DFEL-RTN, a set of TSP programs for root-N consistent estimations of dynamic fixed effects logit models*

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Abstract

"DFEL-RTN (version 0.0.0)" is a set of TSP programs for root-N consistently estimating the dynamic fixed effects logit model with strictly exogenous continuous explanatory variables and/or time dummies. This set facilitates the researchers exploring the binary choice panel data.

Keywords: dynamic fixed effects logit models; strictly exogenous continuous explanatory variables; time dummies; root-N consistent GMM estimators

JEL classification: C23; C25

1 Introduction

Kitazawa (2013, 2016) proposed root-N consistent estimators for the dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies. The set of TSP programs "DFEL-RTN (version 0.0.0)", which is named after "Dynamic Fixed Effects Logit models and RooT-N consistency", provides us with a tool enabling us to carry out empirical studies aimed at obtaining the root-N consistent estimates in the framework of dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies. "DFEL-RTN (version 0.0.0)" is composed of two programs: "dfelrtna.tsp" estimates the models including strictly exogenous continuous explanatory variables with or without time dummies, while "dfelrtnb.tsp" estimates the model with time dummies but excluding the explanatory variables. At present, this is the only program set for root-N-consistent estimations of dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies.

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Over the last fifteen years, it has been a conventional belief that no root-N consistent estimator is feasible for the dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies. Initially, Honoré and Kyriazidou (2000) proposed a consistent estimator using kernel weight, but it is not root-N consistent and cannot estimate time dummies. Soon after, Hahn (2001) suggested that the root-N consistent estimation is infeasible for dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies. Later, a series of the development of approximation estimators flourished in the theoretical econometrics field on binary choice panel data analysis. Some less biased approximation estimators were proposed by Carro (2007), Bester and Hansen (2009), Fernández-Val (2009), Hahn and Kuersteiner (2011), and Yu et al. (2012) for a moderately large number of time periods, while the pseudo CMLE proposed by Bartolucci and Nigro (2012) is a kind of the approximation estimator, which is not root-N consistent for true values of the parameters of interest. However, Kitazawa (2013, 2016) recently proposed root-N consistent GMM estimators for dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies when the number of time periods is four or more.[1] It is obvious that the root-N consistent GMM estimators facilitate the measurement of the state dependence of binary outcomes using panel data, and "DFEL-RTN" is created for this purpose.[2]

2 Advance preparations

Some preparations are needed to run the programs "dfelrtna.tsp" and "dfelrtnb.tsp" in "DFEL-RTN".

2.1 Requirements

The programs work under both 'TSP 5.1' and 'OxMetrics 6' for the operating systems 'Windows Vista/7/8/8.1/10'.[3] Use 'TSP 5.1 (Windows with OxMetrics interface)'.

2.2 Download

The zipped file of "DFEL-RTN" is downloadable from the following site:

[1] The GMM (Generalized Methods of Moments) was proposed by Hansen (1982).
[2] This version deals with only the 'AR(1)' dynamic fixed effects logit model, where the term "the 'AR(1)' logit model with individual effects" is used in Kyriazidou (2010). The treatment of models with more lags of dependent variables is for future versions.
[3] 'TSP 5.0' and other versions of 'OxMetrics' may be also available. The econometrics software "TSP (Time Series Processor)" has been developed by TSP international. See also Hall and Cummins (2009).

http://www.kyusan-u.ac.jp/J/kitazawa/SOFT/DFEL_RTN/index.htm

2.3 Installation

First, make sure that 'TSP 5.1/OxMetrics 6' is installed on a Windows PC. Next, unzip the downloaded file "dfelrtn000.zip" in a folder of your choice. This creates a subfolder "dfelrtn000", in which the following four principal folders are found: "docum", "errorx", "estim", and "funcx". The main programs "dfelrtna.tsp" and "dfelrtnb.tsp" are stored in the folder "estim" and are to be run in this folder. The folder "funcx" stores the subroutine files used in the main programs. The folder "errorx" contains the error message codes used in the programs "dfelrtna.tsp" and "dfelrtnb.tsp". The folder "docum" contains the manuals for "DFEL-RTN".

In addition, there are five example folders: "estim_ex1", "estim_ex2", "estim_ex3", "estim_ex4", and "estim_ex5". These folders contain the estimation examples created by running the programs "dfelrtna.tsp" and "dfelrtnb.tsp" using different dataset files and parameter settings. It should be noted that the results executing the main programs in the folder "estim" in default configurations of commands are just all the same as those in the folder "estim_ex1".

2.4 Running the programs

Moving to the folder "estim", we can run the programs "dfelrtna.tsp" and "dfelrtnb.tsp" after compiling "prma.tsp" and "prmb.tsp" (and also "datra.tsp" and "datrb.tsp", if needed) respectively, and preparing the dataset files. See the manuals "dfelrtna.pdf" and "dfelrtnb.pdf" in the folder "docum" for the instructions for running the programs "dfelrtna.tsp" and "dfelrtnb.tsp", respectively.

In the folder "estim", some default files are provided. The dataset files and the command setting files are configured in accordance with the manuals "dfelrtna.pdf" and "dfelrtnb.pdf" (found in the folder "docum"). These files should be replaced by customized ones when researchers conduct their own estimations.

3 Remarks

"DFEL-RTN (version 0.0.0)" is a provisional and incipient version, with the aim of implementing root-N consistent estimations for dynamic fixed effects logit models with strictly exogenous continuous explanatory variables and/or time dummies. In future editions, author would like to make some improvements to the programs and include other estimators. Users can use this code set freely if 'TSP 5.1 (Windows with OxMetrics

interface)' is appropriately installed on their Windows PC. The programs come with no warranty of any kind, although they have been thoroughly checked. If you have any comment, query, request concerning the programs, and so on, please feel free to e-mail them to Yoshitsugu Kitazawa (e-mail: kitazawa@ip.kyusan-u.ac.jp).

In addition, announcements including the information on errata, conference presentations, new version release, etc. for this program set are available from the link in the download site of this program set as shown in the subsection 2.2.

References

Bartolucci F., Nigro, V., 2012. Pseudo conditional maximum likelihood estimation of the dynamic logit model for binary panel data. Journal of Econometrics 170 (1), 102–116. doi:10.1016/j.jeconom.2012.03.004

Bester, A., Hansen, C., 2009. A penalty function approach to bias reduction in nonlinear panel models with fixed effects. Journal of Business and Economic Statistics 27 (2), 131-148. doi:10.1198/jbes.2009.0012

Carro, J.M., 2007. Estimating dynamic panel data discrete choice models with fixed effects. Journal of Econometrics 140 (2), 503-528. doi:10.1016/j.jeconom.2006.07.023

Fernández-Val, I., 2009. Fixed effects estimation of structural parameters and marginal effects in panel probit models. Journal of Econometrics 150 (1), 71-85. doi:10.1016/j.jeconom.2009.02.007

Hahn, J., 2001. The information bound of a dynamic panel logit model with fixed effects. Econometric Theory 17 (5), 913-932. doi:10.1017/S0266466601175031

Hall, B.H., Cummins, C., 2009. TSP 5.1 User's Guide. TSP International, Palo Alto, CA.

Hansen, L.P., 1982. Large sample properties of generalized method of moments estimators. Econometrica 50 (4), 1029–1054. doi:10.2307/1912775

Honoré, B.E., Kyriazidou, E. 2000. Panel data discrete choice models with lagged dependent variables. Econometrica 68 (4), 839-874. doi:10.1111/1468-0262.00139

Kitazawa, Y., 2013. Exploration of dynamic fixed effects logit models from a traditional angle. Discussion Paper Series, Faculty of Economics, Kyushu Sangyo University, April 2013, No. 60.

http://www.ip.kyusan-u.ac.jp/keizai-kiyo/dp60.pdf

Kitazawa, Y., 2016. Root-N consistent estimations of time dummies for the dynamic fixed effects logit models: Monte Carlo illustrations, Kyushu Sangyo University, March 2016, No. 72.

http://www.ip.kyusan-u.ac.jp/keizai-kiyo/dp72.pdf

Kyriazidou, E., 2010. Nonlinear panel data models. In: S. N. Durlauf and E. B. Blume, Eds., Microeconometrics, Palgrave and Macmillan, Basingstoke, 154-168.

Yu, G., Gao, W., Shi, N.Z., 2012. A note on the estimation problem of dynamic binary panel data model with fixed effects. Pakistan Journal of Statistics 28 (2), 271-278.