

The Causal Effect of Data Centers on Regional Electricity Demand: Evidence from Korea Using Synthetic Difference-in-Differences

Wonyoung Kim, Jihyo Kim, Jiyong Eom

KAIST Graduate School of Green Growth and Sustainability, Daejeon, Korea, Republic of

Extended Abstract

[Download file](#)

Abstract Summary

This study analyzes the impact of data center introduction on regional electricity consumption in Korea. Using a synthetic difference-in-differences (SDiD) methodology, we investigate monthly electricity consumption data for neighborhoods affected by the data center introduction between 2014 and 2024. Our findings show that the installation of data center introduction leads to about 44.7% increase in regional electricity demand over the decade. Furthermore, a 36-month gradual increase of electricity consumption suggests that electricity demand rises with the operational maturity of the facility rather than peaking immediately upon installation. This study suggests that potential bias of underestimating or overestimating the electricity demand through capacity based projections of data center electricity demand.