Problem 1: On tax incidence (1/3)

1. Norwegian wealth owners can either invest their money in real production capital at home, or in financial assets abroad. Production at home is given by the constant returns to scale production function $F(k, l)$, where k is real capital and l labour. Both capital and labour markets are competitive. Initially there are no capital income taxes and Norwegian capitalists invest both at home and abroad. It is not possible to tax the returns to financial investments abroad. Suppose the government imposes a tax with a rate $t > 0$ on domestic capital income. Discuss the incidence of this tax, in the short term and in the long term, respectively.

Norway is a small country; Norwegian capitalists can always obtain a tax free return γ per unit of capital. If it is costless to convert physical production capital to cash the capitalists will not bear any of the capital income tax. The tax will be fully born by the residual claimants, which in this case with constant returns to scale, are the workers. After the tax there will be less capital per worker and lower wages. In the short run investments in production capital is likely to be irreversible which means that in the short run capital is less elastic and some (maybe all in the very short run) will be borne by the capitalists.

1. Suppose demand for good X is given by $Q^D = 900 - p/2$ where p is the price and Q^D the quantity demanded. Supply is given by $Q^S = p/4$.

   a) What is the market equilibrium for good X

   Equating Supply and Demand: $P/4 = 900 - P/2 \Rightarrow P^* = 1200, Q^* = 300$

   b) Suppose a $\tau = 60$ NOK tax is imposed on each unit of X that is purchased. What are the equilibrium price and quantity of X after the tax is imposed.

Nice if they mention that it does not matter who bears the statutory incidence of the tax. We add the tax on the demand side and therefore find the before tax price (faced by the supplier). $P/4 = 900 - (P + 60)/2 \Rightarrow P^D = 1160$ and $P^S = 1120$. The quantity exchanged in the market fell to 290 units, the before tax price is \$1160 and the after tax price is \$1220.

c) Compute and graphically depict the deadweight loss due to the tax in market X.

Deadweight loss is represented by a triangle. Its height is the tax of 60 and its base is the distortion in the quantity exchanged: $300 - 290 = 10$ units. $DL = (10 \times 60)/2 = 300$

d) What is the incidence of the tax? Explain the intuition for the key factors that determine the incidence.

Out of the 60NOK tax, 40 are born by consumers and 20 by producers, therefore 66% on the supply and 33% on the demand. The more inelastic side bears the largest incidence. In this case, you can see from the relative slopes, that supply is less elastic than demand.

e) Now suppose that consumers are inattentive to the tax and demand is given by $Q^D = 900 - (P + \theta\tau)/2$ where $\theta = 2/3$. Again, suppose that a tax

of $\tau = 60$ NOK is imposed on each unit of X that is purchased. How can we interpret θ?

θ represents the share of inattentive of consumers. As the Chetty et al paper shows consumers don't fully internalize sales tax. the $2/3$ coefficient implies that $1/3$ of consumers are inattentive to the sales tax.

f) Find the new equilibrium price and quantity.

$P/4 = 900 - [P + (60 \times 2)/3]/2$

$\Longrightarrow P^D = 1173.33, Q^* = 293.33$

$\Longrightarrow P^S = 1173.33 + 60 = 1233.33$

g) Suppose the government sets the tax on X based on a trade-off between efficiency and distributional concerns. The optimal tax of 60 NOK per unit was based on the assumption that θ were equal to 1. Now the government realizes that $\theta = 2/3$. Should they then reduce or increase the tax on X (explain!).

Price elasticity is lower than perceived which means that the deadweight loss is lower for the tax now so for efficiency reasons one should increase the tax. But is it correct to exploit that individuals do not pay attention to the price? And what if it is the poor and uneducated that do not keep track on the after tax price? Some discussion here.

Problem 2: ACE and CBIT (1/3)

Explain the two tax systems for corporate income taxes known under the respective acronyms ACE and CBIT. Explain why it is reasonable to assume that ACE will have a higher tax rate than CBIT. Explain how these two systems have one common feature, which may be seen as a type of neutrality, and explain why this may be seen as beneficial. Explain how the systems differ, and give some economic argument(s) in favor of either system.

Problem 3: Short questions (1/3)

1. Consider a income tax system with four tax brackets. Income below 50 000 is exempted from taxation. Income above 50 000 but below 250 000 is taxed at a rate of 20%. Income from 250 to 500 000 is taxed at at rate of 35%. Income above 500 00 is taxed at a rate of 40%. A person with no income gets 100 000 NOK in social benefits. Consider a person who is currently without work but who can get a job that pays 350 000. What is the marginal tax rate if he starts to work, and what is the participation tax rate?

The marginal tax rate is 35%. Participation tax rate is $(200 \cdot 0,2 + 100 \cdot 0,35 + 100)/350 = 50\%$

1. Define the elasticity of taxable income, the so-called ETI.

It is the percentage change in reported income for a one percentage change in the net of tax rate. Let z be reported income and t the tax rate $ETI = \frac{\partial z}{d(1-t)} \frac{(1-t)}{z}$.

1. One of the cases studied in Sandmo (1974) has interest cost deductible for the full amount of capital invested, ($k = 0$ in the notation used by Sandmo). In Sandmo's notation, s is the tax rate, K_{1t} is the amount of capital of type 1 at time t, q_1 is the price per unit of this capital, i is the interest rate, δ_1 the rate at which K_{1t} depreciates, and α_1 is the rate of depreciation allowance for capital of type 1. One of the first-order conditions is

$$p\frac{\partial F}{\partial K_{1t}} - \left[i + \delta_1 + \frac{s}{1-s}(\delta_1 - \alpha_1)\right] q_1 = 0$$

   Explain what type of tax distortion is evident in this equation, and what is the effect on the firm's optimal choice?

2. Explain why it is seen as necessary, in some tax systems, to split the income from closely held firms into labour income and capital income. How can this be done, and what may be problematic about the method?

3. Discuss the statement: A tax on labour income that does not change the labour supply will not have a dead weight loss associated with it!

Not true. It is the price effect, the substitution effect that creates the efficiency loss. Labour supply as a function of after tax income incorporates both of a substitution effect and an income effect

1. Discuss the statement: The excess burden of a tax is proportional to the tax rate!

Not true. The excess burden or dead weight loss increases more than proportionally with the tax rate, the loss is quadratic. This is easy to illustrate in a diagram. And this fact is the reason for having a broad tax base with low rates, rather than a narrow base with higher tax rates.