

Vertical Spillovers in Global Value Chains

Swapnika Rachapalli *

ONLINE APPENDIX

A Data Construction

Sample Selection: I drop countries from the final sample based on the following criteria: (a) low-income economies according to the World Bank definition for 2019 (Gross National Income per capita of less than USD 1,025), (b) those with a population of less than 5 million in 2018, (c) those with exports-to-GDP ratio of more than 1 in 2018, (d) those countries whose fuel exports make up more than 75% of all merchandise exports in 2018, and (e) those countries whose manufactures exports are less than 10% of all merchandise exports in 2018. Data for the above criteria is taken from the World Bank Indicators database.

Other Details: See [Rachapalli \(2021\)](#) for detailed description of the construction of input-output linkages, as well as the crosswalk between the Harmonized System (HS) classification and the Annual Survey of Industries Commodity Classification (ASICC).

B Additional Results

First State and Reduced Form Estimates: Table 1 reports first stage estimates for the endogenous variables - own exports, $\ln(X_{ip(t-3)})$, upstream exports, $\ln(X_{iU(p)(t-3)})$, and downstream exports, $\ln(X_{iD(p)(t-3)})$. Table 2 reports the reduced form estimates. Columns (1)-(4) in both tables correspond to the instrumental variable specifications in columns (1)-(4) respectively of Table 1 in the main draft.

Placebo Exercise, Own Exports Coefficient: Figure 1 plots the histogram of the coefficient on own exports $\ln(X_{ip(t-3)})$ from the placebo exercise described in the main draft. The baseline estimate from column (3) of Table 1 in the main draft is plotted using the solid line for reference. While the upstream and downstream export measures are randomized in the placebo exercise, the correct product-level exports are used in the regressions. The figure shows that the placebo estimates are all very close to the baseline estimate, albeit very marginally larger (the mean of the placebo estimates is 2% larger than the baseline estimate).

*Rachapalli: University of British Columbia Sauder School of Business (email: s.rachapalli@sauder.ubc.ca).

Different Lags of Explanatory Variables: Figure 2 plots the IV estimates for different lags of the explanatory variables. The causal effect of export shocks to vertically related products on the RCA of a product declines over time, with a peak around 3 years.

Heterogeneity Across Product Categories: Figure 3 plots the baseline IV estimates for different aggregate product categories separately. The results show that vertical spillovers in a value chain are not similar across all products. Products in the food and beverage manufacturing experience the largest spillover effects, while products in the mining, chemical, and transportation equipment industries have no significant relationship with their upstream and downstream exports. Table 3 lists the aggregate product descriptions for the product categories used in Figure 3.

References

Rachapalli, Swapnika. 2021. “Learning between buyers and sellers along the global value chain.”

Table 1: First Stage Estimates

	(1)	(2)	(3)	(4)
<u>A. Dependent Variable: Own Exports, $\ln(X_{ip(t-3)})$</u>				
$\ln(X_{ip(t-3)}^{IV})$	0.420 ^a (0.002)	0.427 ^a (0.002)	0.397 ^a (0.002)	0.397 ^a (0.021)
$\ln(X_{iU(p)(t-3)}^{IV})$	0.035 ^a (0.001)	0.016 ^a (0.001)	0.010 ^a (0.001)	0.010 ^a (0.003)
$\ln(X_{iD(p)(t-3)}^{IV})$	0.038 ^a (0.001)	0.015 ^a (0.001)	0.010 ^a (0.001)	0.010 ^a (0.002)
R-squared	0.961	0.963	0.964	0.964
<u>B. Dependent Variable: Upstream Exports, $\ln(X_{iU(p)(t-3)})$</u>				
$\ln(X_{ip(t-3)}^{IV})$	0.045 ^a (0.001)	0.024 ^a (0.001)	0.017 ^a (0.001)	0.017 ^a (0.003)
$\ln(X_{iU(p)(t-3)}^{IV})$	0.333 ^a (0.002)	0.328 ^a (0.002)	0.307 ^a (0.002)	0.307 ^a (0.044)
$\ln(X_{iD(p)(t-3)}^{IV})$	0.033 ^a (0.001)	0.008 ^a (0.001)	0.003 ^a (0.001)	0.003 ^a (0.001)
R-squared	0.968	0.971	0.972	0.972
<u>C. Dependent Variable: Downstream Exports, $\ln(X_{iD(p)(t-3)})$</u>				
$\ln(X_{ip(t-3)}^{IV})$	0.042 ^a (0.001)	0.019 ^a (0.001)	0.015 ^a (0.001)	0.015 ^a (0.002)
$\ln(X_{iU(p)(t-3)}^{IV})$	0.029 ^a (0.001)	0.007 ^a (0.001)	0.003 ^a (0.001)	0.003 ^b (0.001)
$\ln(X_{iD(p)(t-3)}^{IV})$	0.381 ^a (0.002)	0.375 ^a (0.002)	0.349 ^a (0.002)	0.349 ^a (0.027)
R-squared	0.973	0.975	0.976	0.976
Observations	3,347,237	3,347,237	3,347,237	3,347,237
Country \times Product FE	Y	Y	Y	Y
Product \times Year FE	Y	-	Y	Y
Country \times Year FE	-	Y	Y	Y
Clustering	Product \times Year	Product \times Year	Product \times Year	Product, Year

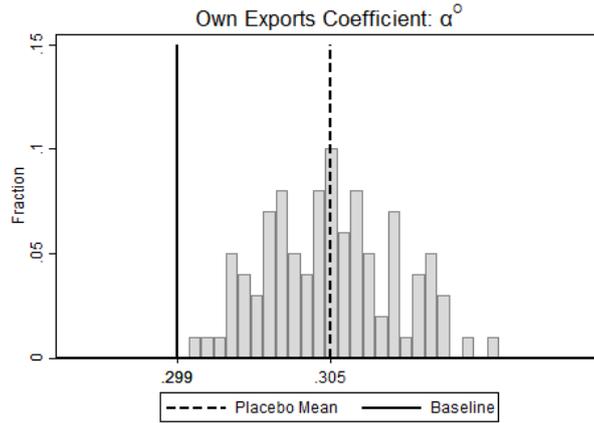
Notes: Each column reports the first stage estimates of the instrumental variable specification in the corresponding column of Table 1 in the main draft. ^a Significance at 1%, ^b Significance at 5%, ^c Significance at 10%.

Table 2: Reduced Form Estimates

	Dependent Variable: $\ln(\text{RCA}_{ipt})$			
	(1)	(2)	(3)	(4)
$\ln(X_{ip(t-3)}^{IV})$	0.125 ^a (0.001)	0.124 ^a (0.001)	0.119 ^a (0.001)	0.119 ^a (0.027)
$\ln(X_{iU(p)(t-3)}^{IV})$	0.017 ^a (0.001)	0.012 ^a (0.001)	0.011 ^a (0.001)	0.011 ^a (0.003)
$\ln(X_{iD(p)(t-3)}^{IV})$	0.015 ^a (0.001)	0.012 ^a (0.001)	0.010 ^a (0.001)	0.010 ^a (0.002)
Observations	3,347,237	3,347,237	3,347,237	3,347,237
R-squared	0.844	0.846	0.852	0.852
Country \times Product FE	Y	Y	Y	Y
Product \times Year FE	Y	-	Y	Y
Country \times Year FE	-	Y	Y	Y
Clustering	Product \times Year	Product \times Year	Product \times Year	Product, Year

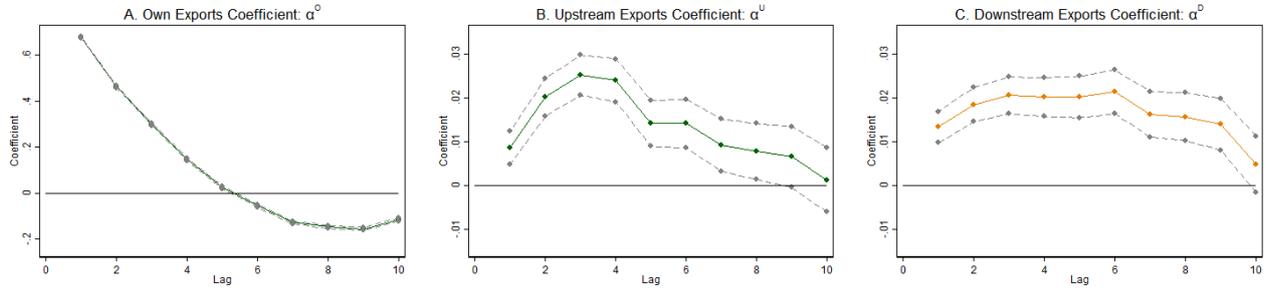
Notes: Each column reports reduced form estimates of the instrumental variable specification in the corresponding column of Table 1 in the main draft. ^a Significance at 1%, ^b Significance at 5%, ^c Significance at 10%.

Figure 1: Placebo Estimates



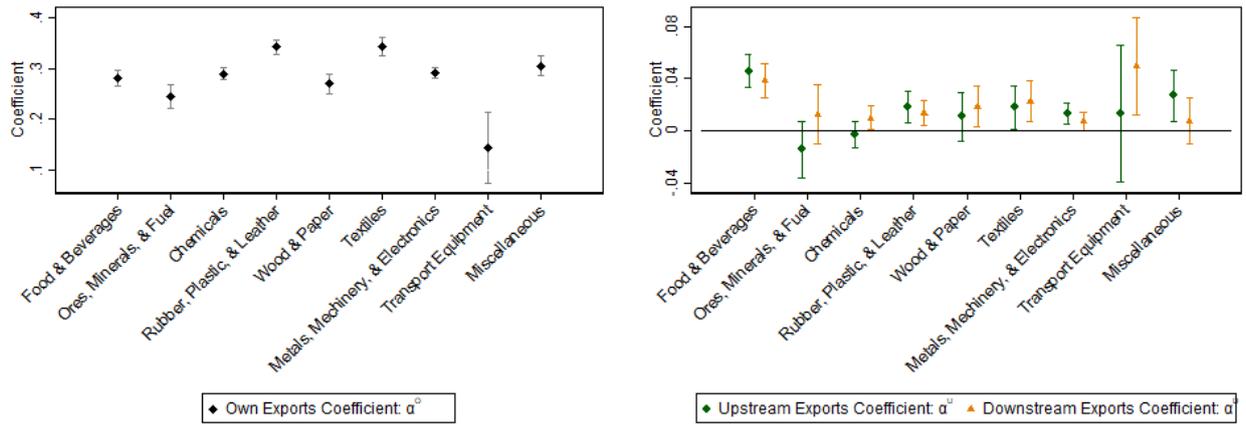
Notes: Figure plots the histograms of the IV estimates from the placebo exercise described in the main draft. Each estimate is obtained by randomizing the set of upstream and downstream products that a product is linked to, and running the regression specification in equation 7 of the main draft for 3-year lagged explanatory variables, country \times product, product \times year, and country \times year fixed effects (specification used in column (3) of table 1 in the main draft). The mean of all the placebo estimates is represented at the dashed line, and the corresponding baseline estimate from column (3) of table 1 of the main draft is represented at the solid line.

Figure 2: Estimates for Different Lags



Notes: Figure plots the IV estimates (solid lines), and the corresponding 95% confident intervals (dashed lines), of the regression specification in equation 7 of the main draft for different lags s of the explanatory variables. Regressions include country \times product, product \times year, and country \times year fixed effects (specification used in column (3) of table 1 in the main draft). Standard errors are clustered at the product \times year level.

Figure 3: Heterogeneity Across Product Categories



Notes: Figure reports IV estimates and corresponding 95% confidence intervals for different industries using the regression specification in equation 7 of the main draft for 3-year lagged explanatory variables. country \times product, product \times year, and country \times year fixed effects (specification used in column (3) of table 1 in the main draft). Standard errors are clustered at the product \times year level.

Table 3: Product Category Descriptions

Code	Short Description	Detailed Description
1	Food & Beverages	Animal, Vegetable, Horticulture, Forestry Products, Beverages, Tobacco & Pan Masala, and Non-edible Water/spirit & Alcohol Chiefly Used in Industry
2	Ores, Minerals, & Fuel	Ores, Minerals, Mineral Fuels, Lubricants, Gas, and Electricity
3	Chemicals	Chemical and Allied Products
4	Rubber, Plastic, & Leather	Rubber, Plastic, Leather, and Products Thereof
5	Wood & Paper	Wood, Cork, Thermocol and Paper, and Articles Thereof
6	Textiles	Textile and Textile Articles
7	Metals, Machinery, & Electronics	Base Metals and Products Thereof, Machinery Equipment and Parts Thereof, Excluding Transport Equipment
8	Transport Equipment	Railways, Airways, Ships & Road Surface Transport, and Related Equipment & Parts
9	Miscellaneous	Other Manufactured Articles and Services N.E.C

Notes: Column “Code” is the 1-digit ASICC code of the aggregate product category. Short description is the category title used in the graph.