PhD Policy Comprehensive Exam
Fall 2008

Instructions: Answer Question I; Question II OR III; AND Question IV OR V .

Question I
Develop a research design to evaluate the impact of an ongoing public program, policy, or institutional design; to compare the impact of program, policy, or institutional design alternatives; to examine cause (or causes) of policy or institutional choice by legislators, legislatures, bureaucrats, or bureaus; or to examine reasons for the differential implementation of policy by bureaucrats or bureaus.

Choose any policy area that you are familiar with. The application MUST be theoretically non-trivial. For example, it should relate to important normative questions of designing institutions that are representative, accountable, and efficient, or to tradeoffs among those values. Or it could relate to theoretically important disputes (for example, about government or market failures, or about cooperation versus self-interest). Discuss the theory or theories that motivate the research question, hypotheses, and the experimental or statistical model. Briefly describe the program or policy alternatives, or policy decisions, that you are examining, and discuss and justify the outcome measure(s) you will use. Based on theory, what do you expect to find? Why will your findings be theoretically important? Cite relevant literature and previous findings.

Develop a feasible research design to estimate the parameters of your theoretical model. In your design, consider some of the problems you anticipate in generating unbiased and efficient estimates, and suggest how you might address these problems. Include in your discussion the following items, as well as others you believe are pertinent:
  *how you propose to collect data;
  *problems of measurement;
  *how you will analyze the data you collect;
  *given your analytical strategy, what are the important threats to internal and
    statistical validity (that is, threats to generating BLU estimates and steps to
    minimize these threats);
  *issues of external validity;
  *how you will interpret the data you collect in light of the theory you are testing.

Question II

Table 1: Descriptive Statistics on Major Earthquakes (>= 6 on Richter Scale), 1975-2003

Variable	N	Mean	Std. Dev.	Minimum	Maximum
Fatalities	344	849	4,439	0	50,000
Corruption Perception Scale* (Lo=1; Hi=7)	344	3.78	1.41	1	7
Frequency (# 6+ Richter scale earthquakes in country in last 100 years)	344	0.51	0.24	0.01	0.80
Distance (in miles) between affected area and quake epicenter (accounts for both depth and surface distance)	344	125	185	6	2,317
Magnitude (Richter Scale, hi. is worse)	344	6.8	0.6	6	8.5
Density (population of affected province or state per sq. kilometer)	344	269	1096	0.20	13,148
Population (population of affected province or state in 1000's)	344	9,331	20,213	1.98	166,053
GDPPC (real GDP per capita in constant US 1995 dollars)	344	6652	10,424	102	44,775
AFRICA (=1 if affected province/state is in Africa)	344	.03	.17	0	1
AMERICA (=1 if affected province/ state is in N. or S. America)	344	.35	.48	0	1
ASIA (=1 if on Asian continent)	344	.43	.50	0	1
EUROPE (=1 if in Europe)	344	.19	.19	0	1

*From International Country Risk Guide, based on survey responses from masses and elites.

Note: Unit of analysis is an earthquake.

Table 2: Determinants of Earthquake Fatalities from OLS Regression

Variable	Estimate	Std. error
Corruption	1,876	891
Frequency	-671	213
Distance	-353	92
Magnitude	20,428	2,517
Density	131	132
Population	315	145
GDPPC	-340	174
AFRICA	375	819
ASIA	514	401
EUROPE	1960	511
Intercept	-27	5

N = 344
R^2 = 0.34
F-prob. = 0.0001

a) What is the underlying theoretical model that generated these results? What is the theoretically relevant variable? Why is it important theoretically?

b) What do the results say? Discuss each variable in the model. Put the estimates in context of the means and proportions in Table 1.

c) What policy issues regarding market and/or government failure do the results raise?

d) Do you believe the results? How would you improve the validity of the estimates, focusing on the theoretically important variable?

Question III

Consider the following two statements by Robinson Hollister in a recent issue of the *Journal of Policy Analysis and Management*. Explain the defense for each of his responses to each question, and then offer a critique.

1. What is the proper role for random assignment social experiments? How generally and widely should they be used?

Whenever it is desired to estimate the effect, or impact, of a social policy or institution on specific outcomes and one wishes to assert that the estimated impact is *caused by* the policy or institution, then a random assignment experimental design should be the method of first resort. The random assignment of units (persons, institutions, geographic areas, etc.) to the "treatment" or to a control group, if properly carried out with a large enough sample, assures that on average characteristics that might affect the outcome are the same (not statistically significantly different) in the two groups. This holds both for measured and unmeasured, or unmeasurable, characteristics. Further, as contextual conditions that might affect the outcome change over time (for

example, a weakening of the labor market), both groups are subject to those changing contextual conditions. Therefore, the control group provides a reliable estimate of what would have happened to the members of the treatment group had they not been subjected to (or offered the opportunity to receive) the treatment; that is, the control group provides *reliable counterfactual* measures of outcome variables.

2. Are there alternatives to random assignment that are nearly as good? If so what kinds of guidelines should be applied in deciding when to use random assignment and when to use alternatives?
The short answer to the first of these questions is: No, not as far anyone has been able to establish thus far.

Question IV

Part 1: Economics
Developed under the Clean Water Act and the Critical Program Act of 1990, the Great Lakes Water Quality Guidance was proposed by the Environmental Protection Agency (EPA) for the protection of aquatic life, wildlife, and human health within the Great Lakes basin. Subsequent legislation had a number of effects on the Lower Fox River and Green Bay areas of northeast Wisconsin (hereafter LFR-GB). LFR-GB is a high demand area providing access to a variety of recreational, commercial, and industrial uses. Recreational fishing and boating, facilities for wildlife and bird watching, and swimming have been popular in the bay area. The river also provides process water for industrial use. Both recreational and industrial uses have been limited due to surface water discharge problems caused by over 42 industries and 10 municipalities.
Essentially, the Water Quality Guidance provided for specific water quality standards and anti-degradation policies. The new water quality standards forced firms to change their water treatment processes, so that they would dump fewer pollutants into LFR-GB.

As a policy analyst, evaluate the merits and drawbacks of this policy proposal. Can it be viewed as an appropriate response to a market failure, as a government failure, or both? Provide graphs where appropriate.

Part 2: Statistics
A researcher interested in the effects of pollution regulations on the level of pollution conducted a regression analysis using the following variables (collected for each state for the year 2000):

Dep. Var.: Ambient Air Quality measured by sulfur oxide micrograms per cubic meter
Indep. Vars.:
      State GDP in thousands
      State population in thousands
      # of air pollutant regulations in the state

The regression output is reported on the following page:

	Coefficient	t-statistic
State GDP	3.45	2.9
State Population	1.27	1.0
# of Regulations	10.23	2.45

Adj-R^2: 0.233
F-stat: 4.61
F-prob: 0.01
N=50

a) What do the results in the table above tell you about the impact of the number of regulations on Ambient Air Quality? What, if any, are the implications of the results for the efficacy of command and control mechanisms as a means to prevent pollution?
b) What do the results in the table above tell you about the impact of other factors on the level of air pollution?
c) With respect to the impact of regulations, do you believe the result reported in the above table? Specifically, do you believe the parameter estimate? The significance test result? Discuss how well or how poorly the model above meets the assumptions necessary for valid parameter estimates and hypothesis tests. How could you improve the model?

Question V
Answer the following question as asked, OR answer it by using taxes on cigarettes OR taxes on alcoholic beverages as the example of choice.

Mark Twain observed that humans have in common not only death, but also taxes. Motor vehicle fuel taxes are among the most common of taxes. Developing nations and developed nations all have some form of gasoline tax, though some may have none; within the U.S., all of the states have a gasoline tax, some of it imposed by the national government, but the rest chosen by the state.
a) What, if any, market failure (or failures) justifies the imposition of gasoline taxes by government? If there is a market failure rationale, what, in theory, should be the optimum level of the tax? Should it be uniform? At what level of government (national or sub-national) should it be implemented? (Use supply and demand curves, if necessary, to illustrate your answer.)
b) What theories of policy choice would be useful in explaining why some nations (or states within the U.S.) select different levels of the motor vehicle fuel tax? Consider in your answer theories of rent seeking, election incentives, matters of institutional design, and other theories or variables that might be relevant. Cite relevant literature. Briefly discuss how you would test these theories in the context of examining variation in gasoline taxes, and specify your theoretical equation(s).
c) What are the likely consequences of increases (decreases) in the level of the gasoline tax? Consider beneficial as well as adverse consequences, and intended as well as unintended consequences. Briefly describe a research design to test

ONE of your hypotheses regarding the likely consequences of a change in the level of the gasoline tax.
d) Briefly discuss how you would evaluate whether gasoline taxes (either in nations <u>or</u> U.S. states) are too high, too low, or just right.