論文の要旨

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論文　題目　Essays on Dynamic Panel Data Analysis

論文の要旨

Dynamic panel data model is widely used in empirical economic studies, such as macro economics, finance and so on. But with the enormous mounts of data, the most popular econometric estimation method, Ordinary Least Square method or Fixed Effect estimation may not be significant for short dynamic panels, NIckell (1981). Many types of panel data models and estimation methods are proposed to solve the problems caused by different situation.

In the second chapter, we proposed the double filter instrumental variable estimators for the panel data models with weakly exogenous variables. The model is allowed to include heterogeneous time trends besides the standard fixed effects. The proposed instrumental variable estimator is constructed by removing the fixed effects (and time trends) from both the model and instruments by a variant of GLS transformation. From the theoretical point of view, that IV estimator has addressed the trade-off problem of using many instruments. Although many instruments are required to improve efficiency, the IV estimator becomes efficient despite the same number of instruments as the parameters is used. Hence, the IV estimator becomes efficient with the minimal number of instruments.

This property has an advantage that it does not cause a large finite sample bias induced by using many instruments. Thereby, the trade-off problem between the bias and efficiency of the generalized method of moments (GMM) estimator is addressed: both the bias and variance of the IV estimator become small simultaneously. We also show that the proposed estimator has the same asymptotic distribution as the bias corrected fixed effects estimator when both N and T , the dimensions of cross section and time series, are large. Monte Carlo simulation results reveal that the proposed estimator performs well in finite samples and outperforms the conventional IV/GMM estimators using instruments in levels in many cases.

In the third chapter, we propose a new system GMM estimator for weak instrumental problem of dynamic panel data models.When the sample size of time series (T) is small and number of cross-section (N) is large, as the variance ratio of individual effects to the disturbance is large or the persistency of series is strong, the system GMM estimator constructed from level (LEV) and first-differenced (DIF) model and IV suffers from the weak instrumental problem, Bun and windmeijer(2010).

The new system GMM estimator considered forward orthogonal deviations (FOD) model suggested by Arellano and Bover (1995) and forward random effect (FRE) model proposed by Hayakawa (2010, 2015), alternative to DIF and LEV model. In this chapter we show that the concentration parameter of FOD and FRE model for cross-section regression at each period. We investigate that as the variance ratio of individual effects and error gets larger, the performance of concentration parameter of LEV and FRE is totally

different, the concentration parameter of LEV tend to be zero, but the FRE is not. Hence the FRE model is used instead of LEV models, the weak instrumental problem will less effected by the variance ratio.

Our Monte Carlo simulation supported our derivation. The finite sample performance of system GMM estimator used FOD and FRE models performs well when the variance ratio of individual effects and error term is large, while the conventional system GMM estimation combined the LEV and DIF does not.

In the forth chapter, we proposed a higher-order bias-corrected estimator for heterogeneous dynamic panel data model.Theoretical result implies that the bias of estimator in Kiviet and Phillips(1993)(KP1) for short run coefficients of dependent variables and heterogeneous variables should be smaller than that of OLS, and the bias of Kiviet and Phillips(2012) (KP2) should be smaller than that of KP1. From our simulation results, we can confirm that this is the case. For these short run coefficients, KP2 has the smallest bias in almost all cases while OLS is most biased. This reduction in bias is also reflected in mean absolute error (MAE). Indeed, KP2 has the smallest MAE in almost all cases among the three estimators.

However, for the long-run coefficient θ, this result does not readily apply. In some cases, the estimate for θ based on KP2 is more biased than that based on KP1. Moreover, the estimates for θ based on bias-corrected estimators are sometimes severely biased. Note that this result is also reported in Pesaran and Zhao (1999). As a solution to this problem, we consider DBC1 and DBC2, first-order and second-order bias corrected estimators based on KP1 and KP2. From the simulation result, it is observed that DBC2 which is based on second-order bias-corrected estimator has the smallest bias in many cases. These results suggest that second-order bias-correction is useful in reducing the bias of mean group estimators.