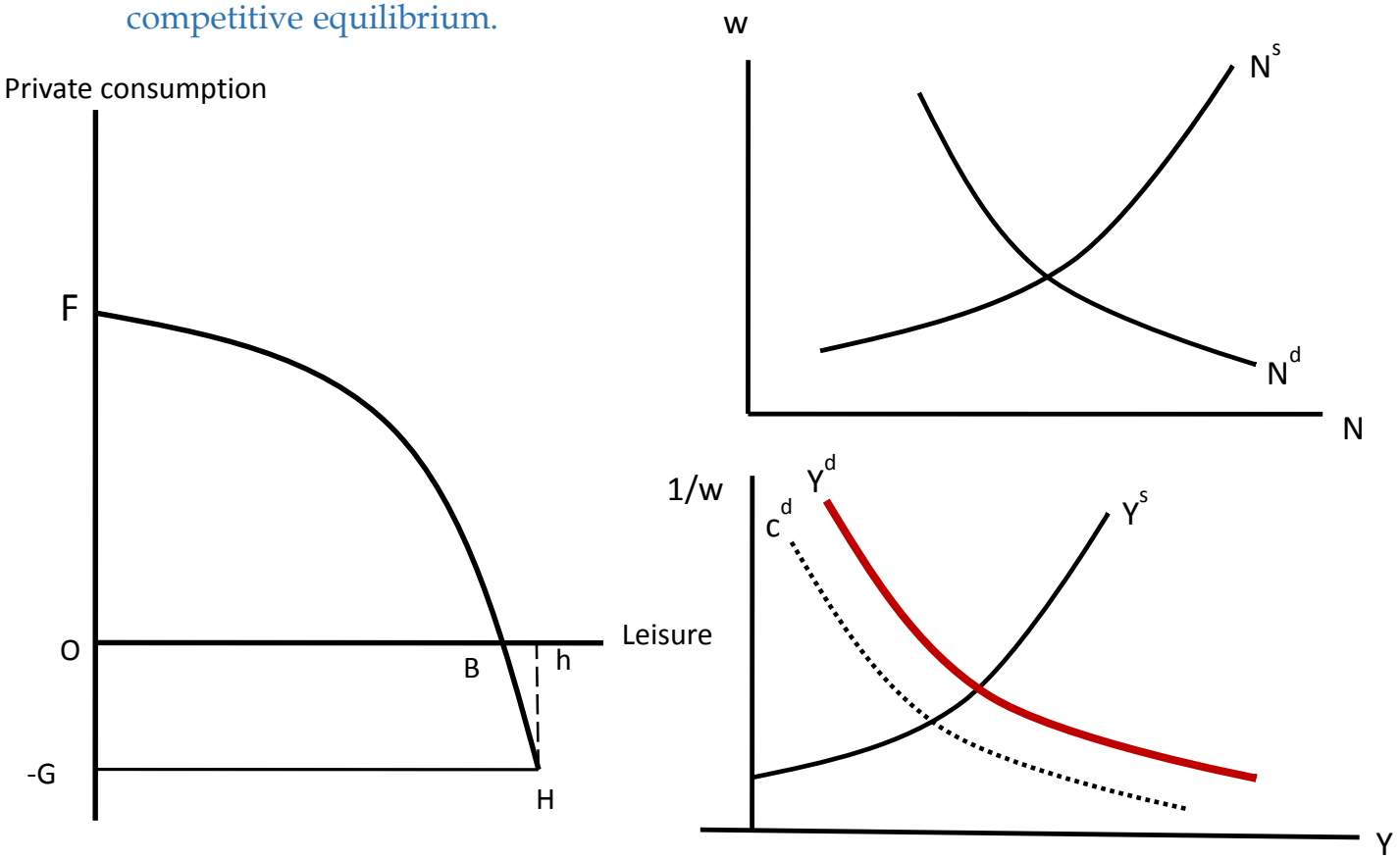
Problem sets 6: One-period general equilibrium model
EE312: Intermediate macroeconomics
Semester 2/2018
Instructor: Asst. Prof. Dr. Kittichai Saelee
Due on April 23rd, at the BE office before 3 pm.

Questions in Williamson (Use the 2017 edition)

1. *Chapter 4: Q3, Q4, Q7, Q12, Q13, and Q16*

2. Use the figures below, and redo the analysis discussed in class. Start with the opposite situation. Assume that when W = 10, the economy is experiencing *an excess demand in labor*. Locate all the points that represent the initial situation. Explain step-by-step why all the located points make sense. Then, analyze the adjustment mechanism and determine the possible competitive equilibrium.



3. *Government spending and productivity*

In class, we discuss about the case for which government spending is wasteful in the sense that households receive no benefit from the spending. In the real-world example, tax-financed spending can generate some extra benefit to the society. For example, government spending can be used for the investment on infrastructure, which can potentially raise the level of overall productivity of a nation. Use the graphical approach that we discussed in class, and consider the overall impact of an increase in government spending when the spending can raise the level of technology. Start from the initial situation and develop your own presentation step-by-step. Showing all the possible effects of an increase in government spending. Combined each effect and discuss the possibilities of the final outcomes, both equilibrium and welfare comparison. Explain what would happen to output, private consumption, leisure, real wage and household welfare. When do you expect household welfare to increase?

Optional questions (Does not require you to turn in)

Calculus of the General equilibrium

In class, we discussed about the graphical approach to the general equilibrium analysis. This exercise guides you step-by-step towards understanding the same topic using mathematical analysis. Consider a simple mathematical version of the general equilibrium model. Assume that the preference of a represent household can be given by,

$$u(C, L) = \alpha \ln(\mathrm{C}) + (1 - \alpha) \ln(\mathrm{L})$$

The budget constraint is: C = w(1 − L) - T, where T is lump-sum tax, and w is wage, both of which are measured in terms of units of output. Assume that total time endowment is normalized to 1, and hence L is expressed in term of the fractions of total time endowment. Capital is fixed at 1, and the representative firm technology is: $Y = z\sqrt{N}$

2.1) Use the optimization and find the household labor supply function. Is the quantity of labor supply always fixed?

2.2) Find the labor demand function. Is the labor demand function downward-sloping in wage?

2.3) Find expressions for the equilibrium values of the labor input and the wage. (Hint: labor market is cleared when labor demand is equal to labor supply.)

2.4) Given "T", how much does the representative worker (household) consume in the equilibrium?

2.5) Use the comparative static and show the impact of "T" on equilibrium variables, i.e. real wage, output, private consumption, working hour.

2.6) Redo the analysis in (2.1) – (2.5), with a new utility function given by,

$$u(C, L) = 2\sqrt{C} - a\frac{(1 - L)^{1.5}}{1.5}$$

What is the impact of an increase in "a" on the equilibrium variables? What does "a" capture?