Economic Questions and Data

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Econo-metrics

- Economics.
- Measurement.

Economic Questions

- Economics suggests important **relationships**, often with policy implications, but virtually never suggests **quantitative** magnitudes of **causal effects**.

Examples of economic questions.

- What is the effect of reducing class size on student achievement?
- What is the effect on earnings of a year of education?
- What is the price elasticity of cigarettes (water)?

This course is about how to use **data** to measure **causal** effects.

- Ideally, we would like an experiment
  - class size;
  - returns to education;
  - cigarette prices;
- But almost always we only have observational (nonexperimental) data.
- Observational data poses major challenges: consider estimation of returns to education
  - confounding effects (omitted factors),
  - simultaneous causality,
  - correlation does not imply causation.

Data

- Cross-Sectional Data: California School District Data

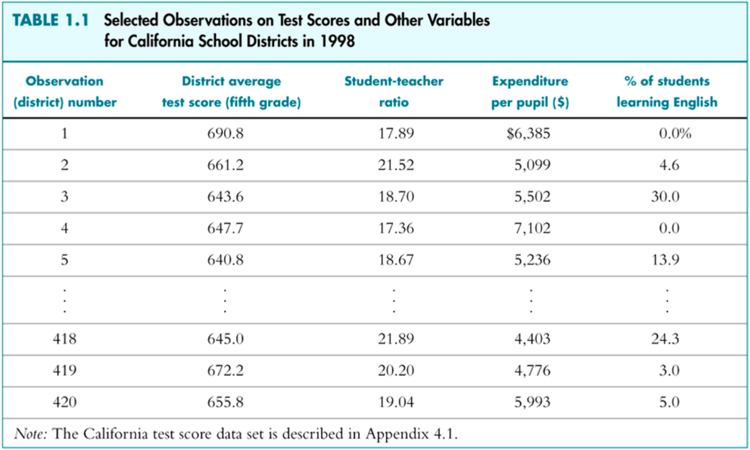

TABLE 1.1 **Selected Observations on Test Scores and Other Variables for California School Districts in 1998**

Observation (district) number	District average test score (fifth grade)	Student-teacher ratio	Expenditure per pupil ($)	% of students learning English
1	690.8	17.89	$6,385	0.0%
2	661.2	21.52	5,099	4.6
3	643.6	18.70	5,502	30.0
4	647.7	17.36	7,102	0.0
5	640.8	18.67	5,236	13.9
⋮	⋮	⋮	⋮	⋮
418	645.0	21.89	4,403	24.3
419	672.2	20.20	4,776	3.0
420	655.8	19.04	5,993	5.0

Note: The California test score data set is described in Appendix 4.1.

- Time Series Data:
  CPI Inflation and Unemployment in the United States, 1959-2000.

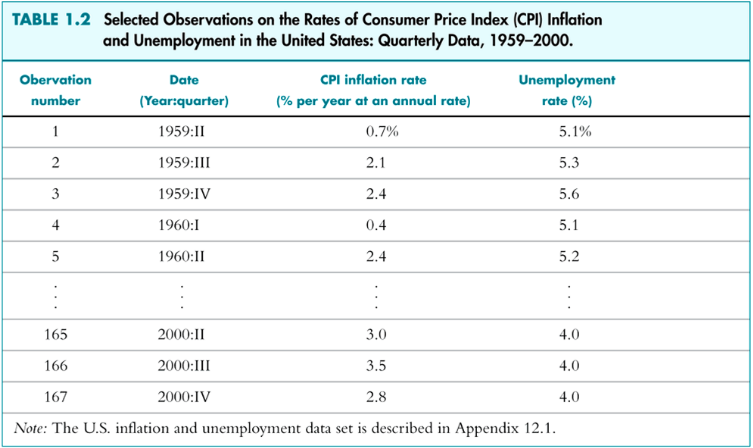

TABLE 1.2 Selected Observations on the Rates of Consumer Price Index (CPI) Inflation and Unemployment in the United States: Quarterly Data, 1959–2000.

Obervation number	Date (Year:quarter)	CPI inflation rate (% per year at an annual rate)	Unemployment rate (%)
1	1959:II	0.7%	5.1%
2	1959:III	2.1	5.3
3	1959:IV	2.4	5.6
4	1960:I	0.4	5.1
5	1960:II	2.4	5.2
⋮	⋮	⋮	⋮
165	2000:II	3.0	4.0
166	2000:III	3.5	4.0
167	2000:IV	2.8	4.0

Note: The U.S. inflation and unemployment data set is described in Appendix 12.1.

- Panel Data:
  Cigarette Sales, PRices, and Taxes by State and Year for U.S. States, 1985-95.

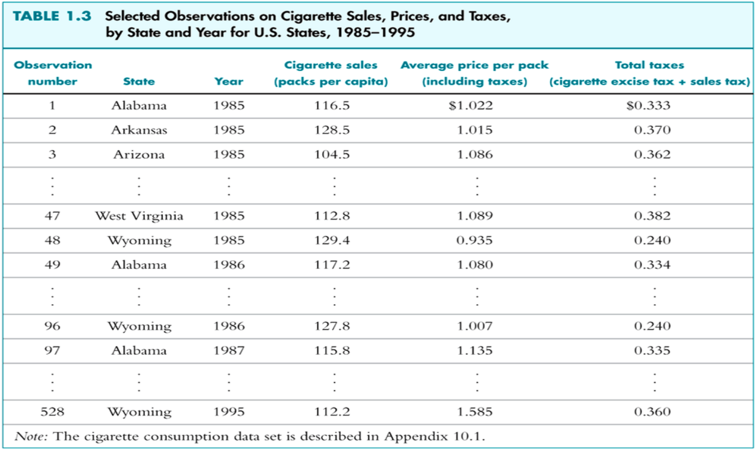

TABLE 1.3 **Selected Observations on Cigarette Sales, Prices, and Taxes, by State and Year for U.S. States, 1985–1995**

Observation number	State	Year	Cigarette sales (packs per capita)	Average price per pack (including taxes)	Total taxes (cigarette excise tax + sales tax)
1	Alabama	1985	116.5	$1.022	$0.333
2	Arkansas	1985	128.5	1.015	0.370
3	Arizona	1985	104.5	1.086	0.362
⋮	⋮	⋮	⋮	⋮	⋮
47	West Virginia	1985	112.8	1.089	0.382
48	Wyoming	1985	129.4	0.935	0.240
49	Alabama	1986	117.2	1.080	0.334
⋮	⋮	⋮	⋮	⋮	⋮
96	Wyoming	1986	127.8	1.007	0.240
97	Alabama	1987	115.8	1.135	0.335
⋮	⋮	⋮	⋮	⋮	⋮
528	Wyoming	1995	112.2	1.585	0.360

Note: The cigarette consumption data set is described in Appendix 10.1.