

FINANCIAL ECONOMETRICS
SHANGHAI JIAO TONG UNIVERSITY
SUMMER SCHOOL 2026
EMPIRICAL EXERCISE 10.1

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Reference: Stock, J.H. and Watson, M.W., Introduction to Econometrics (4th Edition, Global Edition)

*Data: **Guns.csv**, a balanced panel of the 50 US states plus the District of Columbia for the years 1977–1999.*

Empirical Exercise 10.1. Some US states have enacted laws that allow citizens to carry concealed weapons. These laws are known as “shall-issue” laws because they instruct local authorities to issue a concealed-weapons permit to all applicants who are citizens, are mentally competent, and have not been convicted of a felony. (Some states impose additional restrictions.) Proponents argue that if more people carry concealed weapons, crime will decline because criminals will be deterred from attacking other people. Opponents argue that crime will increase because of the accidental or spontaneous use of the weapons. In this exercise, you will analyse the effect of concealed-weapons laws on violent crime.

The data file is **Guns.csv**, a balanced panel of the 50 US states plus the District of Columbia for the years 1977–1999. The variable names follow the S&W **Guns** file: **vio**, **rob** and **mur** are the violent-crime, robbery and murder rates (incidents per 100,000 residents); **shall** equals 1 if a shall-issue law was in effect that year and 0 otherwise; **incarc_rate** is the incarceration rate; **density** is population per square mile; **avginc** is real per-capita personal income; **pop** is the state population; **pb1064**, **pw1064** and **pm1029** are the percentages of the population that are black aged 10–64, white aged 10–64, and male aged 10–29; **stateid** identifies the state; and **year** identifies the year.

- (a) Estimate (1) a regression of $\ln(\text{vio})$ on **shall**, and (2) a regression of $\ln(\text{vio})$ on **shall**, **incarc_rate**, **density**, **avginc**, **pop**, **pb1064**, **pw1064** and **pm1029**.

- (i) Interpret the coefficient on `shall` in regression (2). Is this estimate large or small in a “real-world” sense?
 - (ii) Does adding the control variables in regression (2) change the estimated effect of a shall-carry law in regression (1), as measured by statistical significance? As measured by the “real-world” significance of the estimated coefficient?
 - (iii) Suggest a variable that varies across states but plausibly varies little (or not at all) over time and that could cause omitted-variable bias in regression (2).
- (b) Do the results change when you add fixed state effects? If so, which set of regression results is more credible, and why?
 - (c) Do the results change when you add fixed time effects? If so, which set of regression results is more credible, and why?
 - (d) Repeat the analysis using `ln(rob)` and `ln(mur)` in place of `ln(vio)`.
 - (e) In your view, what are the most important remaining threats to the internal validity of this regression analysis?
 - (f) Based on your analysis, what conclusions would you draw about the effects of concealed-weapons laws on these crime rates?

Calculations performed using Stata. See accompanying `EE_10_1.do` file.