

**Problem 1** 25%

a)  $B_{CIT} = F(k) - rD$

Only investment financed with debt is deductible, which creates two distortions:

1. Lower investment when financed by equity
2. Higher debt/equity ratio due to preferable tax treatment of debt

b) Benefit: Can avoid the two distortions in a). Candidates should explain this.

Drawback: Must set the "correct" interest rate for equity, hard to let it vary according to actual investment costs

Less tax revenue for the same rate

Profit shifting incentives, more equity in ACE-countries, more debt in non-ACE countries

**Problem 2** 35%

a) Individual:  $(1 - t)w$

Society:  $(1 - t)w + tw = w$

b) 0 utility change (envelope theorem)

evasion cost = tax avoided:  $k(e) = t$

Candidates may set up the utility maximization problem

c)  $\Delta S = t - k(e) - t = -t$ , since  $k(e) = t$  on the margin.  $\Delta R = -t$ . Hence  $\Delta S = \Delta R$ .

**Problem 3** 40%

- a) All income is consumed, such that any tax on goods reduces the gain in terms of goods of working one more hour, like an income tax. An equal tax on both goods is equivalent to a flat tax on income.
- b) Homogenous Ramsey problem/Corlett-Hague model. The distortion arises because there is one good we cannot tax. Hence, higher tax on goods that are more complementary with the untaxed good. The untaxed good here is leisure. Tax more the good more complementary with leisure. Need to know which good is more complementary with leisure.
- c) Now, commodity taxes are redundant because we can observe types. The non-linear type tax implements the first-best. Lump sum taxation based on types. The type tax is undistortive, any commodity tax will create an unnecessary distortion.
- d) Mirrlees model. Need to tax income now. Income responds to taxation. A good answer explains the mimicking problem, which is that the high-type might mimic the income of lower type, and it is optimal to distort the choice of the lower types to reduce the mimicking incentives of the higher types.
- e) Mixed taxation Mirrlees model: If utility is homogenous and separable between income and leisure, there is no gain from taxing commodities (Atkinson Stiglitz). Commodity taxes can reduce the mimicking problem explained in d) if the good is preferred more by the mimicking higher type than the true lower type. This will happen if higher types either have different preferences, or because higher types (when mimicking) demand different goods due to having more leisure than the true lower type. If preferences are non-separable between leisure and consumption goods, the higher type will prefer different goods than the true lower type when enjoying more leisure. The information we need to set commodity taxes is the preferred consumption of the two goods for the mimicking high type compared to the true low type. Assuming homogenous preferences (as the exercise does), knowing the different goods' complementary with leisure is the key information to set optimal commodity taxes (when setting the non-linear income tax optimally).  
Non-separability is the central point. The exercise states that individuals have the same utility function. Good candidates explain that this means that only non-separability matters.