By interpreting exporters’ dynamics as a complex learning process, this paper constitutes the first attempt to investigate the effectiveness of different Machine Learning (ML) techniques in predicting firms’ trade status. We focus on the probability of Colombian firms surviving in the export market under two different scenarios: a COVID-19 setting and a non-COVID-19 counterfactual situation. By comparing the resulting predictions, we estimate the individual treatment effect of the COVID-19 shock on firms’ outcomes. On average, we find that the COVID-19 shock decreased a firm’s probability of surviving in the export market by about 20% in April 2020. Finally, we use a Classification Analysis (CA) to uncover the exporters’ characteristics determining higher COVID-19 effects.

Research Questions

- How to estimate a counterfactual for Colombian exporters under a worldwide shock?
- Is the COVID-19 effect heterogeneous? With respect to which firm’s characteristics?

Estimation Problem

1. We cannot observe the outcome under a pure non COVID-19 scenario for any firm during 2020: no control group is available.
2. The economy-wide impact of the shock is coupled with complex interdependencies between firms and products belonging to different sectors and countries: no variable measuring the extent of the firm-level exposure to COVID-19 is readily available.

Data

We use monthly product level transactions data on exports and imports, and firms’ characteristics reported at the Colombian Customs Office (DIAN) for 2018, 2019, and 2020. For 2020, we combine this data with four indexes [4] representing the strength of the measures taken by countries to contain the COVID-19 outbreak. Our final data set is composed by 1,975 explanatory variables.

Results

On March 25 2020, the Colombian government implemented a complete and mandatory lockdown.

Conclusions

We show along which firms’ characteristics 𝜂 displays the more relevant heterogeneity. Specifically, we adapt and apply to our setting the Sorted Partial Effects (SPE) and Classification Analysis (CA) method introduced in [3].

References