1.1.2. Financial Intermediation Purposes

Reasons for Intermediation

(i) Asymmetric information on investment projects => Information intermediation

(ii) Incomplete markets and contracts => FIs are required to intermediate between parties with conflicting interest, as specialized and large-scale operators:

- external incompleteness – when the legal system is too costly to ensure the outcome of the contracts;

- intrinsic incompleteness – as it is also very hard to anticipate all the factors that will affect a borrower's credit worthiness, it may be very hard for a lender and borrower to contract on all eventualities => contracts may not anticipate all the states of the nature (e.g. consequences of loan defaults);

- deliberate incompleteness – contracts are not written in all the detail possible simply because doing so would lead to worse outcomes than leaving contracts incomplete.

Reasons for Intermediation

- "Incomplete-contract" approach to banking: Boot, Greenbaum, and Thakor (1993); Diamond and Rajan (1997); Kiyotaki and Moore (1996); and Myers and Rajan (1997) - commercial banks emerged at a time when contracts were very incomplete and property rights insecure.

- Besides the role of banks in the contracts written with depositors and borrowers, the distinguishing feature of banks is their investment in:

  - **reputation** – Book, Greenbaum, and Thakor (1993)

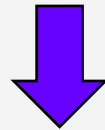 - **relationships with clients** - Diamond and Rajan (1997)
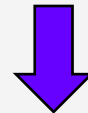
- These institutional abilities cannot be replicated instantaneously in the market.
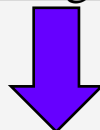
Reasons for Intermediation

☐ **World with no banks:**
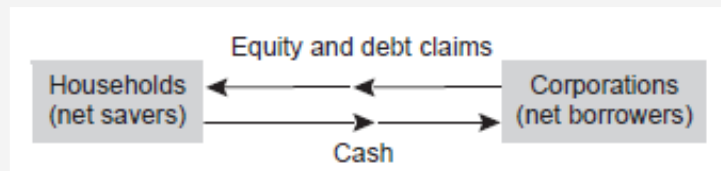
Saunders, Anthony and Marcia Millon Cornett (2006), Financial Institutions Management – A Risk Management Approach, 5th Edition, McGraw-Hill International.
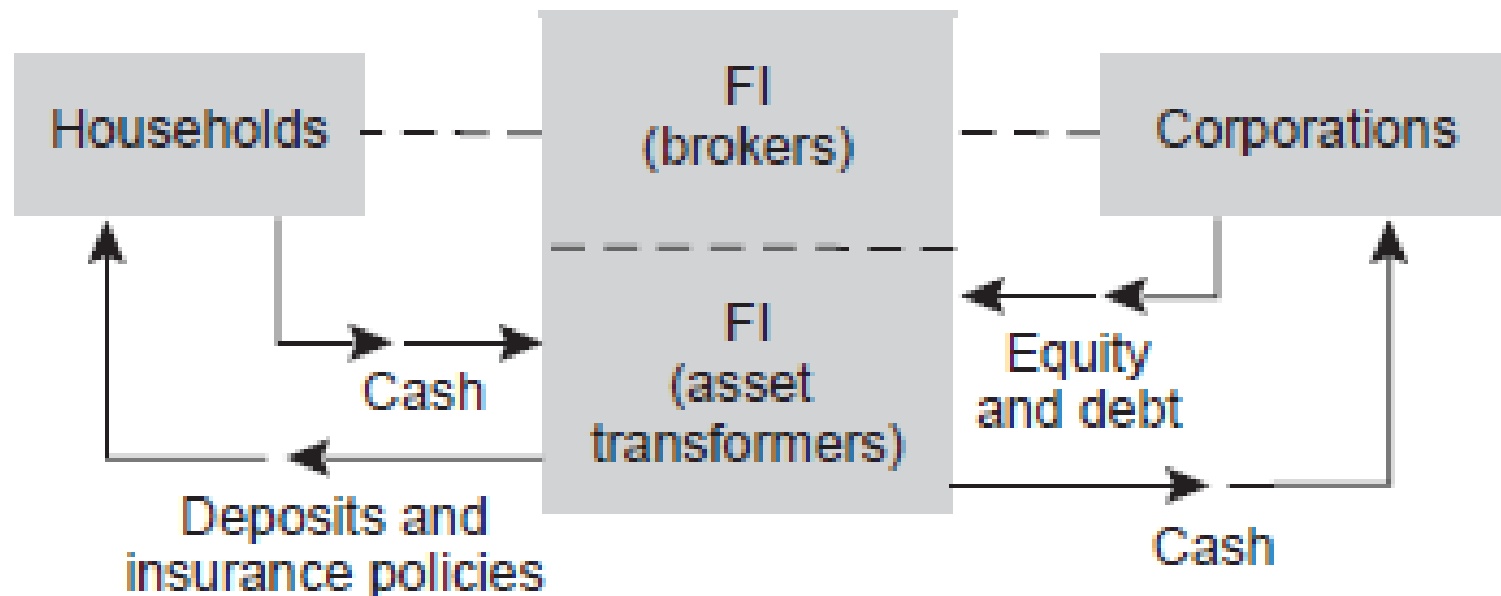
☐ Households would have to monitor the behavior of companies, which is very costly, probably ending up in little or no monitoring and a low flow of funds.

☐ Even with financial markets in place, to ensure liquidity to these securities, transaction costs would be very large without financial intermediaries.

Reasons for Intermediation

☐ Banks offer economies of scale and scope:

Financial Roles

(i) **Liquidity Intermediation** – channeling savings to investment projects, by maturity transformation.

(ii) **Risk Intermediation** – risk taking (e.g. credit, interest rate, currency) and reselling to final investors/savers.

(iii) **Information Intermediation** – FIs are **delegated monitors (Diamond (1984))** of economic agents, optimally processing the information available. FI average size allows the collection of information at a lower average cost (economies of scale).

(iv) **Transmission of monetary policy effects** – monetary aggregates are linked to macroeconomic variables (namely prices) and correspond to banks' liabilities.

(v) **Intergenerational wealth transfer**

(vi) **Payment system**

Liquidity Intermediation

- Assets - banks make long-term illiquid investments

- Liabilities – banks issue short-term liabilities, demand deposit accounts and money-like short-term securities.
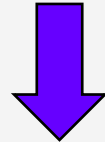
- **Value is created in 2 ways**:

(i) <u>Mutualize liquidity risks of individual investors and borrowers</u> - banks can manage liquidity reserves more efficiently than individual investors and borrowers on a standalone basis;

(ii) <u>Collect information and monitor borrowers</u> – banks can take more informed decisions.
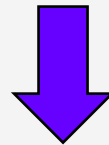
Liquidity Intermediation
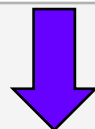
☐ Banks charge a spread for this maturity transformation and liquidity offer, due to its costs, the risk of loans and the liquidity risk involved.
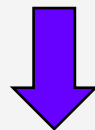
☐ Diamond and Dybvig (1983) - a bank is essentially an ex-ante insurance contract providing liquidity to customers.

– FI provide claims with higher liquidity than most securities issued by investors, e.g. deposits than can be immediately fully redeemed.

☐ But **liquidity is created at the cost of financial fragility**, as **banks hold less than 100% of deposits in reserves** => risk of bank run => fire sales of assets.

Liquidity Intermediation

□ Regulators can require banks to hold a higher fraction of reserves or can limit their short-term liabilities by raising the required fraction of equity capital or long-term debt (e.g. imposing minimum levels for regulatory liquidity ratios).
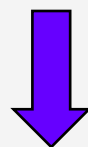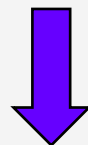
□ This provides a 'bigger cushion' to absorb losses and postpone the moment when the bank must do fire sales, but it doesn't fully eliminate the risk of a run.

□ Only a narrow bank with 100% reserves (reserve banks) could perfectly avoid a run, but this solution would force all liquidity transformation to migrate outside the regulated banking sector and would make almost impossible to get profits.

Liquidity Intermediation

- A usual solution is the implementation of Deposit Insurances, with a limit set to avoid moral hazard (informed economic agents taking more risk, while being aware of a bank's difficulties), but high enough to disincentive most people to withdraw their balances.

- Additionally, the implementation of the Lender of Last Resort (LOLR) role performed by the central bank avoids a solvent institution to turn illiquid, as the interbank market is usually unable to solve the issue under dire circumstances.

- Walter Bagehot's (1873) rule: central bank must lend without limit to solvent banks, against good collateral (valued at pre-crisis levels), and at penalty rates (i.e. higher than those prevailing under normal market conditions).

Risk Intermediation

- Risk intermediation is performed not only by financial entities, but also by markets and governments, e.g. in the provision of unemployment and disability insurances, healthcare and education, being taxes also a risk sharing vehicle.

- Interest rate and currency risk management has been developed through the derivatives market, with banks offering these services to their customers.

- By intermediating risk, banks originate claims on companies and issue liabilities to savers, performing also a role as asset transformers.
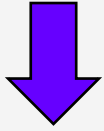
Information Intermediation

Main outcomes:

(i) Minimizing information costs

(ii) Improving corporate governance

(iii) Asymmetric information (agency theory)

Information Intermediation

(i) Minimizing information costs

- Even with very liquid and efficient capital markets, there is a minimum optimal size to perform information intermediation, in order to minimize the costs of information management.

- Banks are generally in a better position to assess the credit risk of economic agents, namely those with lower size, for whom the information available is more limited and less robust and the capital markets are not available.

- FI may reduce the costs of acquiring and processing information (agency costs), consequently improving resource allocation [Boyd and Prescott (1986)].

- As FI and firms develop long-run relationships, this can further reduce information acquisition costs.

Information Intermediation

(ii) Improving corporate governance

- Being a "delegated monitor", FIs monitor risks for all investors, eliminating the free-rider problem among the several shareholders (e.g. Bencivenga and Smith (1993), Sussman (1993), Harrison, Sussman and Zeira (1999) and De la Fuente and Marin (1996).

- By reducing information costs, banks help small shareholders to exert a more effective oversight and to take decisions on crucial issues, e.g. M&A and other strategic issues.

- Schumpeter (1912)* view of finance in the process of economic development: "The banker, therefore, is not so much primarily a middleman . . . **He authorizes people in the name of society . . . (to innovate)".**

* Schumpeter, J. A. (1911), *A Theory of Economic Development*, Harvard University Press.

Information Intermediation

- Monitoring firms can also be performed through financial markets, including rating agencies, that are typical used by larger companies.

- According to a large set of literature (see e.g. Jensen and Meckling (1976), quoted in Levine (2005), efficient stock markets also improve corporate governance:

(i) public trading of shares allows owners to link managerial compensation to stock prices, helping to align the interests of managers with those of owners [Diamond and Verrecchia (1982) and Jensen and Murphy (1990), quoted in Levine (2005)].

(ii) better stock markets can improve corporate control and facilitate takeovers of poorly managed firms => the threat of a takeover will help align managerial incentives with those of the owners [Scharfstein (1988) and Stein (1988), quoted in Levine (2005)].

Information Intermediation

(iii) Asymmetric information (agency theory)

☐ The manager or entrepreneur has privileged information on the project to finance and its management vis-à-vis the FI or the shareholders. => **Principal-agent problem**

☐ 2 risks of asymmetric information:

– Adverse selection (before loan decision) – fixing the same interest rate for loans to different projects, banks may crowd-out the best projects, attracting only those whose entrepreneurs know in advance they will not redeem the loans (consequently being available to accept higher interest rates);

– Moral hazard (after the loan decision) – if a bank cannot monitor the entrepreneur, the latter may manage the project sub-optimally, hampering the company growth and its ability to redeem the loan.

☐ Nonetheless, debt is the type of financial contract that limits moral hazard to extreme scenarios, reducing monitoring costs, as creditors must be focused on debtor's ability to make the loan payments imposed contractually (instead of facing risk towards all debtor's cash-flows, as in equity).
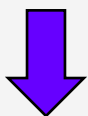
Information Intermediation

☐ **However, debt contracts still face moral hazard,** as they allow debtors to capture all cash-flows beyond the debt costs.

⬇
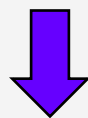
Incentive for debtors to take riskier projects

☐ Creditors can mitigate moral hazard by imposing more "skin in the game" to debtors, either by increasing equity or by demanding collaterals.

⬇

Key issue: make debt contracts "incentive compatible", aligning the incentives of debtors and creditors

Information Intermediation

□   Debt contracts often include restrictive covenants - agreements imposing and/or ruling out a given set of behaviors by the debtor:

1. Covenants to discourage undesirable behavior or to encourage desirable behavior – e.g. impose a set of uses for the funding provided and/or prohibit others.

2. Covenants to keep collateral valuable – e.g. insurance requirements.

3. Covenants to provide information – e.g. requirements on the provision of periodic information.

□   But even with these restrictive covenants, moral hazard still exists, as debtors may find ways to circumvent them.

Information Intermediation

Moral hazard behaviors:

☐ Actions motivated by private benefits

☐ Utilization of company resources for private goals

☐ Limited effort

☐ Drop-out pressure

☐ Overinvestment to maximize the entrepreneur's utility

☐ Opposition to the project's abandonment, when such decision is optimal

☐ Postponement of the disposal of NPLs

☐ Too big to fail (in some cases, too big to bail)

Transmission of Monetary Policy Effects

**3 types of players in the money supply process:**
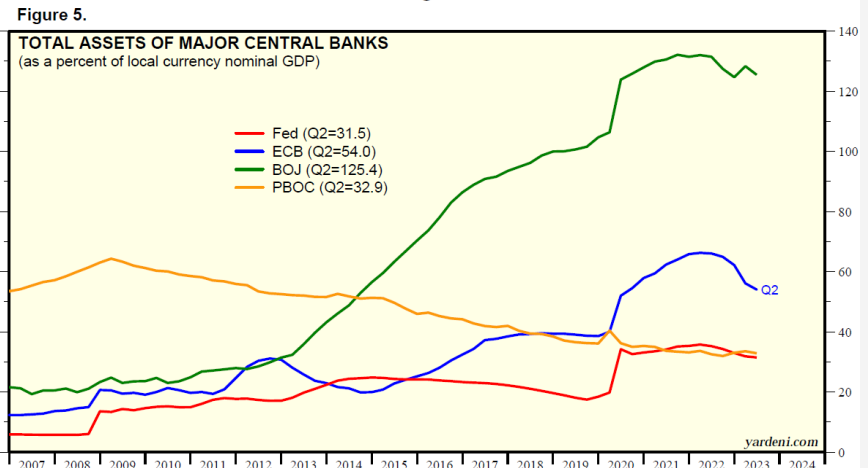
(i)   Central Bank

(ii)   Banks

(iii) Depositors

Transmission of Monetary Policy Effects

☐ The balance sheets of the main Central Banks increased significantly between the subprime crisis and 2019 and even more after the pandemic started, though this trajectory was inverted in 2022 (with the inflation surge and the monetary policy tightening):

- Bank of Japan – from 20% of the GDP to 130%

- ECB (Eurosystem) - from 15% of the GDP to 70% (currently around 50%)

- Fed – from 5% to close to 40% (currently around 35%).
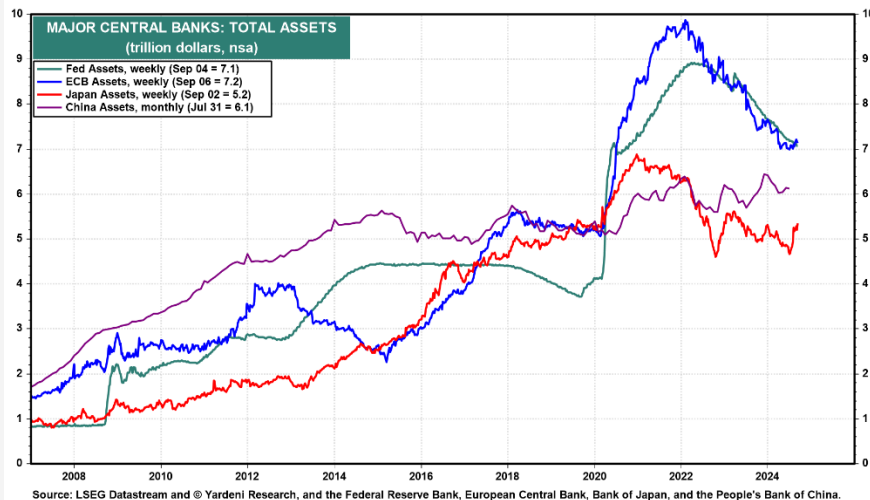
Source: Yardeni Research.

Transmission of Monetary Policy Effects

☐ **Balance Sheet of the Central Bank:**

Assets	Liabilities
Securities	Currency in circulation
Loans to financial institutions	Reserves

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets"

☐ Liabilities = Monetary Base (MB) or high-powered money $MB = C + R$

☐ Reserves = Required reserves + Excess reserves

☐ Central Bank has a significant power over the MB by deciding on the Circulation amount and setting required reserves.

Transmission of Monetary Policy Effects

Assets: sources of liquidity provision to banks by the central bank:

(i) Securities – central banks buys (sells) securities from banks, pumping (absorbing) liquidity into (from) the banking system – <u>open market operations</u>;

(ii) Loans to FI – liquidity provided directly to banks, mostly in short maturities, whose interest rate and quantity influences interest rates charged by banks in loans to costumers.

Transmission of Monetary Policy Effects

□ **Notwithstanding the role of the central bank in money creation, the role of banks is even more important, as circulation is typically a small % of the money supply** (around 10% in the Euro Area, with money supply measured by M3):

Euro Area: M3 and main components
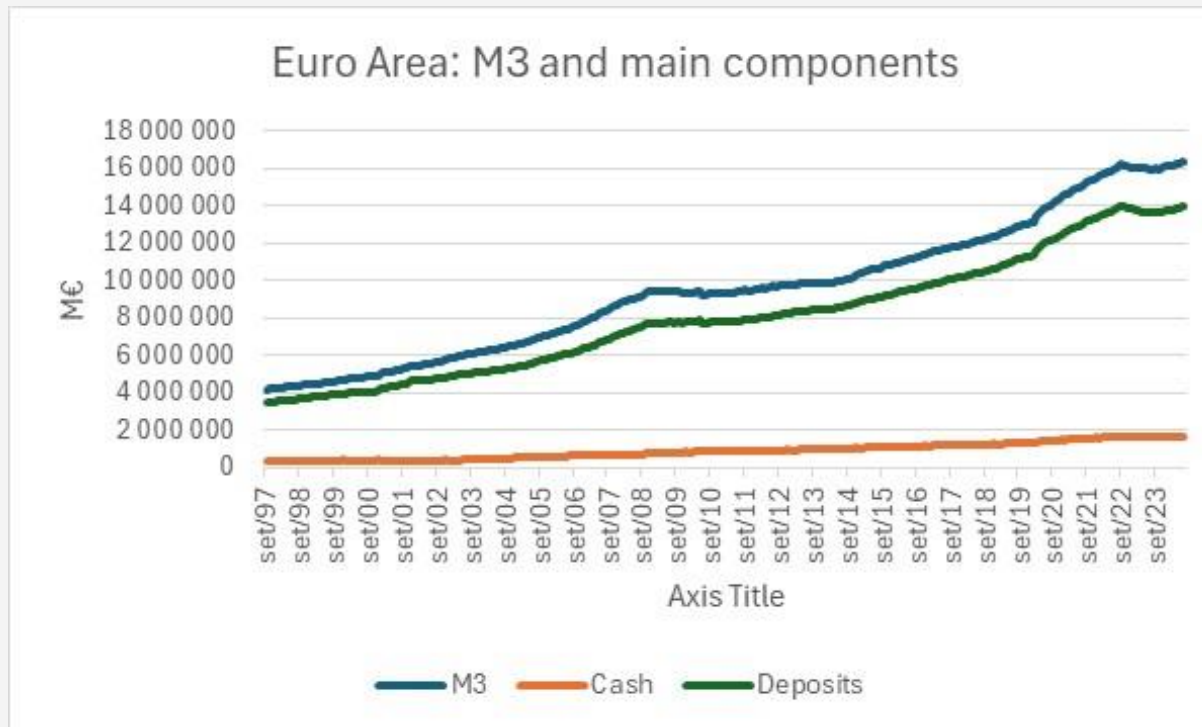
Source: ECB

Transmission of Monetary Policy Effects

- M3 = M2 + repurchase agreements + money market fund shares/units + debt securities with a maturity of up to two years ≈ 16 T€

- M2 = M1 + deposits with maturity up to 2 years and deposits redeemable at notice of up to 3 months ≈ 15,1 T€

- M1 = currency in circulation + overnight deposits ≈ 10 T€;

- Cash = 1,6 T€

- Therefore, in broader monetary aggregates, additional banks' liabilities are included (e.g. short-term bonds, deposit certificates and repos).
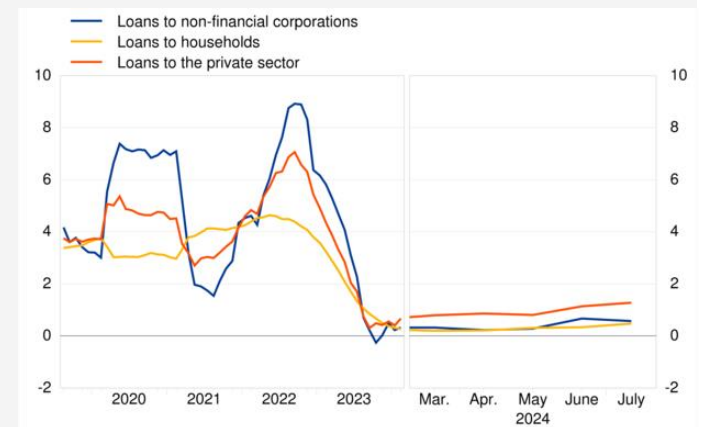
Transmission of Monetary Policy Effects

□ Central banks - by setting interest rates in liquidity providing and absorption facilities to banks, they exert influence on the general level of interest rates (though at a lesser degree on long term interest rates) and on the liquidity available.

□ Banks - ensure the transmission of Monetary Policy by the involvement in the money market, where they obtain or invest liquidity and by providing funding to the economy => **Banks act like a franchise of the central bank in money creation** and money supply is mostly driven by bank's decisions in providing credit to the economy.

Contribution of the M3 counterparts to the annual growth rate of M3
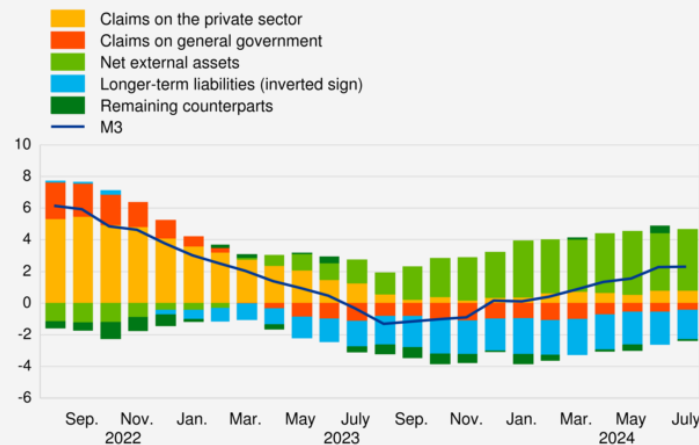
Annual Growth Rates of Loans to the Private Sector

Source: ECB

Transmission of Monetary Policy Effects

☐ The central bank purchases (through an open market operation) $100m securities from the First National Bank (FNB), increasing the banking system reserves deposited at the central bank (and MB, consequently).

Federal Reserve System			
Assets		**Liabilities**	
Securities	+$100 m	Reserves	+$100 m

☐ Consequently, the impact on the FNB will be the following:

First National Bank			
Assets		**Liabilities**	
Securities	−$100 m		
Reserves	+$100 m		

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Transmission of Monetary Policy Effects

☐ Assuming that all this increase in reserves corresponds to excess reserves, FNB will be able to make a loan of $100m => the borrower's deposits will increase by $100m => the bank has created $100m of deposits, increasing the money supply also by $100m => the bank has created money by deciding to grant a loan.

First National Bank

Assets		Liabilities	
Securities	−$100 m	Checkable deposits	+$100 m
Reserves	+$100 m		
Loans	+$100 m		

☐ After the loan amount is fully used by the borrower, the bank will have to use its reserves to pay for the deposits used and its balance sheet becomes:

First National Bank

Assets		Liabilities	
Securities	−$100 m		
Loans	+$100 m		

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Transmission of Monetary Policy Effects

☐ However, this money was used by the borrower to make payments to other entities and will be deposited at other banks in the financial systems.

☐ Assuming that all the money is deposited at Bank A, we have the following impact:

Bank A			
Assets		**Liabilities**	
Reserves	+$100 m	Checkable deposits	+$100 m

☐ If Bank A faces a reserve requirement of 10% over its deposits and decides to grant a loan using the total amount of excess reserves ($90m), to avoid keeping excess reserves, assuming that this new borrower will move immediately all the money borrowed from Bank A to a Bank B, the aggregate variation of Bank A's balance sheet will be:

Bank A			
Assets		**Liabilities**	
Reserves	+$10 m	Checkable deposits	+$100 m
Loans	+$90 m		

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

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Transmission of Monetary Policy Effects

☐ Conversely, the impact on Bank B's balance sheet is:

Bank B			
Assets		**Liabilities**	
Reserves	+$90 m	Checkable deposits	+$90 m

☐ With the same reserve requirement of 10%, Bank B also decides to grant a loan using the total amount of excess reserves, which will be 90% of its deposits ($81m):

Bank B			
Assets		**Liabilities**	
Reserves	+$ 9 m	Checkable deposits	+$90 m
Loans	+$81 m		

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Transmission of Monetary Policy Effects

☐ If the loan amount keeps being deposited at a different bank (C, D, E, …) following the same assumptions, the aggregate impact on deposits, loans and reserves of the banking system is:

TABLE 1 Creation of Deposits (assuming 10% reserve requirement and a $100 million increase in reserves)

Bank	Increase in Deposits ($)	Increase in Loans ($)	Increase in Reserves ($)
First National	0.00	100.00 m	0.00
A	100.00 m	90.00 m	10.00 m
B	90.00 m	81.00 m	9.00 m
C	81.00 m	72.90 m	8.10 m
D	72.90 m	65.61 m	7.29 m
E	65.61 m	59.05 m	6.56 m
F	59.05 m	53.14 m	5.91 m
.	.	.	.
.	.	.	.
.	.	.	.
.	.	.	.
Total for all banks	1,000.00 m	1,000.00 m	100.00 m

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Transmission of Monetary Policy Effects

☐ The variation in deposits can be expressed as a function of reserve requirements:

$$\Delta D = \frac{1}{rr} \times \Delta R$$

being 1/rr = **Simple Deposit Multiplier**

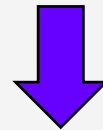☐ In our example, this multiplier is equal to 10: 1/rr = 1/0,1 = 10:

− ΔR = 100

$$\Delta D = \frac{1}{rr} \times \Delta R = 1/0,1 \text{ x } 100 = 1000$$

Transmission of Monetary Policy Effects

◻ Shortcomings:

(i) Some of the amounts will be kept as currency and will not be deposited at the banking system;

(ii) Banks may decide to keep some excess reserves (ER) in addition to required reserves.

$$MB = R + C = (rr \times D) + ER + C$$
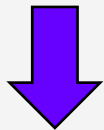
Transmission of Monetary Policy Effects

☐ Defining

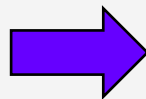$c = \{C/D\}$ - coefficient of preference for central bank's money

$e = \{ER/D\}$ - coefficient of excess reserves
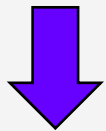
$$MB = (rr \times D) + (e \times D) + (c \times D) = (rr + e + c) \times D$$

$$D = \frac{1}{rr + e + c} \times MB$$

Deposits Multiplier (similar to the Simple Multiplier (*1/rr*), but adding ER and C to the denominator)
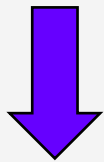
Transmission of Monetary Policy Effects

☐ Defining the money supply simply as M = D + C

$$M = D + (c \times D) = (1 + c) \times D$$

☐ Using the 2 last equations (replacing D in the last equation by the expression from the previous equation):

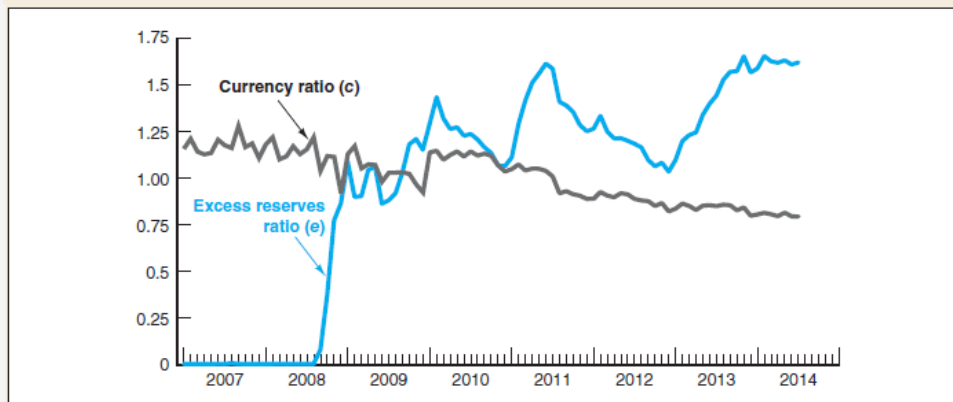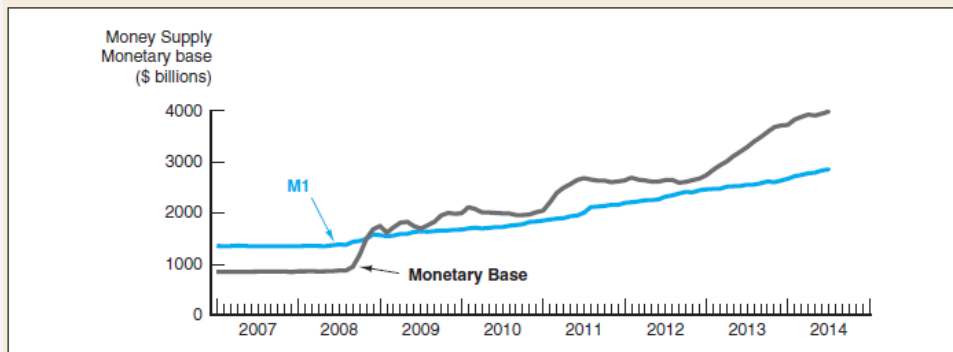$$M = \frac{1 + c}{rr + e + c} \times MB$$

☐ **Money Multiplier** gives the magnitude of a change in total money supply due to a given change in MB, which is a decreasing function of *rr*, *e* and *c*:

$$m = \frac{1 + c}{rr + e + c}$$
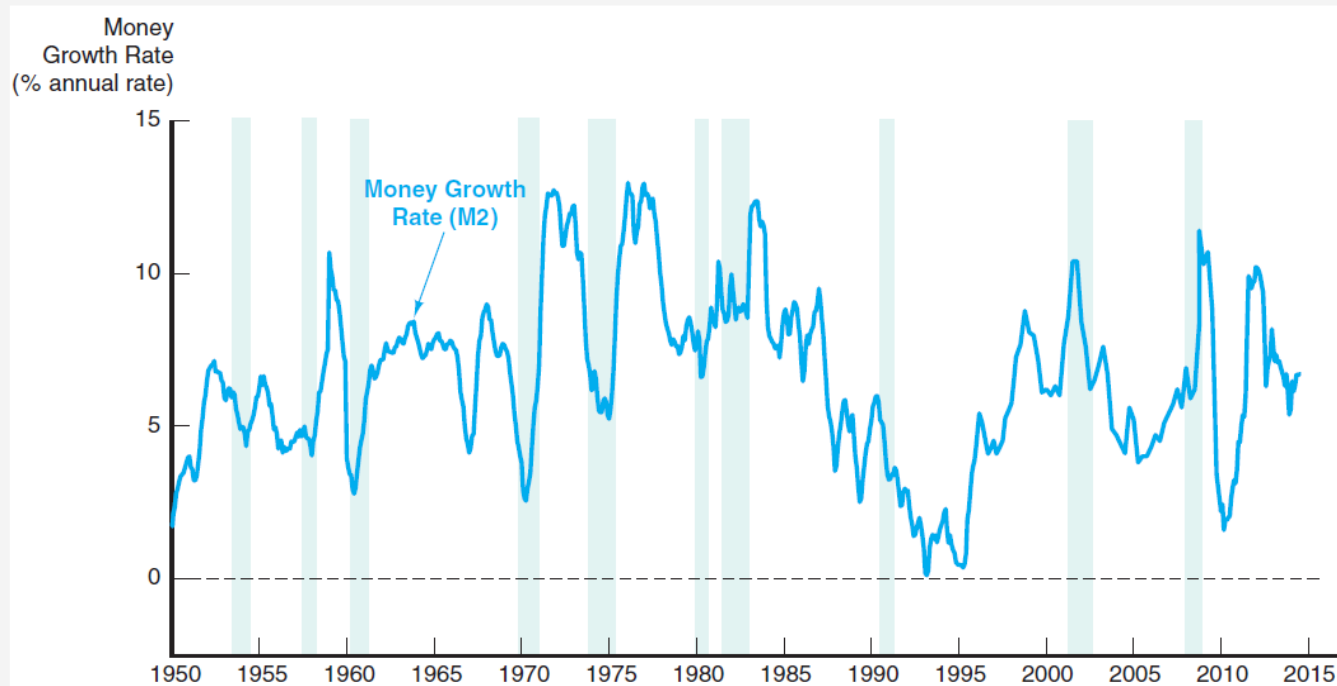
Transmission of Monetary Policy Effects

- Sometimes the coefficients in the money multiplier change dramatically, as in the US during the subprime crisis, when MB increased much more than M:

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Transmission of Monetary Policy Effects

- Typically, business cycle downturns are preceded by declines in money growth, even though not all declines in money growth lead to downturns.
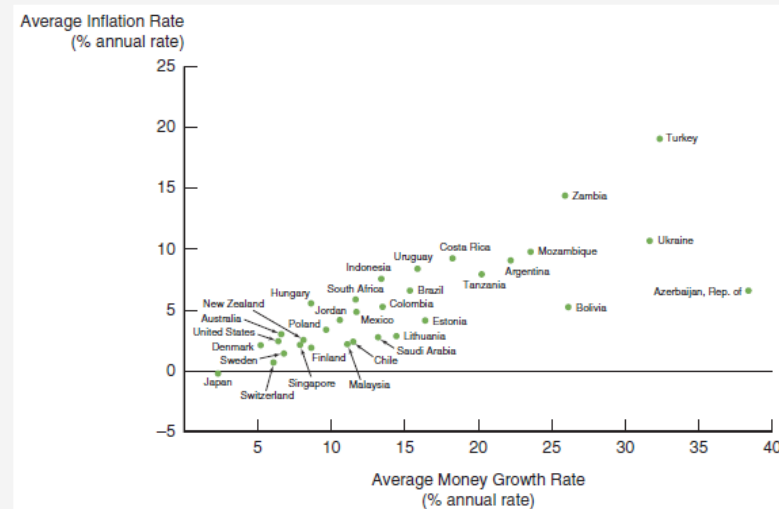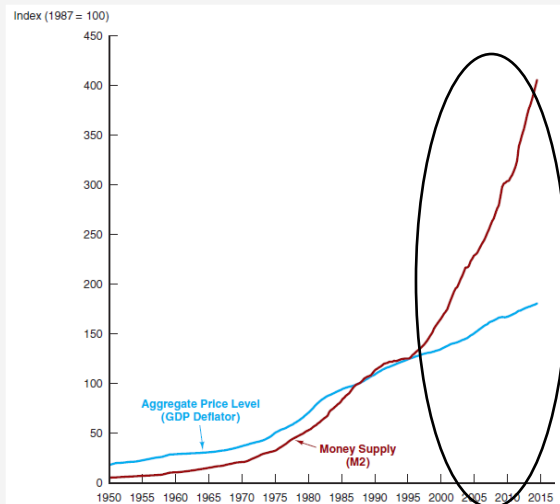

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".
Note: Shaded areas represent recessions
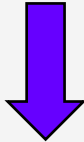
Transmission of Monetary Policy Effects

- Money growth is also related to inflation, even though there was a noticeable decoupling since the end of the XXth century (after the massive monetary injections by the Fed, to tackle the effects of the several financial crises since then, e.g. Asian crisis, Nasdaq bubble and subprime crisis) and the current inflation surge.

Source: Mishkin (2019), "The Economics of Money, Banking, and Financial Markets".

Note: Left-hand chart: US - 1950-2014; Right-hand chart: 2003-2013.

Intergenerational Wealth Transfer

□ Ensured by long term saving instruments offered by FIs.

□ These instruments may also be offered by insurance or pension fund management companies, frequently with a tight connection to banks.

□ The weight of financial intermediation in private wealth has been increased significantly during the second half of the XXth century.

□ Households ownership of stocks in US decreased from 90% in the 50's to less thank 40%, while non-bank intermediaries, namely pension funds and mutual funds, hold over 40%.

Payment System

□ Ensured by the payment mechanisms implemented and managed by banks, e.g.:

- banking transfers;

- ATM;

- correspondent banks;

- credit cards.

□ Hoggarth *et al*. (2001): "the payments system will not work if customers do not have confidence to leave funds on deposit at banks or, crucially, banks lose confidence in each other. A complete breakdown in the payments system would bring severe costs since trade would be impaired (see Freixas *et al*. (2000))".

□ "As the heart of the payments system, banks are like electric companies – they are public utilities, whose failure would lead the entire economy to grind to a halt". (in Bolton *et al*. (2019)).