ECN 7059 Macroéconomie avancée

Lecture 1: Is there a role for macroeconomic policy?

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Lecture 1

Plan of Lecture 1 :

Syllabus

1) Concepts and methods for normative macroeconomics

   a) Is there a role for macroeconomic policy ?

Syllabus

- Taught by : Guillaume Sublet
- Hour of availability :
  Guillaume is available Fridays from 11 :30 to 12 :30 in the classroom or on Zoom (link posted on StudiUM)
- Courriel : guillaume.sublet@umontreal.ca
  Include ECN7059 in the subject line of the email, response within 24h

Syllabus

Homework, Problem sets, Intra and Final exam

- Homework :
  - each week, at the end of the course, you will select a paper related to the course and prepare a 20 minutes presentation (12 slides maximum) for the next week.
  - Upload your presentation on StudiUM by Thursday evening (10 pm) in the folder "Presentations for week ..."
  - One of you (randomly chosen) will present and we will take 10 minutes to discuss the presentations
- Problem sets : two of them, due October 15th and December 3rd, each worth 15% of the grade
- Exams : Intra on October 29 is worth 30% and final on December 17 is worth 40%

Syllabus

Guidelines for presentations

Present *your* understanding (i.e. do not copy-paste the paper).

If you can relate it to what we learnt in class, please do it.

It is not a test. The objective is to improve our understanding of economics and develop our presentation skills.

Some guidelines (free disposal) :

- What is the economic problem ?
- Is the economic problem quantitatively important ?
- Is there a role for policy ? If so, what is the role of policy ?
- What is the solution ?
- What is the economic mechanism ?
- What are the shortcomings of the paper ?

Syllabus

Presentation guidelines continued

Remarks :

- Throughout your career, you will need to present your work, let's develop this skill now
- I know this is a difficult exercise, but practice helps
- Your grade will not depend on your presentations (or only as a bonus). Again, it is not a test.
- You will present twice but need to be ready every week
- StudiUM folder : "Tricks of the trade" contains useful information on how to present and on how to write

Syllabus

1. Concepts and methods for the design of economic policy
   - 1.a) Is there a role for macroeconomic policy
   - 1.b) Ramsey approach to policy design : exogenous policy instruments
   - 1.c) Mirrleesian approach to policy design : endogenous policy instruments
     - Static theory : non-linear tax policy
     - Dynamic theory : inverse Euler equation
   - 1.d) Rules with discretion
2. Lack of commitment, time inconsistency, and recursive formulation of optimal policy design
3. Rules with discretion : applications
   - 3.a) Fiscal rules
   - 3.b) Monetary rules
4. International macroeconomics/trade

Introduction

Question 1 :
Is there a role for the government ? If yes, then what is the role of the government ?

Examples where there is a role for the government :

- corrective taxation to address inefficiency (e.g. pollution)
- finance public good (e.g. finance social security, the military)
- redistribution (e.g. insurance against bad luck, reduce inequality)
- raise tariff "beggar-thy-neighbor" in an international context

Introduction

First Welfare Theorem : If markets are complete, that is

- no externalities, no public goods
- perfect competition
- no asymmetry of information
- perfect enforcement of contracts
- agents behave rationally

then a competitive equilibrium allocation is Pareto efficient.

Exercise : *Suppose that you study an economy for which the First Welfare Theorem applies. What does this tell you about the role for policy ?*

Introduction

Question 2 :
What policy tools does the government have access to ?

- linear tax (e.g. VAT)
- non-linear tax (e.g. income tax)
- quantity restrictions (e.g. quota, cap on loan-to-value ratio)
- lump-sum tax

The tools available to the policy maker depends on what the government observes.

Exercise : *For each policy tool above, what does the government need to observe to be able to implement it ?*

Introduction

Second Welfare Theorem : Any Pareto efficient allocation can be reached by a competitive equilibrium of a complete market economy with lump-sum taxes.

Exercise :

- *Suppose that you study an economy for which the Second Welfare Theorem applies. What is the takeaway for policy design ?*
- *Why aren't lump-sum taxes more prevalent ?*

Positive vs Normative economics

Positive analysis : how does the economy work ?

- Example : if the government were to raise taxes on the top 1% of income, what would be the effect on labor supply ?
- Example : if the Canadian government were to lower the tax on business income, what would be the effect on entrepreneurship ?
- Need a model to assess the effect of counterfactual policy

Positive vs Normative economics

Normative analysis : how should the economy work ?

- Example : what is the optimal income tax schedule ?
- Example : what is the optimal taxation of business income ?
- Need a model to evaluate different policies and find the optimal policy
- Need a welfare criterion to evaluate different allocations ; e.g. maximize the average utility (utilitarian), maximize the utility of the worst off (Rawlsian)

Plan

This lecture elements of welfare economics :

1.a) Is there a role for macroeconomic policy

Readings :

- Mas-Colell Whinston and Green *Microeconomic Theory*, Chapter 22 A-D "Elements of Welfare Economics"
- Chari Kehoe (2006) "Modern Macroeconomics in Practice : How Theory is Shaping Policy" *JEP*
- Saez Stantcheva (2016) "Generalized Social Marginal Welfare Weights for Optimal Tax Theory" *AER*
- Boerma McGrattan (2020) "Quantifying Efficient Tax Reform" *working paper*

Economic environment

- There is a set I of households each with utility function over consumption and labor :

$$\sum_{t=0}^{\infty} \beta^t u(c_t, n_t)$$

- One final good (consumption can be invested and capital can be consumed) and labor
- Endowment of one unit of labor every period and $K_0 > 0$.
- Technology : labor and capital are combined to produce a final good $zf(K, N)$
- *Definition* : The set of *feasible* allocations is

$$\left\{ (c_t^i, n_t^i)_{i \in I} \middle| \int c_t^i di + K_{t+1} - (1-\delta)K_t \leq z_t f\left(K_t, \int n_t^i di\right) \text{ and } K_t \geq 0 \right\}$$

Utility possibility set

The utility possibility set is the set of all profiles of utility for the households of the economy that can achieved with a feasible allocation of ressources.

Definition : Utility possibility set

$$\left\{ (U^i)_{i\in[0,1]} \middle| \text{there exists } (c_t^i, n_t^i)_{i\in I} \text{ feasible and } U^i \leq \sum_{t=0}^{\infty} \beta^t u(c_t^i, n_t^i) \right\}$$

Efficiency and constrained efficiency

- *Definition* : an allocation is **efficient** if there is no other feasible allocation that Pareto dominates it ; that is there is no other feasible allocation that makes everyone at least as well off and someone strictly better off.

- *Remark* : efficiency relies only on the environment which characterizes what allocations are feasible (preferences, technology, endowments, information). It does not depend on the market structure (budget constraints and availability of assets, collateral constraints)

- *Definition* : for a given market structure, an allocation is **constrained efficient** if there is no other feasible allocation that satisfies budget constraints at market clearing prices and Pareto dominates it.

  In other words, the social planner faces the same constraints as the market faces in allocating resources.

Social Welfare Function

Definition :
A *Social Welfare Function* is a function that aggregates the utility of households into one number :

$$W : (u_i)_{i \in I} \mapsto \mathbb{R}$$

Remarks :

- The social welfare function represents the preferences of society over the distribution of utility, and hence of resources, in society.
- The concavity of the function W is a related to society's aversion to inequality (just like the concavity of the utility index in expected utility theory is related to aversion to risk).

Examples of Social Welfare Functions

Suppose $I = \{1, 2\}$

- Utilitarian :
$$W(u_1, u_2) = \frac{1}{2}(u_1 + u_2)$$

- Generalized utilitarian :
$$W(u_1, u_2) = w(u_1) + w(u_2)$$
for w increasing concave. A special case is the weighted average of utility (weighted utilitarian) :
$$W(u_1, u_2) = \omega u_1 + (1 - \omega)u_2$$
where $\omega \in [0, 1]$ is the welfare on household 1 in society's preferences

- Rawlsian : all welfare weight on the household with the lowest welfare :
$$W(u_1, u_2) = \min(u_1, u_2)$$

Welfare criteria with representative agent

Exercise : *Consider the Neoclassical Growth Model. The government would like to design the optimal taxes and debt policy to finance some exogenous government expenditures. To be able to talk about optimal taxation, we need to agree on a welfare criterion. What Social Welfare Function would you use ?*

(Hint : How many households are there ? Are there any distributional considerations ?)

Welfare criteria with heterogenous agents

Exercise : *Consider a two agents economy with utility* $\sum_{t=0}^{\infty} \beta^t u(c_t, n_t)$ *and production technology* $f(k, n)$. *In equilibrium, the first agent consumes and works* $(c_{1t}, n_{1t})_{t=0}^{\infty}$. *The second agent consumes and works* $(c_{2t}, n_{2t})_{t=0}^{\infty}$. *There is a representative firm which makes profits* $(\pi_t)_{t=0}^{\infty}$ *and the equilibrium path of capital is* $(k_t)_{t=0}^{\infty}$. *Write down the weighted utilitarian social welfare function, the utilitarian, and the Rawlsian social welfare functions. Discuss the preferences underlying these*

Social optima and reforms

- *Optimal policy* : a policy that maximizes the social welfare function subject to the constraint that the profile of utility is in the utility possibility set.

- *Pareto improving reform* : a policy such that no one is worse off and at least one agent is strictly better off relative to a benchmark allocation.

- *Kaldor-Hicks improving reform* : a policy such that there exists lump-sum transfers after which no one is worse off and at least one agent is strictly better off relative to a benchmark allocation.

Exercise on social optima and reforms

Exercise :

- If a policy is a Pareto improving reform, is it necessarily an optimal policy ?
- If a policy is a Pareto improving reform, is it a Kaldor-Hicks improving reform ?
- If a policy is a Kaldor-Hicks improving reform, is it a Pareto improving reform ?
- If the current policy is not optimal, does it imply that there exists a Pareto improving reform ?
- If the current policy is not optimal, does it imply that there exists a Kaldor-Hicks reform ?

(Hint : use an example with a utility possibility set as we did in class to illustrate your answer.)

Policy design

Dual formulation

The design of policy is a central theme of this course. It can be abstractly formulated as follows :

1. Specify the economic environment, a social welfare function W, and the policy tools available. The set of policies available is denoted $\mathcal{P}$.
2. Define an equilibrium *given a policy* $P \in \mathcal{P}$. Denote by $E(P)$ the set of equilibrium allocations associated with policy $\mathcal{P}$.
3. The optimal policy maximizes social welfare evaluated at the utility profile of the equilibrium allocation given the policy :

$$\max_{P \in \mathcal{P}} \quad W\left((u_i(x_i))_{i \in I}\right)$$
$$\text{such that : } (x_i)_{i \in I} \in E(P)$$

This formulation of the design of policy, where we optimize over policies, is called the *dual approach*.

Policy design

Primal formulation

The design of policy as formulated as in the dual approach can be hard to solve. It is common to rewrite the problem in a different form, called the *primal approach* where we optimize directly over allocations and then recover the policies which implement this allocation as an equilibrium.

Primal approach :

1. Establish an equivalence between an equilibrium given a policy and a set of equations that depends on allocations only. The equations are called *implementability conditions*
2. The primal formulation of the problem is :

$$\max_{(x_i)_{i\in I}} \quad W\left((u_i(x_i))_{i\in I}\right)$$

such that : $(x_i)_{i\in I}$ satisfies the implementability conditions.

Plan

Next Lecture, we will formulate the design of taxation of capital and labor in the Neoclassical Growth Model with a public sector in the dual approach, derive implementability conditions to solve the equivalent primal formulation.

1.a) Is there a role for macroeconomic policy ?

1.b) **Ramsey approach**

- Reading (Kocherlakota Chapter 2)

1.c) Mirrleesian approach

- Readings for static environment (Mas-Colell Winston Green, Chapter 23 Sections A,B,D,E,F and Salanié Chapter 2)
- Reading for dynamic environment (Kocherlakota Chapter 3)
- Also Ljungqvist Sargent Chapters 19, 20, and 21