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PROJECT NAME:

“What if, tariffs? A Synthetic Control Group approach to short-term impact assessment for policy evaluation - the case of EU tariff, on Chinese EV OEMs, impact on German EV vehicle sales ”

KEY WORDS: Synthetic Control Group; Demand Forecast; Policy Evaluation;

ABSTRACT: This paper proposes the application of synthetic control groups, to forecast the demand of electric vehicle sales in Germany, against a counterfactual that implies the absence of the most recent set of tariffs imposed on the import of Chinese electric vehicles. It outlines a possible quantitative approach to policy evaluation, that is mostly model-driven, in a information scarce environment.

A. PREPARATION

1. Define Objective

The objective is twofold,:

- 1. demonstrate the plausibility of a quantitative approach to policy evaluation, when there arise the issues of timeliness and information scarcity
- 2. **(if 1. then)** prescribe a course of action given the EU Counsel’s deadline regarding the status of current tariff on Chinese EV imports – changing from preliminary to permanent.

2. Collect Data

Note: pre-policy period [Jan, 2022: Jun 2024], post-policy period [Jul, 2022: Set 2024]

Thus far we have collected pre- and post- policy sales data on EV in all major countries, on a monthly granularity, as well as the relevant financial indicators for all countries used in this study, and useful indicators, about commodities like gas prices and lithium spot prices. Countries without the policy that might be used in the control have been identified.

3. Data Wrangling

The data is to be wrangled into a tsibble, with monthly granularity, for each country in the set.

B. MODELING

4. Modeling

Our approach to justifying the applicability and efficacy of the SCG to the task of policy evaluation, will be mostly experimental, that is; we will consider how the SCG interpolation behaves against a couple of models, that we have seen during our BsC studies, and on which we have enough confidence in their interpolation capabilities.

MLRM:

- Model demand using MLRM to benchmark against linear methods.

ARIMA:

- Model demand using SARIMA, to benchmark against time series methods.

Synthetic Control Group:

- Interpolate demand, by finding optimal country weights for the controls countries in the synthetic control, then inspecting parallel trends.

5. Evaluating Performance**Metric Comparison:**

- Compare model performance metrics, with the idea that a good performance of the SCG at interpolation, provides good confidence on the realization of the counterfactual.

Placebo Tests

- Apply SCM to Control Units and compare treatment effects, quantify proportion of placebo that show a treatment effect (false positive) and conclude with a p-value given by ($p\text{-value} = k/N$)

C. CONCLUSION**6. Results**

If the results of the SCG approach shows good performance i.e. if the model shows similar or superior interpolation to the other models, we move to conclude about the effects of the policy. Not forgetting to acknowledge limitations, and constraints.

7 . Policy Recommendation

Conclude with recommendations regarding policy (assuming favorable results).