

# **"Difference in Differences with Latent Group Structures"**

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## **Abstract**

This paper investigates the estimation of average treatment effects on the treated (ATT) from the panel data in the presence of latent group structures, where potential outcome distributions depend on latent types. We examine a scenario where the parallel trends assumption holds when conditioned on latent types, but may not be maintained in aggregate, resulting in an inconsistent standard difference-in-difference estimator. We demonstrate that the latent group-specific ATT (LGATT) can be identified if parallel trend assumptions and other regularity conditions are met for latent types. We present the conditions under which latent group structures are identified from the pre-treatment period data. We propose an estimator for the LGATT that minimizes a weighted least squares criterion function, using weights derived from the estimated posterior probabilities of each latent type using pre-treatment data.