

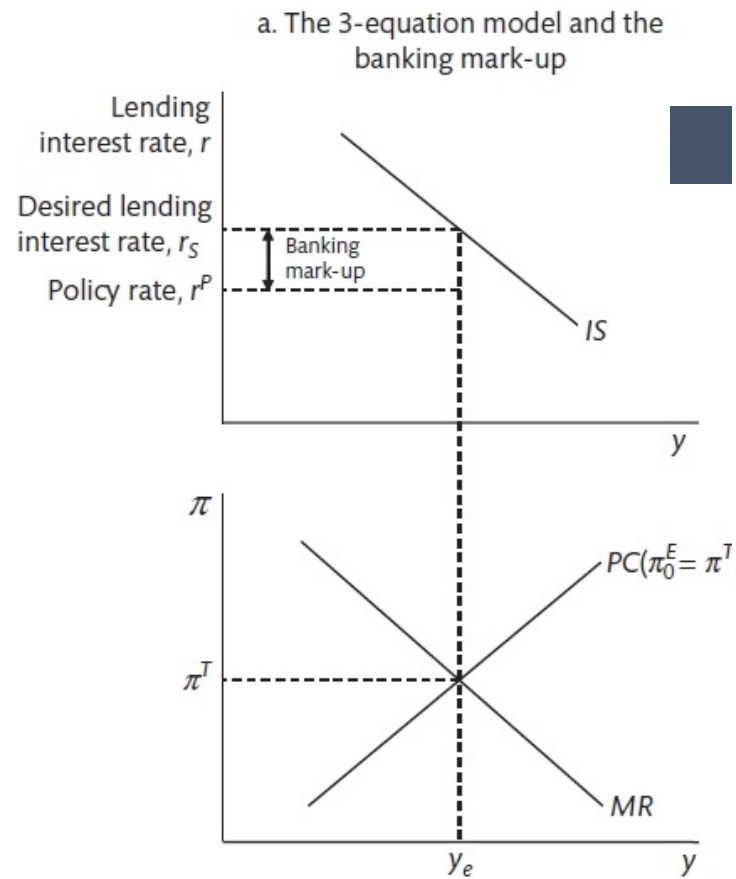
31E2300
MACROECONOMICS: POLICY

INTEREST RATE DETERMINATION: REVIEW AND EXTENSIONS

BASIC IDEA

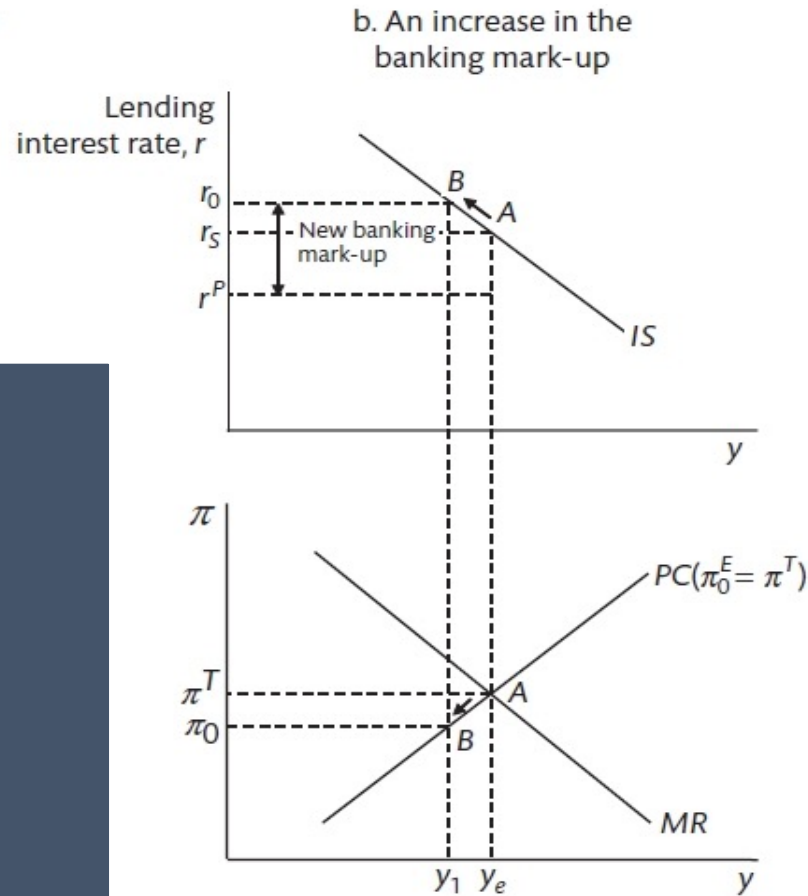
Role of banking in the 3-equation model

- The CB policy rate (r^P) vs the lending rate (r)
- r is the rate relevant to the IS curve, and is a mark-up over r^P .



APPLICATION

- Shock to the banking system: Banks view loans as being riskier $\rightarrow \uparrow$ Mark-up (unanticipated by CB so r^P stays fixed) $\rightarrow \downarrow$ AD.



Under an inflation targeting CB, the adjustment process is as before:

- \uparrow Mark-up $\rightarrow \downarrow$ AD/ $y \rightarrow \downarrow \pi$
- \rightarrow CB finds desired y -gap
- \rightarrow CB finds lending rate on IS
- \rightarrow CB lowers r^P

KEY ELEMENTS OF THE “NEW VIEW”

- Distinction between policy rate and lending rate.
 - **Addition to textbook: In times of excess liquidity (now), central banks focus on interest rate paid on reserves and overnight reverse repo rates. (See new article)**
 - **Federal Reserve will continue to do so for the foreseeable future, ECB expects (hopes) to return to more traditional tools soon ...**
- Banks set the lending rate and (sometimes) ration credit.
- Money market: Borrowing and lending among banks, market for government bonds.
- Governance structure of the financial system: Relationship between government (and taxpayers), the CB, and banks; Solvency and liquidity problems.



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European Central Bank to review how it controls interest rates

29 Aug 2023 – Simply Short – Monetary policy

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The European Central Bank (ECB) tightens or loosens financing conditions in the economy primarily through raising or cutting its key interest rates. These key ECB interest rates, or policy rates, directly affect short-term money market interest rates, as policy rates determine the interest paid by banks when borrowing from the central bank and the interest banks receive when making deposits with the central bank. In recent years, with the ECB's asset purchase programmes and credit granted to banks, the ECB's deposit facility rate has become the principal policy rate. The gradual reduction in the asset purchase programmes and in the volume of credit have prompted the ECB to review how it will control short-term money market interest rates in the future. It must also consider how to take climate change into account in its implementation of monetary policy.

IS THERE A STABLE RELATIONSHIP BETWEEN THE TWO RATES?

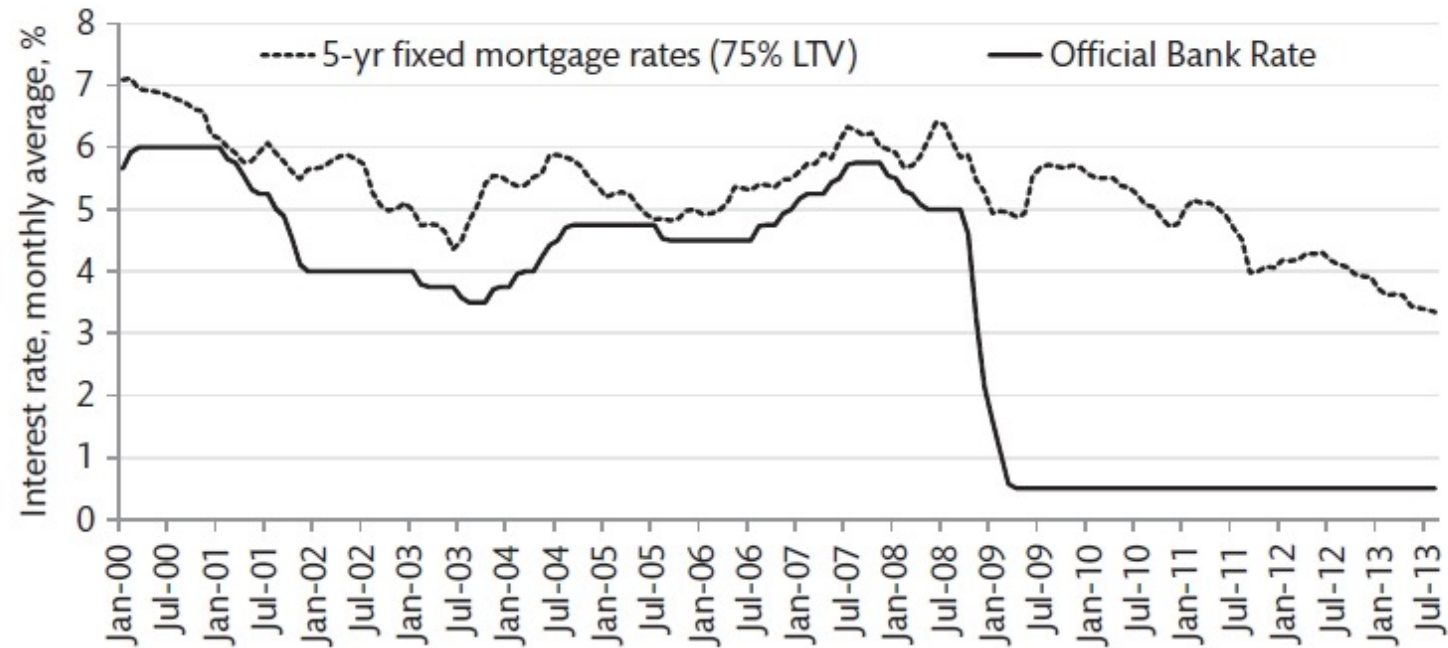


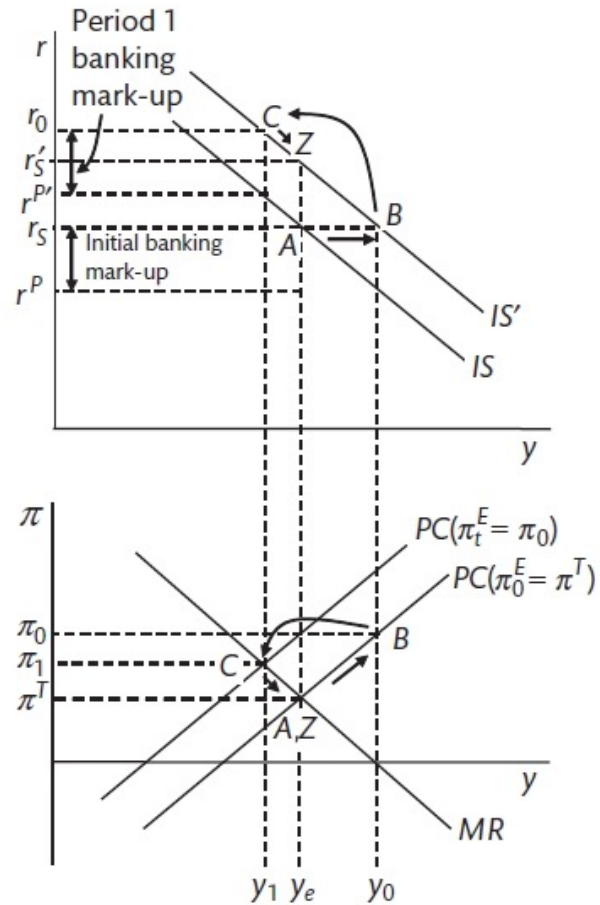
Figure 5.4 UK Official Bank Rates and 5-yr fixed mortgages rates (75% LTV): Jan 2000–Aug 2013.

Source: Bank of England (data accessed October 2013).

HOW DOES THIS DIFFER FROM TRADITIONAL “LM”-BASED MODELS?

- *The inflation-targeting CB sets the policy rate ...*
 - *Traditional textbook view and supplies whatever money is demanded at that price.*
 - *Current (esp US) ... which we can interpret as interest rate on reserves/reverse repo rate*
- *The money market rate (rate between banks) is close to the policy rate due to arbitrage.*
- *Banks then choose the lending rate based on:*
 - i. Risk: \uparrow credit risk \rightarrow \downarrow expected returns on loans*
 - ii. Risk Tolerance: \downarrow risk tolerance \rightarrow \uparrow mark-up, for a given risk level*
 - iii. Bank Equity: \uparrow equity/capital cushion \rightarrow \uparrow ability to bear credit risk*
 - iv. The banking sector: \downarrow degree of competition \rightarrow \uparrow mark-up*
- *Lending rate: $r = (1 + \mu^B) r^P$, where mark-up (μ^B) increases with risk and decreases with risk tolerance and bank equity.*

CB stabilization in the 3-equation model



The increase in investment shifts the IS curve to the right. The central bank responds by raising the policy rate to $r^{P'}$ to achieve a lending rate of r_0 . Policy rate then lowered over following periods until the lending rate reaches r'_S .

Difference from Ch. 3:

In Ch. 3, the CB sets the lending rate directly.

In Ch. 5, the CB sets the policy rate to achieve the desired lending rate

Figure 5.13 An investment boom in the 3-equation model with the banking system.

THE PROBLEM OF CREDIT RATIONING

- ***Credit rationing** also matters in modelling bank behaviour*
- *Banks do not just adjust mark-ups in response to credit risk, they also impose credit rationing*
- *Credit rationing affects household credit constraints → increases the multiplier and decreases the slope of the IS curve.*
- *Information asymmetries between banks and borrowers contribute to credit rationing (Weiss 1984):*
 - *Moral Hazard: Effort exerted by the borrower in his or her bank-financed project is unobserved by the bank*
 - *Expected future earnings are unknown to lenders → cannot necessarily borrow when permanent income increases (as in PIH)*
 - *Adverse selection: Individuals with stronger prospects will self-select away from high interest loan agreements → remaining pool of applicants is deemed weaker → banks ration credit.*

BUT WHAT IMPORTANT FUNCTIONS DO BANKS PERFORM?

The role of banks in a fractional reserve system:

1. ***Maturity transformation:*** *Transforming liquid savings into long-term borrowing, but a maturity mismatch poses liquidity risk to banks*
2. ***Aggregation:*** *Aggregating small savings to make large loans*
3. ***Risk pooling:*** *Banks are larger and can better withstand defaults → offer limited risk to savers.*

- Fractional Reserve Banking System: Banks only hold a fraction of deposits in liquid form in their reserve accounts at the CB.
- Liquidity risk: Inadequate reserves to meet depositors' demand to withdraw money from their accounts (e.g. 'banking panic' → incentive to be the first to withdraw → everyone withdraws → bank run)

∴ The CB acts as a Lender of Last Resort (LOLR) to provide emergency liquidity to (otherwise solvent) banks.

LIQUIDITY SPILLOVERS, MORAL HAZARD AND SOLVENCY RISK

Schemes to prevent liquidity problems (LOLR facility and deposit guarantees) have to be designed to tread the fine line between:

1. Protecting the public from the spillovers of liquidity problems
2. Avoiding moral hazard

Such schemes make banks less prudent in their lending behaviour, and households less prudent in their savings behaviour (Households might save in unsound banks, since their deposits are guaranteed anyway)

- Solvency risk: when the value of assets is less than that of debts or liabilities → bankruptcy if not bailed out by the government.
- Interconnectedness in the banking sector: Solvency problem for a small no. of banks → banks unsure about safety in borrowing from one another → widespread liquidity problems
- Insolvency has direct negative effects on bank depositors, creditors, shareholders and bondholders.

BANK BALANCE SHEET

The Balance Sheet of a Bank: $Assets \equiv Liabilities + Equity$

→ *Asset purchases are funded with debt (liabilities) and equity*

Assets	% of balance sheet	Liabilities	% of balance sheet
1. Cash and reserve balances at the central bank	2	1. Deposits	50
2. Government bonds, which can be used as collateral for repo borrowing	10	2. Wholesale repo borrowing secured with collateral	30
3. Asset-backed securities, which can be used as collateral for repo borrowing	20	3. Unsecured borrowing	16
4. Wholesale reverse repo lending	11		
5. Loans (e.g. mortgages)	55		
6. Fixed assets (e.g. buildings, equipment)	2		
Total Assets	100	Total liabilities	96
		Net worth	
		Equity	4
Memorandum item: Leverage (Total Assets/Net worth)		100/4 = 25	

Figure 5.9 The balance sheet of a typical commercial bank before the financial crisis.

IF TIME ...

ASSET SIDE

1. Cash and reserves at the CB: Highly liquid assets; low interest rate (r^P) so banks do not hold more than is prudent.
2. Govt Bonds: Interest-earning and relatively safe; can be used as high-quality collateral for borrowing from other banks etc.
3. Asset-backed securities (ABS): Securities backed by a bundle loans or mortgages (MBS); int. rate depends on loan riskiness; can be used as collateral for money market borrowing
4. Wholesale reverse repo lending: See item 2. on 'Liability Side'
5. Loans: Largest item on B/S; The core activity of the bank: mortgages, car loans etc.
6. Fixed Assets: Physical assets, e.g. buildings and equipment.

LIABILITY SIDE

1. Deposits: by households and firms; The largest liability of banks.
2. Wholesale repo borrowing secured with collateral:

'Repo' = sale and repurchase agreement; short-term secured borrowing from the money markets.

The borrowing bank sells assets (eg. bonds, ABS etc) to the lending bank and promises to repurchase the assets at a higher price in the future. Assets are seized if borrower unable to repurchase them.

Large banks perform a market maker function: Lend and borrow at the same time in the repo market.

3. Unsecured borrowing: banks sell bonds which are not secured with collateral; bond holders are not repaid under insolvency.
 - Leverage: *Ratio of assets to equity; played a central role in the build-up to the financial crisis*

EXAMPLE: BARCLAYS PLC, PRE-CRISIS

Leverage ratio = Assets/ Net Worth = 36.4

Assets		Liabilities	
1. Cash and reserve balances at the central bank	7,345	1. Deposits	336,316
2. Wholesale reverse repo lending	174,090	2. Wholesale repo borrowing secured with collateral	136,956
3. Loans (e.g. mortgages)	313,226	3. Unsecured borrowing	111,137
4. Fixed assets (e.g. buildings, equipment)	2,492	4. <i>Trading portfolio liabilities</i>	71,874
5. <i>Trading portfolio assets</i>	177,867	5. <i>Derivative financial instruments</i>	140,697
6. <i>Derivative financial instruments</i>	138,353	6. <i>Other liabilities</i>	172,417
7. <i>Other assets</i>	183,414		
Total Assets	996,787	Total liabilities	969,397
		Net worth	
		Equity	27,390
Memorandum item: Leverage (Total Assets/Net Worth)		996,787/27,390 = 36.4	




Figure 5.10 The consolidated balance sheet of Barclays PLC in 2006, £m.

Source: Barclays PLC Annual Report 2006.

BENEATH THE SURFACE OF THE PREVIOUS INVESTMENT BOOM

Banks and Macro stabilization

(3-equation model adjustment process: Investment boom)

1. Investment boom → Banks make new loans to households and firms, thus needing to replenish reserves at the CB.
2. Higher income from the investment boom → Households increase deposits and bond purchases
3. Because of bond purchases by households, the increase in deposits is insufficient to fund the new loans made by the bank → Banks borrow from the money market
4. CB wants to bring inflation back to target → raises policy rate
5. Higher policy rate → Higher cost of funding → Banks pass this on in a higher lending rate → Interest-sensitive spending decreases → Economy adjusts back to equilibrium output and target inflation.