Japan’s "lost decade" - due to problems in financial sector?
The credit channel: Motivation

- Japan’s "lost decade" - due to problems in financial sector?
- The great depression: financial channels explored by Bernanke, may have worsened situation
The credit channel: Motivation

- Japan’s "lost decade" - due to problems in financial sector?
- The great depression: financial channels explored by Bernanke, may have worsened situation
- Today, financial system under stress
The credit channel: Motivation

- Japan’s "lost decade" - due to problems in financial sector?
- The great depression: financial channels explored by Bernanke, may have worsened situation
- Today, financial system under stress
- Here: Is the financial sector important for the way the interest rate affects the economy?
The credit channel: Motivation

- Japan’s "lost decade" - due to problems in financial sector?
- The great depression: financial channels explored by Bernanke, may have worsened situation
- Today, financial system under stress
- Here: Is the financial sector important for the way the interest rate affects the economy?
- Standard: Sticky prices make nominal interest rate changes become real interest rate changes and exchange rate changes $\Rightarrow$ real exchange rate changes
The credit channel: Motivation

- Japan’s "lost decade" - due to problems in financial sector?
- The great depression: financial channels explored by Bernanke, may have worsened situation
- Today, financial system under stress
- Here: Is the financial sector important for the way the interest rate affects the economy?
- Standard: Sticky prices make nominal interest rate changes become real interest rate changes and exchange rate changes \( \Rightarrow \) real exchange rate changes
- Standard: Only two types of capital: Money and Bonds, no modelling of financial intermediation
Plan for presentation

- What do we mean by the credit channel?
Plan for presentation

- What do we mean by the credit channel?
- Micro-structure of financial markets: Principal-agent problem
Plan for presentation

- What do we mean by the credit channel?
- Micro-structure of financial markets: Principal-agent problem
- Micro-structure effects in partial equilibrium model and *role for monetary policy*
Plan for presentation

- What do we mean by the credit channel?
- Micro-structure of financial markets: Principal-agent problem
- Micro-structure effects in partial equilibrium model and *role for monetary policy*
- Macro model with financial sector and *role for monetary policy* (next week)

Empirical evidence of credit channel affecting the way monetary policy works?

Alternative measures implemented by central banks to help financial market functioning

(Norges Bank)
Plan for presentation

- What do we mean by the credit channel?
- Micro-structure of financial markets: Principal-agent problem
- Micro-structure effects in partial equilibrium model and role for monetary policy
- Macro model with financial sector and role for monetary policy (next week)
- Empirical evidence of credit channel affecting the way monetary policy works?
Plan for presentation

- What do we mean by the credit channel?
- Micro-structure of financial markets: Principal-agent problem
- Micro-structure effects in partial equilibrium model and role for monetary policy
- Macro model with financial sector and role for monetary policy (next week)
- Empirical evidence of credit channel affecting the way monetary policy works?
- Alternative measures implemented by central banks to help financial market functioning
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

Conclusion: In theory: more affected, and nonlinearly. In practise?

Main idea: Market imperfections mean that interest rate changes may affect
- Availability of credit (credit rationing)
- Relationship between key policy rate and rate that private sector pays (nonlinear?)

Need more sophisticated modelling of financial markets, more assets than just M and B!
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

If so, will consumption and spending will be more or less affected than otherwise?
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

If so, will consumption and spending will be more or less affected than otherwise?

Conclusion: In theory: more affected, and nonlinearly. In practise?
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

If so, will consumption and spending will be more or less affected than otherwise?

Conclusion: In theory: more affected, and nonlinearly. In practise?

Main idea: Market imperfections mean that interest rate changes may affect
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?
If so, will consumption and spending will be more or less affected than otherwise?
Conclusion: In theory: more affected, and nonlinearly. In practise?
Main idea: Market imperfections mean that interest rate changes may affect
- Availability of credit (credit rationing)
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

If so, will consumption and spending will be more or less affected than otherwise?

Conclusion: In theory: more affected, and nonlinearly. In practise?

Main idea: Market imperfections mean that interest rate changes may affect

- Availability of credit (credit rationing)
- Relationship between key policy rate and rate that private sector pays (nonlinear?)
Credit channel: is credit intermediation, and hence consumption and investment, helped/hindered/changed by interest rate changes?

If so, will consumption and spending will be more or less affected than otherwise?

Conclusion: In theory: more affected, and nonlinearly. In practise?

Main idea: Market imperfections mean that interest rate changes may affect

- Availability of credit (credit rationing)
- Relationship between key policy rate and rate that private sector pays (nonlinear?)

Need more sophisticated modelling of financial markets, more assets than just M and B!
Two approaches; bank lending channel and broad credit channel

• Traditional: Banks special, they transform short term deposits into long term lending.
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
- Availability of bank funding linked to monetary policy?
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
- Availability of bank funding linked to monetary policy?
- Bank of England deliberations. Public ownership of banks in the US?
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
- Availability of bank funding linked to monetary policy?
- Bank of England deliberations. Public ownership of banks in the US?

- Modern, and focus here: Financial accelerator and broader credit channel

(Norges Bank)
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
- Availability of bank funding linked to monetary policy?
- Bank of England deliberations. Public ownership of banks in the US?

- Modern, and focus here: Financial accelerator and broader credit channel
- "external finance premium", Collateral and balance sheets important.
Two approaches; bank lending channel and broad credit channel

- Traditional: Banks special, they transform short term deposits into long term lending.
- Historically, reserve requirements/quantitative measures. No more.
- Availability of bank funding linked to monetary policy?
- Bank of England deliberations. Public ownership of banks in the US?

- Modern, and focus here: Financial accelerator and broader credit channel
- "external finance premium", Collateral and balance sheets important.
- Availability of collateral/own funds linked to monetary policy?
Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
- Lender/supplier of capital is principal, borrower is agent. Different types of funding:
  - Own funds/withheld earnings (no “agency costs”)
  - Bank loans (nominal return known, highest priority, loss if default/bankruptcy)
  - Bonds (higher return than on loans, some more downside than loans)
  - Shares (highest risk, lowest priority, involves monitoring of firm & influence)

Here: study market for loans

(Norges Bank)
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
- Lender/supplier of capital is principal, borrower is agent. Different types of funding:
  - Own funds/withheld earnings (no "agency costs")
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
- Lender/supplier of capital is principal, borrower is agent. Different types of funding:
  - Own funds/withheld earnings (no "agency costs")
  - Bank loans (nominal return known, highest priority, loss if default/bankruptcy)
Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm

Market imperfections: funding structure matters

Lender/supplier of capital is principal, borrower is agent. Different types of funding:

- Own funds/withheld earnings (no "agency costs")
- Bank loans (nominal return known, highest priority, loss if default/bankruptcy)
- Bonds (higher return than on loans, some more downside than loans)
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
- Lender/supplier of capital is principal, borrower is agent. Different types of funding:
  - Own funds/withheld earnings (no "agency costs")
  - Bank loans (nominal return known, highest priority, loss if default/bankruptcy)
  - Bonds (higher return than on loans, some more downside than loans)
  - Shares (highest risk, lowest priority, involves monitoring of firm & influence)
Principal-agent problems in credit markets

- Perfect markets: Modigliani and Miller theorem states that financing irrelevant to value of firm
- Market imperfections: funding structure matters
- Lender/supplier of capital is principal, borrower is agent. Different types of funding:
  - Own funds/withheld earnings (no "agency costs")
  - Bank loans (nominal return known, highest priority, loss if default/bankruptcy)
  - Bonds (higher return than on loans, some more downside than loans)
  - Shares (highest risk, lowest priority, involves monitoring of firm & influence)
- Here: study market for loans
Types of agency problems due to imperfect information:

- Adverse selection (the interest rate set by lender affects pool of interested borrowers)

Aim: incorporate this in macro model, see how monetary policy transmission influenced.

First: micro-effects in isolation

(Norges Bank)
Types of agency problems due to imperfect information:

- Adverse selection (the interest rate set by lender affects pool of interested borrowers)
- Moral Hazard (the interest rate set by lender affects actions of borrowers)
Types of agency problems due to imperfect information:

- Adverse selection (the interest rate set by lender affects pool of interested borrowers)
- Moral Hazard (the interest rate set by lender affects actions of borrowers)
- Aim: incorporate this in macro model, see how monetary policy transmission influenced.
Types of agency problems due to imperfect information:

- Adverse selection (the interest rate set by lender affects pool of interested borrowers)
- Moral Hazard (the interest rate set by lender affects actions of borrowers)
- Aim: incorporate this in macro model, see how monetary policy transmission influenced.
- First: micro-effects in isolation
Would be no problem with perfect info: individual interest rates
Adverse selection and moral hazard (cont.)

- Would be no problem with perfect info: individual interest rates
- But info about customers a real problem, as shown in ad. for credit information company:
Adverse selection and moral hazard (cont.)

- Would be no problem with perfect info: individual interest rates
- But info about customers a real problem, as shown in ad. for credit information company:

  ![Adverse selection and moral hazard (cont.)](image_url)

  NOEN AV DISSE PERSONENE VIL DUTAPE PENGERS, MEN EN VIL BLI DIN BESTE KUNDE. SER DU FORSKJELLEN?
Would be no problem with perfect info: individual interest rates

But info about customers a real problem, as shown in ad. for credit information company:

You will loose money on some of these people, while one will be your best customer - can you tell them apart?
May get credit rationing *in equilibrium* (similar to "lemon"-problem of Akerlof),
Adverse selection: the interest rate as a screening device

- May get credit rationing \textit{in equilibrium} (similar to "lemon"-problem of Akerlof),
- ref. Stiglitz and Weiss (1981) "Credit Rationing in Markets with Imperfect Information"
Adverse selection: the interest rate as a screening device

• May get credit rationing \textit{in equilibrium} (similar to "lemon"-problem of Akerlof),

• ref. Stiglitz and Weiss (1981) "Credit Rationing in Markets with Imperfect Information"

• May be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan
Adverse selection: the interest rate as a screening device

- May get credit rationing in equilibrium (similar to "lemon"-problem of Akerlof),
- ref. Stiglitz and Weiss (1981) "Credit Rationing in Markets with Imperfect Information"
- May be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan
- May not be optimal to raise interest rate or collateral requirement when there is excess demand for credit
Model by Stiglitz and Weiss (1981)

- Group of projects $\theta$ characterized by a distribution of return $R$, $F(R, \theta)$. Risk increasing with $\theta$.
- Get decreasing return in increasing interest rate $r$ charged, because average $\theta$ increases in pool of projects that apply for funding: average risk increases. Why? Default if

$$C + R \leq B(1 + \hat{r})$$

Net return to borrower:

$$\pi(R, \hat{r}) = \max(R - (1 + \hat{r})B; -C)$$

Return to lender:

$$\rho(R, r) = \min(R + C; B(1 + \hat{r}))$$
Firm profits convex function of $R$

$$\pi(R, \hat{r}) = \max(R - (1 + \hat{r})B; -C)$$

- Firm will want to borrow from bank only if project is risky enough
Firm profits convex function of $R$

\[
\pi(R, \hat{r}) = \max(R - (1 + \hat{r})B; -C)
\]

- Firm will want to borrow from bank only if project is risky enough
- Downside is limited, upside increases with risk
Firm profits convex function of $R$

$$\pi(R, \hat{r}) = \max(R - (1 + \hat{r})B; -C)$$

- Firm will want to borrow from bank only if project is risky enough
- Downside is limited, upside increases with risk
- Implies that firm borrows from bank iff $\theta \geq \hat{\theta}$: Expected profit increases with risk ($\theta$).
Funding for low-risk projects not wanted when $r$ is high

Critical value of $\theta, \hat{\theta}$ with expected profit equal to zero (below $\hat{\theta}$, project not profitable):

$$E\Pi(\hat{r}, \hat{\theta}) \equiv \int_0^\infty \max[R - (\hat{r} + 1)B; -C]dF(R, \hat{\theta}) = 0$$

How does the critical $\hat{\theta}$ depend on $\hat{r}$? Use implicit function theorem to find $\frac{d\hat{\theta}}{d\hat{r}} > 0$ $=>$

- When $r \uparrow$, low-risk projects do not apply for financing.
Critical value of \( \theta, \hat{\theta} \) with expected profit equal to zero (below \( \hat{\theta} \), project not profitable):

\[
E\Pi(\hat{r}, \hat{\theta}) \equiv \int_0^{\infty} \max[R - (\hat{r} + 1)B; -C]dF(R, \hat{\theta}) = 0
\]

How does the critical \( \hat{\theta} \) depend on \( \hat{r} \)? Use implicit function theorem to find \( \frac{d\hat{\theta}}{d\hat{r}} > 0 \Rightarrow \)

- When \( \hat{r} \uparrow \), low-risk projects do not apply for financing.
- Note also that return to bank is concave function of return on project \( \Rightarrow \) bank prefers less risk to a mean-preserving spread:
Bank return concave function of \( R \)

- Upside for bank is limited, downside increasing with risk: get back:
  \[ \rho(R, r) = \min(R + C; B(1 + \hat{r})) \]
Upside for bank is limited, downside increasing with risk: get back: 
\[ \rho(R, r) = \min(R + C; B(1 + \hat{r})) \]

The return to the bank is a decreasing function of the riskiness of the loan.
Case with two types of $\theta$ only (Walsh book)

- May be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan.
Case with two types of $\theta$ only (Walsh book)

- may be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan
- may not be optimal to raise interest rate or collateral requirement when there is excess demand for credit
Moral hazard: The interest rate as an incentive mechanism

- Borrower has convex profit function: incentive to take on more risk

**Example**

Suppose borrower can invest in project A or project B. B is more risky. Payoff: \( R^a < R^b \) in "good state of the world", but probability \( p^a > p^b \). In bad state of the world, payoff is 0 for both projects.

\[
E\pi^A = p^a[R^a - (1 + r_l)B] - (1 - p^a)C, \\
E\pi^B = p^b[R^b - (1 + r_l)B] - (1 - p^b)C
\]

The interest rate that gives equal expected return for the two projects is characterized by:

\[
(1 + r^*_l)B - C = \frac{p^aR^a - p^bR^b}{p^a - p^b}
\]
Interest rate above this rate $\Rightarrow$ project B is preferred $\Rightarrow$ profit to lender is

$$p^b(1 + r^H_l)B + (1 - p^b)C$$

Interest rate below this rate $\Rightarrow$ project A is preferred $\Rightarrow$ profit to lender is

$$p^a(1 + r^L_l)B + (1 - p^a)C$$

Since in borderline case ($r = r^*_l$)

$$p^b(1 + r^*_l)B + (1 - p^b)C < p^a(1 + r^*_l)B + (1 - p^a)C$$

$\Rightarrow$ Lender will make sure $r_l$ is (marginally below) $r^*_l$. 
may be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan
- may be optimal to deny credit to customers who are observationally indistinguishable from those who receive loan
- may not be optimal to raise interest rate or collateral requirement when there is excess demand for credit
Optimal interest rate $\Rightarrow$ credit rationing in competitive equilibrium

- Moral hazard and adverse selection $\Rightarrow$ return to bank not monotone in $\hat{r}$

![Graph showing expected return to bank as a function of interest rate with a peak at $r^*$](image)
Optimal interest rate $\Rightarrow$ credit rationing in competitive equilibrium

- Moral hazard and adverse selection $\Rightarrow$ return to bank not monotone in $\hat{r}$
- We get credit rationing in eqm.

"optimal interest rate"
The financial accelerator: Bernanke, Gertler and Gilchrist (1996)

- In examples above, if $C = B(1 + r_l)$, no default risk and no non-linearities. BGG show:

1. If collateral lower, default risk exists, and external finance more expensive than internal finance (alternative cost risk free rate), because of agency costs.
2. Premium on external finance varies inversely with net worth (liquid assets + collateral value of illiquid assets = $C$).
3. Fall in borrowers net worth increases external finance premium and reduces spending and production = Accelerator.
4. Ultimate question: how does monetary policy affect net worth/collateral and hence finance premium/availability of credit?
In examples above, if $C = B(1 + r_l)$, no default risk and no non-linearities. BGG show:

- If collateral lower, default risk exists, and external finance more expensive than internal finance (alternative cost≈risk free rate), because of agency costs.
In examples above, if \( C = B(1 + r_l) \), no default risk and no non-linearities. BGG show:

- If collateral lower, default risk exists, and external finance more expensive than internal finance (alternative cost \( \approx \) risk free rate), because of agency costs.

- Premium on external finance varies inversely with net worth (liquid assets + collateral value of illiquid assets \( = C \)).
In examples above, if \( C = B(1 + r_l) \), no default risk and no non-linearities. BGG show:

- If collateral lower, default risk exists, and external finance more expensive than internal finance (alternative cost ≈ risk free rate), because of agency costs.
- Premium on external finance varies inversely with net worth (liquid assets + collateral value of illiquid assets = C).
- Fall in borrowers net worth increases external finance premium and reduces spending and production = Accelerator.
The financial accelerator: Bernanke, Gertler and Gilchrist (1996)

- In examples above, if \( C = B(1 + r_l) \), no default risk and no non-linearities. BGG show:
- If collateral lower, default risk exists, and external finance more expensive than internal finance (alternative cost≈risk free rate), because of agency costs
- Premium on external finance varies inversely with net worth (liquid assets + collateral value of illiquid assets = C)
- Fall in borrowers net worth increases external finance premium and reduces spending and production=Accelerator
- Ultimate question: how does monetary policy affect net worth/collateral and hence finance premium/availability of credit?
Example

Two periods, 0 and 1. Entrepreneur uses inputs from period 0 to produce in period 1. Fixed input $K$, variable input $x_1$. Market price of $K$ at end of period is $q_1$ per unit. Output period 1: $a_1 f(x_1)$. Gross cashflow from previous production $a_0 f(x_0)$. Entrepreneur maximizes period 1 output net of debt, $a_1 f(x_1) - r_1 b_1$, subject to accounting identity

$$x_1 = a_0 f(x_0) + b_1 - r_0 b_0$$  \hspace{1cm} (1)

Unconstrained optimal value of $x_1$:

$$Max_{x_1, b_1}(a_1 f(x_1) - r_1 b_1) = Max_{b_1}[a_1 f(a_0 f(x_0) + b_1 - r_0 b_0 - r_1 b_1)]$$

implies $x_1 = x_1^*$ such that

$$a_1 f'(x_1^*) = r_1$$
Example of financial accelerator cont

But borrowing is subject to constraint (no unsecured borrowing)

\[ b_1 \leq \left( \frac{q_1}{r_1} \right) K \]  \hspace{1cm} (2)

Which implies

\[ x_1 \leq a_0 f(x_0) + \left( \frac{q_1}{r_1} \right) K - r_0 b_0 \]  \hspace{1cm} (3)

When \( x_1 \) is suboptimal,

\[ x_1 < x_1^* \quad \Rightarrow \quad a_1 f'(x_1) > r_1 \]

\((f(\cdot) \text{ is concave}) \Rightarrow \text{Shadow price for internal funding} = a_1 f'(x_1), \text{ higher than } r_1, \text{ reflects "agency costs".} \)
Effects of monetary policy in financial accelerator model:

**External finance premium, collateralized financing only**

Financial accelerator: reducing interest rate increases value of collateral/assets. External finance premium falling.

- Internal Financing
- External Financing (r)
- Extra financing with lower r’
Conclusions from example:

- Internal funds special value

\[
\text{Agency premium} = a_0 f(x_0) + \left( \frac{q_1}{r_1} \right) K + r_0 b_0 \\
\text{because "no unsecured borrowing constraint"}
\]

More binding

Higher agency premium reduces spending

Financial accelerator: fluctuations in borrowers net worth lead to fluctuations in real activity

Negative demand shock reduces net worth = downturn amplified by collateral-effects

(Norges Bank)
Conclusions from example:

- Internal funds special value
- Agency premium $a_1 f'(x_1) - r_1$ increases when $a_0 f(x_0) \downarrow$ or $(q_1/r_1)K \downarrow$ or $r_0 b_0 \uparrow$ because "no unsecured borrowing constraint" more binding
Example of financial accelerator cont.

Conclusions from example:

- Internal funds special value
- Agency premium $a_1 f'(x_1) - r_1$ increases when $a_0 f(x_0) \downarrow$ or $(q_1/r_1)K \downarrow$ or $r_0 b_0 \uparrow$ because "no unsecured borrowing constraint" more binding
- Higher agency premium reduces spending $x_1$ and production $f(x_1)$
Example of financial accelerator cont.

Conclusions from example:

- Internal funds special value
- Agency premium $a_1 f'(x_1) - r_1$ increases when $a_0 f(x_0) \downarrow$ or $(q_1 / r_1) K \downarrow$ or $r_0 b_0 \uparrow$ because "no unsecured borrowing constraint" more binding
- Higher agency premium reduces spending $x_1$ and production $f(x_1)$
- Financial accelerator: fluctuations in borrowers net worth lead to fluctuations in real activity
Example of financial accelerator cont.

Conclusions from example:

- Internal funds special value
- Agency premium $a_1 f'(x_1) - r_1$ increases when $a_0 f(x_0) \downarrow$ or $(q_1 / r_1)K \downarrow$ or $r_0 b_0 \uparrow$ because "no unsecured borrowing constraint" more binding
- Higher agency premium reduces spending $x_1$ and production $f(x_1)$
- Financial accelerator: fluctuations in borrowers net worth lead to fluctuations in real activity
- Negative demand shock reduces net worth $\Rightarrow$ downturn amplified by collateral-effects
Financial accelerator model central in discussion of financial crisis

- Definition of financial crisis: collateral constraint suddenly binding (Christiano, Rust, Roldos (2002)): Monetary Policy in a Financial Crisis, NBER WP9005
Financial accelerator model central in discussion of financial crisis

- Definition of financial crisis: collateral constraint suddenly binding (Christiano, Rust, Roldos (2002)): Monetary Policy in a Financial Crisis, NBER WP9005
- Variants of the premium in many modern models of credit channel
Model with less extreme collateral assumption

External finance premium

Financial accelerator: reducing interest rate increases value of collateral/assets. External finance premium falling.
Premium on corporate bonds, the US and the euro area

Percentage points. 2. jan 1997 – 19. januar 2009

Kilde: Thomson Reuters
External finance premium

Premiums in international money markets\(^1\)

5-day moving average. Percentage points. 1 June 2007 – 1 February 2009.

1) Average of the spread between 3-month money market rates and expected key rates in the US, UK and euro area.

Source: Thomson Reuters
Minutes from last FOMC-meeting:

"The Federal Reserve will employ all available tools to promote the resumption of sustainable economic growth and to preserve price stability. The focus of the Committee’s policy is to support the functioning of financial markets and stimulate the economy through open market operations and other measures that are likely to keep the size of the Federal Reserve’s balance sheet at a high level".
"The Federal Reserve continues to purchase large quantities of agency debt and mortgage-backed securities to provide support to the mortgage and housing markets, and it stands ready to expand the quantity of such purchases and the duration of the purchase program as conditions warrant. The Committee also is prepared to purchase longer-term Treasury securities if evolving circumstances indicate that such transactions would be particularly effective in improving conditions in private credit markets."
"The Federal Reserve continues to purchase large quantities of agency debt and mortgage-backed securities to provide support to the mortgage and housing markets, and it stands ready to expand the quantity of such purchases and the duration of the purchase program as conditions warrant. The Committee also is prepared to purchase longer-term Treasury securities if evolving circumstances indicate that such transactions would be particularly effective in improving conditions in private credit markets."

Next time: interpretation of this - alternatives to using policy rate available to central banks? Is this monetary policy?
• Literature, next time:
• Literature, next time:

Literature, next time:

- Literature, next time:

- Additional suggested reading:
Literature, next time:

- Additional suggested reading:
Literature, next time:


Additional suggested reading:

Literature, next time:


Additional suggested reading:

- Literature, next time:
- Additional suggested reading:
Practical information

- Evaluation of the course will be done at the end of the semester.
Evaluation of the course will be done at the end of the semester.

An internet form will be used.
Practical information

- Evaluation of the course will be done at the end of the semester.
- An internet form will be used.
- Students will be asked to answer the form during the period between the final exam and when grades are given.