UNIVERSITY OF OSLO
DEPARTMENT OF ECONOMICS

Exam: **ECON4271 – Distributive Justice and Economic Inequality**

Date of exam: Tuesday, May 19, 2015   **Grades are given: June 9, 2015**

Time for exam: 2.30 p.m. – 5.30 p.m.

The problem set covers 2 pages

Resources allowed:
- No resources allowed (except if you have been granted use of a dictionary from the Faculty of Social Sciences)

The grades given: A-F, with A as the best and E as the weakest passing grade. F is fail.

Answer all questions of the following 3 parts. Each part carries equal weight, and within each part, each question carries equal weight.

1 Welfare Economics

(i)   Briefly discuss Sen's social welfare functional approach and its differences w.r.t. the Arrowian social welfare function approach.

(ii)   Which axioms characterize utilitarianism in a social welfare functional approach?

(iii)   Use the axioms from (ii), and not the utilitarian criterion, to show that the utility vector u is better than utility vector v, where:

$$u = \begin{pmatrix} 3 \\ 5 \\ 4 \end{pmatrix} \text{ and } v = \begin{pmatrix} 1 \\ 1 \\ 8 \end{pmatrix}.$$

(iv)   Use the above example to show that the utilitarian criterion is not compatible with co-ordinality (common ordinal scale).

(v)   An econometrician has data for income (in dollars) and health (normalized between 0 and 1, where 0 is the lowest health level and 1 is perfect health). He assumes Cobb-Douglas utility functions and estimates the parameters of the exponents. The following preferences for two types of individuals arise:

$$U^A(x, y) = x^{.25} y^{.75}$$
$$U^B(x, y) = x^{.75} y^{.25}$$

where x is income and y is health level. He uses these estimates in a utilitarian social welfare function and determines some optimal tax policy t^*.

His (brilliant) PhD student repeats the same exercise (without making mistakes!). She uses income data in thousands of dollars (denoted $\bar{x}$) and the same health data. She re-estimates the parameters of the Cobb-Douglas utilities and obtains utilities

$$U^A(\bar{x}, y) = \bar{x}^{.25} y^{.75}$$
$$U^B(\bar{x}, y) = \bar{x}^{.75} y^{.25}$$

with the same exponents as before. However, when applying the utilitarian welfare, she obtains a different optimal tax policy $t^{**} \neq t^*$. Explain this puzzling result: why are the functional form of utilities equal, whereas the optimal tax design is not identical?

2 Inequality measurement

(i) Explain what it means that one income distribution F_1 stochastically dominates another distribution F_2. Explain why we can say that social welfare is higher under F_1 than under F_2.

(ii) Explain what we mean by (first-degree) Lorenz dominance, and explain why Lorenz dominance is a valid criterion for ranking income distributions with regard to inequality. Can we always use (first-degree) Lorenz dominance to rank income distributions with regard to inequality?

(iii) Explain what we mean by the families of dual social welfare functions and dual measures of inequality and explain how the dual inequality measures can be rationalized from dual social welfare functions. Give an interpretation of the dual social welfare functions. What conditions do we have to impose on the family of dual (rank-dependent) social welfare functions in order to use these social welfare functions as a basis for defining measures of inequality?

(iv) Explain why the ranking of two income distributions with regard to inequality becomes more complicated when the associated Lorenz curves cross. What methods can we use in such cases?

(v) Explain why the family of dual inequality measures can either by justified as an axiomatic characterizations of an ordering of cumulative distribution functions or as an ordering of Lorenz curves.

3 Evolution of inequality

(i) Discuss some factors that can explain why there is inequality in labor earnings among ordinary wage earners. To what extent can these factors explain the increase in inequality observed in many Western countries since the 1980s?

(ii) Discuss the evolution of top incomes relative to mean incomes over the same period. What can explain these changes?

(iii) Explain how Almås et al. (2011) operationalize the concept of fair income and how they measure unfair inequality.

(iv) Discuss whether the change in top incomes discussed in (ii) should be seen as fair or unfair.