Assessment guidelines SØK2011, fall 2023

This is guidelines for assessment. Thus, it is not a complete suggestion of solution. The presentation here is shorter than expected for a complete solution.

Question 1 (20%)

Briefly explain the following terms

a) *Substitution effect*

   The substitution effect follows from changes in relative prices. The effect of changes in prices can be decomposed into an income effect and a substitution effect. The substitution effect is the "pure" effect of changes in prices, for a given income.

b) *The first fundamental theorem of welfare economics*

   The first fundamental theorem of welfare economics is based on two main assumptions: There is complete competition in all markets and there exists markets for all goods. Under these assumptions, the theorem says that the outcome in the economy is a Pareto-effective allocation of resources and goods.

c) *Present value*

   The value today of a stream of income and costs in the future. Future values are discounted in order to make them comparable and express the present value.

d) *Pay-as-you-go pension system*

   A pension system in which benefits to the retirees are financed by current tax income. There er no pension funds built up based on taxes paid by the retirees.

e) *Laffer curve*

   A curve that expresses the relationship between the tax rate and the tax revenue to the state. The tax revenues are equal to zero in the case of a tax rate of zero (no taxes paid) and a tax rate of unity (no incentives to generate income). The tax revenues are positive for tax rates between zero and unity, and must thus have a maximum somewhere in this interval.

Question 2 (20%)

Why should the government provide income redistribution policies?

When the starting point is that the state should serve the inhabitants, the state's preferences must be based on the preferences of the inhabitants. The preferences of the state can be denoted the social welfare function, and it must include the utility functions of the inhabitants. It would be useful to say something about the challenges by aggregating the utility function of the individuals to a social welfare function. When the utility for an individual has a positive but decreasing impact on social welfare, smaller differences between individuals will increase social welfare. When the utility is strongly related to income, this is an argument for income redistribution. It would be useful to describe the additive social welfare function and the max-min-criterium.

Question 3 (30%)

a) *What is tax incidence?*

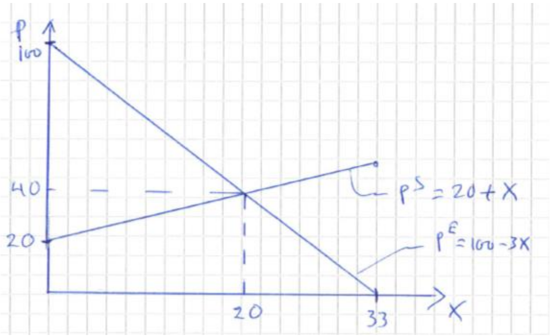
The incidence of a tax is the change in the distribution of private income induced by the tax. Who pays, in reality, the tax in terms of changes in prices after tax payment?

Consider a market with perfect competition where the demand is given by

$P^E = 100 - 3X$ and the supply is given by $P^S = 20 + X$. P is the price of the commodity and X is the quantity.

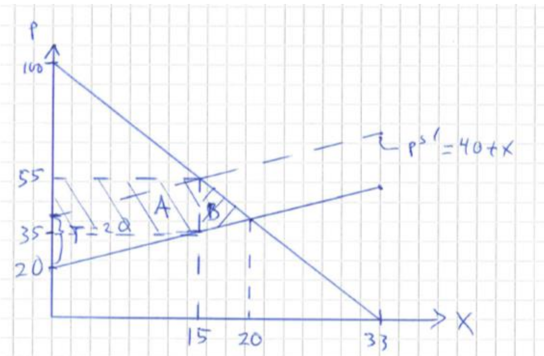
b) *Find the equilibrium in the market*

By equalizing P^E and P^S, one gets that X = 20 and P = 40. The equilibrium is illustrated in the figure.



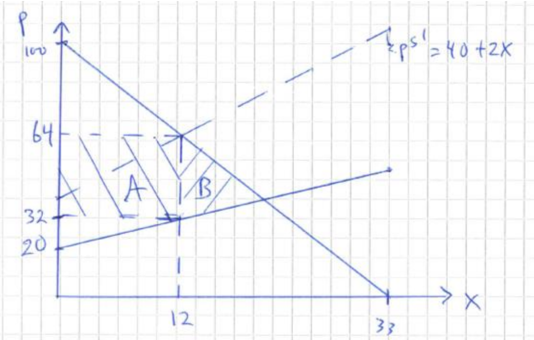
c) *The government considers introducing a tax on the commodity such that the seller must pay 20 to the state for each unit sold. Present the equilibrium in the market in a figure. What is the tax incidence, the revenue for the state, and the excess burden of the tax?*

The seller must pay the tax T = 20 to the state per unit sold, in addition to its cost of production. Thus, the supply can be written $P^S = 20 + X + T = 40 + X$. By equalizing P^E and P^S, one gets that X = 15. It follows that P = 55 and the price after tax for the seller is P – T = 35. The tax incidence is that the consumers pay 15/20 = ¾ of the tax, while the sellers pay 5/20 = ¼ of the tax. The revenue of the state is the tax per unit sold times the quantity, that is T * X = 300. The equilibrium is illustrated in the figure. The revenue of the state is the area A. The excess burden is shown in the figure as area B. The area of triangle B is given by the half of the reduction in quantity times the tax, that is ½*ΔX*T = ½*5*20 = 50.



d) *The government also considers an alternative tax such that the seller must pay to the state 50% of the price in the market. Present the equilibrium in the market in a figure. What is the tax incidence, the revenue for the state, and the excess burden of the tax?*

The seller keeps only half of the price in the market. Thus, the supply can be written $P^S = (20 + X)*2$. By equalizing P^E and P^S, one gets that 100 – 3X = 40 + 2X, which gives X = 60/5 = 12. It follows that P = 64, the price after tax for the seller is ½*P = 32, and the tax per unit is t = 32. The tax incidence is that the consumers pay (64-40)/32 = 24/32 = ¾ of the tax, while the sellers pay (40-32)/32 = 8/32 = ¼ of the tax. The revenue of the state is the tax per unit sold times the quantity, that is t * X = 32 * 12 =384. The equilibrium is illustrated in the figure. The revenue of the state is the area A. The excess burden is shown in the figure as area B. The area of triangle B is given by the half of the reduction in quantity times the tax, that is ½*ΔX*t = ½*8*32 = 128.



e) Explain the differences in tax incidence, the tax revenue for the state, and the excess between the answers of c) and d)

It is the elasticity of demand and the elasticity of supply, relative to each other, that determines the tax incidence. Given the demand and supply function, the elasticity of demand is three times larger than the elasticity of supply for all levels of X. That explains why the tax incidence is such that the buyers pay the most of the tax, and that the share of the tax paid by the consumers does not change when the tax system changes from c) to d). The tax revenue is higher in d) because the tax is higher. The tax is more than 50% higher in d) than in c) (32 vs. 20), while the tax revenue is less than 50% higher (384 vs. 300) This is because the quantity sold in the market is lower. The excess burden is, however, more than 50% higher in d) than in c) (128 vs. 50). This is because the excess burden is quadratic in the tax level.

Question 4 (30%)

This question has two alternatives. You shall answer either alternative 1 or alternative 2, and only one of the alternatives.

Alternative 1

Consider that the firms in the economy use labour and capital as inputs in production. It is a tax on the profit of the firms.

a) *How does the profit tax affect the production of the firms and their behavior?*
It is expected that it is explained that a tax on profit has no behavioral effects on firms, and therefore there is no excess burden of taxation. It is an advantage that some modifications are discussed. The probability that a firm can move to another country is perhaps the most important modification. In addition, the challenges for the tax system to use the true cost of capital might be discussed, or left to b).
b) *Explain the difference between taxation of deferred income and cash flow.*
The cash-flow (*kontantstrøm*) is money in and out of the firm during the year. Investment cost is deducted the year of investment. Deferred income (*skattemessig overskudd*) uses costs and not payment in the tax system. The challenge is to determine the cost of capital, which is the deduction (*avskrivning*) of investment. This can be elaborated by introducing the term "free income" (*friinntekt).*

The state needs to increase its revenues and the government wants to achieve it by increased taxation on firms. The government is considering introducing a ground rent tax in some industries such that the tax rate is higher in these industries than in other industries.

a) *Discuss advantages and disadvantages of the proposal. What characterizes industries that are suitable for the introduction of a ground rent tax?*
It is expected that the answer relates to the discussion in a). The main behavioural reaction on a profit tax is probably the possibility to move the production out of the country. Then the industries suitable for ground rent are industries that cannot move, for example, because they are based on local natural resources. There might be other arguments, perhaps related to restricted competition determined by the state (production based on selective licenses, *konsesjoner*), exploitation of common resources, or fairness.

Alternative 2

a) *What is a federal system?*
It might be useful to distinguish between a legal definition and an economic definition. Legally, a federal system is defined in the Constitution as autonomy of states. Economically, it is the autonomy of local governments to make independent decisions.

b) *Discuss how mobility might impact local government decisions.*
It is expected that the term Tiebout mobility is included in the answer. Since people might react to local decisions by moving out of or into the local government, there are extra costs or benefits to changes in how local public services are financed and the quality of local public services.

c) *How can the federal government influence local government decisions?*
Because of the autonomy of local governments, the federal government might either impose regulations or economic incentives. The former might be restricted by the constitution. One typical economic incentive is co-financing by the federal government (often called matching grants), which makes the local public services cheaper to provide for the local government.