

MACROECONOMICS

Sponsored by a Grant TÁMOP-4.1.2-08/2/A/KMR-2009-0041

Course Material Developed by Department of Economics,
Faculty of Social Sciences, Eötvös Loránd University Budapest (ELTE)

Department of Economics, Eötvös Loránd University Budapest

Institute of Economics, Hungarian Academy of Sciences

Balassi Kiadó, Budapest



Authors: Áron Horváth, Péter Pete

Supervised by: Péter Pete

February 2011

Week 4

One-period model

Áron Horváth, Péter Pete

Model

- Market participants
- Consumer: maximizes utility, demand consumption goods, supplies labor (time)
- Producer: maximizes profit, supplies consumer goods and demand labor
- Government?

Government

- Government spending is exogenous. The government produces goods and services to the representative consumer. However, the consumer does not make decisions about them
- Value of government services is measured by the level of government spending
- Spending is financed by tax collections. There is no borrowing because there is one period only

Government

- $G = T$, no deficit is allowed
- We postpone discussing whether this assumption is restrictive or not
- No money in the model, the government collects taxes “in kind” and consumes the goods
- Fiscal policy: a decision on the level of G (and automatically on T)

Model

- Solution: for given values of the exogenous variables (h, G, z, K) we search for the values of the endogenous variables (C, N, Π, Y, w, T) so, that players' behavior is harmonised with each other
- Operating the model: we examine how a given change in one of the exogenous variables effects the values of the endogenous one. In this respect we say: the exogenous change causes the changes in the endogenous ones

Competitive equilibrium

- The consumer chooses C and N^s to maximize her utility over her budget constraint, given w, T and Π
- Given w , the producer chooses N^d so, that with the available technology the output Y to be produced maximizes her profit

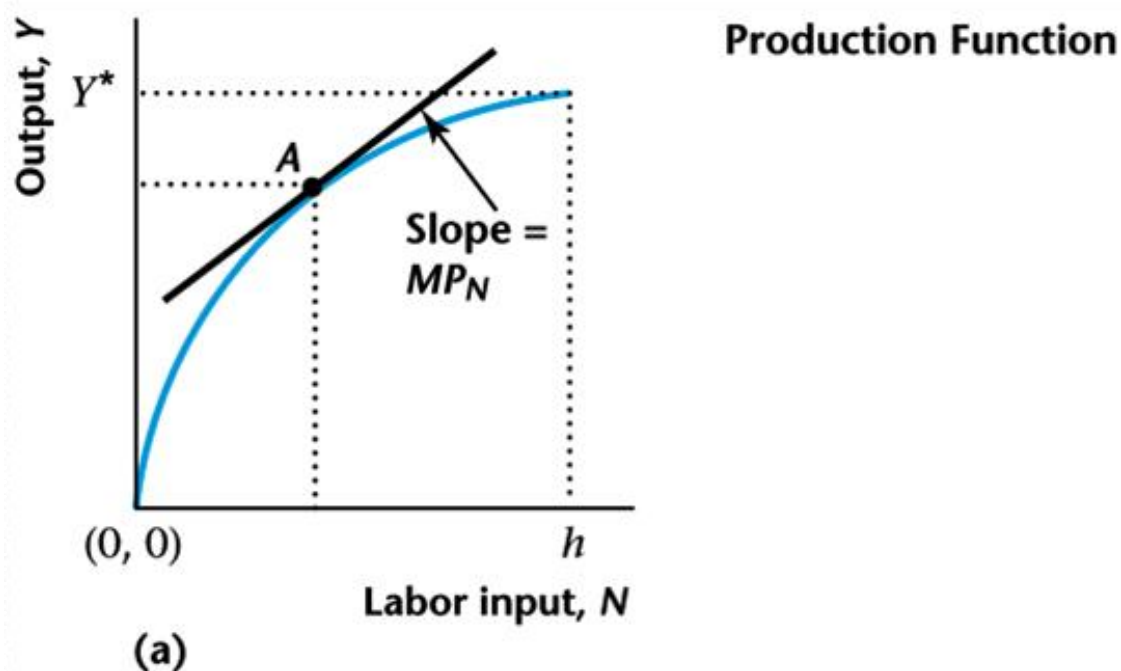
Competitive equilibrium

- The real wage w adjusts, so that the labor market clears, supply at w equals demand
- Profit of the producer is the same that dividend income that the consumer receives
- The government observes her budget constraint, $G = T$
- Constellation of variables leading to meeting the conditions above is competitive equilibrium of the model

Conclusion

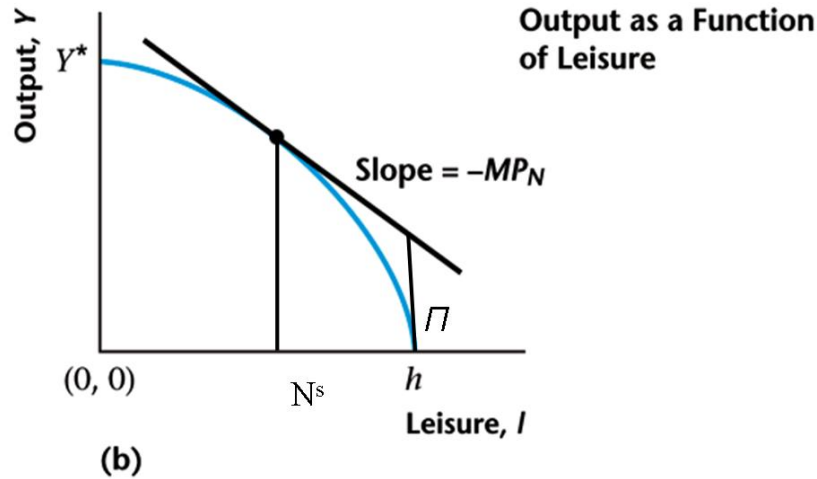
- If conditions above are all met, equilibrium in the market for goods automatically follows
- Take the definition of profit from the producer's problem and substitute into the consumer's budget constraint. Given that the labor market clears
- $C + G = Y$ follows
- Walras' law

The producer's problem



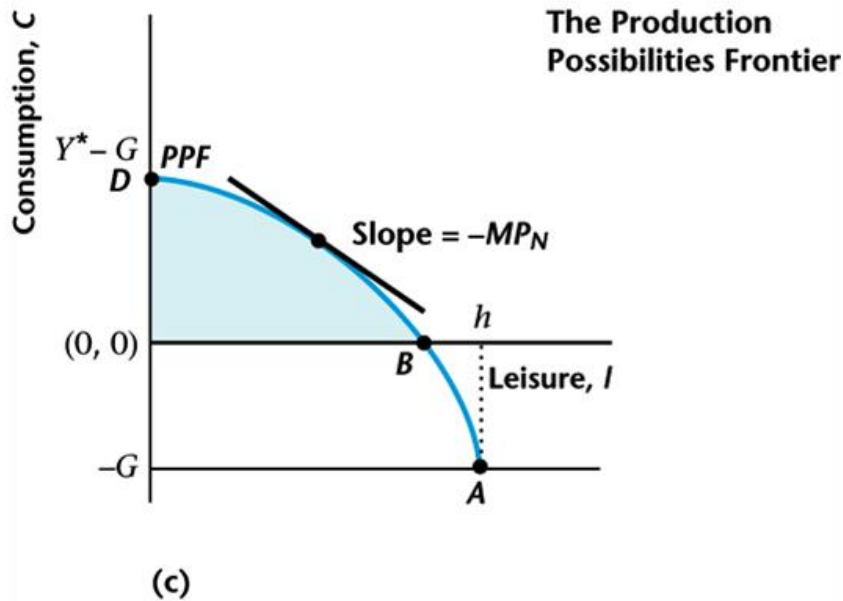
Production possibility frontier

MRT, Marginal rate of transformation, the trade off between labor time and output. It is the same as the marginal product of labor



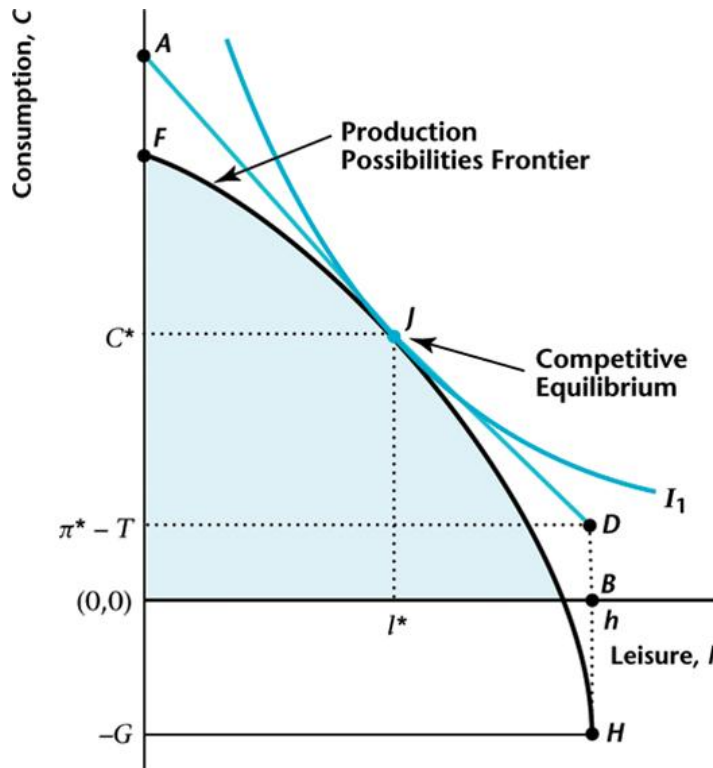
Time and output can change at the expense of each other

PPF and the government



The government takes $G = T$ portion of the output, the consumer can choose consumption in the range of DB only

Equilibrium



Calculus

In equilibrium $N^d = N^s = N$

Consumer:

$$\frac{C}{(h - N)} = w \quad C = wN^s + \pi - T$$

Producer:

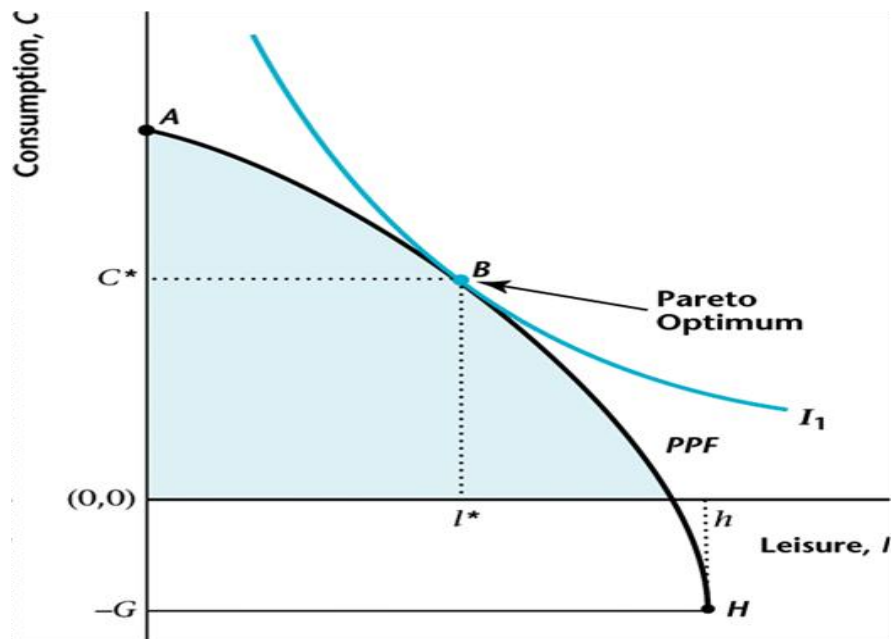
$$\frac{Z}{(1 + N)} = w \quad \Pi = z \ln(1 + N) - wN$$

Four equations to be solved for the four variables: N , C , w , and Π

Efficiency

- Efficient solution, the one that does not have a superior
- Pareto-efficiency
- Current model: there is just one consumer
- Decentralized market model versus benevolent social planner
- In case of competitive equilibrium, the two models have the same solution

The competitive equilibrium is efficient



Absent market failures, the competitive equilibrium is Pareto-efficient

The social planner's problem

$$\text{Max } U = \ln C + \ln(h - N)$$

$$C = z \ln(1 + N) - G$$

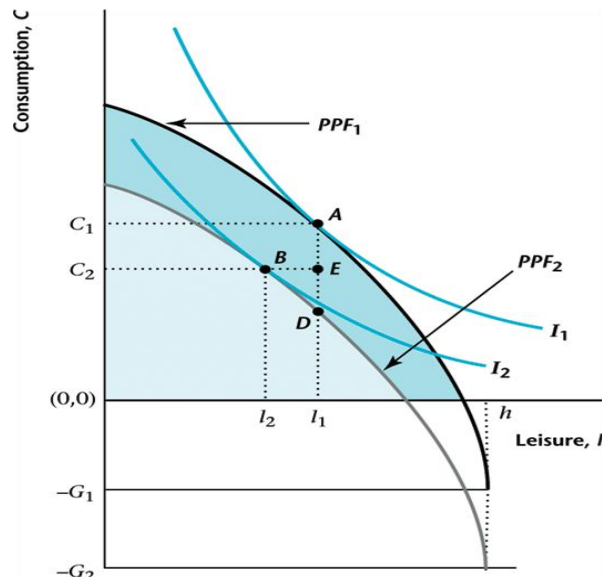
There is no social planner like that.

However, the social planner's problem is technically much easier. Therefore, if we are sure, it has the same solution as the competitive equilibrium problem, we use the easier one

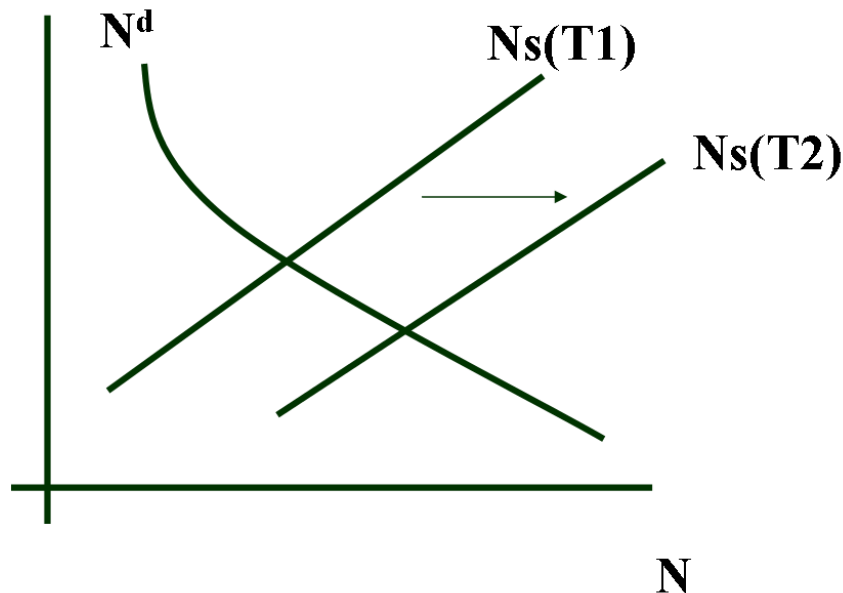
Effect of an increase in G

- An increase in G (and T) takes income away from the consumer
- A pure income effect. C as well as I are both normal goods, the consumer wants less of both of them
- Less leisure means more labor supplied
- Y increases, w decreases, C decreases. Increase of G crowds out consumption
- Crowding out is not complete

Effect of an increase of G



Labor market



Intuitive story

- Careful! The increase in Y does not happen for some demand pull effect. Output depends on w only. Direct effect on demand by G is cancelled by increase in T which is the same size
- Increase of T reduces consumer income. Therefore she values her leisure less. Increases labor supply because her resources are reduced. Output grows because labor supply grows

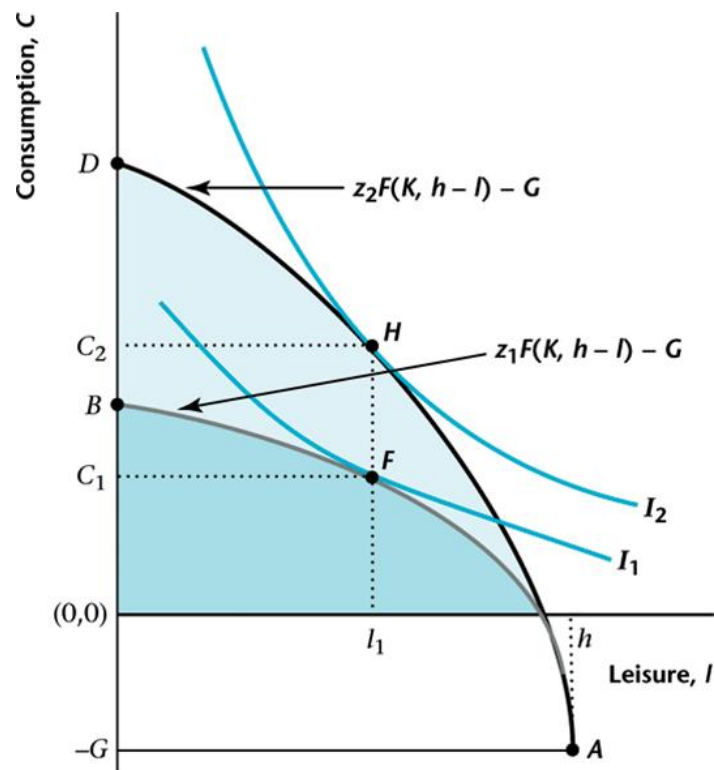
Empirical fit (USA)

- Cycle facts: C, N and w are procyclical, they move together with Y
- Model prediction: if G moves, N is procyclical, C and w are counter-cyclical
- In the US the main mover of the cycle cannot be changes in G
- Other (more open) economies may have different experience

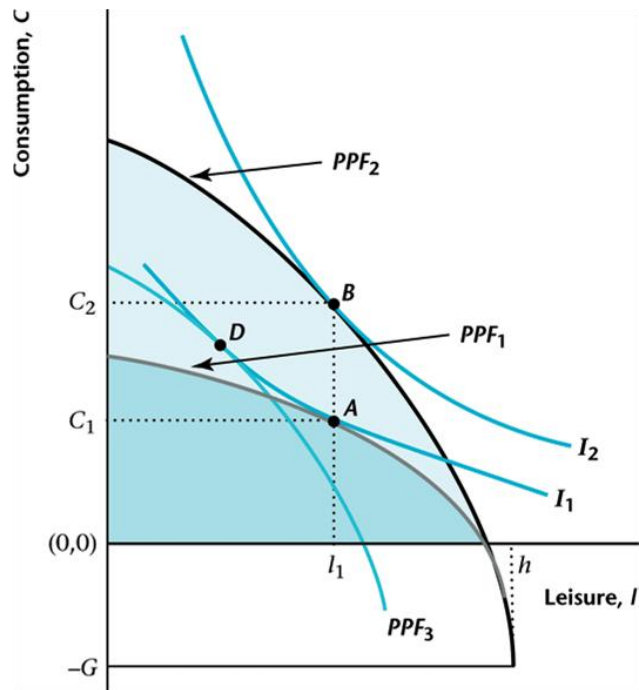
An increase in TFP

- With K and N given, output increases and the marginal product of labor also increases
- PPF shifts out and its slope increases
- Z increases, demand for leisure increases, labor supply decreases (income effect)
- W increases, demand for leisure increases, labor supply increases (substitution effect)

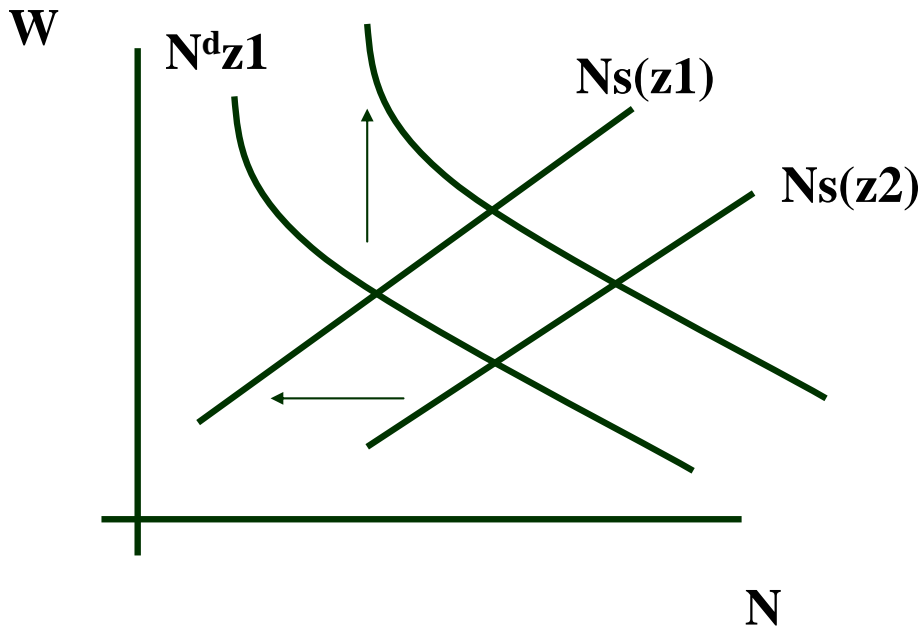
Effect of an increase in Z



Separation of income and substitution effects



Labor market



Intuitive story

- Long run (trend)
- There is secular growth in Y and C
- W also increases, hours worked per capita does not change
- Long run living standards increase due to increase in productivity
- In the long run income and substitution effect of long run increase in w cancel each other

Intuitive story

- Short run, business cycle
- Observation? C , w and N are procyclical
- The model explains movement in C and w , but not N . In the short run N should increase if Z increases
- Explanation?
- Intertemporal substitution of labor