PhD Policy Comprehensive Examination Sept. 2016

Instructions:
First field: Answer I, II and III.
Second field: Answer I and either II or III.
Note: In all questions with subsections, answer all subsections; each subsection counts equally.

I. Economics and Statistics

a) Economics: All U.S. states now have maximum state speed limits that vary from 65-75 mph, depending on the particular year of measurement (since 1986). The decision to drive an automobile, what kind of auto to drive, where to drive, how to get from one point to another, and, within limits, the speed with which one drives, is generally an individual market-based decision, driven by one's income and time constraints, prices, prices of substitutes and complements, and individual tastes and preferences. Yet all states have speed limits. What, if any, market failure (or failures) can justify the existence of speed limits? Or are speed limits likely to represent a government failure, or a mix of both market and government failure? What would be an optimal policy response? Or, would no government intervention at all be optimal? Use supply and demand curves to clarify, illustrate, and shorten, your answer.

b) Statistics
Two investigators recently examined whether speed limits in U.S. states save lives with an analysis of traffic fatalities in 48 American states between 1990 and 2006. Hawaii was not included in the data set because it does not maintain a state policing organization. Arkansas was excluded because it did not report the number of state troopers to the Federal Bureau of Investigation for the period under study. Data for most variables were collected directly from the Federal Highway Administration.

Dependent Variable
The dependent variable is the number of traffic fatalities per 100,000 vehicle miles traveled (VMT) in each state. VMT is an estimate of the actual number of miles traveled in each state each year, which normalizes fatalities across states with different populations, longer or shorter highway systems, and/or the presence of mass transit systems. Residents of the average state and year in the period under study drove over 57,000,000 mi. The measure has a mean of 16.96, suggesting that in our data, approximately 17 people die for every 100,000 mi driven in a state. The variable has a standard deviation (SD) of 4.65. Descriptive statistics for this and all other variables are included in Table 1.

Theoretically important Independent Variables

The first set of key independent variables measures speed limits within the states. After the partial devolution of power to set limits in 1986, all but eight states abandoned the 55-mph limit. Though not immediately, 49 states eventually settled on 65, 70, or 75 as the maximum allowable speed on the interstate highway system within the state. There is variation in allowable speeds within a state, depending most often on the type of road, but we use the maximum limit, as is the practice in this literature. We measure the speed limit with dichotomous indicators of whether or not the state had a 55-mph, 65-mph, or 70-mph limit in a given year. The omitted category is 75 mph. We expect the measures to be negatively related to the fatality rate.

The next focal independent variable is the number of highway patrol officers per patrol mile, which captures the probability of being caught for speeding within a state. To construct this measure, we first consulted the Federal Bureau of Investigation's Uniform Crime Report (Federal Bureau of Investigation, 1990–2006) to obtain the number of highway patrol officers a state employs for each year in the study. We then examined highway patrol Web sites from each state in order to determine which roadways fell under their authority. We then combined the information regarding jurisdiction with the Federal Highway Administration's (1990–2006) data on number of road miles per state by highway function (e.g., county, interstate, etc.) to create the denominator of patrol miles. The final measure is a ratio of the number of troopers employed by the state over the number of patrol miles. It has a mean of 0.029 and a SD of 0.032. We expect the measure to be negatively correlated with the dependent variable.

We also include a variable measuring the maximum fine allowable for speeding in each state and year. These data are gathered from the *Summary of State Speed Laws*, various editions, published by the National Highway Traffic Safety Administration's Office of Traffic Injury Control. The measure ranges from $20 to $1,000. It has a mean of $296 and a SD of $286. We expect fines to be negatively associated with fatalities.

Finally, the model includes a multiplicative interaction between highway patrol per mile and fines. This interaction term allows the impact of the punishment severity to be moderated by the probability of receiving the sanction. We expect the interaction term to be negative.

Control Variables

In addition to these independent variables, we include a fairly standard set of controls suggested by the traffic safety literature. Table 1 lists those variables.

Methods

Because we are analyzing data from 48 states over 17 years, we estimate a cross-sectional time series. The vector decomposition variable includes the unexplained part of the fixed effect vector.

Results

Table 1. Descriptive Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Total deaths per 100,000 vehicle miles	816	16.969	4.651	7.781	39.648
Passenger vehicle speed limit	816	67.077	4.694	55	75
Blood alcohol content of 0.08 law	816	0.458	0.499	0	1
Primary seat belt law	816	0.328	0.470	0	1
Population density	816	155.125	194.898	0.907	990.737
Per capita income	816	22,732.18	6,001.639	12,201.26	49,563.43
Highway expenditures	816	20.395	17.813	2.210	128.139
Semi-truck speed limit	816	0.118	0.322	0	1
Temperature	816	54.707	7.563	41.5	72.9

Table 2. Determinants of Roadway Fatalities in the American States

Independent Variables	Column 1	Column 2	Column 3
55-mph speed limit	–1.492*** (0.513)	–1.428*** (0.515)	–1.515*** (0.519)
65-mph speed limit	–1.718*** (0.268)	–1.651*** (0.268)	–1.624** (0.268)
70-mph speed limit	–1.261*** (0.258)	–1.326*** (0.258)	–1.280*** (0.258)
Highway patrol	N/A	–18.737*** (3.430)	–10.800*** (5.923)
Fines	N/A	–0.002*** (0.000)	–0.001*** (0.000)
Highway patrol × fines	N/A	N/A	–0.028* (0.015)
Blood alcohol content of 0.08 law	0.067 (0.191)	0.079 (0.196)	0.054 (0.195)
Primary seat belt law	–0.201 (0.182)	–0.222 (0.183)	–0.305 (0.186)
Population density	–0.013*** (0.001)	–0.012*** (0.001)	–0.012*** (0.001)
Per capita income	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Highway expenditures	–0.006 (0.007)	–0.005 (0.008)	–0.007 (0.008)
Semi-truck speed limit	0.088 (0.279)	0.034 (0.290)	0.071 (0.289)
Temperature	0.300*** (0.013)	0.316*** (0.013)	0.316*** (0.014)
Vector decomposition variable	1.001*** (0.032)	1.004*** (0.032)	1.003*** (0.032)
Constant	–8.193*** (1.726)	–8.199*** (1.763)	–7.863*** (1.748)
rho_ar	0.421	0.421	0.416
R^2	0.90	0.91	0.91
χ^2	0.000	0.000	0.000
Number of observations	816	816	816

Models include fixed effect for year.
Standard errors in parentheses.
*Significant at the 0.1 level; **significant at the 0.05 level; ***significant at the 0.01 level.

For you to complete, referring only to the results in Column 3 of Table 2.

1) Do speed limits save lives? Which limits work best? How many lives (per VMT) are saved by each limit? Do the other policies (highway patrol, fines, and their interaction) matter? By how much?

2) Do you believe the focal parameter estimates for speed limits? Do the diagnostics and control variables in the Table provide information that helps you assess the validity or reliability of the estimates? Why or why not? Are there any key omitted variables in the analysis? How, if at all, would you improve the research design? Are there other designs that you would use to supplement (or replace) this one?

II. Program Evaluation

A recent randomized field experiment (RFE) was conducted investigating the effect of one-on-one nutrition education on obesity prevention. Overweight patients visiting a community health center in Washington, DC were randomly assigned to private nutrition counseling compared to a group nutrition education class. Results from the study (n=200) suggest that those in private nutrition counseling were less likely to become obese. Weight was measured by a health professional before and after the intervention.

A group of researchers has decided to replicate this study using a different research design. They apply for funding from your organization and propose using a large, cross-sectional, nationally-representative data set of individuals that includes information on their participation in various types of nutrition education, along with their weight, and obesity status. A rich set of demographic variables such as gender, marital status, and income are also in the data set. All data are self-reported. They also plan to use a quasi-experimental design with a matched comparison group.

A reviewer of the proposal states "This study is not necessary. It does not add value over the results from the RFE." Answer the following questions regarding this statement and the proposal. To answer the questions, you can make assumptions about all of the studies as long as you explicitly state them.

1) Describe some reasons why you agree with this critique.
2) Describe some reasons why you disagree with this critique.
3) Describe the criteria you would use to evaluate the research methodology of the proposal.

III. Policy Implementation

Describe an empirical study you have read, or a stream of studies with which you are familiar, in the literature on policy implementation. Critique the conception and design of the study or set of studies. Explain why you think the basic research question or hypothesis is well developed, or why you think it is not as effectively developed as it should be. Critique the research design and method both positively and negatively, as you see fit. What did the author(s) do right and/or wrong? Assess the strength and contribution of the study or studies to the field of policy implementation.