Written Preliminary Ph.D. Examination

Department of Applied Economics
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Policy Analysis

Instructions

- Identify yourself by your code letter, not your name, on each question
- Start each question’s answer at the top of a new page
- Answer three of the following questions
- You have four hours to complete the examination
Question #1

a. Simplification of the tax system is often named as a goal of tax reform. Why is tax simplification a policy goal? What are the benefits of a simpler system over one that is more complex?

b. Is it always best to collect taxes in the simplest way possible? In other words, can the simplest tax system achieve the objectives of sound tax policy? Explain and provide some specific examples.

c. Describe the Allingham-Sandmo model of tax evasion and enforcement. Write out the model, including the taxpayer’s optimization problem. Define all of the variables in the model.

d. In the Allingham-Sandmo model, what are the available tools (i.e., model parameters) for tax enforcement? For each parameter, explain the model’s implications for tax compliance. For example, if the tax authority increases or decreases the magnitude of a parameter, what does the model predict about the effect on tax compliance? Explain your answers.

e. Are the predictions of the Allingham-Sandmo model consistent with observed levels of tax compliance? Explain.

f. Beyond the Allingham-Sandmo model, what are additional tools the tax authority could use to increase tax compliance? What are the pros and cons of the tools you name?
Question #2

Some health advocates propose vaccinating all one year-old children against Hepatitis A. One way to assess the effectiveness of vaccinations is to use state-level data on the number of child vaccinations as well as information on adult days of work lost each year. (A sizeable part of the economic cost of hepatitis in children arises from the days of work missed by parents.)

Assume you have state-level data on the number of child vaccinations for Hepatitis A, worker absences, and other relevant covariates for N states and T years.

a. Write out an estimating equation for this panel data set that could be used to estimate the effect of child vaccinations on worker absences. Show how the specification for pooled regressions of the time series and cross-sectional data differs from a state fixed effects regression.

b. In what way is the method of state fixed effects estimation useful in obtaining unbiased effects of vaccinations on lost productivity? What main assumption(s) is required to generate unbiased effects of vaccinations?

Additional studies by researchers have yielded results on additional outcomes that are useful for cost-effectiveness analysis or cost-benefit analysis. Assume a policy in which 4 million children would be vaccinated in one year at a cost of $150 million. Policy analysts have considered two types of benefits. Compared to no vaccinations, this proposal will prevent a sizeable number of illnesses that in present value terms are associated with $100 million in medical costs and lost productivity. In addition, vaccination saves 2000 QALYS (Quality-adjusted life years).

c. Perform a cost-benefit analysis of vaccination, compared to no vaccination, assuming a QALY is worth $50,000. Show your work and state what you conclude.

d. If an analyst were to use a higher discount rate than what was used originally, how would this change the findings of the CBA? Explain.

e. Perform a cost-effectiveness analysis of vaccination, compared to no vaccination. State would you conclude. (Note: while CEA typically incorporates one type of benefits – e.g., QALYS – it is possible to incorporate a second benefit that has already been monetized.)
Question # 3

In 2004 New Jersey Department of Transportation fully implemented an “Emerging Small Business Enterprise” (ESBE) program as a means of addressing concerns that its “Disadvantaged Business Enterprise” program (DBE) discriminates against non-DBEs (or NBEs). DBEs are certified if they do not exceed certain size, tenure and net worth ceilings and if the majority owners are women, members of racial minority groups, or persons who can establish social disadvantage. The DBE program establishes a goal of a percentage amount of contract dollars that will be allocated to DBEs.

An ESBE is understood to be a firm that meets the size, tenure and net worth standards for a DBE but which need not be a firm whose majority owners are women, minorities or persons who are socially disadvantaged. The ESBE program sets aside contracts on which only ESBEs are permitted to bid. Thus, DBEs are presumptively ESBEs, but NBEs (non-DBEs) might qualify as ESBEs if they meet the size, tenure and net worth standards for certification.

The New Jersey Department of Transportation wants to know whether the ESBE program remedies putative discrimination against non-DBEs while leaving unchanged or increasing the share of dollars awarded to DBEs.

Analysts estimated the following model for prime contractors before (t) and after (t+1) the implementation of the ESBE program.

**Equation 1**
\[
\ln Y_t = \sum \beta_{it} x_{it} + \gamma \cdot DBE_t + \mu_t
\]

**Equation 2**
\[
\ln Y_{t+1} = \sum \beta_{it+1} x_{it+1} + \gamma_{t+1} \cdot DBE_{t+1} + \mu_{t+1}
\]

where DBE is a dummy variable indicating whether the prime contractor was a DBE or non-DBE; Y is contract amounts awarded to prime contractors; x is a vector of characteristics of the contract and the contractor (location of firm in New Jersey, construction contract, year of the award, industry classification of the firm) The model was estimated for all firms and also for DBEs and non-DBEs separately, before and after the implementation of the ESBE program:

**Equation 3**
\[
\ln Y_{t}^{DBE} = \sum \beta_{it}^{DBE} x_{it}^{DBE} + \mu_{t}^{DBE}
\]

**Equation 4**
\[
\ln Y_{t+1}^{DBE} = \sum \beta_{it+1}^{DBE} x_{it+1}^{DBE} + \mu_{t+1}^{DBE}
\]
And

Equation 5
\[ \ln Y_{t}^{NBE} = \sum \beta_{it}^{NBE} \times_{it}^{NBE} + \mu_{t}^{NBE} \]

Equation 6
\[ \ln Y_{t+1}^{NBE} = \sum \beta_{it+1}^{NBE} \times_{it+1}^{NBE} + \mu_{t+1}^{NBE} \]

a) Using only information from equations 1 and 2, indicate under what conditions discrimination against non-DBEs might have existed prior to the implementation of the ESBE program

b) Using only information from equations 1 and 2, indicate under what conditions discrimination against non-DBEs might have been eliminated (or reduced) by the implementation of the ESBE program

c) Using only information from equations 4-6, indicate under what conditions discrimination against non-DBEs might have existed prior to the implementation of the ESBE program and might have been eliminated (or reduced) by the implementation of the program

d) Are DBEs better off or worse off as a result of the implementation of the ESBE program? Discuss, making reasonable assumptions about the estimated parameters \( \beta, \gamma \) and the values of \( Y \) for DBEs and non-DBEs.

e) Compare your conclusions using equations 1-2 to your conclusions using equations 4-6. Why might the basic conclusions differ? What justifies using equations 1-2 or equations 4-6 for addressing the underlying question posed by New Jersey Department of Transportation?

f) Provide at least one alternative strategy, drawn for the literature on policy analysis, for answering the two questions posed by New Jersey Department of Transportation: i) are non-DBEs discriminated against as a result of the DBE program and ii) Does the ESBE program remedy any putative discrimination without making DBEs worse off? Detail how this alternative strategy would be implemented.
Question #4

1. How does Becker measure “tastes for discrimination?” What does Becker assume about the mobility of capital in his two sector model of discrimination? What assumptions are made in the Becker Model about uncertainty, bargaining and information about skills of workers? In long run equilibrium in the Becker model of discrimination, what can be said about racial gaps in wages?

   “The impact of market discrimination is not determined by the most discriminatory participants in the market, or even by the average level of discrimination among firms, but rather by the level of discrimination at the firms where ethnic minorities or women actually end up buying, working and borrowing. It is at the margin that economic values are set.”

   Explain. What are the implications of the Heckman proposition for the measurement and detection of discrimination?

3. What is statistical discrimination? What distinction is made in Aigner & Cain (1977) between group vs. individual discrimination? What does (or would) the Phelps Model say about the reliability of test scores in predicting true skill level, ability, or productivity of whites vs blacks?

4. What is implicit discrimination (sometimes called “implicit bias”) and how does it differ from Becker-type discrimination and Statistical Discrimination? What are some of the techniques used to measure implicit discrimination?

5. Consider the following regression:

   \[ \ln y = \sum \beta_i x_i + \delta Race \quad (Eq. 1) \]

   where \( y \) is earnings, \( x \) is human capital measures, absent measures of intelligence. Race is equal to one if the worker is African American and equal to zero if the worker is white. Consider the revised regression equation that incorporates unmeasured intelligence through a proxy, AFQT.

   \[ \ln y = \sum \beta’_i x_i + \delta’ Race + \theta AFQT \quad (Eq. 2) \]

   According to the Darity-Mason critique of human capital models of discrimination, what can be said about the relationship between \( \delta \) and \( \delta’ \)?

   Suppose that the AFQT scores are missing for the most able of African Americans. Suggest a method for reestimating equations 1 and 2 and discuss the implications for the resulting estimates of \( \delta \) and \( \delta’ \).
Question #5

The financial problems facing state government are forcing a re-evaluation of the financial relationships between federal, state, and local government in the United States. Demonstrate your knowledge of the economics behind multi-level governmental finance by answering the following questions.

1) Under what conditions will public sector provision of services increase economic efficiency in a perfectly competitive market economy? Provide examples of three different types of market failures which would require government intervention and explain the nature of the market failure and how public sector action can overcome those failures.

2) Explain how the public preferences are reflected in the level of spending and taxation chosen in a community. Begin by assuming a single community containing residents with non-identical preferences and a single elected official. In the long run, whose preferences will the community’s spending and tax collections represent? Will this lead to a pareto optimal result? Explain why or why not.

3) Expand your conceptual model to include the existence of many units of government, no barriers to mobility, and no economies or diseconomies of size in the production of the service. Does this increase economic efficiency? Will it lead to a pareto optimal result? Explain why or why not.

4) Show how a system of aid from state aid to local governments can help to overcome some market failures. What key assumptions are necessary for state aid to successfully change the allocation of local services? Explain why this will or will not guarantee that local government services will be provided at optimum levels. How is the allocation of services provided by the state (other than the aid to local government) affected.

5) Some argue that growth in local government spending over time should reflect only increases in population served and prices, that is, that real, per capita local government spending should remain constant. Evaluate that statement, what are the assumptions necessary for the statement to be true?