D8.3 Employment growth and the establishment of bio-refineries in the EU (TUM)

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SUMMARY:
This study contributes to the field of bio-refinery research in two ways. First, the difference-in-difference (DiD) methodological framework is applied for the first time to analyse the impact of bio-refineries on employment in a local context. In addition, a novel approach of incorporating non-binary treatment effects into the DiD model is used to provide a robust estimation of the marginal economic effects of bio-refineries. Second, this study uses a unique regional level dataset provided by EU JRC and the EH H2020 BioMonitor project to examine the impact of the bio-refinery industry on local employment. This dataset covers multiple European Member states and enables us to account for regional characteristics to assess the effects of the bio-refineries sector on the local employment. Based on the findings, this research shows that the establishment of a bio-refinery can have a positive impact on regional employment.

RESEARCH QUESTION:
How does establishing and operating a bio-refinery influence employment at the regional level?

CASE:
The employment impact of bio-refineries

BIO-BASED PATHWAYs:
Bio-refineries producing bioenergy, bio-methane, biochemicals, biofuel, or bio-based components

DEVELOPMENT STAGEs:
Drive to maturity; Mature

DATA SOURCEs:
JRC DataM biorefinery database; Eurostat data

DATA ANALYSIS:
Propensity score matching and difference-in-difference methods

INDICATORS:
Employment (thousands of employees) related to bioeconomy

GEOGRAPHICAL SCOPE:
All EU member states

TIME REFERENCE:
2000-2018

AUDIENCE:
Policy-makers; Researchers

KEY RESULTS:
- Regions with bio-refineries perform better when overall employment decreases (less employment loss or higher employment growth). Regions without bio-refinery establishments have a higher employment growth when overall employment increases.
- Regions with bio-refinery establishments have higher employment compared to regions with no bio-refinery establishments.
- The establishment of bio-refineries has a positive impact on regional employment overall and such impact is persistent over time.

CONTEXT:
- The local employment might be influenced by regional population, disposable income, education, business birth rate, and survival rate.
- Key determinants of where a biorefinery can be located are agricultural land, patents, motorways, and railways.
- Contextual factors such as the changing of NUTS codes, biomass or fossil fuel prices, policies and regulation, consumer preferences, and the development of technology can influence the methodological framework.

LIMITATIONS:
- Missing data on detailed bio-refinery properties such as the size of bio-refinery and years of operation after establishment.
- Missing data of the dataset were filled with multiple imputation methods. This might lead to variation in the model results when replicating the estimation.
- Since bioeconomy drivers are key determinants for the evolution and dispersion of bio-refineries, a shift of the drivers might also shift the estimated employment impact.

GOOD PRACTICES:
- Use of multiple imputation methods to cover the data gaps.
- Investigate persistent vs. non-persistent impact of bio-refinery on employment after its establishment.

FEEDBACK and RECCOMANDATION to other WPs

WP1 Indicators: This case study explores the links between the emerging bio-economy and common indicators (such as regional employment collected by Eurostat). It incorporates newly developed bioeconomy indicators (such as the establishment of bio-refineries) into a leading-edge analytical framework. This helped inform the adoption of bioeconomy's indicators in future studies.

WP2-3 Data collection: Currently collecting data on bio-refinery operations is difficult due to data confidentiality issues. This case study provides an example of how missing data are treated with multiple imputation. However, this method is only able to deal with a small amount of missing data. Collecting first-hand data is still the preferable way.

WP4-5 Model Toolbox: The results of this case study serve as a comparison for the similar indicators estimated by the BioMonitor Model Toolbox. It strengthens the robustness of the models developed in WP4 and WP5.

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