CEGE0016 Topic Notes

UCL

HD

October 3, 2022

Contents

Chapter 1

Introduction

1.1 Module Introduction

1.1.1 Teaching Team

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1.1.2 Assessment

Assessment Type	Description	Weighting
Quiz	Three multiple-choice quizzes **over the course of the module**, to be turned in within **24 hours**	15% (3 x 5%)
Course Project	Written report and recorded presentation on a project to be set **halfway through the module**, to be completed in **6 weeks**	40%
Individual Exercise	Written set of questions **completed in examination conditions**	45%

Figure 1.1: Module Assessment.

1.1.3 Timeline

Lecture Number	Date	Lecture Topic	Assessment Set	Assessment Due
1	3rd October 2022	Introduction to Module; Public Economics		
2	10th October 2022	Public Goods and Externalities		
3	17th October 2022	Techniques for Project Evaluation	**Quiz 1 set Wednesday 19th October 12pm**	**Quiz 1 due Thursday 20th October 12pm**
4	24th October 2022	Cost-Benefit Analysis	**Quiz 2 set Wednesday 26th October 12pm**	**Quiz 2 due Thursday 27th October 12pm**
5	31st October 2022	Guest lectures on HS2 and the Lower Thames Crossing; Introduction to Course Project	**Course project set Monday 31st October in class**	**Course project presentation due Monday 12th December in class; Course project report due Friday 16th December at 5pm**
		----------------------Reading Week----------------------		
6	14th November 2022	Companies and Financial Accounting	**Quiz 3 set Wednesday 16th November 12pm**	**Quiz 3 due Thursday 17th November 12pm**
7	21st November 2022	Project Planning Financial Project Planning		
8	28th November 2022	Risk Analysis		
9	5th December 2022	Project Management		
10	12th December 2022	Course Project Presentations	**Course project presentation delivered in class**	

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Figure 1.2: Module Timeline.

1.2 Introduction and overview of mixed economies

1.2.1 Aims

1. Understand the roles of the private and public sector in mixed economies

2. Become (re)familiar with key microeconomic concepts of consumption and production, including Pareto optimality and market equilibrium
3. Understand the trade-offs between market efficiency and equitable distribution of resources
4. Be aware of the assumptions and limitations of fundamental theorems and associated neoclassical economics

1.2.2 Economies

A simplified definition

> An area of *production, trade* and *consumption* of goods and services by different *agents*.

Agents

- Individuals and households
- Businesses
- Government

1.2.3 Mixed economies

Economies today are predominantly *mixed economies*

Private sector:

> profit-maximising firms operate in competitive markets

Public sector:

> governments/other organisations make interventions in those markets

1.2.4 Private sector

Welfare economics

> "he is in this, as in many other cases, led by an invisible hand to promote an end which has no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectively than when he really intends to promote it. (Smith 1776)

1.2.5 Public sector

Public sector aims to balence trade-offs

In particular

> efficiency of competitive markets vs. improved equity of distribution of income from regulation

Understanding the role of public sector in mixed economies first requires u s to understand operation of free-markets

1.2.6 Classical microeconomics

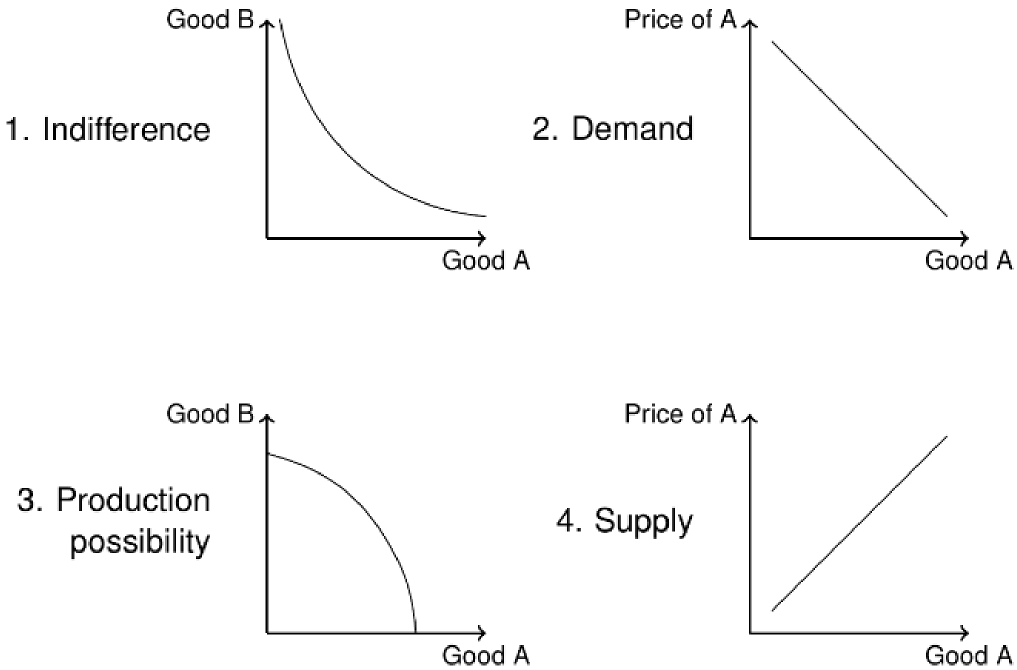

Figure 1.3: Classical microeconomic models.

1.2.7 Economic models

> "Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful" (Box and Draper 1987)

1.3 Consumer theory

1.3.1 Consumer theory: continuous goods

- J continuous goods, each good denoted by $j = 1, ..., J$
- Each good has associated price per unit p_j
  - e.g., $j = 1$ corresponds to milk, $p_j = 90$ pence/litre
  - $j = 2$ corresponds to eggs, $p_j = 16$ pence/egg
- Consider choice of agent, with total budget I
  - Assume agent represents individual
  - Individual chooses quantity q_j of each good j, subject to budget constraint

$$\sum_{j=1}^{J} \left(p_j q_j\right) \leq I \tag{1.1}$$

1.3.2 Utility

- Individual's choice of goods represented by consumption bundle Q
  - i.e. vector of q_1, ..., q_J
- Individual gets utility $U(Q)$ from Q
  - Utility represents how individuals perceived benefit from consuming/owning Q
  - Assume $U(Q)$ increases monotonically with increasing q_i

1.3.3 Choice between two continuous goods

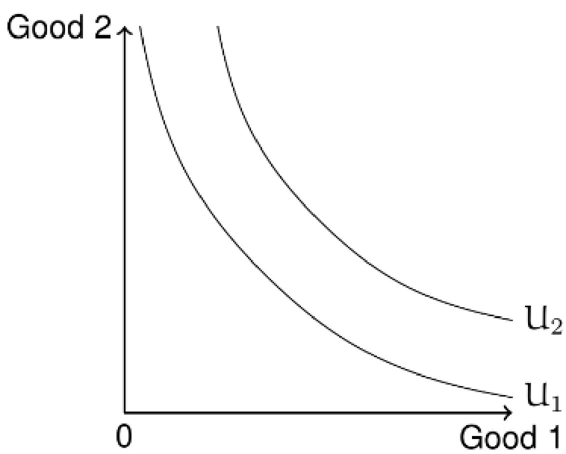

Figure 1.4

Indifference curves:

Different combinations of each good that yield same level of utility

Marginal Rate of Substitution (MRS):

Gradient of indifference curve

- i.e. how many unites of good 2 individual would substitute for 1 unit of good 1
- Assumed to be convex

1.3.4 Utility maximisation with budget constraint

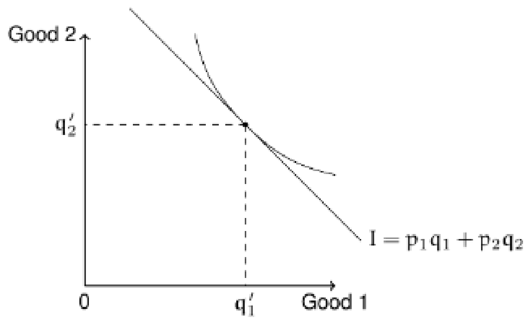

Figure 1.5

- Assume agents try to maximise utility
- Under maximal utility assumption, optimal solution when indifference curve is tangent to budget line

$$\text{MRS} = \frac{p_1}{p_2} \tag{1.2}$$

1.3.5 Trade between two agents

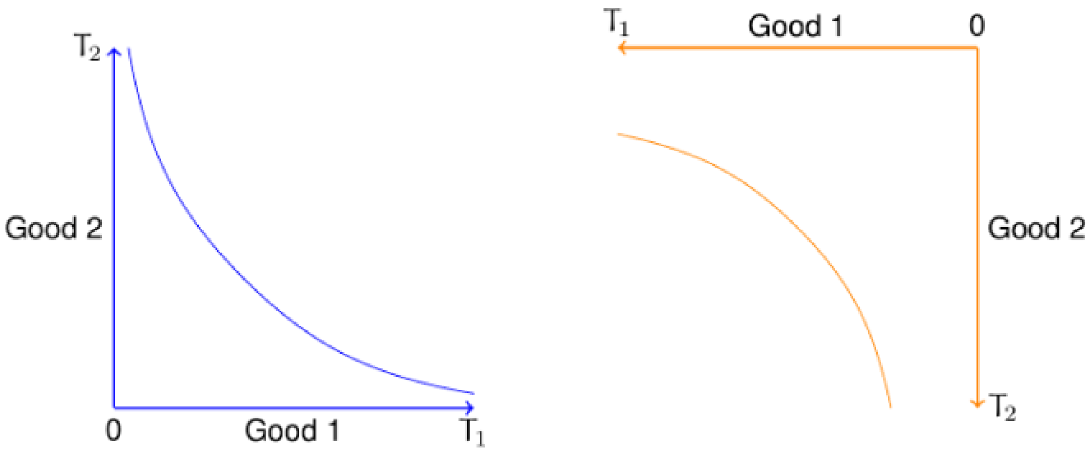

Figure 1.6

1.3.6 Edgeworth box

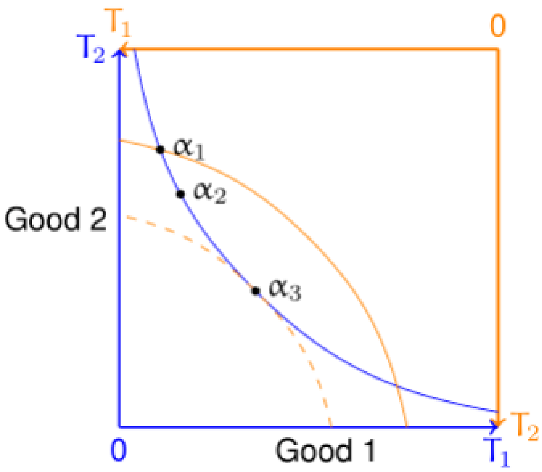

Figure 1.7

Edgeworth box:

> depicts distribution of commodities in closed economy between two agents

Pareto improvement:

> A reallocation that improves utility of of one individual without reducing anyone else's utility

- α_2 is Pareto improvement of α_1

- α_3 is Pareto improvement of α_2

Pareto optimal/efficient:

> An allocation from which no-one can improve utility without reducing someone else's

- α_3 is Pareto optimal

1.3.7 Pareto efficiency

- Pareto efficient solutions happen when indifference curves have equal gradient
- i.e. each agent has equal MRS

Pareto frontier:

> Set of all possible Pareto efficient allocations

1.4 Producer theory

1.4.1 Production of goods and services

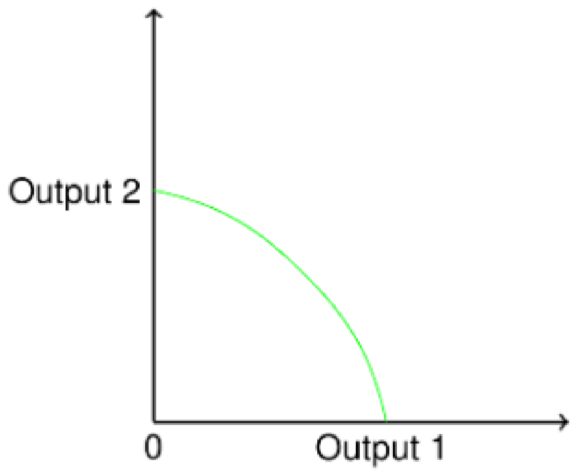

Figure 1.8

Production Possibilities Frontier (PPF):

> possible combinations of outputs (e.g. goods/services) that can be produced by economy with fixed inputs technology

- all points on PPF are production efficient: no more of one output can be produced without sacrificing the other

Marginal Rate of Transformation (MRT):

Gradient of PPF

- Measures amount of Output 2 that must be sacrificed to produced additional unit of Output 1

1.4.2 Marginal cost

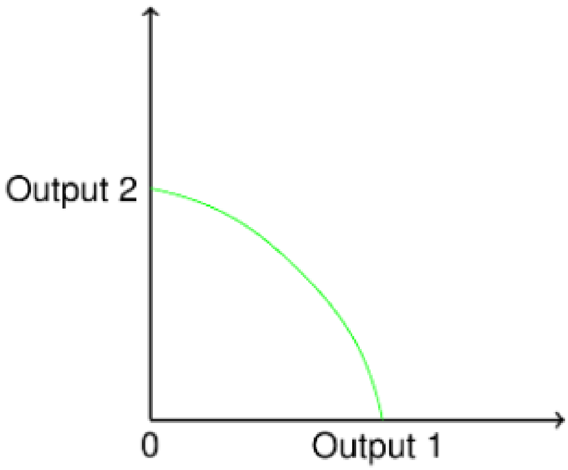

Figure 1.9

Marginal cost:

Cost of producing one additional unit of output

$$\text{MRT} = \frac{MC_{output_1}}{MC_{output_2}} \tag{1.3}$$

- PPF often assumed to be concave under certain conditions (i.e. rewards diversity)
  - Easier to obtain low-hanging fruit

1.4.3 Pareto efficient production

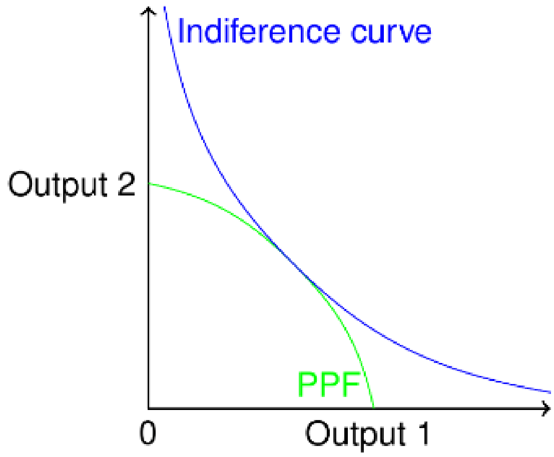

Figure 1.10

Pareto efficiency only achieved when production of goods matches consumers' willingness to pay

- Gradient of PPF matches combined indifference curve of all consumers
- i.e. MRS = MRT

1.4.4 Single market efficiency

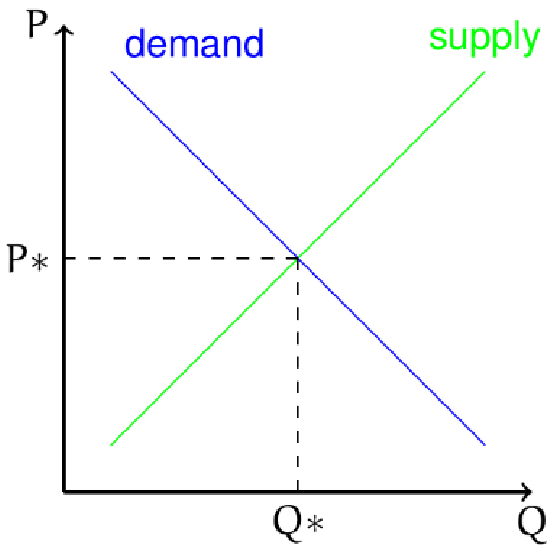

Figure 1.11

Market equilibrium occurs when supply equals demand

- marginal benefit of consumption is equal to marginal cost of production

1.5 Fundamental theorems of welfare economics

1.5.1 Competitive economies

Fundamental theorems of welfare economics

If the economy is competitive, it is Pareto efficient

1.5.2 Efficiency vs equality

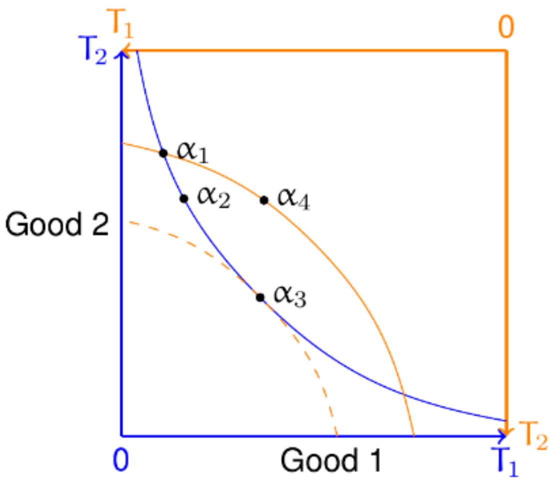

Figure 1.12

- So far, considered only efficiency of allocations
  - α_3 is Pareto efficient
- Social welfare also depends on equitable distribution of goods
- How do we choose between α_3 and α_4
  - Do we need to?

1.5.3 Wealth distribution

Fundamental theorems of welfare economics

- If the economy is competitive, it is Pareto efficient

- Every Pareto efficient resource allocation can be obtained with competitive market process with an appropriate initial redistribution of wealth

1.5.4 Efficiency and equality?

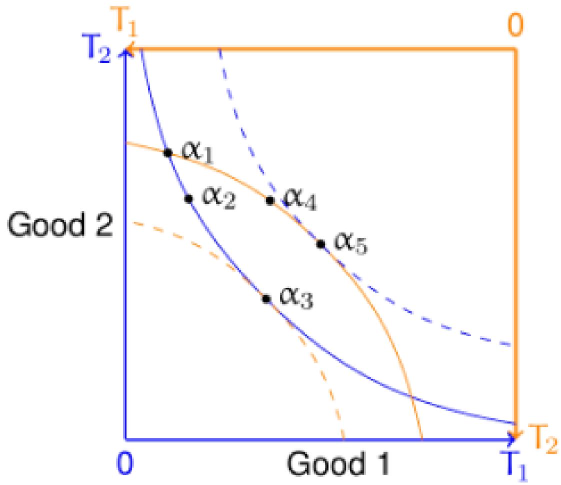

Figure 1.13

According to second fundamental theorem:

> more equitable allocation can be found through suitable assignment of initial endowments and free trade

1.6 Public sector

1.6.1 Role of government: the theory

When and how should governments make interventions in mixed economies?

According to first fundamental theorem:

> government interventions that reduce competition make economies less efficient

> Redistribute income and leave markets alone?

1.6.2 Role of government: reality

Note... Governments play an active role in all major economies, including:

- Allocation
- Distribution
- Regulation
- Stabilisation

1.6.3 Market failures

Several situations result in the failure of free markets to achieve optimal solutions. Causes include:

- existence and need for public goods
- existence of externalities
- imperfect competition
- incomplete information and uncertainty

1.7 Review and recap

1.7.1 A need for better understanding?

- Several strong assumptions
  - Individuals as rational utility maximisers
  - Equivalence of utility, value and price
  - Markets as continuous
  - Statics tastes and preferences
  - Perfect competition
- Fundamental welfare economic theory does not capture
  - unpaid labour
  - social exchange
  - long-term resilience and sustainability