Tutorial 4
Fixed Effects - Due on 10.06.2020 24:00

Empirical Banking and Finance
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In this exercise we replicate some results of [Mian et al., 2017]. The original data can be found here. The paper studies the short-run impact of increases in credit to households and firms on subsequent GDP growth. The dataset includes information about credit to households and credit to firms as well as total credit credit to the private sector[1].

1. Data & Descriptives

   a) Create descriptive statistics and comment briefly.

   b) Provide a scatter plot of *logGDP_future* against *private_credit_past* and compute the correlation between the two variables. Describe what the variables used measure exactly and interpret the results.

   c) How can you reconcile the results with the estimates on private credit to GDP on GDP growth in the two previous tutorials?

2. Regression set 1

   a) Run a regression of *logGDP_future* on *private_credit_past* with country fixed effects using the Stata command *reghdfe*. For now, don't pay attention to the standard errors. Comment briefly on the sign and size of the coefficient.

   b) Run the same regression as in a) using the Stata command *reg* and including one dummy variable for each country. Compare the coefficient obtained and the R^2 measures to the previous regression.

   c) Compute the average for *logGDP_future* and *private_credit_past* for each country over time. Create two new variables, where you subtract the mean from each variable. Run a regression of the demeaned *logGDP_future* on the demeaned *private_credit_past*. Compare the coefficient obtained and the R^2 measures to the two previous regressions.

   d) Which is the appropriate R^2 measure to report and why?

   e) If you want to give the coefficient on *private_credit_past* a causal interpretation, what is the key identifying assumption?

[1] For most countries private credit = credit to firms + credit to households, but for some there is a slight difference.

f) In a seminar someone suggests controling for a country's legal origin. What do you answer?

3. Regression set 2

   a) Run the regression of *logGDP_future* on *private_credit_past* with country fixed effects using the Stata command *reghdfe* four times:
      i. Using the default standard errors
      ii. Using standard errors robust to hetereoskedasticity
      iii. Clustering standard errors at the country level
      iv. Clustering standard errors at the country level and at the year level
   b) Compare the standard errors across the four types of adjustments and comment.
   c) What are the "theoretical" arguments in favor of and against clustering standard errors at the country-level? What could be the reason for the additional clustering at the year level?
   d) Does the coefficient change?
   e) In a seminar someone suggest clustering standard errors at the country-year level. What do you answer? What happens to the standard errors if you do that?

4. Regression set 3

   a) Please replicate columns (2), (3) and (4) of Table III in [Mian et al., 2017]
   b) Test formally whether the coefficients on household credit and firm credit in the regression of column (4) are equal. Provide the distribution, H_0, H_A and the result of the test.
   c) Re-run the regression of column (4) and add year fixed effects. Briefly comment on the results. How does the interpretation of the coefficients change compared to the regression without year fixed effects?

References

[Mian et al., 2017] Mian, A., Sufi, A., and Verner, E. (2017). Household Debt and Business Cycles Worldwide. *The Quarterly Journal of Economics*, 132(4):1755–1817.