Analysis of the COVID-19 Shock, Technology and Trade

New Expansion Proposals for Extensive Margin Analysis - India

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We will expand the dataset to include the firm-month-HS6 level. However, we will only include a feasible set of HS6 products for each firm, rather than using every possible HS6 product. We follow two different approaches to do this.

1. First Expansion Proposal: Using HS4 codes

We plan to expand the dataset at the firm-month-HS6 level by using only feasible HS6 products, which we will obtain through the HS4 codes. If a firm exports or imports an HS6 product, we will allow the expansion of the firm in all months (or quarters) to all HS6 products in the HS4 code of the exported (imported) HS6 product.

1.1 Descriptive statistics of number of HS6 products by HS4 code

The table below showcases different summary statistics of the number of HS6 products by HS4 code. It reveals that, on average, there are approximately 4 HS6 products for each HS4 code.

Table 1: Descriptive statistics of number of HS6 products by HS4 code

Mean	Min	p25	Median	p75	Max
4.4	1	2	3	6	48

1.2 Descriptive statistics of number of distinct HS4 products traded by firm

Table 2 presents the summary statistics for the number of unique HS4 products traded by each firm, based on the regression sample of the model that examines the impact of technology adoption on trade outcomes. On average, firms export products from approximately 10 distinct HS4 codes and import products from about 12 different HS4 codes.

In contrast, Table 3 shows the same information but based on the regression sample of the model examining whether technology adoption mitigated the impacts of COVID-19.

Table 2: Descriptive statistics of the number of distinct HS4 products traded by firm.

Data	Mean	Min	p25	Median	p75	Max
Exports	10.35	1	2	4	10	499
Imports	12.37	1	2	5	13	403

[a] Note: Regression sample of the model that measures if tech adoption affects trade outcomes

Table 3: Descriptive statistics of the number of distinct HS4 products traded by firm.

Data	Mean	Min	p25	Median	p75	Max
Exports	10.45	1	2	4	10	499
Imports	12.67	1	2	5	13	403

[a] Note: Regression sample of the model that measures if tech adoption helped to mitigate COVID impacts.

1.2 In which percentage are the firms exporting (importing) the same HS4?

The following tables display the proportion of firms where a single HS4 code constitutes at least 90%, 80%, or 70% of the total trade volume throughout the analysis period. In the regression sample for the model examining the effect of technology adoption on trade outcomes, 46.3% of firms have a single HS4 code accounting for at least 90% of the total export volume, while only 36.1% of firms exhibit a single HS4 code representing at least 90% of the total import volume.

Regarding the model assessing whether technology adoption mitigated COVID-19 impacts, 45.81% of firms have a single HS4 code comprising at least 90% of the total export volume, while a smaller proportion of 35.78% of firms show a single HS4 code accounting for at least 90% of the total import volume.

Table 4: Percentage of firms for which the same HS4 code accounts for 90%, 80%, or 70% of total trade volume. Sample from the model that measures of tech adoption affects trade outcomes

Data	90\% same HS4	80\% same HS4	70\% same HS4
Exports	46.32	55.69	64.33
Imports	36.11	45.73	54.96

Table 5: Percentage of firms for which the same HS4 code accounts for 90%, 80%, or 70% of total trade volume. Sample from the model that measures if tech adoption helped to mitigate COVID-19 impacts on trade outcomes

Data	90\% same HS4	80\% same HS4	70\% same HS4
Exports	45.81	55.26	64.03
Imports	35.78	45.44	54.72

1.3 Expected number of observations in the expanded dataset

The tables below display the expected number of observations in the blown-up datasets using the HS4 approach previously described. They present the observation counts for both monthly and quarterly analysis scenarios.

Table 6: Expected Observations in Indian Expanded Datasets (using HS4 approach) for Extensive Margin Analysis: Tech Adoption's Effect on Trade Outcomes

Data	Num. Obs. at Firm-Month-Feasible HS6 Level	Num. Obs. at Firm-Quarter-Feasible HS6 Level
Exports	69,771,870	23,257,290
Imports	86,846,928	28,948,976

Table 7: Expected Observations in Indian Expanded Datasets (using HS4 approach) for Extensive Margin Analysis: Tech Adoption's Mitigation of COVID-19 Impacts

Data	Num. Obs. at Firm-Month-Feasible HS6 Level	Num. Obs. at Firm-Quarter-Feasible HS6 Level
Exports	45,382,080	15,127,360
Imports	57,142,584	19,047,528

2. Second Expansion Proposal: Using NAICS4 codes

We will expand the dataset at the firm-month-HS6 level or firm-quarter-HS6 level, but only using feasible HS6 products. The set of feasible HS6 products will be obtained using the NAICS4 codes (NAICS subsectors). For each NAICS4 code, we take the HS6 codes that are ever exported by any firm in that 4 digit subsector. This will be the feasible subset of HS6 codes for a firm in a particular 4 digit subsector.

2.1 Expected number of observations in the expanded datasets

The tables below display the expected number of observations in the blown-up datasets using the NAICS4 approach previously described. They present the observation counts for both monthly and quarterly analysis scenarios.

Table 8: Expected Observations in Indian Expanded Datasets (using NAICS4 approach) for Extensive Margin Analysis: Tech Adoption's Effect on Trade Outcomes

Data	Num. Obs. Firm-Month-Feasible HS6	Num. Obs. Firm-Quarter-Feasible HS6
Exports	1,591,139,298	530,379,766
Imports	1,480,441,368	493,480,456

Table 9: Expected Observations in Indian Expanded Datasets (using NAICS4 approach) for Extensive Margin Analysis: Tech Adoption's Mitigation of COVID-19 Impacts.

Data	Num. Obs. Firm-Month-Feasible HS6	Num. Obs. Firm-Quarter-Feasible HS6
Exports	1,077,957,216	359,319,072
Imports	1,015,620,744	338,540,248