Replication Assignment 1

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1 Data

I took bilateral trade flow data from the OECD Structural Analysis (STAN) Bilateral Trade in Goods by Industry and End-use Category (edition 2021) relating to the year 2017. I took the inverse of producer price indices, which were from the GGDC Productivity Level Database, as a measure of productivity across countries and industries. The countries I selected closely follow Costinot et al. (2012). I selected year 2017 because both bilateral trade flow data and productivity data were available for this year. My selection of sectors is driven by the fact that 2023 release of the GGDC Productivity Level Database presents data on relative prices across 12 sectors, for the 2017 benchmark year. My sample includes 22 countries (18 European countries plus Japan, Korea, Australia and the U.S.) and 3 sectors (Agriculture, Mining, and Manufacturing), which correspond to ISIC rev. 4 code. My relative productivity measures across countries and sectors are reported in Table 1. The productivity levels reported in Table 1 are normalized to one in all sectors for the U.S. and in all countries for the Agriculture sector. I also took data on output across countries and industries from the OECD Structural Analysis (STAN) to construct import penetration ratio (IPR). I replaced exporter–industry observations with an IPR that exceeded one with the maximum IPR value, within each exporter, among those values that were less than one. If the IPR remained greater than one because the exporter country did not have the value of IPR which was less than one, I removed these observations. Data on R&D expenditure are from Business enterprise R&D expenditure by industry database collected by the OECD. Exporter-industry observations, such as Luxembourg, Sweden, Netherlands, U.K. with missing R&D expenditure information were removed from the analysis.

2 Results

When estimated by OLS a 1% change in productivity, all else equal, leads to 1.8941% change in corrected exports. When instrumented productivity levels with (the log of) research and development (R&D) expenditures at the country–industry level, a 1% change in productivity, all else equal, results in 17.961% change in corrected exports. This increase can be due to attenuation bias in

OLS estimates. If exports are not corrected, it can lead to biased upwards results (24.391 in column (4)).

Table 1: Relative productivity levels, by country and sector

Country	**Agriculture**	**Mining**	**Manufacturing**
AUS	1	0.56	0.82
BEL	1	0.68	0.71
CZE	1	0.59	0.78
DEU	1	0.81	0.85
DNK	1	1.21	0.72
ESP	1	0.57	0.72
FIN	1	0.90	0.83
FRA	1	0.92	0.94
GBR	1	1.18	1.06
GRC	1	0.67	0.96
HUN	1	0.57	0.78
IRL	1	0.87	1.02
ITA	1	1.22	0.91
JPN	1	1.53	2.39
KOR	1	1.19	1.62
LUX	1	0.75	0.93
NLD	1	0.96	0.78
POL	1	0.51	0.82
PRT	1	0.61	0.67
SVK	1	0.66	0.72
SWE	1	0.66	0.81
USA	1	1.00	1.00

Note: The productivity levels are normalized to one in all sectors for the U.S. and in all countries for the Agriculture sector.

Table 2: Cross-sectional results—baseline

Dependent variable	**log (corrected exports)**	**log (exports)**	**log (corrected exports)**	**log (exports)**
	(1)	(2)	(3)	(4)
log (productivity based on producer prices)	1.8941***	1.164**	17.961***	24.391***
	(0.41742)	(0.38991)	(2.1813)	(1.9061)
Estimation method	OLS	OLS	IV	IV
Exporter × importer fixed effects	YES	YES	YES	YES
Industry × importer fixed effects	YES	YES	YES	YES
Observations	704	704	843	843
R^2	0.843	0.876	0.854	0.902

Note: "Exports" is the value of bilateral exports from the exporting country to the importing country in a given industry. "Corrected exports" is "exports" divided by the share of the exporting country's total expenditure in the given industry that is sourced domestically (equal to one minus the country and industry's IPR). "Productivity based on producer prices" is the inverse of the average producer price in an exporter–industry. Columns (3) and (4) use the log of 1997 R&D expenditure as an instrument for productivity. Standard errors are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

References

Costinot, A., Donaldson, D. & Komunjer, I. (2012), 'What goods do countries trade? a quantitative exploration of ricardo's ideas', *The Review of economic studies* **79**(2), 581–608.