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OLLSCOIL NA hEIREANN, GAILLIMH
THE NATIONAL UNIVERSITY OF IRELAND, GALWAY

AUTUMN EXAMINATIONS 2002
B.A. AND B.COMM. Degree Examination
Visiting Students

EC386 Public Economics

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5 Questions, Attempt 3.

Time allowed: 2 hours

1. Joint Income Taxation
   (i) Describe what we mean by joint taxation. Give examples.
   (ii) If a tax allowance is €2000, the low rate band is €5000, the standard rate band is €5000, the low rate tax is 10%, the standard rate tax is 25% and the high rate tax is 50%, calculate the tax of a couple with two children where the first earner has income of €25000 and the second €5000. Utilise the three methods of joint taxation as well as individual taxation. In the case of the Family Quotient, utilise the quotient rule:
   Individual = 1
   Couple = 2
   Each child add 0.5 (i.e. Q = 3 for a couple with 2 children.
   [Hint:
   Aggregate Taxation: Tax = T(YM + YF)
   Split Taxation: Tax = 2 * T((YM + YF)/2)
   Tax = Q(HH Size) * T((YM + YF + Sum(Yj))/ Q(HH Size))]
   (iii) What are the labour supply effects of joint taxation relative to individual taxation for (1.) principle earners, (2.) secondary earners, and (3) where both are individually high rate tax payers?

2. Excess Burden
   (i) Explain what we mean by excess burden in the case of a two good model of consumption.
   (ii) What is the excess burden of a lump sum tax? Highlight your answer graphically. Why are lump sum taxes not used more often?
   (iii) Derive the formula for excess burden in terms of taxation, elasticity, price and quantity (the formula based upon a single good using a supply and demand curve).
   (iv) In a two good economy, where goods are independent in consumption, derive the relationship between tax rates that minimise excess burden and the price elasticity of those goods.

3. Insurance Market Failure

    (i) Show how pooling reduces the variability of insured income.
    (ii) What is an annuity? How does it serve to reduce risk? What factors influence the value of an annuity?
    (iii) What characteristics are necessary for an insurance market to operate efficiently?
    (iv) What is moral hazard? In the absence of moral hazard, the expected utility of income is EU = (1-p)U(Y1) + pU(Y2), where Y1 is income without the insurable risk occurring and Y2 is income of the risk occurs at probability p. Extend this definition of expected utility to incorporate the effect of effort in reducing the risk of an event occurring on expected utility. Show that there is no incentive to make an effort in reducing the probability of the risk occurring. How do insurance companies enforce individuals to make this effort?

4. Social Welfare Functions

    (i) What is a social welfare function?
    (ii) Describe the difference between Utilitarian and Rawlsian theories of State. Describe this difference in relation to their social welfare functions.
    (iii) What is an isoelastic social welfare function? Show that if the inequality aversion parameter, e is greater than zero that more weight is placed on welfare gains of poorer individuals. What is the relationship between the Utilitarian, Rawlsian and Isoelastic social welfare functions.
    (iv) Optimising a social welfare function, to determine an optimal linear income tax, what four characteristics will result in a higher marginal income tax rate?

5. Environmental Taxation

    (i) Briefly describe the proposed EU Carbon Tax.
    (ii) What do we mean by a double dividend?
    (iii) What are the economic grounds for introducing such a tax? Compare and contrast with the use of regulation.
    (iv) Assess the distributional impact of a carbon tax.