ECO 102: Topics in Economics
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Professors: Geoffroy Barrows, Benoit Schmutz
Teaching Assistants: Arnault Chatelain, Maddalena Conte

TD5: Practice Quiz

Today, we will go through the practice test which you gonna have a real one and die in the TD session next week LOL.

Exercise

1. Under what condition on trade openness does this graphical analysis identify the causal impact of trade openness on pollution? (5 points)
   Answer: Trade opennes should be uncorrelated with the error term.
   which means $E[(error-term|trade-opennes] = 0$, off topic: $E[\epsilon|X] = 0$ also means $cov(trade-opennes, error-term) = 0$

   Correction: Trade openness is uncorrelated with any other determinants of SO_2 concentrations.

2. this condition likely to hold? Why or why not? (be specific for this context) (5 points)
   Answer: First you can argue reverse causality, or you can argue with omitted variable. For example GDP could have impact on both trade oppennes and environmental damage. Also could be demecracy or not of the country.

   Correction: No. Emissions are a byproduct of production. If a countryproduces a lot, it will have higher emissions, and probably also trade more. Alternatively, democracy may lead to stricter environmental regulation, and also higher trade volumes.

3. Why do Frankel and Rose (2005) include $ln(Y/pop)_i$, $Polity_i$, $ln(LandArea/pop)_i$ in the regression? (5 points)
   Answer: These variables are correlated to trade oppennes and environmental damage and he want to run this OLS to prove that

   Correction: These variables are likely correlated with trade openness, and hence represent omitted variables

4. Can we interpret the point estimates in columns 2-4 as causal? (5 points)
   Answer: Since we might still have reverse causality so we need a IV here.

   Correction: No. Even controlling for GDP per capita and democracy, there could be omitted variables and reverse causality. Higher pollution might make it harder to trade agreements reflect environmental conditions.

5. To address potential endogeneity, Frankel and Rose (2005) propose to "instrument" trade openness using plausibly exogenous determinants of trade. It is well known in the Trade

literature that trade flows decline with distance between two trading partners. Frankel and Rose (2005) use this insight to build a prediction of trade flows between two partners based solely on the distance between them (and a few other variables which you don't need to worry about). Frankel and Rose (2005) then aggregate up these predicted trade flows across all trading partners and generate predicted trade openness. Does this procedure generate a valid instrument? Why or why not? (10 points)
Answer: IVs have two condition which is strong instrument which instrument have to be correlate to the variables you want to instrumented, Second is Exclusive restriction which means instrument variables have no impact on dependent variable.
since that distance between the trade partner is independent with the environment situation in the country and also smaller distance with your trade partner have impact on your trade openness.

Correction: Arguably yes. Distance should not affect emissions other than through its effect on trade.

Question4: Frankel and Rose (2005) re-estimate equation 1 using the instrument for trade openness and present results in columns 5-7 in Figure 2. Again, each column reports point estimates and standard errors from a separate regression, taking a different pollutant as the dependent variable.

6. interpret the point estimate on "Trade/GDP" in column 6 (where SO_2 is the dependent variable) (5 points)
Answer: From the table we can see that we increase 1 unit in trade open and then will lead -0.23 in SO_2 concentration.

Correction: 1 percentge point increase in trade openness (like 10% to 11%) reduces SO_2 concentration by 0.23 micrograms per cubic meter.

7. Compute a rough 95% confidence interval for the estimate on "Trade/GDP" in column 6. Can Frankel and Rose (2005) reject the hypothesis that $\beta = 0$ at the 5% level? based on this regression (5 points)
Answer: $-0.23 - 2 * 0.10 \leq \beta \leq -0.23 + 2 * 0.10$ therefore $-0.43 \leq \hat{beta} \leq -0.03$ we have 95% confidence that trade open have impact on environmental damage.

Correction: $\beta \in (0.43, 0.03)$. Yes, they can reject.

8. According to the evidence in Frankel and Rose (2005) is there a causal relationship between trade openness and environmental quality? If so, which way does it go? I.e., is trade good or bad for the environment? Is the result surprising? Do you believe the result? Why or why not? (10 points)
Answer: I don't really believe since only $S0_2$ be rejected others like NO_2 which is not so maybe β is not in the 95%.

Correction: Yes, based on the IV, it looks like trade openness reduces pollution levels. Seems pretty surprising.