This is an introduction of our codes and how you can use it for testing our results in the report. You can download all codes (7 .R files and 2 test folders) in the github, and all the results (tables and figures) are maintained here.

DGPs.R

Contain two data generating process functions, DGP1 and DGP2.

Model 1-4 in the function *DGP2*, correspond to the Eq. (12) - (15) in Chapter 4 of our report. Four models are written all together in one function. If you want to test a specific model, please use the in the fold test_iid by changing the function *DGP* into the IID case.

in DGPs.R file	Name of the Model	in the report
Model 1	Time Invariant Fixed Effects Model	Eq. (12)
Model 2	Additive Fixed Effects Model	Eq. (13)
Model 3	Interactive Fixed Effects Model	Eq. (14)
Model 4	Interactive Fixed Effects Model with Common Regressors and Time-invariant Regressors	Eq. (15)

Methods.R

Calculate two estimators as described in Bai(2009): the within-group estimator and the interactive estimator. The corresponding theory is in Chapter 3 of our report.

Statistics.R

Calculate the statistics of the different estimations, which contains mean, bias, RMSE, standard error and confidence interval.

Since the algorithm commands loads of data and calculation, we use parallel computing in simulation function to speed up the Monte Carlo Simulations.

Tables.R

Generate Table 1-4 in our report and the table corresponding to Figure 14 in our report. You can replicate Table 1-4 by directly running the whole program. You can also do tests by set a smaller number of simulation (nsims) or a bigger Iteration precision (tolerance).

Figures.R

Generate Figures 1-14 in the report. For analyzing bias, we use jitter plot, box plot and violin plot. For RMSE we use point plot and heat plot.

FactorEstimation.R

You can replicate Table 6-7 in the report by just runing the whole program.

RealData.R

Apply the methods as described in Chapter 3 to real data from Chapter 1.
You can replicate Table 10-12 in the report by sourcing this R file.

test_starting_values

You can replicate Table 5 in the report by sourcing this R file.

test_iid

Change data generating process in *DGP2* of the file DGPs.R and generate tables for (12)-(15), by assuming time fixed effects as independent AR(1) series.
Only Table 8-9 are presented in our report. You can replicate Table 8 by runing the file **model 3.R** and Table 9 by runing **model 4.R** in this folder.