest trade surplus, similar to Japan's.



c) *Globalisation and the Eurozone*

- Globalization or increased global trade and financial integration is characterized by significant changes in global trade patterns, with new players from low-cost countries. It created an international fragmentation of the production process and gave rise to a significant increase in the trading of intermediate products. The integration of capital markets has led to an unprecedented increase in cross-border holdings of asset and liabilities with international capital flows having increased even faster than product trade. The euro area economy has become increasingly interconnected with its external environment. (ECB 2008)
- There are stronger trading ties with emerging market economies and an increased demand for euro area products from these countries as well as an additional source of imports and competition in third markets. The decline in world trade share has been broadly similar across major economies; the share of imports from low-cost countries in overall euro area imports

has steadily increased in recent years as well as a more intense trade with the new EU member states. Meanwhile, the internationalisation of production means that large firms headquartered in the euro area are using production facilities located in the new member states. (ECB 2008)

Literature:

Mundell, R. (1961), "A Theory of Optimum Currency Areas", The American Economic Review, Vol. 51, No. 4, pp. 657-65.

ECB (2008): The Changing role of the Exchange rate in a Globalised Economy. ECB Occasional Paper Series, No 94 https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp94.pdf

d) Trade-exposure analysis with panel gravity-model analysis (dynamic panel regression)

About gravity models

- Gravity models are generally used as a tool to analyse trade relations among core and periphery, using log-linear models (Greene 2003):
- $\ln y = const. + \alpha_1 \ln X_1 + \cdots + \alpha_n \ln X_n + \varepsilon$
  - where for all *k* variables $(1 \leq k \leq n)$ $X_k > 0$ and for *i* countries $(1 \leq i \leq m)$ $X_k = x_{k,core} - x_{k,i}$.
  - X_1 variable represents the difference in size, like GDP_{EU}-$GDP_{Hungary}$ to represent the difference in magnitude
- This model is widely applied in the analysis of trade relations (Brakman – Bergeijk 2010), and it can be combined with exchange rate volatility (Simáková 2016).

In our interpretation

- Smaller EU member states can be attracted more to the trade of the EU. The EU has bigger share from their export then in the case of the bigger member states, which has a more diversified export-structure. These ties can be proximity and production chain (or FDI) related.

The model

- The share of the EU from *i* country's export (Y_i) as a percentage can be explained by the relative size of the economy (GDP_{EU}-GDP_i) and the relative importance from the total European export in million euros (X_{EU}-X_i).
- Meanwhile, we should consider the starting date of EU membership ($dummy_{EU}$), euro-adoption ($dummy_{EZ}$) and the recession in the Eurozone ($dummy_{recession}$) which can be represented as exogenous shocks for the exporters.
- $\Delta ln Y_{i,t} = const. + \beta_1 \Delta ln\left(GDP_{EU,t} - GDP_{i,t}\right) + \beta_2 \Delta ln\left(X_{EU,t} - X_{i,t}\right) + \beta_3 dummy_{EU} + \beta_4 dummy_{EZ} + \beta_5 dummy_{recession} + \mu_i + v_{it}$
- We are anticipating the following results from the model:
  - As the countries size shrinks compared to the EU ($GDP_{EU,t} - GDP_{smal,t} > GDP_{EU,t} - GDP_{big,t}$), the trade-orientation of the country should be more EU-focused, so β_1 is expected to be positive. Bigger economies can have more diversified trade relations and they can be more active overseas as well.
  - As the countries' trade can be considered as insignificant on EU level ($X_{EU,t} - X_{smal,t} > X_{EU,t} - X_{big,t}$), it can be assumed, that is conducts its trade within club, so β_2 is expected to be positive.
  - EU and Eurozone memberships provide access to the common market and eliminate the currency risk, so β_3 and β_4 can be assumed to be positive.
  - Recession in the Eurozone can distort trade relations, so its β_5 coefficient can be considered negative.

About panel data

- Panel data analysis describes the relationship among the dependent (*y*) and explanatory variables (*x*) in cross-sectional (N) and time (T) dimensions with an assumed non-observed variable (u_i).
- Groups, variables and time
- Dataset is structured like: column=variable (groups are under each other) + group ID and time ID columns as well

Method: dynamic panel regression

- For shorter data-length with tendencies for autocorrelation.
- Assuming that (y_{it}) is autocorrelated, the lagged values are considered (y_{it-1}) as an AR(1) process. It is specified for panels with big variable number and short time set and considered as a special version of the FE models (μ_i variable-specific error term, v_{it} zero-mean uncorrelated error terms) (Blundell – Bond, 1998; Arellano – Bond, 1991):
  - $y_{it} = \alpha y_{it-1} + \beta x_{it} + \mu_i + v_{it}$, i=1,…, n, t=1,…, T_i. (3)
- assuming:
  - $y_{it} = \beta x_{it} + f_i + \xi_{it}$, ahol $\xi_{it} = \alpha \xi_{it-1} + v_i$ és $\mu_i = (1-\alpha) f_i$, $|\alpha| < 1$. (4)
- Overidentification means that we are using more than enough variables to the estimation. It can be checked with Sargan-test (Eviews: J-statistic) where p>0.05 signs the appropriate result).
- Arellano-Bond Serial Correlation Test:
  - AR(1): p<0.05 no problem
    - The presence of correlation of first order in the differentiated waste does not imply that the estimates are inconsistent.
  - AR(2): p>>0.05
    - The presence of second-order autocorrelation implies that if the estimates are inconsistent.

Data

- EU28 countries, 2002-2018 annual data, from Eurostat database

Results

- First differences were necessary to provide stationary inputs.

$\Delta lnY_{i,t}$	Method	Statistic	Prob.**	Cross-sections	Obs
	Null: Unit root (assumes common unit root process)				
	Levin, Lin & Chu t*	-4.64071	0.0000	28	392
	Null: Unit root (assumes individual unit root process)				
	Im, Pesaran and Shin W-stat	-5.38385	0.0000	28	392
	ADF - Fisher Chi-square	121.426	0.0000	28	392
	PP - Fisher Chi-square	245.930	0.0000	28	420
$\Delta ln(GDP_{EU,t} - GDP_{i,t})$	Method	Statistic	Prob.**	Cross-sections	Obs
	Null: Unit root (assumes common unit root process)				
	Levin, Lin & Chu t*	-12.4281	0.0000	28	392
	Null: Unit root (assumes individual unit root process)				
	Im, Pesaran and Shin W-stat	-11.3765	0.0000	28	392
	ADF - Fisher Chi-square	228.649	0.0000	28	392
	PP - Fisher Chi-square	661.389	0.0000	28	420
$\Delta ln(X_{EU,t} - X_{i,t})$	Method	Statistic	Prob.**	Cross-sections	Obs
	Null: Unit root (assumes common unit root process)				
	Levin, Lin & Chu t*	-14.4808	0.0000	28	392
	Null: Unit root (assumes individual unit root process)				
	Im, Pesaran and Shin W-stat	-8.50825	0.0000	28	392
	ADF - Fisher Chi-square	173.251	0.0000	28	392
	PP - Fisher Chi-square	186.796	0.0000	28	420

- The results of the dynamic panel regression supports that relative economic smallness contributes to deeper trade integration – however the relative smallness in export had a diversification effect (these results were robust with lag 1 as well). Meanwhile, EU membership

provided deeper integration, while recession distorted the ties. However, euro-adoption had no significant impact.

Dependent Variable: DLN_EU_SHARE_FROM_X
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 02/25/20 Time: 09:43
Sample (adjusted): 2005 2018
Periods included: 14
Cross-sections included: 28
Total panel (balanced) observations: 392
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument specification: @DYN(DLN_EU_SHARE_FROM_X.-2)
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLN_EU_SHARE_FROM_X(-1)	-0.1334	0.0118	-11.2853	0.0000
DLN_EXPORT_DIFF_EU	-0.2029	0.0177	-11.4763	0.0000
DLN_GDP_DIFF_EU	0.4194	0.0543	7.7244	0.0000
DUMMY_EUMS	0.0538	0.0059	9.1164	0.0000
DUMMY_EZ	0.0045	0.0032	1.3992	0.1626
DUMMY_RECESSION	-0.0074	0.0004	-19.2631	0.0000

Effects Specification

Cross-section fixed (first differences)

Root MSE	0.0246	Mean dependent var	-0.0001
S.D. dependent var	0.0253	S.E. of regression	0.0248
Sum squared resid	0.2377	J-statistic	26.0583
Instrument rank	28.0000	Prob(J-statistic)	0.2492

- Sargan-test (J-statistic) and Arellano-Bond Serial Correlation Test showed no over identification nor inconsistency.

Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 02/25/20 Time: 09:43
Sample: 2003 2018
Included observations: 392

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-2.606056	-0.108545	0.041651	0.0092
AR(2)	-0.580152	-0.014142	0.024377	0.5618

Literature:

Arellano, M. – Bond, s. (1991): some Tests of specification for Panel Data: Monte carlo Evidence and an Application to Employment Equations. The Review of Economic Studies, Vol. 58, pp. 277–297

Blundell, R. – Bond, s. (1998): Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, Vol. 87, pp. 115–143

Greene, W. H. (2003) 'Econometric analysis', Pearson Education, India.

Judson, R. A., Owen A. (1999): Estimating dynamic panel data models: a guide for macroeconomists. Economics Letters, 65(1), pp. 9–15
Sargan, J. D. (1958): The estimation of economic relationships using instrumental variables. Econometrica: Journal of the Econometric Society, 393-415. o.
Simáková, J. (2016): The Gravity Modelling of the Relationship between Exchange Rate Volatility and Foreign Trade in Visegrad Countries. Economic Studies & Analyses / Acta VSFS. 10(1), 7-31.
Van Bergeijk, P. A., & Brakman, S. (Eds.). (2010): The gravity model in international trade: Advances and applications. Cambridge University Press

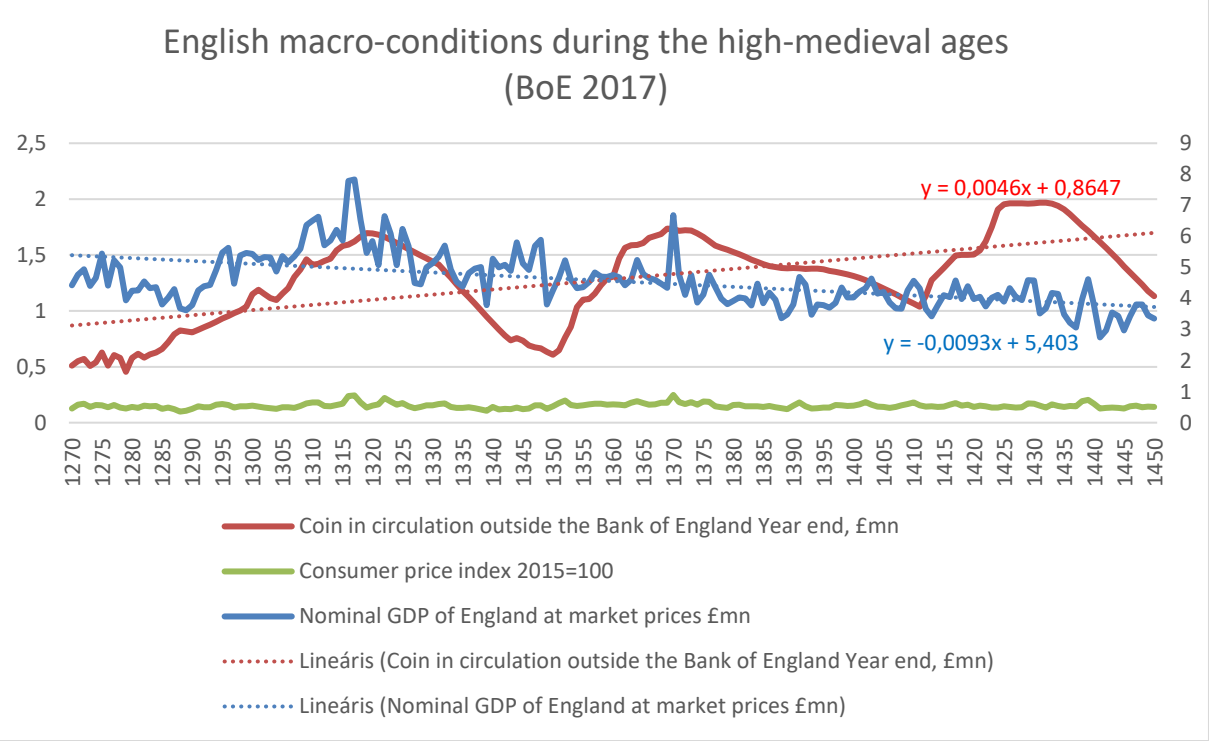
II. Financial history

1. Gold standard compared to Breton Woods, Reasons behind the fall of Breton Woods system

a) Gold coins in the medieval and the early modern period (1200-1820/74)

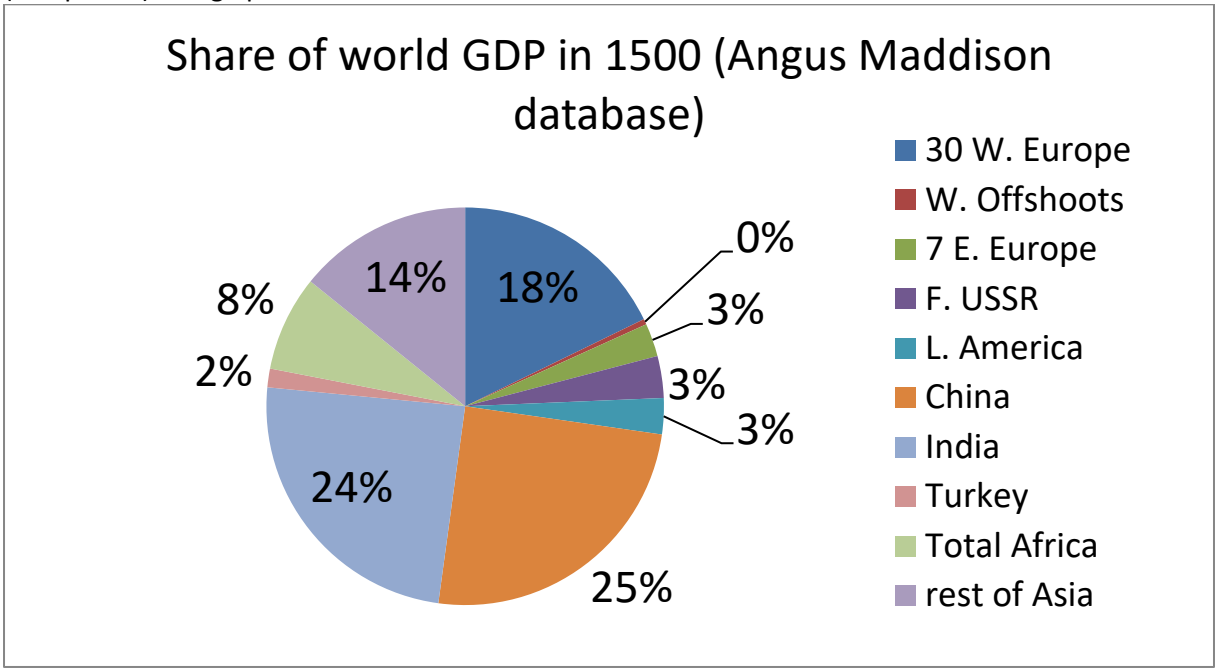
- The medieval economy had linear and slow growth, which could be easily supported by a precious-metal (mainly gold and silver) coin-based monetary system.
- After the Justitianic plague in 541 AD, the extreme weather events of 535–536 and gothic-byzantine wars (535-554) on the Italian peninsula, European internal trade, urbanization and monetized economy ceased to exist on the former core-regions for half thousand years. Europe had a 4% share from global GDP in 1000 AD (India: 28%, China: 23%) with a nearly 35-55 million people. Self-supplying autarky was a common economic form after the 20% urbanization level of the late antiquity times (~300 AD).
- However the agricultural revolution of the 1000s (three-field system, heavy plow, horse plow) increased wheat gross yield per seed ratio to 1:10 (in England: 1:4), while rice in China had 1:20, corn in the Americas had 1:30 at the same time (Braudel 1979). This surplus allowed a population growth to 75-90 million until the early 1300s, the reemergence of large cities (and rural townships), causing a substantial increase in demand and migration from country to city and the development of commerce. At the same time, food production required far more lands and more diversified sources, inhabiting even the mountainous regions like the modern Switzerland.
- The Commercial Revolution redefined the European economy, based on local, regional and long-distance trade: luxuries from the East and intra-continental trade of consumption goods and commodities on an increasing scale. While North-Italian city-states (like Venice, Milan, Genoa, Florence) were involved in the eastern trade through the Levant (luxuries, spices, soap, precious manufactured goods made from high quality Indian steel), Hanseatic cities at the Northern Sea and in the Baltics were oriented on bulk goods and commodities (like wool from the British island or tar from Scandinavia). These two regions had strong ties both on land and sea, while population centers like Paris (220-270 thousand people) provided demand for these goods. However, the European continent had a trade deficit with its eastern partners (there were insufficient goods to export), causing a constant outflow of gold and silver.
- The institutional system based on the feudal state. However, this model was inherently unstable: tax base became wide enough in the core regions (and mainly in France) inly in the late 1400s to project the kings' sovereign power on its entire kingdom (centralized taxation, public administration, standing army). Until this achievement, kings had to share their power with the higher nobility and the parliament (with representatives from the lower nobility and cities) had a mayor legislative power. Meanwhile the feudal state was only one of the state-models on the continent: city states in Northern Italy or in the Low countries (today's Netherlands) had similar or even higher power than most of the monarchs. While the French or English king was able to collect short-term funding for military campaigns (where tax incomes, mining regions and other properties served as a collateral), Florence was able to issue long-term bonds for infrastructure development. After the consolidation of the central power in the 1400s, French, Spanish, Danish and English kings were able to project their power and maintain expansionary policies. Meanwhile the Habsburg Empire was much more like a scattered collection of territories (Austria, Czechia, Hungary, the Low Countries and Spain) trough lucky marriages – which made modern (absolutist) state-building hardly impossible. In between, the Holly Roman Empire was a diverse collection of free cities, duchies, and other minor, local political powers.

- Trade had different levels: merchants moved goods in the relation of rural towns and regional population centers, between the different geographical regions and on intercontinental scale (from the Middle-east coastline) as well. This required more complex organizations: the Italian trade associations (holding companies) had semi-autonomous subsidiaries in all major ports, where business operations based on continent-wide correspondence with highly trained administrative staff (double entry book-keeping, sophisticated Latin writing skills). This structure allowed more complex funding, mostly through commercial papers and supplier credit. Meaning, that commercial lending is crucial even under a gold coin-based system. However, most of the companies were related to the founder and dissolved after its death, so capital accumulation was limited.
- The high-medieval economy had a linear growth trend, which could be served with gold-coins (even if commercial lending bypassed this system already) due to the constant supply of gold mining.



- However, the European economy reached a critical mass around the mid-1400s. On one hand, plagues after the 1350s moderated population growth, causing higher wealth concentration (through inheritance), more diversified agriculture (lower population required less lands, the rest was used to grow industrial plants or the produce wool), higher productivity (water and wind mills), and higher wages (with improved civil rights) in the core regions. On the other hand, with the end of the Pax Mongolica and the fall of Constantinople (the emerging Osman state fought endless wars with the Italian maritime city states like Venice or Geneva) long-distance trade became harder and profit margins were lower as well as the gold outflow was less tolerable as the size of the economy grew further.
- Naval trade was traditionally significant in the Mediterranean region or at the Nordic and Baltic seas and the near-shore sailing connected them on the Atlantic coastline in between. The first Portuguese naval expeditions were motivated by the desire to connect the West-African gold (mined in the Mali and Songhai Empires) directly, by bypassing the traditional cross-Saharan trade-routes. Blue water sailing ships like the caravels and naos were first used to discover and colonize the Azores (by Portugal) and the Canary Islands (by Castile), where missions served

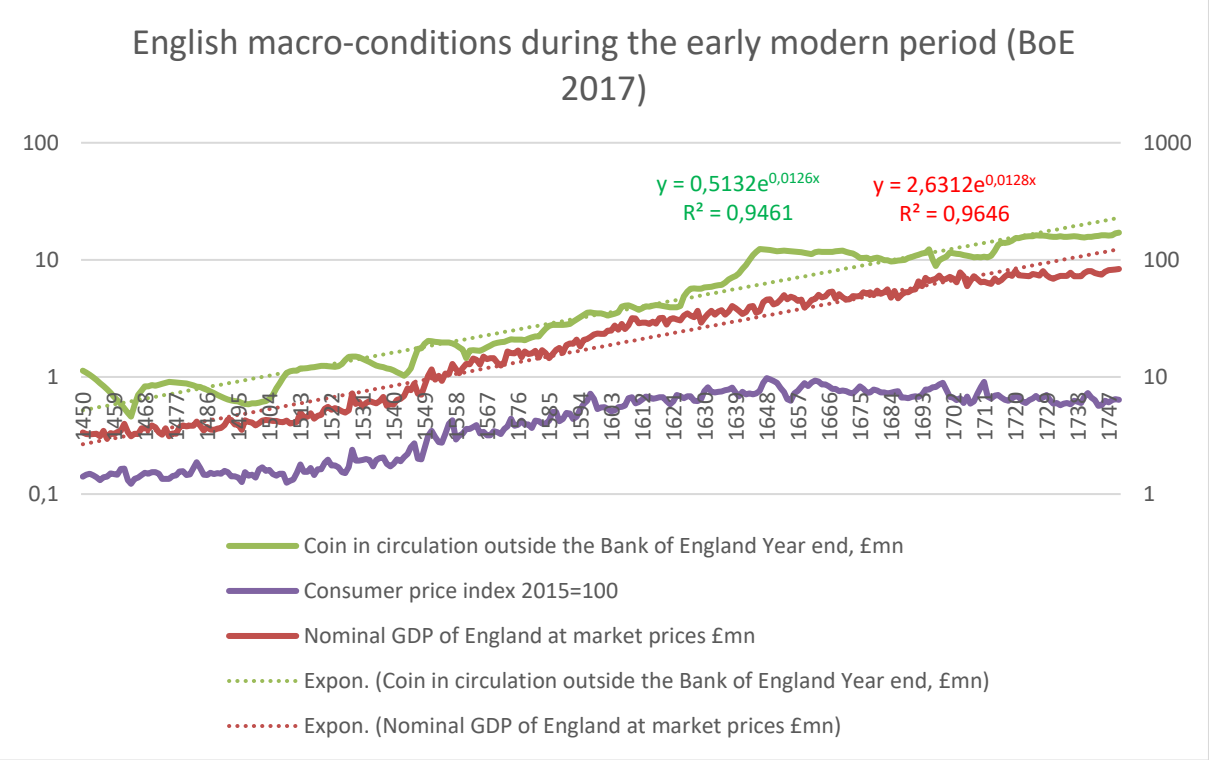
trade purposes as well (tropical plants, slaves and gold). Reaching India took nearly a half century, until Vasco da Gama became the first European sailor to reach India by sea (1498), while the Americas were discovered by Christopher Columbus in 1492. However, the Indian and Chinese trade was based on gold export, since the lack of adequate goods to be sold on these markets. This gold was collected on the American settlements (~180 tons of gold and 8200 tons of silver). The Atlantic triangular trade was dominant until the early 1800s: slaves were moved from Africa to the Americas; raw materials from the Americas were shipped to Europe; which sold finished goods back to the colonies trough royal trade monopolies (companies) at high prices.



- The colonialist expansion caused a constant need for industrial goods. While demand was relatively limited during the high-medieval times, production of a specific good was the "privilege" of a local artisan guild. However, merchants bypassed these monopolies through the workshop (or putting out) system once the demand expanded drastically. Economic output tended to increase more with an exponential than a linear trend, and the increase in productivity reduced the prices of the industrial products in Western Europe. Since industrial plants and wool production required more and more land, food prices stared to increase, while the sudden silver inflow caused an inflation for the 1500s. Central and Eastern Europe lagged behind in this process: the population was decimated multiple times during the 30 years war (1618-1648) and the Turkish wars (1526-1700), orienting the region more towards the agricultural production and export. Western Europe's share from global GDP reached 22% in 1700, while the Eastern half stagnated at 3% (Latin-American colonies: 2%, Osman Empire: 1%, India 25%, China 22%).
- Meanwhile the inflow of new plants (potato, rice, corn) allowed further population growth, despite the extraordinary cold 1600s after the warm 1400s. Increasing the median population from ~80 million (around 1500) to ~140 million (around 1750), with a constant outflow of European colonists. Compared to the high-medieval expansions, where mainly German settlers founded cities the Baltics or in the eastern half of Central Europe spontaneously, early modern colonialism was fuelled under Spanish, Portuguese, French, Dutch and British flags.
- The monetization of the economy increased further, since maritime trade required insurance, and while merchant banks were dealing in commercial loans and investments. Larger

investments required the formation of joint stock companies and stock issuance appeared on the already existing bond and commodity markets (Amsterdam, Ghent, London) in the 1600s.

- Public finance was reinforced by professional public administration in the core countries. Mercantilism was more popular especially in France, aiming to maximize the exports and minimize the imports on nation-level through tariffs on manufactured products. It fuelled the desire to conquer new colonies that would be sources of gold, sugar under the aegis of companies with government-guaranteed monopolies in certain defined geographical regions.



Literature:

BoE (2017): *A millennium of macroeconomic data for the UK, The Bank of England's collection of historical macroeconomic and financial statistics*. Bank of England

Little, Lester K., ed. (2006): *Plague and the End of Antiquity: The Pandemic of 541–750*. Cambridge

Angus Maddison database: http://www.ggdc.net/maddison/oriindex.htm

Bruce M. S. Campbell (2007), *Three centuries of English crops yields, 1211-1491*. URL http://www.cropyields.ac.uk

Braudel, F. (1979): *Civilization and Capitalism, 15th–18th Centuries – The structures of everyday life*. Harper & Row, New York

Spufford, P. (2002): *Power and Profit: The Merchant in Medieval Europe*. Thames & Hudson

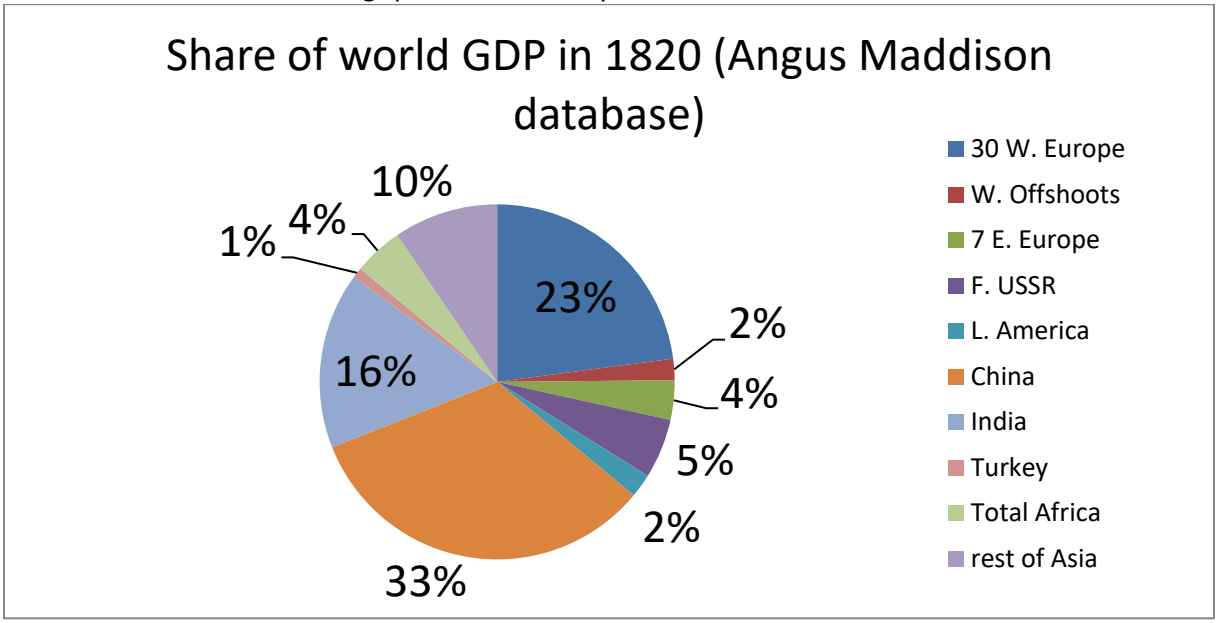
Wyman, P. (2016): *Letters, mobility, and the fall of the Roman Empire*. Dissertation, University of Southern California

Behringer, W. (2009): *A Cultural History of Climate*. Wiley

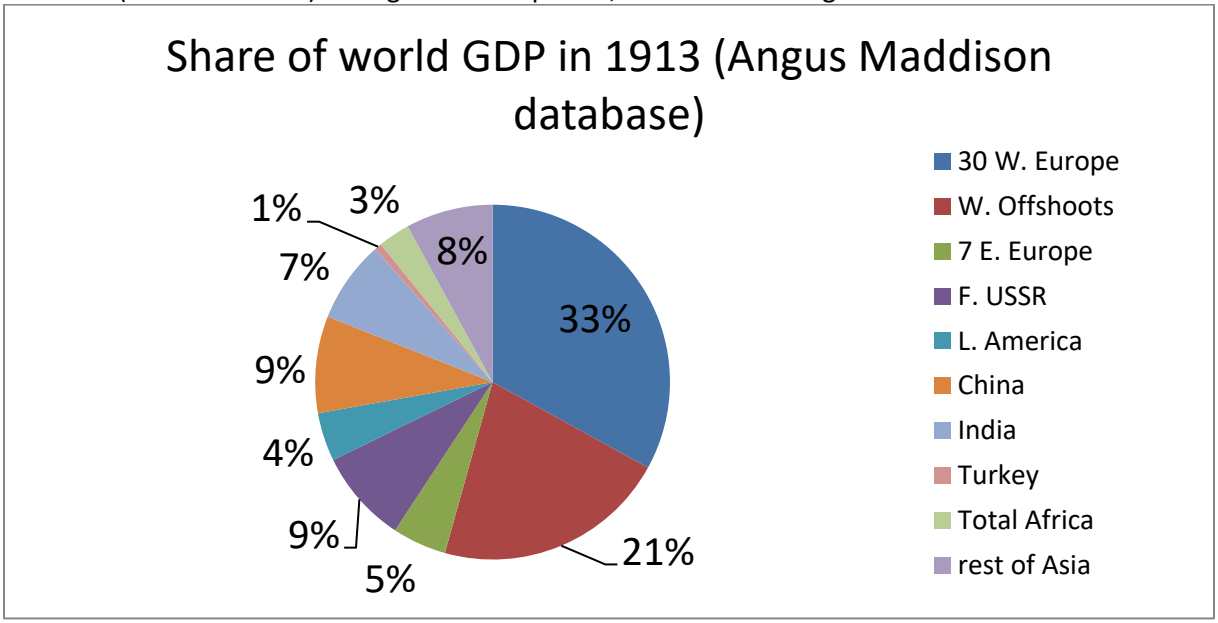
b) Gold standard (1820/74-1914)

- Europe's commercial revolution formed the wealth, the knowledge and the aggregate demand needed for the first industrial revolution (1760-1840). Mass demand for manufactures products allowed the transition from hand production to machines, developments in the natural sciences allowed the practical use of physics and chemistry with mutual feedbacks on iron production, usage of steam and water power. Textile industry had dominance at this time

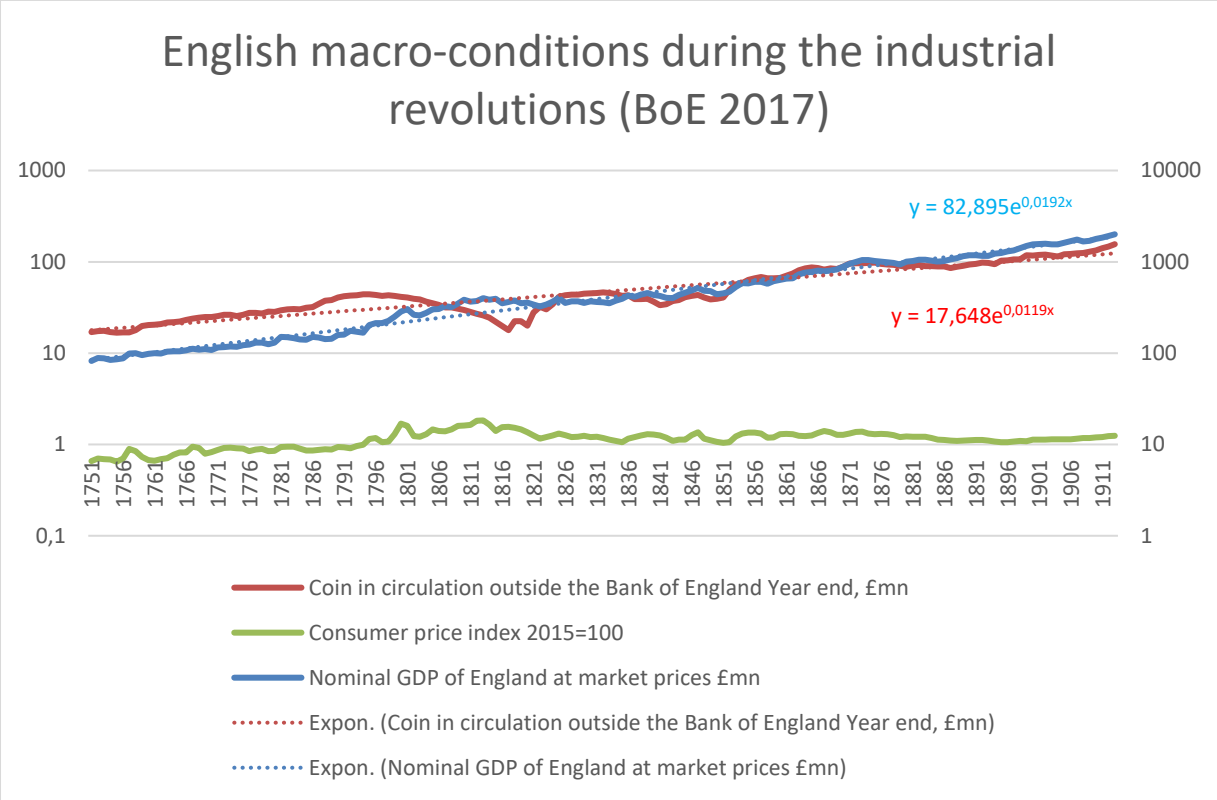
by employment, output and capital. It allowed the increase of per-capita GDP first time in human history, while population had also an unprecedented growth (Europe: ~190 million in 1800). Until the introduction of the first steam locomotives, vast inland canal and waterway networks were built and sailing speed increased by 50% until 1830.



- The second industrial revolution is generally dated between 1870 and 1914, with the emergence of machine tool industry, standardization and developed steel production provided the widespread appearance of telegraph and railroad networks, gas and water supply, and sewage systems. Electrical power was an emergent territory as well. Western Europe had its peak with 33% share from the global GDP before falling in the demise of the first and second world wars (Northern America, mostly the US: 21%), while East Europe had 5%, China 9% and India 7%. The rapid expansion of the productivity growth caused a mild deflation (or low inflation) during the entire period, due to decreasing unit costs.

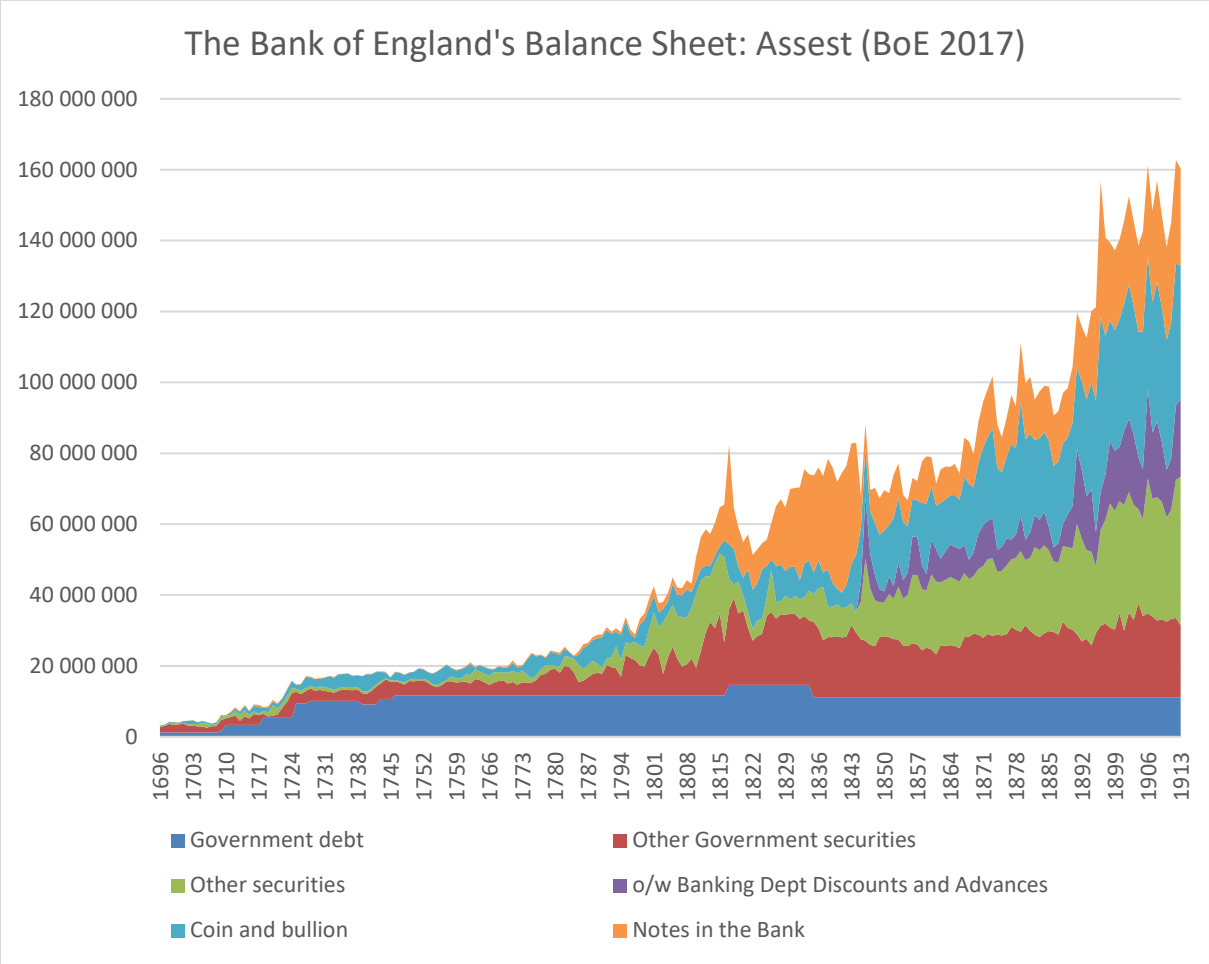


- The proto-industrialist mercantilism was followed by the ideology of laissez-faire capitalism and free trade after Adam Smith's book The Wealth of Nations in the late 1700s, but protectionism became an answer for shifts in comparative advantage for specific countries.



- The gold standard was introduced at first in Great Britain around 1820, where paper money had convertible gold collateral. Bank-notes represented a claim to the bank without interest paid, and could be considered as one of the liabilities besides bank deposits or credit-notes. This paper money could be issued by commercial banks, but money emission soon became central bank's monopoly. Central banks were formed after repositioning one bank:
    - The Sveriges Riksbank (funded in 1668) gained an exclusive right to issue bank-notes in 1897;
    - The Bank of England (funded in 1694) was originally formed to issue bank notes and purchase government bonds, which was transformed in 1781 to bankers' bank: it had to keep enough gold to pay its notes on demand (suspended under the Napoleonic wars from 1797 until 1821). The issue of notes was finally tied to the gold reserves in 1844, giving the Bank exclusive rights to the issue of banknotes.

  However, the lender of last resort function became significant in the mid-1800s, since commercial banking became more and more complex and oligopolistic, therefore financial stability needed an institutional safeguard.



- Paper money was fully convertible to gold for everyone – the amount of gold reserves and money quantity was balanced at the time and gold reserves had homogenous distribution among capitalist countries. Main dilemma: the amount of gold available can be slowly increased by mining while the economy is growing due to continuous growth in productivity (1st and 2nd industrial revolution) - smooth deflation at that time.
- Regardless the gold standard makes high inflation impossible and reduces uncertainty in the international trade (mainly through the price-specie flow mechanism), monetary policy could no longer be used to stabilize the economy. A monetary standard causes that money supply jumps randomly due to unpredictable exogenous events like gold discoveries or shortages. The real-output and unemployment were uncontrollable for monetary policy, with higher interest and output volatility than the post-WW2 monetary systems in the advances economies (Taylor and Williams 2011).
- By the end of the 1st World War the result was an economic chaos (France and Great Britain indebted towards the US, Germany, Austria, Hungary had to pay enormous reparations, losses in manpower, decreased demand and overproduction).

Literature:

John B. Taylor and John C. Williams (2011): Simple and Robust Rules for Monetary Policy, in: Friedman B. M., Woodford M. (eds.): *Handbook of Monetary Economics*, Elsevier, pp. 829-856

Melvin, M. and Norrbin, S. (2013): *International Money and Finance*, Academic Press

Angus Maddison database: http://www.ggdc.net/maddison/oriindex.htm

BoE (2017): *A millennium of macroeconomic data for the UK, The Bank of England's collection of historical macroeconomic and financial statistics*. Bank of England

Bordo, Michael D. (1981): The Classical Gold Standard—Some Lessons for Today. *Federal Reserve Bank of St. Louis Review*, 63, no. 5, pp. 2-17. https://files.stlouisfed.org/files/htdocs/publications/review/81/05/Classical_May1981.pdf

c) *Bretton Woods Agreement (1944 – 1971/73)*

- Lessons from the great financial depression from 1929-1933:
  - The WWI generated an economic boom outside Europe, since demand for food and manufactured products increased drastically on the continent. After the end of the "great war", economic recovery was poor even on the winning side. Global aggregated demand lagged behind the aggregated supply. Increasing tariffs are hindering trade.
  - Indebtedness of the losing countries (Germany, Austria, Hungary) towards France, Great Britain and Italy, and they are also indebted towards the US. Consolidation of the debt was negotiated until 1933, but at that time it was too late. Hyperinflation in Germany, Hungary and in Austria.
  - Investment and commercial banking activities were not separated, while central banks were trying to restore the gold standard.
  - As lending and debt financing collapsed, aggregate demand decreased further. Deflationary Spiral is a downward price reaction to an economic crisis leading to lower production, lower wages, decreased demand, and still lower prices. This provided a positive feedback for further reduction in funding, increasing the number of defaults.
  - Glass–Steagall act separated investment and commercial bank activities in the US after 1933 (until 1999).
  - Keynes – aggregate demand affects output and inflation[4]:
    - more concerned about combating unemployment than about conquering inflation
    - both fiscal and monetary policies affect aggregate demand
    - aggregate demand (anticipated or unanticipated) has short-run effect on real output and employment, but not on prices: Phillips-curve (inflation rising only slowly when unemployment decreases)
    - monetary policy is efficient (has real effects on output and employment) only if some prices are rigid
    - aggregate demand: consumption, investment and government expenditures have an impact on the output – multiplier effects
    - prices (especially wages) have slow response on changes in supply and demand: periodic shortages and surpluses (especially of labor): unemployment is subject to the caprice of aggregate demand
    - activist stabilization policy ("fine-tuning") to reduce the amplitude of the business cycle, which they rank among the most important of all economic problems:
      - adjusting government spending, taxes, and interest rates every few month to stabilize unemployment
- After the Second World War, most of the European and East-Asian countries were in ruins. Their export-capacities had to be restored, so reconstruction and the restoration of the external balance was combined:
  - FX regime: Half of the world's gold reserves were in the US, so the U.S. dollar was valued as 1/35 ounce of gold and Western European exchange rates were fixed to US dollar (+/- 1% band). Only central banks were allowed to be served at the 1/35 exchange rate. The demand for USD (to fill foreign FX reserves) required BoP deficit in

[4] https://www.econlib.org/library/Enc/KeynesianEconomics.html

the US, while the reserve-currency function of the USD extended the US (public)debt financing on global scale.
    - External balance and reconstruction: European economies had to rebuild from scratch, external macro balance was supported by IMF lending, project financing for physical infrastructure programs were supported by the International Bank for Reconstruction and Development ("World Bank") and the Marshal-plan provided assets for that.
- The fall of the Breton Woods system after the 1960s:
    - German and Japanese economies regained their significance, so world trade became multipolar again.
    - Western European countries happily accumulated excess US dollars until the end of the 1960s.
    - Fiscal causes of the inflation: There were no fiscal rules for participant countries, and the Cold War increased the US budget deficit (weapon development programs, Korean and Vietnamese Wars, NATO capabilities, space program etc.).
    - Keynesian monetary policy pursued unemployment, but generated inflation as a result. Inflation started to increase after 1969.
    - International raw material prices became undervalued, oil exporter countries became uneasy to see the decrease of the purchasing power of the USD, what decreased their import potential as well.
    - Practically, while the purchasing power of the USD was eroded by the inflation (both with fiscal and monetary roots), the external value (FX rate) was fixed, what undermined credibility. This came from the paradox of using a national currency as a global currency, where the domestic and foreign preferences about the monetary policy could have a conflict.
- Smithsonian Agreement (1971-1973): devaluation of the U.S. dollar by about 8 percent against other currencies. In addition, boundaries for the currency values were expanded to within 2.25 percent above or below the rates initially set by the agreement.
- Temporary suspension of the agreement in 1973. The result was increased inflation and economic stagnation (*stagflation*) until 1979 with increasing oil prices and volatile FX rates.

Literature:

Melvin, M. and Norrbin, S. (2013): *International Money and Finance*, Academic Press
Botos, K. and Halmosi, P. (2006): *Nemzetközi Pénzügyek*, JATEPress, Szeged
Szegő, Sz. (1969): *Arany, pénz, hatalom*. Kossuth könyvkiadó, Budapest

d) The Great Moderation (1982-2007)

- The great moderation
    - started at first month of the expansion following the 1981–1982 recession (November 1982)
    - end at the beginning of the 2007–2009 recession (December 2007)
    - inflation and interest rates and their volatilities diminish compared with the experience of the 1970s
    - volatility of real GDP reached lows never seen before
    - Economic expansions became longer and stronger while recessions became shorter and shallower
        - variance of real GDP growth,
        - the variance of the real GDP gap,

        - the average length of expansions,
        - the frequency of recessions, or
        - the duration of recessions
    - improvement in price stability with the inflation rate much lower and less volatile than the period from the late 1960s to the early 1980s
    - also occurred in other developed countries and most developing countries
- the contribution of simple policy rules to the Great Moderation
    - central banks became more responsive and systematic in adjusting to developments in the economy when changing their policy interest rate
        - interest rate moves were less responsive to changes in inflation and to real GDP in the period before the 1980s
        - After the mid-1980s, the reaction coefficients increased significantly
            - reaction coefficient to inflation nearly doubled
                - estimated reaction of the interest rate to a 1% increase in inflation rose from about 0.75 to 1.5
            - reaction to real output also rose
            - coefficients are much closer to the parameters of a policy rule like the Taylor rule
        - reaction coefficients were also low in the highly volatile pre-World War II period
    - deviations from a Taylor rule began to diminish in a number of countries in the early 1980s
    - formal statistical techniques or macroeconomic model simulation
        - change in monetary policy had an effect on performance;
        - other factors, mainly a reduction in other sources of shocks to the economy (inventories, supply factors), were responsible for a larger part of the reduction in volatility
        - shift in the monetary policy rule led to a more efficient point on the output-inflation variance trade-off
        - 20 of the 21 countries that had experienced a moderation in the variance of inflation and output, they found that better monetary policy accounted for over 80% of the moderation
    - connection between the research on policy rules and the decisions of policymakers

Literature:

John B. Taylor and John C. Williams (2011): Simple and Robust Rules for Monetary Policy, in: Friedman B. M., Woodford M. (eds.): *Handbook of Monetary Economics*, Elsevier, pp. 829-856

e) Gold standard and higher macroeconomic volatility

Theoretical Model:

Monetary policy should manage and reduce the volatility of the main macro-variables, like output (GDP), interest rates or price level (CPI). As it was referred above, there is a consensus in the literature about the higher macro-volatility under gold-based currency regimes – suggesting that a rule-based monetary policy can provide smoother economic conditions than a standard-based.

Data:

The "A millennium of macroeconomic data for the UK", published by the Bank of England, from 1270-2007. The following subsets were compared:

a. high-medieval period with gold coin system: 1272-1450
b. early modern period: 1451-1750
c. first industrial revolution: 1751-1843
d. gold standard: 1844-1913
e. Breton-Woods system: 1944-1971
f. the great moderation: 1982-2007

Methods:

Volatility is *time variant* as market sentiment changes constantly, so the usage of unconditional (time-invariant) standard deviation would be misleading. Persistence is an another important property, since heteroscedasticity represents the presence of high and low volatile periods – meaning that if the market was unsure to price in an asset (volatility was high) it will be uncertain tomorrow as well. Such persistence can be captured by different GARCH models, since they can be fitted to estimate conditional (time-variant) standard deviations, following Cappeiello, Engle and Sheppard (2006).

The following GARCH(p,q), GJR GARCH(p,o,q), TARCH(p,o,q) and APARCH(p,o,q) models can be useful to capture volatility developments and their clustering in time (heteroscedasticity).

GARCH (p,q): $\sigma_t^2 = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_i \sigma_{t-j}^2$.

where σ_t^2 represents present variance, ω is a constant term, p denotes the lag number of squared past ε_{t-i}^2 innovations with α_i parameters, while q denotes the lag number of past σ_{t-j}^2.variances with β_i parameters to represent volatility persistence.

Asymmetric GARCH models can be introduced via

$\begin{cases} S_{t-i}^- = 1, if\, \varepsilon_{t-i} < 0 \\ S_{t-i}^- = 0, if\ \varepsilon_{t-i} \geq 0 \end{cases}$ as a sign asymmetric reaction to decreasing returns (volatility increases if the return is positive or negative).

TARCH (p,o,q): $\sigma_t = \omega + \sum_{i=1}^{p} \alpha_i |\varepsilon_{t-i}| + \sum_{i=1}^{o} \gamma_i S_{t-i}^- |\varepsilon_{t-i}| + \sum_{j=1}^{q} \beta_i \sigma_{t-j}$,

GJR GARCH (p,o,q): $\sigma_t^2 = \omega + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{o} \gamma_i S_{t-i}^- \varepsilon_{t-i}^2 + \sum_{j=1}^{q} \beta_i \sigma_{t-j}^2$,

Model selection can be made with a focus on homoscedastic residuals (using a 2 lagged ARCH-LM test), searching for the lowest Bayesian Information Criteria (BIC).

Software:

Matlab2014b, MFE toolbox (by Kevin Sheppard)

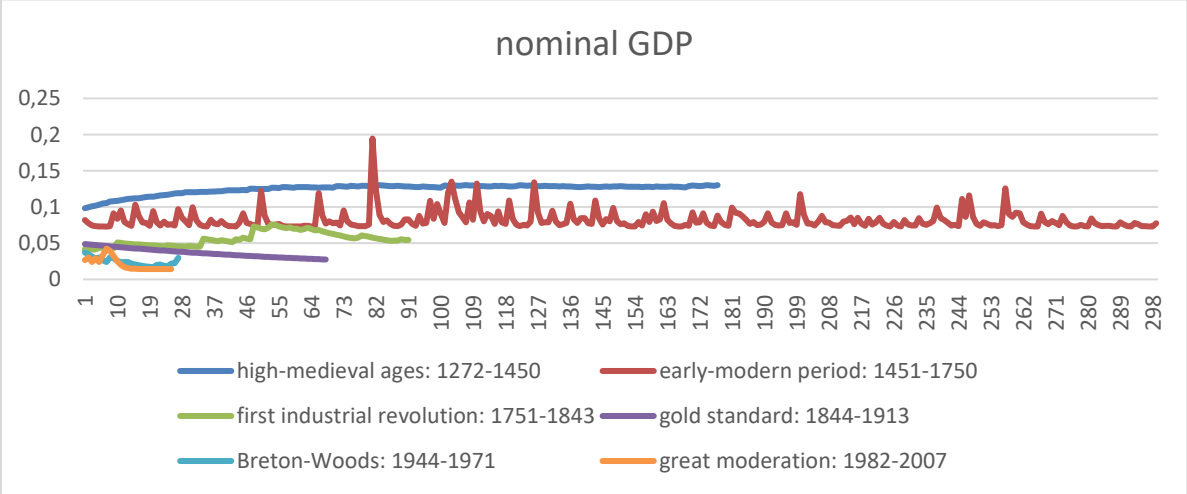
Results:

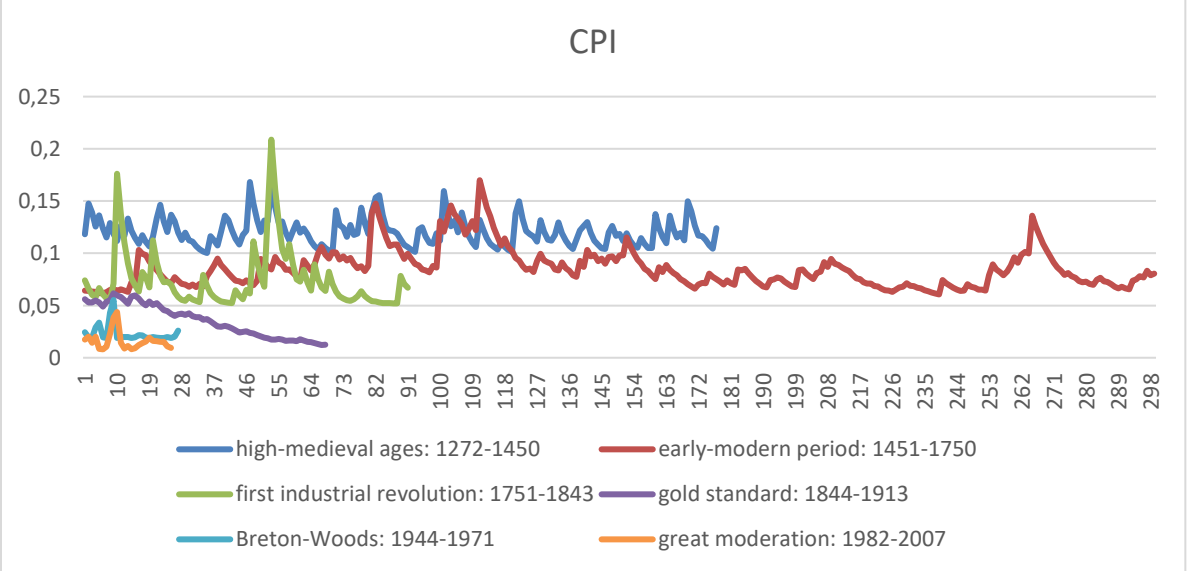
The median standard deviation of the output, price level and the interest rate were higher under the gold-based systems, while the money in circulation was highly robust on the underlying regime. The introduction of free-floating increased volatility for the GBP.

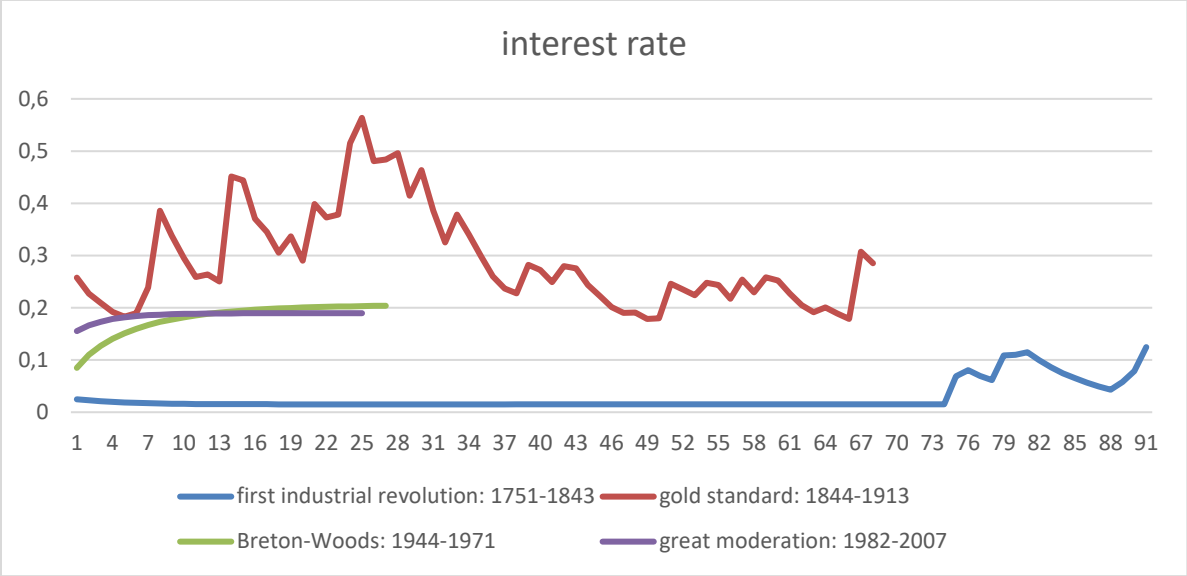
	high-medieval ages: 1272-1450	early-modern period: 1451-1750	first industrial revolution: 1751-1843	gold standard: 1844-1913	Breton-Woods: 1944-1971	great moderation: 1982-2007
GDP	13%	8%	5%	4%	2%	2%
CPI	12%	8%	6%	4%	2%	1%
money in circulation	3%	3%	3%	4%	3%	4%
interest rate			2%	26%	19%	19%
FX rate				1%	4%	7%

Source: Authors' calculations

The conditional standard deviations provided similar results, where the post 1982 period provided lower volatility due to the inflation-oriented approaches.







Source: Authors' calculations

Literature:

Cappeiello, L. – Engle, R. F. – Sheppard, K. (2006): Asymmetric Dynamics in the Correlations of Global Equity and Bond Returns. *Journal of Financial Econometrics*. 4. pp. 537-572.

2. European attempts to overcome the FX rate exposure

a) European Monetary System (EMS, 1979-1992)

Under the EMS, exchange rates of member countries were held together within specified limits and were also tied to the European Currency Unit (ECU), which was a unit of account. Its value was a weighted average of exchange rates of the member countries; each weight was determined by a member's relative gross national product and activity in intra-European trade. The currencies of these member countries were allowed to fluctuate by no more than 2.25% from the initially established values. Without general rules about economic and fiscal policy, fears of GBP and Italian Lira devaluation resulted in a huge speculative attack kicking these currencies out of EMS. The ERM II system was introduced with +/- 15% fluctuation band but the introduction of one single currency (Euro) with a common monetary policy (represented by the European Central Bank) became necessary.

b) What is a fixed exchange rate regime and how is it related to the Euro?

Currencies in fixed exchange regimes are tied to another currency (like the US dollar or the euro), to a basket of currencies (like 45% USD, 45% EUR and 10% GBP) or to gold (like Gold Standard or Breton Woods systems in the past) with a narrow fluctuation band (usually 1-2%). Monetary policy focuses on the stability of the exchange rate with direct interventions from its currency reserves and trough indirect interventions by changing the interest rates (and the relative interest rate premium against the benchmark currency). The benefits of the fixed regimes are the stable exchange rate for foreign trade actors and the harmonized inflation levels. The problems are coming from the sustainability of the regime: the entire monetary policy will be in a mechanical relationship with another country determining all the interest rates and the benchmark-currency's appreciations and depreciations will have an impact on the foreign markets as well.
The Eurozone can be interpreted as a fixed exchange rate regime on the inside: the member states have none of their former national currencies and the national central banks are the local executioners of the European Central Bank's monetary policy. However, the maintenance of this fixed regime required further fiscal and financial integration as well single bank supervision.

c) How can a country introduce the euro?

The euro can be introduced anywhere as an official currency ("eurolisation") as it happened in Montenegro or Kosovo by unilateral decision, where the central bank in limited on the euro-liquidity management. First they have to accumulate euro reserves (for example by taking up a loan from other central banks), than they can lend it out to the domestic commercial banks or they can accept deposits from them. However, these countries can't join to the European Union until they are not introducing a national currency.
The official way to introduce the euro starts by joining the European Union as a member state. In this case the country accepts the four freedoms, the Union's commitments toward the civil rights and it will be obligatory to introduce the euro in the undefined future[5]. Than the country must meet the Maastricht-criteria (Treaty Article 109j (1)):

- high degree of price stability (rate of inflation is close to at most, the three best performing member states);
- sustainability of the government financial position (deficit is lower than 3% of GDP and public debt is lower than 60% of GDP or decreasing toward this direction);

[5] Great-Britain and Denmark have opt-out right, but Denmark maintains a +/- 2.25% fixed exchange regime and their interest rate policy follows closely the steps of the ECB.

- Normal fluctuation margins provided for by the Exchange Rate Mechanism II., for at least two years (staying inside a +/-15% fluctuation band);
- long-term interest rate levels are converging.

If a country can keep their currency inside this really broad +/-15% fluctuation band (actually it is more close to free floating than to a fixed regime) for two years and they have stable fiscal policy, than they can introduce the euro.

d) What are the consequences of the introduction the euro?

The Eurozone is a whole much deeper level of the European integration: the monetary policy of determined by the European Central Bank (the governor of the local national bank is represented in the Governing Council and has voting power as well as they execute the monetary policy on local level) and they became the part of the Banking Union. It means that the systemically important commercial banks are supervised by the ECB as well as banking crises can be solved from the Single Resolution Fund (55 billion euros until 2023) and all bank deposits below €100 000 are insured by the European Deposit Insurance.
The European Commission (EC) becomes an integrated part of public budget planning and the fiscal and macroeconomic instabilities are subjects of constant monitoring. Countries who are close to public default (government bond yields increasing to unsustainable levels) can be supported from the European Stability Mechanism (€500 billion) loans.

e) Can we maintain floating exchange rate regime inside the EU?

Any Member State can delay the introduction of the euro and can initiate any exchange rate regime (except official eurolisation). However, when more than half of the foreign trade is done with other EU MSs, the volatile behaviour of the floating regime can have adverse side-effects. Non-Eurozone MSs followed two different paths: they are fixing their currency to euro (like Denmark or Bulgaria) or their floating currencies tend to appreciate (like the Czech Koruna or the Swedish Koruna) or depreciate (like the Hungarian forint, the Romanian lei and sometimes the Polish zloty). Floating regimes are preferred because their shock-absorbent capabilities: devaluations during recession periods can stimulate export and growth. On the other hand: ECB's interests rate decisions are respected and followed even in under floating regime – however, the relationship is less mechanical than under fixed regimes.

f) Europe's Snake Arrangement – Why can't we just fix the national currencies?

Fixing the European currencies against each other was a dead end when they tried it between 1972-1979. There were 9 countries and 36 possible combinations to stabilize with a +/- 2.25% band. Meanwhile, there were neither common rules for either fiscal and monetary policies nor common funds for crisis resolution. By 1977 the system was restricted to the West-German, Belgian, Luxembourg, Dutch and Danish currencies while the others (Italy, France, and Great-Britain) were not able to follow the constant appreciation of the Deutsche mark.

g) European Monetary System I. – Why can't we just introduce a basket currency to fix the national currencies?

The "currency snake" failed due to its difficulty and the lack of harmonised economic policies. The European Currency Unit (ECU) was introduced as an artificial basket currency in 1979 which never had any physical form. Its exchange rate was calculated as weighted averages: weights were determined by a member's relative gross national product and activity in intra-European trade (West-Germany ~30%, France ~20%, Italy, Great-Britain, Belgium, Netherlands ~10%). Member States had to fix their currencies to the ECU with a +/-2.25% (or sometimes 6%) band. This system started to follow the Deutsche mark as well due to the low inflation preference of the German Bundesbank, but the volatility

of the European currencies decreased. The ECU was also used as an accounting unit to calculate the budget of the European Economic Community (predecessor of the EU). The ECU was officially replaced by the euro in 1998; however the so-called "ERM-crisis" in 1992 kicked Great-Britain and Italy out from the system due to their currencies' rapid devaluation. This incident led to the general adoption of inflation targeting monetary policies on the continent. Practically, interest rates cannot be the tools of currency stabilisation and a stimulant for economic growth at the same time – pursuing moderate inflation became a more realistic goal.

h) Why does the euro follow an independent floating regime?

Floating is inevitable because there is no other currency which is backed by a big-enough economy to fix the euro to it. The GDP of the euro area was 11.205 trillion euro in 2017 (Eurostat) while the United States was 19.39 trillion USD (~17.13 trillion euro). China and Japan were on the third and fourth places. This means that the euro could be fixed to the US dollar only (Chinese renminbi is already fixed to the USD). However, last time when European currencies were fixed to USD under the Breton-Woods agreement (1944-1971/73) did not end well. The US dollar was fixed to gold and all other currencies to the USD, which served well during the reconstruction years after the Second World War. However, this system was too rigid: the 1 ounce of gold to 35 USD ratio[6] did not consider the inflation which emerged after 1965 nor the Keynesian monetary policy which managed recession periods with reduced interests rates or budget expansion pushed by the cold war, increasing the public debt by nearly 60% between 1950 and 1971. The European countries reserved US dollars, so first it was welcomed as excessive dollars started to flow as a result of their balance of payments deficit. However, once the increasing inflation started to eat away the purchasing power of the US dollar, some European and raw material exporter countries became uneasy of the situation. The US dollar was devaluated in 1971 to 100 USD per ounce of gold according to the Smithsonian Agreement but in 1973 it was suspended and dollar started a floating regime. The result was a worldwide decade-long stagflation (inflation and economic stagnation), which was consolidated in the early 1980s only (then, this consolidation caused defaults in many developing countries, even in Hungary and Poland as side-effects).

i) Why not to fix the euro to gold?

Gold is considered as a commodity nowadays, same as oil, iron or grain. However, it was used as money since the beginning of time due to its unique physical properties. Firstly, it does not oxidize as most metals, secondly, it is rare. However, this scarcity is also a problem: in cases of rapid economic growth, the rate of mining (money-supply) can lag behind money-demand, causing decreasing prices. Price levels were biased by gold supply shocks since the medieval age in Europe, while the continent covered its trade deficit with China and India with gold and silver export. Once economies started to expand, commercial and debt-backed funding started to substitute gold-transactions. After the Napoleonic wars, the gold standard became dominant until the First World War. Central banks were known to accumulate gold reserves on the asset-side of their balance sheets and to issue paper money (bank notes) as their liabilities. In this 1820s-1914 period there were two industrial revolutions and exponential growth in production, productivity and population as well – so money had less and less gold-coverage. However, gold production swings maintained a short-term price instability and real-output and unemployment were uncontrollable for monetary policy[7]. Later, gold reserves were disrupted by the First World War and the deflation-combined recession in 1929-1933 ended this system.

On the other hand, gold did not disappear from monetary policy: 17% (33.7 thousand tons) of above ground stocks are still in the hands of central banks. Central banks in the Eurozone (ECB included) have

[6] Only for the central banks, while half of the gold reserves were located in the US.

[7] https://www.econlib.org/library/Enc/GoldStandard.html

32% of it (10.8 thousand tons) and gold reaches 54% of their foreign exchange reserves[8]. There is one problem: gold prices can fluctuate (like government bond prices as foreign exchange reserves are invested) but they do not pay any interests as it is happening in case of government bonds. So technically it is more risky and less profitable for central banks, but they are still keeping the gold as a last resort asset.

Literature:

Michael Melvin and Stefan Norrbin (2013): *International money and finance*. Elsevier, p.25-34-51

[8] https://www.gold.org/goldhub/data/monthly-central-bank-statistics

III. The international spillovers of the monetary policy

1. Monetary trilemma

The trilemma is a constraint on monetary policy, meaning a country cannot simultaneously have free movement of capital (liberalized financial account), fixed exchange rate and autonomous monetary policy at the same time. The value of the US dollar is market-determined but the United States has an independent monetary policy and a liberalized financial account. Countries in the Eurozone preferred exchange rate stability by introducing the euro, and they enjoy the free movement of capital as a cornerstone of the EU – but the price for this is that individual nations no longer have an independent monetary policy as it is now determined by the European Central Bank. The stabilized Chinese exchange rate and the autonomous monetary policy require restrictions on international capital flows for China.
However, market-determined exchange rate and free capital movements are not necessarily providing high autonomy for monetary policy – the degree of freedom, how the central bank can focus its economy can be limited by external factors, such as key central banks' decisions or global capital movements. But at least the monetary policy will be less mechanical (Davis 2015).

Literature:
OBSTFELD, M., SHAMBAUGH, J. C., TAYLOR, A. M. (2005): The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility. The Review of Economics and Statistics, vol. 87, no. 3, pp. 423-438.
Davis, J. S. (2015): *The Trilemma in Practice: Monetary Policy Autonomy in an Economy with a Floating Exchange Rate*. FEDERAL RESERVE BANK OF DALLAS, Globalization and Monetary Policy Institute 2015 Annual Report

2. Primary objectives of the monetary policy and its impact on foreign exchange rates

a) Objectives

- Exchange rate anchor (peg, band, crawling peg/band, currency board)
  - USD (2008: 66; 2017: 39)
  - Euro (2008: 27; 2017: 25)
  - Composite (2008: 15; 2017: 9)
  - Other (2008: 7; 2017: 9)
- Monetary aggregate target (2008: 22; 2017: 24)
- Inflation targeting framework (2008: 44; 2017: 40)
- Other (mixed, 2008: 11; 2017: 46)

b) Monetary aggregate target

- Policy makers are assuming a function-based relationship between money supply, price level and output. If you are able to manage reserve money, M1, or M2 aggregates, you will have an impact on price level and output as well. The strategy was used in the US between 1979 and 1982 to fight against stagflation with a shock therapy: inflation became the main enemy regardless to growth. High inflation between 1965 and 1980 partially was a result of negative interest rate policy of the US FED (lazy fiscal policy also had an impact on it as well), because they tried to increase economic output with cheap lending.
- Commercial bank reserves were regulated by the FED and the yield curve became the subject of market forces. Interest rates and bond yields were booming while banks suffered from liquidity scarcity. Pragmatic monetarism had some weaknesses: the link between money

supply and monetary base is tenuous; information is available only with a lag while the framework increased volatility of interest and/or exchange rates (Benati-Goodhart 2011). More than 1000 US banks which lent money with long term fixed interest rates before 1979 went in default ("US savings bank crisis"). However, inflation decreased and economic growth started again.

- Pragmatic monetarism had its side effects on global economics too: Mexico, Brazil and Argentina declared default while Hungary became the member of the IMF (in 1982!) with Chinese support to avoid default. The Polish communist party was cued by the Polish army for Soviet suggestion to avoid the further escalation of economic crisis. All of these countries took up many cheap loans in the 1970s but most of them were not utilised to increase their productivity.
- Lesson: when we are afraid of inflation and the problem can be solved through lending policies, then why not focus only on inflation?
    - Poole's analysis: interest rate is a better tool than money supply (Fender 2012).
    - Goodhart's law: „any observed statistical regularity will tend to collapse once pressure is placed on it for control purposes" (Fender 2012).

c) *Inflation-targeting framework*

- Setting the interest rate in order to meet an inflation target. Inflation is measured by the Consumer Price Index in the medium run (expectations for 1-2 years). Short term interest rate management has three channels: lending, FX rate and expectation channels. Lending is related to consumption, investment, public debt – changes in key policy interest rate will have an impact on interest rates of the commercial bank deposits and (due to maturity transformation) bank loans[9]. This is the process through which monetary policy decisions affect the economy in general, and the price level in particular is called transmission mechanism (Issing et al. 2001).
- The exchange rate channel represents how exchange rate movements affect the domestic price of imported goods. Imports are used as inputs into the production process, lower prices for inputs result in lower prices for final goods. Import prices are related to the competitiveness of domestically produced goods on international markets. The strength of exchange rate effects depends on how open the economy is to international trade. The expectations channel influences the private sector's longer-term expectations. Its effectiveness crucially depends on the credibility of the central bank's communication, how it is able to guide economic agents' expectations of future inflation thereby influencing their wage and price-setting behaviour.
- Price stability is good, because of many reasons:
    - it allows the market to allocate resources more efficiently
    - creditors can be sure that prices will remain stable in the future,
    - it does not demand an "inflation risk premium",
    - it is effective against stockpile real goods,
    - tax and welfare systems can create perverse incentives which distort economic behaviour,

[9] Official interest rates → market interest rates → expectations → saving and investment decisions → a change in aggregate demand and prices → asset prices → the supply of credit → the overall risk-taking behaviour of the economy (ECB 2011).

- inflation acts as a tax on holdings of cash,
- maintaining price stability prevents redistribution of wealth and income in inflationary environments,
- sudden revaluations of financial assets undermine the soundness of the banking sector's balance sheets and decrease households' and firms' wealth (ECB 2011).

- Lesson: it works because when a country introduced it in the past, inflation decreased sooner or later.
  - Tinbergen principle: a policy maker needs as many instruments as targets. Instrument is a tool the policy maker has control over that he uses to try to achieve his target (Fender 2012).
  - „Obliquity": the best way to achieve a goal is to pursue some other goal rather than the goal itself (Fender 2012).

d) Macroprudential policy

- focuses on the excessive systemic financial risks by preventing severe financial crises and minimising their effects on the real economy.
- The aim is to prevent excessive credit growth,
  - to manage liquidity risks,
  - to limit excessive concentration,
  - to limit the misaligned incentives
  - that strengthen systemic risks and to strengthen the resilience of financial infrastructures.
- Capital requirements – against incentives to take excessive risks
  - Consequences of a failure of financial intermediaries can be severe for the rest of economy
  - Bank managers can be fired but not have to pay back losses
  - Shareholders are also have limited liability
  - Deposit insurance – depositors will not punish with their withdrawal
- Capital requirements should be countercyclical
  - Raised under boom and cut in a recession
  - But how one knows the economy is in boom or recession?
- reading: http://www.mnb.hu/en/financial-stability/macroprudential-policy/a-brief-review-of-macroprudential-policy

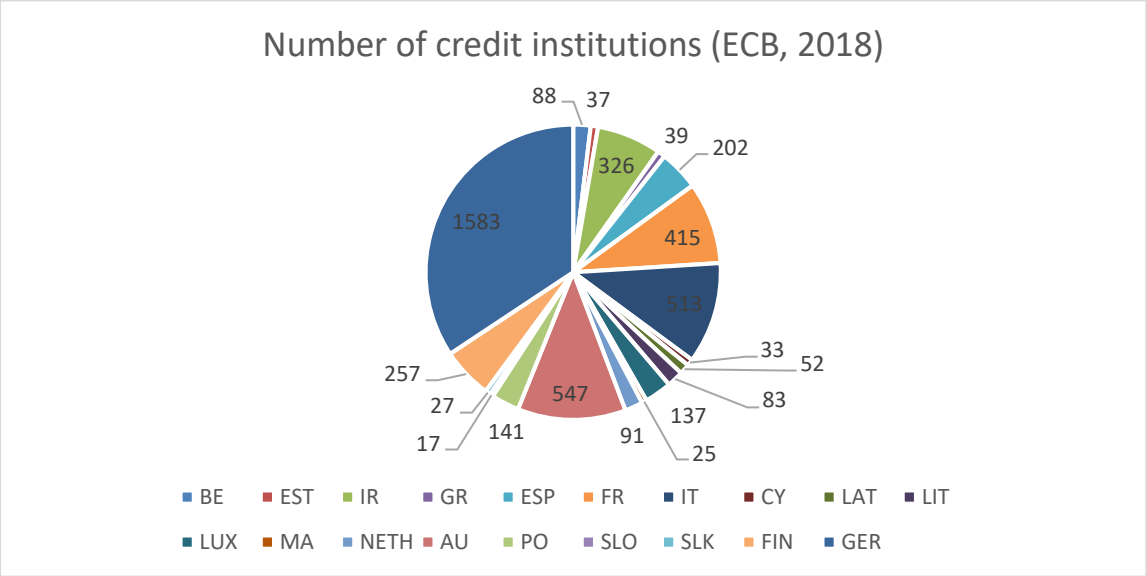
e) Single Supervisory Mechanism

- „Financial stability: a condition in which the financial system financial intermediaries, markets and market infrastructures capable of withstanding shocks and the unravelling of financial imbalances, thereby mitigating the likelihood of disruptions in the financial intermediation process which are severe enough to significantly impair the allocation of savings to profitable investment opportunities" (ECB 2011).
- Macroprudential policy[10] focuses on the excessive systemic financial risks by preventing severe financial crises and minimising their effects on the real economy. The aim is to prevent

[10] http://www.mnb.hu/en/financial-stability/macroprudential-policy/a-brief-review-of-macroprudential-policy

excessive credit growth, to manage liquidity risks, to limit excessive concentration, to limit the misaligned incentives that strengthen systemic risks and to strengthen the resilience of financial infrastructures.

- The banking union stands from the Single Supervisory Mechanism (SSM), the Single Resolution Mechanism (SRM) and the European deposit insurance scheme (EDIS). Mainly it is focusing on the Eurozone, but it is open for other member states as well.
- The creation of the bank union was motivated by the cross-border operations of the main banking networks which enjoyed the free movement of capital, but grown too complex for national supervision authorities. Nearly 2,000 credit institutions have the facility to bid at the weekly ECB operations, of which around 300 regularly does so.
- The European Central Bank is responsible for the prudential supervision of commercial banks located in the euro-area, under the Single Supervisory Mechanism. The ECB directly supervises the largest significant banks (N=118 in 2018), while the national supervisors continue to monitor the remaining banks. A bank became significant[11] when the total value of its assets exceeds €30 billion, the total value of its cross-border assets exceeds €5 billion (and above 20% of total assets) or it has requested or received funding from the European Stability Mechanism. Actually, ECB supervision seems marginal if we are looking at the number of credit institutions operating in the euro-zone.



- In many cases, a bank's balance sheet has similar size as the country's GDP. The Single Resolution Mechanism (SRM) prevents the bail-out driven booms in public debt as it happened in Spain around 2010. The Single Resolution Fund collects 1% of the amount of covered deposits of all credit institutions reaching 55 billion euros in 2023. The idea of risk sharing is behind the initiative: losses like 0-8% of balance sheet are absorbed by shareholders, and then the next 9-13% will be absorbed by the SRM.

f) Monetary policy objective of the ECB

- "The primary objective of the European System of Central Banks (the ECB and the national central banks in the EU) shall be to *maintain price stability*. *Without prejudice* to the objective of price stability, the ESCB shall support the general economic policies in the Union with a view to contribute to the achievement of the objectives of the Union as *full employment* and *balanced economic growth*."[12] Practically, interest rate is managed by the ECB in order to meet

[11] https://www.bankingsupervision.europa.eu/banking/list/criteria/html/index.en.html
[12] Treaty on the Functioning of the European Union, Article 127 (1).

an inflation target. The targeted inflation level is 2% for the ECB on the medium run (1-2 year horizon). The maintenance of the price stability is about safeguarding the value of the euro.

- On the one hand, there is no real alternative objective: the Eurozone is too big to fix the euro to another currency, while monetary aggregate targeting is outdated. The Keynesian full employment targeting after WWII led to stagflation in the 1970s. The practical benefit of inflation targeting is that it works: inflation dropped after it was implemented in most cases. (Fender 2012, Benati - Goodhart 2011, Frankel 2011)
- On the other hand, price stability is good, because it allows the market to allocate resources more efficiently, creditors can be sure that prices will remain stable in the future and they don't demand an "inflation risk premium". It is against stockpiling of real goods. Tax and welfare systems can be biased by high inflation. Inflation acts as a tax on holdings of cash. Maintaining price stability prevents the redistribution of wealth and income in inflationary environments. Sudden revaluations of financial assets undermine the soundness of the banking sector's balance sheets and decrease households' and firms' wealth. (ECB 2011)

g) Structure of the ECB (decision making)

- The European Central Bank and the national central banks together constitute the Eurosystem, the central banking system of the euro area.
- The monetary policy decisions[13] (for example: changes in the interest rates, modifications in lending and security purchase programs, banking supervision etc.) are made on the regular Governing Council bi-weekly meetings. The Governing Council consists of the six members of the Executive Board and the governors of the national central banks of the 19 euro area countries.
- The decisions are prepared and implemented by Executive Board consists of the President, the Vice-President and four other members. Practically, they are responsible to manage the day-to-day business of the ECB. All members are appointed by the European Council for 8 years, acting by a qualified majority.
- The General Council has a supportive advisory function and includes representatives of the 19 euro area countries and the 9 non euro area countries, Executive Board members and the President of the EU Council (no voting power) and one member of the European Commission (no voting power). The General Council will be dissolved once all EU Member States have introduced the single currency. Practically, this was created for consultations and has no impact on the monetary policy.
- Allocation of net profits and losses of the ECB:
  - The **net profit** of the ECB shall be transferred in the following order:
    - an amount to be determined by the Governing Council, which may not exceed **20% of the net profit**, shall be transferred to the general **reserve** fund subject to a limit equal to 100% of the capital;
    - the **remaining net profit shall be distributed to the shareholders** of the ECB in proportion to their paid-up shares.
  - In the event of a **loss** incurred by the ECB, the shortfall may be offset against the general **reserve** fund of the ECB and, if necessary, following a decision by the Governing Council, against the **monetary income** of the relevant financial year in proportion and up to the amounts allocated to the **national central banks**

h) Monetary policy objective of the US FED

- „promoting maximum **employment**, stable **prices**, and moderate long-term **interest rates**"
- Taylor-rule:

[13] https://www.ecb.europa.eu/ecb/orga/decisions/govc/html/index.en.html

- approximating price stability and the extent to which output and employment may be departing from their maximum sustainable levels
- ECB rejects monetary activism (long term neutrality of money), FED keeps as a sole tool to accelerate

i) Structure of the US FED (decision making)

- **Board of Governors**
  - 7 **members**,
    - who are appointed by the President of the United States and confirmed by the U.S. Senate
    - full term of a Board member is 14 years
  - **Chairman** and the Vice Chairman
    - must already be members of the Board or must be simultaneously appointed to the Board
    - 4 years
    - testifies before the Senate Committee on Banking, Housing, and Urban Affairs and the House Committee on Financial Services on or about February 20 and July 20 of each year
    - a member of the board of International Monetary Fund, Bank for International Settlements (BIS), OECD, G-7
- 12 Reserve banks
  - Each Reserve Bank has its own board of nine directors
  - chosen from outside the Bank as provided by law.
  - The boards of the Reserve Banks
    - are intended to represent a cross-section of banking, commercial, agricultural, industrial, and public interests within the Federal Reserve District.
  - nominate a president and first vice president approval by the Board of Governors

3. Taylor-rule

- Taylor-rule (to describe the relationship among the key policy rate, the deviation from the inflation target, the output gap and the exchange rate):
  - Δit=a+bΔ(πt- π*)+cΔ(yt-y*)+d(ΔSt)
    - π* inflation target (or expected inflation)
    - y* output target – trends of GDP or industrial output
    - S: spot exchange rate
  - „pure" inflation targeting: c=0
  - If b>1 CB raises interest rate in response to rise in inflation stabilizing
  - If b<1 real interest rate reduces
  - When inflation is higher than the target ($\pi_t > \pi_t^*$), the key interest rate shall be increased.
  - When the economy is overheated, inflation and output are both higher than they should be ($\pi_t > \pi_t^*, y_t > y_t^*$), so a central bank must increase the interest rate to cool down the growth.
  - A strong depreciation ($\Delta e_t < 0$) can create higher inflation through import prices, which can be also managed by increased interest rates.
  - The rule guides the monetary policy under stagflation as well: inflation shall be reduced under economic stagflation and high inflation periods, causing higher interest rate-driven shock-therapy (like in 1979 followed by the US).

- Deflation and recession allows the central banks to cut interest rates nearly or even to zero (Zero-Lower Bound – ZLB) as it happened in 2008.

4. The independence and autonomy of the monetary policy

a) Independence:

- Requirements:
  - Fiscal policy (government) ← → Monetary policy (central bank)
  - Good against inflation, to avoid excess monetary stimulus
  - Central bank operations are regulated by a Law on Central Bank by Parliament
  - Monetary policy decisions: by a group of leading experts + head of central bank
  - monetary council / board of governors
- ECB:
  - The independence of the monetary policy (as of the central banks) is necessary to maintaining price stability. The euro system is functionally independent: it has all the necessary instruments and competencies at its disposal to promote an efficient monetary policy and is authorised to decide autonomously how and when to use them.
  - **Institutional independence:** "Neither the ECB nor the national central banks (NCBs), nor any member of their decision-making bodies, are allowed to seek or take instructions from EU institutions or bodies, from any government of an EU Member State or from any other body." The primary objectives of the central banks in the EU are defined by the Treaty about the EU.
  - **Operational independence:** The ECB has its own budget. Its capital is subscribed and paid by the euro area NCBs. The euro system is prohibited from granting loans to EU bodies or national public sector entities.
  - **Personal independence:** The long terms of office for the members of the Governing Council. Members of the Executive Board cannot be reappointed.
- US FED:
  - because its decisions do not have to be ratified by the President or anyone else in the executive branch of government
  - subject to oversight by the U.S. Congress
  - work within the framework of the overall objectives of economic and financial policy established by the government
  - >> "independent within the government"
- Bank of Japan:
  - Article 4 The Bank of Japan shall, taking into account the fact that currency and monetary control is a component of overall economic policy, always maintain close contact with the government and exchange views sufficiently, so that its currency and monetary control and the basic stance of the government's economic policy shall be mutually compatible

Scoreboard to evaluate CB independence	
Appointment	Governor not appointed by government
	Governor appointed for more than five years
Relations with Government	Governor cannot hold government office
	Government's approval not required in formulating monetary policy

Constituting Laws	Central bank required to pursue monetary stability among its primary objectives
	Legal protections exist to strengthen central bank's position in event of conflict with government
Political Autonomy Index	
Monetary Financing of Public Deficits	Direct credit is forbidden
Monetary Instruments	Central bank sets discount rate autonomously
	Banking supervision not the responsibility of central bank (alone)
Economic Autonomy Index	

Source: Segalotto et al. (2006)

Literature:

Segalotto J-F. – Arnone M. –Laurens, B. (2006): Measures of Central Bank Autonomy: Empirical Evidence for OECD, Developing, and Emerging Market Economies. IMF Working Papers 06/228, Washington: International Monetary Fund.

b) Autonomy:

- ability of central banks to set prime rates according to macroeconomic conditions,
- the independence from the monetary policies in the key currency areas
- reduced by the degree of monetary interdependence, which is based on trade relationships and cross-border production chains
- Global liquidity is able to limit this autonomy by increasing the vulnerabilities of a financial system through substantial mismatches across currencies, maturities and countries, while the supply of global liquidity stems from one or more "core countries"

Monetary autonomy is about the degree of freedom, how the central bank can set prime rates according to macroeconomic conditions. It can be reduced by monetary policies in the key currency areas, by the degree of monetary interdependence which is based on trade relationships and cross-border production chains.

Global liquidity is able to limit this autonomy by increasing the vulnerabilities of a financial system through substantial mismatches across currencies, maturities and countries, while the supply of global liquidity stems from one or more "core countries". (BIS 2011, Plümper – Troeger 2008, Obstfeld et al. 2005)

Literature:

BIS 2011: *Global liquidity - concept, measurement and policy implications*. BIS CGFS Publications No 45, November 2011

Plümper T. – Troeger V. E. 2008: Fear of Floating and the External Effects of Currency Unions. *American Journal of Political Science*, vol. 32, no. 3, pp. 656-676

Obstfeld, M. – Shambaugh, J. C. – Taylor, A. M. 2005: The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility. *The Review of Economics and Statistics*, vol. 87, no. 3, pp. 423-438

5. Timbergen principle, Goodhart's law, Poole's analysis

a) Tinbergen principle:

- policy maker needs as many instruments as targets
- Instrument is a tool the policy maker has control over that he uses to try to achieve his target

b) Poole's analysis:

- interest rate is a better tool than money supply

c) Goodhart's law:

- „any observed statistical regularity will tend to collapse one pressure is placed on it for control purposes"

d) „obliquity":

- the best way to achieve a goal is to pursue some other goal rather than the goal itself

Literature:

John Fender (2012): *Monetary Policy*. Wiley, Chichester

6. Liquidity: market, funding, official, in foreign currency

- **Key concepts:** "*ease of financing" (or perceptions thereof)*
- **Private liquidity**
  - willingness to provide cross-border and/or foreign currency financing (market-making activity, interbank lending)
  - ***Market** liquidity*
    - *is the ability to trade an asset or financial instrument with little impact on its price.*
  - ***Funding** liquidity*
    - *to raise cash either via the sale of an asset (sometimes called balance sheet liquidity) or by borrowing*
    - ***MARKETABLE COLLLATERAAAAAALLLLLL*** – you can refinance your project/asset, when your lender is able to sell your project/asset easily on the market if you go default
- **Official liquidity**
  - funding that is unconditionally available to settle claims through monetary authorities
  - Central banks create official liquidity in their domestic currency
    - regular monetary operations
    - emergency liquidity support
    - changes in the terms under which standing facilities can be accessed
  - official liquidity in foreign currency
    - foreign exchange reserves
    - swap lines between central banks
    - dedicated facilities: IMF programs - Special Drawing Rights (SDR)

Literature:

BIS (2011): *Global liquidity - concept, measurement and policy implications*. BIS CGFS Publications No 45, November 2011

7. Channels of transmission mechanism

a) The transmission mechanism

- **Definition:** The process through which **monetary policy decisions affect the economy** in general, and the **price level** in particular
- **economic** developments are continuously influenced by **shocks** from a wide variety of sources

- Monetary policy must therefore **monitor** the transmission chain to avoid that exogenous shocks to the financial structure interfere with the transmission of monetary impulses
- take into account all other developments relevant for **future inflation** in order to prevent these having an impact on **longer-term inflation trends and expectations** in a way that is inconsistent with price stability

b) Channels

- **The interest rate channel (main)**
  - A change in **official interest rates** → **market** interest rates → expectations → **saving and investment** decisions → a change in **aggregate demand and prices** → **asset** prices → the supply of **credit** → the overall **risk-taking behavior** of the economy
- **The exchange rate channel**
  - exchange rate movements → domestic price of imported goods
  - **Import**s are used as **inputs** into the production process, lower prices for inputs → lower prices for final goods
  - impact on the competitiveness of domestically produced goods on international markets
  - strength of exchange rate effects depends on **how open the economy is to international trade**
- **The expectations channel**
  - influencing the private sector's longer-term expectations
  - effectiveness crucially depends on the **credibility of central bank communication**
    - guiding economic agents' expectations of future inflation and thereby influencing their **wage and price-setting behavior**

c) About yield curves

→ shows several yields or interest rates across different contract lengths
  - relation between the (level of) interest rate (or cost of borrowing) and the time to maturity, known as the "term"
- usually upward sloping asymptotically: the longer the maturity, the higher the yield
  - liquidity spread, anticipating a rise in the risk-free rate, investors who are willing to lock their money in now need to be compensated for the anticipated rise in rates
- inverted: market's anticipation of falling interest rates causes
  - if long-term investors dominate the market - historically preceded economic depressions - large demand for long bonds
- flat or hump-shaped: anticipated interest rates being steady, or short-term volatility outweighing long-term volatility
- Market expectations (pure expectations) hypothesis: assumes that the various maturities are perfect substitutes and suggests that the shape of the yield curve depends on market participants' expectations of future interest rates.
- Liquidity Premium Theory: rp_n is the risk premium associated with an {n} year bond
- Market segmentation theory: short-term (portfolio to be liquid) and long-term instruments is determined largely independently
- Preferred habitat theory: investors have distinct investment horizons and require a meaningful premium to buy bonds with maturities outside their "preferred" maturity

8. Financial innovations (securitization, collateralized funding, derivatives)

a) securitisation

- transformation of illiquid assets into more liquid ones
- via the pooling and
- transfer of assets to bankruptcy-remote special purpose vehicles, which may then issue tranched claims against the assets.
- Securitization is the process in which certain types of assets are pooled so that they can be repackaged into interest-bearing securities. The interest and principal payments from the assets are passed through to the purchasers of the securities – an alternative and diversified source of finance based on the transfer of credit risk (and possibly also interest rate and currency risk) from issuers to investors. In step one, a bank (*originator*) with loans identifies the assets it wants to remove from its balance sheet and pools them into a reference portfolio. It then sells the asset pool to a special purpose vehicle (*SPV*)—an entity to purchase the assets and realize their off-balance-sheet treatment for legal and accounting purposes. In step two, the SPV finances the acquisition of the pooled assets by issuing tradable, interest-bearing securities that are sold to capital market investors. The investors receive fixed or floating rate payments from the cash flows generated by the reference portfolio. In most cases, the originator services the loans in the portfolio, collects payments from the original borrowers, and passes them on—after the deduction of the service-fee—directly to the SPV (Jobst 2008).

b) collateralised funding

- repo contracts (major pre-crisis source of short-term financing)

c) derivatives

- sufficiently standardised facilitate position-taking and hedging due to their low cost and high flexibility
- potential source of illiquidity in funding,
- positions in these instruments entail requirements for margin and
- daily cash settlement or
- may expose investors to hidden maturity mismatches
- A **futures contract** is a standardized contract between two parties to buy or sell a specified asset of standardized quantity and quality for a price agreed upon today (the futures price) with delivery and payment occurring at a specified future date, the delivery date, making it a type of derivative instrument[14].
- An **option contract** gives the buyer (the owner) the right but not the obligation to buy or sell an underlying asset or instrument at a specified strike price on or before a specified date. The seller has the corresponding obligation to fulfil the transaction – that is to sell or buy – if the buyer (owner) "exercises" the option. The buyer pays a premium to the seller for this right. An option which conveys to the owner the right to buy something at a specific price is referred to as a call; an option which conveys the right of the owner to sell something at a specific price is referred to as a put[7].
- **Swap contract**: When two counterparties exchange cash flows of one party's financial instrument for those of the other party's financial instrument.

14 http://chicagofed.org/digital_assets/publications/understanding_derivatives/understanding_derivatives_chapter_1_derivatives_overview.pdf

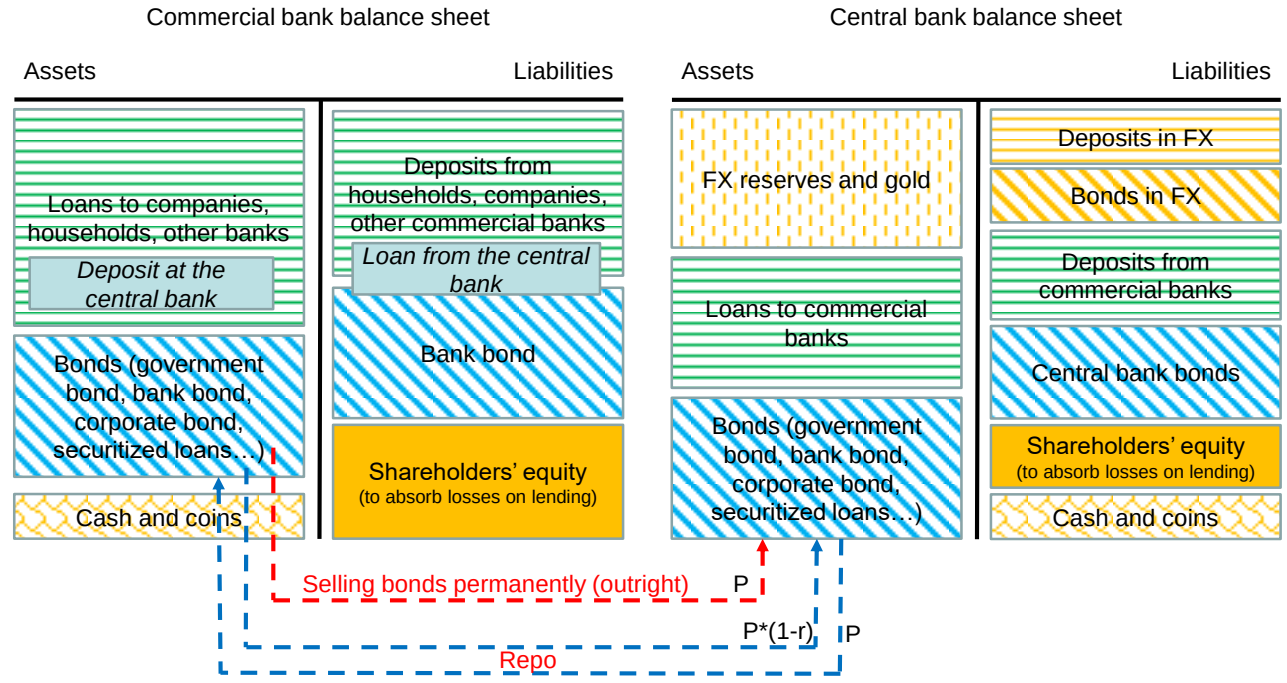
- Commodity swaps: a floating (or market or spot) price is exchanged for a fixed price over a specified period (crude oil).
- Currency swaps: exchanging principal and fixed rate interest payments on a loan in one currency for principal and fixed rate interest payments on an equal loan in another currency.
- Interest rate swaps: exchange of a fixed rate loan to a floating rate loan.
- Credit Default Swap (CDS): is a financial swap agreement where the seller of the CDS will compensate the buyer (the creditor of the reference loan) in the event of a loan default (by the debtor) or other credit event. The buyer of the CDS makes a series of payments (the CDS "fee" or "spread") to the seller and, in exchange, receives a payoff if the loan defaults. There is a big difference between insurance and CDS: losses actually suffered in first case, but there is only a speculation on debt objects in the second case.

Literature:

JOBST, A. (2008): What Is Securitization? *Finance & Development*, September 2008, pp. 48-49.

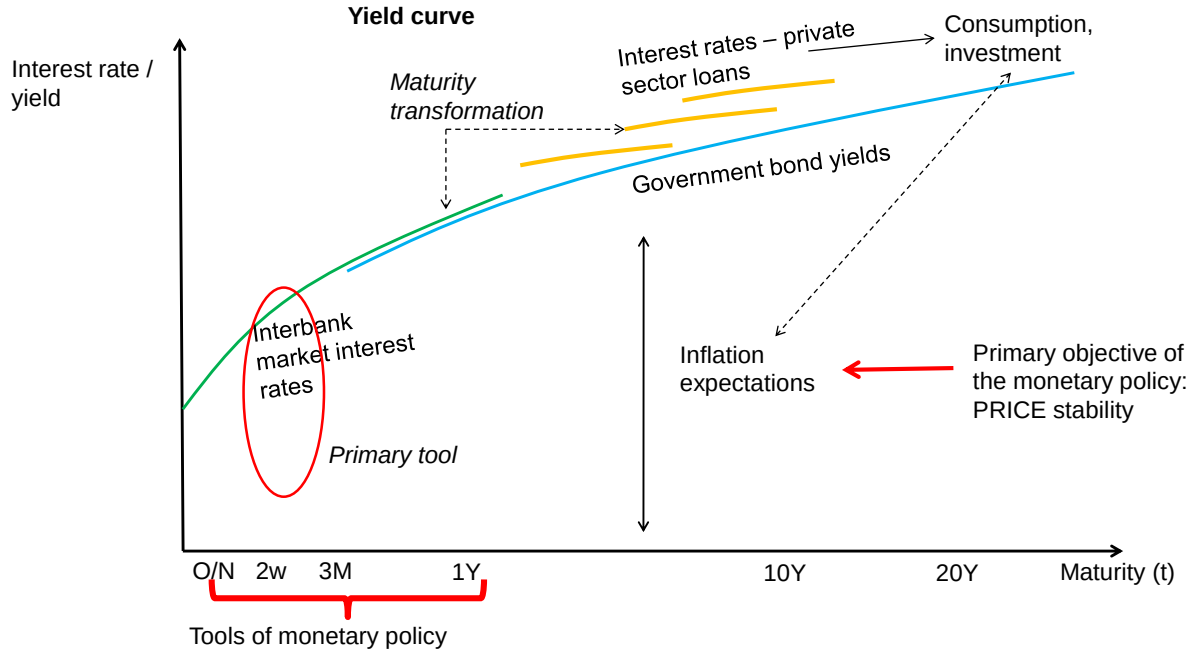
9. CB instruments: outright operations, repo, Lombard lending, swap, standing

- The central bank has medium term objective as moderate (2% for the ECB) inflation on medium run (1-2 years), but its instruments are mainly interest rates. The interest channel of the transmission mechanism connects the instrument and the objective together.
- Central banks can lend money and accept deposits from commercial banks (**standing facility**), where the interest rate differential can influence interbank-lending and retail depository interest rates (and then lending interest rates).
- Commercial banks are keeping bonds in their asset portfolio as well; their benefit is the liquid secondary market, so if they need money they can sell it immediately. Government bonds are the most secure instruments from them, while corporate bonds are riskier.
- Commercial banks can take loans from the central bank with bond collaterals (**Lombard lending**). When a central bank realizes that consumption and investments are overheated (meaning increasing prices), they can increase the interest rates (lending become more expensive) and sells bonds to extract excess liquidity from the market. When consumption and investments are poor (during recessions, combined with low or negative inflation), central banks are decreasing interest rates to make lending cheaper as well as starts to purchase bonds to pump cash into the markets.
- Bond purchases can be permanent (when bonds are accumulated in the balance sheet until they expire or being sold again), called **outright transactions**, and it can be temporary, called repo.
- The **repo transaction** is the sale of securities together with an agreement for the seller to buy back the securities at a later date. The repurchase price should be greater than the original sale price, the difference effectively representing interest, sometimes called the repo rate. Bonds are usually purchased under market price (“haircut”) to protect the central bank from losses due to market price fluctuations and to motivate market participant to use private channels.



Source: Authors' edition

- Commercial banks are special, because they are collecting short term deposits (as liabilities) and providing long term loans, creating **maturity transformation**. A bank is profitable until the asset-side interest revenues (and bond price changes) are bigger than the spending on deposit interests and bank bond interests – meaning a positive interest margin. If interest margins became negative or the ratio of non-performing loans are increasing, the bank covers its losses from the equity capital (bank deposits are secured until €100 000).



Source: Authors' edition

- The positive interest margins and the inflation expectations are reflected on the **yield curve**. Once banks start not to lend to each other (they are afraid of defaults or there is no excess liquidity to lend out), the short interest rates are starting to increase, pushing long-term interest rates and bond yields even further. (ECB 2011, Menkhoff 1997)

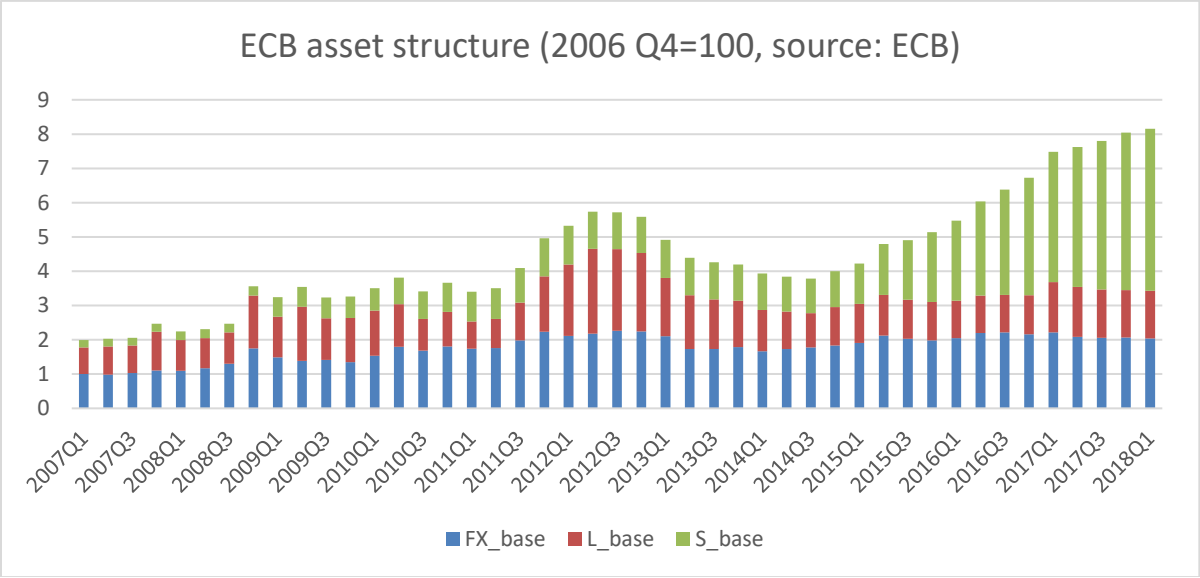
Literature:

ECB (2011): *The Monetary Policy of the ECB*. The European Central Bank, https://www.ecb.europa.eu/pub/pdf/other/monetarypolicy2011en.pdf
Menkhoff, L. (1997): *Instruments for European Monetary Union*. Springer

10. Quantitative and qualitative easing (non-standard measures)

- Non-standard measures are used when interest rates hit zero and traditional CB instrument lost much of its stimulating power so the environment can no longer be captured solely by the level of a very short-term interest rates. (Farmer 2013, Bagus – Schiml 2009)
- After the sudden stop in funding liquidity in September 2008, central banks had to maintain external financing: in bank lending based economies it called for reactivation (long-term lending to the commercial banks), while in capital market-based environments by bond purchases to by-pass non-functioning counterparties. Or both. (Lenza et al. 2010)
- Quantitative easing is a broader expansion of central bank balance sheet and monetary base without altered composition of conventional assets. Lending, FX reserve, securities have the same quality but they are increased as the interbank/security market-based lending decreases. It helps to reduce the risk premiums of high quality assets through their increased prices. (Ellison – Tischbirek 2014)
- Qualitative easing means that balance sheet size remains untouched, but the composition of asset holdings changed – accumulating unconventional and lower quality assets to stabilize market or to bail out an insolvent and illiquid banking system. It aims for the re-establishment and enhancement of transmission channels, the money market spreads and risk premiums at longer maturities. It can exploit neglected transmission channels, like corporate papers and bonds, ETFs, Real Estate Investment Trust papers (as it happened in Japan). It supports the financial stability by liquidity and foreign exchange liquidity provision to funding and credit markets. Macroeconomic stability is served by bond purchases, large-scale foreign exchange interventions and credit provisions to the private sector. (Stone et al. 2011)
- Qualitative and quantitative easing (QE) is combined usually, by focusing on lending and security market in domestic and foreign currencies. Lending is improved by maturity extension: central bank loans for commercial banks are available not only for 2 weeks but with 1-3-6 month or 1-3 year maturities. Meanwhile the list of acceptable collateral is widened by accepting riskier securities as well. Security markets are supported by government bond purchases (pushing investors toward riskier investments) on the secondary markets, while corporate bonds and securitized loans (asset backed securities, mortgage backed securities, covered bonds) are purchased on the primary and secondary markets (it suggests the bond holders that there is a secure buyer on the market and calms them down). Overnight (O/N), 1-2 week, 1 month FX lending required FX liquidity acquisition at first, trough global swap lines with the FED, and local swap agreements for EUR, GBP, CHF.
- Key policy interest rates hit zero right after the fall of Lehman Brothers at the end of 2008. The ECB focused on the banking sector: longer-term repo operations and reactivated (expanded its list of eligible collateral for BBB and better rated papers) the covered bond market was in the focus of the ‘enhanced credit support’ in 2008-2009.

- ECB initiated its first securities markets programme[15] in 2010, when the euro area NCBs[16] and the ECB, started to conduct outright interventions in the euro area public and private debt securities markets. It addressed the malfunctioning of securities markets and to restore an appropriate monetary policy transmission mechanism.
- Additional temporary measures[17] relating to euro system refinancing operations and eligibility were introduced in 2014 to accept asset-backed securities[18] (ABS) with a haircut of 10% (for ratings of at least single A) and 22% lower rated papers. Euro-denominated short-term debt instruments, issued by non-financial corporations that are established in the euro area were also accepted as collateral as well as government-guaranteed bank bonds with lower credit standards. Even marketable debt instruments issued or fully guaranteed by the central governments of euro area Member States under a European Union or International Monetary Fund programme were accepted.
- Later, it was followed by the Asset-Backed Securities Purchase Programme[19] (ABSPP) to accumulate ABSs which are backed by residential mortgage-backed securities (RMBS) or commercial mortgage-backed securities (CMBS) those are located in the euro area. The third Covered Bond Purchase Programme[20] (CBPP3) was initiated also in late 2014, focusing on covered bonds backed by assets such as mortgage loans (covered mortgage bond) rating of 'BBB-' or equivalent, denominated in euro, held and settled in the euro area. The Asset Purchase Programme was expanded[21] further in 2015, to include bonds issued by euro area central governments, agencies and European institutions, providing combined monthly asset purchases to amount to €60 billion (ABSPP, CBPP3).
- The Secondary Markets Public Sector Asset Purchase Programme[22] (PSPP) was initiated later in 2015 to buy any marketable government bonds with 2-30 year maturities, where NCB purchases had 92% as ECB purchases had 8% shares.



[15] http://www.ecb.europa.eu/ecb/legal/pdf/l_12420100520en00080009.pdf
[16] according to their percentage shares in the key for subscription of the ECB's capital
[17] http://www.ecb.europa.eu/ecb/legal/pdf/oj_jol_2014_240_r_0012_en_txt.pdf
[18] (i) residential mortgages; (ii) loans to small and medium-sized enterprises (SMEs); (iii) commercial real estate mortgages; (iv) auto loans; (v) leasing receivables; (vi) consumer finance loans; (vii) credit card receivables.
[19] http://www.ecb.europa.eu/ecb/legal/pdf/oj_jol_2015_001_r_0002_en_txt.pdf
[20] http://www.ecb.europa.eu/ecb/legal/pdf/oj-jol_2014_335_r_0010-en-txt.pdf
[21] http://www.ecb.europa.eu/press/pr/date/2015/html/pr150122_1.en.html
[22] http://www.ecb.europa.eu/ecb/legal/pdf/en_dec_ecb_2015_10_f_.sign.pdf

- The QE had fundamental impacts on the ECB's balance sheet: while lending was more dominant in the first, 2008-2013 phase of the crisis, later they turned towards security accumulation after 2014.

Literature:

Farmer, R. E. A. (2013): Qualitative easing: a new tool for the stabilisation of financial markets. Bank of England Quarterly Bulletin. 2013 4th Quarter, Vol. 53 Issue 4, p405-413

Bagus, P., Schiml, M. H. (2009): New Models of Monetary Policy: Qualitative Easing by the FED. Economic Affairs. Jun2009, Vol. 29 Issue 2, p46-49

Lenza, M., Pill, H., Reichlin, L. (2010): Monetary policy in exceptional times. Economic Policy. Apr2010, Vol. 25 Issue 62, p295-339

Ellison, M. – Tischbirek, A. (2014): Unconventional government debt purchases as a supplement to conventional monetary policy. Journal of Economic Dynamics & Control, Vol. 43, p199–217

Stone, M. - Fujita, K. – Ishi, K. (2011): Should Unconventional Balance Sheet Policies be Added to the Central Bank Toolkit? A Review of the Experience So Far. IMF Working Paper, WP/11/145

11. Central Bank balance sheet operations and its impact on FX rates Comparison of the ECB and the FED (objectives, structure)

a) Monetary policy and FX rates

- Exchange rates can we managed directly via peg-like regimes or indirectly under floating-like approaches. Non-euro user countries are maintaining independent floating regimes under liberalized capital flows to meet Mundell-Fleming trilemma and to maintain some sort of autonomy. The uncovered interest parity (1) describes foreign exchange rate changes (Δe_t) by the differentials in their interest rates (r) on a well-performing market (Herger 2016, MNB 2012):

$$\Delta e_t = \omega_t + \alpha\Delta\left(r_{t,d} - r_{t,f}\right) + \varepsilon_t \quad (1)$$

- Foreign exchange rates (FX) are channeled in the transmission mechanism due to their impact on domestic prices. However, open and small economies are affected much more by FX changes and even prime policy rate is influenced as it is represented in the specific Taylor-rule – partially it can be responsible for "fear of floating" behavior as well (Calvo and Reinhart 2002, Svensson 2000, Taylor 2001, Taylor 1993).
- Flight to safety can bias currency markets due a sudden and excessive demand for safe assets[23] – especially when their range decreases due to market sentiment changes (Bekaert et al. 2009, Horváth and Szini 2015). The Great Financial Crisis (GFC) initiated such a flight with sudden stops for riskier emerging countries (Kiss and Szilágyi 2014) – which can be captured in portfolio investment changes. Safe haven currencies (like CHF) faced (and still facing) with appreciation pressure which was motivated mainly by capital inflows instead of interest premium ($r_{t,d} - r_{t,f} > 0$) (Ranaldo and Söderlind 2010, Habib and Stracca 2012). Flight to safety can be a disruptive sign how limited is the monetary autonomy of the safe havens: for example, the Swiss central bank was not able to withstand the appreciation pressure regardless their efforts to introduce a negative interest premium, the inflation of their FX reserves and the introduction of a temporary FX ceiling. These theoretical results are pointing towards the inclusion of the capital inflows (namely the balance of portfolio investments – *PF*) in the conventional model of uncovered interest rate parity (2) and a dummy (*D*) variable to represent the introduction and maintenance of temporary peg-like measures (Model I.):

[23] "Investors would feel comfortable using as a store of value" (Beckworth 2011).

$$\Delta e_t = \omega_t + \alpha\Delta\left(r_{t,d} - r_{t,f}\right) + \beta\Delta PF_t + \gamma D_t + \varepsilon_t \quad (2)$$

b) Unconventional monetary instruments

- The asset side of the central bank balance sheet (CBBS) can be approximated as a sum (3) of FX reserves (FX_t), loans for the domestic banking system (L_t) and accumulated securities (S_t) with a dominance of the reserves:

$$CBBS_t = S_t + L_t + FX_t, \text{ where } FX_t > S_t + L_t. \quad (3)$$

- The introduction of unconventional monetary policies were the response on the bursts of deflationary waves and deteriorating financial stability during the GFC – with instruments focusing on zero interest rates (zero lower bound, ZLB), long term lending, asset purchases of even currency swap agreements. These instruments were combined into programs to enhance the transmission mechanism, to smoothen the yield curve or to reduce a specific asset's risk premium (Krekó et al. 2012, Csortos et al. 2014).
- The ZLB was mainly combined with forward guidance to anchor expectations and the QE initiates lending or security programs which have structural and size impacts on central bank balance sheet. The expansion and recombination (4) of the asset side changes the usual FX reserve based CBBS – referred later as "LSFX" (Bernanke and Reinhart 2004, Czeczeli 2017, Kool and Thornton 2012):

$$\Delta CBBS_t > 0, \text{ under QE leads to } \Delta\frac{L_t+S_t}{FX_t} > 0. \quad (4)$$

- A detailed analysis was obtained on the sample central banks, to check the application of various unconventional monetary instruments and to see, what kind of discretionary FX regimes were introduced against the excessive appreciation (FX ceiling) and a summary about the balance of portfolio investments in the analyzed period (Tab. 1). There were common instruments like forward guidance, FX swap or negative interest policy, while asset purchase programs were important mainly for the ECB, SR and later for the MNB. While Swiss and Danish CBs faced with positive portfolio investment balance, the Swedish CB or the ECB experienced a balanced situation. The V3 countries suffered from the withdrawal of the portfolio investments. Denmark followed a tight peg since the 1990s, while Switzerland adopted an upper ceiling between 2012 and 2015, or Czechia maintained a similar regime between 2013 and 2017.

Tab. 1: The application of unconventional instruments (2007-2018)

instrument\central bank	MNB	NBP	CNB	SNB	DN	SR	ECB
asset purchase programs	●					●	●
forward guidance	●	●	●	●	●	●	●
negative interests	●			●	●	●	●
quantity limits on refinancing	●	●		●	●	●	
FX swap	●	●	●	●	●	●	●
interest swap	●						
targeted lending	●						●
FX ceiling			●	●			
asymmetric interest channel	●		●				●
PF balance	–	–	–	+	+	+/–	+/–
FX regulations	×	×	✓	✓	✓	×	×

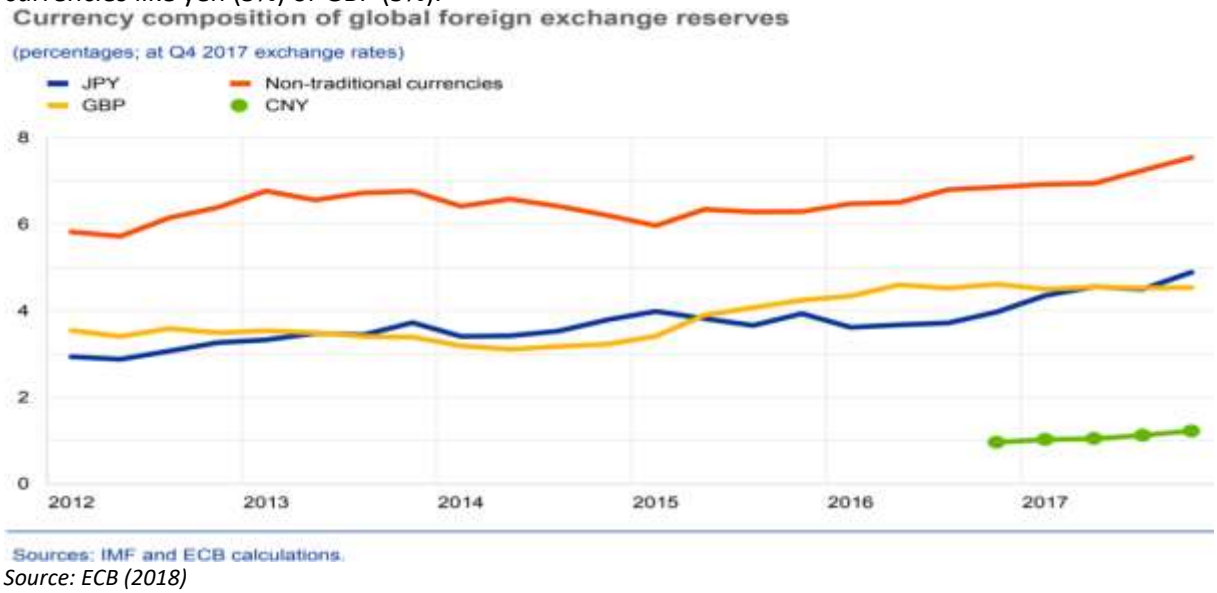
Source: authors' computation, based on the CBs' press releases after monetary council meetings

- These results are supporting Singer's (2015) results, who suggested the application of liquidity-oriented instruments and forward guidance at the key central banks (US FED, ECB and Bank of Japan). These recovery programs were efficient according to Gambacortaet al. (2014) or Lewis and Roth (2015), but these interventions presented their results slower and they required higher efforts (Bluwstein and Canova 2016). Asset purchase programs provided lower yields and long term interest rates but their long term costs and fragility is unknown (Joyce et al. 2012).

12. Theories about FX reserves

a) *Definition*

- A country's foreign exchange reserves include
- all financial instruments denominated in a foreign currency
- that embody claims on non-residents and
- are readily available to the monetary authority.
- Foreign exchange reserves therefore refer to a **portfolio of financial assets**, from which the monetary authority's liabilities towards foreign entities are not deducted
- → it is invested in to short term government bonds in USD (62%), EUR (20%) and other currencies like yen (5%) or GBP (5%).[24]



Source: ECB (2018)

b) *Reasons to hold FX reserves*

- Meeting the demands of global financial markets/investors (the "international collateral" function)
- Providing foreign currency liquidity for government transactions.
- Maintaining fixed exchange rate regimes or target zones
- Ensuring adequate capacity for FX market intervention.
- Financing the balance of payments, providing buffer for balance of payments shocks
- Expanding the set of domestic monetary policy instruments
- Increasing national wealth, generating revenue
- Lender of last resort in foreign currency
- Providing ultimate resources for 'extreme' global financial collapses
- Managing liquidity shortages on the FX swap market

c) *Guidotti-Greenspan rule*

- ***The ratio of foreign exchange reserves to short-term external debt (the 'Guidotti–Greenspan rule')***
  - (debt with remaining maturity of one year or less

[24] IMF International Reserves and Foreign Currency Liquidity: http://data.imf.org/?sk=2DFB3380-3603-4D2C-90BE-A04D8BBCE237

- 1997−98 Asian crisis: sudden capital outflows
- alternative versions :
  - should also cover the current account balance deficit for the current year in addition to short-term debt
    - no adjustments occur in external balance developments despite the funding crisis
  - only include debt elements denominated in foreign currency,
    - based on the fact that repayment of debt denominated in domestic currency does not require foreign currency
- Critics
  - reserve requirement is difficult to gauge, as most countries do not publish data on the maturity structure of their external debt.
  - short-term debt may accumulate rapidly, while central banks often have little room for maneuver to increase their reserves
  - not adequately measure the drying up of external funding or the foreign currency needs arising from the flight of foreign investors, as the maturity of the assets does not necessarily correspond to their liquidity

- ***Reserve indicators based on gross external debt***
  - (1) better availability of data;
  - (2) the one-year limit is arbitrary and lacks grounding, as
  - (3) long-term debt elements are not necessarily more stable compared to short-term ones
  - (during times of crisis, holders of long-term instruments can hedge or sell, which can also contribute to the depreciation of the exchange rate)
  - „-": Overkill a bit

d) <u>M2-based indicators</u>

- reserves must cover a given 5-25% percentage of bank savings with maturities of less than two years
- good measure of liquid funding within the banking system
- funding risk that may arise if the confidence of domestic deposit-holders deteriorates
- countries *with floating exchange* rates should target the lower edge of the range

e) <u>Import rule</u>

- foreign exchange reserves must cover three months of import accounts
- capture risks related to financing the current account balance in countries with *fixed exchange rate regimes*
- liberalization of capital markets the import coverage indicator has essentially <u>lost all relevance</u>

f) Applications – credit rating agencies

Table 1
Rules-of-thumb of foreign reserve adequacy monitored by credit rating agencies and investment banks

	Import rule	M2 rule	Guidotti-type rule	Gross external debt	Gross external financing need
Fitch			X		
Moody's		X	X	X	
Standard & Poor's					X
Deutsche Bank	X	X	X		
Goldman Sachs		X			
Citibank		X	X		
Barclays			X		X

Note: Data compiled by the MNB from credit rating agency and investment bank analyses.

Source: Antal – Gereben (2011)

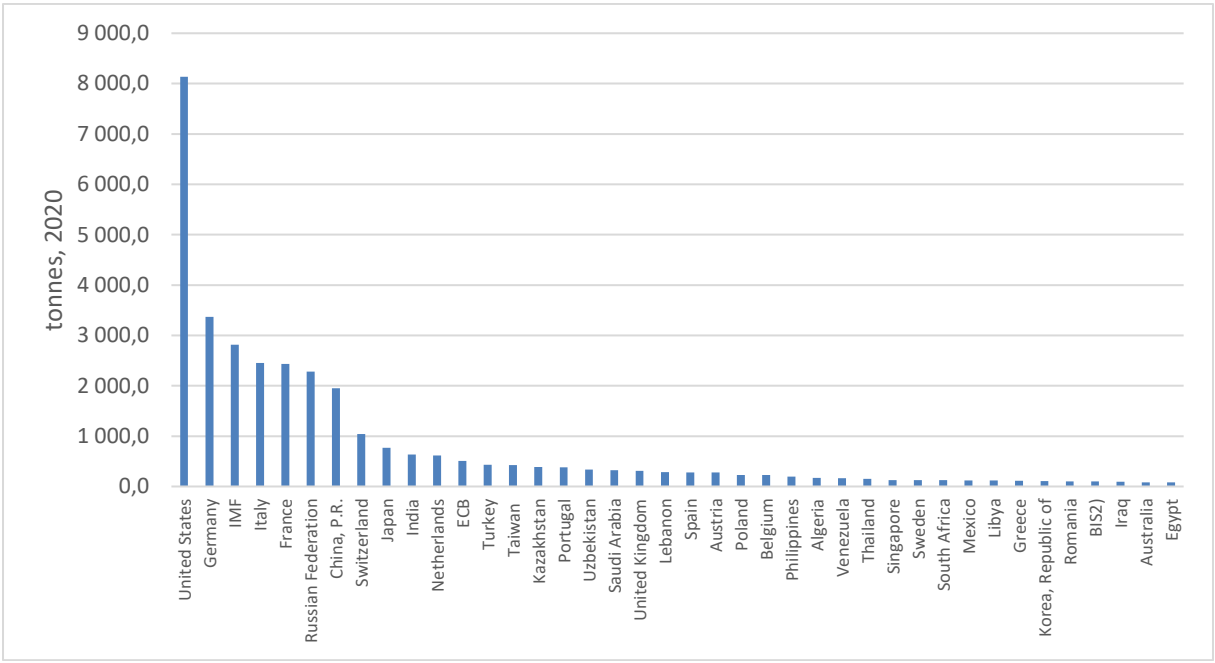
Literature:

Antal J., Gereben Á. (2011): Foreign reserve strategies for emerging Economies – before and after the crisis. *MNB Bulletin* 2011, 1 pp. 7-19 https://www.mnb.hu/letoltes/antal-gereben-eng.pdf

Aizenman J. A., Cheung Y-W, Qian XW (2020): The currency composition of international reserves, demand for international reserves, and global safe assets. *Journal of International Money and Finance*, 102, pp. 102-120

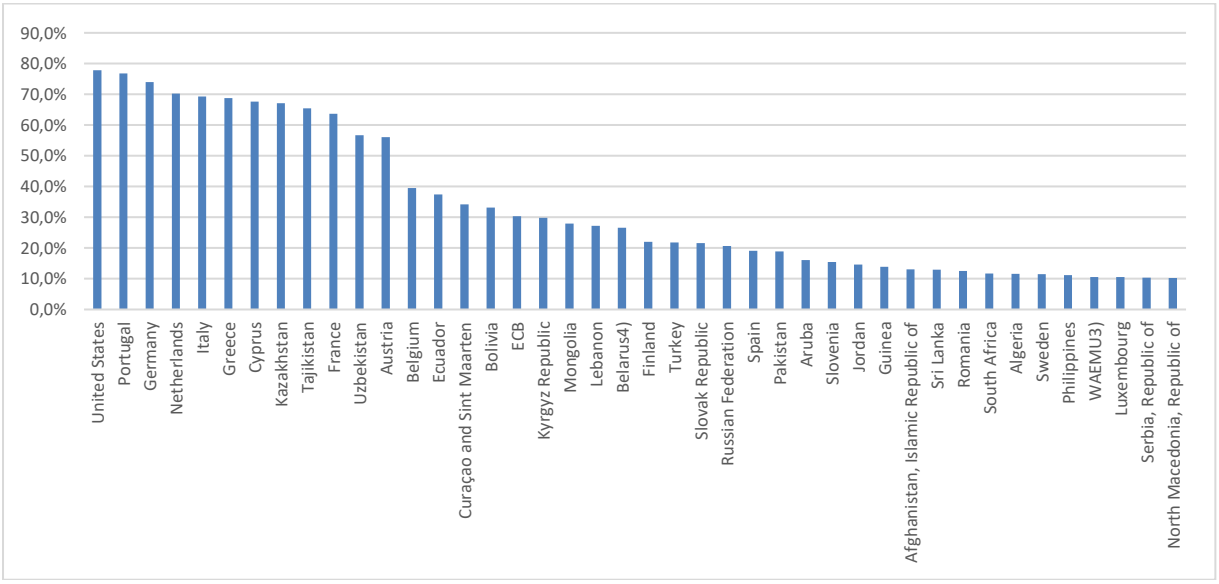
13. Gold reserves

- Gold reserves are located on the asset-side of the central bank balance sheet
  - financing can be made via banknotes (gold standard) and other conventional liabilities
  - there is no currency mismatch, compared to the FX reserves – gold reserves can be financed from domestic currency denominated liabilities
  - the interest of the liability will be the price of keeping gold reserves
- Low interest environment:
  - foreign high quality bonds are losing their advantage (or even they have negative yields)
- The beta of the gold is zero by the CAPM and has minimal risk (like treasury bills)
  - inflation hedge
- Composition:
  - 197 576 t in the world economy
  - 47% jewellery
  - 20% bars and coins
  - 1% ETF
  - 17% (34 thousand t) central banks
  - 14% other
  - 54 000 t proven reserves
- Central banks had a net selling position between 1998 and 2008, but they are maintaining a net investor since then.
  - Russia: +1700 t
  - China: +1300 t
  - Euro-area: 10775 t
  - USA: 8133 t



Source: gold.org

- Still the USA and the European countries are maintaining the most gold-focused international reserve.



Source: gold.org

- Central Bank Gold Agreement (CBGA)
  - CBGA 1 (2000-2004): 400 tonnes annual sales limit to avoid further price fluctuation (utilized)
  - CBGA 2 (2005-2009): 500 tonnes, gold sales zeroed after 2007
  - CBGA 3 (2010-2014): back to the 400 tonnes per year quota, but no sales were made
  - CBGA 4 (2015-2019): no sales were planned

Literature:

WGC (2020): *The relevance of gold as a strategic asset US edition*, World Gold Council

https://www.gold.org/goldhub/data/monthly-central-bank-statistics

14. FX SWAP-lines among the key central banks

a) FX swap

- Commercial banks can borrow and lend in different currencies.
  - in the absence of capital flow restrictions and notwithstanding prudential restrictions
  - borrow in a foreign currency to finance assets that are denominated in the same currency
  - finance assets in their domestic currency or some other currency
  - obtain their foreign currency:
    - deposits they collect in this currency (maturity is shorter than the domestic)
      - unsecured (certificate of deposits or commercial paper)
      - secured form such as repurchase agreements
    - spot and swap markets
    - can sell assets denominated in foreign currency
  - commercial banks' balance sheets are potentially subject to mismatches between the currencies in which their assets and liabilities are labeled
    - mitigated by currency swaps and options that themselves generate a counterparty risk
  - domestic central banks cannot create liquidity in foreign currency,
    - the liquidity support they can provide in the absence of currency swaps is
    - limited to the supply of domestic liquidities that commercial banks can swap on the Foreign Exchange (FX) market
  - → to act as a lender of last resorts in other currencies than their own may encourage the risk-taking behaviors of the banks operating in international currencies and hence financial instability
- An agreement to exchange future cash flows according to a prearranged formula.
  - Foreign exchange swap: Simultaneous spot and forward transactions exchanging one currency against another.
    - two reciprocal loans denominated in two currencies
  - Swap point: The difference between the exchange rate of the forward transaction and the exchange rate of the spot transaction in a foreign exchange swap.
  - Forward transactions in securities: purchase or sale of an interest rate instrument (usually a bond or note) is agreed on the contract date, for delivery at a future date, at a given price.
- National central banks buy or sell euro spot against a foreign currency and at the same time sell or buy them back in a forward transaction.
  - to increase the foreign exchange reserves they hold
  - to lend against adequate collaterals to the commercial banks within their jurisdiction, to provide them with temporary liquidity in a foreign currency
  - decentralized and contingent process of direct negotiation between a limited number of parties
    - an alternate way to acquiring FX liquidity, other than borrowing from the IMF
- currency swaps between central banks were occasionally used on an ad hoc basis since the 1920s.
  - for a limited duration of 3 months,
    - to reduce foreign exchange risk and

        - limit the time during which reserves were immobilized;
    - at the end of its duration,
        - a swap line could be cancelled or
        - put on standby for later reactivation
- 1962, the Federal Reserve:
    - network of swap lines involving Western central banks as well as the Bank of International Settlements
    - to aid in the provision of international liquidity in the longer term
- "new generation" of central bank swaps after 2001
    - September 11, 2001 episode that led to severe liquidity shortages in cross currency markets
    - Federal Reserve Board (FED) and the European Central Bank (ECB)
- Shortcomings of FX swap lines
    - CBs can act swiftly and creatively and can leverage their money-creating power to manage massive and prompt interventions in money markets
        - power of central banks to create money combined with their legal capacity to sign international agreements
    - CB swap-lines are more fragile and reversible than their institutional counterparts (IMF)
        - reconsidered when their time limit is reached
        - parties are usually freer and more prone to behave in an opportunistic manner
        - give international currencies issuers the possibility to pick and choose among potential counterparties for reasons that are not necessarily financial but might be strategic or political
        - not include surveillance, and conditionality is limited to use of the proceeds of the swaps – moral hazard
        - two-tier counterparty risks
            - commercial banks cannot repay their leg
            - central bank cannot settle the swap when due

b) <u>USD swap with FED</u>

- "central bank liquidity swap"
    - prevented the collapse of systemically important financial institutions following a run of Eurodollar creditors
- FED: facto international lender of last resort through central banks currency swaps
- The Bank of Canada, the Bank of England, the European Central Bank, and the Swiss National Bank and later the Bank of Japan reciprocal swap agreement (swap line) with the Federal Reserve
    - at the first time on December 3 2007 and renewed it until October 31 2013 when it was converted to a permanent standing facility
- Later it was enhanced to provide euro, Japanese yen, sterling, Swiss franc and Canadian dollar liquidity in addition to the existing operations in US dollars at the end of November 2010.

c) <u>EUR swap with ECB</u>

- a GBP-EUR swap line was signed between the ECB and Bank of England on December 17 2010
- Polish central bank collected euro liquidity via repo agreement after November 21 2008

- Denmark, Hungary and Poland (they tried to make repo contracts as well, but Hungarian government bonds did not satisfy ECB's collateral requirements) in October-November 2008.

d) Nordic EUR swap

- Central banks of Sweden, Norway and Denmark have entered into a euro/Icelandic krona swap facility agreement with the Central Bank of Iceland (Sedlabanki Íslands) on May 16 2008.
- A euro swap agreement became active between Swedish and Danish and Latvian central banks after December 16 2008 and was extended with central banks of Iceland, Estonia and Latvia on May 27 2009.
- Later it was followed by a co-operation agreement on cross-border financial stability, crisis management and resolution between Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden on August 17 2010.

e) CHF swap

- Swiss National Bank signed CHF swap agreements multiple times:
  - with the ECB on October 15 2008,
  - with Polish and Hungarian national banks on November 7 2008 and January 8 2009 until January 2010.
- Polish National Bank reinitiated a CHF-PLN swap line later on June 25 2012.

f) Chinese RNB SWAP-lines

- "central bank local currency swap":
  - internationalizing of its currency, the renminbi
- Yüan or RNB is still undervalued – compared to 1990
- Chinese government bond market is restricted even for domestic agents
  - capital controls strictly limiting foreign access to the Chinese debt market,
  - the accumulation of official foreign exchange reserves in RMB is impossible, and
  - international commercial banks have no direct access to the mainland interbank market
- First steps towards Yüan – cross-CB swap lines
  - 23 active local currency swap agreements
  - „Renminbi swap agreement and granting of a renminbi investment quota to the Swiss National Bank" 21 July 2014
    - it can use to invest part of its foreign exchange reserves in the Chinese bond market
    - swap agreement enables renminbi and Swiss francs to be purchased and repurchased between the two central banks, up to a limit of 150 billion renminbi, or CHF 21 billion
    - The PBC has granted the SNB an investment quota for the Chinese interbank bond market in the amount of 15 billion renminbi, or just over CHF 2 billion. The SNB's foreign exchange reserves can thereby be diversified even further
    - http://www.snb.ch/en/mmr/reference/pre_20140721/source/pre_20140721.en.pdf
  - „ECB and the People's Bank of China establish a bilateral currency swap agreement" 10 October 2013
    - Swap line will have a maximum size of 350 billion Chinese yuan and €45 billion.
    - Agreement will be valid for three years.
    - From the Eurosystem's perspective, it will serve as a backstop liquidity facility.

- maximum size of 350 billion yuan when yuan are provided to the ECB and of €45 billion when euro are provided to the PBC.
- http://www.ecb.europa.eu/press/pr/date/2013/html/pr131010.en.html

- „Russia, China Sign Currency Swap Agreement to Double $100b Trade" October 13, 2014
  - three-year swap deal is worth 150 billion yuan ($24.5 billion)
  - http://www.bloomberg.com/news/articles/2014-10-13/russia-china-sign-currency-swap-agreement-to-double-100b-trade
- Bank of England - People's Bank of China swap line
  - reciprocal 3-year, sterling/renminbi (RMB) currency swap line.
  - The maximum value of the swap is RMB 200bn.
  - may be used to promote bilateral trade between the two countries and
  - to support domestic financial stability should market conditions warrant.
  - unlikely event that a generalised shortage of offshore renminbi liquidity emerges, the Bank will have the capability to facilitate renminbi liquidity to eligible institutions in the UK
  - http://www.bankofengland.co.uk/publications/Pages/news/2013/082.aspx

Literature:

Destais C. (2016): Central Bank Currency Swaps and the International Monetary System. *Emerging Markets Finance & Trade*, 52:2253–2266

15. Sovereign Wealth Funds - forms, portfolios, connections to developed bond markets

- Definition: public investment agencies which manage part of the (foreign) assets of national states → to invest excess FX reserves
- Portfolio: riskier than the FX reserve → long term government bonds, shares

SWFs are public investment agencies which manage part of the (foreign) assets of national states. They can apply the following strategies:

- stabilization funds where the primary objective is to insulate the budget and the economy against commodity (usually oil) price swings;
- savings funds for future generations which aim to convert non-renewable assets into a more diversified portfolio of assets and mitigate the effects of Dutch disease;
- reserve investment corporations whose assets are often still counted as reserve assets and are established to increase the return on reserves;
- development funds which typically help fund socio-economic projects or promote industrial policies that might raise a country's potential output growth;
- contingent pension reserve funds, which provide (from sources other than individual pension contributions) for contingent unspecified pension liabilities on the government's balance sheet.

They are created by resource-rich economies which currently benefit from high oil and commodity prices to serve the purpose of stabilising government and export revenues which would otherwise mirror the volatility of oil and commodity prices. It is also made by Asian countries where reserves are

being accumulated in excess of what may be needed for intervention or balance-of-payment purposes. These countries are mostly not linked to primary commodities but rather related to the management of inflexible exchange rate regimes. They have explicit return objectives and may invest in more risky assets than central banks. (Beck – Fidora 2008)

16. Crisis management in Japan

a) Quantitative monetary easing (QE) in 2001–2006

- Japan experienced the collapse of the bubble in real estate and stock prices in the early 1990s, and the subsequent financial crisis in the second half of the 1990s
  - economy was adversely affected by the bursting of the U.S. IT bubble in 2000
  - Exports and production dropped sharply in early 2001, while CPI-based price changes negative
- Framework for the QE policy (March 2001)
  - it was introduced in the presence of a virtually zero uncollateralized overnight call rate
  - **main operating target** policy rate (uncollateralized overnight call rate) → current account balance at the BOJ—**interest rate targeting → reserve targeting**
  - target balance was then increased gradually by expanding excess reserves
    - target amount was raised nine times from the initial 5 trillion yen (which is higher than the required reserve level of 4 trillion yen) to around 30–35 trillion yen in January 2004
    - money market operations with various maturities of 1 year or less
  - (1) **lowering the risk premiums of financial assets (**portfolio rebalance effect**)**
    - financial institutions and investors to invest more actively in those assets
    - raise their prices, thus indirectly stimulating business fixed investment and consumption—and hence general prices
  - (2) the **signaling effect:** lowering the expectations for the future path of short-term interest rates
    - BOJ made a **clear commitment to maintaining this policy** until the condition of year-over-year core inflation is ‘‘stably 0 % or positive’’ was met - **forward guidance**
    - **increase the outright purchase of (long-term) Japanese government bonds (JGBs)** if deemed necessary to facilitate meeting the targeted current account balance at the BOJ
    - altering the composition of the BOJ’s balance sheet without changing its size

b) Economic recovery setting the stage for exit from the QE policy

- 2001–2006, favorable economic performance overseas contributed to an increase in Japan’s export growth
- a recovery phase after the trough in January 2002
  - main engine for the growth was exports and associated domestic business fixed investment activities, which had been supported by favorable worldwide economic growth and the depreciation of the yen
  - yen’s depreciation, especially against the U.S. dollar and the euro, was promoted mainly by the growing yen **carry-trade** in the face of interest rate differentials and the risk-taking behavior of investors
  - headline inflation became positive and reached 0.5 % in January 2006.

- decision to exit the QE policy was made together with a reintroduction of the **standard uncollateralized overnight call rate** as an **operating target** for money market operations (initially set at effectively 0 %)
    - from 0 to 0.25 % in July 2006, and further to 0.5 % in February 2007 till October 2008

- Was the QE policy effective?
    - monetary base from 38 trillion yen in 1990 (9 % of GDP) to 65 trillion yen (13 % of GDP) to 110 trillion yen (22 % of GDP) by March 2006
    - (1) the transmission mechanism from monetary easing to financial and capital markets (first stage);
        - The portfolio rebalance effect meanwhile had mixed result
        - purchase of JGBs had little impact on lowering risk premiums
        - But through the channel of cross-border capital flows
    - (2) the transmission mechanism from the first stage to the real economy and prices through financial and capital markets (second stage)

c) Comprehensive monetary easing (CME) from 2010 to March 2013

- Global economic conditions deteriorated sharply after autumn 2008
- yen began to appreciate against the U.S. dollar in summer 2007 with the weakening of the global risk appetite and the unwinding of the yen carry-trade
- headline and core CPIs rapidly increased in summer 2008: surge in commodity prices

- series of **accommodative monetary policy measures:**
    - First, the level of the policy rate was lowered twice: from 0.5 % to around 0.3 % in October 2008 and further to around 0.1 % in December 2008
    - Second, the BOJ newly adopted a 3-month funds-supplying operation at the fixed target interest rate (0.1 %) against pooled collateral up to a total amount of 10 trillion yen in December 2009
        - promoting a further decline in longer-term interest rates in the money market.
        - In March 2010, the amount of this operation was raised to 20 trillion yen.
        - In August 2010, an additional 6-month funds-supplying operation was introduced with the maximum amount of 10 trillion yen. Thus, the total amount provided under this operation reached 30 trillion yen
    - Third, the ‘‘Special Funds-Supplying Operations to Facilitate Corporate Financing’’ was established in December 2008 to ensure stability in the financial markets and facilitate corporate financing
    - **New forward guidance policy** with the **commitment to a zero interest rate policy until the price stability (1-2%)** defined under the ‘‘understanding of medium- to long-term price stability’’
    - **Asset Purchase Program** to promote the decline in longer-term interest rates and various risk premiums.
        - *Japanese Government Bonds (JGBs) with a remaining maturity up to 3 years,*
        - *treasury discount bills (T-Bills),*
        - *Corporate papers (short-term), corporate bonds (long-term),*
        - *exchange-traded funds (ETFs), and*
        - *Japan real estate investment trusts (J-REITs)*

- What were the **differences** between **QE 2001-2006 and CME 2010-2013**?

- First, the **Asset Purchase Program covered a wider range of financial assets** than those of QE
  - direct purchase of various financial assets **might** encourage the further decline in longer-term interest rates and risk premiums through possibly greater portfolio rebalance and signaling effects
- Second, CME **directly aimed at lowering longer-term interest rates and risk premiums** through an emphasis on asset purchases
- Third, the **positive interest rate of 0.1 % applied to the complementary deposit facility** (introduced in October 2008) remained under CME, while the policy target was set in the range of around 0–0.1 %.

- Was CME effective?
  - CME was not successful in conquering deflation—*Lehman shock, the European sovereign debt crisis, the Great East Japan Earthquake, and the Thailand floods of 2011*.

d) Quantitative and Qualitative Monetary Easing - in Japan April 4, 2013

- To double monetary base
  - 2012 end 138 trillion Yen → +60-70 trillion Yen / year
  - Focus on monetary base instead of interest rates (they are already 0-1% - nothing to focus on them)
  - Japanese Government Bond purchase 50 trln JPY (7 years average maturity)
  - Corporate Papers: 2.2 trln JPY
  - Corporate bonds: 3.2 trln JPY
  - ETF: 1 trln JPY
  - J-REIT: 30 bln JPY
- reading: http://www.boj.or.jp/en/announcements/release_2013/k130404a.pdf
- Results:
  - expansionary fiscal measures taken by the new administration of the Japanese government
  - Stock prices have been higher in 2013;
  - private consumption is more resilient;
  - More active commercial and residential investment have taken place;
  - the yen's exchange rate has been at more depreciated levels;
  - funding costs for firms and households in the loan and bond markets remain more accommodative
  - The unemployment rate dropped to 3.7 % in December 2013, approaching the lowest level in recent years of 3.6 % recorded in July 2007
  - economy moving out of deflation with the year-over-year percentage change in the consumer price index (CPI) for all items less fresh food, or the core CPI, turning positive in June 2013 and reaching 1.3 % in December 2013

Literature:

Sayuri Shirai **2014**: Japan's monetary policy in a challenging environment. *Eurasian Econ Rev* (2014) 4:3–24

IV. International financial organizations

1. Crisis and public default

a) General concepts of public default

- The state as debtor is not able to pay back the expiring debt – because it is not able to sell new government bonds at a reasonable price (par value-market price+interest rate=yield is too high). The probability of default is not related to debt-to-GDP level, it is related to the ability to SELL the government bond! Domestic sale is always easier than the combination of domestic and foreign sales – but the latter is necessary when domestic savings are not enough…
- Debt rescheduling: expiring government bonds are transformed to long maturity government bonds.
- Debt reduction, forgiveness: some % of existing government bonds are transformed to new government bonds with a 40-50% discount. Domestic banks, insurance companies, investment funds etc. are losing their assets as well – reduces household savings and overall confidence in the financial system.
- Organisations related to public defaults:
    - Paris Club: sovereign lenders (countries) and debtors can negotiate here.
    - London Club: private lenders and sovereign debtors can negotiate here – if there is someone to represent private lenders (they are not too atomized).
    - IMF lending programs: refinancing public debt for several years until public budget is consolidated.
- An economic crisis can result in mass bankruptcy (companies, households), leading to questionable repayment of bank loans, requesting bank consolidation.
    - By merger (bad bank + good bank = mediocre bank).
    - By debt: bank assets: bad loans purchased for new government bonds but public debt increases and the state is not able to meet its current refinancing requirements, so public debt shall be prolonged or restructured.
    - Banks are not able to renew their resources but central bank provides loans instead of market lending.

b) Contagions

- **Broad Definition:**

Contagion is the cross-country transmission of shocks or the general cross-country spillover effects.
take place both during "good" times and "bad" times - not need to be related to crises.

- **Restrictive Definition:**

Contagion is the transmission of shocks to other countries or the cross-country correlation,
beyond any fundamental link among the countries and
beyond common shocks.
referred as excess co-movement, commonly explained by herding behavior.

- **Very Restrictive Definition:**

Contagion occurs when cross-country correlations increase during "crisis times" relative to correlations during "tranquil times."

- **Financial links**

connected through the international financial system
when leveraged institutions face margin calls.
When the value of their collateral falls, due to a negative shock in one country,
leveraged companies need to increase their reserves.
they sell part of their valuable holdings on the countries that are still unaffected by the initial shock.
when open-end mutual funds foresee future redemptions after there is a shock in one country.
Mutual funds need to raise cash and, consequently, they sell assets in third countries.

- **Real links**

fundamental economic relationship among economies (international trade)
two countries trade among themselves or if they compete in the same foreign markets
devaluation of the exchange rate in one country deteriorates the other country's competitive advantage
both countries will likely end up devaluing their currencies to re-balance their external sectors.
foreign direct investment across countries

- **Political links**

When a country belongs to an association or "club of countries," with an exchange rate arrangement, the political cost of devaluing is much lower when other countries have devalued
crises tend to be clustered. A crisis in one country is followed by crises elsewhere.

A Note on Herding Behavior:

- asymmetric information is at the root

Information is costly so investors remain uniformed about the countries in which they invest.
relatively uninformed investors follow the supposedly informed investors. So all the market moves jointly.
investors reassess the risks of investing abroad when they see a foreign crisis.

- Is it rational for investors to follow this "irrational" behavior?

at a private level, it might be rational to follow the herd.
Information is too costly, so each investor might benefit from looking at the market reaction.
At a public level, contagion can be very expensive.

c) Crisis

- **Domestic factors**

inappropriate fiscal and monetary policies,
→ large economic imbalances
current account and fiscal deficits
high levels of external and public debt;
→ an exchange rate fixed at an inappropriate level
erode competitiveness
persistent current account deficits
loss of official reserves;
→ a weak financial system
create economic booms and busts.

- **External factors**

natural disasters
large swings in commodity prices
common causes of crises especially for low-income countries
limited capacity to prepare for such shocks
dependent on a narrow range of export products
even countries with sound fundamentals ← *spillovers* of economic crises and policies in other countries.

- **Different forms**
- balance of payment problems

a nation is unable to pay for essential imports or service its debt repayments;

- financial crises

insolvent or illiquid financial institutions;

- fiscal crises

excessive fiscal deficits and debt.

- *more than one type of crisis*

Reading: http://www.imf.org/external/np/exr/facts/crislend.htm

2. International Monetary Fund (IMF)

a) IMF regulations

- Article VIII: General Obligations of Members
  - Section 2. Avoidance of restrictions on current payments
    - (a) …no member shall, without the approval of the Fund, impose restrictions on the making of payments and transfers for current international transactions.
  - Section 3. Avoidance of discriminatory currency practices
  - Section 4. Convertibility of foreign-held balances
  - Section 5. Furnishing of information
  - Section 6. Consultation between members regarding existing international agreements
  - Section 7. Obligation to collaborate regarding policies on reserve assets

b) IMF Quotas

- Quota subscriptions are a central component of the IMF's financial resources.
- Each member country of the IMF is assigned a quota, based broadly on its relative position in the world economy. weighted average of

GDP (weight of 50 percent) → based on market exchange rates (weight of 60 percent) - PPP exchange rates (40 percent)
openness (30 percent),
economic variability (15 percent), and
international **reserves** (5 percent).

- quota determines its

maximum **financial commitment** to the IMF,
voting power,
bearing on its **access to IMF financing**.

- Countries with the biggest quotas: USA (16.5%), EU27 (29.4%), China (6%), Russia (2.6%)

Reading: http://www.imf.org/external/np/exr/facts/quotas.htm

http://www.imf.org/external/np/sec/pr/2011/pdfs/quota_tbl.pdf

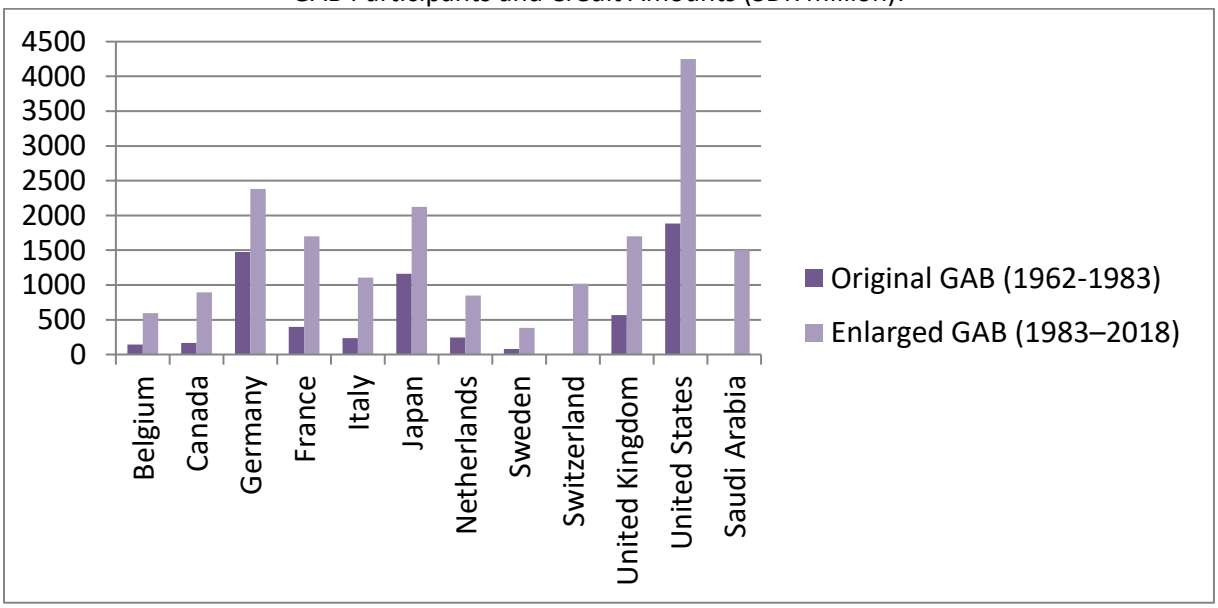
Quota and Voting Shares Before and After Implementation of Reforms Agreed in 2008 and 2010
(In percentage shares of total IMF quota)

	Quota Shares				Voting Shares			
	Pre-Singapore (i)	As of March 2, 2011 (ii)	Post-2008 Reform (iii)	Post-2010 Reform (iv), (v)	Pre- Singapore (i)	As of April 26, 2012 (ii)	Post-2008 Reform (iii), (vi)	Post-2010 Reform (v), (vi)
Advanced economies	61.6	60.5	60.5	57.7	60.6	59.5	57.9	55.2
Major advanced economies (G7)	46.0	45.2	45.3	43.4	45.1	44.3	43.0	41.2
United States	17.4	17.1	17.7	17.4	17.0	16.7	16.7	16.5
Other	28.6	28.1	27.7	26.0	28.1	27.6	26.3	24.7
Other advanced economies	15.6	15.3	15.1	14.3	15.4	15.2	14.9	14.0
Emerging Market and Developing Countries	38.4	39.5	39.5	42.3	39.4	40.5	42.1	44.8
Developing countries	30.9	32.1	32.4	35.1	31.7	32.9	34.5	37.1
Africa	5.5	5.4	4.9	4.4	6.0	5.9	6.2	5.7
Asia (vii)	10.3	11.5	12.6	16.1	10.4	11.6	12.8	16.1
Middle East, Malta & Turkey	7.6	7.6	7.2	6.7	7.6	7.6	7.3	6.8
Western Hemisphere	7.5	7.6	7.7	7.9	7.7	7.8	8.2	8.4
Transition economies	7.6	7.4	7.1	7.2	7.7	7.6	7.6	7.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memorandum items:								
EU 27	32.9	32.4	31.9	30.2	32.5	32.0	30.9	29.4
Low-Income Countries (viii)	3.5	3.4	3.2	3.2	4.0	3.9	4.5	4.5
Shifts from 2008 Reform								
Underrepresented countries (shift in p.p.)				6.2				5.8
Underrepresented EMDCs (shift in p.p.)				5.7				5.4
Dynamic EMDCs (shift in p.p.) (ix)				6.0				5.7
EMDCs (shift in p.p.)				2.8				2.7
Source: Finance Department.								
Hungary	0.486	0.477	0.436	0.407	0.487	0.478	0.441	0.414
Czech Republic *	0.383	0.376	0.420	0.457	0.387	0.380	0.427	0.461
Poland *	0.640	0.629	0.708	0.859	0.638	0.627	0.699	0.841
China * (vi)	2.980	3.718	3.996	6.390	2.928	3.651	3.806	6.068
Russia	2.782	2.732	2.494	2.705	2.734	2.686	2.386	2.585
Iran, Islamic Republic of	0.700	0.688	0.628	0.748	0.697	0.685	0.623	0.736
Turkey *	0.451	0.547	0.611	0.977	0.453	0.547	0.607	0.952

Source: IMF website

c) *Fundraising and lending*

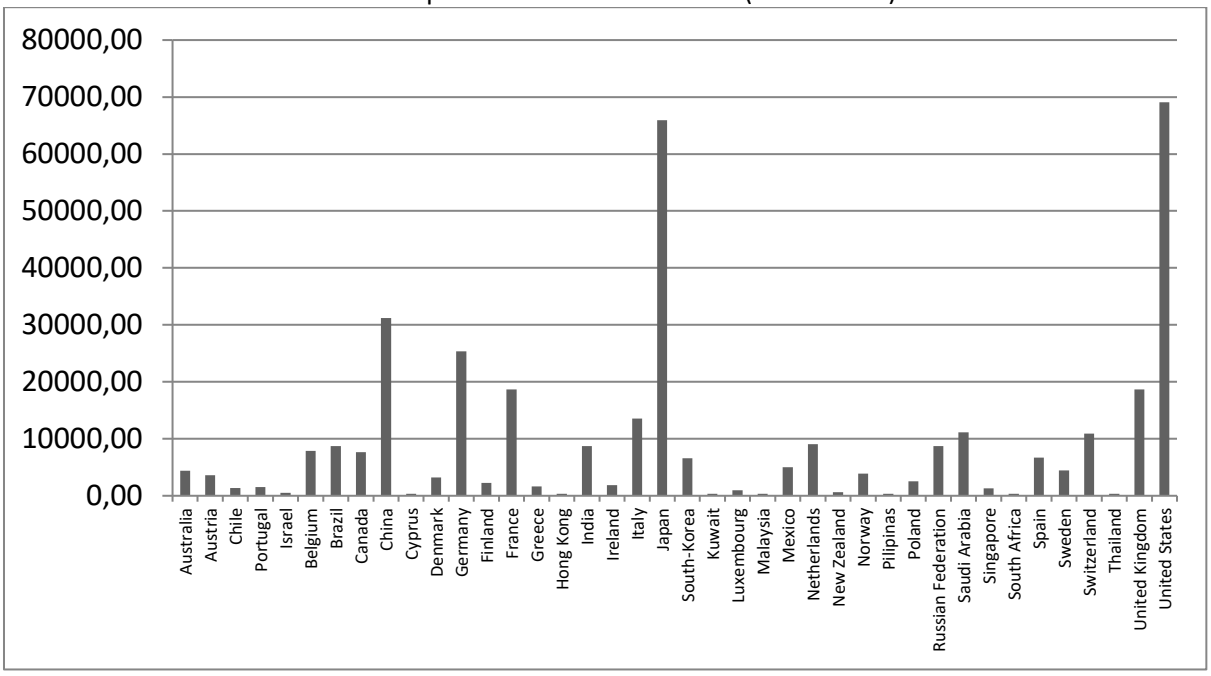
- Fundraising (reading: https://www.imf.org/external/np/exr/facts/gabnab.htm):
  - General Arrangements to Borrow (GAB)
    - IMF to borrow specified amounts of currencies from 11 industrial countries (or their central banks), under certain circumstances.
    - GAB Participants and Credit Amounts (SDR million):



Source: IMF website

  - *New Arrangements to Borrow:* 1995 G-7 Halifax Summit

- Collecting funds from donor countries when 85 percent of total credit arrangements of participants eligible to vote (every 6 month since March 11, 2011)
- NAB Participants and Credit Amounts (SDR million):



Source: IMF website

- IMF lending programs (reading: http://www.imf.org/external/np/exr/facts/howlend.htm)
  - Stand-by Arrangements (SBA)
    - short-term balance of payments problems
    - typically 12–24 months, and repayment is due within 3¼-5 years of disbursement
    - precautionary - option if conditions deteriorate
  - Extended Arrangements (EFF)
    - medium- and longer-term balance of payments problems
    - require fundamental economic reforms
    - 3-4 years, repayment is due within 4½–10 years
  - Flexible Credit Line (FCL)
    - for countries with very strong fundamentals, policies, and track records of policy implementation
    - 1-2 years
  - Precautionary and Liquidity Line (PLL)
    - countries with sound fundamentals and policies, and a track record of implementing such policies
    - may face moderate vulnerabilities
    - not require the substantial policy adjustments
    - 6M-1-2Y
  - The Extended Credit Facility (ECF)
    - For Low-income countries
    - interest rate is reviewed every two years (0% until the end of 2014)
    - medium-term support
    - protracted balance of payments problems

        - grace period of 5½ years, and a final maturity of 10 years.
    - Standby Credit Facility (SCF)
        - short-term balance of payments needs

d) SDR

- The SDR is an international reserve asset, created by the IMF in 1969 to supplement its member countries' official reserves. The SDR serves as the unit of account of the IMF and some other international organizations. The SDR is neither a currency nor a claim on the IMF. Rather, it is a potential claim on the freely usable currencies of IMF members. SDRs can be exchanged for these currencies.
- Currency Weight (in percent) since 2015
    - U.S. dollar 41.73%
    - Euro 30.93%
    - Chinese renminbi 10.92%
    - Japanese yen 8.33%
    - Pound sterling 8.09%
- SDR interest rate: Determined weekly based on a weighted average of representative interest rates on short-term government debt instruments in the money markets of the SDR basket currencies, with a floor of 5 basis points.

e) CEESE and IMF (1989-2009)

- After the fall of the communist regime in 1989, countries in Central and East Europe started their transition towards a market economy and to regain their economic links towards the western side of the European Economy. Meanwhile, they were facing with a deep recession as they had to consolidate their former planned economy. These institutional changes were made under severe funding condition and under the necessity of privatization of state owned enterprises.
- 1982
    - Hungary joins the IMF
- 1984
    - The IMF approves an SDR 297 million for Hungary
- 1986
    - Poland joins the IMF
- 1988
    - The IMF approves an SDR 165 million for Hungary
- 1989
    - The collapse of the communist regimes in the region
    - The IMF approves an SDR 50 million for Hungary
- 1990
    - The Paris Club and Poland sign a debt rescheduling agreement
    - The IMF approves an SDR 160 million compensatory and contingency financing facility for Hungary
    - Czechoslovakia joins the IMF
    - Bulgaria joins the IMF
- 1991
    - The IMF approves an SDR 1.1 billion extended fund facility for Hungary
    - The IMF approves an SDR 279 million stand-by facility for Bulgaria
    - The IMF approves an SDR 380.5 million stand-by facility for Romania
    - The IMF approves an SDR 1.2 billion extended fund facility for Poland.

- The Paris Club reaches an agreement with Poland on debt reduction and with Bulgaria on debt rescheduling

- 1992
  - SDR 236 million stand-by arrangement for Czechoslovakia
  - SDR 155 million stand-by arrangement for Bulgaria
  - Lithuania, Latvia, Estonia joins the IMF
  - SDR 314 million stand-by arrangement for Romania
  - Slovenia succeeds to the IMF membership
- 1993
  - Czech Republic and Slovakia succeed to the IMF membership
  - SDR 476 million stand-by credit for Poland
  - SDR 177 million stand-by credit for the Czech Republic
  - The IMF approves an SDR 405 million stand-by credit for Slovakia
  - SDR 25.9 million systemic transformation facility for Lithuania.
  - SDR 11.6 million stand-by credit for Estonia
  - SDR 22.9 million stand-by credit for Latvia
- 1994
  - SDR 69.7 million stand-by credit for Bulgaria
  - The Paris Club and Bulgaria sign a debt rescheduling agreement
  - Lithuania, Latvia, Estionia accepts the IMF's Article VIII obligations regarding the liberalization of capital movements
  - SDR 132 million stand-by credit for Romania
  - The London Club and Bulgaria sign a debt reduction (nearly 50%) agreement
  - The IMF approves an SDR 96.5 million stand-by credit for Slovakia
  - The IMF approves an SDR 545 million stand-by credit for Poland
  - The London Club and Poland sign a debt reduction (nearly 50%) and rescheduling agreement
  - Czech Republic finances its public debt on market basis (IMF loans repaid)
- 1995
  - SDR 14 million stand-by credit for Estonia.
  - SDR 27.5 million stand-by credit for Latvia.
  - Poland, Slovenia, Czech Republic and Slovakia accepts the IMF's Article VIII obligations
  - Poland finances its public debt on market basis (IMF loans repaid)
- 1996
  - Hungary accepts the IMF's Article VIII obligations
  - SDR 264.2 million stand-by credit for Hungary
  - SDR 30 million stand-by credit for Latvia
  - SDR 400 million stand-by credit for Bulgaria
  - SDR 14 million stand-by credit for Estonia
- 1997
  - SDR 479.5 million credit for Bulgaria
  - SDR 301.5 million stand-by credit for Romania
  - SDR 33 million stand-by credit for Latvia
  - SDR 16.1 million stand-by credit for Estonia
- 1998
  - Romania and Bulgaria accepts the IMF's Article VIII obligations
  - SDR 627.6 million extended fund facility for Bulgaria
  - Hungary finances its public debt on market basis (IMF loans repaid)
- 1999

- SDR 400 million stand-by credit for Romania
- SDR 33 million stand-by credit for Latvia

- 2000
  - SDR 29.3 million stand-by credit for Estonia
  - SDR 61.8 million stand-by credit for Lithuania
  - Slovakia finances its public debt on market basis (IMF loans repaid)
- 2001
  - SDR 33 million stand-by credit for Latvia
  - SDR 86.5 million stand-by arrangement for Lithuania
  - SDR 300 million stand-by credit for Romania
- 2002
  - SDR 240 million stand-by credit for Bulgaria
- 2004
  - The EU10 (Czechia, Hungary, Poland, Slovakia, Slovenia, Estonia, Latvia and Lithuania) joins the European Union.
  - SDR 250 million stand-by arrangement for Romania
  - SDR 100 million stand-by arrangement for Bulgaria
- 2007
  - Romania and Bulgaria joins the EU
- 2008
  - to avert a deepening of financial market pressures in Hungary, the
    - IMF approves an SDR 10.5 billion stand-by arrangement, and the
    - European Council approves a EUR 6.5 billion loan
  - to stabilize the Latvian economy,
    - the IMF approves an SDR 1.5 billion stand-by arrangement.
    - European Council approves a EUR 3.1 billion loan.
    - Scandinavian, Baltic and Eastern European countries provide bilateral financial assistance
- 2009
  - sharp drop in Romanian capital inflows,
    - IMF approves an SDR 11.4 billion stand-by arrangement
    - European Council approves a EUR 5 billion loan
  - SDR 13.7 billion arrangement under the flexible credit line for Poland
- 2013
  - Hungary finances its public debt on market basis (IMF loans repaid)
- 2016
  - Romania finances its public debt on market basis (IMF loans repaid)
- 2017
  - Poland Ends the Two-Year €8.24 Billion Flexible Credit Line Arrangement with the IMF

Literature:

OeNB (2009): 1989–2009 Twenty Years of East-West Integration: Hopes and Achievements. https://www.oenb.at/en/Publications/Economics/Focus-on-European-Economic-Integration.html

3. European Stability Mechanism (ESM)

a) How prepared was the Eurozone for a default of a MS?[25]

If a state is not able or not willing to meet its payment obligations, it typically can't sell the sovereign bonds meant to finance government deficits and maturing sovereign debt at a reasonable yield, and there are problems with interest payment as well (Losoncz, 2014). In this case, the options include rescheduling with the same present value, restructuring while decreasing the present value, and partial remittance. The country in trouble can negotiate with its sovereign creditors within the Paris Club and with its private creditors in the London Club (if it is not too atomised). Another option is to take intergovernmental loans, provided there is a willing partner. After the Bretton Woods conference (1944), the IMF became the institutionalised framework for sovereign multilateral lending. The IMF can diversify the sources of financing and lending, and it has the competencies to set the conditions of the latter. This means that when a country switches to IMF financing from market financing, it is at the expense of the collective sovereign debt of the IMF member states.

The eurozone, created by the core states of the European Union, did not have an institutional and financial background to deal with banking and sovereign debt crises at the time of its establishment. Because of this, member states tried to handle the effects of the global financial crisis that started in 2008 with funds from the International Monetary Fund (IMF) and ad-hoc intergovernmental loans at first. Later it became clear that this was insufficient, both politically and financially, and that a permanent, dedicated fund was required, so the European Stability Mechanism (ESM) was created.

Programmes to transform the ESM into a 'European Monetary Fund' as we see it in Jean-Claude Juncker's 'sixth scenario' and in communication from the European Commission in 2017 and the Managing Director of the ESM in 2018, also prompt a comparison of the two multilateral funds used for crisis management.

b) How are the liabilities of the ESM collected?

The objective of the European Stability Mechanism (ESM) is to provide financial assistance to euro area Member States experiencing or threatened by financing difficulties. It has a lending capacity (Forward Commitment Capacity) of €500 billion (maximum, current: €369.31 billion). To collect this €500 billion, ESM issues 3- and 6-month bills as well as medium and long-term debt with maturities of up to 45 years (following a diversified funding strategy), while losses are absorbed by a paid-in capital of €80 billion (ESM Treaty). The Basel Committee on Banking Supervision has designated ESM securities as Level 1 High Quality Liquid Assets so banks don't have to increase their capital when they buy these bonds (0% risk weight under Basel III). The long term credit rating is excellent: Moody's Aa1, Fitch Ratings AAA.

c) How is the capital of the ESM allocated (lending)?

The objective of the European Stability Mechanism[26] (ESM) is to provide financial assistance to euro area Member States experiencing or threatened by financing difficulties. It has a lending capacity (Forward Commitment Capacity) of €500 billion (maximum, current: €369.31 billion). Any financial assistance under the ESM is subject to strict conditionality and MSs must follow European Commission's requirements to participate.

Loans have extra-long term maturities: amortisation can start 19 years later and can remain for 23 years. It allows the distribution of large public debt expirations in time: governments will face with a small amount of expired debt on yearly basis.

[25] This and the next sections are based on the shortened version of the following article: Kiss, Gábor Dávid; Csiki, Máté; Varga, János Zoltán (2019): Comparing the IMF and the ESM through Bond Market Premia in the Eurozone, PUBLIC FINANCE QUARTERLY 64 : 2 pp. 281-296. https://www.penzugyiszemle.hu/pfq/public-finance-quarterly-archive-articles/Comparing-the-IMF-and-the-ESM-through-Bond-Market-Premia-in-the-Eurozone

[26] http://www.esm.europa.eu/

The requirements are usually focusing on the downsizing of the country's financial sector, fiscal consolidation (redemption of medium and long-term debt), structural reforms and privatisation.

d) Which Member States were supported by the ESM?

The ESM provides funding to member states through several channels: conventional loans (to Ireland, Portugal, Greece and Cyprus), loans for the recapitalisation of the banking system (Spain); the programme in which sovereign bonds are purchased on the primary and secondary markets and the precautionary liquidity line have not yet been used. In this subsection we describe the use and maturity profile of loans provided through the EFSF/ESM, relying on data from the website of the organisation.
Greece returned to full market financing in 2018 after the first loan agreement was made in 2010 to manage the crisis. In this agreement Greece first received bilateral loans of EUR 52.9 bn and a loan of EUR 20.1 bn from the IMF, which was followed by a EUR 141.8 bn EFSF (and a EUR 12 bn IMF) package between 2012 and 2015, then an additional amount of EUR 61.9 bn was allocated within the ESM. In the case of the EFSF, it must be emphasised how the private sector (especially banks) were involved in crisis management: In May 2012, 97 percent (EUR 197 bn) of privately owned bonds were subject to a 53.5 percent haircut, in which Greek sovereign bonds were swapped with EFSF bonds, the maturity of which was later extended. After that, 55 percent of Greece's sovereign debt was held by the ESM, with an average maturity period of 32.25 years and a 2034–2060 repayment period. In November 2018, a decision was made to extend the weighted average maturity of all EFSF loan tranches by ten years, which, together with the low variable borrowing rates (average: 1.62 percent), may result in significant debt reduction by 2060. 58 percent of ESF funds were spent on debt servicing, 18 percent on building a cash buffer, 11.3 percent on arrears clearance and 8.7 percent on bank recapitalisation.
Cyprus first received a loan from the IMF (EUR 1 bn) in 2012, then from the ESM (EUR 6.3 bn), with an average maturity period of 14.9 years. The repayment period is from 2026 to 2031, the average variable borrowing rate is 0.91 percent. EUR 1.5 bn of the loans was used for the recapitalisation of the banking system.
Portugal needed IMF-EFSF-ESM support between 2011 and 2014, receiving EUR 26 bn from each, and EUR 12 bn of this was used for the recapitalisation of three large banks. Borrowing rates vary, the average rate is 1.76 percent, the average maturity period is 20.8 years, the repayment period is between 2025–2040.
From 2010 to 2012, Ireland needed loans from the IMF (EUR 22.5 bn), the European Commission (EUR 22.5 bn), the EFSF (EUR 17.7 bn), the United Kingdom (EUR 3.8 bn), Sweden (EUR 0.6 bn) and Denmark (EUR 0.4 bn). The average maturity period of the EFSF loans is 20.8 years, the repayment period is between 2029 and 2042, and most recently the variable borrowing rates were at 1.79 percent. The funds were mostly used for financing the budget deficit, and a smaller part was used for the recapitalisation of the banking system.
Spain only used ESM funds for the recapitalisation of the banking system. The total amount between 2012 and 2013 was EUR 41.3 bn, with maturity between 2025 and 2027 (the average variable interest rate is 1.11 percent), capital repayment starts in 2022, but EUR 17.612 bn has already been repaid voluntarily. The IMF was not involved, as at the time it did not have facilities suitable for the recapitalisation of the banking system. ESM funds were managed by the restructuring fund of the Spanish government, Fondo de Reestructuración Ordenada Bancaria, and it involved 8 banks. An asset management fund was also established.
Overall, the ESM provided loans with variable interest rates (with the exception of the facility provided to Greece, amended in 2018), not exposing itself to market interest risks. On the other hand, it launched programmes that span over decades, sometimes 50 years, and the economic policy of the recipient countries are now under strict supervision until 75 percent of the loans are repaid (Ódor, P. Kiss, 2011; Török, 2018). Every member state involved in these assistance programmes managed to return to direct capital market financing, which suggests the programme is accepted.

4. What are the differences between the IMF and the ESM lending?

The European Stability Mechanism (ESM) was established in 2012 with an international treaty outside of EU legislation (as confirmed later by the European Court of Justice in the Pringle case) to protect the stability of the eurozone, as an instrument of economic policy (Kálmán, 2016; Benczes, 2014; Várnay, 2016). The eurozone must ensure free capital flow, which stems from the theory of Optimum Currency Area (Mundell, 1961), and at the same time, resulting from the impossible trinity, it must also ensure irreversibly fixed exchange rates and the maintenance of a common monetary policy, while there are provisions against exit, no bailout and sovereign default (Losoncz, 2017; Marján, Buda, 2014; Benczes, 2011). The free flow of capital is essential, so we will examine this from two aspects: how it brought the idea of a banking union to centre stage and how this effects the convergence of bond market yields. Due to free capital flows and the free provision of services, financial crises spread more easily through parent banks (Árvai et al., 2009) and the balance sheet total of certain bank groups are now comparable to the gross national product of member states. Because of this, the aim of macroprudential policy is to mitigate system-level crises, to prevent excessive credit growth, to manage liquidity risks and to avoid excessive risk-taking. This is also the aim of the Banking Union, which focuses mostly on the eurozone but is also open to other member states, through the direct supervision of banks that are significant on a system-level (Single Supervisory Mechanism), and through the common resolution fund and deposit insurance fund (Mérő, 2017). Some of the resources provided by the ESM, described in the following sections, were also spent on bank consolidation by the recipient countries, which, again, underlines the significance of the institutional deepening mentioned before.

It makes the institutional background even more complex that the European Commission has always involved the IMF as a partner in the crisis management process (Marján, Buda, 2014; Losoncz, 2014). This involvement is justified by the high quota of the eurozone member states, their considerable voting power and credit facilities. In the IMF, according to the latest, fifteenth amendment accepted in 2008, it is a 19 percent quota share (US 14.7 percent), which is SDR 103.8 bn. In addition, euro area countries contribute to the NAB (New Arrangements to Borrow) and GAB (General Arrangements to Borrow) funds, which constitute the source of financing for the IMF, with 36 percent and 26 percent respectively. Which means it would not be rational not to rely on these available resources.

On the other hand, except for the reconstruction after the second world war and some short detours (and the support provided to countries during the political transition of the 1990s), the IMF did not focus on European and euro area countries. Considering this, it is understandable that the Ecofin and the European Commission became committed to the establishment of an own crisis management fund (more than one, with the bank resolution fund). Another important difference is that the ESM admittedly has no independent decision-making powers, it is only responsible for the availability of funds [an 85 percent majority of members is required for access (Móra, 2013)].

The IMF lends the resources provided by the member states for a maximum duration of ten years, while the ESM can set a 50 year repayment period for its loans, for which it raises capital from the bonds it issues with member state guarantees. This is also useful from the aspect of how sovereign debts affected by the consolidation are spread over time. Table 1 shows the main differences between the lending facilities.

Table: Differences in IMF and ESM lending

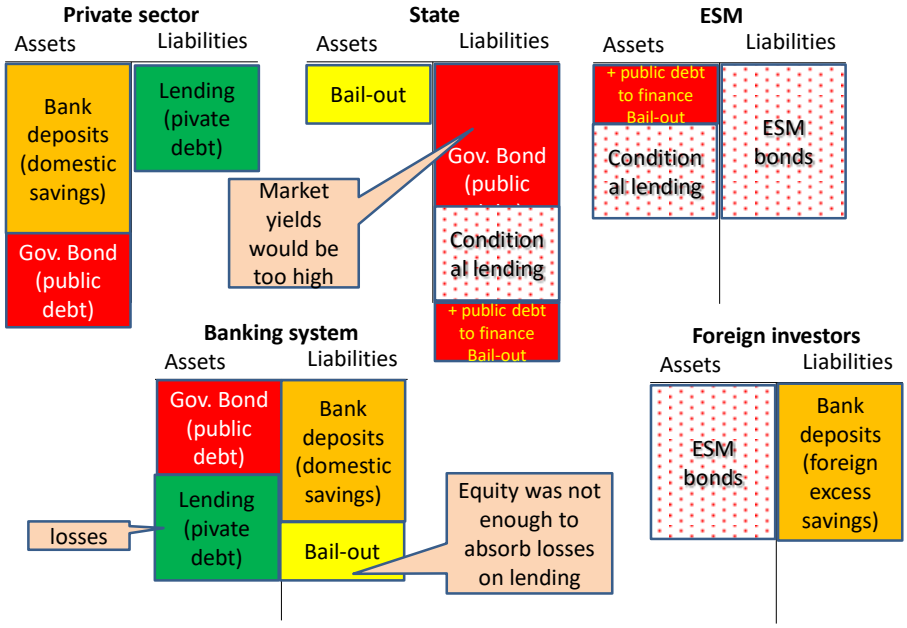
	IMF	ESM
Duration (and repayment period)	Stand-By Arrangement (SBA): 1–2 years (3¼–5 years) Extended Fund Facility (EFF): 3–4 years (4½–10 years) Flexible Credit Line (FCL): 1–2 years (3½–5 years) Precautionary and Liquidity Line (PLL): 0.5–2 years	2–3 years (~20 years grace period, 45 years final maturity)
Currency of loan	SDR (41.71% USD, 30.93% EUR, 10.92 RMB, 8.33 JPY, 8.09% GBP)	EUR
Decision-making mechanism	Based on quotas	European Commission, Ecofin, with 85% qualified majority
Financing	Funds from member states (*General Arrangements to Borrow* and *New Arrangements to Borrow*), accessible with 85% qualified majority	Bond issuance (EUR 500 bn) backed by member state guarantees (EUR 80 bn)

Note: without loans to poor countries
Source: IMF, ESM websites

ESM bonds are officially recognised as bonds issued by a Sovereign, Supranational Agency (SSA), which receive a 0 percent risk weight according to the Basel II document . In addition, the European Banking Authority recognises it as an 'extremely high quality liquid asset', and it is accepted by the ECB and the Bank of England as collateral. ESM sells bonds globally through 41 institutional investors, while short-term notes provided for the recapitalisation of the banking sector may only be used in the repo markets as collateral. The interest rates of the bonds issued are built in the interest rates of the loans provided to the recipient countries, together with the commission that ensures the operation of the ESM and the stand-by fee.

The lending facility of the EMS can be seen as some 'bad eurozone bond', and its acceptance is sweetened by the related sovereign guarantees, the solvency capital requirement benefits and the fact that they are accepted as collateral (Sági, 2018). From an institutional aspect, it seemed an acceptable hybrid solution in addition to the politically less popular other options, namely ad-hoc bilateral loans, the 'euro bond' covering the whole euro area, and the bonds issued by the European Commission (European Financial Stabilisation Mechanism). The establishment of the ESM, however, clearly indicated that in addition to the emergency reforms of the Stability and Growth Pact, member states were ready for showing solidarity that complies with the prohibition of sovereign default and for a deepening integration (Benczes, Rezessy, 2013; Kutasi, 2012). It is a question, however, also raised by Benczes and Rezessy (2013), and Vigvári (2015), what will happen if a larger member state gets into trouble.

General model of sovereign crisis management



Source: Authors' edition

5. World Bank (WB) group

a) Structure

- International Bank for Reconstruction and Development (IBRD)
  - governments of middle-income and creditworthy low-income countries
  - loans, guarantees, risk management products, and analytical and advisory services
  - Established in 1944
  - raises most of its funds on the world's financial markets (bonds) since 1947
  - middle-income and creditworthy low-income c.
  - Strategy and Coordination Services
    - identifying the most critical constraints and opportunities reducing poverty and building shared prosperity sustainably
  - Financial Services
    - Financing (IBRD Flexible Loan - up to 35 years, LIBOR-based; Local currency loans; Financing for subnationals - with a sovereign guarantee or on commercial terms with IFC; Contingent financing - unexpected a shortfall in resources
    - Guarantees (Project-Based and Policy-Based MIGA direct private sector investment in oil, gas and mining, power, telecom, transport, and water projects)
    - Hedging (help clients manage their financial risks - interest rate and currency swaps, limit interest rate variability with a cap or a collar; commodity swap: one set of cash flows is linked to the market price of a commodity or index. The other is a fixed cash flow or a cash flow based on a variable rate of interest)
    - Disaster risk financing
  - Knowledge Services
- International Development Association (IDA)
  - governments of the (77) poorest countries (~ 2.8 billion people)
  - interest-free loans — called credits — and grants
  - single largest source of donor funds for basic social services
  - little or no interest and repayments are stretched over 25 to 38 years, including a 5- to 10-year grace period
    - Heavily Indebted Poor Countries (HIPC) Initiative
    - The Multilateral Debt Relief Initiative: July 2005 G8 Summit G8 leaders pledged to cancel the debt of the world's most indebted countries, provided by IDA, IMF and the African Development Fund
- International Finance Corporation (IFC) (reading: http://www.ifc.org/wps/wcm/connect/CORP_EXT_Content/IFC_External_Corporate_Site/What+We+Do/Client+Services)
  - focused exclusively on the private sector (debt and equity financing)
  - financing investment, mobilizing capital in international financial markets, and providing advisory services to businesses and governments
  - owned by 184 member countries and is the only multilateral with fully paid-in capital (others at 25%)
  - rated AAA/Aaa by Moody's and S&P since its initial rating in 1989
  - Eligible projects:
    - Be located in a developing country that is a member of IFC;
    - Be in the private sector;
    - Be technically sound;
    - Have good prospects of being profitable;
    - Benefit the local economy; and

        - Be environmentally and socially sound
    - Investing Solutions
        - Loans (fixed and variable rate loans, mostly in leading currencies, maturities of seven to 12 years, for-profit projects, early-stage companies and expansion projects /25-50% of total loan/, banks, leasing companies)
        - Syndicated Loans
        - Equity Finance
        - Structured Finance
        - Risk Management Products
        - Local Currency Financing
        - Private Equity & Investment Funds
        - Trade Finance
- Multilateral Investment Guarantee Agency (MIGA) (reading: http://www.miga.org/investmentguarantees/index.cfm?stid=1797#toc2)
    - offering political risk insurance (guarantees) to investors and lenders
    - Currency inconvertibility and transfer restriction
    - Expropriation (government actions that may reduce or eliminate ownership of, control over, or rights to the insured investment)
    - War, terrorism, and civil disturbance
    - Breach of contract
    - Non-honoring of financial obligations
    - Fees average ~1% of the insured amount per year, coverage is for up to 15 years, insure up to $220 million per project
- International Centre for Settlement of Investment Disputes (ICSID)

b) Fundraising – IBRD

- Debt securities issued by the World Bank (triple-A rated since 1959) (reading: http://treasury.worldbank.org/cmd/htm/financial_strength.html)
    - Issue Size: 2-4 billion
    - Maturity: 2, 5, 7, 10 or 30 years
    - Backed by 188 member governments, including the US, Japan, China, Germany, and France and UK
    - BIS Basel II and III 0% risk weighting
    - Bonds in Non-Core Currencies
        - Liquidity backstop: IBRD provides secondary markets
        - Nigerian Naira, Chinese Renminbi, Zambian Kwacha, Chilean Peso, Swedish Krona, Thai Baht, New Zealand Dollar, Turkish Lira
    - Structured Notes
        - Minimum size requirement can be even less than USD 5 million or equivalent in other currencies
        - Minimum maturity one year
        - Callable or puttable notes
        - Floating rate notes with caps, floors or collars
        - Step-up and step-down coupons
        - Notes linked to an equity, bond, hedge fund index, or to a constant maturity swap rate
        - Dual currency notes
        - Powered dual currency notes with foreign exchange optionality
        - Other unique structures as requested by an investor and designed together with the World Bank

- Discount Notes
  - short-term investment in US and Euro dollar
  - maturities of 360 days or less in the US and Eurodollar markets
  - Face amount: US$50000
- "Sustainable Investment Products"

- Prudent Financial Policy
  - Maximum “gearing ratio” of 1:1: lending 0.59 USD of loans and guarantees to 1USD of subscribed capital, reserves, and surplus
  - Liquid assets > minimum liquidity target (activity is under potentials)
- Quality Loan Portfolio
  - Lending is limited to sovereign or sovereign-guaranteed projects and programs (<<100%, syndicated borrowing!)
  - Strict limits are set on loan concentration in individual countries
  - policy of freezing loans approvals and disbursements if a country fails to pay in time
- Shareholder Support
  - Paid-in Capital ($14.4bln), Callable Capital ($219 bln), reserves ($24 bln)
- Profitability

6. Bank for International Settlements (BIS)

a) About the BIS

- Established on 17 May 1930
- for profit, publicly listed
- 60 member central banks (95% of world GDP)
- mission
  - to serve central banks in their pursuit of monetary and financial stability,
  - to foster international cooperation in those areas and to act as a bank for central banks
- banking activities: the customers of the BIS are central banks and international organisations
- own analyses & statistics of monetary and financial stability issues
- Structure:
  - Basel Committee on Banking Supervision
    - regular cooperation on banking supervisory matters
  - Committee on the Global Financial System
    - identify and assess potential sources of stress in global financial markets
  - Committee on Payments and Market Infrastructures (CPMI)
    - safety and efficiency of payment, clearing, settlement and related arrangements
  - Irving Fisher Committee on Central Bank Statistics
    - forum of central bank economists and statisticians
  - The Financial Stability Institute (FSI)
    - promote sound supervisory standards and practices, latest information on market products, practices and techniques
  - Markets Committee
    - formerly the Committee on Gold and Foreign Exchange information on the monetary policy frameworks and market operations
  - Financial Stability Board (FSB), the International Association of Insurance Supervisors (IAIS) and the International Association of Deposit Insurers (IADI).

b) Products and services

- To assist central banks, monetary authorities and international financial institutions in the management of their foreign exchange and gold reserves
- BIS money market instruments
    - Sight/notice accounts and fixed and floating-rate deposits in most convertible currencies
    - Fixed-term deposits can also be denominated in and index-linked to a basket of currencies such as the SDR
    - Standard and non-standard amounts and maturities
- BIS tradable instruments
    - Issued in major currencies
    - Available in two forms: Fixed Rate Investments at the BIS (FIXBIS) for any maturities between 1 week and 1 year and Medium-Term Instruments (MTIs) for quarterly maturities from 1 year and up to 10 years
- Foreign exchange and gold services
    - spot deals, swaps, outright forwards, options, FX-linked deposits
    - foreign exchange overnight orders
    - safekeeping and settlements facilities available loco London, Berne or New York
    - purchases and sales of gold: spot, outright, swap or options
- Asset management services
    - invested in government bonds or high-grade credit securities
    - structured as dedicated portfolio mandates or BIS Investment Pool (open-end funds)
    - offered as either single currency or multi-currency mandates in the major world reserve currencies
- Other services
    - Short-term advances to central banks, usually on a collateralised basis
    - Trustee for a number of international government loans
    - Collateral agent functions

V. Emerging Markets, Open and Small Economies

Literature:
Jeffrey Frankel (2011): Monetary Policy in Emerging Markets, in: Friedman B. M., Woodford M. (eds.): Handbook of Monetary Economics, Elsevier, pp. 1441-1499

1. Different models for emerging markets

a) Changes since the 1970s

- models had been designed for industrialized countries
  - financial sectors that were highly market-oriented
  - open to international flows
- developing countries: "financial repression"
  - financial intermediaries were uncompetitive
  - government kept nominal interest rates artificially low and allocated capital administratively
  - capital controls:
    - capital inflows and outflows were heavily discouraged
    - largely limited to foreign direct investment and loans
- emerging markets: more liberalized and open
  - globalization of their finances
    - late 1970s with the syndicated bank loans that recycled petrodollars to oil-importers
    - waves of capital inflow followed after 1990 and again after 2003
    - capital busts:
      - the international debt crisis of 1982–1989
      - the emerging market crises of 1995–2001
      - the global financial crisis of 2008–2009
  - market-imperfection models
    - default risk
    - procyclicality
    - asymmetric information
    - imperfect property rights
    - other flawed institutions

b) Special characteristics

- less developed institutions: lower central bank **credibility**
  - history of price instability (hyperinflation)
  - **seignorage** as a means of government finance
  - uncompetitive banking system:
    - traditional reliance on the banks as a source of finance
  - financial repression and controls on capital outflows
- goods markets more exposed to international influences: "**small open economy**"
  - trade barriers and transport costs
  - smaller in size and more dependent on exports of agricultural and mineral commodities
  - standard labor-intensive manufactured exports as close substitutes across suppliers

- **price-takers for tradable goods** on world markets
- more **volatility**
  - supply shocks
    - primary products (agriculture, mining, forestry, and fishing) make up a larger share of their economies
    - extreme weather events domestically
    - volatile prices on world markets
    - terms of trade are exogenous
  - demand shocks
    - domestic macroeconomic and political instability
    - runaway budget deficits
    - money creation
    - inflation
    - procyclical
    - inequality and populist political economy
- greater incidence of **default risk**
  - debt-intolerance
    - higher interest rates in response to increases in debt
  - agency ratings
    - reputational effects of a long history of defaulting or inflating away debt
- imperfections in financial markets
  - underdeveloped institutions
    - poor protection of property rights
    - bank loans made under administrative guidance or connected lending
    - government corruption
  - financial turbulence
    - multiple equilibrium
    - contagion
      - not all the volatility experienced by developing countries arises domestically ← from global financial markets

2. Goods markets, pricing and devaluation

- small open economy:
  - price-takers (for export and import) – tradable goods
  - devaluation should push up the prices of tradable goods quickly

a) Traded goods, pass-through, and the law of one price

- traditional view: developing countries, especially small ones, experience rapid pass-through of exchange rate changes into import prices, and then to the general price level
  - pass-through coefficient represents to what extent a devaluation has been passed through into higher prices of goods sold domestically
  - Pass-through has historically been higher and faster for developing countries than for industrialized countries
  - pass-through to import prices is **complete and instantaneous**
- less valid, especially in the big emerging market devaluations of the 1990s

  - Pass-through coefficients appear to have declined in developing countries but still above the industrialized countries' levels
- export side:
  - raw materials: prices that are determined on world markets, arbitrage, monopolistic
  - less clear for the pricing of manufactures and services

b) Export prices are sticky

- devaluation or depreciation of the nominal domestic currency devaluates real exchange rates as well
  - some real exchange rate fluctuations are exogenous — and would show up in prices if the exchange rate were fixed
- evidence of stickiness in the nominal prices of traded goods,
  - especially noncommodity export goods, which in turn requires some sort of barriers to international arbitrage (tariffs or transportation costs)
  - nontraded goods and services, which by definition are not exposed to international competition: important role in the price index
    - even highly tradable goods have a nontraded component at the retail level
- Developing countries tend to face higher price-elasticities of demand for their exports than industrialized countries
  - Marshall-Lerner condition satisfied, but usual lags in quantity response to a devaluation (J-curve pattern in response to the trade balance)

c) Nontraded goods

- prices of all traded goods are determined on world markets and nontraded goods and services

$$Q(real\ fx\ rate) \equiv \frac{E(CPI_{world})}{CPI_{domestic}} = \frac{E\left(P_{w,TG}^{1-a}P_{w,NTG}^{a}\right)}{P_{d,TG}^{1-a}P_{d,NTG}^{a}} = \frac{\left(EP_{w,TG}^{1}\right)\left(P_{w,TG}^{-a}P_{w,NTG}^{a}\right)}{P_{d,TG}^{1-a}P_{d,NTG}^{a}}$$

$$= since\ P_{w,TG} = EP_{d,TG} = \frac{\left(\frac{P_{w,NTG}}{P_{w,TG}}\right)^{a}}{\left(\frac{P_{d,NTG}}{P_{d,TG}}\right)^{a}}$$

  - If the relative price of nontraded goods goes up in one country, that country's currency will exhibit a real appreciation
- Balassa (1964)-Samuelson (1964) effect
  - shows up robustly *in long-term* data samples
  - when a country's per capita income is higher, its currency is stronger in real terms
  - increase in the relative price of nontraded goods
  - elasticity coefficient is estimated at around 0.4
  - as productivity growth that happens to be concentrated in the tradable good sector
- deviate very far from the Balassa-Samuelson line, especially *in the short run*
  - Salter-Swan model:
    - monetary expansion in a country with a currency peg will show up as inflation in nontraded goods prices, and therefore as real appreciation, in the short run

        - devaluation will rapidly raise the domestic price of traded goods, reducing the relative price of nontraded goods and showing up as a real depreciation
    - Dornbusch (1973, 1980): overshooting model for the case of floating countries
        - aftermath of a devaluation or in the aftermath of a domestic credit contraction, the levels of reserves and money supply would lie below their long-run equilibria
        - only via a balance of payments surplus could reserves flow in over time, gradually raising the overall money supply and nontraded goods prices in tandem

d) Contractionary effects of devaluation

- Keynesian approach to the trade balance: **devaluation is *supposed to* be expansionary** for the economy
    - higher demand for domestic goods, whether coming from domestic or foreign residents, leads to higher output rather than higher prices
- devaluation often seems to be associated with ***recession rather than expansion***

Political costs of devaluation

- political leaders often lose office in the year following devaluation
    - is almost twice as likely to lose office in the six months following a currency crash as otherwise
    - job loss following devaluations is about 20%, almost double the rate in normal times
- Finance ministers and central bank governors are even more vulnerable
- due to adverse distributional effects for urban population
- devaluations act as a proxy for unpopular IMF austerity programs or other broad reform packages

Empirical studies

- devaluation in developing countries is contractionary in the first year, but then expansionary when exports and imports have had time to react to the enhanced price competiveness
- In the very long run, devaluation is presumed neutral, as prices adjust and all real effects disappear
- devaluations are only contractionary in crisis situations, which they attribute to debt composition issues
- Exports do not increase at all after a devaluation, but rather fall for the first eight months.
    - Perhaps firms in emerging market crises *lose access to working capital and trade credit even* when they are in the export business

Effects via price pass-through

- channels where devaluation might have contractionary effects
    - rapid pass-through of exchange rate changes to the prices of traded goods
    - increase in the exchange rate (depreciation) → increase in the domestic price of imports (prices of traded goods)
        - → reduce real incomes of workers → therefore real consumption
        - → increase costs to producers in the nontraded goods
        - → increased tariff revenue

        - → tightening of real monetary conditions (increase in the interest rate) → decline in the real money supply
- not present in the currency crashes of the 1990s
    - devaluations were not rapidly passed through
        - to higher prices for imports,
        - for domestic competing goods,
        - or to the CPI
    - in the way that the small open economy model led us to believe
    - East Asia after the 1997–1998 devaluations, or even in Argentina after the 2001

Balance sheet effect from currency mismatch

- currency mismatch:
    - bank and corporate debt denominated in foreign currency →← while much of their revenues are in domestic currency
    - combined with a major devaluation → solvent firms → debt service troubles
        - → lay off workers and close plants
        - → go bankrupt
    - ratio of external dollar debt to GDP in excess of 84%; it is expansionary for the rest
        - openness → reduces the vulnerability of a given current account deficit
        - lack of openness coupled with liability dollarization are key determinants of the probability of sudden stops
- origin of the currency mismatch
    - Original sin: Investors in high-income countries are unwilling to acquire exposure in the currencies of developing countries → developing debtors can borrow only in key currencies.
        - poor empirical evidence, country size matters
    - Adjustable currency pegs: An apparently fixed exchange rate lulls borrowers into a false sense of security and into incurring excessive unhedged dollar liabilities.
    - Moral hazard: Borrowing in dollars is a way for well-connected locals hoping that FX reserves will be used to save them.
    - Procrastination of adjustment: BoP<0 → shifting to short-term and dollar-denominated debt maintains funding and governments can postpone adjustment
        - a country without a serious currency mismatch problem may develop one just after a sudden stop in capital inflows but before the ultimate currency crash
- gambling for resurrection: running down reserves & staking ministerial credibility on holding a currency peg → helping to make the crisis worse
    - why the ratio of short-term foreign debt to reserves appears so often and so robustly in the literature on early warning indicators for currency crashes
- restoring external balance is likely to wreak havoc
    - harder to restore confidence (post- devaluation) ← reserves are near zero & ministers have lost personal credibility
    - composition of the debt
        - the short term in maturity,
        - toward the dollar in denomination

e) 'Good' Versus 'Bad' Currency Appreciations

Literature:

Haincourt S. (2018): The Nature of the Shock Matters: Some Model-Based Results on the Macroeconomic Effects of Exchange Rate. In: Ferrara L., Hernando I., Marconi D. (eds.): *International Macroeconomics in the Wake of the Global Financial Crisis*, Springer, pp. 233-247

- Exchange Rate Pass-Through, ERPT
  - elasticity of inflation to exchange rate changes and can be decomposed into two components:
  - (i) on import prices
    - generally incomplete (lower than 1) and quite rapid, and differs among countries
    - related to microeconomic factors like margin behavior or currency invoicing, but also to economic conditions
      - importance of the invoicing currency: a lot given that prices invoiced in foreign currencies are not very sensitive to exchange rates movements
  - (ii) import prices on inflation
    - it depends on the import-intensity of GDP
  - heterogeneous across countries
    - high for EMEs (emerging economies) and very low for the U.S.
    - high elasticity on the export side also have a high elasticity on the import side
  - uncovered interest rate parity condition (in NiGEM model):
    - $E\left[\frac{rx_{t+1}^n}{rx_t^n}\right] = \left[\frac{1+int_t^n}{1+USint_t}\right] * (1 + RP_t^n)$
    - where:
      - *rx* FX rate of US dollar in *n* currency
      - int_t^n short term interest rate in the country n
      - $USint_t$ short-term interest rate in the US
      - RP_t^n risk premium attached to the currency of the country n
      - Effective exchange rates are calculated from a trade-weighted average of bilateral rates
- Appreciations
  - a 'good' appreciation: fall in the risk premium attached to the currency;
    - risk premium shock by generating a 5% appreciation in the nominal effective exchange rate (NEER) of the Dollar and the Euro
    - his is a direct endogenous shock to the floating exchange rate, with forward-looking agents
    - fall in the risk premium will induce more investment and a higher equilibrium capital stock
    - lead to higher potential output and therefore more slack today, creating disinflationary pressure
    - Central Bank will respond by cutting its intervention rate
  - a 'bad' appreciation: domestic monetary policy shock;
    - a new path to the Central Bank intervention rate by changing the nominal target in the monetary policy rule
    - brings the current nominal GDP back to its target level, with a Taylor(like)-rule
      - $USint_t = \beta_1 USint_{t-1} + \beta_2\left[\frac{USnom_t}{USnomT_t}\right] + \beta_3[\frac{USinf_t}{USinfT_t}]$
      - USint: Central Bank interest rate

- USnom: nominal GDP
- USnomT: nominal GDP target
- USinf: inflation expectations
- USinfT: inflation target
- β_1 and β_2 equal to 0.5 and β_3 equal to 0.7

  - output gap puts a positive pressure on US interest rates, eventually pushing up the Dollar – same shock runs for the Euro area
  - monetary policy shock will change the short term interest rate and, as agents are forward-looking and rational, the long term interest rate
  - financial variables will act on the various components of demand,
  - but will also affect supply through new expectations of real factor costs as inflation expectations will be affected by the monetary policy shock
  - monetary policy shock (an instantaneous rise in the Central Bank interest rate) is expected to be more painful to activity than a risk premium shock
  - transmission to consumer prices and growth is rapid and significant for both the US and Euro area
  - transmission of higher interest rates to investment explains most of the negative impact on activity, with negative spillovers to employment and wages
- a 'third' appreciation: rise in interest rate differentials prompted by weaker foreign demand.
  - translates quickly into weaker GDP growth

3. Inflation

a) <u>High inflation</u>

- Hyperinflation
  - rate of increase in prices of 50% per month
  - or 1000% per year
- Clusters of hyperinflation
  - ends of World War I and World War II
  - end the Cold War (in Latin America, Central Africa, and Eastern Europe)
- quite high inflation (40%) periods:
  - 27 countries have experienced inflation above 100 percent per annum after 1947;
  - higher inflation tends to be more unstable;
  - in high inflation countries, the relationship between the fiscal balance and seigniorage is strong
  - inflation inertia decreases as average inflation rises;
  - high inflation is associated with poor macroeconomic performance;
  - stabilizations from high inflation that rely on the exchange rate as the nominal anchor are expansionary.
- traditional hypothesis
  - monetary expansion and inflation → higher output and employment
    - the expansion is an acceleration from the past or a departure from expectations
  - in case of high inflation
    - this relationship breaks down,
    - the detrimental effects of price instability (disruption of the usefulness of price signals) on growth dominate

- policies that lead to high inflation
    - public finance: seignorage or the inflation tax ← polarized and unstable political structure find it hard to collect taxes (seignorage 10% of total government finance)
        - Olivera-Tanzi effect: lags in tax collection, disinflation reduces the real value of tax receipts
        - developing economies display a significant positive long-run effect on inflation of the fiscal deficit when it is scaled by narrow money (the inflation tax base)
        - Cagan logic: high inflation arises when
            - the needed revenue > the seignorage-maximizing rate of money growth
    - low credibility of government → exogenous rate of money growth

b) Inflation stabilization programs

- inflation came down substantially during the 1990s
- often had national indexation of wages and other nominal variables
    - removing the indexation arrangements was usually part of the successful stabilization programs
- change to a credibly firm nominal anchor
    - fundamentally change expectations → all inflation (traded and nontraded goods) would disappear
    - without loss of output
- stabilization attempts are likely to fail
    - ← excessive money growth is rooted in the government's need to finance itself by seignorage
    - ← Inflation inertia: exchange-rate based stabilization attempts generally show a lot of inflation inertia
        - → producers gradually lose price competitiveness on world markets in the years after the exchange rate target is adopted
    - **recessionary effects** associated with disinflation
        - ← late stages of exchange-rate-based programs
        - ← show up early in money-based programs as a result of tight monetary policy
    - ← completely credible commitment (dynamic consistency problem)
        - proclamation of a rule is not a sufficient solution to the poor government credibility and institutional restrictions
        - → loss of output during the transitions
- when **Ecuador** gave up its currency in favor of the dollar, neither the inflation rate nor the price level converged rapidly to U.S. levels, instead, **inflationary momentum continued**

c) Central bank independence

- underdeveloped institutions and low inflation-fighting credibility
- two prescriptions for monetary policy:
    - (1) that their central banks should have independence: institutional insulation of the central bank from political pressure help to bring down inflation at lower cost to output
        - 1990s with Chile, Colombia, Mexico, and Venezuela
        - Bank of Korea was made independent in 1998 following that country's currency crisis
    - (2) that they should make regular public commitments to a transparent and monitorable nominal target

- three measures of central bank independence (CBI)
  - legal independence (but not enough to look at the de jure or legal independence)
  - turnover of governors of central banks,
    - correlated with inflation in developing countries
  - an index derived from a questionnaire that the authors had asked monetary policymakers to fill out
- central bank independence lowers the mean and variance of inflation with no effect on the mean and variance of output growth
  - but inefficient if political economy is dictated by budget deficit

4. Nominal targets for monetary policy

- commitment to a nominal anchor
  - in a nonstochastic model, any nominal variable is as good a choice for monetary target as any other nominal variable
  - in a stochastic model (not to mention the real world) it makes quite a difference
  - Money supply?
  - Exchange rate? CPI?
  - Other alternatives?

a) money targeting to exchange rate targeting to inflation targeting

- inflation stabilization programs
- money growth targets
  - died out by the end of 1980
  - M1 targets had recently proven unrealistically restrictive in the largest industrialized countries
- exchange rate
  - successful
  - Chile's tablita, Bolivia's exchange rate target, Israel's stabilization, Argentina's convertibility plan, and Brazil's real plan
  - emerging market currency crises that began in December 1994 and ended in January 2002 → flexible currency regimes
    - speculative attack (Mexico and Argentina)
    - jump to floating preemptively, before a currency crisis could hit (Chile and Colombia)
    - full dollarization (Ecuador) or currency boards (Bulgaria)
    - four decades since 1971: the general trend has been in favor of floating exchange rates
  - never really left, especially in the smaller countries
- inflation targeting (IT)
  - successes in wealthier countries (New Zealand, Canada, UK, and Sweden)
  - Brazil, Chile, Colombia, and Mexico switched from exchange rate targets to IT in 1999
  - Czech Republic, Hungary, Poland, Mexico, Israel, Korea, South Africa, and Thailand around 2000
  - Indonesia and Romania in 2005 and Turkey in 2006
  - IT has functioned well
    - anchored expectations and avoided a return to inflation in Brazil despite two severe challenges:
      - the 50% depreciation of early 1999, as the country exited from the real plan,

- the similarly large depreciation of 2002, when a presidential candidate who at the time was considered anti-market and inflationary pulled ahead in the polls
  - emerging market countries that had adopted inflation targeting had enjoyed greater declines in inflation and less growth volatility

b) The impact of the GFC in 2008

- post-IT after 2008?
- FX rate reemerges, or never disappeared in small economies
- prices of agricultural and mineral products
  - relevant for many developing countries
  - volatility of commodity prices in the 2000s
- equities and real estate
  - re-think the exclusive focus on inflation to the exclusion of asset prices
  - it is not the job of monetary policy to address asset prices
- IT is better suited to large industrialized countries than to developing countries
  - role for exogenous shocks in trade conditions or difficulties in the external accounts
    - countries need not worry about financing trade deficits internationally
    - international capital markets function well enough to smooth consumption in the face of external shocks
    - for developing countries, international capital markets often exacerbate external shocks
      - Booms, featuring capital inflows, excessive currency overvaluation, and associated current account deficits are often followed by busts, featuring sudden stops in inflows, abrupt depreciation, and recession
  - Supply shocks, tend to be larger for developing countries
    - IT (defined narrowly) can be vulnerable to the consequences of supply shocks
      - to prevent the price index from rising in the face of an adverse supply shock, monetary policy must tighten so much that the entire brunt of the fall in nominal GDP is borne by real GDP
    - this is why it is necessary to allow part of the temporary shock to show up as an increase in the price level
      - flexible inflation targeting, often in the form of the Taylor rule, which does indeed call for the central bank to share the pain between inflation and output
    - large temporary shocks in import prices for oil and other agricultural and mineral products are excluded from the measure of the targeted CPI
      - focusing on core CPI
      - or endangering credibility

5. Procyclicality

a) The procyclicality of capital flows in emerging markets

- intertemporal optimization
  - countries should borrow during temporary downturns to sustain consumption and investment, and
  - should repay or accumulate net foreign assets during temporary upturns
- Capital flows are more often procyclical than countercyclical
  - imperfections in capital markets,
    - asymmetric information or

    - the need for collateral
- if shocks take the form of **changes in the permanent trend of productivity** rather than temporary cyclical deviations from trend
- result from procyclical fiscal policy:
    - when governments increase spending in booms, some of the deficit is financed by borrowing from abroad
        - tax receipts are particularly endogenous with respect to the business cycle
        - cannot resist the temptation or political pressure to increase spending proportionately in booms
    - forced to cut spending in downturns → to repay some of the excessive debt that incurred during the upturn.
- political business cycle:
    - governments to adopt expansionary fiscal policies (and monetary policies) in election years
    - tax cuts as easily as spending increases
    - present in both developed and less developed countries, but developing countries are thought to be even more susceptible to the political business cycle than advanced countries

b) Commodity and procyclicality

- commodity cycle (Dutch disease): exporters of agricultural and mineral commodities:
    - very high export price volatility
    - specialized in the production of oil, copper, or coffee,
    - which periodically experience swings in world market conditions that double or halve their prices
    - upward swing in the world price of the export commodity →
        - large real appreciation in the currency
        - an increase in spending
        - increase in the price of nontraded goods relative to nonexport-commodity traded goods
        - shift of resources out of nonexport-commodity traded goods
        - current account deficit
        - adversely affected tradable goods are in the manufacturing sector → deindustrialization
    - reallocation of resources across tradable sectors may be the inevitable consequence of a global increase in the real commodity price
    - reversed when the world price of the export commodity goes back down
    - discovery of new deposits or some other expansion in supply
        - leading to a trade surplus via exports
        - capital account surplus via inward investment to develop
    - analogy for other sorts of inflows such as the receipt of transfers (foreign aid or remittances) or a stabilization-induced capital inflow
        - → result is real appreciation and a shift into nontradables and away from (noncommodity) tradables
            - real appreciation takes the form of a nominal appreciation if the exchange rate is flexible, and inflation if the exchange rate is fixed
    - most important measures are institutions
        - to ensure that export earnings are put aside during the boom time,

        - into a commodity saving fund, perhaps with the aid of rules governing the cyclically adjusted budget surplus
- IT monetary policy procyclicality:
    - CPI target, if implemented literally, can be destabilizing for a country subject to of trade volatility
    - calls for monetary tightening and currency appreciation when the price of the imported good goes up on world markets
    - not when the price of the export commodity goes up on world markets
    - alternative to the choice of CPI as a price target is an output-based price index such as the PPI, the GDP deflator, or an index of export prices
- peg the export price (PEP)
    - a special version of the producer price targeting (PPT)
    - copper producer would peg its currency to copper, an oil producer would peg to oil, a coffee producer to coffee
    - government holding reserves of gold or copper or oil and buying and selling the commodity whenever necessary to keep the price fixed in terms of local currency
    - stabilize the price of the commodity in terms of local currency, or perhaps, since these commodity prices are determined on world markets
    - It delivers one of the main advantages that a simple exchange rate peg promises (a nominal anchor), while simultaneously delivering one of the main advantages that a floating regime promises (automatic adjustment in the face of fluctuations in the prices of the countries' exports on world markets).

6. Capital flows

a) The opening of emerging markets

- First wave: capital flows to developing countries came after the large oil price increases of the 1970s
    - borrowers were governments in oil-importing countries
    - syndicated bank loans
        - "recycling petrodollars" from surplus OPEC countries via the London euromarket
    - end: international debt crisis that surfaced in 1982 (see: pragmatic monetarism)
- Second wave: from 1989 to the East Asia crisis of 1997
    - greater role for securities rather than bank loans
    - capital went mostly to private sector borrowers
- Third wave: from 2003 to the global financial crisis of 2008
    - China and India
- boom-bust cycle with a long-run trend of gradually increased opening of financial markets

b) Financial integration

- Measuring the financial integration
    - direct observation of the barriers to integration,
        - developing countries had serious capital controls as recently as the 1980s
        - majority liberalized them subsequently
        - lack of enforcement can arise because the private sector finds ways around the controls
        - announce a liberalization but exercising heavy-handed "administrative guidance"
    - measurements based on flow quantities

- current account magnitudes, net capital flows, gross capital flows, debt/GDP ratios,
- saving-retention coefficient: regression of national investment rates against national saving rates
  - instrumenting for the endogeneity of national savings, the coefficient remains surprisingly high for developing countries, which throws additional doubt on whether this is actually a measure of barriers to capital mobility
- risk-pooling estimates: comparison of cross-country consumption correlations with cross-country income correlations
  - volatility of consumption in developing countries has, if anything, gone up rather than gone down as one would expect if free capital flows smoothed intertemporaly
- problem: they reflect the magnitude of exogenous disturbances

- ability of arbitrage to equalize returns across countries
  - strong correlation among foreign and domestic returns: barriers are low and arbitrage is operating freely
  - price of an asset inside an emerging market is close to the price of essentially the same asset in New York or London
  - interest rate parity, which compare interest rates on bonds domestically and abroad but denominated in different currencies
    - Covered interest differentials
      - remove the currency element by hedging it on the forward market: rt-r*t=(F-S)/S (S: current/spot exchange rate, F: interest rate in the future at time t, r: interest rate, *: domestic, t: time)
      - sovereign spread: the premium that the country must pay to borrow in dollars, relative to LIBOR or the U.S. Treasury bill rate → reflects default risk
      - credit default swap: may have underestimated risk during the boom phase of the credit cycle, relative to fundamentals, even ex ante
    - Equalization of expected returns: implied by perfect financial integration, if risk is unimportant
      - Uncovered interest parity: interest differential equals expected depreciation, stronger than covered interest parity
      - if the forward discount equals expected depreciation - “carry trade”: investors go short in the low interest rate currency and long in the high interest rate currency
      - Expected returns in equity markets: Liberalization of emerging markets shows up as increased correlation between returns locally and globally → reduces one of the major benefits of investing in emerging markets in the first place: portfolio diversification
    - Real interest rate equalization

c) <u>Sterilization and offset</u>

- Mundell-Fleming model: are exchange rate stability, open financial markets, and monetary autonomy mutually incompatible?

- arguable in emerging economies: money demand is unstable and central banks have gone back to using the interest rate as their instrument anyway
- countries with flexible exchange rates have more autonomous

- offset coefficient:
  - defined as the fraction of an increase in net domestic assets (in the monetary base)
  - that has leaked out of the country through a deficit in the capital account (in the overall balance of payments)
  - after a given period of time
- it is easier to sterilize reserve inflows than outflows
  - selling sterilization bonds to domestic residents → progressively more difficult over time
    - domestic interest rate above the world interest rate created a quasi-fiscal deficit for the central bank
  - later they gave up, and allowed the reserve inflow to expand the money supply
    - after 2004 China experienced the largest accumulation of reserves in history due to unrecorded speculative portfolio capital inflows
  - highly regulated banking sector has efficiency costs, it does have advantages such as facilitating the sterilization of reserve flows
    - 2007–2008: China too had to allow the money to come in, contributing to overheating of the economy

d) Capital controls

- Most developing countries retained capital controls even after advanced countries removed theirs, and many still do
- many ways to circumvent controls
  - become harder to enforce if the trade account has already been liberalized: exporters and importers can use leads and lags in payments, and over- and under-invoice
- Controls on inflows
  - more likely to be enforceable
  - easier to discourage foreign investors than to block up all the possible channels of escape
  - Chile 1990s: short-term capital inflows → maturity composition of inflows toward the longer term, considered more stable, without evidently reducing the total
  - 2008–2009: Brazil revived the policy
- Controls on capital outflows
  - receive less support from scholars, but are still used by developing countries, especially under crisis conditions
  - Malaysia imposed controls on outflows in 1998 to maintain its exchange rate, the result was not the disaster predicted by many economists

e) Financial openness and institutions

- financial opening lowers volatility and raises growth only for rich countries, and is more likely to lead to market crashes in lower income countries
  - countries experiencing occasional financial crises grow faster, on average, than countries with stable financial conditions
  - financial liberalization is followed in the short run by more pronounced boom-bust cycles in the stock market, but leads in the long run to more stable markets
- benefits to financial integration, in theory
  - finance investment more cheaply by borrowing from abroad than if they were limited to domestic savings

  - consumption smoothing in response to adverse shocks
  - diversification of assets and liabilities across countries
  - emulation of foreign banks and institutions
  - discipline on macro policy
- to financial integration, in practice with salient anomalies:
  - capital often flows "uphill" rather than from rich to poor,
    - lower income countries: lower capital/labor ratios
    - but inferior institutions in many developing countries prevent potential investors from capturing the high expected returns that a low capital/labor ratio would in theory imply
  - capital flows are often procyclical rather than counter cyclical,
    - smoothing short-term disturbances such as fluctuations on world markets for a country's export commodities, private capital flows are often procyclical
  - severe debt crises
    - international investors sometimes abruptly lose enthusiasm for emerging markets, unexplained by any identifiable change in fundamentals or information
    - contagion sometimes carries the crises to countries with strong fundamentals
    - lost output, often seem disproportionate to any sins committed by policymakers
- theoretical prediction that financial markets should allow efficient risk-sharing and consumption-smoothing is not borne out in many empirical studies
- financial liberalization is more likely to be beneficial
  - aggregate size of capital inflows is not as important as the conditions under which they take place
  - good for economic performance if countries have reached a certain level of development, particularly with respect to institutions and the rule of law
  - financial account liberalization raises growth only in the absence of macroeconomic imbalances, such as overly expansionary monetary and fiscal policy
  - institutions (such as shareholder protection and accounting standards) determine whether liberalization leads to development of the financial sector and in turn to long-run growth
  - cost-benefit trade-off from financial openness improves significantly once some clearly identified thresholds in financial depth and institutional quality are satisfied
- corruption
  - tilts the composition of capital inflows toward the form of banking flows (and away from FDI),
  - toward dollar denomination (vs. denomination in domestic currency)
- sequencing of reforms:
  - better development if institutional reforms → opening the financial account
  - dangerous for capital flows to be allowed to respond to faulty signals
    - relaxing capital controls increases the likelihood of experiencing a sudden stop if it comes ahead of other reforms
- strong capital inflows to emerging markets
  - flows originate in good domestic fundamentals, such as macroeconomic stabilization and microeconomic reforms
  - external factors are at least as influential as domestic fundamentals
    - low interest rates in the advanced economies → emerging market spreads

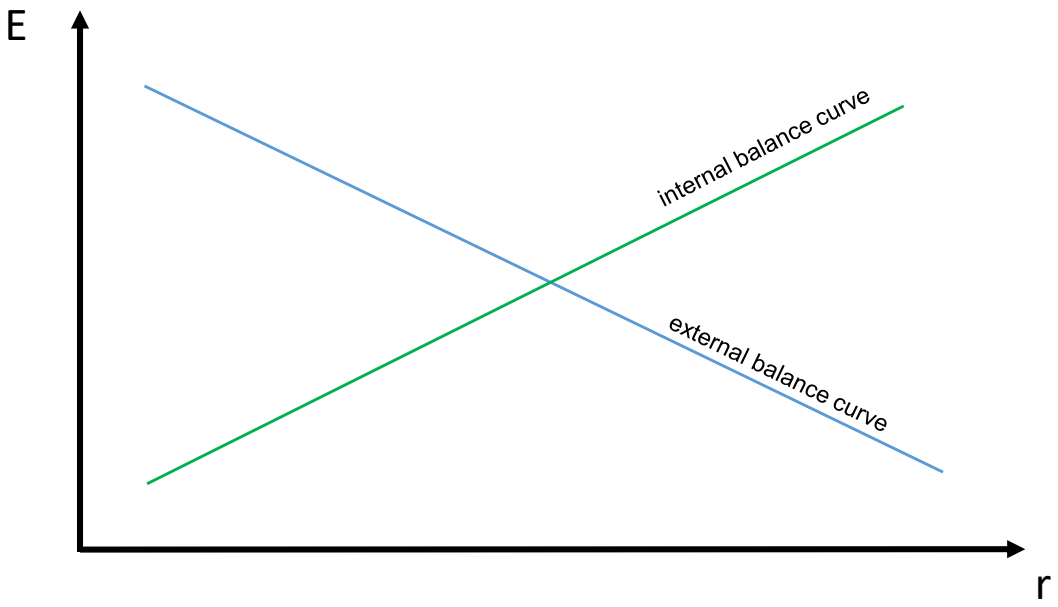
- global factors, such as U.S. interest rates, have been a driver of the global capital flow cycle since 1960
- → how emerging market authorities manage the inflows such as between currency appreciation, sterilized foreign exchange intervention, unsterilized intervention, and capital controls

7. Crisis models

- central bank attempting to attain two goals (internal and external balance) by means of two policy instruments (the exchange rate and the interest rate
- internal balance: $Y \equiv \bar{Y}$, where Y is real income and $\bar{Y}$ denotes potential output
- external balance: overall balance of payments $BP = 0, where\ BP = CA + FA$, CA: capital account, FA: capital- and financial account
  - Trade balance: $TB = xE - mY$, with *E* exchange rate (*dE>0*: depreciation)
  - interest rate: *r*, while r* is the world interest rate
  - absorption *A* is a function of the interest rate $\frac{dA}{dr} < 0$

a) Internal and external balance when devaluation is expansionary

- If the trade balance is derived from an **elasticities approach** (the country has some monopoly power in its export good) → *x* is related to the **sensitivity of export demand to relative prices**.
- If the trade balance is derived from the **traded goods/nontraded goods** model (the country is a price-taker in all traded goods – small and open economy) → *x* is related to **sensitivity of the supply of traded goods to relative prices**.
- "Sensitivity": the elasticity normalized for the **quantity of goods** relative to *E*, if there were no additional effect on **import spending or the demand** for traded goods.
- Financial account of the balance of payments is given by the function:
  - $FA = k(r - r^*), where\ \frac{dk}{d(r-r^*)} > 0$
- derive the **internal balance** relationship, solving for *Y* as a function of *r* and *E*:
  - $Y = A(r) + TB$ and $TB = xE - mY$ → $Y = \frac{A(r)+xE}{(1+m)}$
  - So the r and E which gives internal balance (output equals to potential):
  - $Y \equiv \bar{Y} = \frac{A(r)+xE}{(1+m)}$
  - An increase in the *E* (depreciation) would improve the trade balance and the output as well
  - The slope of the **internal balance curve**: $\frac{dE}{dr}|(Y = \bar{Y}) = -\frac{A_r}{x}$ (positive)
- Derive the **external balance** relationship, solving for BP as a function of *r* and *E*.
  - The balance of payments is the sum of the trade balance and the financial account:
  - $BP = TB + FA = xE - mY + k(r - r^*)$ where external balance is at $BP = 0$
  - $BP = \frac{xE}{1+m} - \frac{mA(r)}{1+m} + k(r) = 0$
  - *E* increases (depreciation) then the interest rate has to fall to restore external balance
  - trade surplus created by the depreciation would be offset by the capital outflow and increase in imports
  - The slope of the **external balance curve**: $\frac{dE}{dr}|(BP = 0) = \frac{m}{x}A_r - \frac{1+m}{x}k_r$ (negative)
  - Devaluation improves the trade balance, which could be financed by borrowing from abroad if the interest rate is raised

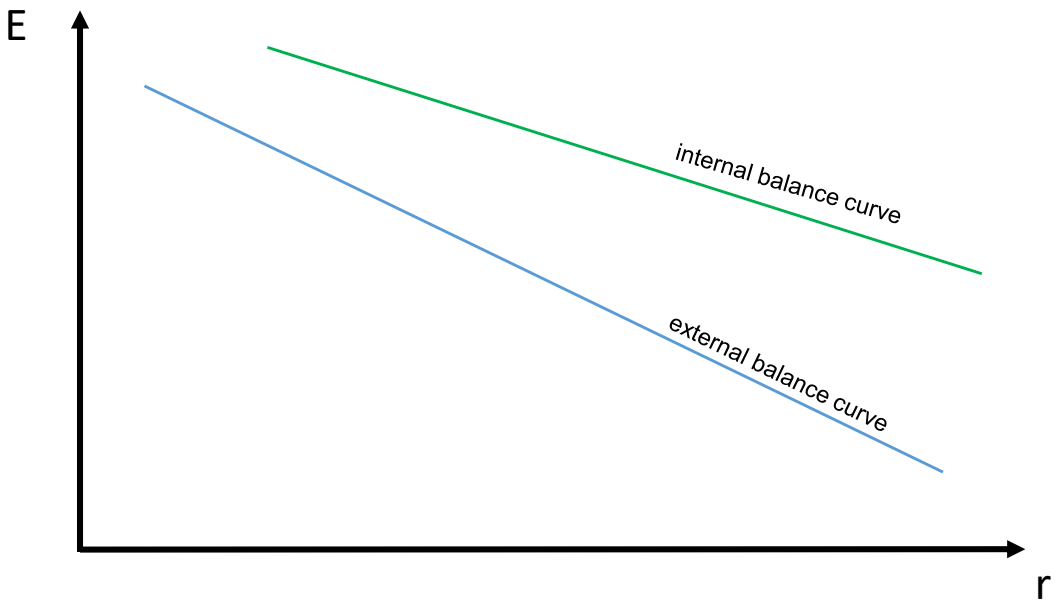


Source: Authors' edition

- The points below the Ext. B curve are points of deficit:
  - the interest rate is not high enough to attract the necessary capital inflow
  - Assume an exogenous adverse financial account shock → a rise in the world interest rate *r** or some other downward shift → in *FA* as in a speculative attack.

b) <u>Internal and external balance when devaluation is contractionary</u>

- contractionary effect on domestic demand ← balance sheet effect from dollar debts
  - $Y = A(r, E) + TB$ and $\frac{dA}{dr} < 0$ and $\frac{dA}{dE} < 0$ the new output can be:
  - $Y = \frac{A(r,E)+xE}{(1+m)}$ so the $Y \equiv \bar{Y}$ case gives the
  - new **internal balance curve**: $\frac{dE}{dr}|(Y = \bar{Y}) = -\frac{A_r}{x+A_E}$
  - the stimulus to net exports (*x*) from a devaluation is small in the short run because the elasticities are small, so that A_E dominates, and the devaluation is indeed contractionary overall: The *slope is negative* instead of being positive



Source: Authors' edition

- exogenous adverse balance of payments shock:
  - both internal and external balances have negative slopes → may not intersect at all
  - not confident in which direction the interest and the exchange rate should go
  - when the balance of payments goes into deficit due to a shock in the capital account → a devaluation will restore external balance (by improving the trade balance→ but hurts the economy as it is contractionary
    - improvement in exports may not be enough to offset the contractionary effects so the country may go into a recession
    - a situation where we may not be able to restore equilibrium internally and externally, at least not at reasonable levels of *E* and *r*
    - → not possible to say whether *E* should be increased a large amount and *r* decreased, or vice versa

8. International Spillovers of Non-standard Monetary Policy: Evidence from Central and Eastern Europe

Literature:

Ciarlone A., Colabella A. (2018): International Spillovers of Non-standard Monetary Policy: Evidence From Central and Eastern Europe. In: Ferrara L., Hernando I., Marconi D. (eds.): *International Macroeconomics in the Wake of the Global Financial Crisis*, Springer, pp. 271-298

a) Transmission Channels of UMPs

- Asset Purchase Programs can (domestically and internationally) transmit their effects trough:
  - portfolio rebalancing channel:
    - Outright purchases of public and private securities modify the size and composition of the balance sheet of both the central bank and the private sector
    - purchase of longer-duration assets
    - increase the liquidity holdings of the sellers

        - purchasing a particular security, the central bank reduces the relative amount held by private agents, usually in exchange for risk-free reserves. As a
        - result, asset prices increase and long-term interest rates fall, creating more favorable conditions for economic recovery
    - banking liquidity channel:
        - directly ease financial conditions and support bank lending to the private sector by improving the availability of funds
        - counterpart of the purchase of long-term assets on private banks' balance sheets is typically an increase in reserves
        - → such reserves are more easily traded in secondary markets than long-term securities, there would be a decline in the liquidity premium which, in turn, would enable previously liquidity constrained banks to extend credit to investors
        - → a decline of borrowing costs and an increase in overall bank lending, including cross-border lending to emerging and developing countries
        - largely depends on the business cycle and on the conditions of the domestic banking sector
    - signaling channel:
        - conveys information to the public about its intentions regarding the future evolution of monetary policy
        - communication is perceived by market participants as a signal of lower-than-previously-expected future policy rates, long-term yields may decline (via a lower risk-neutral component in interest rates)
        - complemented by a sort of confidence channel whereby the announcements, or actual operations, of the central bank may contribute to reducing economic uncertainty, reducing risk premia and bolstering activity

b) <u>The Impact on CESEE Economies of the Series of Shocks Hitting the Euro Area</u>

- global financial crisis (2008-2009) spread to most emerging economies, including those in the CESEE region, through both
    - real and financial channels
- collapse of Lehman Brothers in September 2008 → increase in global risk aversion
    - capital inflows to the CESEE region came to a sudden stop and
    - global trade collapsed,
    - placing the region at the epicentre of the emerging market fallout
    - it was the hardest hit, and this 'recoupling' with advanced economies continued throughout the euro area's sovereign debt crisis
- trade integration channel:
    - CESEE countries are in general much more open than other emerging regions
    - trade links with the euro area are very intense,
    - the fall in euro area demand: a major drag on output in the region
- financial channel:
    - bank-linked capital outflows initially played a major role ← retrenchment of Western European banks
    - outflow of other categories of capital: financial investors became more risk-averse and exposure in CESEE → 'safe havens'
        - net private capital inflows dropped from about 11% of GDP in 2007 to zero in 2009
            - Latin American debt crisis in the 1980s: from 5% of GDP to -3%

- East Asian crisis in 1997: from 6% to -1%
  - → credit crunch necessitated strong adjustment in domestic demand
- export and investment declines → future growth prospects?

- Monetary policy:
  - compromise between sustaining growth and preserving financial stability by avoiding excessive exchange rate depreciation
    - significant balance sheet effects (Croatia and FYR of Macedonia)
    - countries perceived by markets as safer that were able to provide more monetary policy stimulus (such as the Czech Republic and Poland)
- IMF support:
  - Bosnia-Herzegovina, Hungary and Romania: large and front-loaded support packages designed to avoid crippling recessions
  - Serbia was first treated as precautionary but was quickly augmented and drawn upon
  - Poland qualified for the newly introduced Flexible Credit Line
    - a precautionary arrangement with no requirement to take additional measures, underscoring its very sound economic fundamentals and policy frameworks
  - FYR of Macedonia adopted a Precautionary and liquidity line (which it later drew upon),
    - an arrangement that recognized its sound fundamentals with focused and limited conditionality
- EU offers balance of payments assistance:
  - member countries outside the euro area that are experiencing, or threatened by, difficulties in financing external imbalances
  - medium-term loans, which are conditional on the implementation of policies designed to address underlying macroeconomic imbalances
  - offered in cooperation with the IMF and other international financial institutions
- Vienna Initiative (European Bank Coordination)
  - framework for safeguarding the financial stability of emerging Europe
  - launched in January 2009
  - all the relevant public and private sector stakeholders of EU-based cross-border banks
    - significant banking market share & significant portion of government securities
  - reactivated in late 2011
    - severe credit crunch within the eurozone, and of rapid deleveraging in emerging Europe
- strong cyclical rebound: recover almost all the GDP losses recorded in the aftermath of the 2008–2009 financial crisis and 2011–2012 euro area's sovereign debt crisis and, in some cases, to close existing output gaps
- announcement and subsequent actual implementation of non-standard monetary measures by the ECB played an important role in this sense by
  - positively affecting euro area growth prospects while
  - boosting the confidence of global investors,
    - who started to rebalance their portfolios towards this area in search of higher yields

c) <u>The Portfolio Rebalancing and Banking Liquidity Channels</u>

- cross-border international capital flows was largely attributable to global liquidity and funding conditions

- quantity and price indicators → state of liquidity and financing conditions in the euro area

ECB's APPs actually translated into more favourable liquidity and financing conditions in the euro area

- equation: $y_t = const. + \beta_1 Asset\ purchases_{t+1} + \varepsilon_t$
- dependent variable (y_t) (with the results and interpretations):
  - yearly changes in the M2
    - was positively affected by asset purchases (p<0.01) → M2 was increasing
  - credit to the private sector
    - the yearly change in the stock of euro area credit to the private sector
    - was positively affected by asset purchases (p<0.01) → improved lending
  - average level of 10-year yields on AAA rated government bonds
    - was negatively affected by asset purchases (p<0.01) → long-term funding became cheaper
  - average term spread
    - difference between 10-year yields of AAA euro area government bonds and the 3-month Euribor rate
    - was negatively affected by asset purchases (p<0.01) →yield curve steepness was decreasing
  - average spread between Italian and Spanish long-term yields and the German Bund
    - to capture those phases in which the 'redenomination' risk related to the break-up of the euro area and the ensuing fragmentation of its financial system
    - at the height of the euro area sovereign debt crisis adverse movements in the Italian and other peripheral euro area countries sovereign spreads were unfavourably transmitted to bank funding costs, lending conditions and the availability of credit for the real economy
    - strong banking linkages between the euro area and CESEE economies → transmission of the shock stemming from the outbreak of the euro area's sovereign debt crisis to CESEE economies
    - was negatively affected by asset purchases (p<0.01) → end of cherry-picking, riskier bonds are preferred again
- explanatory variable: Asset purchases
  - one-quarter ahead ECB's actual gross asset purchases
- estimated by OLS
  - on a monthly basis for M2 and nominal credit
  - on a weekly basis for the remaining dependent variable from January 2009 to June 2016
- → outright purchases of public and private financial assets carried out between 2009Q3 and 2016Q2 → a gradual easing of liquidity and financing conditions in the euro area → on the cross-border portfolio and banking flows to CESEE economies

Two types of cross-border capital flows

- ECB's APP

- the actual measures of euro area liquidity conditions;
- the portion of them actually accounted for by the working of the ECB's outright asset purchases;
- a dummy indicator to investigate the behaviour of these flows during the quarters
  - when the different rounds of asset purchase programmes were first announced or
  - subsequently implemented and
  - extended

- international investors' asset allocations
  - portfolio theory, according to which expected returns, risk and risk preferences matter for international investors' asset allocations
  - dependent variable (y): portfolio flows-to-GDP ratio
  - explanatory variables (x) (with the results and interpretations):
    - G_i and G_{EA} real GDP growth rates in country *i* and the euro area
      - both positive: GDP growth generates portfolio inflow
    - R_i and R_{EA} short-term interest rates in interbank-market
      - to capture the relative attractiveness of domestic versus foreign assets and thus capital flows
      - R_i was positive: higher interest rates motivate capital inflow
      - R_{EA} was negative: increasing euro area interests are motivating portfolio capital outflow
    - VIX a measure of global risk aversion
      - negative: the risk aversion drives capital outflow
    - LIQ_{EA} series of measures for euro area liquidity and financing conditions
      - non-price: Growth of Euro area M2
        - positive: the growth of monetary aggregate motivates portfolio investments
      - price: Long-term bond yields
        - negative: higher yields reverse portfolio investment flows
      - Asset purchase announcements (dummy)
        - positive: APP announcement motivates portfolio investments
    - t time trend
      - negative: as time passes, portfolio flows back from the sample countries
  - equation:
    - $y_{i,t} = const._i + \beta_1 G_i + \beta_2 G_{EA} + \beta_3 R_i + \beta_4 R_{EA} + \beta_5 VIX + \beta_6 LIQ_{EA} + \beta_7 t + \varepsilon_{i,t}$
    - country-fixed effect panel procedure on a quarterly basis from 2009Q3 to 2016Q2
    - Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, FYR of Macedonia, Montenegro, Poland, Romania and Serbia
    -

- banking flows
  - set of standard control variables
  - describing country-specific characteristics and time-varying global financial conditions
  - dependent variable (y): interbank flows-to-GDP ratio
  - explanatory variables (x) (with the results and interpretations):
    - G_i real GDP growth rates in country *i*
      - both positive: GDP growth generates portfolio inflow

- R_i reference interest rate in country
  - to capture the relative attractiveness of domestic assets
  - R_i was insignificant
- $NEER_i$ nominal effective exchange rate in country *i*
  - mostly positive: depreciation drives in bank capital
- $M2\ growth$ year-on-year change in the M2 aggregates in country *i*
  - mostly positive: the growth of monetary aggregate motivates bank investments
- VIX a measure of global risk aversion
  - negative: the risk aversion drives bank capital outflow
- LIQ_{EA} series of measures for euro area liquidity and financing conditions
  - non-price: Growth of Euro area M2
    - positive: the growth of monetary aggregate motivates bank investments
  - price: Long-term bond yields
    - negative: higher yields reverse bank investment flows
  - price: average spread
    - negative: higher spreads reverse bank investment flows
  - Asset purchase announcements (dummy)
    - insignificant: APP announcement not motivates bank investments
- t time trend
  - negative: as time passes, bank capital flows back from the sample countries

o equation:

- $y_{i,t} = const._i + \beta_1 G_i + \beta_2 R_i + \beta_3 NEER_i + \beta_4 M2_i + \beta_5 VIX + \beta_6 LIQ_{EA} + \beta_7 t + \varepsilon_{i,t}$
- country-fixed effect panel procedure on a quarterly basis from 2009Q3 to 2016Q2
- Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, FYR of Macedonia, Montenegro, Poland, Romania and Serbia

d) <u>Conclusion</u>

- most CESEE economies seem to have benefitted from the spillover effects arising from the ECB's non-standard monetary policies
- APPs announcements appear to have been accompanied, in the very short-run, by
  - a broad-based appreciation of CESEE currencies vis-à-vis the euro,
  - an increase in the value of domestic stock market indices,
  - a moderate compression of their respective long-term sovereign yields and
  - a positive impact on mutual fund investment flows
- outright purchases of financial assets by the ECB ultimately translated into
  - stronger cross-border portfolio investment flows
  - larger foreign bank claims
- implementation of non-standard measures by the ECB
  - the compression of both policy and long-term interest rates in CESEE economies
  - to levels well below those predicted on the basis of similarities in
    - business cycles or
    - global risk factors
- cross-border effects of nonstandard monetary policies may change upon the cyclical position

- output gaps are closing,
- unemployment rates falling to pre-crisis levels,
- real wage growth picking up and
- credit growth gradually gathering pace
- → a monetary tightening become necessary prior

VI. References

Antal J., Gereben Á. (2011): Foreign reserve strategies for emerging Economies – before and after the crisis. *MNB Bulletin* 2011, 1 pp. 7-19 https://www.mnb.hu/letoltes/antal-gereben-eng.pdf

Babetskaia-Kukharchuk O. – Babetskii I. – Podpiera J. 2008: Convergence in exchange rates: market's view on CE-4 joining EMU. *Applied Economics Letters*, 15, 385-390

Bagus, P., Schiml, M. H. (2009): New Models of Monetary Policy: Qualitative Easing by the FED. *Economic Affairs*. Jun2009, Vol. 29 Issue 2, p46-49

Benati, L. – Goodhart, C. (2011): Monetary Policy Regimes and Economic Performance: The Historical Record, 1979-2008. In Friedman, B., Woodford, M., (eds.): *Handbook of Monetary Economics*. North Holland: Elsevier

BIS 2011: *Global liquidity - concept, measurement and policy implications*. BIS CGFS Publications No 45, November 2011

Ciarlone A., Colabella A. (2018): International Spillovers of Non-standard Monetary Policy: Evidence From Central and Eastern Europe. In: Ferrara L., Hernando I., Marconi D. (eds.): *International Macroeconomics in the Wake of the Global Financial Crisis*, Springer, pp. 271-298

Davis, J. S. (2015): *The Trilemma in Practice: Monetary Policy Autonomy in an Economy with a Floating Exchange Rate*. FEDERAL RESERVE BANK OF DALLAS, Globalization and Monetary Policy Institute 2015 Annual Report

ECB (2008): *The Changing role of the Exchange rate in a Globalised Economy*. ECB Occasional Paper Series, No 94 https://www.ecb.europa.eu/pub/pdf/scpops/ecbocp94.pdf

ECB (2011): *The Monetary Policy of the ECB*. The European Central Bank, https://www.ecb.europa.eu/pub/pdf/other/monetarypolicy2011en.pdf

ECB (2018): *The international role of the euro*. ECB 2018 June, https://www.ecb.europa.eu/pub/pdf/ire/ecb.ire201806.en.pdf

Ellison, M. – Tischbirek, A. (2014): Unconventional government debt purchases as a supplement to conventional monetary policy. *Journal of Economic Dynamics & Control*, Vol. 43, p199–217

Farmer, R. E. A. (2013): Qualitative easing: a new tool for the stabilisation of financial markets. *Bank of England Quarterly Bulletin*. 2013 4th Quarter, Vol. 53 Issue 4, p405-413

Ghysels E., Marcellino M. (2018): *Applied Economic Forecasting using Time Series Methods*. Oxford University Press

Haincourt S. (2018): The Nature of the Shock Matters: Some Model-Based Results on the Macroeconomic Effects of Exchange Rate. In: Ferrara L., Hernando I., Marconi D. (eds.): *International Macroeconomics in the Wake of the Global Financial Crisis*, Springer, pp. 233-247

Hossfeld, O. and Pramor, M., 2018. *Global liquidity and exchange market pressure in emerging market economies*. Discussion Papers 05/2018, Deutsche Bundesbank.

IMF (2017): *Annual Report on Exchange Arrangements and Exchange Restrictions 2017*. International Monetary Fund

IMF (1993): *BoP Manual* (5th edition, 1993): https://www.imf.org/external/pubs/ft/bopman/bopman.pdf

IMF (1999-2018): *IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) reports*. International Monetary Fund: https://www.elibrary-areaer.imf.org/Pages/YearlyReports.aspx

Jeffrey Frankel (2011): Monetary Policy in Emerging Markets, in: Friedman B. M., Woodford M. (eds.): *Handbook of Monetary Economics*, Elsevier, pp. 1441-1499

JOBST, A. (2008): What Is Securitization? *Finance & Development*, September 2008, pp. 48-49.

John Fender (2012): *Monetary Policy*. Wiley, Chichester

Kiss, Gábor Dávid; Csiki, Máté; Varga, János Zoltán (2019): Comparing the IMF and the ESM through Bond Market Premia in the Eurozone, *PUBLIC FINANCE QUARTERLY* 64 : 2 pp. 281-296.

Lenza, M., Pill, H., Reichlin, L. (2010): Monetary policy in exceptional times. *Economic Policy*. Apr2010, Vol. 25 Issue 62, p295-339

Madura, J. (2008): *International Financial Management.* Thomson

Menkhoff, L. (1997): *Instruments for European Monetary Union*. Springer

Michael Melvin and Stefan Norrbin (2013): *International money and finance*. Elsevier, p.25-34-51

Mundell, R. (1961): A Theory of Optimum Currency Areas. *The American Economic Review*, Vol. 51, No. 4, pp. 657-65.

Obstfeld, M. – Shambaugh, J. C. – Taylor, A. M. 2005: The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility. *The Review of Economics and Statistics*, vol. 87, no. 3, pp. 423-438

OBSTFELD, M., SHAMBAUGH, J. C., TAYLOR, A. M. (2005): The Trilemma in History: Tradeoffs Among Exchange Rates, Monetary Policies, and Capital Mobility. *The Review of Economics and Statistics*, vol. 87, no. 3, pp. 423-438.

OeNB (2009): *1989–2009 Twenty Years of East-West Integration: Hopes and Achievements*. https://www.oenb.at/en/Publications/Economics/Focus-on-European-Economic-Integration.html

Plümper T. – Troeger V. E. 2008: Fear of Floating and the External Effects of Currency Unions. *American Journal of Political Science*, vol. 32, no. 3, pp. 656-676

Sayuri Shirai (2014): Japan's monetary policy in a challenging environment. *Eurasian Econ Rev* (2014) 4:3–24

Segalotto J-F. – Arnone M. –Laurens, B. (2006): *Measures of Central Bank Autonomy: Empirical Evidence for OECD, Developing, and Emerging Market Economies*. IMF Working Papers 06/228, Washington: International Monetary Fund.

Stone, M. - Fujita, K. – Ishi, K. (2011): *Should Unconventional Balance Sheet Policies be Added to the Central Bank Toolkit? A Review of the Experience So Far*. IMF Working Paper, WP/11/145

Vargas-Silva, C. (2010): Exchange rates. In: Free, R. C. (ed.): *21st Century Economics – a Reference Handbook*. Sage