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Replication and Extension of Dynamic Trade Elasticity Estimates

A replication of Boehm et al. (2023) and applications to the European Union, Nordic countries, and Denmark

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1 Recent estimates of trade elasticities

This note replicates Figures 1 and 2 from Boehm et al. (2023) and extends the sample period from 2018 to 2020. The purpose of the exercise is to assess whether the methodology proposed in the paper can be used to estimate dynamic trade elasticities for Denmark, the Nordic countries and the European Union.

The original paper exploits tariff changes applied to a broad set of trading partners and estimates the dynamic response of trade flows using local projections. Using a global sample covering approximately 180 countries, the authors find a short-run trade elasticity of roughly -0.8 and a long-run elasticity close to -2.

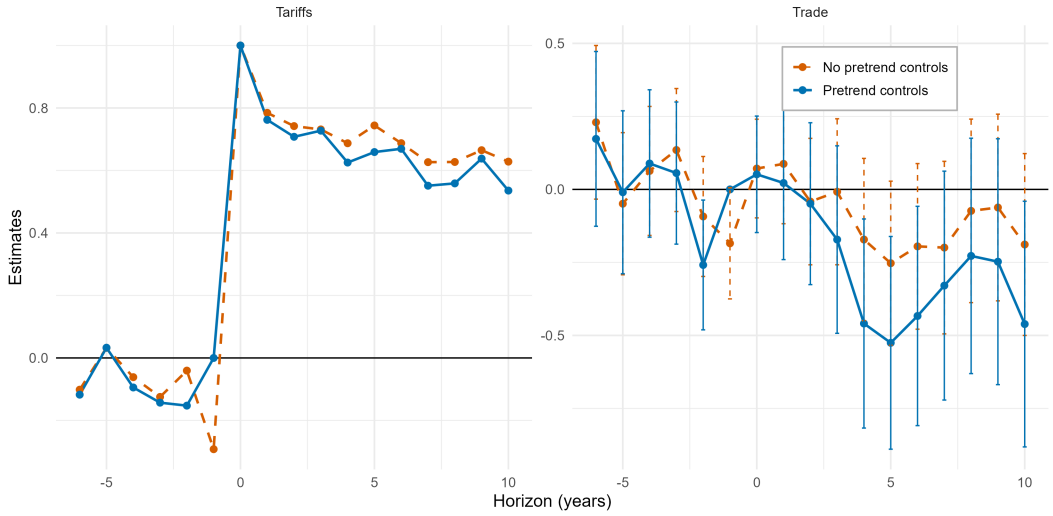
The replication proceeds in three steps. First, the original results are replicated using the full-country sample. Second, the analysis is repeated using only European Union member states. Finally, the methodology is applied exclusively to Denmark. The objective is to evaluate whether the identification strategy remains informative when the available cross-sectional variation is substantially reduced. We conclude that the replication produces economically relevant and statistically significant results for the EU sample, but the proposed identification methodology does not appear to be suited for estimating dynamic trade elasticities for a single small open economy such as Denmark.

2 Replication of the original sample

First, we replicate Figures 1 and 2 for the years 1995-2018. The replication using the full sample of countries broadly reproduces the

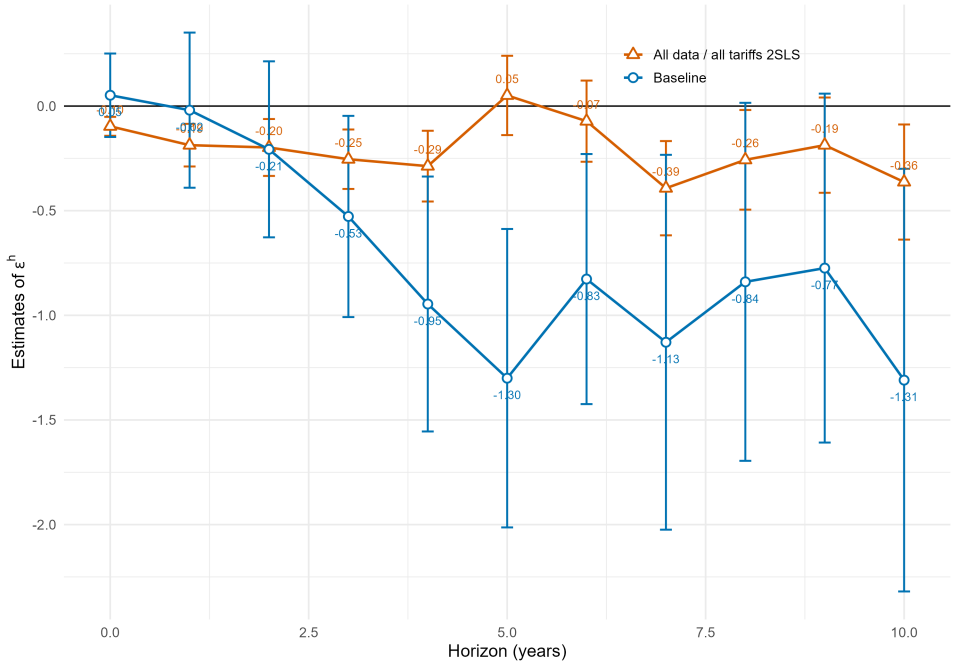
main findings of the paper. Tariff responses and trade-flow dynamics are qualitatively similar to those reported in the original study, and the estimated trade elasticity gradually increases in absolute value over time.

Figure 2.0.1: Local projections: tariffs and trade - replication of Boehm et al. (2023)



Notes: Displays the results from estimating local projection of h-period tariff growth (left panel) and h-period import growth (right panel) on the tariff change from t-1 to t, instrumented with the baseline tariff, see Boehm et al. (2023). All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The specification with pre-trend controls additionally includes log-changes in tariffs from t-2 to t-1. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair product level.

Figure 2.0.2: Trade elasticity: baseline and all data/ all tariffs 2SLS - replication of Boehm et al. (2023)



Notes: Display estimates of the trade elasticity as specified by Boehm et al. (2023), and including one lag of the changes in tariffs and trade as pre-trend controls. 2SLS estimates with the baseline instrument are in blue and all data/all tariffs 2SLS estimates in red. All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair-product level.

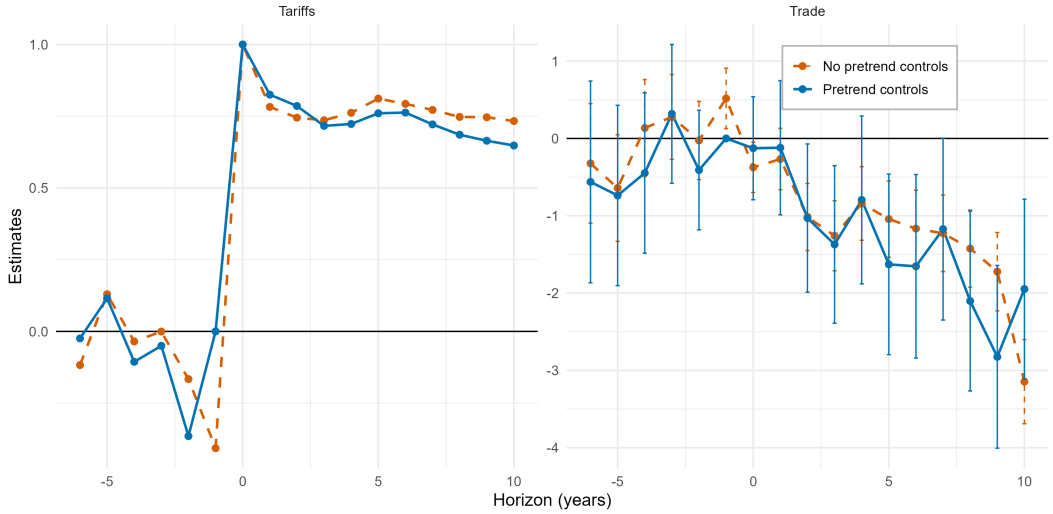
3 European Union Sample

The methodology is subsequently applied to a restricted sample consisting only of European Union countries, Figure 3.0.3 and Figure 3.0.4. Relative to the full-country sample, the estimated tariff responses remain reasonably stable, but the trade responses become more volatile. Consequently, the implied trade elasticities are estimated somewhat less precisely, particularly at short and medium horizons.

Extending the sample period from 2018 to 2020 does not improve

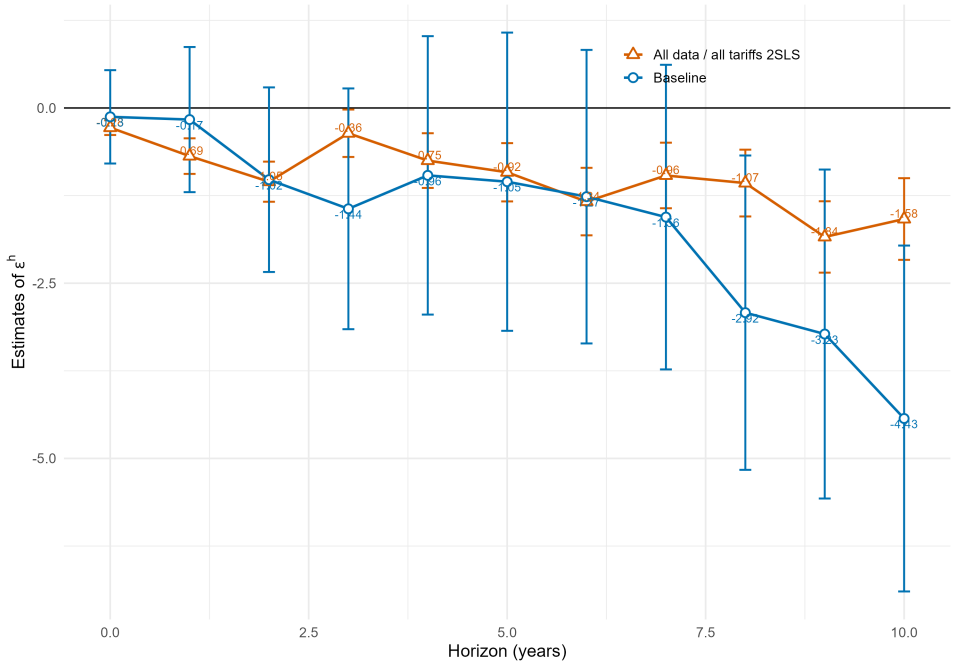
the precision of the estimates. Although point estimates remain economically plausible in several specifications. Overall, the evidence suggests that the identifying variation available within the European Union still gives informative results.

Figure 3.0.1: Local projections: tariffs and trade - EU sample



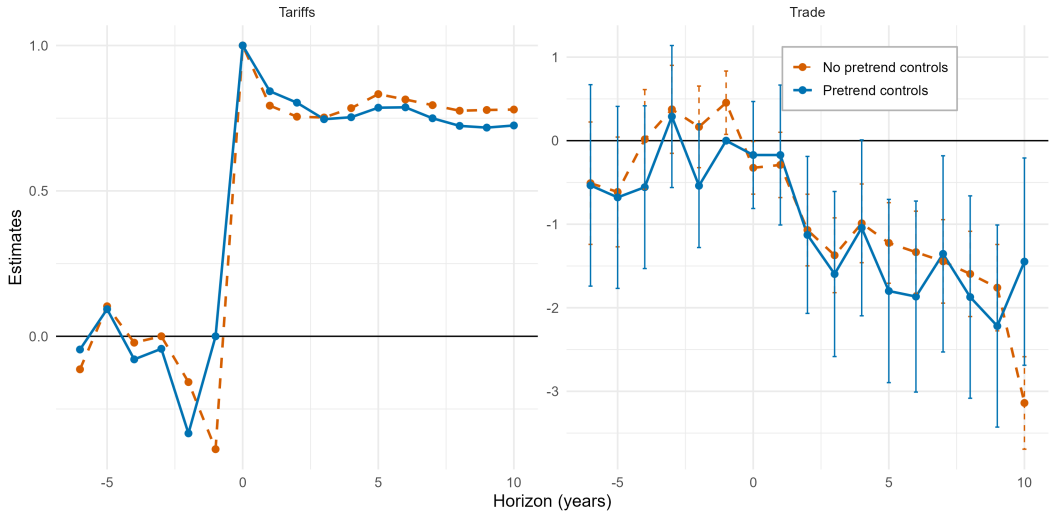
Notes: Displays the EU results from estimating local projection of h-period tariff growth (left panel) and h-period import growth (right panel) on the tariff change from t-1 to t, instrumented with the baseline tariff, see Boehm et al. (2023). All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The specification with pre-trend controls additionally includes log-changes in tariffs from t-2 to t-1. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair product level.

Figure 3.0.2: Trade elasticity: baseline and all data/ all tariffs 2SLS - EU sample



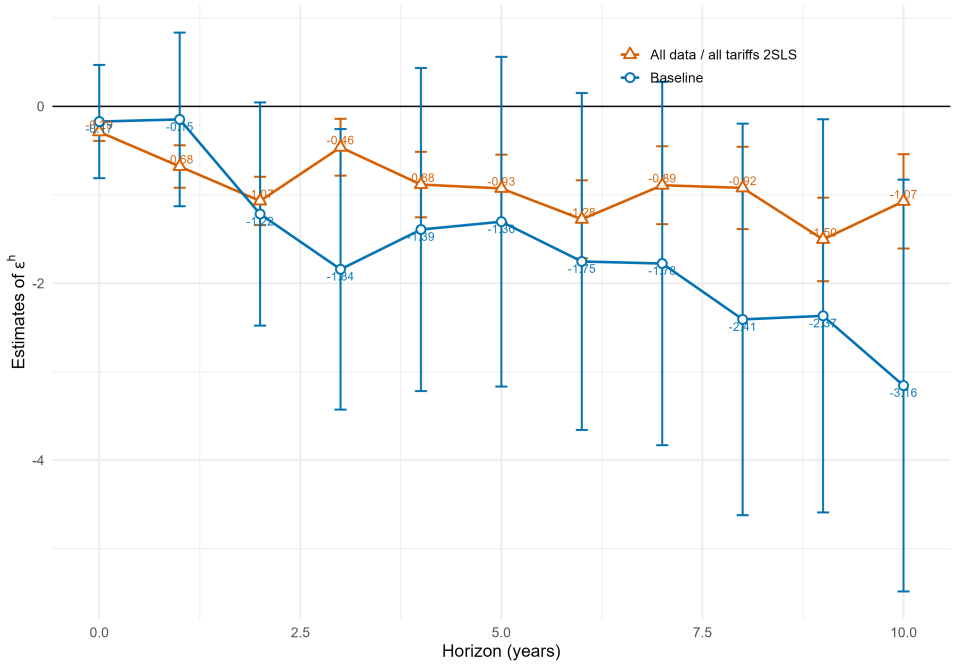
Notes: Display estimates of the trade elasticity for EU as specified by Boehm et al. (2023), and including one lag of the changes in tariffs and trade as pre-trend controls. 2SLS estimates with the baseline instrument are in blue and all data/all tariffs 2SLS estimates in red. All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair-product level.

Figure 3.0.3: Local projections: tariffs and trade - EU extended sample period



Notes: Displays the EU results from estimating local projection of h-period tariff growth (left panel) and h-period import growth (right panel) on the tariff change from t-1 to t, instrumented with the baseline tariff, see Boehm et al. (2023). All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The specification with pre-trend controls additionally includes log-changes in tariffs from t-2 to t-1. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair product level.

Figure 3.0.4: Trade elasticity: baseline and all data/ all tariffs 2SLS - EU extended sample period



Notes: Display estimates of the trade elasticity for EU as specified by Boehm et al. (2023), and including one lag of the changes in tariffs and trade as pre-trend controls. 2SLS estimates with the baseline instrument are in blue and all data/all tariffs 2SLS estimates in red. All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair-product level.

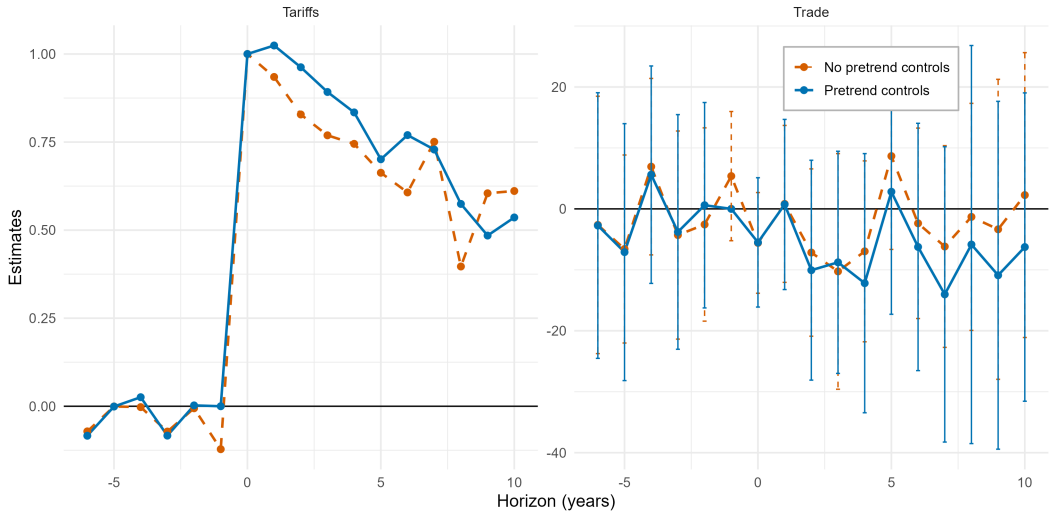
4 Denmark Sample

Finally, the methodology is applied exclusively to Danish data. In this case, the estimated tariff responses remain identifiable, but the trade responses become highly volatile and are estimated with substantial uncertainty. Consequently, the implied trade elasticities fluctuate markedly across horizons and frequently attain values that are difficult to interpret economically.

The confidence intervals are wide throughout the sample, and the

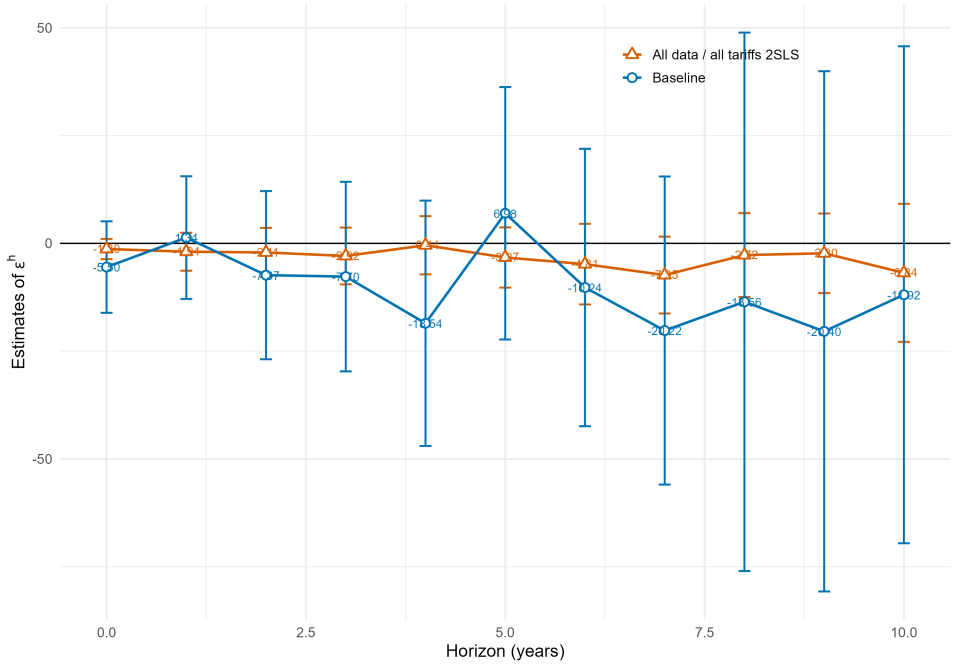
estimates are highly sensitive to the inclusion of additional observations and alternative specifications. These findings suggest that the variation in tariff changes affecting Denmark alone is insufficient to support reliable estimation of dynamic trade elasticities using the methodology proposed by Boehm et al. (2023).

Figure 4.0.1: Local projections: tariffs and trade - DK sample



Notes: Displays the DK results from estimating local projection of h-period tariff growth (left panel) and h-period import growth (right panel) on the tariff change from t-1 to t, instrumented with the baseline tariff, see Boehm et al. (2023). All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The specification with pre-trend controls additionally includes log-changes in tariffs from t-2 to t-1. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair product level.

Figure 4.0.2: Trade elasticity: baseline and all data/ all tariffs 2SLS - DK sample



Notes: Display estimates of the trade elasticity for DK as specified by Boehm et al. (2023), and including one lag of the changes in tariffs and trade as pre-trend controls. 2SLS estimates with the baseline instrument are in blue and all data/all tariffs 2SLS estimates in red. All specifications include exporter-HS4-year, importer-HS4-year, and exporter-importer-HS4 fixed effects. The bars display 95 percent confidence intervals. Standard errors are clustered at the country-pair-product level.

5 Conclusion

This note replicates the methodology of Boehm et al. (2023) and extends the analysis to several regional samples, including the European Union and Denmark.

The replication reproduces the main findings of the original paper for the global sample. Tariff increases are associated with persistent reductions in trade volumes, and the implied trade elasticity becomes increasingly negative over time. This confirms that the replication

captures the core mechanisms documented in the original study.

However, the methodology performs less well when applied to smaller and more geographically concentrated samples. While the European Union continue to generate economically plausible estimates, precision deteriorates markedly relative to the full-country sample. For Denmark, the estimated trade responses are highly volatile and the resulting trade elasticities are not sufficiently robust to support reliable inference.

Taken together, the results suggest that the identification strategy proposed by Boehm et al. (2023) relies heavily on the large cross-sectional variation available in a global panel of countries. Once this variation is substantially reduced, the methodology loses statistical power and produces unstable elasticity estimates. Consequently, the approach does not appear well suited for estimating dynamic trade elasticities for a single small open economy such as Denmark.

References

Boehm, C. E., Levchenko, A. A. and Pandalai-Nayar, N. (2023), 'The long and short (run) of trade elasticities', *American Economic Review* **113**(4), 861–905.