

# CENTRE FOR STUDIES IN SOCIAL SCIENCES, CALCUTTA

R-1 BAISHNABGHATA PATULI, KOLKATA 700094

## ECONOMICS STUDY GROUP SEMINAR

**Saraswata Chaudhuri**

shall present

### More powerful Difference-in-difference

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#### Abstract

Within group correlation in the errors of difference-in-difference (DID) regression models is an extremely common empirical phenomenon. Therefore, allowing for unrestricted within group correlation is the principled way to do inference, but this can dramatically reduce the precision of OLS regression estimates and the power of tests based on OLS estimates (see Bertrand, Duflo and Mullainathan (2004)). In spite of its theoretical appeal in increasing precision, nonparametric FGLS is not an appropriate solution to this problem of reduced precision because it is typically misleading for estimation and inference unless groups are very small in size. Hansen (2007) also noted that though parametric FGLS is undesirable if group size is small, a suitable bias correction in the parametric FGLS method using autoregressive working models for error variance matrix can perform well (BCFGLS). BCFGLS is in fact optimal if the autoregressive working model for error variance is correct. However, in practice, the autoregressive working model is almost always going to be incorrect. Hence, BCFGLS, or for that matter, standard FGLS may not be optimal. We argue that this improvement is realized if we abandon the existing methods of estimation of the working model and instead estimate the autoregressive or any user-chosen working model with the objective of maximizing the precision of the final estimates of the regression coefficients. Our proposed method leads to a variant of FGLS, and we call it Targeted FGLS (TFGLS) since it explicitly targets the regression coefficients and allows for unrestricted within group error correlation. TFGLS is the asymptotically optimal estimator given the user-chosen working model, and it does not lead to asymptotic bias because the TFGLS estimating equation is robust to local/global perturbation of the working model.

**Date:** 16<sup>th</sup> August 2024 (Friday)

**Time:** 3 P.M.

**Venue:** CSSSC's Seminar Room, Patuli Campus

All are welcome to attend

Dr. Sattwik Santra  
(Co-Convener, Seminar Sub-Committee)