Import Competition, Foreign Inputs, and Labor Adjustment in a Developing Country: Evidence from Colombian Liberalization

Juan Sebastián Munoz
IÉSEG School of Management

Leonardo Bonilla
Banco de la República

December 2, 2021

Introduction

"*Jobs that should be offered to* *Brazilians* *are being delivered on a tray to the Chinese, Koreans, Indians, etc ..*"

(Association of Capital Goods Producers, cited in Pavcnik (2017)).

Introduction

"*Jobs that should be offered to* Brazilians *are being delivered on a tray to the* Chinese, Koreans, Indians, *etc ..*"

(Association of Capital Goods Producers, cited in Pavcnik (2017)).

- Competition from low-wage countries decrease employment in developed countries.

  Autor et al. (2013, 2014); Pierce and Schott (2016)

Introduction

"*Jobs that should be offered to* Brazilians *are being delivered on a tray to the Chinese, Koreans, Indians, etc ..*"

(Association of Capital Goods Producers, cited in Pavcnik (2017)).

- Competition from low-wage countries decrease employment in developed countries.

  Autor et al. (2013, 2014); Pierce and Schott (2016)

- Liberalization in developing countries negatively affect employment and salaries because of imperfect labor mobility.

  Dix-Carneiro and Kovak (2017); Pavcnik (2017)

Introduction

"*Jobs that should be offered to* *Brazilians* *are being delivered on a tray to the Chinese, Koreans, Indians, etc ..*"

(Association of Capital Goods Producers, cited in Pavcnik (2017)).

- Competition from low-wage countries decrease employment in developed countries.

  Autor et al. (2013, 2014); Pierce and Schott (2016)

- Liberalization in developing countries negatively affect employment and salaries because of imperfect labor mobility.

  Dix-Carneiro and Kovak (2017); Pavcnik (2017)

- No net job loses because of labor reallocation.

  Bloom et al. (2019)

Introduction

"*Jobs that should be offered to* *Brazilians* *are being delivered on a tray to the Chinese, Koreans, Indians, etc ..*"

(Association of Capital Goods Producers, cited in Pavcnik (2017)).

- Competition from low-wage countries decrease employment in developed countries.

  Autor et al. (2013, 2014); Pierce and Schott (2016)

- Liberalization in developing countries negatively affect employment and salaries because of imperfect labor mobility.

  Dix-Carneiro and Kovak (2017); Pavcnik (2017)

- No net job loses because of labor reallocation.

  Bloom et al. (2019)

- Unknown how competition and intermediate inputs from high-wage countries affect employment in low-wage economies.

Overview

How does the penetration of goods from high-wage countries affect the labor market in emerging economies?

Our methodology:

- Exploit exogenous variation by a unilateral tariff cut (2010) and the Colombia-USA free-trade agreement (2012).
- Use highly detailed administrative data.
- Compute competition and input shocks to account for aggregate effects.
- Explore heterogeneity by skills and accessibility (crucial in developing countries).

$\Rightarrow$ Heterogeneous effects in developing countries that contrast with responses in developed economies.

Preview of Results

Main findings identify winners and losers:

Preview of Results

Main findings identify winners and losers:

1. Opposite employment effects of competition (negative) and foreign inputs (positive);

Preview of Results

Main findings identify winners and losers:

1. Opposite employment effects of competition (negative) and foreign inputs (positive);
2. $\downarrow$ earnings among informal workers (less rigid salaries);

Preview of Results

Main findings identify winners and losers:

1. Opposite employment effects of competition (negative) and foreign inputs (positive);
2. $\downarrow$ earnings among informal workers (less rigid salaries);
3. $\downarrow$ manufacturing employment driven by $\downarrow$ in foreing input prices;

Preview of Results

Main findings identify winners and losers:

1. Opposite employment effects of competition (negative) and foreign inputs (positive);
2. $\downarrow$ earnings among informal workers (less rigid salaries);
3. $\downarrow$ manufacturing employment driven by $\downarrow$ in foreing input prices;
4. Earnings of the high-skilled $\downarrow$, especially for informal;

Preview of Results

Main findings identify winners and losers:

1. Opposite employment effects of competition (negative) and foreign inputs (positive);
2. $\downarrow$ earnings among informal workers (less rigid salaries);
3. $\downarrow$ manufacturing employment driven by $\downarrow$ in foreing input prices;
4. Earnings of the high-skilled $\downarrow$, especially for informal;
5. Relatively higher employment losses in less-accessible areas.

Contributions

- Local labor market effects of imports do not depend on the country of origin $\Rightarrow$ Imports from high-wage countries also affect developing economies.
- Estimate the effects of competition and input shocks.
- Heterogenous effects by skills and accessibility.
- Evidence of deeply heterogeneous effects among workers in the developing world.

Outline

Outline

Stylized-Framework (I)

- J economic sectors and a representative firm in each sector $j \in J$;
- CES technology,

$$Y_j = \left[\theta L_j^{\frac{\sigma_j - 1}{\sigma_j}} + (1-\theta) X_j^{\frac{\sigma_j - 1}{\sigma_j}} \right]^{\frac{\nu_j \sigma_j}{\sigma_j - 1}};$$

- Decreasing returns to scale $\nu < 1$;
- Elasticity of Substitution σ;
- Foreign Inputs (X_j) are charged ad-valorem tariff (τ).

Labor demand given by:

$$\ln L_j = \epsilon_j \ln \nu_j P_j(\tau) + \alpha \ln \left[\theta^{\sigma_j} W_j^{1-\sigma_j} + (1-\theta)^{\sigma_j} Q_j (1+\tau)^{1-\sigma_j} \right] - \sigma_j \ln \left(\frac{W_j}{\theta} \right).$$

$\epsilon_j = \frac{1}{1-\nu} \equiv$ price elasticity of demand.

Stylized-Framework (II)

Taking a derivative with respect to τ:

$$\frac{\partial \ln L}{\partial \tau} = \underbrace{\frac{\epsilon_j P_j'(\tau)}{\nu_j P_j(\tau)}}_{\text{Competition Shock}} \underbrace{+ (\sigma_j - \epsilon_j) \frac{(1-\theta)}{(1+\tau)} \left(\frac{X_j}{Y_j^{\frac{1}{\nu_j}}} \right)^{\frac{\sigma_j - 1}{\sigma_j}}}_{\text{Input Shock}}$$

A decrease in tariffs:

- $\downarrow$ employment by competition shock.
- $\downarrow$ or $\uparrow$ employment by input shock.
- Labor adjustment can be done by wages with less rigid contracts (informal employment).

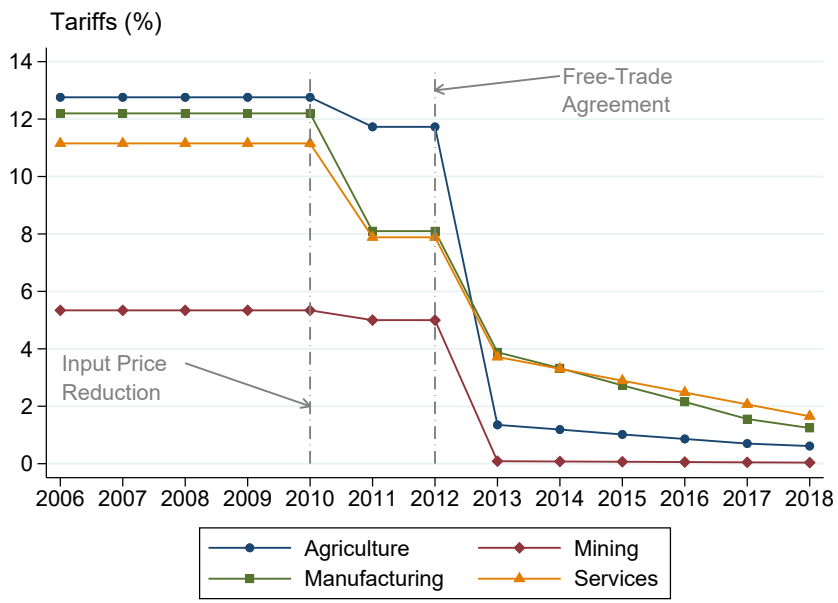
Outline

Colombian Tariff Reductions

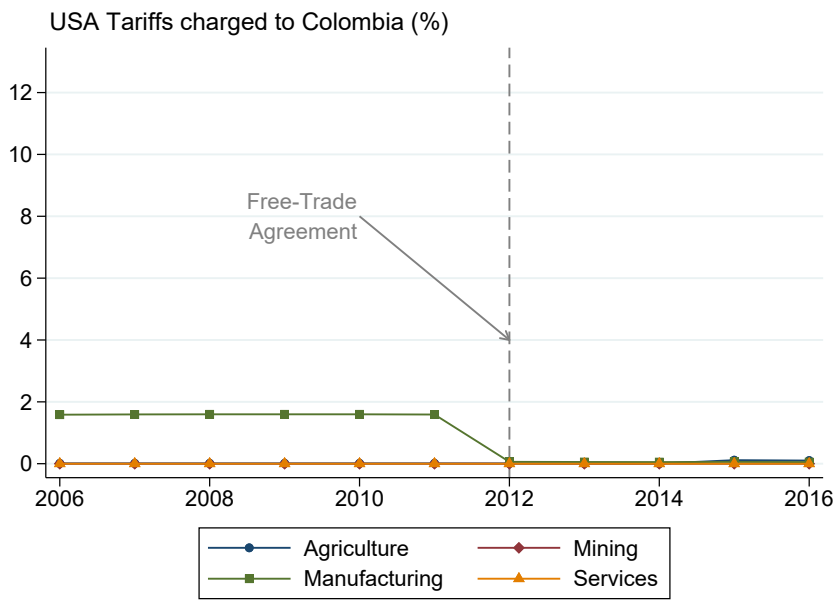
- The United States is Colombia's biggest trade partner (30% of imports).
- The Colombian government had interest in increasing international trade.
- Two tariff decreases:
  1. Unilateral tariff decrease in 2010 (decree 4114):
     - Applied to all countries;
     - Decreased tariffs on mainly manufactured inputs.
  2. Free-trade Agreement in 2012 (decree 730):
     - Applied only to United States.
     - Mainly manufacturing products.
     - Progressive decrease in some agricultural goods.
- Neither affected Colombian exports.

Tariffs Charged by Colombia and U.S.

Colombian Tariffs

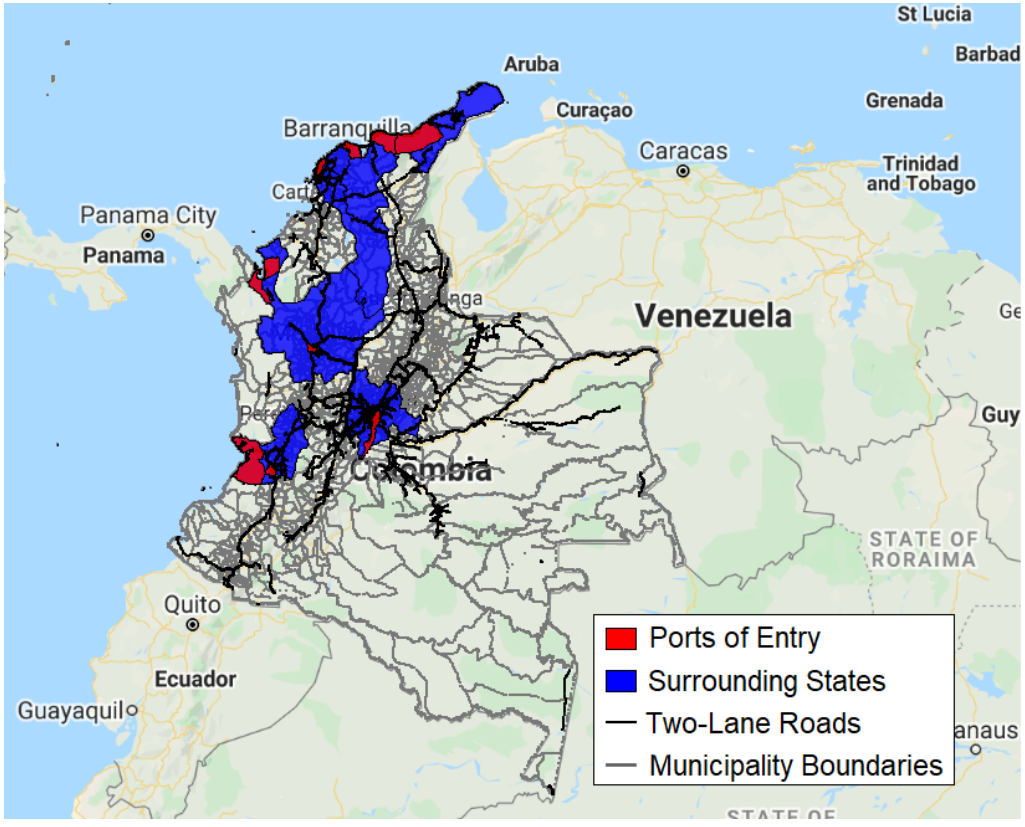


U.S Tariffs



Trade Evolution | Other Countries | Products

Connectivity is a Central Issue in Developing Countries



- Trade centralized trade within regions (Duranton, 2015).
- Political neglect to build roads (geography and conflict)(Duranton, 2015; Bushnell, 1993).
- 70% of US imports stay in the same state they enter.

Outline

Competition and Input Shocks

1. Competition Shock:

$$\tilde{\tau}_{jt} = \tau_{j,2010} - \tau_{jt}.$$

2. Input Shock:

$$\tilde{q}_{jt} = \sum_k w_{jk}^{2008} \Delta\tau_{kt},$$

$$\text{where } w_{jk}^{2008} = \frac{X_{jk}^{2008}}{\sum_k X_{jk}^{2008}} \ .$$

- $j \equiv$ industry,
- $k \equiv$ input,
- $X_{kj}^{2008} \equiv$ Sector j's imports of inputs k,
- $w_{jk}^{2008} \equiv$ Share of input k imported by j,
- $\tilde{q}_{jt} \equiv$ Weighted decrease in the tariffs of imported inputs.

Identification

We compare industries facing different tariffs declines:

$$y_{jt} = \beta^c \tilde{\tau}_{jt} + \beta^i \tilde{q}_{jt} + \mu_j + \mu_t + u_{jt}.$$

In addition, we explore heterogeneity in accessibility using:

$$y_{jst} = (\beta^c \tilde{\tau}_{jt} + \gamma^c \tilde{\tau}_{jt} A_s) + (\beta^i \tilde{q}_{jt} + \gamma^i \tilde{q}_{jt} A_s) + \mu_j + \mu_t + \mu_s + u_{jt}.$$

- $y_{jt} \equiv$ log outcome in year t minus log in 2008.
- $A_s = 1/h_s \equiv$ Accessibility index (inverse of driving time from s to closest port, rescaled from 0 to 1).
- $\mu_j \equiv$ Industry FE.
- $\mu_t \equiv$ Year FE.
- $\mu_s \equiv$ State FE.

Weighted Sum of the Effect

We aggregate the effect by computing the weighted sum of both shocks:

$$\text{Av. Weighted Sum}_j = \underbrace{\tilde{\tau}_j \times \beta_j^c}_{\text{Competition Shock}} + \underbrace{\tilde{q}_j \times \beta_j^i}_{\text{Input Shock}},$$

where the average shocks by sector are:

Sector	Competition Shock ($\Delta\bar{\tau}$)	Input Shock ($\Delta\bar{q}$)
Agriculture	3.86	3.68
Manufacturing	5.98	5.00
Services	0.16	4.70
Overall	1.93	3.46

Computing Earnings by Industry

- Earnings effects might be selected.
- To get rid of selection, we estimate:

$$\ln(\mathit{Earnings})_{imsjt} = \theta_{jt} + X_{imsjt}\phi_t + \mu_{st} + \mu_{mt} + \varepsilon_{imsjt}.$$

- Estimated separately by year.
- $\ln(\mathit{Earnings})_{imsjt} \equiv$ log monthly earnings.
- State (μ_{st}) and month (μ_{mt}) fixed effects
- $X_{imrjt} \equiv$ gender, age, and age-squared.
- $\theta_{jt} \equiv$ industry premia.

Data

We merge multiple sources of data:

1. Matched employer-employee monthly earnings records;
   - Longitudinal records,
   - Reporting issues in initial edition (2008) $\Rightarrow$ matching estimator,
   - Formal employees (60% of workers).
2. Colombian household surveys;
3. Colombian trade at the state-year-industry level;
4. Tariff Decrees: 4589 of 2006; 4114 of 2010; and 730 of 2012;
5. Records of imports by firm in 2008.

$\Rightarrow$ Two estimating data sets from 2008-2018.:

- Year-industry (4-digit): N= 4,576 (416×11);
- Year-state-industry: N = 140,085 ($416 \times 11 \times 33$, but only sector with at least one employee).

Outline

Tariff Reduction on Imports (Compliance) Event Study

	Total		*U.S. Imports*				*Non U.S. Imports*			
	Log		Log		Percentage		Log		Percentage	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
$\Delta\tau$	0.015***		0.016***		0.242***		0.006		-0.177***	
	(0.005)		(0.005)		(0.030)		(0.004)		(0.038)	
$\Delta\tau * 1(2010 < t \leq 2012)$		0.016***		0.026***		0.144***		0.010*		-0.117**
		(0.005)		(0.006)		(0.045)		(0.005)		(0.056)
$\Delta\tau * \times 1(t > 2012)$		0.015***		0.015***		0.253***		0.005		-0.184***
		(0.005)		(0.005)		(0.032)		(0.005)		(0.040)
Observations	79,956	79,956	79,956	79,956	79,956	79,956	79,956	79,956	79,956	79,956
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

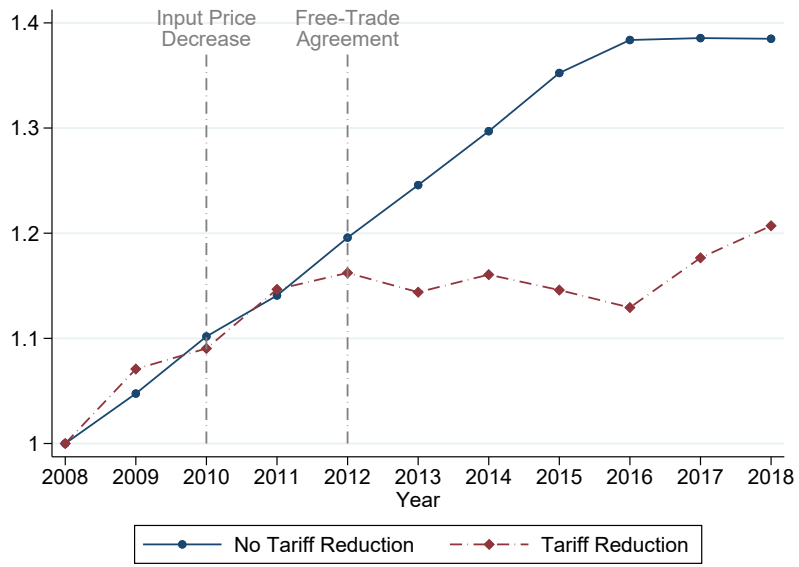
Note: This table presents the results of estimating equation (**??**) using imports as an outcome, and excluding the input shock. Columns (1) and (2) use the log of total imports, columns (3) and (4) use the log of imports from the U.S, columns (5) and (6) the percentage of import from the U.S, columns (7) and (8) the log of non-U.S imports, and columns (9) and (10) the percentage of non-U.S. imports. Odd columns present the linear effect, wheras even columns split the effect before and after 2012. *** p¡0.01, ** p¡0.05, * p¡0.1

- Increase in imports from the United States.
- No observed changes in imports from other countries.
- There is no effect on exports.

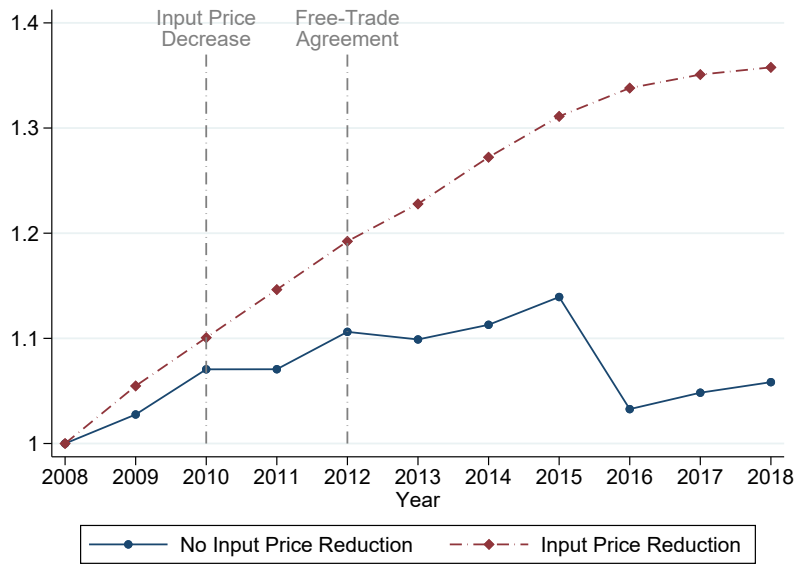
Outline

Evolution of Employment by Industries

Tariff Reduction

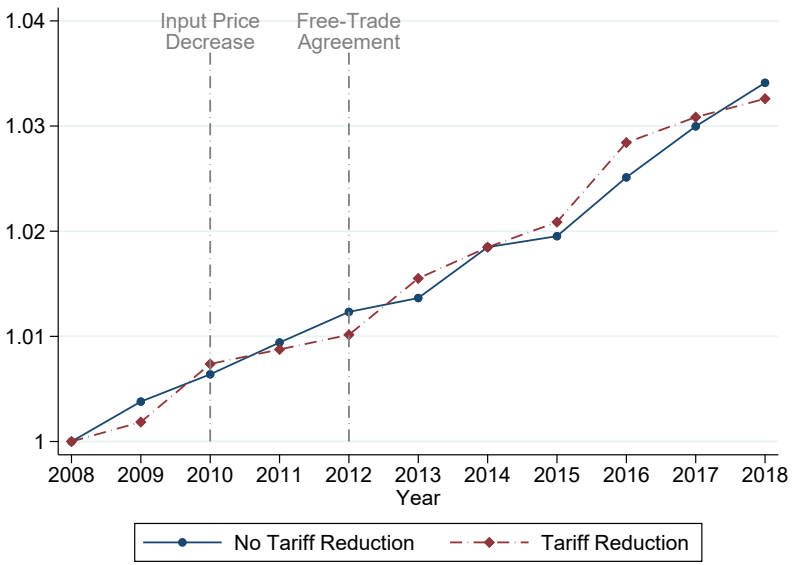


Input Price Reduction

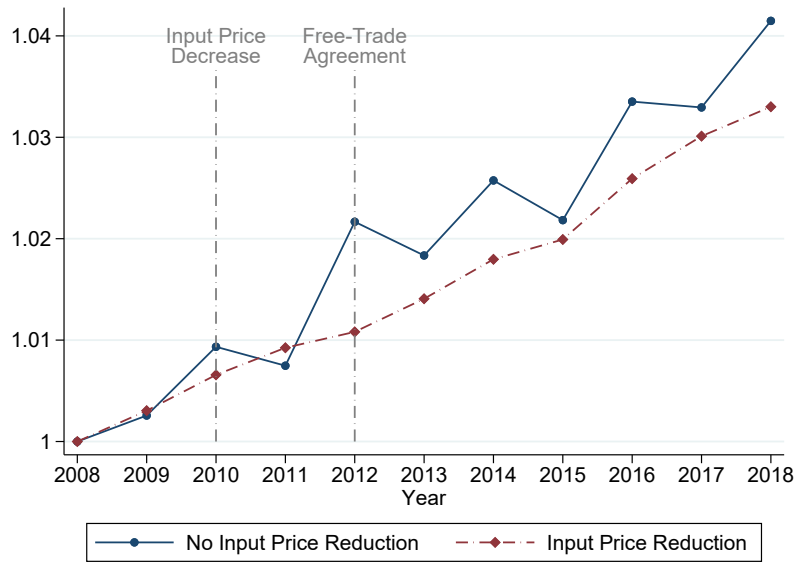


Evolution of Earnings by Industries

Tariff Reduction

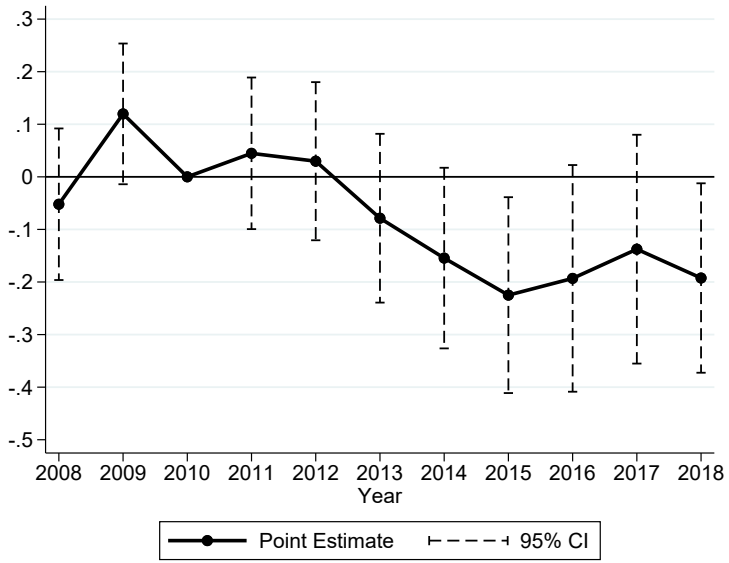


Input Price Reduction

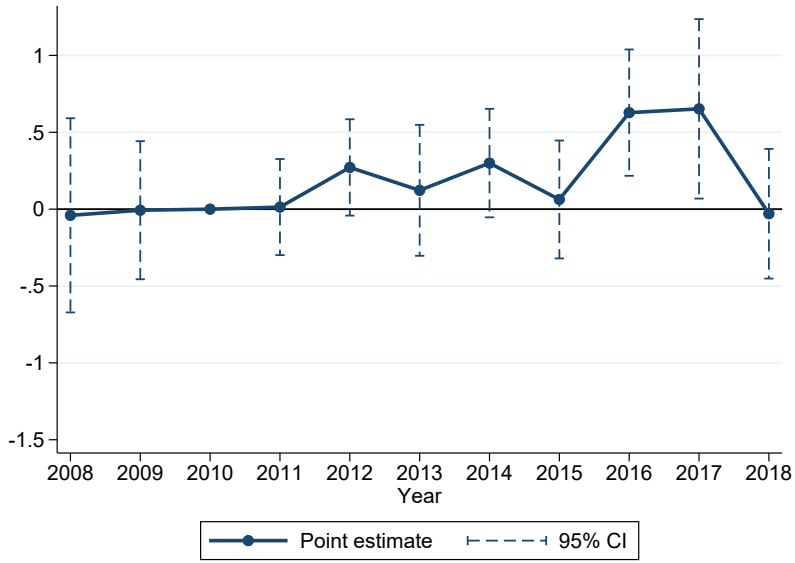


Event-Study Estimates on Overall Employment

Tariff Reduction



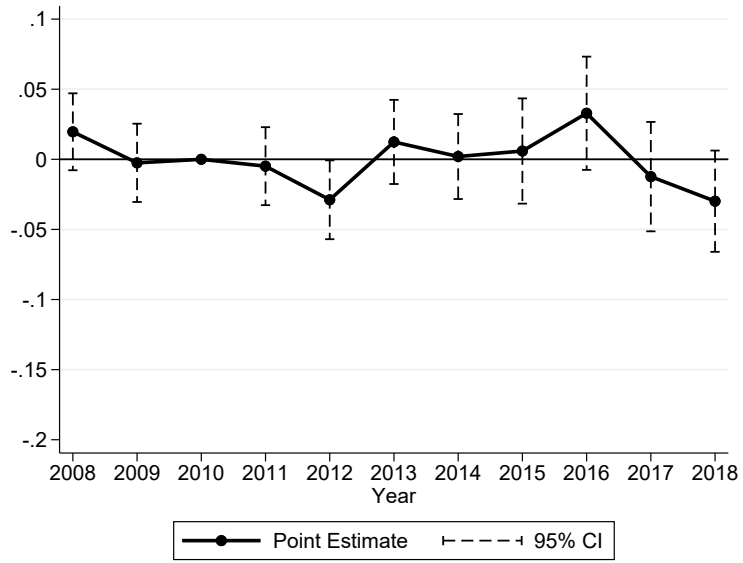
Input Price Reduction



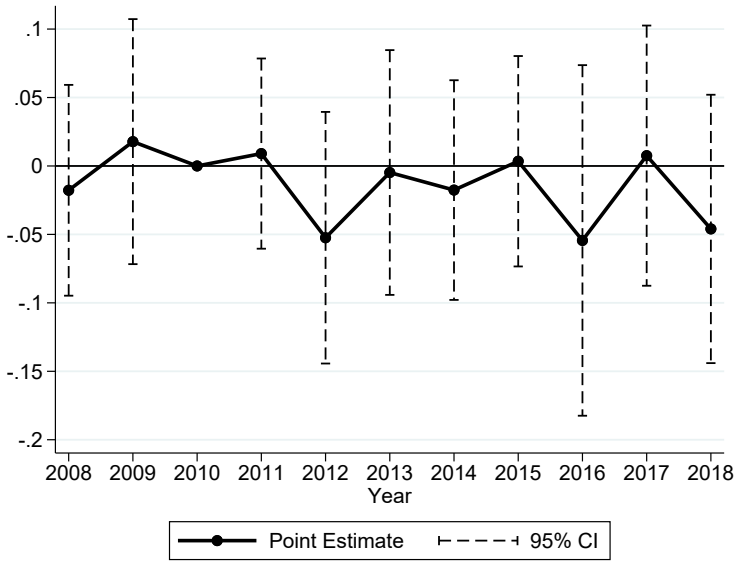
Other Measures

Event-Study Estimates on Earnings

Tariff Reduction



Input Price Reduction

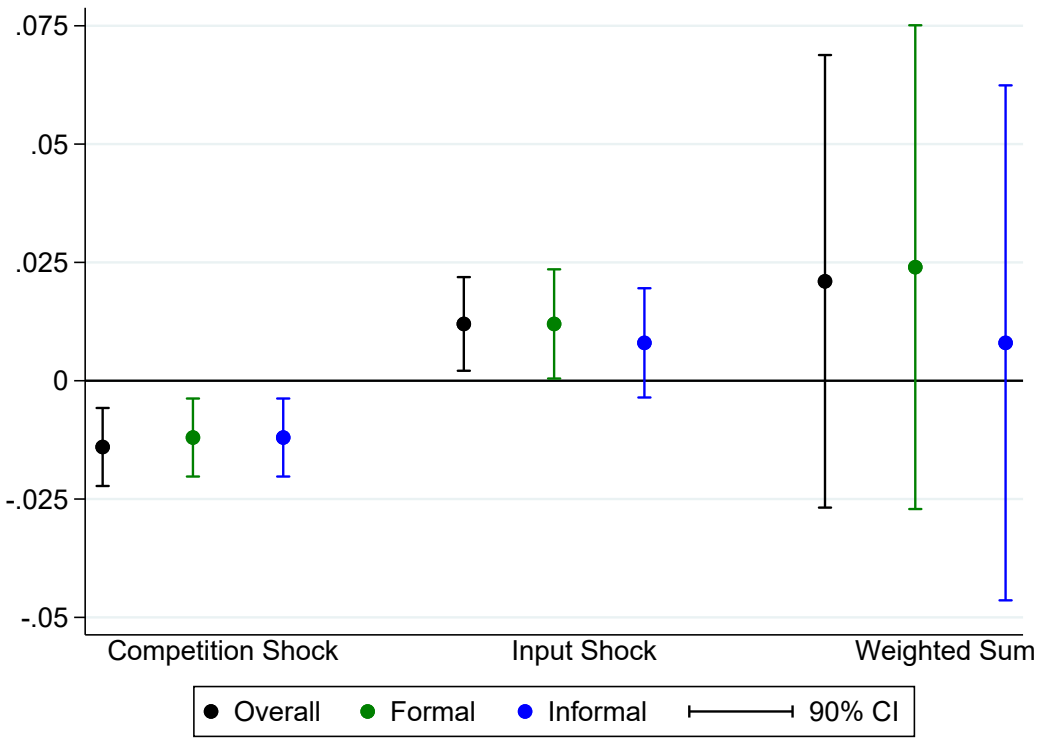


Other Measures

1) Opposite Employment effects

Estimating equation:

$$\hat{Employment}_{jt} = \beta^c \tilde{\tau}_{jt} + \beta^i \tilde{q}_{jt} + \mu_j + \mu_t + u_{jt}$$



Table

2) Input shock decreases earnings of informal workers

Estimating equation[1]:

$$\hat{\theta}_{jt} = \beta^c \tilde{\tau}_{jt} + \beta^i \tilde{q}_{jt} + \mu_j + \mu_t + u_{jt}$$

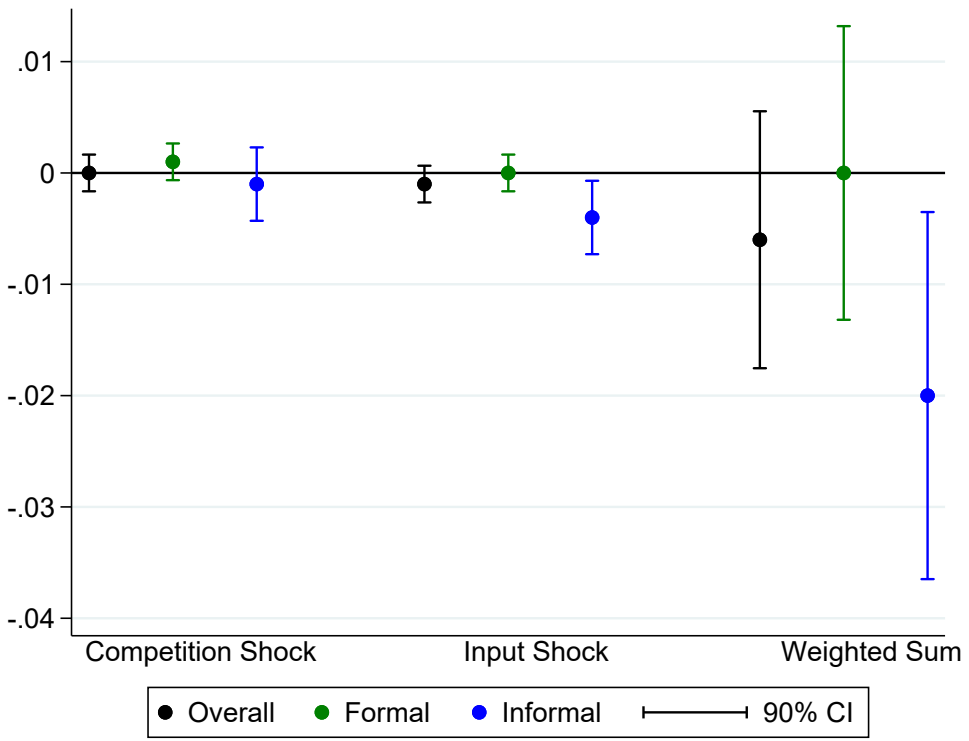
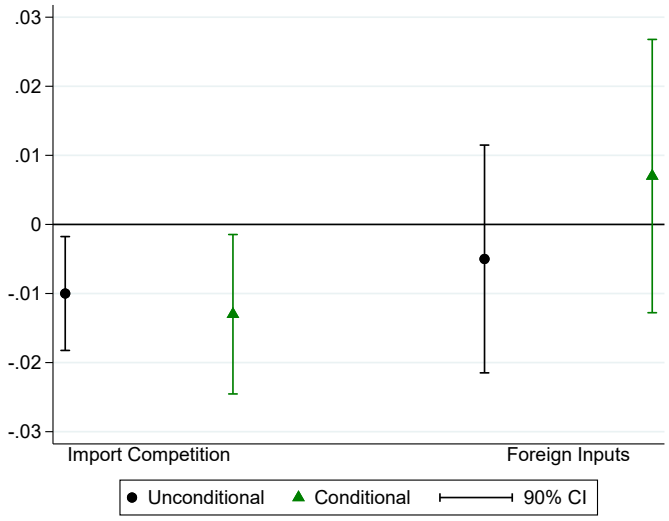


Table | Detailed Table

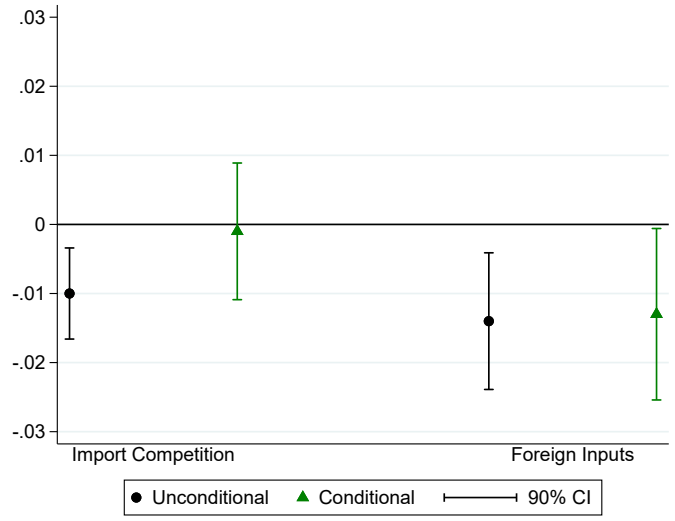
[1] Estimations are efficiency-weighted by the inverse of $s.e.(\hat{\theta})$.

3) Manufacturing employment ↓ due to foreign inputs

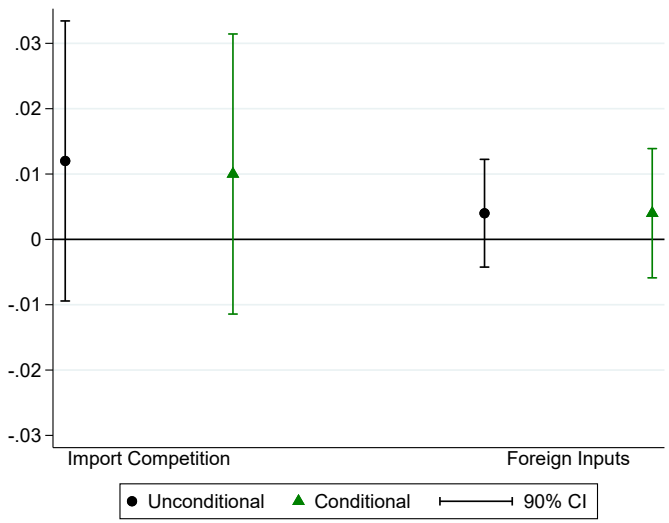
Agriculture



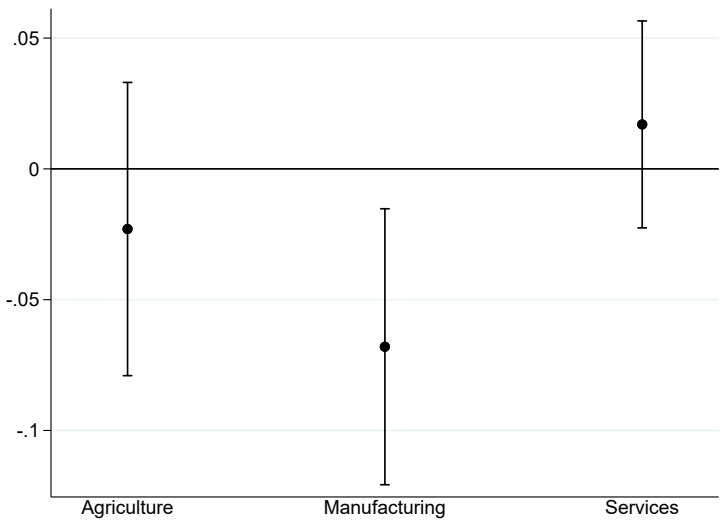
Manufacturing



Services



Weighted Sum

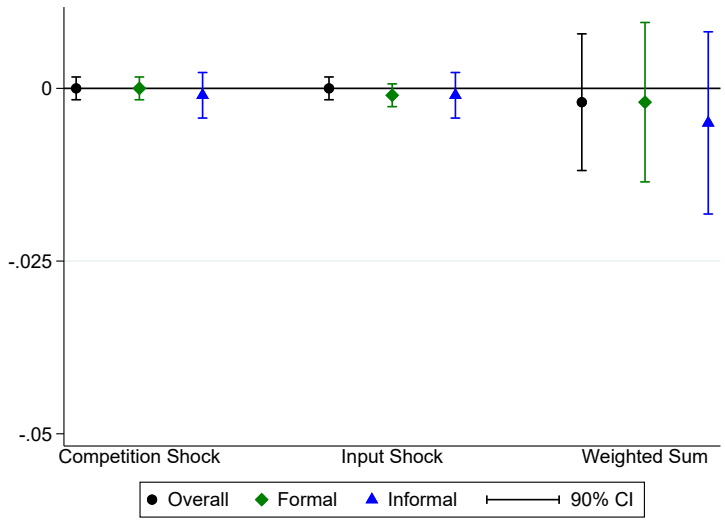


Table

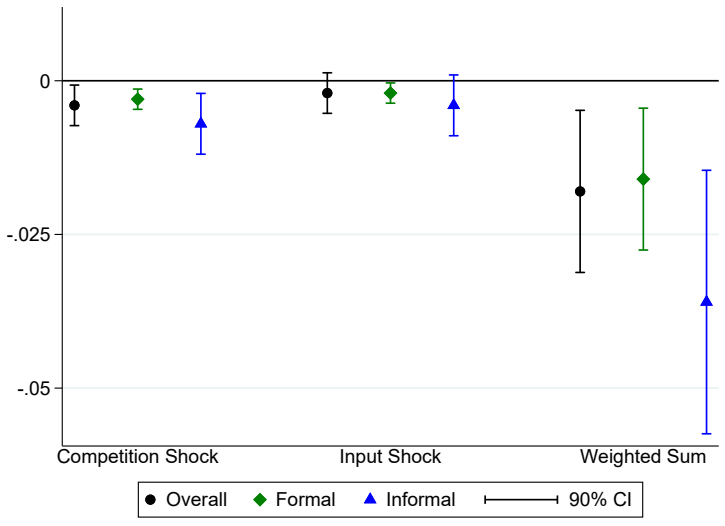
4) College-educated workers decrease earnings (I)

Effect on Earnings:

Non-college Educated



College-Educated

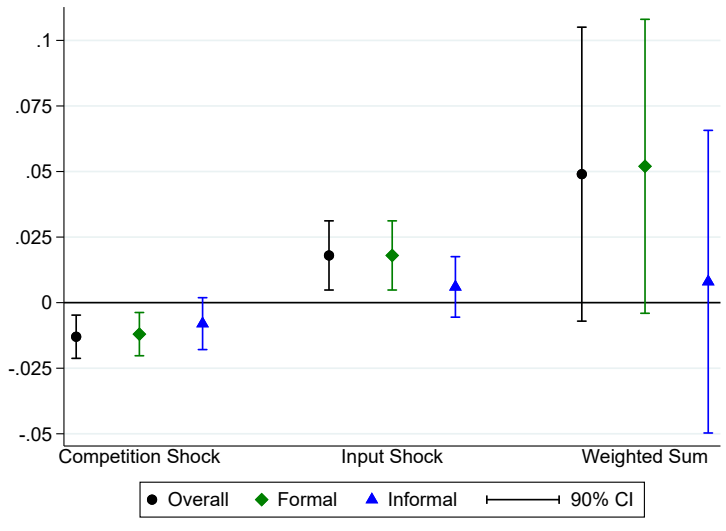


Table

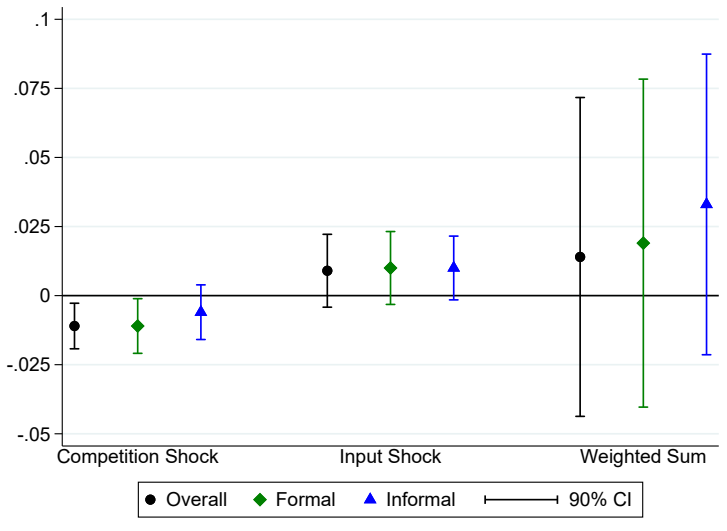
4) College-educated workers decrease earnings (II)

Effect on Employment:

Non-college Educated



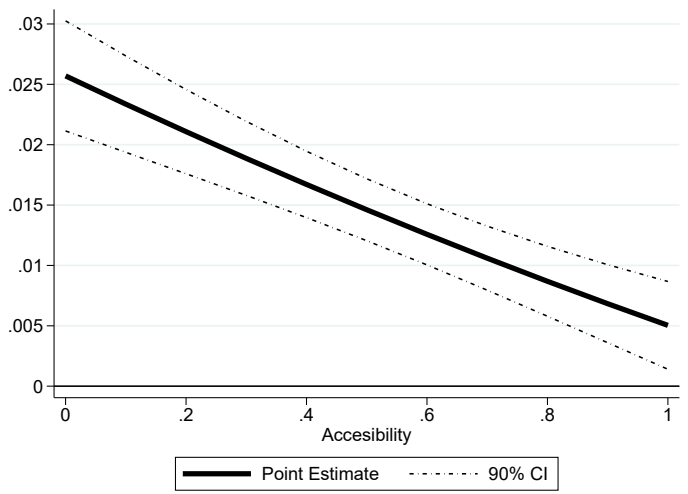
College-Educated



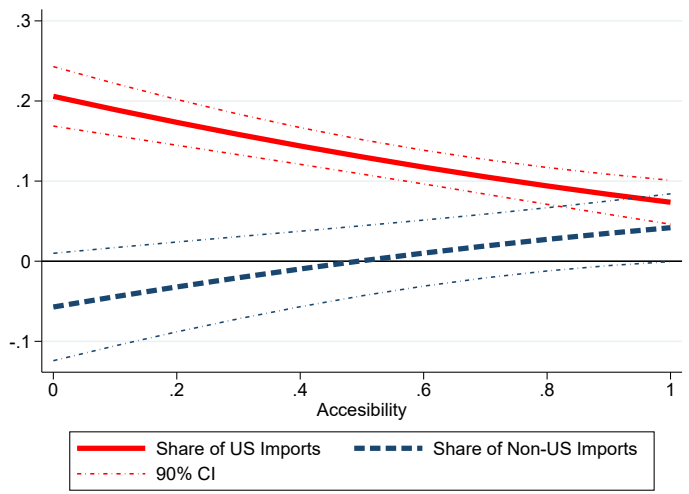
Table

Tariff Reduction on Imports by Accessibility

log(U.S. Imports)

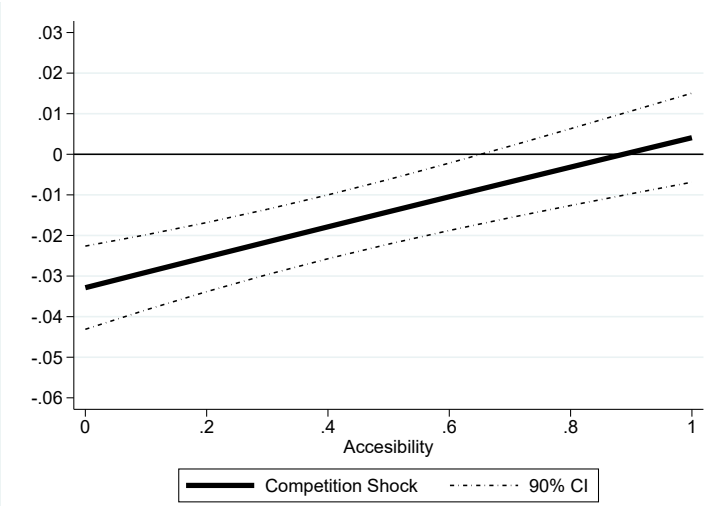


Share of US and Non-US Imports

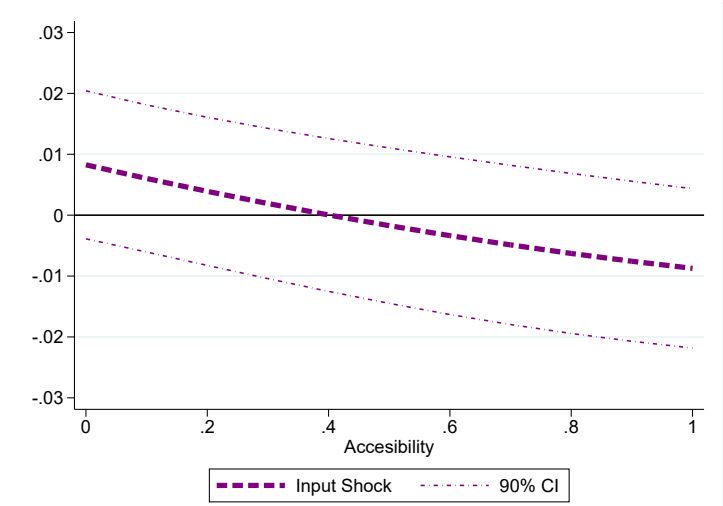


5) Relative employment losses in less-accessible areas

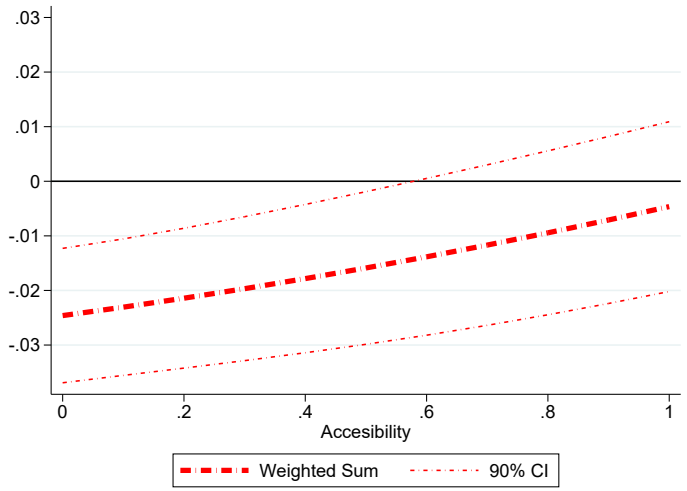
Competition Shock



Input Shock



Aggregated Effect



Agriculture | Manufacturing | Services

Outline

Conclusion

Products from the United States:

- Import competition and foreign Inputs have opposite effects on employment.
- Input shock decreases earnings of informal workers.
- Input shock decreases employment in manufacturing.
- College-educated workers (and informal) decrease earnings.
- Employment losses in less-accessible areas.

$\Rightarrow$ Trade between countries with different level of development has heterogeneous responses in developing countries that contrast with developed economies.

Thank you!

Autor, D. H., Dorn, D., and Hanson, G. H. (2013). The China Syndrome: Local Labor Market Effects of Import Competition in the United States. *American Economic Review*, 103(6):2121–68.

Autor, D. H., Dorn, D., Hanson, G. H., and Song, J. (2014). Trade Adjustment: Worker-Level Evidence*. *The Quarterly Journal of Economics*, 129(4):1799–1860.

Bloom, N., Handley, K., Kurman, A., and Luck, P. (2019). The Impact of Chinese Trade on US Employment: The good, the bad, and the debatable. *Mimeo*.

Bushnell, D. (1993). *The Making of Modern Colombia: A Nation in Spite of Itself*. University of California Press, 1 edition.

Dix-Carneiro, R. and Kovak, B. K. (2017). Trade Liberalization and Regional Dynamics. *American Economic Review*, 107(10):2908–46.

Duranton, G. (2015). Roads and trade in Colombia. *Economics of Transportation*, 4(1):16 – 36. Special Issue on Collective Contributions in the Honor of Richard Arnott.

Pavcnik, N. (2017). The impact of trade on inequality in developing countries. Working Paper 23878, National Bureau of Economic Research.

More and Less Imported Products

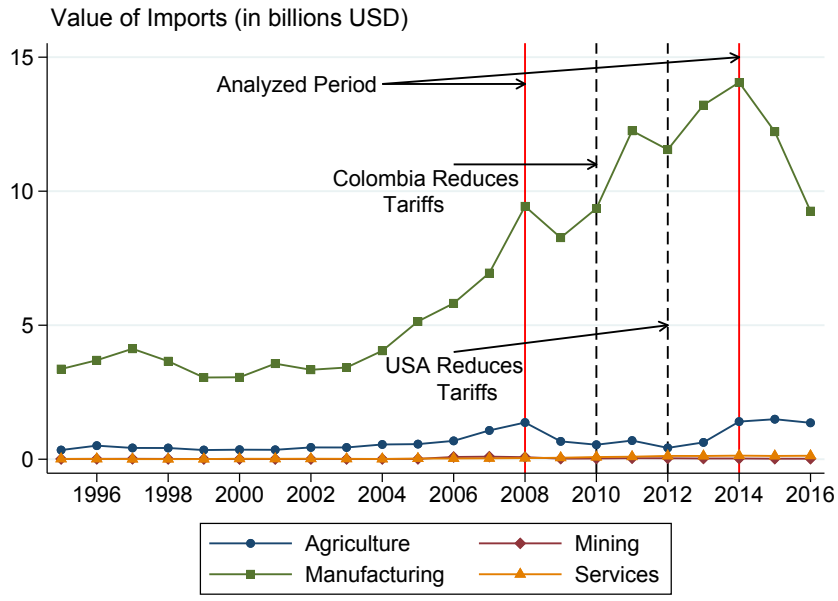
Before FTA (2008-2010)	After FTA (2011-2014)
Product	Product
More Imported Products	
Manufacture of refined petroleum products	Manufacture of refined petroleum products
Manufacture of basic chemicals, except fertilizers and nitrogen compounds	Manufacture of basic chemicals, except fertilizers and nitrogen compounds
Manufacture of aircraft and spacecraft	Manufacture of aircraft and spacecraft
Growing of cereals and other crops n.e.c.	Growing of cereals and other crops n.e.c.
Manufacture of machinery for mining, quarrying and construction	Manufacture of plastics in primary forms and of synthetic rubber
Manufacture of plastics in primary forms and of synthetic rubber	Manufacture of motor vehicles
Manufacture of pumps, compressors, taps and valves	Manufacture of machinery for mining, quarrying and construction
Manufacture of motor vehicles	Manufacture of other chemical products n.e.c.
Manufacture of other chemical products n.e.c.	Manufacture of pharmaceuticals, medicinal chemicals and botanical products
Less Imported Products	
Manufacture of pharmaceuticals, medicinal chemicals and botanical products	Manufacture of pumps, compressors, taps and valves
Dramatic arts, music and other arts activities	Motion picture and video production and distribution
Manufacture of structural non-refractory clay and ceramic products	Manufacture of television and radio transmitters
Cutting, shaping and finishing of stone	Cutting, shaping and finishing of stone
Photographic activities	Fishing, operation of fish hatcheries and fish farms
Manufacture of tobacco products	Manufacture of gas; distribution of gaseous fuels through mains
Manufacture of coke oven products	Manufacture of wooden containers
Manufacture of wooden containers	Photographic activities
Hairdressing and other beauty treatment	Manufacture of coke oven products
Dressing and dyeing of fur; manufacture of articles of fur	Architectural and engineering activities and related technical consultancy
Manufacture of gas; distribution of gaseous fuels through mains	Dressing and dyeing of fur; manufacture of articles of fur
Architectural and engineering activities and related technical consultancy	Hairdressing and other beauty treatment

Back

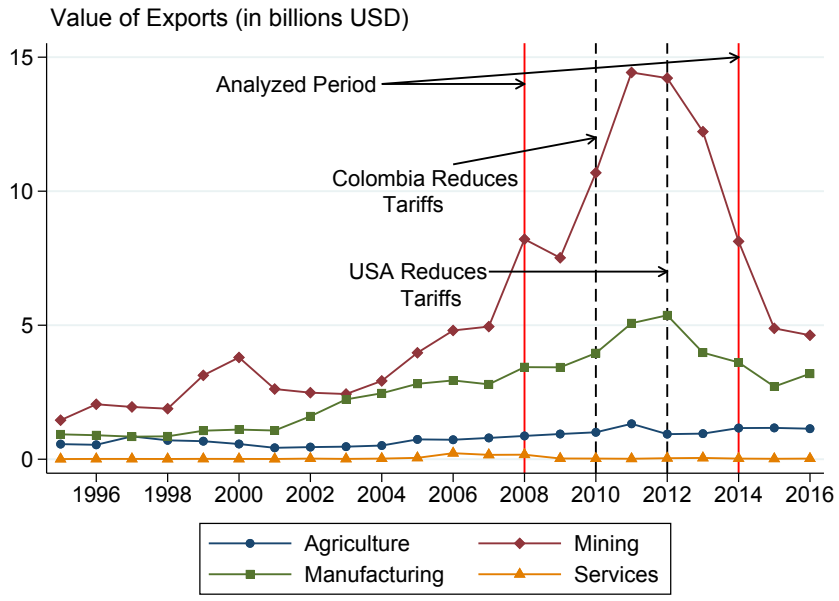
Trade Between Colombia and the US

Back

Imports by Industry

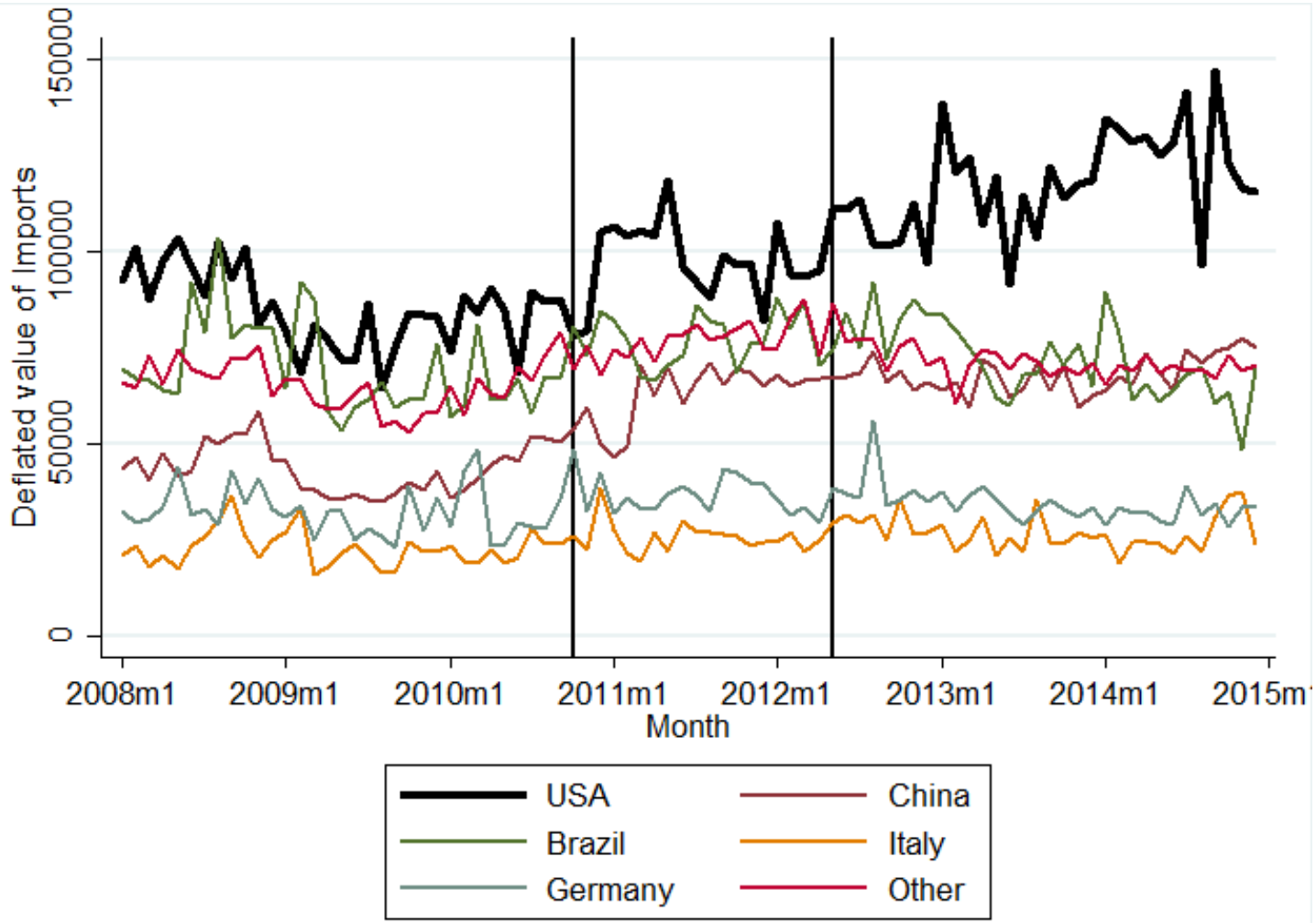


Exports by Industry



- Imports: manufacturing goods.
- Exports: mining goods.

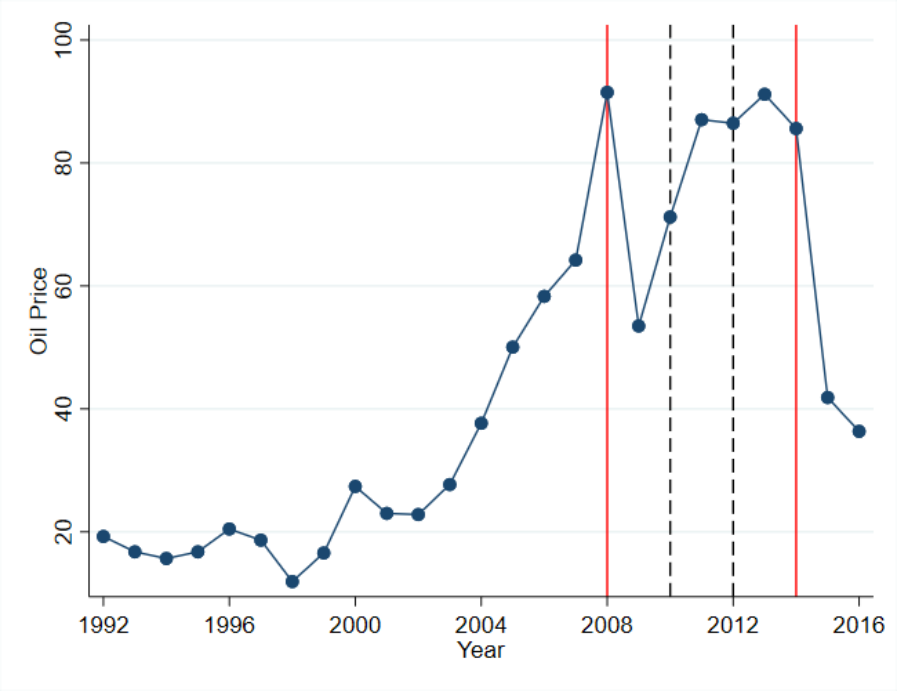
Imports from Other Countries compared to the U.S.



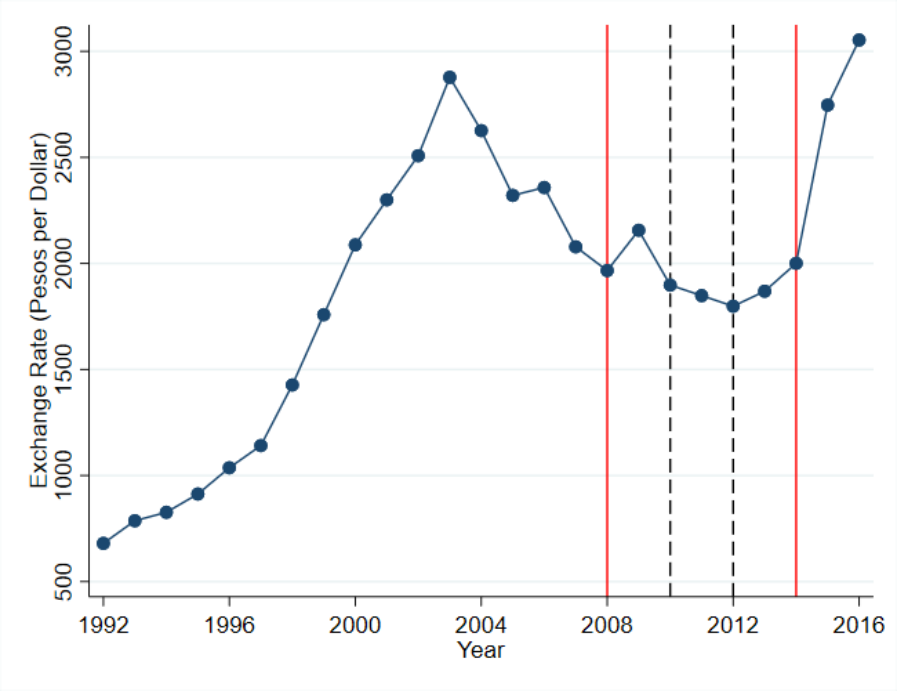
Back

Macroeconomic Environment

Oil Price



Exchange Rate



There are some possible confounders:

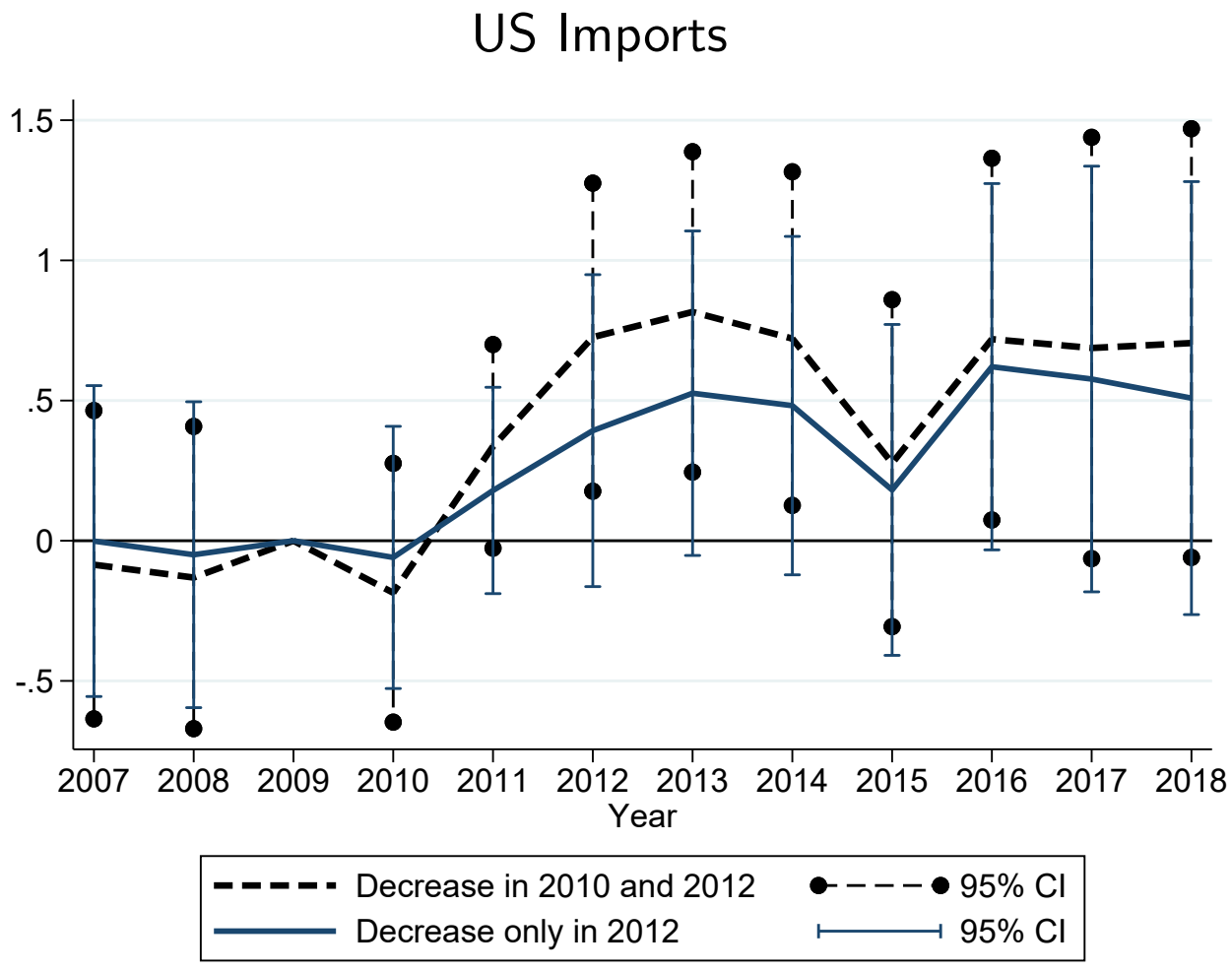
1. Exports rely heavily in oil price ⇒ we drop mining sector
2. Big peso devaluation after 2015 ⇒ we drop 2015-2016

Our results hold when relaxing both constraints.

Back Back Samples

Tarrifs and imports - event study

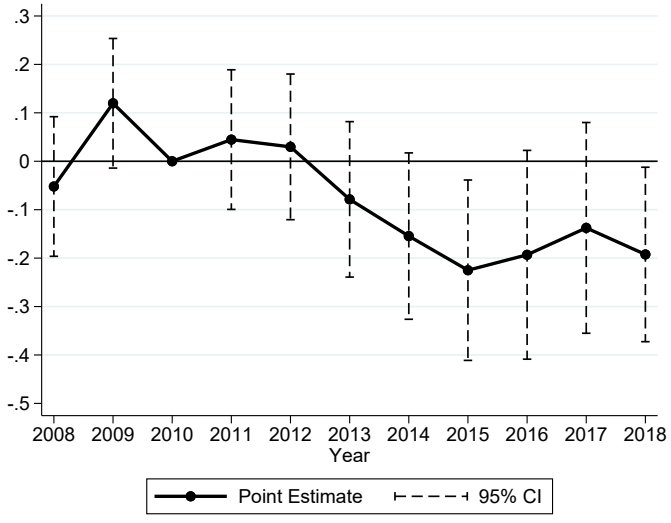
Compliance



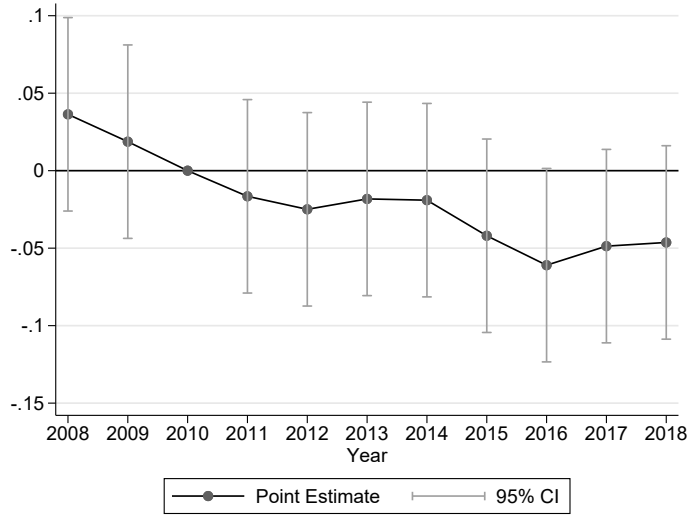
Event Studies

Compliance | Results

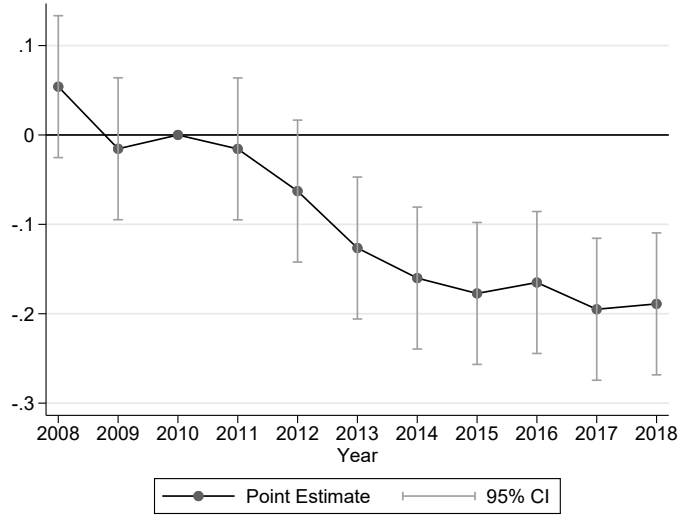
Employment



Number of Firms

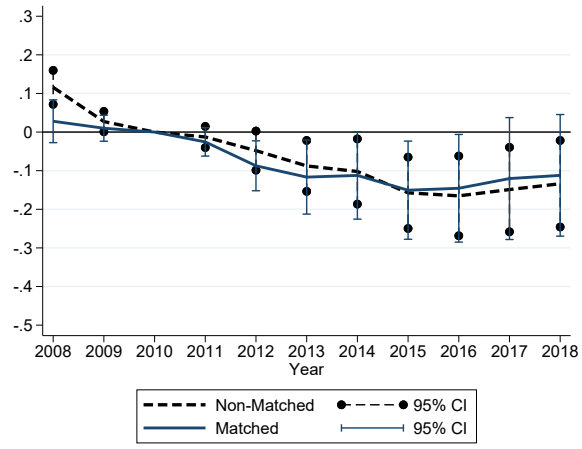


Firm Size

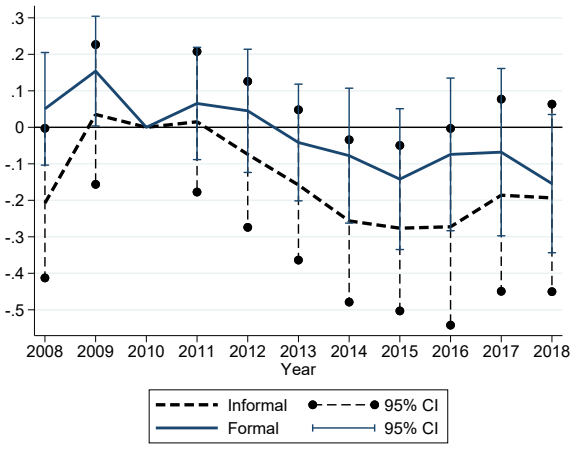


Event-Study Estimates on Other Measures of Employment

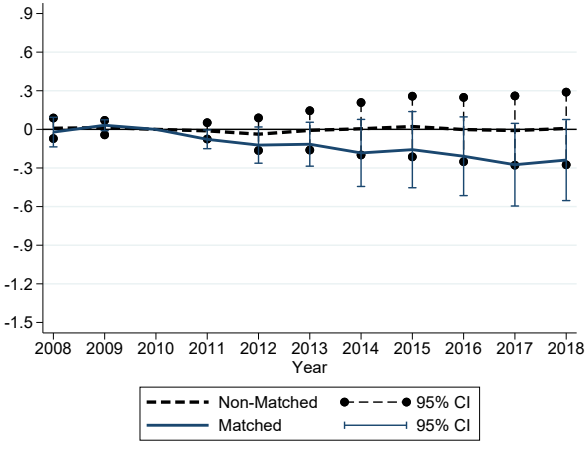
Comp. Shock on Longitudinal Data



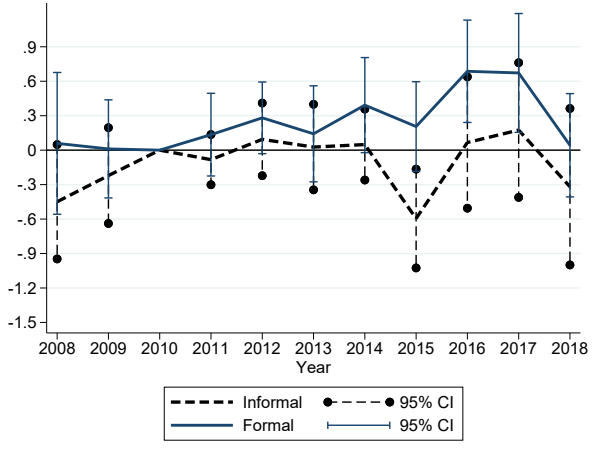
Comp. Shock on HH-Survey



Input Shock on Longitudinal Data



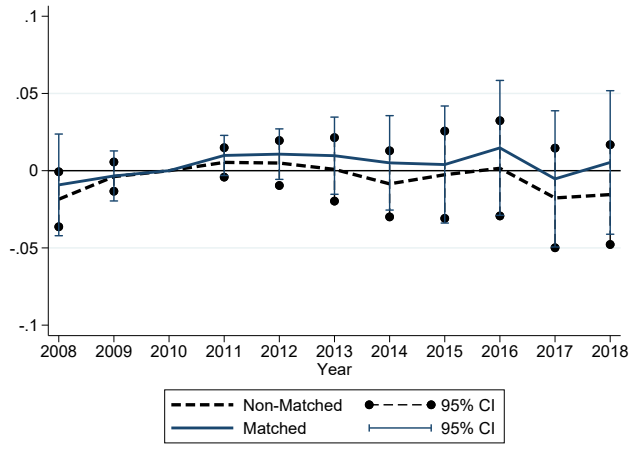
Input Shock on HH-Survey



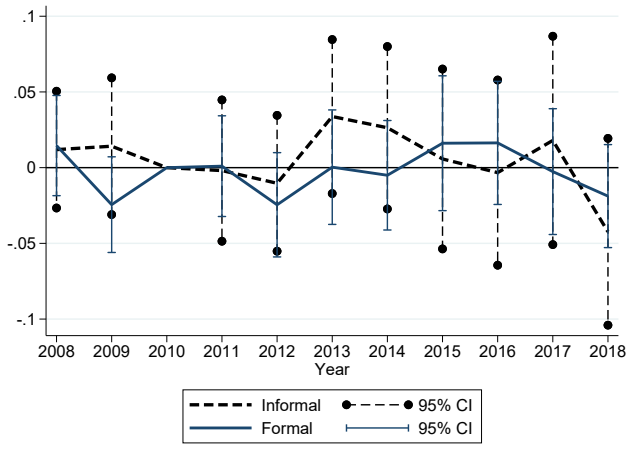
Back

Event-Study Estimates on Other Measures of Earnings

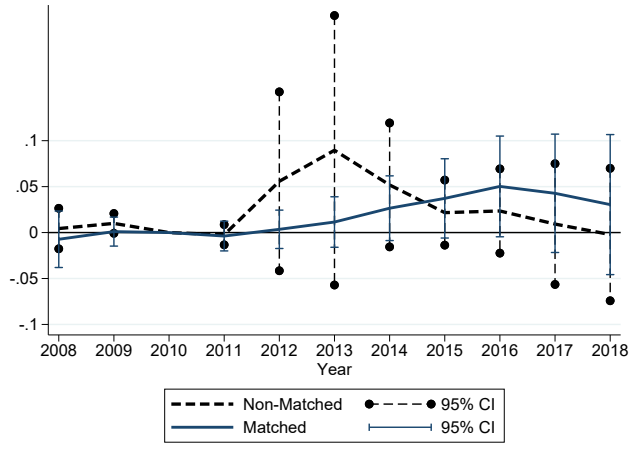
Comp. Shock on Longitudinal Data



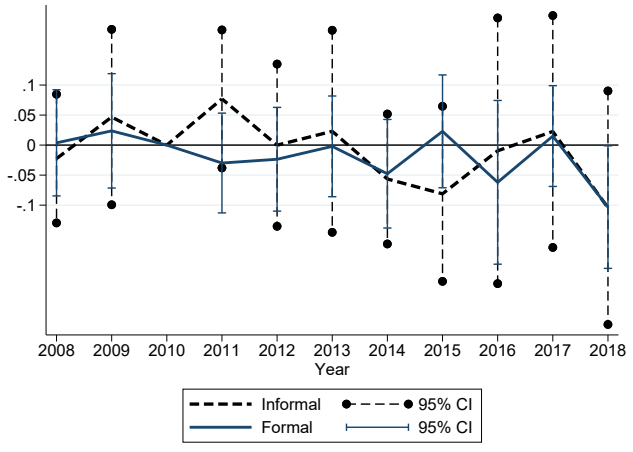
Comp. Shock on HH-Survey



Input Shock on Longitudinal Data



Input Shock on HH-Survey



Back

1) Opposite Employment effects

	HH-Survey			*Longitudinal*	
	Overall	*Formal*	*Informal*	*Full*	*Matched*
	(1)	(2)	(3)	(4)	(5)
A) Competition Shock					
Δ Import Competition ($\Delta\tau$)	-0.012***	-0.010**	-0.011*	-0.009**	-0.012**
	(0.005)	(0.005)	(0.006)	(0.004)	(0.005)
B) Input Shock					
Δ Foreign Inputs (Δq)	0.008	0.008	0.005	-0.002	-0.014
	(0.006)	(0.007)	(0.007)	(0.005)	(0.009)
C) Both Shocks					
Δ Import Competition ($\Delta\tau$)	-0.014***	-0.012**	-0.012**	-0.009**	-0.010**
	(0.005)	(0.005)	(0.005)	(0.004)	(0.005)
Δ Foreign Inputs (Δq)	0.012*	0.012*	0.008	0.001	-0.009
	(0.006)	(0.007)	(0.007)	(0.005)	(0.008)
D) Aggregated Shock					
$\Delta\bar{\tau} * \beta^c + \Delta\bar{q} * \beta^i$	0.021	0.024	0.008	-0.021	-0.063
	(0.029)	(0.031)	(0.033)	(0.024)	(0.040)
Observations	4,422	4,422	4,422	4,576	3,575
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Back

2) Informal workers adjust by wages

	HH-Survey			*Longitudinal*	
	Overall	*Formal*	*Informal*	*Full*	*Matched*
	(1)	(2)	(3)	(4)	(5)
A) Competition Shock					
Δ Import Competition ($\Delta\tau$)	-0.000	0.001	-0.001	-0.000	0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
B) Input Shock					
Δ Foreign Inputs (Δq)	-0.001	-0.000	-0.004**	0.001	0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
C) Both Shocks					
Δ Import Competition ($\Delta\tau$)	-0.000	0.001	-0.001	-0.000	0.000
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Δ Foreign Inputs (Δq)	-0.001	-0.000	-0.004**	0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
D) Aggregated Shock					
$\Delta\bar{\tau} * \beta^c + \Delta\bar{q} * \beta^i$	-0.006	-0.000	-0.020**	0.004	0.011
	(0.007)	(0.008)	(0.010)	(0.008)	(0.011)
Observations	4,324	4,277	4,125	4,565	3,674
Industry FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Back

3) Employment ↓ in manufacturing (because of inputs) and ↑ in services

	Longitudinal				*HH-Survey*		
	Diff-in-Diff			*Matching*	Overall	Formal	Informal
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Δ Imp. Competition*1(Agriculture) ($\Delta\tau_A$)	-0.010**		-0.013*	-0.018**	-0.022	-0.011	-0.020
	(0.005)		(0.007)	(0.007)	(0.031)	(0.032)	(0.034)
Δ Imp. Competition*1(Manufacturing) ($\Delta\tau_M$)	-0.010**		-0.001	-0.004	-0.001	0.008	-0.005
	(0.004)		(0.006)	(0.007)	(0.009)	(0.008)	(0.011)
Δ Imp. Competition*1(Services) ($\Delta\tau_S$)	0.012		0.010	0.010	-0.016	-0.027***	-0.002
	(0.013)		(0.013)	(0.014)	(0.011)	(0.006)	(0.014)
Δ Foreign Inputs*1(Agriculture) (Δq_A)		-0.005	0.007	0.004	0.037	0.040	0.045
		(0.010)	(0.012)	(0.010)	(0.054)	(0.055)	(0.059)
Δ Foreign Inputs*1(Manufacturing) (Δq_M)		-0.014**	-0.013*	-0.018*	-0.007	-0.018	-0.003
		(0.006)	(0.008)	(0.010)	(0.012)	(0.012)	(0.016)
Δ Foreign Inputs*1(Services) (Δq_S)		0.004	0.004	-0.006	0.016**	0.018**	0.010
		(0.005)	(0.006)	(0.009)	(0.007)	(0.007)	(0.007)
$\Delta\bar{\tau}_A * \beta^c_A + \Delta\bar{q}_A * \beta^i_A$			-0.023	-0.055	0.054	0.104	0.090
			(0.034)	(0.043)	(0.093)	(0.094)	(0.103)
$\Delta\bar{\tau}_M * \beta^c_M + \Delta\bar{q}_M * \beta^i_M$			-0.068**	-0.111**	-0.040	-0.036	-0.046
			(0.032)	(0.050)	(0.039)	(0.041)	(0.048)
$\Delta\bar{\tau}_S * \beta^c_S + \Delta\bar{q}_S * \beta^i_S$			0.017	-0.023	0.067**	0.076**	0.043
			(0.024)	(0.041)	(0.030)	(0.032)	(0.030)
Observations	4,576	4,576	4,576	3,575	4,422	4,422	4,422
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Back

Aggregate Effect by Detailed Sector

		Full			*Matched*				
		$\Delta\tau$	Δq	Aggreg.	$\Delta\tau$	Δq	Aggreg.	N. of Firms	Av. Firm Size
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
A) Agric.	Forestry and logging	0.004	0.023***	0.104***	-0.005	0.012	0.041	0.223***	-0.248***
	Fishing and aquaculture	-0.041***	0.104***	0.085**	-0.042***	0.088***	0.024	-0.066	0.111***
	Crop and animal production	-0.014	0.002	-0.040	-0.017	-0.006	-0.108**	-0.054	0.019
B) Manuf.	Wearing apparel and leather	0.012	-0.016	0.008	0.007	-0.018	-0.044	-0.038	0.055
	Tobacco products	-0.008***	-0.074***	-0.628***	-0.010***	-0.080***	-0.695***	-0.538***	-0.176***
	Coke and refined petroleum products	-0.047***	-0.034*	-0.222***	-0.063***	-0.037*	-0.278***	-0.113**	-0.107
	Office, communication, electrical and medical equipment	-0.013	-0.023	-0.175***	-0.019	-0.031	-0.240***	-0.048	-0.159**
	Textiles	-0.000	-0.018	-0.146**	-0.001	-0.025*	-0.203**	-0.068	-0.020
	Chemicals, rubber, plastic, and non-metallic minerals products	-0.009	-0.007	-0.075*	-0.021	-0.005	-0.114*	0.008	-0.146***
	Vehicles, furniture, and other	-0.007	-0.001	-0.039	-0.007	-0.013	-0.094	0.015	-0.058
	Foods and bevarages	0.002	-0.012*	-0.037	-0.002	-0.015*	-0.091	0.041	-0.109**
	Wood, paper, printing, and recorded media	-0.033	0.035	-0.005	-0.042	0.036	-0.034	0.017	0.002
C) Serv.	Wages and sewage disposal		0.080***	0.303***		0.064***	0.244***	0.284***	0.021
	Water transport		0.078***	0.171***		0.364***	0.432***	0.173***	0.020
	Hotels and restaurants		0.035***	0.155***		0.032***	0.126***	0.192***	-0.028
	Construction		0.030*	0.148*		0.010	0.055	0.191**	0.020
	Travel agencies and support activities for transportation		0.029***	0.135***		0.022*	0.123*	0.166**	-0.041
	Education and health		0.034**	0.072**		0.046**	0.063**	0.029	0.064*
	Real estate activities	-0.138***	0.013	0.047	-0.154***	0.011	0.024	0.065	0.013
	Land transport		0.010	0.045		0.014	0.072	-0.028	0.049
	Air transport		0.006	0.011		-0.007	-0.017	-0.110	0.067
	Electricity, gas and water supply		0.002	0.011				0.086	-0.019
	Recycling		-0.076***	-0.316***		-0.094***	-0.382***	-0.428***	-0.013
	Financial and insurance activities		-0.021*	-0.074*		-0.064***	-0.074***	-0.045	-0.001
	Postal and telecommunications		-0.020	-0.071		-0.043**	-0.074**	-0.040	-0.042
	Activities of households as employers and organizations		-0.002	-0.007		-0.017**	-0.166**	0.024	-0.038
	Arts, entertainment and recreation	0.025	-0.004	-0.007	0.022	-0.015	-0.039	0.025	0.034
	Retail and vehicle repair	0.018***	-0.001	-0.000	0.026***	-0.020	-0.087	-0.003	0.027

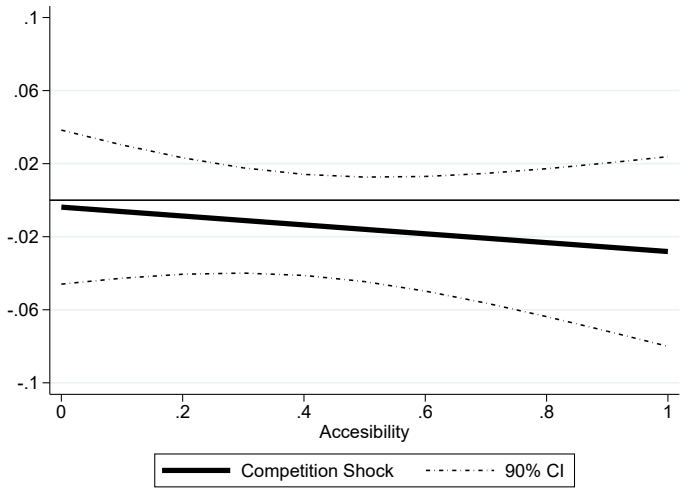
Back

4) Earnings of high-skilled workers decrease

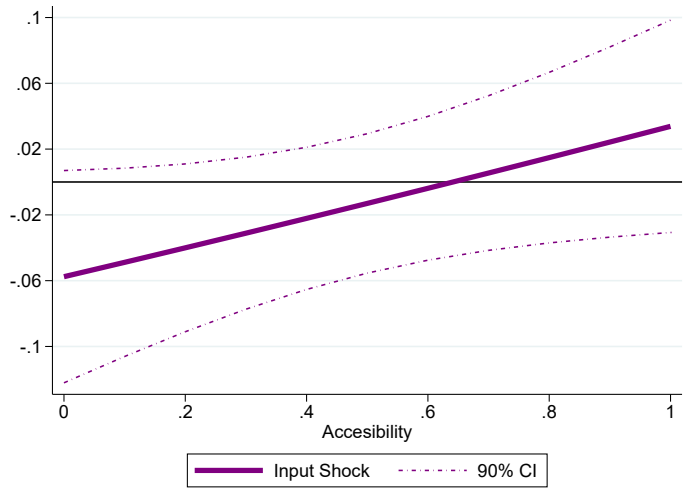
	Employment			*Earnings*		
	Overall	*Formal*	*Informal*	*Overall*	*Formal*	*Informal*
	(1)	(2)	(3)	(4)	(5)	(6)
A) Skilled Workers						
Δ Import Competition ($\Delta\tau$)	-0.011**	-0.011*	-0.006	-0.004**	-0.003**	-0.007**
	(0.005)	(0.006)	(0.006)	(0.002)	(0.001)	(0.003)
Δ Foreign Inputs (Δq)	0.009	0.010	0.010	-0.002	-0.002	-0.004
	(0.008)	(0.008)	(0.007)	(0.002)	(0.001)	(0.003)
$\Delta\bar{\tau} * \beta^c + \Delta\bar{q} * \beta^i$	0.014	0.019	0.033	-0.018**	-0.016**	-0.036***
	(0.035)	(0.036)	(0.033)	(0.008)	(0.007)	(0.013)
Observations	4,422	4,422	4,422	4,191	4,134	3,798
B) Unskilled Workers						
Δ Import Competition ($\Delta\tau$)	-0.013**	-0.012**	-0.008	-0.000	0.000	-0.001
	(0.005)	(0.005)	(0.006)	(0.001)	(0.001)	(0.002)
Δ Foreign Inputs (Δq)	0.018**	0.018**	0.006	-0.000	-0.001	-0.001
	(0.008)	(0.008)	(0.007)	(0.001)	(0.001)	(0.002)
$\Delta\bar{\tau} * \beta^c + \Delta\bar{q} * \beta^i$	0.049	0.052	0.008	-0.002	-0.002	-0.005
	(0.034)	(0.034)	(0.035)	(0.006)	(0.007)	(0.008)
Observations	4,422	4,422	4,422	4,219	4,131	3,903
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Agriculture

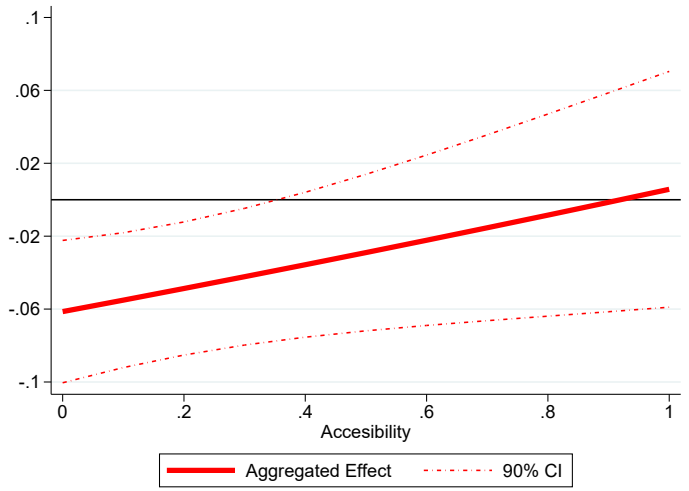
Competition Shock



Input Shock



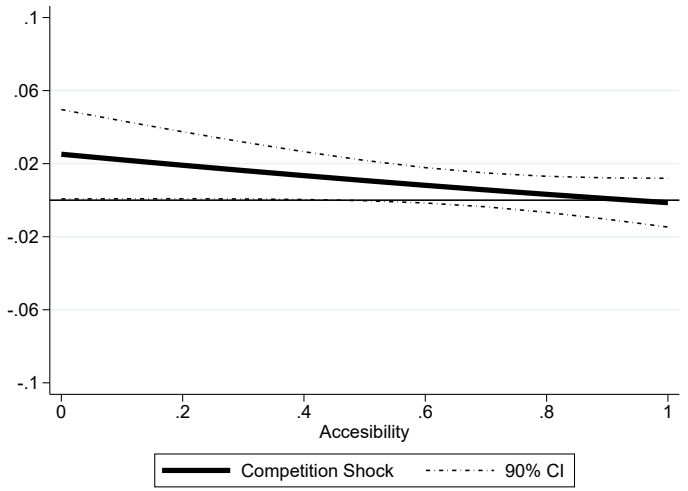
Aggregated Effect



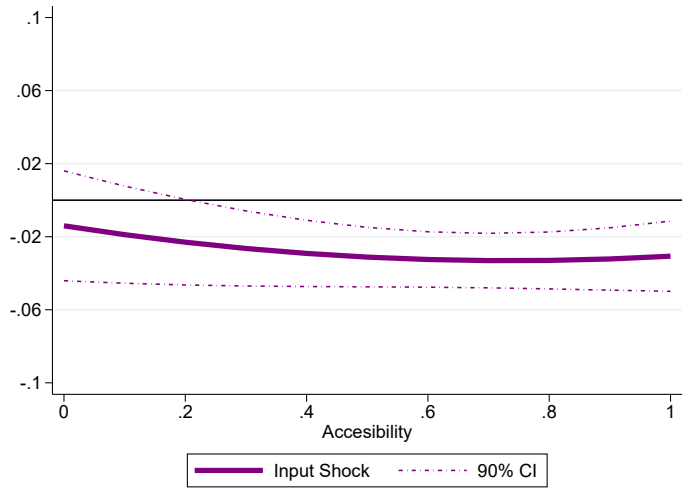
Back

Manufacturing

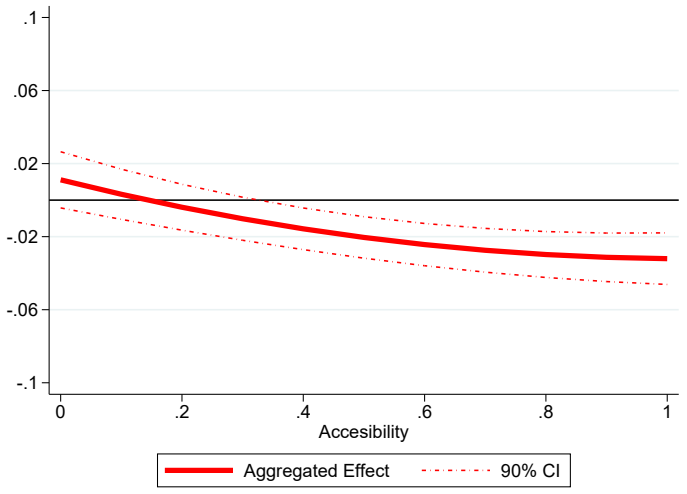
Competition Shock



Input Shock



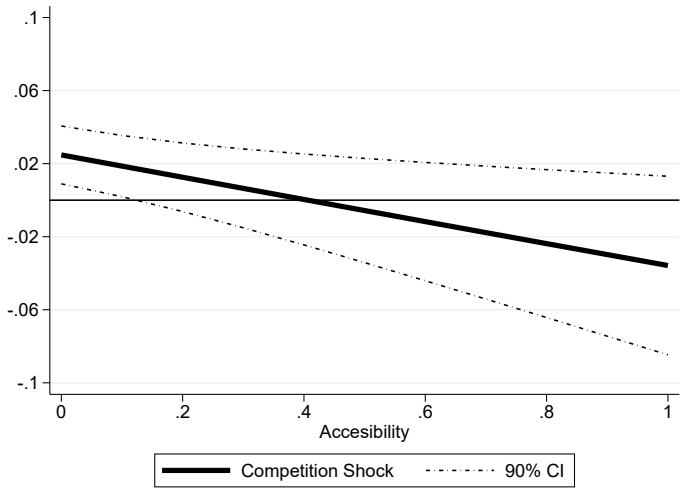
Aggregated Effect



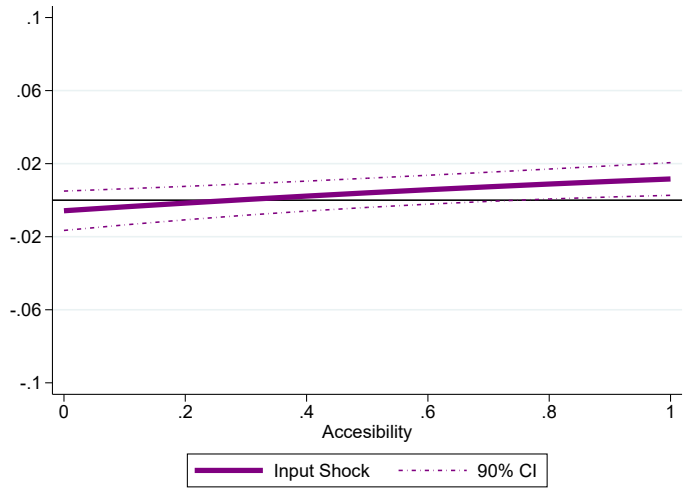
Back

Services

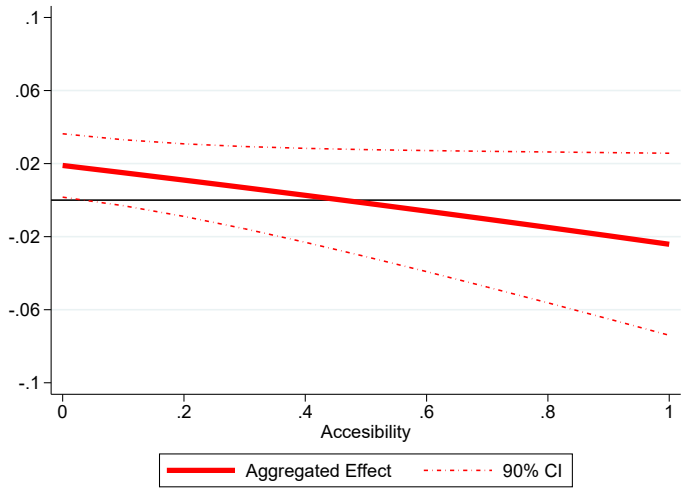
Competition Shock



Input Shock



Aggregated Effect



Back