Home Assignment # 4

ARE 256b
Due: 3/17/2023

Instructions. You are welcome to work in groups of a maximum of <u>three</u> students. Each group member has to hand in their individual problem sets and compose their separate Stata files. Please list your group members on your problem set. Present hand-written answers to each question clearly and concisely and use tables to present results wherever possible. Attach a print-out of your Stata do file. The problem sets are meant to help you understand the material. If you have any questions, please come to the instructor or TA.

1. **Gun Control and Violence: Pooled OLS, Random Effects or Fixed Effects?**
   Using the gun control data set (*Guns* and its description *Guns_ Description* are on Canvas), we are interested in the relationship between "shall-carry" laws and violent crime rates, robbery rates and murder rates, i.e. we have three different dependent variables. You have a state-level panel for 1977-1999. Perform the following regressions and tabulate the coefficient estimates for "shall-carry" laws as well as their standard errors.
   <u>Write down the regression equation for each regression you perform.</u>

   (a) Perform the pooled OLS regression of each of the three dependent variableson the dummy variable for "shall-carry" law, *time trend* and other control variables from the dataset. Choose the control variables to include and explain your choice.

   (b) Perform the random-effects regression of each of the three dependent variables on the dummy variable for "shall-carry" law and the same control variables you included in (a).

   (c) Perform the fixed-effects regression of each of the three dependent variables on the dummy variable for "shall-carry" law and the same control variables you included in (a). Make sure to compute robust standard errors.

   (d) Compare the results in (a) through (c) in light of the differences between the estimators you considered.

   (e) Perform the Hausman test to test the random effects assumption. Can you use the regression you performed in (c)? Under what assumptions is the Hausman test command in Stata valid?

2. **Seat Belt Usage: First-Difference or Fixed-Effects?**
   In this problem you will use the seat belt data set (*SeatBelts* and its description *SeatsBelts_ Description* are on Canvas), which is a state-level panel from 1983-1997.
   <u>Write down the regression equation for each regression you perform.</u>

   (a) perform the fixed effects regression of fatality rate on seat belt usage, drinkage21 , and interaction of drinkage21 and high speed ($drinkage21 * speed70$) as well as including time fixed effects , and including time fixed effects and state-level time trends. Tabulate your estimates of the coefficient on seat belt usage in each case as well as its robust standard errors.

   (b) Do lower speed limits reduce fatality risk of among young DUI (drivers under influence)?

   (c) perform the first-difference regression of all three cases in (a).
   <u>Hint</u>: In order to perform these regressions correctly, first write down the first-difference equation with time fixed effects and state-level time trends before you go to Stata to write down the regression as $regress\ D.(_____)$.

   (d) compare your results in (a) and (c). Do you have any suggestive evidence for or against strict exogeneity?