ECON 4325
Monetary Policy
Lecture 1

Martin Blomhoff Holm
About me

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Visiting hours: by appointment

Education

- Master in Economics, UiO, 2014
- MSc in Economic History, LSE, 2012
- Bachelor in Mathematics and Economics, UiO, 2011
Introduction

Lectures (with me or guests)
  - Thursdays 1215 - 1400 in Auditorium 3

Seminars (Even Comfort Hvinden)
  - Tuesdays 0815 - 1000 in Grupperom 1
  - Thursdays 0815 - 1000 in Seminarrom 101

Material
  - *Monetary Policy, Inflation, and the Business Cycle* by Jordi Gali
  - Some articles, see syllabus on webpage.

Exam
  - June 1st, 9 AM (3 hours written exam)
## Lecture Plan

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| 18.1     | 1       | Introduction
           |
|          |         | Stylized facts                                         | Gali Ch. 1*                                                              | MBH      |
|          |         | The household problem                                  | Romer-Romer (2004)                                                      |          |
| 25.1     | 2       | Mathematical intro
           |
|          |         | Log-linearization                                       | Gali Ch. 2.1*                                                           | MBH      |
| 30.1 or 1.2 | S1    | Log-linearization                                       | Problem set 1                                                           | ECH      |
| 01.2     | 3       | The firm problem                                        | Gali Ch. 2.2*, 2.3*, 2.4*, and 3.2*                                     | MBH      |
| NB! 09.2 | 4       | The NK firm problem                                     | Gali Ch. 3.3*                                                           | MBH      |
| 13.2 or 15.2 | S2   | Households                                              | Problem set 2                                                           | ECH      |
| 15.2     | 5       | The basic NK model                                      | Gali Ch. 3*                                                             | MBH      |
|          | Term paper                                    | The CES aggregator and price dynamics                          | Problem set 3                                                           | ECH      |
| 01.3     | 6       | Monetary policy in the NK model                         | Gali Ch. 4*                                                             | MBH      |
|          |         | Clarida-Gali-Gertler (2000)*                           |                                                                          |          |
| 08.3     | 7       | Optimal monetary policy – discretion vs. commitment    | Gali Ch. 5*                                                             | MBH      |
|          |         | Clarida-Gali-Gertler (1999)*                           |                                                                          |          |
| 13.3 or 15.3 | S4   | The firm problem                                        | Problem set 4                                                           | ECH      |
| 15.3     | 8       | Optimal monetary policy - discretion vs. commitment     | Clarida-Gali-Gertler (1999)*                                           | MBH      |
|          |         | Woodford (1999, section 4, Timeless Perspective)         |                                                                          |          |
| 22.3     | 9       | Monetary policy in Norway                               | Norges Bank MPR 1/2018*                                                | Pål Ulvedal |
|          |         | Norges Bank Watch Report 2018*                          |                                                                          |          |
| 3.4 or 5.4 | S5   | The Canonical New-Keynesian Model                       | Problem set 5                                                           | ECH      |
| 10.4 or 12.4 | S6  | Optimal Policy                                          | Problem set 6                                                           | ECH      |
| 12.4     | 10      | The exchange rate channel                               | Gali Ch. 8*                                                             | MBH      |
|          |         | Bernanke-Gertler (1995)*                                |                                                                          |          |
|          |         | Bernanke-Gertler-Gilchrist (1999)                       |                                                                          |          |
| 17.4 or 19.4 | S7  | The financial accelerator                              | Problem set 7                                                           | ECH      |
| 19.4     | 11      | Unconventional monetary policy – zero lower bound, forward guidance and quantitative easing | Woodford (2012)*                                                       | MBH      |
|          |         | Introduction in CEPR e-book on SS                      |                                                                          |          |
|          |         | Introduction in CEPR e-book on FG                      |                                                                          |          |
|          |         | Introduction in CEPR e-book on QE                      |                                                                          |          |
|          |         | Eggertsson-Woodford (2003)                             |                                                                          |          |
|          |         | Eggertsson-Krugman (2012)                              |                                                                          |          |
|          |         | McKay-Nakamura-Steinsson (2016)                        |                                                                          |          |
| 24.4 or 26.4 | S8   | Unconventional monetary policy                          | Problem set 8                                                           | ECH      |
| 03.5     | 13      | Summary, wrap up                                        |                                                                          | MBH      |

* required reading
Some Advice

HOW to do well in this course?

▶ Study hard! The hard parts of this course are math and the interpretations
  ▶ First, work hard to understand the math. The core methods are:
    ▶ dynamic optimization
    ▶ log-linearization
    ▶ method of undetermined coefficients
  ▶ Then, once you have a grasp of the math. Work a lot on the interpretations. This is where you start understanding monetary policy.

WHY do well in this course?

▶ Good investment in general, but an extremely valuable investment if you want to work in central banking
Norges Bank Case-NM

- National case competition in macroeconomics/monetary economics among bachelor/master students at Norwegian institutions
- Video
- See Case-NM for more info
- Semi-final: Feb 28th in Oslo
- Final: March 14th and 15th at Norges Bank
- Prize: a seat at the annual address of the governor + dinner

Let me know if you plan to participate and I will help preparing you.
Outline

1. What is monetary economics?
2. Some history of monetary economics and monetary policy
3. The current monetary policy situation
4. Some stylized facts about monetary policy
What is monetary economics?

Monetary economics analyzes the relationship between real and nominal variables.

Real variables
- Real GDP
- Real interest rate
- Real wages
- Real exchange rate
- Unemployment

Nominal variables
- Nominal interest rate
- Nominal wages
- Nominal exchange rate
- Inflation
- Money supply
What is Monetary Policy?

- Monetary policy is the study within monetary economics of how central banks (should) conduct monetary policy.
- What effects does the nominal interest rate change have on the real economy?
- Why do central banks change the nominal interest rate?
- We need to understand
  - the *transmission mechanisms of monetary policy*
  - the *goals* of central banks
Q1: What are the transmission mechanisms of monetary policy (nominal interest rate changes)?

- Households (substitution, income, wealth, cash-flow)
- Expectations
- Firms (financing costs / expectations)
- Exchange rates
- Financial (financial accelerator / credit channel)
- And possibly other channels?

In addition: unconventional monetary policy
Q2: What are the goals of central banks?
Q2: What are the goals of central banks?
A Brief History of Monetary Policy Regimes

There are many ways to preserve the value of money.

Where are we today? And why are we here?
The Gold Standard (pre-1929)

**Monetary policy regime**
- The silver/gold standard
- All currencies pegged at a fixed parity
- Central banks adjusted the interest rate to defend the peg

**Theoretic framework**
- The price-specie-flow mechanism (Hume)
- ”The rules of the game”
- The quantity theory of money

**Main advantage:** trade friendly

**Main drawback:** asymmetric adjustments, worker unfriendly
Interim period (1930s)

The gold standard collapsed. During the Great Depression, imbalances between countries led to tensions in the global capital markets. One after another, countries dropped the peg:

- 1931: the UK, Scandinavia ++
- 1933: the US
- 1935: France ++
The Bretton Woods (1945 - 1971)

Monetary policy regime
- USD pegged to gold, all other currencies pegged to USD ±1%
- IMF responsible for temporary lending to shield countries against short-term imbalances

Theoretic framework
- Same as above
- 1960s - 70s: the IS-LM / AD-AS models and the Phillips curve
The collapse of the Bretton Woods

Again, long-term global capital flow imbalances is the culprit.

- The USD, the world reserve currency, experienced high demand. This made it easy for the US issue bonds and sell them abroad, thus threatening the convertibility to gold.
- The US borrowed substantially during the 1960s (Vietnam war ++)
- Mlynarski-Triffin dilemma
- Eventually, USD-gold convertibility was no longer credible and Nixon suspended it in 1971.
Stagflation in the 1970s

The US experienced both high inflation and high unemployment in the 1970s, a break-down of the Phillips curve.

New focus in economics: **expectations**
- The expectation augmented Phillips curve (Friedman)
- Rational expectations (the Lucas critique)

The inflation period ended abruptly with the **Volcker disinflation**: a large increase in the nominal interest rate from the late 1970s ended the high inflation period and resulted in a recession in the early 1980s.
New Models in 1980s and early 1990s

The Real Business Cycle theory:
▶ ”Microfounded” DSGE models
▶ Fully flexible prices and wages
▶ TFP shocks important (supply driven economy)

The Classical Monetary Model:
▶ Still fully flexible prices and wages
▶ Monetary policy has no effect on real variables
▶ A conflict with empirical evidence: changes in monetary policy seem to influence output and employment in the short-run
Flexible Inflation Targeting (1990s - today)

Central Banks seek to stabilize inflation and output gap.

The New Keynesian Framework

- Still "microfounded" DSGE model
- Introduces monopolistic competition and nominal rigidities in price setting, resulting in non-neutrality of monetary policy
- Classical long-run properties (MP neutral in the long-run)
Models in Macroeconomics

Why do we need models?
The Current Monetary Policy Situation

kahoot
Does Monetary Policy Have Real Effects?

Q: Does changes in the nominal interest rate affect the (real) economy? Is monetary policy non-neutral?

Major challenge: identify **exogenous** variation in monetary policy?

- Monetary policy is endogenous
- Monetary policy is multidimensional

Two kinds of evidence

- Narrative evidence
- Time-series evidence (with both good and bad identification)
Narrative Evidence I (Real Exchange Rate Volatility)

Figure 3: Monthly Change in the US-German Real Exchange Rate
Narrative Evidence II (The Volcker Disinflation)

Figure 2: Federal Funds Rate, Inflation, and Unemployment from 1965 to 1995

Note: The figure plots the federal funds rate (solid blue, left axis), the 12-month inflation rate (solid pink, left axis), and the unemployment rate (dashed green, right axis). Volcker disinflation period shaded in blue (August 1979 to August 1982).
Time-series evidence (VARs)

\[ Y_t = \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \ldots + B_p Y_{t-p} + \epsilon_t \]

where \( Y \) is a vector of endogenous variables, e.g. \( Y_t = [y_t, \pi_t, i_t] \).

- Used when all variables you want to study are endogenous
- The VAR includes \( p \) lags of all variables in the system
- We want to answer questions such as "how does the economy respond to a particular shock?"
- We need to identify the shocks!
Identification in Structural VARs

\[ Y_t = \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \ldots + B_p Y_{t-p} + \epsilon_t \]

where \( Y \) is a vector of endogenous variables, e.g. \( Y_t = [y_t, \pi_t, i_t] \).

To identify monetary policy shocks in a VAR-system, we need to make one of the following assumption:

1. Contemporaneous restrictions (Cholesky), typical assumptions
   - E.g. no contemporaneous effect of monetary policy shocks on other variables (e.g. output).

2. Long-run restrictions
   - The monetary policy shock is neutral in the long-run

3. Sign restrictions
   - A contractionary monetary policy shock lowers inflation and output.
Identification in Structural VARs

The assumptions above may seem innocuous, but even if we believe these, we are also making three additional assumptions

1. The VAR system contains all relevant variables.
   - Typically, monetary policy authorities rely on a wider set of information.
   - E.g. Cochrane-Piazzesi (2002) show that a Cholesky VAR interprets the interest rate reduction after 9/11 as a monetary policy shock.

2. The relationships between variables in the VAR are stable.

3. Monetary policy is one-dimensional. All effects are contained in the immediate change in the short-run interest rate.
SVAR evidence (Christiano-Eichenbaum-Evans, 2005)

Figure: Impulse responses to an expansionary monetary policy shock
Some VAR-results

- Persistent effects on real variables.
- Inflation is slow to react.
- Hump-shaped response of real variables.
- The interest rate falls for about one year.
- Real profits, real wages, and labor productivity rise.
Other Kinds of Identification

▶ Romer-Romer, 1989: *natural experiments* (6 episodes where the Federal Reserve attempted to exert contractionary influence on the economy in order to reduce inflation).


▶ Gertler-Karadi, 2015: *market movements* (surprise movement in the 3-month-ahead fed funds rate in a 30-minute window around FOMC announcements).

NB! They still assume that monetary policy is one-dimensional.
Time-series evidence (Romer-Romer, 2004)
Still

- Persistent effects on real variables.
- Inflation is slow to react.
- Hump-shaped response of output.
- The interest rate falls for about a year, and is then fairly flat.
Next Week

Readings:
- Note on log-linearization
- Gali ch. 2

Topics:
- Math I: log-linearization
- The household problem