Online Appendix for *Complements or Substitutes? Labor Market Effects of Foreign Inputs in Developing Economies*

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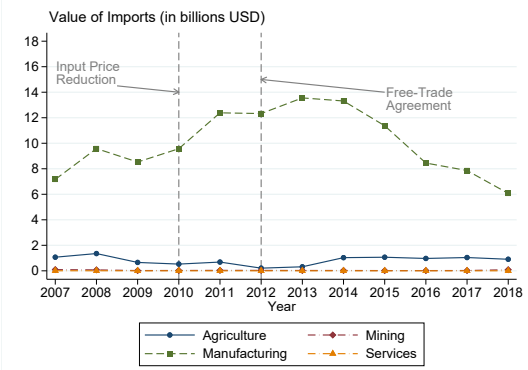
This appendix contains supplementary material intended to accompany the main text. It is not part of the published version of the paper.

Contents of the Appendix

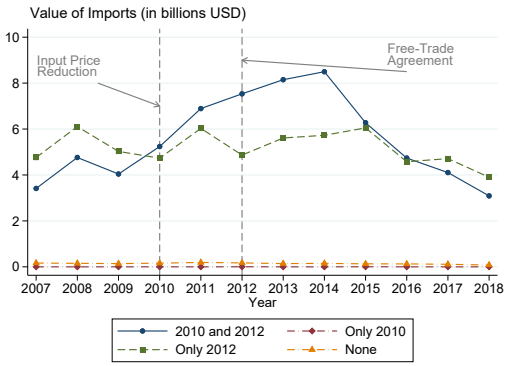
A. Additional Figures and Tables

Appendix Figure A.1: Colombian Imports from the United States

(a) By Economic Sector



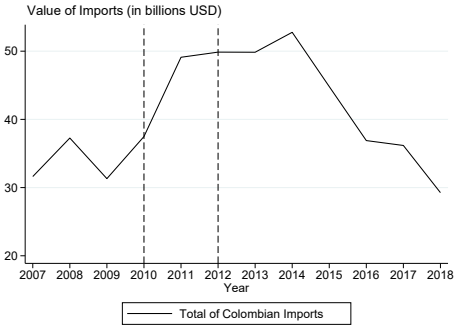
(b) By year of Tariff Reduction



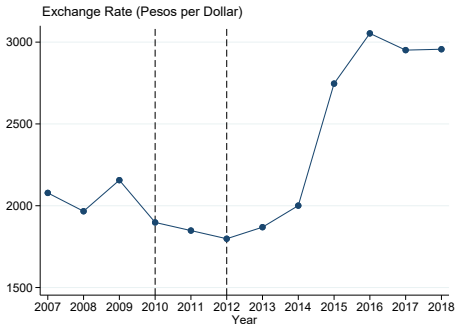
Notes: This graph plots the value of imports in billions USD. Panel A.1a plots the evolution of Colombian imports from the United States by industry. Panel A.1b plots the evolution of Colombian imports from the United States by the year in which the product's tariff was decreased. Vertical gray lines depict the years in which the two tariff reductions took place.

Appendix Figure A.2: Macroeconomic Environment

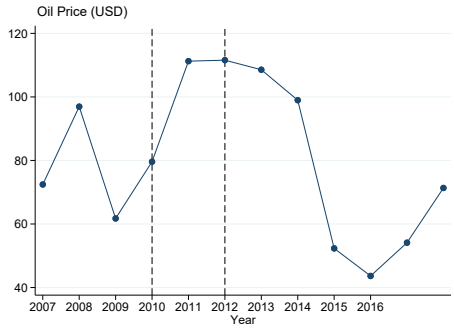
(a) Total Imports



(b) Exchange Rates

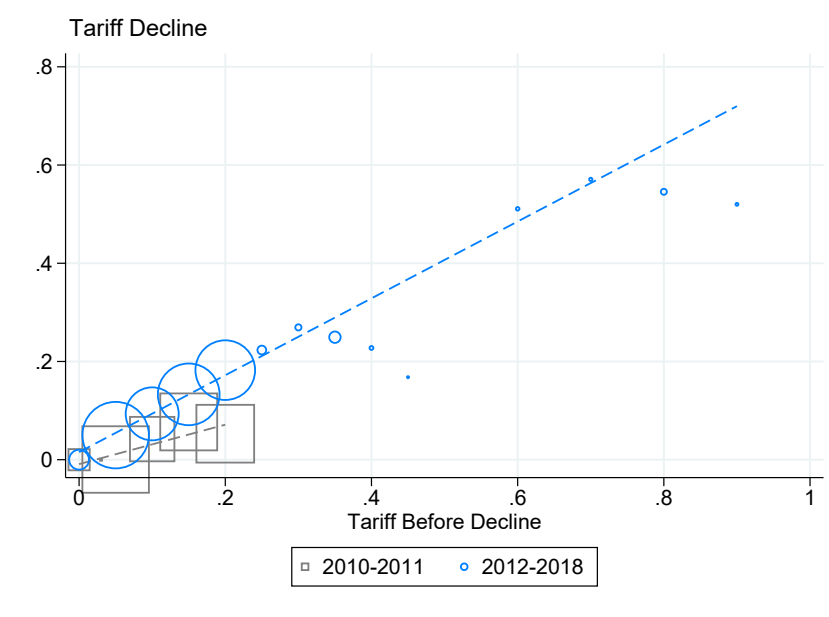


(c) Oil Prices

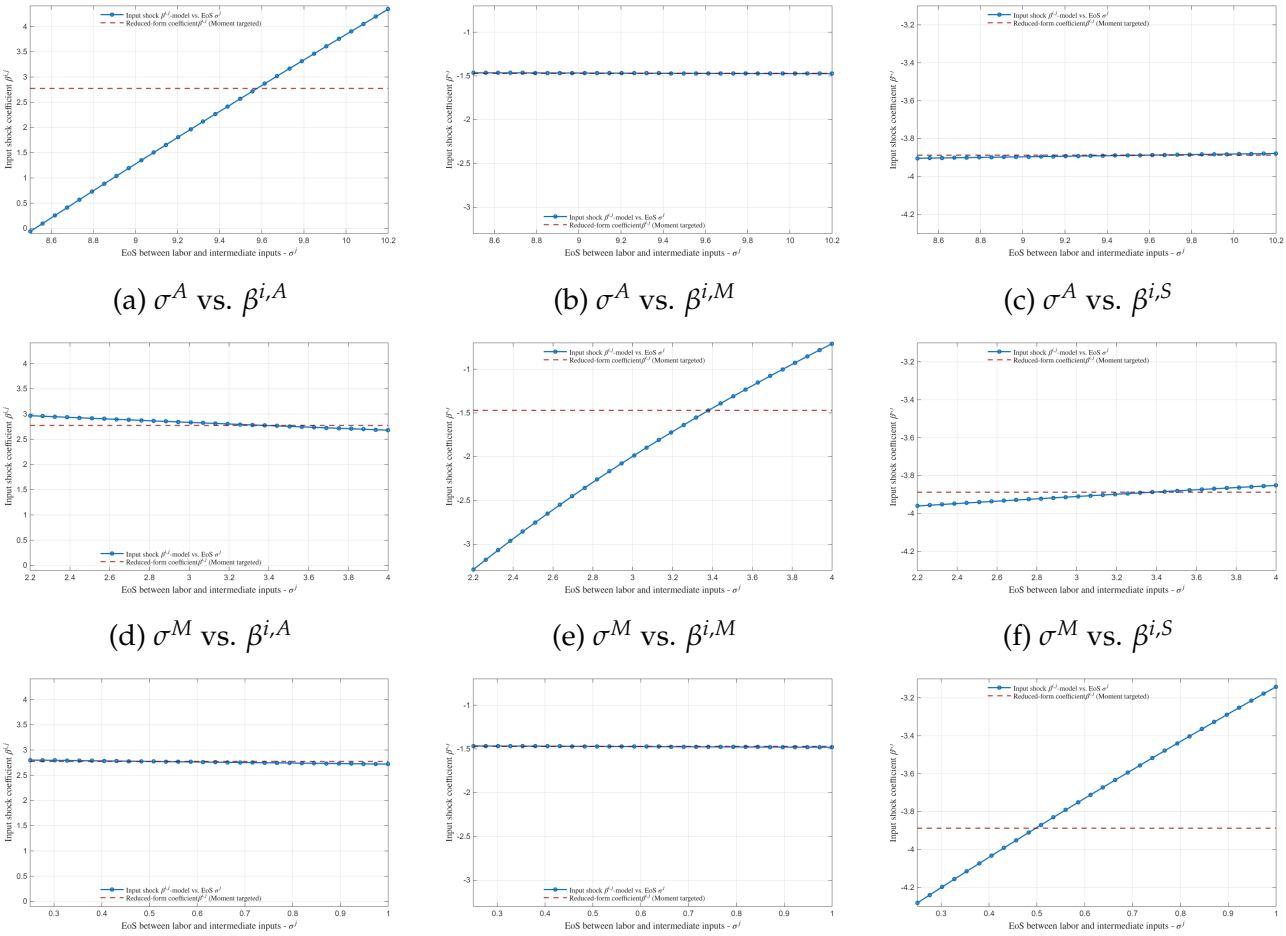


Notes: These graphs describe the macroeconomic environment around the implementation of the free-trade agreement. Panel A.2a presents the evolution of total imports in billions USD. Panel A.2b presents the evolution of the exchange rate of U.S. dollars to Colombian pesos. Panel A.2c presents the evolution of the price of oil (in dollars). The vertical dashed lines correspond to the years of tariffs reductions.

Appendix Figure A.3: Average Tariff Reductions by Baseline Level



Appendix Figure A.4: Sensitivity analysis of the model parameters



(a) σ^A vs. $\beta^{i,A}$ (b) σ^A vs. $\beta^{i,M}$ (c) σ^A vs. $\beta^{i,S}$

(d) σ^M vs. $\beta^{i,A}$ (e) σ^M vs. $\beta^{i,M}$ (f) σ^M vs. $\beta^{i,S}$

(g) σ^S vs. $\beta^{i,A}$ (h) σ^S vs. $\beta^{i,M}$ (i) σ^S vs. $\beta^{i,S}$

Notes: This figure plots the relationship between the EoS between labor and intermediate inputs, σ^j for each one-digit sector vs. the coefficient of the input shock implied by the model, also for each one-digit sector. The rows fix the sector for the EoS, and the columns fix the sector for the input-shock point estimate. The first row corresponds to the EoS in agriculture, the second row in manufacturing, and the third row in services. The first column corresponds to the input shock coefficient in agriculture, the second column in manufacturing, and the third column in services. The blue line illustrates the relationship between each EoS and the point estimate of the input shock according to the model simulations. The red line corresponds to the targeted moment, which is the coefficient of the input shock that we find in the reduced-form for each 1-digit sector. The intersection between the blue curve and the red line identifies the σ^j values that align the model with the reduced-form moment in that panel, providing the basis for our calibration of σ^j across sectors.

Appendix Table A.1
U.S Tariff Reductions on Colombian Exports

	Total (1)	To the U.S. (2)	To All Other (3)
U.S. Tariff Reduction	-0.008	-0.006	-0.010
	(0.010)	(0.008)	(0.011)
Observations	55,903	55,903	55,903
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Notes: This table uses Colombian exports as outcome. Column (1) refers to total exports, column (2) refers to exports to the United States, and column (3) to exports to other countries. Estimations are done at the six-digit industry and year level. Tariff reduction in year t is computed as the tariff charged by the United States to Colombian products in 2011 minus the tariff charged in year t. All specifications control for Colombian tariff reduction. *** p<0.01, ** p<0.05, * p<0.1

B. Data Construction and Aggregation

We combine several data sources, as described in Section 3.2 of the main paper. Appentix Table B.1 describes the level at which each of these data sets exists. Most of them report information at the ten- or four-digit sector level, while the input–output matrix is available at the two-digit level. This mismatch creates limitations when aggregating the data. In this appendix, we explain how the estimating data sets are created and how we address the aggregation limitations.

Appendix Table B.1: Data Sources

	Regions		Sectors	
Data Source	Level	Number	Level	Number
Tariff Records	-	-	Ten-Digit	7,305
Trade Records	Department	33	Ten-Digit	7,920
Imports by Firm (2008)	Department	33	Four-Digit	416
Household Surveys	Department	24	Four-digit	402
Input-Output Matrix	Department	24	Two-Digit	13

B.1. Data Construction

We merge the data sets in Appendix Table B.1 to build two main estimating data sets. The first is a panel that captures Colombian imports by country of origin. This panel exploits the granularity of the data. Therefore, it is constructed at the 10-digit sector, by country-of-origin, by department, and year level. It is built merging the trade and tariff records. We restrict to imports coming from high-income countries that are comparable to the U.S.[1] In addition, we restrict the panel to observations after 2012 capturing the differential effects of tariffs charged to the U.S. and the

[1]High-income countries include: Germany, Australia, Austria, Belgium, Canada, Denmark, Spain, Finland, France, Netherlands, Italy, Norway, Portugal, United Kingdom, Sweden, Switzerland, and Japan.

rest of exporters. The panel includes information on 6,304 imported products, in 33 departments, observed during 7 years (2012-2018), for a total of 4,929,099 observations.

The second is a four-digit industry-code panel that matches data from the household surveys and the tariffs. This dataset follows 402 department-by-four-digit ISIC sectors over 11 years. We built this panel by keeping sector-department combinations with at least one employee observed in 2008, and that report imports at any point during the period 2008-2018. The panel at the department-industry-year level includes 53,371 observations, corresponding to 5,844 department-by-industry combinations (24 departments and 343 four-digit industries, excluding those with no employment in 2008 or no trade activity).[2]

Appendix Table B.2 presents descriptive statistics for both samples. We drop the mining sector from the analysis because of potential confounders due to variation in oil prices and exchange rates. This sector encompasses 21 industries, including oil and coal, constituting less than 0.5 percent of Colombia's imports.

Appendix Table B.2: Descriptive Statistics Across Samples

	Count	Mean	S.D.	Min.	Max.
	(1)	(2)	(3)	(4)	(5)
A) Trade Elasticity Data (10-Digit sector, country of origin, and region)					
$\tilde{\tau}^{U.S}$	4,929,099	-0.04	0.05	-0.68	0.00
$\tilde{\tau}^{U.S} \times 1(Agric.)$	4,929,099	-0.00	0.01	-0.47	0.00
$\tilde{\tau}^{U.S} \times 1(Manuf.)$	4,929,099	-0.04	0.05	-0.68	0.00
$\ln(M_{i,nj,t}) - \ln(M_{US,nj,t})$	4,929,099	4.34	5.50	-20.71	22.35
ln(Value Imports USA)	2,447,541	9.61	2.82	-3.51	21.65
ln(Value Imports USA)	2,447,541	9.61	2.82	-3.51	21.65
1(Manufacturing)	4,929,099	0.99	0.12	0.00	1.00
B) Wage Bill Data (4-Digit sector and region)					
Input Shock	58,522	-0.01	0.02	-0.14	0.00
Comp. Shock	58,522	-0.01	0.03	-0.18	0.00
Initial Input Prices ($-T^i_{jn}$)	58,522	0.02	0.05	0.00	0.68
Initial Tariffs ($-T^c_j$)	56,646	0.02	0.05	0.00	0.47
Log(Wagebill)	58,522	21.60	2.00	10.32	28.07
Log(Wagebill Low-Skilled)	52,777	21.15	1.91	8.22	27.49
Log(Wagebill High-Skilled)	46,934	21.06	1.90	10.32	28.00
1(Agriculture)	58,522	0.06	0.24	0.00	1.00
1(Manufacturing)	58,522	0.29	0.45	0.00	1.00
1(Services)	58,522	0.65	0.48	0.00	1.00

Note: This table presents descriptive statistics of the different samples used. Panel A) describes the panel at the 10 digit sector, country or origin, region, and year (2012-2018) level. Colombian departments are used as regions. Panel B) describes the panel at the industry region, and year (2008-2018) level. 1() stands for a dummy variable that takes the value of one if the condition inside parentheses is met.

[2]We address zeros by excluding region–sector combinations in which the outcome equals zero. In addition, we drop region–sector cells that do not import inputs over the entire period analyzed (2007–2018) to increase comparability. Including these cells does not alter our final results.

B.2. Data Aggregation for Reduced Form Results

We combine the regional input-output matrix, the World Input-Output Database, and the Colombian social security records to compute an *input-output* matrix specific to Colombia and an *employment transition probability* matrix:

- *Input-Output Matrix:-* Using information from the regional input-output tables, we construct bilateral trade flows, M_{ni,s,t_0}, across the Colombian regions in Colombian pesos, where n corresponds to the destination and i to the exporter. Trade flows between the United States and the rest of the world are based on *World Input-Output Database* (WIOD). We decompose the Colombian international trade flows (between the United States and the rest of the world) using imports and exports administrative records. Based on this matrix, we compute the total demand and the input share matrices. The first one reflects the total demand (intermediate inputs and final demand) of region n for goods produced by sector j in region n. The second one reflects the total sales of sector j to sector j in region n. The input-output tables also include information on the input shares and labor shares used by each sector.
- *Transition Probability:-* Based on the main job of each worker in each year, as reported in the social security records, we compute the transition probability among regions and industries, assuming no international migration. We add an additional sector accounting for adults that are out of the formal labor market in each region.[3]

The unit of observation for both matrices corresponds to the region-by-sector cell, aggregated to 13 sectors and 26 regions—of which 24 are Colombian States, and the last two corresponds to the United States and the rest of the world. Appendix Table B.3 describe the regions used.

However, the sector-level variation in the input-output matrix is not the same as the one used in our main outcomes. Unfortunately, this matrix is built at the two-digit sector level, whereas our main labor market outcomes are computed at the four-digit level. This forces us to aggregate two-digit sector shares with four-digit outcomes in the reduced form results and for the model calibration.

Recall from Section 4.1.1 that the competition and input shocks are defined, respectively, as:

$$\tilde{\tau}_{jnt} = \psi_{d(j),n,col} \left[\ln(1+\tau_{jt}) - \ln(1+\tau_{j,2010})\right]$$
$$\tilde{q}_{jnt} = \sum_k \omega_{jnk} \left[\ln(1+\tau_{kt}) - \ln(1+\tau_{k,2010})\right].$$

In these expressions, j corresponds to the economic sector. From our data, we aggregate τ_{jt} (which is originally measured at the 10-digit sector level) to the four-digit industry–year level—-this is the same level used for our outcome in Equation 4.3, which is computed from the household surveys. However, the attached weights, $\psi_{d(j),n,col}$ and $\pi_{d(k),nr}$, are constructed from the input–output matrix, which is available only at the two-digit sector level.

The weight $\psi_{d(j),n,col}$ corresponds to the revenue share of sector j-region n in Colombia relative to exports to the U.S. and the RoW:

$$\psi_{d(j),n,col} = \frac{Y_{d(j),n,col}}{Y_{d(j),n,col} + Y_{d(j),n,usa} + Y_{d(j),n,RoW}}$$

[3]We estimate the number of adults out of the formal labor market in each region using household surveys. The flow among industries and this category is given by the social security records.

Appendix Table B.3: Regions for the model

Region Code	Region
05	Antioquia
08	Atlántico
11	Bogota, Cundinamarca
13	Bolívar
15	Boyacá
17	Caldas
18	Caquetá
19	Cauca
20	Cesar
23	Cordoba
27	Chocó
41	Huila
44	La Guajira
47	Magdalena
50	Meta
52	Nariño
54	Norte de Santander
63	Quindío
66	Risaralda
68	Santander
70	Sucre
73	Tolima
76	Valle del Cauca
99	Others
100	United States
101	Rest of the World

From trade flow data at the four-digit sector level, we can directly compute total exports to the U.S. and to the RoW. This means that we can calculate $Y_{d(j),n,usa} + Y_{d(j),n,RoW}$. However, we do not observe $Y_{d(j),n,col}$ at the four-digit level, since it corresponds to internal consumption in the Colombian economy. As a result, we must rely on the regional input–output tables to estimate this component and, consequently, compute ψ at the two-digit sector level rather than the four-digit level. Then, within each two-digit sector level and Colombian state, there is no variation in ψ.

Similarly, ω_{jnk} captures the share in which Colombian firms in sector j use the intermediate input k.

$$\omega_{jnk} = \sum_{r \in \{US,RoW\}} \pi_{d(k),nr} \cdot \gamma_{jn,kn}, \text{ with } \gamma_{jn,kn} \equiv \frac{X_{jnk}}{\sum_k X_{jnk}}.$$

Since we observe trade flows between Colombia and other countries at a high granular level, we can compute $\gamma_{jn,kn}$ at the ten-digit sector level. However, we also need the trade shares to calculate the input shock. The variable $\pi_{d(k),nr}$ denotes the two-digit import share of product k for region (state) n from country r. The reason for this is that we do not observe the import share at the four-digit sector level because we require internal consumption data for the denominator. Then, we compute this variable at the Colombian state-two-digit sector level and interact with the change in the tariffs and γ.

Appendix Table B.4 describes the aggregation of the multiple parameters used. Importantly,

the input and competition shocks are constructed at the four-digit, regional, and year levels to estimate our main empirical specification. The remaining parameters are aggregated at their original levels of aggregation.

Appendix Table B.4: Level of Aggregation of Parameters for Building the Input and Competition Shocks

Variable	Parameter	Sector level (digits)
Comp. Shock	$\tilde{\tau}_{jnt}$	Four
Tariffs	τ_{jt}	Four
Revenue share	$\psi_{d(j),n,col}$	Two
Exports to the U.S.	$Y_{d(j),n,usa}$	Four
Exports to the RoW	$Y_{d(j),n,RoW}$	Four
Internal consumption	$Y_{d(j),n,col}$	Two
Input Shock	$\tilde{q}_{jnt}$	Four
Tariff input k	τ_{kt}	Ten
Share of k to produce nj	ω_{jnk}	Ten
Share of Imports of k by firms in nj	$\gamma_{jn,kn}$	Ten
Imports of k by firms in nj	X_{jnk}	Ten
Import share of nk from country r	$\pi_{d(k),nr}$	Two

Appendix Table B.5 complements this description by providing the mapping between two and four-digit sectors. We additionally provide information about the number of observations in the household surveys, which are used in our main labor market estimations.

Appendix Table B.5: Sectors for the model

One-Digit	**Two-Digit**			**Four-Digit**	
Sectors	**Codes**	**Sectors**	**ISIC** (Rev4)	**Number of sub-sectors**	**Obs. HH-Survey in 2008**
Agriculture	01	Crop production and Animal Production	01	17	22,781
Agriculture	02	Forestry and logging	02	2	359
Agriculture	05	Fishing and aquaculture	05	2	923
Manufacturing	15	Foods, beverages and tobacco products	15-16	22	5,943
Manufacturing	18	Manufacture textiles, wearing apparel and leather	17-19	21	11,555
Manufacturing	20	Wood, paper, printing, and recorded media	20-21	15	2,392
Manufacturing	23	Mining, crude petroleum manufacture of coke and refined petroleum products	10-14, 23	4	2,108
Manufacturing	24	Manufacture of non-metallic mineral products chemicals	24-26	24	4,059
Manufacturing	27	Manufacture of basic and elaborated metal products except machinery	27	12	2,970
Manufacturing	30	Manufacture of electronic, electrical equipment machinery. Repair and installation of machinery and equipment.	31	30	1,075
Manufacturing	34	Vehicles, furniture, and other manufacturing	34-36	19	5,474
Services	35	Non-retail or wholesale services	40-45, 60-95	175	150,525
Services	36	Wholesale and retail trade, including trade .	50-51	72	74,929

B.3. Data Aggregation for Calibration

The model is calibrated using the regions listed in Appendix Table B.3 and the sectors in Appendix Table B.5. Due to data constraints—-particularly the limited information on expenditure shares and the small number of observations at the four-digit level—-we calibrate the model at the two-digit sector level. This is the level at which domestic absorption data are available, which is essential for implementing the dynamic hat-algebra approach. In other words, although we observe international trade flows at a more disaggregated four-digit level, we do not observe domestic trade flows across Colombian states or internal consumption at that level of detail. Because this information exists only at the two-digit level, the model must be calibrated at that level. This implies that finer within-sector variation cannot be fully captured in the quantitative exercise, and that our counterfactual results should be interpreted at the broader two-digit sector aggregation.

This limitation is common in the literature. For example, studies using the WIOD database face a similar constraint: they estimate empirical regressions at a more disaggregated level but must calibrate their quantitative models at the two-digit level due to data availability.

C. Robustness of Event Study

C.1. Event Studies Across Specifications

This appendix provides additional evidence supporting the absence of differential pre-trends before the trade reforms discussed in Section 3. We estimate our main event study specifications using within-sector and within-region variation, controlling for time trends. Appendix Figure C.1 presents the event study estimates corresponding to the four empirical specifications reported in Table 1—each row in Figure C.1 aligns with the respective column in the table. Across all specifications, we fail to reject the null hypothesis that the pre-treatment coefficients differ from zero, whereas this null is rejected in the post-treatment period.

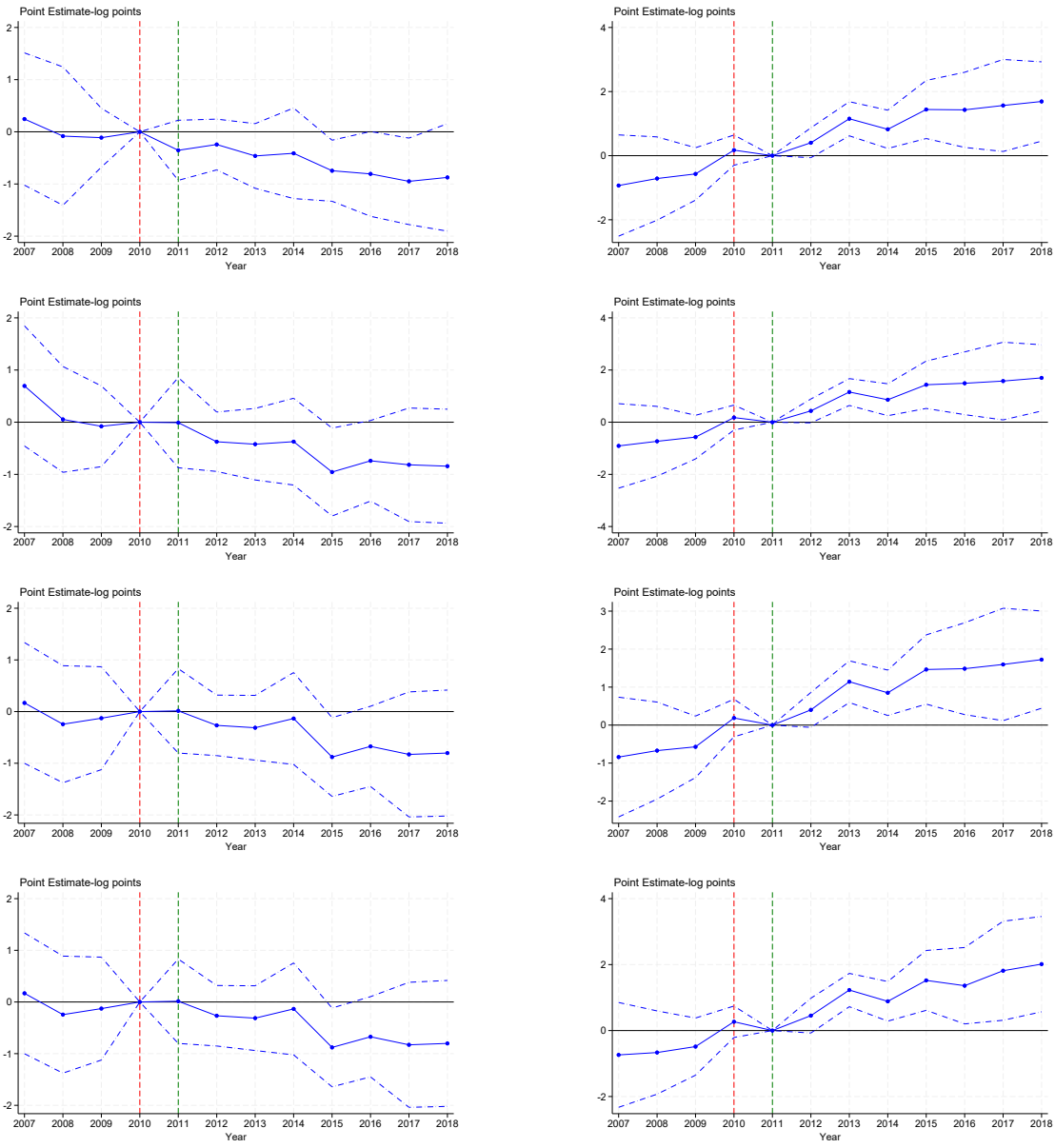
In all specifications, we observe a clear change in trends following the 2010 input shock. In the case of the competition shock, however, the change in trends is somewhat less visually pronounced, raising concerns about potential differential pre-trends. To address this, we conduct two formal tests to assess the absence of pre-trends. First, we compute a joint F-test of the null hypothesis that all pre-treatment coefficients are equal to zero ($H_0 : \beta_t = 0, \forall t < t_0$). This is a stringent test, as it assesses whether any coefficient–or at least one–differs from zero. Second, we perform a less stringent test evaluating whether the sum of the pre-treatment coefficients differs from zero ($H_0 : \sum_{t<t_0} \beta_t = 0$), which provides a formal test of the absence of pre-trends.

Appendix Table C.1 reports the p-values for both tests. The smallest p-value is 0.19, indicating that we cannot reject the null hypothesis in any of the tests, for any specification, or for either shock. This provides strong evidence in support of the validity of our research design. For completeness, we additionally provide the effects of the inputs and competition shock on employment as outcome on Appendix Figure C.2. We again observe strong evidence on the non-existence of differential trends prior to the shocks.

Binary Treatment: The previous specifications rely on a continuous treatment measure and compare treated groups to a baseline of region-industry cells that were never treated. This introduces variation in treatment intensity across sectors and regions, which may raise concerns about potential bias (de Chaisemartin and D'Haultfœuille, 2020). To address this, we re-estimate the event study specifications using binary treatments instead of continuous ones, explicitly accounting for heterogeneity in treatment exposure. Appendix Figure C.3 presents these results, which are consistent with our benchmark estimates using the continuous treatment, thereby reinforcing the robustness of our estimation strategy.

Appendix Figure C.1: Event Study Estimates using a Continuous Treatment

(a) Input Shock **(b)** Competition Shock



Notes: These figures plot the event study specification in Equation 4.4 at the industry, region, and year level. The competition and input shocks are estimated jointly. The plotted estimates correspond to the four empirical specifications reported in Table 1—each row in Figure C.1 aligns with the respective column in the table. Plotted intervals correspond to the 95 percent confidence level.

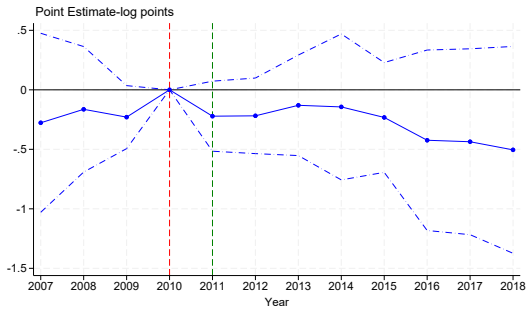
Appendix Table C.1
P-Values of No-Pre Trends in Event Study Estimation

		(1)	(2)	(3)	(4)
Input	Joint	0.77	0.40	0.83	0.86
	Linear Comb.	0.34	0.66	0.33	0.32
Competition	Joint	0.31	0.31	0.30	0.30
	Linear Comb.	0.47	0.81	0.47	0.46
	Region-Industry FE	Yes	Yes	Yes	Yes
	Region-Year FE	Yes			
	Year FE		Yes	Yes	Yes
	Baseline Controls			Yes	Yes
	Region-Specific Trends				Yes

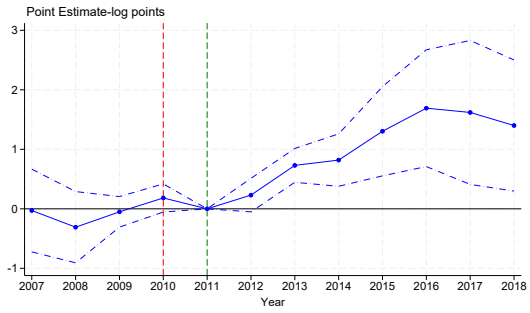
Note: This table presents the p-values of two tests of no-pretrends. The Joint test corresponds to the null hypothesis: $\beta_t = 0, \forall t < t_0$. The Linear Combination test corresponds to the null hypothesis: $\sum_{t<t_0} \beta_t = 0$. We compute the test for both shocks, and across all the specifications included in Table 1

Appendix Figure C.2
Competition and Input Shocks on Employment as Outcome

(a) Input

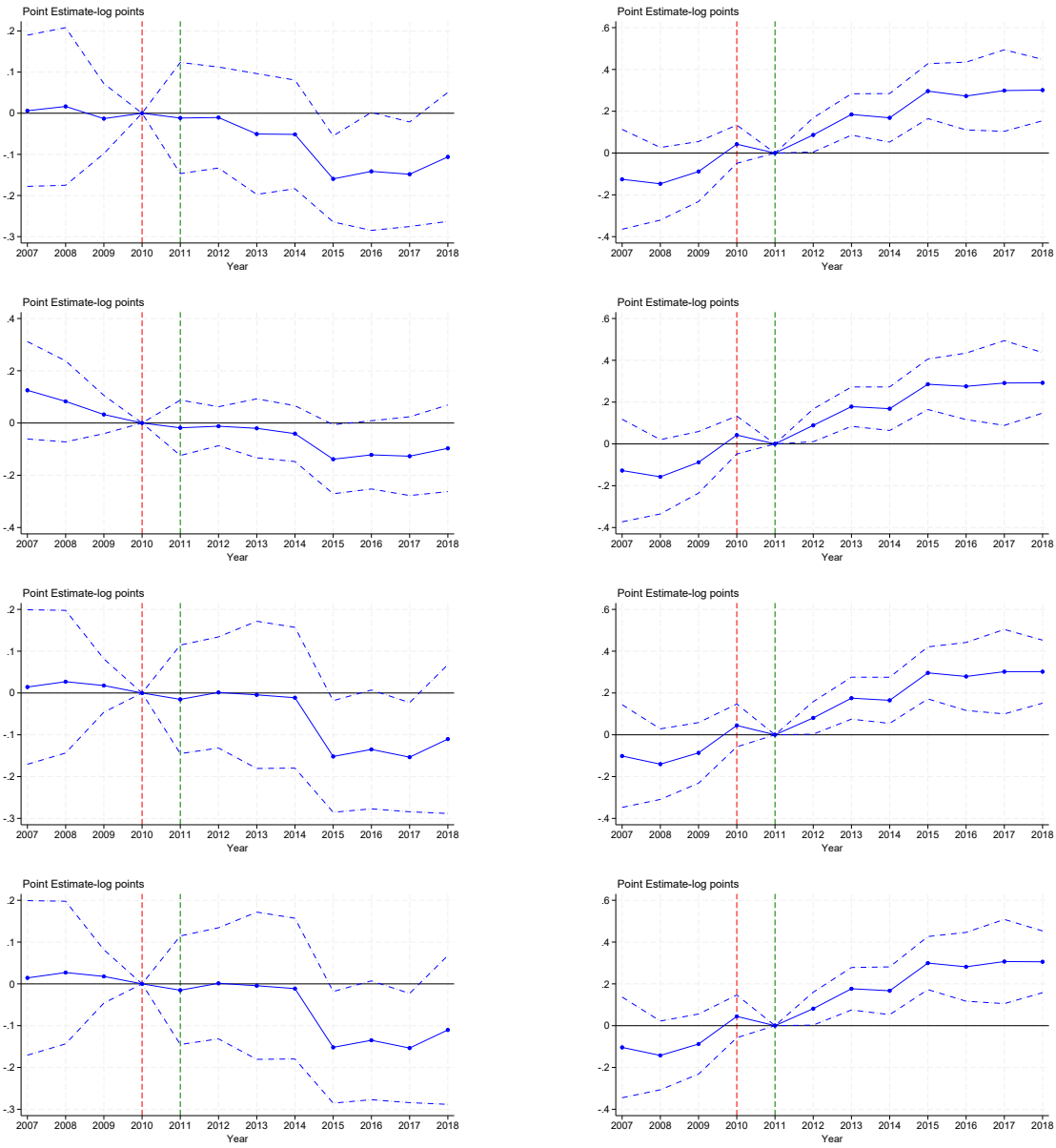


(b) Competition



Appendix Figure C.3
Event Study estimates using a Binary Treatment

(a) Input Shock **(b)** Competition Shock



Notes: These figures plot the event study specification in Equation 4.4 at the industry, region and year level. The competition and input shocks are estimated jointly. The plotted estimates correspond to the four empirical specifications reported in Table 1—each row in Figure C.1 aligns with the respective column in the table. Continuous treatment variables are modified to be binary replacing by one if the region and industry changed tariffs and zero otherwise. Plotted intervals correspond to the 95 percent confidence level.

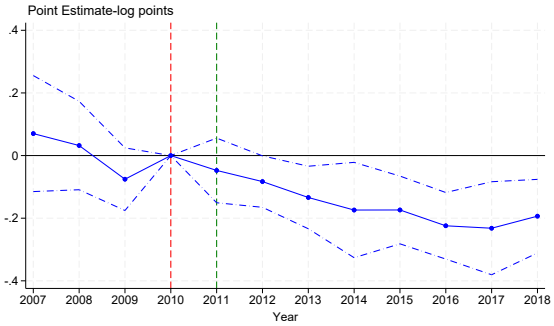
C.2. Event Studies by Economic Sectors

A substantial part of our analysis relies on estimations disaggregated by one-digit sector—-agriculture, manufacturing, and services. Accordingly, we examine the presence of potential

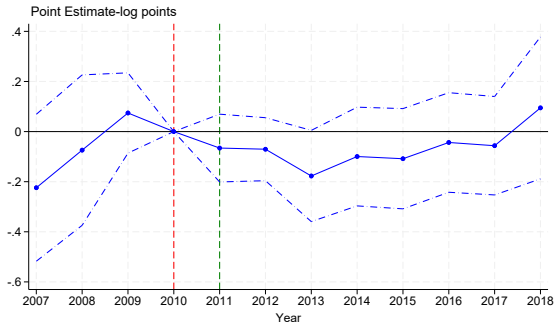
pre-trends within each of these sectors for both the input and competition shocks. Appendix Figure C.4 reports the estimates for the input shock by sector, while Appendix Figure C.5 presents the corresponding results for the competition shock. In all cases, we fail to reject the null hypothesis that any of the pre-treatment coefficients differ from zero.

Appendix Figure C.4
Input shock on Wage Bill By Sector

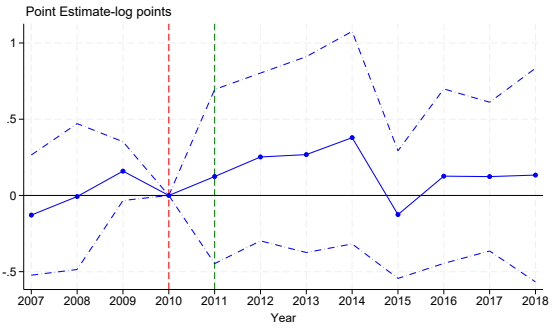
(a) Services



(b) Manufacturing



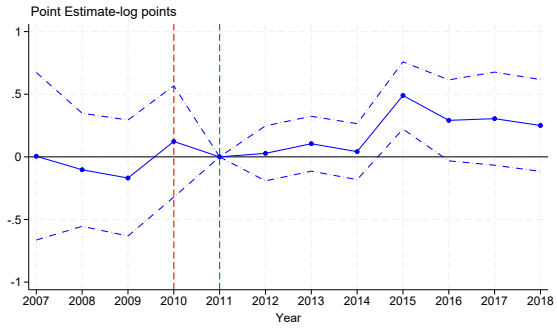
(c) Agriculture



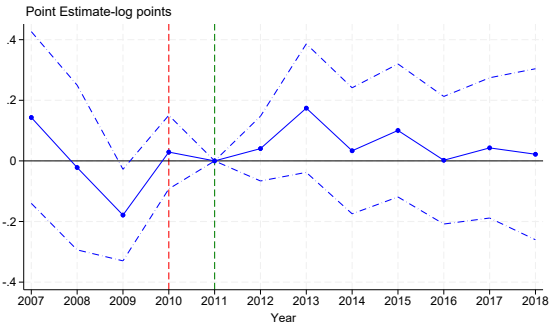
Notes: These figures plot the event study specification at the industry level for the input shock. Plotted intervals correspond to the 95 percent confidence level.

Appendix Figure C.5
Competition shock on Wage bill by Sector

(a) Agriculture



(b) Manufacturing



Notes: These figures plot the event study specification at the industry level for the competition shock. Plotted intervals correspond to the 95 percent confidence level.

D. Robustness of Main Specification

Appendix Table D.1
Input and Competition Shocks on Wage Bill without Shares of Import and Sales

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A) All Sectors								
Input Shock	-1.176***	-1.577**	-1.289**	-1.205***	-1.426**	-1.944**	-1.433**	-1.326**
	(0.419)	(0.571)	(0.469)	(0.428)	(0.588)	(0.795)	(0.617)	(0.603)
Comp. Shock	3.114***	3.132***	3.110***	3.105***	3.642***	3.701***	3.613**	3.603***
	(1.039)	(1.057)	(1.061)	(1.052)	(1.252)	(1.285)	(1.290)	(1.280)
F-Stat First Stage					180.4	191.7	186.7	182.5
B) By Industry								
Input shock × 1(Agric.)	1.124	0.792	0.815	1.238	1.521	1.275	1.314	1.741
	(1.314)	(1.548)	(1.572)	(1.448)	(2.047)	(2.244)	(2.264)	(2.193)
Input shock × 1(Manuf.)	-0.275	-0.834	-0.653	-0.296	-0.528	-1.202	-0.778	-0.363
	(0.699)	(0.889)	(0.859)	(0.703)	(0.851)	(0.914)	(0.951)	(0.814)
Input shock × 1(Serv.)	-1.522***	-1.744***	-1.618***	-1.591***	-1.973***	-2.223**	-1.988***	-1.909***
	(0.434)	(0.569)	(0.475)	(0.439)	(0.639)	(0.842)	(0.654)	(0.626)
Comp. shock × 1(Agric.)	4.986*	4.847	4.993	4.891*	6.139*	5.923	6.089	5.989
	(2.754)	(2.857)	(2.918)	(2.848)	(3.426)	(3.521)	(3.634)	(3.573)
Comp. shock × 1(Manuf.)	1.228*	1.433*	1.408*	1.202*	1.357	1.705*	1.515	1.264
	(0.643)	(0.725)	(0.695)	(0.643)	(0.932)	(0.990)	(0.964)	(0.928)
F-Stat First Stage					69.09	61.42	65.33	69.18
Observations	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370
Region-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Year FE	Yes				Yes			
Year FE		Yes	Yes	Yes		Yes	Yes	Yes
Baseline Controls			Yes	Yes			Yes	Yes
Region-Specific Trends				Yes				Yes

Note: This table presents the results of estimating Equation 4.3 using the wage bill as outcome, but excluding the sector weights. Estimations performed in a panel at the industry-region-year level. Colombian departments are use as regions. Columns (1)-(4) are estimated using ordinary least squares, whereas columns (5)-(8) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Baseline controls include the 2008 share of college-educated workers, the share of manufacturing employment, share of employment in services, and the share of female workers in each region, all interacted with year fixed effects. Estimations are weighted by employment per industry and region in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors are clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table D.2
Input and Competition Shocks on Wage Bill at the Sector-By-Year Level

	OLS				IV			
	All	High-skilled	Low-skilled	Social Sec.	All	High-skilled	Low-skilled	Social Sec.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A) All Sectors								
Input Shock	-1.840***	-0.434	-1.687**	-2.518*	-3.248**	-0.646	-2.646*	-4.623**
	(0.674)	(1.086)	(0.758)	(1.413)	(1.355)	(2.310)	(1.473)	(2.130)
Comp. Shock	2.715***	1.498*	2.285***	1.202*	3.173***	1.761	2.649***	1.567
	(0.844)	(0.856)	(0.837)	(0.631)	(0.963)	(1.172)	(0.955)	(0.955)
F-Stat First Stage					41.74	41.51	41.59	42
B) By Industry								
Input shock × 1(Agric.)	1.913	6.392	0.433	-0.576	-0.294	10.618**	-2.528	-2.705
	(1.176)	(4.147)	(1.190)	(1.883)	(2.394)	(5.269)	(2.540)	(3.113)
Input shock × 1(Manuf.)	0.686	1.893	0.246	-0.163	-1.084	0.323	-1.171	1.043
	(1.099)	(1.498)	(1.132)	(1.338)	(2.832)	(4.863)	(2.499)	(3.515)
Input shock × 1(Serv.)	-1.842***	-0.735	-1.650**	-2.746*	-2.879**	-0.372	-2.371*	-4.738**
	(0.679)	(1.033)	(0.772)	(1.439)	(1.183)	(2.024)	(1.423)	(2.201)
Comp. shock × 1(Agric.)	2.043	-4.097	2.591	-0.677	3.731	-6.943	5.138*	-1.170
	(2.164)	(4.269)	(2.067)	(1.553)	(3.115)	(5.985)	(3.016)	(2.180)
Comp. shock × 1(Manuf.)	-0.014	-0.080	0.093	-0.445	0.659	1.589	0.644	-2.997
	(0.933)	(1.028)	(0.996)	(0.505)	(2.707)	(4.707)	(2.384)	(3.675)
F-Stat First Stage					9.861	9.961	9.716	9.531
Observations	4,650	4,465	4,510	4,400	4,650	4,465	4,510	4,400
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: This table presents the results of estimating Equation 4.3 using the wage bill as outcome. Estimations are performed in a panel at the industry-year level. Columns (1)-(4) are estimated using ordinary least squares, whereas columns (5)-(8) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Estimations are weighted by employment per industry in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors clustered at the level. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table D.3
Input and Competition Shocks on Wage Bill using Social Security Records

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A) All Sectors								
Input Shock	-3.057	-1.713	-3.082	-3.022	-5.522	-2.211	-4.850	-5.364
	(2.739)	(2.508)	(2.504)	(2.716)	(4.795)	(3.797)	(4.156)	(4.699)
Comp. Shock	1.450*	1.426	1.489*	1.437*	1.665	1.674	1.710*	1.635
	(0.812)	(0.836)	(0.821)	(0.813)	(0.985)	(1.015)	(0.995)	(0.989)
F-Stat First Stage					111.3	109.8	110.1	108.1
B) By Industry								
Input shock × 1(Agric.)	0.623	0.423	0.110	0.653	-0.659	1.296	0.004	-0.570
	(2.013)	(2.086)	(2.063)	(1.965)	(4.795)	(4.320)	(4.340)	(4.633)
Input shock × 1(Manuf.)	1.292	3.516	1.195	1.393	0.463	4.016	0.744	0.849
	(2.317)	(2.275)	(1.971)	(2.297)	(3.160)	(2.746)	(2.676)	(3.021)
Input shock × 1(Serv.)	-4.264	-2.529	-4.257	-4.249	-7.236	-3.524	-6.667	-7.080
	(3.011)	(2.849)	(2.759)	(2.995)	(5.131)	(4.366)	(4.535)	(5.064)
Comp. shock × 1(Agric.)	2.567*	2.376	2.797**	2.549*	1.734	1.442	1.927	1.675
	(1.376)	(1.453)	(1.283)	(1.369)	(1.544)	(1.588)	(1.360)	(1.536)
Comp. shock × 1(Manuf.)	-0.667	-0.650	-0.665	-0.701	-1.176	-0.912	-1.099	-1.265
	(0.795)	(0.842)	(0.822)	(0.798)	(1.995)	(2.130)	(2.036)	(1.996)
F-Stat First Stage					119.8	85.41	114.5	122.7
Observations	61,076	61,076	61,076	61,076	61,076	61,076	61,076	61,076
Region-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Year FE	Yes				Yes			
Year FE		Yes	Yes	Yes		Yes	Yes	Yes
Baseline Controls			Yes	Yes			Yes	Yes
Region-Specific Trends				Yes				Yes

Note: This table presents the results of estimating Equation 4.3 using the wage bill computed in the social security records as outcome. Estimations performed in a panel at the industry-region-year level. Colombian departments are use as regions. Columns (1)-(4) are estimated using ordinary least squares, whereas columns (5)-(8) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Baseline controls include the 2008 share of college-educated workers, the share of manufacturing employment, share of employment in services, and the share of female workers in each region, all interacted with year fixed effects. Estimations are weighted by employment per industry and region in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors are two-way clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table D.4
Input and Competition Shocks on Employment

	OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A) All Sectors								
Input Shock	-0.249	-0.422	-0.282	-0.288	-0.904	-0.949	-0.672	-0.790
	(0.765)	(0.721)	(0.750)	(0.752)	(1.347)	(1.061)	(1.262)	(1.358)
Comp. Shock	2.169***	2.245***	2.171***	2.172***	2.498***	2.563***	2.500***	2.483***
	(0.676)	(0.702)	(0.684)	(0.671)	(0.752)	(0.781)	(0.764)	(0.750)
F-Stat First Stage					110.8	107.6	109	106.9
B) By Industry								
Input shock × 1(Agric.)	3.298***	3.114***	2.977***	3.202***	4.746**	5.500**	4.981**	4.908**
	(0.894)	(1.023)	(1.040)	(0.865)	(1.905)	(1.960)	(2.084)	(1.890)
Input shock × 1(Manuf.)	-0.494	-0.433	-0.511	-0.518	-1.577	-1.383	-1.413	-1.354
	(1.352)	(1.327)	(1.386)	(1.351)	(1.678)	(1.616)	(1.742)	(1.682)
Input shock × 1(Serv.)	-0.964	-0.865	-0.984	-1.003	-2.113*	-1.734*	-1.940*	-2.006
	(0.810)	(0.726)	(0.789)	(0.806)	(1.190)	(0.922)	(1.131)	(1.208)
Comp. shock × 1(Agric.)	2.832**	2.957**	2.918**	2.843**	2.985**	2.953**	2.999**	2.938**
	(1.185)	(1.196)	(1.203)	(1.160)	(1.370)	(1.410)	(1.413)	(1.355)
Comp. shock × 1(Manuf.)	1.484**	1.512**	1.458**	1.482**	1.753*	1.850**	1.739*	1.710*
	(0.648)	(0.646)	(0.646)	(0.644)	(0.882)	(0.876)	(0.890)	(0.879)
F-Stat First Stage					116.7	83.07	115.8	124.2
Observations	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370
Region-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Year FE	Yes				Yes			
Year FE		Yes	Yes	Yes		Yes	Yes	Yes
Baseline Controls			Yes	Yes			Yes	Yes
Region-Specific Trends				Yes				Yes

Note: This table presents the results of estimating Equation 4.3 using employment as outcome. Estimations performed in a panel at the industry-region-year level. Colombian departments are use as regions. Columns (1)-(4) are estimated using ordinary least squares, whereas columns (5)-(8) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Baseline controls include the 2008 share of college-educated workers, the share of manufacturing employment, share of employment in services, and the share of female workers in each region, all interacted with year fixed effects. Estimations are weighted by employment per industry and region in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors are two-way clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

E. Heterogeneity Analysis

The results presented in the main text are primarily based on estimates at the one-digit sector level-—i.e., agriculture, manufacturing, and services. However, this level of aggregation conceals substantial heterogeneity across sectors. This appendix provides additional evidence by presenting estimates across 13 two-digit level sectors. Due to data limitations, the analysis at this level has reduced statistical power, so the results should be interpreted as suggestive rather than definitive. Nevertheless, these findings strengthen the main argument of the paper by highlighting the importance of the elasticity of substitution (EoS) between labor and intermediate inputs in explaining the effects of trade liberalization.

E.1. Reduced Form Estimates

To further assess the reduced form effects of the *input* and *competition* shocks, we estimate Equation 4.3 while interacting these shocks with 13 two-digit sector dummies. This specification enables us to infer the EoS between labor and foreign inputs, σ_j, at a more granular level, providing evidence of heterogeneity across sectors. Appendix Table E.1 presents the results. Some estimates display considerable volatility due to small sample sizes (as reported in column 5). Nonetheless, the impact of foreign inputs is markedly heterogeneous: some sectors exhibit negative point estimates, while others show positive ones. The competition shock effect is predominantly negative, except in two sectors with particularly small samples (fishing and aquaculture, and manufacturing of crude petroleum). Overall, these results underscore the importance of the EoS in shaping how exposure to foreign inputs influences local labor market outcomes.

In addition, we provide two additional pieces of evidence highlighting the role of the EoS determining the effects of foreign inputs on local labor markets, even though not considered in the model in Section 2 of the main text.[4] First, we investigate whether the effects of foreign inputs are heterogeneous across skill levels by splitting the outcome based on wage bill contributions from high- and low-skilled workers.[5] The results, presented in Appendix Table E.2, reveal two key findings. First, foreign inputs appear to reduce high-skilled employment in agriculture and manufacturing, indicating a substitution effect between high-skilled workers and foreign inputs. This finding is consistent with the results by Amiti and Cameron (2012) for Indonesia. Second, reductions in the prices of foreign inputs increase mostly low-skilled employment in services, suggesting potential complementarities between foreign inputs and labor in this sector.[6] This second finding aligns with previous studies showing that foreign inputs complement employment (Bas and Paunov, 2021; Fieler et al., 2018; Kamal et al., 2019; Leblebicioğlu and Weinberger, 2021; Verhoogen, 2008).

Second, consistent with our analysis of import effects in Section 4, we examine whether labor market outcomes vary with the type of intermediate inputs imported. To do so, we re-estimate Equation 4.3, this time decomposing the input shock into separate components based on declines in the prices of capital, consumption, and raw material inputs.[7] The results, reported in Appendix Table E.3, reveal notable patterns. On the one hand, increased foreign competition

[4] For tractability purposes we do not include different types of labor inputs nor types of imported inputs. However, the model could be extended to include them

[5] We define high-skilled workers as having at least some tertiary education, whereas low-skilled are those with less than tertiary.

[6] Although we cannot fully distinguish whether this is driven by reduced marginal costs or by substitution effects.

[7] We construct these shocks by restricting Equation 4.2 to inputs of each type, yielding three distinct measures of input shocks.

in all input types reduces the wage bill throughout. On the other hand, the effects differ across input categories. Declines in the prices of foreign capital and consumption inputs tend to increase the wage bill in services (columns (1)–(8)), while the effects of raw material inputs on services are less precisely estimated. For agriculture, however, reductions in consumption input prices are associated with lower wage bills. In manufacturing, point estimates are imprecise and vary in sign: positive for capital inputs, but negative for consumption and raw material inputs. These contrasting effects once again highlight the role of the elasticity of substitution in shaping how foreign input shocks affect local labor market outcomes.

Appendix Table E.1
Input and Competition Shocks on Wage Bill at Two-Digit Level

	Competition		Input		Obs.
	OLS	IV	OLS	IV	
	(1)	(2)	(3)	(4)	(5)
Crop production and Animal Production	6.108***	7.033*	2.268***	2.510	3228
	(0.777)	(3.650)	(0.691)	(4.271)	
Forestry and logging	4.772**	4.541***	-6.035***	-16.057***	264
	(1.882)	(1.063)	(2.140)	(2.079)	
Fishing and aquaculture	1.735*	-5.176***	27.020***	110.029***	189
	(0.847)	(1.466)	(2.134)	(18.214)	
Foods, beverages and tobacco products	1.561***	2.246	-3.908***	-8.759	3382
	(0.527)	(1.773)	(0.814)	(5.830)	
Manufacture textiles, wearing apparel and leather	2.243***	1.739	-2.722***	-2.410	2274
	(0.454)	(1.175)	(0.634)	(2.533)	
Wood, paper, printing, and recorded media	0.814	-5.748	13.463***	23.356	1772
	(0.476)	(8.857)	(2.593)	(21.377)	
Mining, crude petroleum manufacture	7.109***	-28.466*	-20.465***	-8.211	159
	(0.676)	(16.038)	(1.539)	(.)	
Manufacture of non-metallic mineral products	2.108**	6.473***	-0.590	-11.789***	3396
	(0.841)	(1.823)	(2.111)	(4.150)	
Manufacture of basic and elaborated metal products	-3.621***	-35.338	2.648**	29.285	1594
	(0.575)	(21.171)	(1.228)	(22.220)	
Manufacture of electronic, electrical equipment machinery	1.836***	4.762***	1.253	-4.862**	1821
	(0.628)	(1.283)	(1.487)	(1.937)	
Vehicles, furniture, and other manufacturing	0.879	3.047***	1.826	-4.760*	2136
	(0.791)	(0.781)	(2.340)	(2.756)	
Non-retail or wholesale services			-1.861	-5.252**	24156
			(1.265)	(1.895)	
Wholesale and retail trade, including trade			-2.459	-5.638**	13999
			(2.041)	(2.287)	

Note: This table presents the results of estimating Equation 4.3 using the wage bill as outcome, and interacting the input and competition shocks by 13 two-digit sector dummies. Estimations performed in a panel at the industry-region-year level. Columns (1)-(2) are estimated using ordinary least squares, whereas columns (3)-(4) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. All estimations include region-by-industry and region-by-year fixed effects. Column (5) presents the number of observations for each two-digit sector in the estimation sample. Standard errors are two-way clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

Appendix Table E.2
Input and Competition Shocks on Wage Bill by Skill Level

	High-Skilled Workers								Low-Skilled Workers							
	OLS				IV				OLS				IV			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
A) All Sectors																
Input Shock	0.971	2.242*	1.305	0.809	-0.218	2.800	1.327	0.018	-0.867	-2.236*	-1.428	-0.856	-2.996	-4.527**	-3.534*	-2.892
	(1.232)	(1.137)	(1.211)	(1.189)	(2.309)	(2.015)	(2.011)	(2.148)	(0.869)	(1.254)	(1.025)	(0.876)	(1.871)	(2.021)	(1.882)	(1.881)
Comp. Shock	2.634***	2.370***	2.511***	2.585***	2.869**	2.735**	2.787**	2.855**	2.966**	2.947**	2.969**	2.956**	3.507**	3.496**	3.475**	3.476**
	(0.861)	(0.784)	(0.834)	(0.842)	(1.098)	(1.092)	(1.140)	(1.107)	(1.146)	(1.153)	(1.162)	(1.162)	(1.309)	(1.321)	(1.326)	(1.329)
F-Stat First Stage					94.43	94.24	92.09	90.72					109.7	106.4	107.9	108.5
B) By Industry																
Input shock × 1(Agric.)	5.164***	5.211***	4.729**	4.874***	2.898	7.141**	5.829**	3.880***	1.711	1.081	1.059	2.106	2.909	1.754	1.928	3.140
	(1.760)	(1.643)	(1.901)	(1.622)	(1.845)	(2.601)	(2.472)	(1.377)	(1.979)	(2.268)	(2.363)	(2.086)	(4.282)	(4.551)	(4.724)	(4.566)
Input shock × 1(Manuf.)	2.153	4.564***	2.692*	2.121	5.399	8.176***	6.183**	5.545*	-0.254	-2.197	-1.484	-0.280	-2.624	-4.279	-3.823	-2.342
	(1.638)	(1.594)	(1.436)	(1.634)	(3.229)	(2.374)	(2.628)	(3.090)	(1.855)	(2.403)	(2.322)	(1.877)	(2.802)	(3.413)	(3.363)	(2.761)
Input shock × 1(Serv.)	0.058	1.696	0.487	-0.104	-1.352	1.930	-0.097	-1.283	-1.309	-2.380*	-1.856*	-1.399	-4.110*	-4.895**	-4.611**	-4.054**
	(1.125)	(1.112)	(1.129)	(1.127)	(2.530)	(2.025)	(2.054)	(2.336)	(0.988)	(1.200)	(1.035)	(0.999)	(2.006)	(2.046)	(1.920)	(1.953)
Comp. shock × 1(Agric.)	5.002**	3.915*	4.822**	4.797**	7.202*	5.137	6.267	6.699*	5.159*	4.873*	5.034*	5.060*	5.711	5.526	5.615	5.582
	(2.235)	(1.956)	(2.054)	(2.137)	(3.799)	(4.056)	(4.155)	(3.907)	(2.687)	(2.737)	(2.820)	(2.759)	(3.547)	(3.565)	(3.710)	(3.672)
Comp. shock × 1(Manuf.)	1.241*	1.015*	1.115*	1.192*	-0.387	-0.071	-0.261	-0.385	1.512**	1.704**	1.725**	1.491*	1.824	2.106	2.044	1.744
	(0.601)	(0.590)	(0.574)	(0.610)	(1.571)	(1.483)	(1.535)	(1.576)	(0.719)	(0.813)	(0.784)	(0.723)	(1.103)	(1.278)	(1.200)	(1.101)
F-Stat First Stage					95.41	78.12	84.69	89					117.2	82.35	110.8	125.6
Observations	46,522	46,522	46,522	46,522	46,522	46,522	46,522	46,522	52,522	52,522	52,522	52,522	52,522	52,522	52,522	52,522
Region-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Year FE	Yes				Yes				Yes				Yes			
Year FE		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Baseline Controls			Yes	Yes			Yes	Yes			Yes	Yes			Yes	Yes
Region-Specific Trends				Yes				Yes				Yes				Yes

Note: This table presents the results of estimating Equation 4.3 using the wage bill paid to high- (measured as having at least some tertiary education) and low-skilled (measures as less than tertiary education) workers as outcome. Estimations performed in a panel at the industry-region-year level. Colombian departments are use as regions. Columns (1)-(4) are estimated using ordinary least squares, whereas columns (5)-(8) present IV estimates using the tariff initial values interacted with a dummy post-reform as instrument. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Baseline controls include the 2008 share of college-educated workers, the share of manufacturing employment, share of employment in services, and the share of female workers in each region, all interacted with year fixed effects.Estimations are weighted by employment per industry and region in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors are two-way clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

Quintero, Paz, Xu

Appendix Table E.3
Input and Competition Shocks on Wage Bill by Type of Input shock

	Capital				*Consumption*				*Raw Materials*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
A) All Sectors												
Input shock	-1.415	-3.078*	-1.781	-1.478	-2.653	-4.195	-2.821	-2.468	-4.153	-5.755	-3.777	-3.477
	(1.229)	(1.753)	(1.331)	(1.266)	(2.115)	(2.630)	(2.072)	(2.045)	(4.704)	(4.922)	(5.148)	(5.165)
Comp. Shock	3.703**	3.530**	3.641**	3.675**	3.775**	3.703**	3.734**	3.754**	4.243**	4.346**	4.160**	4.147**
	(1.438)	(1.514)	(1.464)	(1.454)	(1.398)	(1.454)	(1.423)	(1.416)	(1.622)	(1.695)	(1.706)	(1.694)
F-Stat First Stage	151.2	156.3	149.8	155.9	100.1	104.8	102.3	100.1	118.6	112.1	118.9	122
B) By Industry												
Input shock × 1(Agric.)	1.944	0.803	0.701	2.193	6.188**	5.181	5.438*	6.343**	15.052	17.064	16.508	17.465
	(3.422)	(3.440)	(3.518)	(3.428)	(2.870)	(3.676)	(3.149)	(2.678)	(27.739)	(31.641)	(30.001)	(30.395)
Input shock × 1(Manuf.)	1.418	0.115	1.195	1.321	-3.906	-7.087	-5.084	-3.405	-0.209	-2.467	-1.015	0.290
	(2.107)	(2.134)	(2.032)	(2.112)	(4.329)	(5.061)	(4.893)	(4.179)	(2.759)	(2.952)	(3.034)	(2.656)
Input shock × 1(Serv.)	-2.826*	-3.997*	-3.136*	-2.952*	-5.363*	-6.141**	-5.364**	-5.168*	-4.636	-5.982	-4.495	-4.339
	(1.503)	(2.094)	(1.612)	(1.545)	(2.626)	(2.900)	(2.523)	(2.558)	(3.489)	(3.677)	(3.243)	(3.449)
Comp. shock × 1(Agric.)	7.940***	7.770**	7.847**	7.814**	7.547**	7.469**	7.425**	7.466**	7.916**	7.719**	7.687**	7.772**
	(2.791)	(2.783)	(2.897)	(2.886)	(2.852)	(2.839)	(2.978)	(2.948)	(2.993)	(3.067)	(3.181)	(3.129)
Comp. shock × 1(Manuf.)	1.641**	1.460	1.579*	1.623**	1.979**	2.042**	2.043**	1.952**	2.055**	2.291**	2.186**	1.976**
	(0.774)	(0.868)	(0.772)	(0.782)	(0.835)	(0.921)	(0.848)	(0.842)	(0.828)	(0.840)	(0.829)	(0.822)
F-Stat First Stage	386.1	448.9	399.8	390.5	276.3	128.9	225.8	281.1	49.58	35.23	43.15	43.05
Observations	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370	58,370
Region-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region-Year FE	Yes				Yes				Yes			
Year FE		Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Baseline Controls			Yes	Yes			Yes	Yes			Yes	Yes
Region-Specific Treands				Yes				Yes				Yes

Note: This table presents the results of estimating Equation 4.3 using the wage bill as outcome and instrumenting. Estimations performed in a panel at the industry-region-year level. Colombian departments are use as regions. Columns (1)-(4) are estimated using the input shock only for capital goods, columns (5)-(8) use the input shock only for consumption goods, and columns (9)-(12) use the input shock only for raw materials. Panel A presents estimates pooling all sectors, whereas Panel B presents estimates interacting by industry dummies. Baseline controls include the 2008 share of college-educated workers, the share of manufacturing employment, share of employment in services, and the share of female workers in each region, all interacted with year fixed effects. Estimations are weighted by employment per industry and region in 2008. The reported first stage F statistic corresponds to the minimum across all the first stage regressions using Sanderson and Windmeijer (2016). Standard errors are two-way clustered at the industry and region level. *** p<0.01, ** p<0.05, * p<0.1

E.2. Counterfactual Estimates

We now present evidence on the effects of trade liberalization across the 13 two-digit sectors. Recall that while the model is estimated at this level, the EoS is calibrated at the one-digit level (i.e., agriculture, manufacturing, and services). Consequently, any variation observed across two-digit sectors within a given one-digit category reflects differences unrelated to the EoS between labor and intermediate inputs, since this parameter is held constant within each broad sector.

Manufacturing: Appendix Figure E.1b plots the evolution of employment across manufacturing sectors. The trade liberalization episode favors some industries in the manufacturing sector, such as metal goods production or petroleum products. These are the two industries within the manufacturing sector where Colombia has a comparative advantage.[8] The chemical industry also experienced a slight increase in employment because the tariff shock was small in this industry. On the other hand, other industries experience a slight decrease in employment due to the trade liberalization episode. For example, the vehicle and furniture industry experienced a drop of around 0.5 percent in total employment. Textiles experienced the largest losses, as tariffs in this sector decreased substantially due to the tariff shocks. The average tariff in this industry declined from 18 to 0 percent. Therefore, textile employment decreased by more than 1.1 percent after 2 years.

The comparison between the CES and the CD cases suggests that, because of higher substitutability between labor and intermediates, employment in all manufacturing industries increases less or decreases more in response to tariff shocks. However, the decline is larger in the sectors that initially rely more on foreign inputs, such as metals, vehicles, textiles, or chemicals. These industries initially had a higher input share, and as a result, were more exposed to the input shock that led them to substitute more labor for intermediate inputs in the CES vs. the CD case. For example, employment in the textile industry decreases by 0.35 percent in the CD case and by 1.0 percent in the CES case.

Agriculture: Appendix figure E.1c shows the employment response to the tariff shock across agricultural sectors. Since these are sectors where Colombia holds a comparative advantage, employment rises in aquaculture and forestry but falls in crop production. This pattern contrasts sharply with manufacturing, where tariff reductions were more substantial. In 2010, the average tariff in primary sectors declined only modestly, from 12 to 11 percent, compared to much larger drops in manufacturing.

The comparison between the CES and Cobb–Douglas cases reveals larger employment declines across all primary sectors since the findings suggest very high substitutability between labor and intermediates in the primary sectors ($\sigma^A = 9.6$). These effects are particularly pronounced in aquaculture and crop production that rely more on intermediate inputs. For instance, in crop production, employment growth falls from 1.3% 0.6%, highlighting the importance of incorporating flexible production functions.

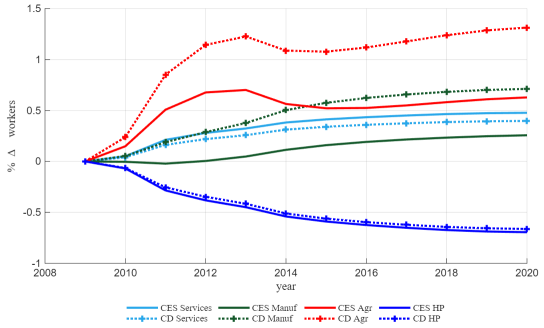
Services: Appendix Figure E.1d reports the results for the two service sectors—both benefit from the trade reform, as the agricultural and manufacturing sectors face more competition from other countries. Moreover, the service sector also benefited from access to cheaper inputs from the U.S. and the RoW. Overall, the non-retail or non-wholesale service sector experienced an employment increase of around 0.50 percent after 10 years due to the shock, while the retail and wholesale service sector experienced a rise of around 0.32 percent. In addition, the comparison between the CES and CD cases reveals that, due to the complementarity between labor and intermediates,

[8] According to OEC (2010), in 2010, exports of refined petroleum accounted for more than 7 percent of total exports, and exports of metal products more than 4 percent.

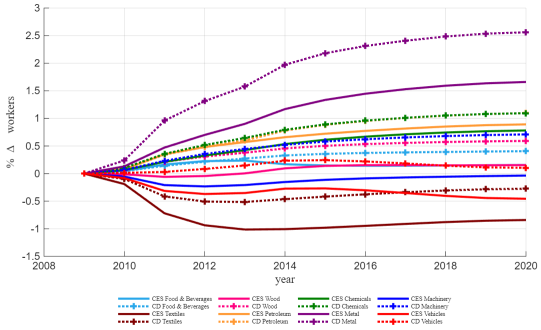
employment growth is slightly higher in the CES case. The effect is still significant in absolute terms, as this increase suggests that at least 5,000 more jobs are allocated to the service sector in the CES case relative to the CD case.

Appendix Figure E.1: Effects on Employment by Two-Digit Sector

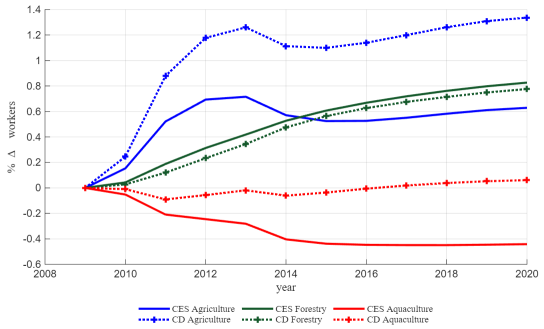
(a) Broad category of sectors



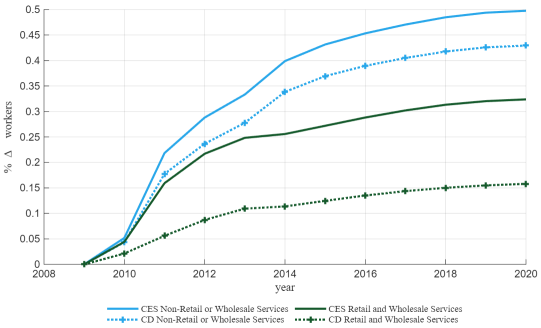
(b) Manufacturing



(c) Primary sectors



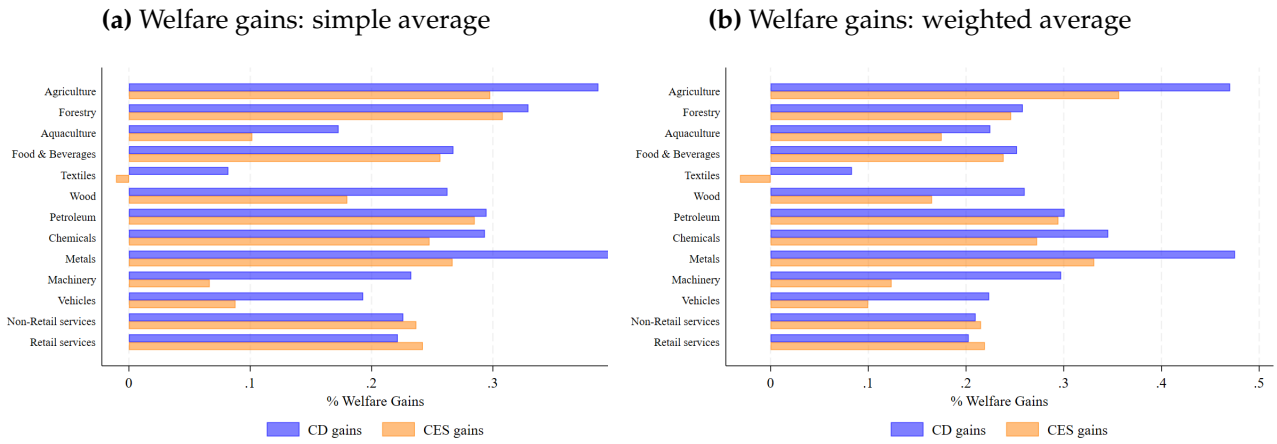
(d) Services



Notes: These figures plot the percentage change in total employment of the trade liberalization episode by industry from the model. Panel E.1a shows the results for the aggregate category of sectors, panel E.1b for the manufacturing sector, panel E.1c for the agricultural sector and panel E.1d for the service sector.

We also examine the effects of the trade shock across two-digit industries on welfare. Appendix Figure E.2 illustrates the average welfare effects. Overall, the gains in the manufacturing and agricultural sectors are substantially lower under the CES framework compared to the CD case. Workers in manufacturing industries that rely heavily on intermediate inputs experience pronounced declines in welfare gains in the CES case. For instance, in industries such as vehicles, machinery, and wood products, welfare gains drop significantly. For example, in vehicles, the average gains are reduced by half, from 0.20 percent under CD to 0.09 percent under CES. Similar declines are observed in other sectors, such as chemicals and metals, where gains decrease noticeably under the CES framework. Workers in the textile industry lose even more from the liberalization, experiencing losses in the CES case (-0.02 vs. 0.08).

Appendix Figure E.2: Welfare Gains from the Trade Liberalization by Two-Digit Sector



Notes: This figure plots the average change in welfare across states for each sector in the economy. Panel E.2a plots the welfare gains using a simple average, while panel E.2b computes a weighted average using as weights the initial sectoral employment. We calculate welfare as the NPV of a compensated variation measure. See section 2 for more details and the exact definition of welfare.

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