Tutorial 4
Fixed Effects - Due on 08.06.2020 20:00

Empirical Banking and Finance
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Formal Requirements

- Please upload one file per group on eCampus
- Two students per group
- Indicate both student IDs on your solution
- Do not write your name on your solution
- Format .pdf or .doc file, no log or txt files please
- Only one file, add your .do file at the end of your solution
- No late submissions will be accepted

Exercise

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. 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. From now on, keep only observations included in that first regression.

    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.

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

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

e) What is the key identifying assumption, if you want to give the coefficient on *private_credit_past* (obtained including country FE) a causal interpretation?

f) Now, run the same regression without country fixed effects. What do you conclude when comparing the obtained coefficient to the FE regression coefficient? Refer to your answer in the previous question.

g) In a seminar someone suggests controling for a country's net foreign assets in addition to the country fixed effects. What do you answer?

2. Regression set 2

a) Run the regression of *logGDP_future* on *private_credit_past* without country fixed effects and store the residuals.

b) Using the formula shown in class (the Moulton factor), compute the ratio of

$$\frac{v(\hat{\beta})_{cluster}}{v(\hat{\beta})_{robust}}$$

where "cluster" means clustering by country. Hint: the average number of observations per country is 26.17, the variance of the number of observations per country is 159.52, and the intra-class correlation coefficient can be computed using *loneway*

c) Now run the regression in a) again, clustering s.e. by country. Compare the actual ratio of s.e. to the one predicted in question b).

3. Regression set 3

a) What are the different possibilities to cluster s.e. in this setting? Which is the most stringent, which is the least stringent option?

b) Run the regression of *logGDP_future* on *private_credit_past* with country fixed effects. Cluster s.e. once using the least stringent, once using the most stringent option, and compare both of them to s.e. without clustering.

c) Does the coefficient change across the different versions?

d) In a seminar, someone suggests that you do not have to cluster s.e. when including country FE. What do you answer?

4. Regression set 4

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?

5. Questions

a) Some countries in the dataset are quite close to each other geographically and likely to be integrated economically. Discuss the potential implications for the analysis in question 5). Expected length: about 6-8 sentences.

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.