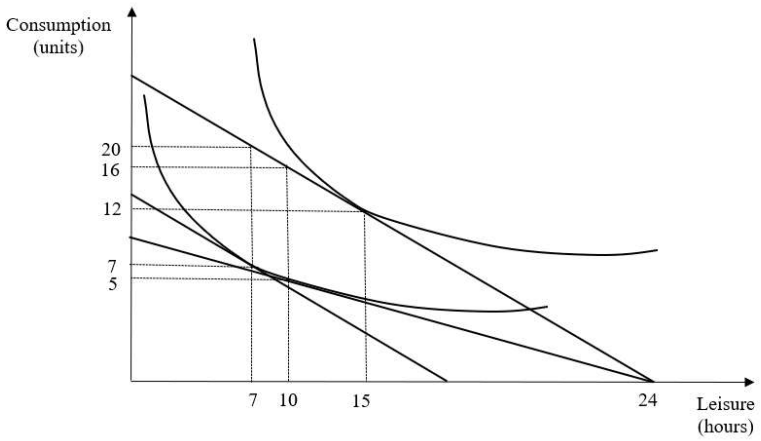
**Issues in international taxation (Prof. Parisi, academic year 2023-24)**

**Exercises: income taxation**

1. The following graph depicts the effects of a proportional income (wage) tax on labour supply for a generic individual. Calculate:
   a) the hours worked by the individual before the tax;
   b) the hours worked by the individual after the tax;

   Now decompose the effect of the tax into the income and the substitution effect. How do you interpret the efficiency effects of the tax?




   **Results**: discussion in class.

2. Consider again exercise 1. Draw the graph under the assumption that the income effect is equal to the substitution effect and discuss the effects of the income tax on labour supply.
3. Consider again data of exercise 1. Now the graph compares the effects of a proportional income tax with those of a lump sum tax on income. Compare the two tax revenue and calculate the deadweight loss of the proportional tax.

   **Results**: proportional income tax revenue = 13; Lump sum tax revenue = 11; DWL = 11.

4. Now consider exercise 3. If the income and the substitution effect are equal, can you conclude the tax is non distortionary, that is does not produce a deadweight loss? Discussion in class.

5. Consider the Earned Income tax credit for a generic individual and assume the tax credit is granted on a monthly basis. The tax credit increases the wage rate by 20% if the individual works up to 100 hours, leaves the wage rate constant if the individual works between 100 and 150 hours, then decreases the hourly wage at a rate of 10% if the individual works between 150 and 200 hours where it becomes 0. Using a graph that reports hours of work (labour) on the horizontal axis and income on the vertical axis, depict the individual's budget line before the scheme and after the tax credit (you do not need to calculate the slope precisely, you can approximate the slope of the two budget lines) and discuss the effects of the scheme on labour supply by analysing the income and the substitution effect produced by the income tax credit. Hint: the income constraint has a positive slope; the maximum number of hours is 480 (24x5x4).

   **Results**: discussion in class.

6. An individual has the following compensated supply curve: $w = 2 + H_L$, where $w$ is the wage rate and $H_L$ hours of work. Assume the before-tax wage is 10 Euros and consider the introduction of a proportional tax on wage with a rate of 20%. Calculate:
   a) tax revenue;
   b) the deadweight loss.

   How do you interpret the deadweight loss?

   **Result**: (a) TR=16; (b) DWL=2.

7. The textbook illustrates the efficiency effects of a proportional wage tax using leisure on the horizontal axis and Income (Consumption) on the vertical axis. Illustrate the effects of a proportional wage tax and its deadweight loss using labour on the horizontal axis (a bad, rather than a good) and income (Consumption) on the vertical axis. Hint: the income constraint as well as the indifference curves will be upward sloping. Why?

   **Result**: discussion in class.

8. Consider a proportional income tax with a rate of 20%. Calculate, for the following income levels, the average tax rate and the marginal tax rate: $Y_1$=10000, $Y_2$=50000, $Y_3$=100000. Is a proportional tax redistributive?

   **Results**: in all cases the ATR and the MTR is 20%; discussion in class.

9. Consider data of the previous exercise. Now assume the introduction of a fixed deduction from income of 2000 Euros. Calculate again the average tax rate and the marginal tax rate for the same income levels. Is a proportional with a fixed income deduction redistributive? How do you interpret the results?

   **Results**: MTR=20%, $ATR_1$=0,16; $ATR_2$=0,19; $ATR_3$=0,196. Discussion in class.

10. Consider a negative income tax with a statutory rate of 20% and an income deduction (exemption level) of 5000 Euros.
    (a) Represent graphically the tax function indicating the subsidy an individual with income equal to 0 receives (you need to derive the disposable income function);
    (b) calculate the marginal tax rate and the average tax rate for the following income levels: $Y_1$=10000, $Y_2$=20000, $Y_3$=50000;
    (c) is the tax schedule progressive?
    (d) What is the rationale behind a negative income tax system?

    **Results**: (a) discussion in class; (b) MTR=20%, $ATR_1$=0,10; $ATR_2$=0,15; $ATR_3$=0,18. (c) yes; (d) discussion in class.

11. Consider the following income tax schedule.

| Income bracket | Marginal tax rate |
|---|---|
| Up to 15000 | 10% |
| From 15001 to 20000 | 15% |
| From 20001 to 30000 | 20% |
| From 30001 to 50000 | 30% |
| Above 50001 | 40% |

(a) Calculate the marginal tax rate and the average tax rate for each upper value of the class (for the last backet consider an income value of 100000 Euros) and discuss if the tax schedule is progressive.
(b) Now assume the government introduces a reform that exempts income up to 15000 Euros from taxation. Will this reform make the system more progressive? Repeat calculations of point (a) to discuss this result.
(c) Draw the income tax schedule before and after the reform (you will report income brackets on the horizontal axis, the marginal tax rate on the horizontal axis). Also draw a curve that approximates the average tax rate before and under the reform and discuss whether it supports the conclusions you have reached in point b.

**Results**: (a) MTRs are defined by the tax schedule; ATRs: 0,10; 0,11; 0,14; 0,20; 0,30, therefore the tax schedule is progressive; (b) ATRs: 0; 0,04; 0,09; 0,17; 0,29, therefore the tax schedule is less progressive; (b) the MTR is 20%, $ATR_1$=0,10; $ATR_2$=0,15; $ATR_3$=0,18; yes; (c) discussion in class.

12. Consider again the tax schedule of exercise 8. Now assume an individual whose income is 35000 Euros. The system also provides a full deduction for social insurance contributions and a tax relief of 500 Euros for each dependent child. Social insurance contributions paid by the taxpayer amount to 5000 Euros and she has two dependent children. Calculate:
    (a) taxable income;
    (b) the tax due;
    (c) the marginal tax rate and the average tax rate

    **Results**: (a) 30000; (b) 3249; (c) MTR=0,20, ATR=0,11;

13. Compare the effects of a proportional income tax and a progressive flat-rate income tax; that is, one in which there is a lump-sum grant from the government of, say, 3000 Euros, and then a constant marginal tax rate on all income. In particular, show that if the two taxes raise the same revenue, utility will be higher with the proportional tax.

    **Results**: discussion in class

14. Now consider a tax on savings (interests income produced by savings). Describe the income and substitution effects of the tax for an individual who saves (you can refer to the textbook). Now consider an individual who borrows money (who does not save money…). Describe the income and the substitution effect of the individual and compare the effects of the tax with the previous case.

    **Results**: discussion in class

15. Consider the tax schedule of reported in exercise 11. Assume the maximum level of (monthly) income an individual can earn is 100000 Euros and the maximum number of hours the individual can devote to leisure (work) is 240. Draw the individual's original budget constraint and show how the line changes after the introduction of the progressive tax (report income on the horizontal axis, leisure on the vertical axis and again you can approximate the slope of the two budget lines).

    **Results**: discussion in class