

TIME: 4 Hours

MAXIMUM POSSIBLE SCORE: 240 Points

IMPORTANT INSTRUCTIONS: This examination contains questions totaling 320 points. You are asked to answer questions of your choice, totaling 240 points. If you answer questions totaling any amount up to 240 points, you will be scored on those questions, as usual. If you answer questions totaling M (an amount more than 240 points), you will be scored on all the questions you have answered, and your total score thus obtained will be multiplied by the factor $(240/M)$, to adjust it to a 240 point basis. In short, going beyond 240 points will not automatically add to your grade. It will do so only if the "added" answers help to pull up your average on your "earlier" answers. Also, it can similarly pull down your average.

I. (90 Pts.) Indicate whether you consider each of the following statements to be TRUE (T), FALSE (F), or UNCERTAIN (U). In each case give a brief (e.g., 2 or 3 sentences) explanation of your answer. Your grade will depend heavily on your explanation.

- 1) A project should not be undertaken until its first-year benefits exceed the relevant discount rate times the capital cost of the project.
- 2) The amounts that in standard accounting would be deducted as depreciation expense are instead added as benefits when cash flow analysis is used.
- 3) The economic opportunity cost of capital to be used in analyzing a new project represents the return on the best alternative use that can be found for the amounts to be invested.
- 4) In order to directly apply "separable components" analysis to a component of a project, the benefits of that component should be independent (i.e., neither substitutes nor complements) of those of the remainder of the project.

- 5) "The appropriate scale of a project is that scale for which the marginal internal rate of return of the project equals the relevant discount rate." This rule should be applied only when the "average" internal rate of return of the project exceeds the relevant discount rate.
- 6) A project to extend the area served by a given irrigation dam should count as benefits the average productivity of the water delivered to the hectares to be added, and as costs the marginal productivity of the water diverted away from the area previously served.
- 7) The economic opportunity cost of foreign exchange is lower in the case: a) where some of the foreign exchange in question is obtained by borrowing abroad than it is in the case b) where all of the foreign exchange is purchased in the market.
- 8) The internal rate of return of alternative investments is a valid criterion in the special case of capital rationing, in which the scarcity of capital funds (during which they have to be rationed) lasts only one period, and projects are independent of each other.
- 9) An old asset should be replaced by a new one when the present value of expected benefits from the new asset exceeds the present value of the expected benefits of the old asset by more than the excess of the price of the new asset over the sale value of the old asset.
- 10) The resulting increment in the value of the land served by a road is a good measure of the present value of the net benefit generated by a project to improve that road.
- 11) The economic opportunity cost of labor "sourced" from the pool of the unemployed is equal to $-U$, where U is the rate at which the workers in question were receiving unemployment compensation from the public treasury.

- 12) If a highway project leads to a reduction in the time cost of traveling along the road, this will lead to an upward shift (from D_0 to D_1) in the demand curve for travel on that road, and the associated benefit can be measured by the area between the initial demand curve D_0 and the new demand curve D_1 , up to the new equilibrium traffic volume V_1 .
- 13) The least-cost principle requires that no hydroelectric project should have an average cost per kilowatt-hour (expected to be projected) that is higher than the average cost of a "standard" thermal-electric project.
- 14) It is possible, in a real-world setting, for a new tariff τ_i on import of a particular good M_i , to be both welfare-increasing and trade-creating..
- 15) Since the corporation income tax cannot be borne by capital in an open-economy setting (so long as that capital is internationally mobile), the tax tends to be shifted to internationally immobile factor or factors, with its burden being shared by all such factors.

II. (20 Pts.) Suppose the government raises the tax rate on income from dividends. Consider two alternative models: dividend signaling, and tax capitalization (under which dividends are the residual of profits less investment expenditures). Under each model, describe (i) what happens to Tobin's "q", and (ii) what happens to investment. You may assume that there are no effects on rates of return.

III. (20 Pts.) Social Choice Mechanisms

- 1) Is there a non-dictatorial social choice mechanism that acts as a utilitarian social welfare function? Briefly explain, commenting also on the importance of your answer.
- 2) Now prove your answer.

IV. (25 Pts.) Write a brief essay on the subject "price distortions versus quantity distortions". Consider an ad valorem tax or subsidy to be the typical price distortion, and a quota (implemented by licenses or permits) to be the typical quantity distortion.

- 1) Give an expression for the efficiency cost (welfare cost) of each of these distortions, applied to X_6 (one of many commodities) X_1, X_2, \dots, X_n .
- 2) Under what circumstances can you establish a direct equivalence between a given quota and its "corresponding" tax?
- 3) Can the efficiency cost of a quota on X_6 ever be less than the efficiency cost of a tax on X_6 that has the same effect as the quota on the equilibrium quantity of X_6 ?
- 4) Can the efficiency cost of a quota on X_6 ever be greater than that of a tax on X_6 that has the same effect as the quota on the equilibrium quantity of X_6 ?
- 5) Consider a subsidy-cum-quota scheme in which each household gets to buy two units of X_6 per period at a subsidized price, and then is free to buy additional units at a free-market price. Does this scheme have lower efficiency cost than a straight subsidy at the same percentage rate? Answer for the case where X_6 is an internationally traded good (market price given).
- 6) Answer the above question for the case where X_6 is a non-traded good characterized by a rising supply price in the local market.

V. (20 Pts.) Suppose the government eliminates the estate tax law provision for the "step-up" in the basis for capital gains at the time of death. That is, the purchase price used for calculating capital gains on assets transferred at death is no longer increased to market value at the time of death. Discuss how this change would affect private household saving under: (i) the pure life-cycle hypothesis, and (ii) a life-cycle with bequest model. You may assume the demand for saving is perfectly elastic.

VI. (20 Pts.) Basic Welfare Economics

- 1) Critically evaluate both the old and the new welfare economics, commenting in particular on their ability to guide the choices of working policy economists.
- 2) Identify a real-world criterion for selecting a social welfare function. Contrast it with the standard metaphysical "criterion".
- 3) Distinguish the optimality criteria of economists proper with those of political economists, considering 19th century classical liberals to exemplify political economists and a 20th century U.S. policy advisor to exemplify an economist proper. On what basis would you decide to tool-up to be a 21st century economist?

VII. (25 Pts.) Discuss the efficiency cost of the corporation income tax. In particular compare three empirical approaches to measuring the extent of distortion in each of m "industries" within the corporate sector.

- i) The distortion is measured by $\tau_{xi} = (\text{total corporation income tax receipts from industry } i) \div (\text{total value of output industry } i)$
- ii) The distortion is measured by $\tau_{ci} = (\text{total corporation income tax receipts from industry } i) \div (\text{total earnings of capital in industry } i)$
- iii) The distortion is measured by $\tau_{ei} = (\text{total corporate income tax receipts from industry } i) \div (\text{total earnings accruing to equity capital in industry } i)$.

- 1) Which of the above do you regard as the most nearly "correct" measure of the corporation income tax distortions in industry i ? If this measure is taken as the height of a triangle of efficiency cost, how would you describe or define the appropriate base for that triangle?
- 2&3) For each of the other two measures of the distortion [not used in your answer to 1)], describe or define the base that would be appropriate in measuring the corresponding triangle of efficiency cost. In each case, also indicate what assumptions are necessary in order to make this triangle a good measure of the efficiency cost of the tax in question.

VIII. (20 Pts.) Some studies of retirement behavior implement a structural econometric approach based on a "lifetime budget constraint." Discuss whether and how this method allows for the following behavior or constraints:

- 1) the Social Security earnings test
- 2) a bequest motive
- 3) borrowing constraints
- 4) precautionary saving against unanticipated health expenditures.

IX. (20 Pts.) Social Theory

- 1) Prove the Pareto optimality of a cooperative equilibrium under perfect strategic information and strict preferences.
- 2) What complication arises under indifference and under what conditions can it be eliminated. Present an empirical example of this.

X. (20 Pts.)

- 1) Explain how each of the following two statements can be said to be "true".
 - i) a value added tax of the consumption type falls on the income accruing to labor and capital.
 - ii) a value added tax of the consumption type is in effect a tax on the income from labor.
- 2) How do you reconcile these two statements?

XI. (20 Pts.) Suppose that Social Security is privatized with the following features:

- 1) incentives for early or late retirement are eliminated, so that adjustments are actuarially fair both before and after age 65,
- 2) private retirement accounts which may hold equities are successful enough to raise Social Security wealth, and
- 3) everyone is forced to annuitize their accounts gradually between the ages of 55 and 62 (to minimize the risk of year-to-year variations in investment returns). The earliest age for collecting these benefits is still age 62, but Medicare still remains available only starting at age 65.

Does everyone retire earlier, or everyone retire later? How does you answer change if the earnings test is eliminated.

XII. (20 Pts.) Collective Goods

- 1) Heuristically describe the theoretical market failures in private-good markets that result from the laissez faire, private marketing of collective goods.
- 2) What kind of economic policies are appropriate, concentrating your attention on either intermediate or final-goods markets.
- 3) Briefly compare these theoretically optimal policies to actual economic policies, both in ideologized and non-ideologized democratic states.