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Monetary Economics

General Introduction

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ENSAE

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Objective of the course

- This course aims at providing an introduction to

    - the **New Keynesian** (NK) framework, from the basic NK model to extended NK models with or without financial frictions,
    - their positive and normative implications for **monetary policy** (MP) in normal times and in crisis times.

- MP is the central-bank (CB) policy of setting the supply of money or the short-term nominal interest rate to achieve macroeconomic goals.

- All of you have already followed a course on Real-Business-Cycles (RBC) models. NK models differ from RBC models in two key assumptions:

    - monopolistic competition,
    - nominal rigidities,

    which give rise to MP non-neutrality in the short term.

Main questions and lessons

- Main **questions** addressed by the course:

  - What are the real effects of MP?
  - How does the transmission mechanism of MP work?
  - What should be the objectives of MP?
  - How should MP be conducted?
  - What to think of the MP strategies adopted by CBs?
  - What to think of the unconventional MP measures taken by CBs?

- Main **lessons** of the course:

  - the importance of the private agents' expectations,
  - the importance of the natural level of output and natural rate of interest,

  in the transmission and the conduct of MP.

Threefold motivation for this course

1. The NK framework has become the workhorse for the analysis of MP (and, more generally, business cycles) in academia.

2. It is the backbone of the medium-scale models currently used or being developed at the International Monetary Fund and many CBs.

3. It has provided the theoretical underpinnings to the inflation-stability-oriented strategies adopted by many CBs.

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Simplicity vs. "realism"

- For pedagogical reasons, Part I of the course focuses on the **basic NK model**.

- This model features
  - monopolistic competition and price stickiness in the goods market,
  - perfect competition and wage flexibility in the labor market,
  - no endogenous capital accumulation.

- This model is too simple and stylised to be taken to the data, but Part II shows how to extend it in two directions to get small-scale "Dynamic Stochastic General-Equilibrium" (DSGE) models.

- Most of these extensions do not qualitatively affect the model's positive and normative implications for MP.

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Outline of the course

- **General introduction**

- **Part I: Conventional MP in the basic NK model**
    - *Chapter 1:* The basic NK model
    - *Chapter 2:* Optimal MP   Normative implications of BasicNK
    - *Chapter 3:* MP design

- **Part II: Conventional MP in extended NK models**
    - *Chapter 4:* The sticky-wages extension
    - *Chapter 5:* The small-open-economy extension

- **Part III: Unconventional MP in NK models**
    - *Chapter 6:* Forward guidance
    - *Chapter 7:* Quantitative vs. credit easing

- **General conclusion**

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The RBC revolution

- In the 80's, **RBC models** became the main framework for the analysis of macroeconomic fluctuations (Kydland and Prescott, 1982).

- The canonical RBC model can be viewed as the Cass-Koopmans-Ramsey growth model adapted to business cycles, i.e. with
    - endogenous labor supply,
    - exogenous shocks.

- From a methodological point of view, the RBC revolution has
    - introduced the use of DSGE models (based on micro-foundations),
    - introduced the use of rational expectations,
    - stressed the importance of the models' quantitative properties.

    Finding model parameters that make results coincide with observed data

Some implications of RBC models

1. Business cycles are **efficient**, as they are the response of a frictionless economy to real disturbances (first welfare theorem), so that there is no role for stabilization policies (unlike in Keynes, 1936).

No role for economic policies to stabilize shocks as BC are efficient in this framework (=equilibrium coincide with Social planer)

2. Technology shocks are a key source of economic fluctuations.

3. MP is quasi-**neutral in the short term** with respect to real variables (Cooley and Hansen, 1989).

4. The optimal MP is **passive** and consists in keeping the short-term nominal interest rate constantly at zero (**Friedman's rule**, 1969).

Limited usefulness of RBC models for CBs

- The RBC approach had a very limited influence on CBs because

    - <u>it could not explain the short-run effects of MP on real variables</u> (Friedman and Schwartz, 1963),
    - the <u>Friedman rule stood at odds with the MPs pursued and viewed as desirable by CBs</u>.

- So CBs went on relying on large-scale non-micro-founded models, despite their limitations for policy evaluation:

    - their vulnerability to Lucas' (1976) critique, (Not sure the effect predicted by model is accurate)
    - their lack of a welfare criterion. No micro function = no utility = no welfare crit.

- These tensions between

    - theoretical predictions and empirical evidence,
    - normative implications and policy practice,

    eventually led to the development of NK models.

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Main similarity between RBC and NK models

- Like RBC models, NK models are **DSGE models**.

- As such, they are <u>micro-founded models</u>, taking explicitly into account
    - private agents' preferences,
    - technological constraints,
    - institutional constraints.

- Their equilibrium conditions are thus   Typical of G.E models
    - the first-order conditions of the private agents' optimization problems,
    - the constraints of these problems,
    - market-clearing conditions.

- Again, <u>micro-founded models have a twofold advantage</u>:
    - they are not subject (or less sensitive) to Lucas' (1976) critique,
    - they enable one to assess the desirability of a policy from a welfare perspective.

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Main differences between RBC and NK models

Key differences b/w RBC and NK:

- Unlike in RBC models, in NK models some markets are

    - **monopolistically** (not perfectly) **competitive**, so it is private agents (not a Walrasian auctioneer) that set the price on these markets,
    - characterized by **nominal rigidities** (e.g., constraints for firms on the frequency with which they can adjust prices).

- These assumptions are borrowed from

    - static general-eq. Keynesian models (Blanchard and Kiyotaki, 1987),
    - dynamic partial-equilibrium Keynesian models (Calvo, 1983).

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Some implications of NK models

1. Economic fluctuations are generally **<u>inefficient</u>**.

   Contrasting with RBC

2. MP is **not neutral in the short term**, due to its effects on real money balances and the short-term real interest rate (themselves due to nominal rigidities).

   Contrasting with RBC / due to Nominal rigidities > real variables cannot perfectly adjust in the short-term

3. MP is neutral in the long term, as all prices and wages then adjust.

   As time goes on real variables marginally adjust and in the LT R.var will have adjusted (in the LT prices are perfectly adjust)

4. Optimal MP is **active** along the business cycle.

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Empirical evidence on nominal rigidities

On the goods market (ie prices):

- Most of the studies based on microeconomic data on **prices** point to

  1. an average price duration of 8 to 12 months, across all firms & products
  2. little synchronization of price adjustments, across firms : they do not adjust at same time
  3. substantial heterogeneity in price durations across sectors,

  both in the US and in the euro area (e.g. Taylor, 1999; Nakamura and Steinsson, 2006; Dhyne et al., 2006).

- The basic NK model can account for Facts 1-2 (see Chapter 1) and can easily be extended to account for Fact 3 (see Chapter 2).

  On the labour market:

- Several studies based on microeconomic data on **wages** provide similar evidence of nominal rigidities for wages (e.g. Taylor, 1999).

- The basic NK model can easily be extended to account for nominal-wage stickiness (see Chapter 4).

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Empirical evidence on MP non-neutrality

- To provide empirical evidence on **MP non-neutrality**, one needs to identify _exogenous_ MP changes (called MP shocks).
  Intricate effect in the data : MP instrument may affect RV but it may also be set in reaction to the state of RV !!

- Most studies have used structural vector auto-regressions (SVARs) to identify MP shocks.

- For instance, Christiano, Eichenbaum and Evans (1999) identify MP shocks in a SVAR by assuming that

    - the Federal Reserve sets its policy rate as a function of past variables and current output, inflation, and commodity prices,

    - neither output, nor inflation, nor commodity prices respond contemporaneously to MP shocks. > Hyp to identify B0

- They find that, following an exogenous increase in the interest rate,

    - output gradually declines before reverting to its initial level,

    - inflation hardly moves for a while and then declines,

    - money declines persistently (which is called the "liquidity effect").
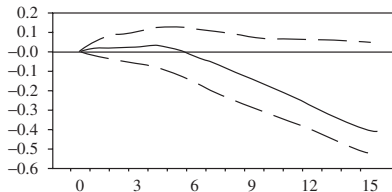
Estimated dynamic responses to a MP shock

Estimate effects on deviation from steady state (constant value taken by variable without shock)
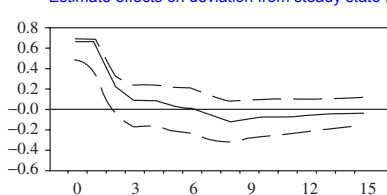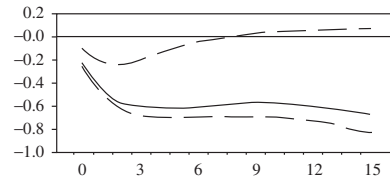

Federal Funds Rate
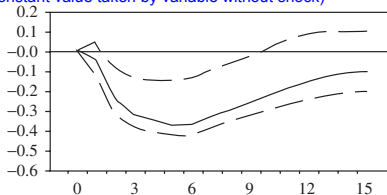
GDP = real variable > seem to have
a significant effect
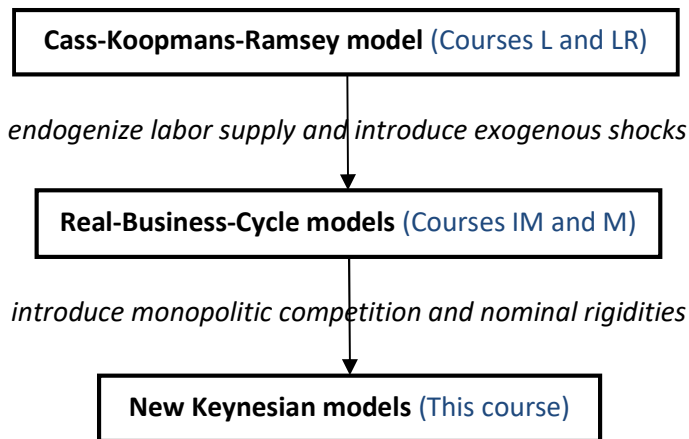> In favour of MP-Non neutrality

GDP Deflator

M2

Source: Christiano, Eichenbaum and Evans (1999).

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Prerequisite courses at ENSAE and in the MiE

Title	Professor(s)	Code	Program	Year	Semester
Macroeconomics 1	O. Loisel	L	ENSAE	Y2	S1
Economic Growth	G. Lukyanov A. Riboni	LR	MiE	M1	S1
Macroeconomics 2: Fluctuations	E. Iliopulos F. Malherbet	IM	ENSAE	Y2	S2
Business Cycles	J.-B. Michau	M	MiE	M1	S2

Link with these courses

Cass-Koopmans-Ramsey model (Courses L and LR)

endogenize labor supply and introduce exogenous shocks

Real-Business-Cycle models (Courses IM and M)

introduce monopolitic competition and nominal rigidities

New Keynesian models (This course)

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Main references for the course

Chap.	Main references
1	Clarida, Galí, and Gertler (1999), Galí (2015, C3), Walsh (2010, C8), Woodford (2003, C4)
2	Galí (2015, C5), Walsh (2010, C8), Woodford (2003, C6-C7), Woodford (2011)
3	Blanchard and Kahn (1980), Clarida, Galí, and Gertler (2000), Galí (2015, C4), Galí (2011), Walsh (2010, C8), Woodford (2003, C7-C8)
4	Erceg, Henderson, and Levin (2000), Galí (2015, C6), Woodford (2003, C5)
5	Clarida, Galí, and Gertler (2001), Galí (2015, C8), Galí and Monacelli (2005), Walsh (2010, C9)
6	Eggertson and Woodford (2003)
7	Cúrdia and Woodford (2011)

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About the (first-session) exam

- The exam will be written and will last two hours.

- The examination paper will be in English, and you will have to answer in English.

- The exam will consist in an exercise and a commentary on a text (typically an excerpt from a central-banker speech).

- The paper version of the course's presentation slides (with or without manuscript annotations, on the slides or on separate sheets of paper), as well as bilingual dictionaries, will be allowed during the exam.

- The examination papers of the last three years are available on "Pamplemousse".

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Other practical information

- The second-session exam is typically of the same kind as the first-session exam, but lasts only one hour.

- The course has eight three-hour lectures, starting on December 6, 2022, and ending on January 13, 2023.

- All lectures take place on Tuesdays and Fridays from 9.00am to 12.15am.

- The course's presentation slides are available in electronic version on "Pamplemousse".

- Questions are welcome, either during lectures and lecture breaks, or by email (olivier.loisel@ensae.fr).