ECON 4325
Monetary Policy
Lecture 10: Monetary Transmission Mechanisms

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... we summarize their views of what is required in a new core model. These can be grouped under four headings:

(i) incorporating financial frictions rather than assuming that financial intermediation is costless;
(ii) relaxing the requirement of rational expectations;
(iii) introducing heterogeneous agents; and
(iv) underpinning the model—and each of these three new additions—with more appropriate microfoundations.

Vines and Wills (2018)
The rebuilding macroeconomic theory project
Outline

Lecture based on Boivin-Kiley-Mishikin (2011)

1. Overview of the transmission mechanisms in the three-equation NKM.

2. Additional non-household transmission mechanisms:
   - Investment channels
   - Exchange rate channels
   - Financial channels: bank lending, bank capital, deposits, and balance sheet

3. Additional household-based transmission mechanisms:
   - Balance sheet channel
   - Cash-flow effects
   - Income risk (Holm)
   - Indirect income effects (Kaplan-Moll-Violante)
Part I: The transmission mechanisms in our three-equation framework.
Overview

- All transmission goes through households.

- Two direct household channels:
  - Intertemporal substitution
  - Wealth effects.

- And the indirect channel through wages.
Intertemporal Substitution

Mechanism:

1. \( i_t \downarrow \)
2. \( r_t \downarrow \)
3. Consumption today is cheaper relative to tomorrow
4. \( c_t \uparrow \)

(Euler-equation effect)
Wealth Effects

Mechanism:

1. $i_t \downarrow$
2. $r_t \downarrow$
4. $c_t \uparrow$

Note: there is no financial wealth in equilibrium in the standard model. Only effect through revaluation of human capital.
Indirect Income Effect

Mechanism:

- $c_t \uparrow$ due to other channels
- $w_t \uparrow$ since firms need to increase production
- $c_t \uparrow$

Accelerator mechanism
(no independent effect of MP, but strengthens already existing channels)
Part II: Additional non-household transmission mechanisms.
Overview

- Firms: investment channel.

- Open-economy: exchange rate channels.

- Intermediation/financial sector:
  - Bank lending channel
  - Bank capital channel
  - Deposits channel
  - Balance sheet channel
Investment Channel

Mechanism:

1. $i_t \downarrow$
2. $r_t \downarrow$
3. User cost of capital $\downarrow$
4. Investment $\uparrow$
5. GDP $\uparrow$

NB! This channel was missing in action during the last recession. Why?

- Uncertainty

If uncertainty is high, user cost of capital has a negligible effect on investment. Two reasons: firms don’t want to invest (demand), banks don’t want to provide loans (supply).
Exchange Rate Channel

Uncovered interest rate parity:

\[ 1 + r_t = E_t \left\{ \frac{S_{t+1}}{S_t} \right\} (1 + r^*_t) u_t \]

where

- \( S_t \) is the real exchange rate (\( S_t = \frac{e P^*}{P} \) ↑ is a real depreciation of NOK)
- \( r_t \) is the real interest rate at home
- \( r^*_t \) is the foreign real interest rate
- \( u_t \) is a risk premium.
Exchange Rate Channel

Mechanism

1. $i_t \downarrow$
2. $r_t \downarrow$
3. $S_t \uparrow$ (real depreciation)
4. Two effects: exporters more competitive, export volumes increase; prices of imported goods more expensive, prices increase
5. $y_t \uparrow$ and $\pi_t \uparrow$

However: many reasons why it doesn’t work quite so much (UIP doesn’t hold empirically, variation in risk premium, pricing to market...).
Banks/intermediation channels

The Bank Lending Channel

Mechanism:

1. Expansionary open market operations increase bank reserves and deposits.
2. This in turn increases the level of bank loans a bank can make (supply effect).
3. Previously constrained firms get loans and GDP increases.

Note: this is one of the primary mechanisms through which QE is supposed to work, see next lecture.
Banks/intermediation channels

The Bank Capital Channel

Mechanism:

1. Expansionary monetary policy results in higher asset prices and/or higher interest margins.

2. This results in gains on banks’ loan portfolios.

3. This is an expansion in bank capital.

4. More lending from these banks (supply effect).

5. Previously constrained firms get loans and GDP increases.

Note: another mechanism through which QE is supposed to work.
Banks/intermediation channels

The Deposits Channel (Dreschler-Savov-Schnabl, 2017)

Mechanism: (households can hold cash-deposits-bonds)
1. When the key policy rate falls, banks decrease the spread between the deposit rate and the bond rate (due to market power).
2. Deposits flow in to the banking system.
3. Banks expand lending.
4. Previously constrained firms get loans and GDP increases.
Banks/intermediation channels

The Balance Sheet Channel

Mechanism:

1. Expansionary monetary policy results in higher asset prices and higher net worth of firms.
2. Firms can therefore pose more collateral and borrow more.
3. More lending (demand effect) to previously constrained firms.
4. GDP increases.

Note 1: this is the typical financial accelerator mechanism built in in large scale DSGE models (Bernanke-Gertler-Gilchrist 1999).

Note 2: this also affects households, see below.
Part III: Additional household-based transmission mechanisms.
Overview

- Modern macroeconomics: incomplete markets models increasingly prevalent.

- What does this mean?
  - Households face **uninsurable risk**
    (e.g. unemployment, income risk, returns risk...)
  - ... and **constraints**
    (e.g. liquidity constraints, loan-to-value constraint, loan-to-income constraint ...)

- Implications (things actually matter in the model)
  - Short-run fluctuations affect households
  - Balance sheet effects on households
  - Fiscal policy matters (**weaker** Ricardian Equivalence)
The Household Problem

\[
\max_{c_t, h_t, n_t} \sum_{t=0}^{\infty} \beta^t u(c_t, h_t, n_t)
\]

subject to

\[
P_t c_t + P_{h,t} h_t + b_t \leq P_{h,t} h_{t-1} + (1 + i_t) b_{t-1} + W_t z_t n_t + d_t
\]

\[
z_t \sim f(z_{t-1})
\]

\[
b_t \geq B(W_t z_t n_t, P_{h,t} h_t)
\]

\[
h_t \geq 0
\]

+ something that keeps \( h \) fixed most of the time

- \( h \) is volume of housing
- \( P_{h,t} \) is nominal price of housing
- \( z \) is idiosyncratic productivity
- \( B(W_t z_t n_t, P_{h,t} h_t) \) is the borrowing constraint
Monetary Transmission Mechanisms

Old Transmission Mechanisms
- Intertemporal substitution
- Wealth effects

New Transmission Mechanisms
1. Balance sheet channel
2. Cash-flow effects
3. Income risk effects (*Holm*)
4. Indirect income effects (*Kaplan-Moll-Violante*)
Balance Sheet Channel

Mechanism:
1. $i_t \downarrow$
2. $c$ and $h \uparrow$
3. $P_{h,t} \uparrow$
4. Borrowing constraint becomes slacker
5. $c$ and $h \uparrow$

Accelerator mechanism
(no independent effect of MP, but strengthens already existing channels)
Cash-flow Effects

Remember: there is a reason why households don’t adjust housing/debt every period.

- $i_t \downarrow$
- $i_t B_{t-1} \downarrow$
- Disposable income net of debt amortization $\uparrow$ (if debtor)
- $c$ and $h \uparrow$

Independent mechanism
Cash-flow Effects in Norway

Chart 2 Effect of a 1 percentage point increase in lending and deposit rates on disposable income excluding dividends. Percent. 1980 – 2017

Sources: Statistics Norway and Norges Bank

Source: Norges Bank MPR 1/14
Income Risk Effects

Remember: households face **uninsurable** income risk.

1. When households face uninsured income risk, they self-insure by accumulating buffer saving.

2. How much buffer saving depends on how effective wealth is at insuring against fluctuations in income.

3. When $i_t \downarrow$, they need more buffer to insure against same level of income risk.

4. $i_t \downarrow \Rightarrow s \uparrow$ and $c \downarrow$.

**NB!** Opposite of standard mechanisms. The presence of income risk weakens monetary transmission.
Indirect Income Effects

**Complete markets benchmark:** households react almost nothing to short-run changes in wages. Main part of monetary transmission is through direct effects.

**Incomplete markets:** some households are constrained and are very sensitive to short-run changes in wages. Main monetary transmission is through indirect effects on wages. (Kaplan-Moll-Violante / Luetticke)

**Implication:** The indirect effects are crucial for monetary transmission.
Summary

Expansionary open market operation

\(i_t \downarrow\)

Intertemporal substitution and cash-flow effects

\(c_t \uparrow\)

Wealth effect and balance sheet channel

\(q_t \uparrow\)

Income risk channel (-)

\(y_t \uparrow\)

Indirect income effect

\(w_t \uparrow\)

Investment and exchange rate channel

Balance sheet channel

Bank capital channel

Supply of bank lending \(\uparrow\)

Bank lending and bank capital channel

Deposits channel

Asset pricing
Next week

- Zero Lower Bound
- Quantitative Easing
- Forward Guidance

- And then negative interest rates the week after that.