Exports "brother-boost": the trade-creation and skill-upgrading effect of Venezuelan forced migration on Colombian manufacturing firms

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Motivation

- Forced displacement: alarmingly important phenomenon in developing countries (UNHCR, 2019)
  - 85 % forcibly displaced hosted in developing nations by 2019
    - ▶ Venezuela expelled 4.5 million citizens
    - ▶ Colombia received 1.8 million **skilled** people

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- Skilled labor: key to export to developed nations (Verhoogen, 2008; Brambilla et al., 2012)
- New dimension of forced displacement explored!
  - Skilled immigrants would allow firms to upgrade inputs and improve export performance

In a nutshell

Manufacturing firms in Colombian districts more exposed to the shock experience
(IV strategy)

- Trade-creation effect
    - Significant for firms with exporting experience
    - At the intensive and extensive margin stronger for high-income countries of
      the OECD
    - Larger for smaller firms

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- Trade-creation effect
  - Significant for firms with exporting experience
  - At the intensive and extensive margin stronger for high-income countries of the OECD
  - Larger for smaller firms
- But... Why?
  - Fall in wages, particularly for blue-collars in exporting firms
  - → Labor force skill-upgrading
  - Noisy effect on employment

Data

Unit of observation: manufacturing plants
Treatment unit: departments

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- Displaced Venezuelans
  - Colombian household survey (GEIH)
  - Venezuelan migrants: persons born in Venezuela
  - Working-age people (15-64 years)

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  - Customs data
  - Balanced panel of exporting plants (2012-2019)
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  - Balanced panel of exporting plants (2012-2019)
  - Relatively large exporters ($> 50k$ USD each year)
- Firms
  - Annual Manufacturing Survey (EAM) $+$ Technological Development and Innovation Survey (EDIT)
  - Balanced panel of plants/companies (2012-2019)

Empirical strategy

$$Y_{ijdrt} = \beta M_{drt} + X'_{drt}\omega + \phi_i^{2012} t + \alpha_i + \lambda_{rt} + \pi_{jt} + \epsilon_{ijdrt}$$

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Standard errors clustered at department-year level

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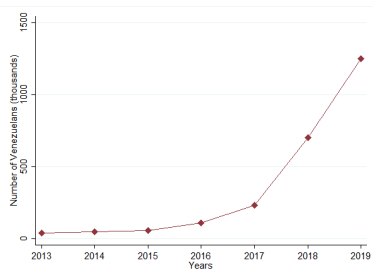Standard errors clustered at department-year level

- We compare plants in districts with different shares of migrants

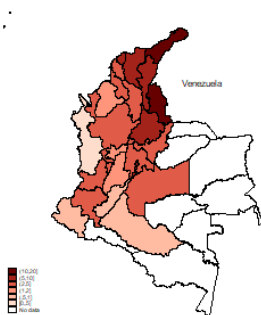# Identification: enclave pattern

2016: opening of borders between Colombia and Venezuela

- Forced migration → Venezuelans settle in Colombia's border districts

Venezuelans in Colombia

Venezuelans in depts (2019, % LF)

Non-random choice of departments: enclave IV

$$IV_{drt} = V_t \sum_s \frac{\alpha_s^{1990}}{K_{drs}}$$

V_t: stock of Venezuelan migrants living in Colombia (year t)

α_s^{1990}: share of Venezuelans living in each Venezuelan state (1990)

K_{drs}: driving-distance (km) between each Colombian department and Venezuelan state

First stage

Effect of immigration on the probability of exporting

Exporting status dummy. All firms

	OLS			
	$Exp_t = 1$		$Exp_t = 1 \mid Exp_{t-1} = 1$	
Share of Immigrants	0.003	0.000	0.009***	0.006**
	(0.005)	(0.005)	(0.003)	(0.003)
	IV			
	$Exp_t = 1$		$Exp_t = 1 \mid Exp_{t-1} = 1$	
Share of Immigrants	0.001	0.002	0.008*	0.008***
	(0.006)	(0.006)	(0.004)	(0.003)
F-statistic	79.06	233.88	79.06	233.88
Number of firms	4,435	4,435	4,435	4,435
Observations	31,045	31,045	31,045	31,045
Firm FE	Yes	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes	Yes
Region × year	Yes	Yes	Yes	Yes
Department controls	No	Yes	No	Yes

Effect of immigration on the probability of exporting

By income group and region (cond. on exporting every year)

	(1) OECD	(2) Low-Income	(3) LAC	(4) EU	(5) N. America
			OLS		
Share of Immigrants	0.024**	0.007	-0.006	0.012	0.006
	(0.011)	(0.010)	(0.005)	(0.008)	(0.008)
			IV		
Share of Immigrants	0.036**	0.033***	0.005	0.005	0.014
	(0.014)	(0.011)	(0.007)	(0.009)	(0.009)
F-statistic	128.29	128.29	128.29	128.29	128.29
Number of firms	1,156	1,156	1,156	1,156	1,156
Observations	8,092	8,092	8,092	8,092	8,092
Firm FE	Yes	Yes	Yes	Yes	Yes
Industry $\times$ year	Yes	Yes	Yes	Yes	Yes
Region $\times$ year	Yes	Yes	Yes	Yes	Yes
Firm initial cond. $\times$ year	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes

Effect on the intensive margin

Exported value (cond. on exporting every year)

	OLS		
	(1)	(2)	(3)
Share of Immigrants	0.038	0.008	0.036
	(0.025)	(0.024)	(0.028)
	IV		
Share of Immigrants	0.118***	0.088***	0.112***
	(0.032)	(0.033)	(0.023)
F-statistic	39.28	38.94	128.29
Number of firms	1,156	1,156	1,156
Observations	8,092	8,092	8,092
Firm FE	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes
Region × year	Yes	Yes	Yes
Firm initial cond. × year	No	Yes	Yes
Department controls	No	No	Yes

Effect on the intensive margin (heterogeneous)

By income group and region (cond. on exporting every year)

	OLS					
	(1)	(2)	(3)	(4)	(5)	(6)
	High-Income	OECD	Low-Income	LAC	EU	N. America
Share of Immigrants	0.041	0.301**	0.003	-0.093	0.139*	0.126
	(0.027)	(0.124)	(0.129)	(0.069)	(0.083)	(0.121)
	IV					
Share of Immigrants	0.111***	0.485***	0.363***	0.062	0.092	0.283**
	(0.024)	(0.138)	(0.124)	(0.078)	(0.101)	(0.130)
F-statistic	128.29	128.29	128.29	128.29	128.29	128.29
Number of firms	1,156	1,156	1,156	1,156	1,156	1,156
Observations	8,092	8,092	8,092	8,092	8,092	8,092
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Region $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes

Effect by firm size

Effect over pre-shock level of exports (cond. on exporting)
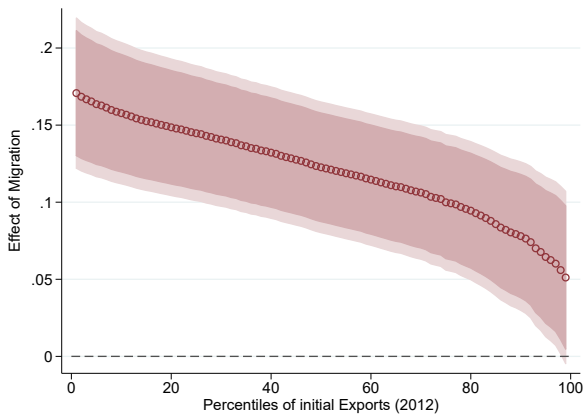
Mechanism: drop in wages of workers in exporting firms

Effect on average wages

	All		White-collar		Blue-collar	
	(1)	(2)	(3)	(4)	(5)	(6)
[a] Share of immigrants	-0.003	-0.002	0.004	0.004	-0.003	-0.001
	(0.003)	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)
[b] Immig. × Exp$_{2012}$		-0.004**		-0.002		-0.006***
		(0.002)		(0.003)		(0.001)
Linear combination: [a]+[b]		-0.006*		0.003		-0.007**
		(0.003)		(0.005)		(0.003)
F-Statistic	197.09	99.73	197.09	99.73	197.09	99.73
Number of firms	5,269	5,269	5,269	5,269	5,269	5,269
Observations	36,883	36,883	36,883	36,883	36,883	36,883
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes	Yes	Yes	Yes
Region × year	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. × year	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes

Mechanism: skill-upgrading

Effect on skills

	White-collar		Blue-collar	
	(1)	(2)	(3)	(4)
[a] Share of immigrants	0.012***	0.013***	0.006	0.004
	(0.004)	(0.005)	(0.004)	(0.004)
[b] Immig. × Exp_{2012}		-0.003		0.006**
		(0.002)		(0.002)
Linear combination: [a]+[b]		0.010**		0.010**
		(0.005)		(0.004)
F-statistic	150.62	78.30	150.62	78.30
Number of firms	4,362	4,362	4,362	4,362
Observations	26,172	26,172	26,172	26,172
Firm FE	Yes	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes	Yes
Region × year	Yes	Yes	Yes	Yes
Firm initial cond. × year	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes

Mechanism: Noisy and negligible effect in employment

Effect on employment

	All		White-collar		Blue-collar	
	(1)	(2)	(3)	(4)	(5)	(6)
[a] Share of immigrants	-0.006*	-0.005	-0.001	0.000	-0.002	-0.001
	(0.004)	(0.004)	(0.007)	(0.007)	(0.004)	(0.004)
[b] Immig. $\times$ Exp$_{2012}$		-0.005**		-0.003		-0.005
		(0.002)		(0.003)		(0.004)
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Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Region $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes

Mechanism: intensity of trade-effect by factor of production
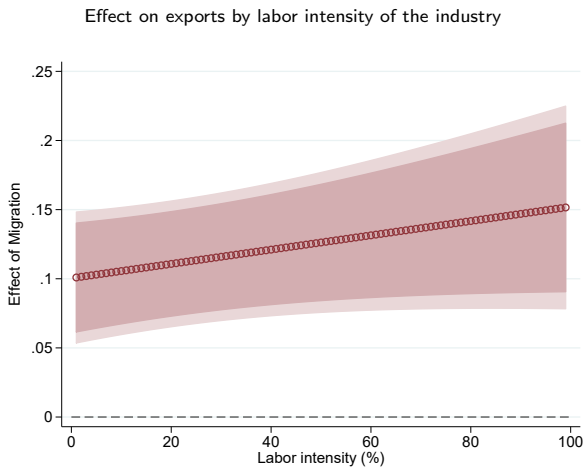
Effect on exports by labor intensity of the industry

Robustness checks & potential threats to identification

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  - Parallel-trends test for IV internal validity (Goldsmith-Pinkham *et al.*, 2020)
    Parallel-trends treade-creation Parallel-trends Mechanisms

Main takeaway

- Evidence consistent with firms hiring workers more compatible with exports to developed destinations due to lower labor costs

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- Evidence consistent with firms hiring workers more compatible with exports to developed destinations due to lower labor costs
- Mechanisms proposed
  - New to the literature
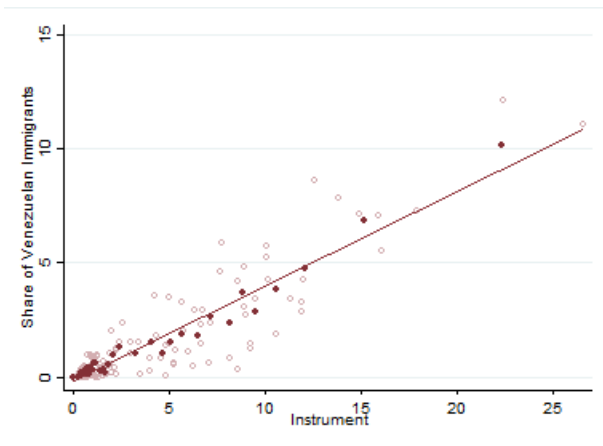 - Reconcile labor market effects found in previous works with trade effects in a context of forced migration

Thank you!

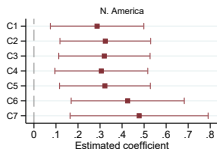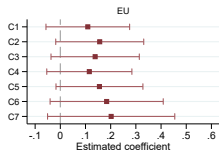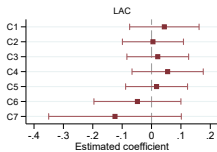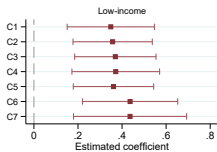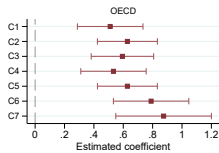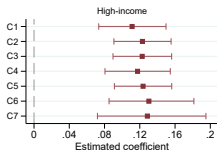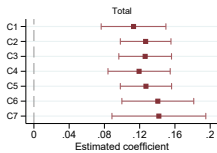Carlo Lombardo

carlo.ilombardo@gmail.com
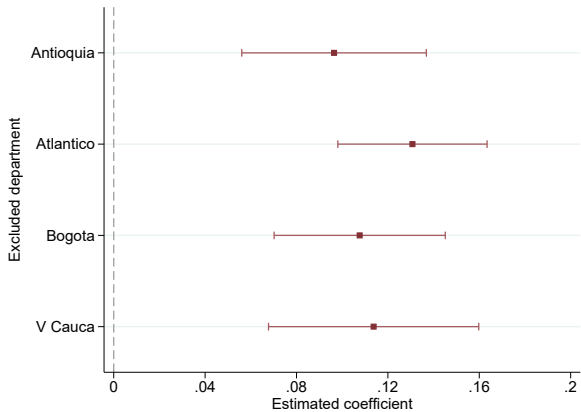
Twitter: @Carloilombardo

Enclave instrument first stage correlation

Robustness check - Changing the instrument

Robustness check - Exclusion of main departments

Back

Effect of immigration on exports - Changing the minimum annual export amount

	(1) Total	(2) High-Income	(3) OECD	(4) Low-Income	(5) LAC	(6) EU	(7) N. America
Minimum annual export amount - US 40.000							
Share of Immigrants	0.113***	0.111***	0.473***	0.358***	0.043	0.101	0.265**
	(0.021)	(0.022)	(0.134)	(0.117)	(0.077)	(0.098)	(0.126)
F-statistic	123.89	123.89	123.89	123.89	123.89	123.89	123.89
Number of firms	1,212	1,212	1,212	1,212	1,212	1,212	1,212
Observations	8,484	8,484	8,484	8,484	8,484	8,484	8,484
Minimum annual export amount - US 30.000							
Share of Immigrants	0.090***	0.087***	0.441***	0.375***	0.037	0.055	0.206**
	(0.021)	(0.021)	(0.153)	(0.117)	(0.075)	(0.118)	(0.098)
F-statistic	125.10	125.10	125.10	125.10	125.10	125.10	125.10
Number of firms	1,297	1,297	1,297	1,297	1,297	1,297	1,297
Observations	9,079	9,079	9,079	9,079	9,079	9,079	9,079
Minimum annual export amount - US 20.000							
Share of Immigrants	0.097***	0.093***	0.459***	0.377***	0.032	0.085	0.226**
	(0.022)	(0.022)	(0.150)	(0.116)	(0.072)	(0.113)	(0.097)
F-statistic	124.78	124.78	124.78	124.78	124.78	124.78	124.78
Number of firms	1,388	1,388	1,388	1,388	1,388	1,388	1,388
Observations	9,716	9,716	9,716	9,716	9,716	9,716	9,716
Minimum annual export amount - US 10.000							
Share of Immigrants	0.067***	0.062***	0.397***	0.330***	0.040	0.052	0.191**
	(0.024)	(0.023)	(0.138)	(0.098)	(0.069)	(0.100)	(0.093)
F-statistic	119.21	119.21	119.21	119.21	119.21	119.21	119.21
Number of firms	1,573	1,573	1,573	1,573	1,573	1,573	1,573
Observations	11,011	11,011	11,011	11,011	11,011	11,011	11,011
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Back

Robustness Check - Venezuela-Colombia 2010 trade volume control

| | OLS | | | | | | |
	(1) Total	(2) High-Income	(3) OECD	(4) Low-Income	(5) LAC	(6) EU	(7) N. America
Share of Immigrants	0.051*	0.062**	0.306**	-0.088	-0.073	0.255***	0.117
	(0.031)	(0.031)	(0.126)	(0.120)	(0.075)	(0.088)	(0.127)
	IV						
Share of Immigrants	0.168***	0.175***	0.529***	0.334**	0.153	0.257**	0.323**
	(0.036)	(0.036)	(0.160)	(0.164)	(0.107)	(0.115)	(0.161)
F-statistic	71.73	71.73	71.73	71.73	71.73	71.73	71.73
Number of firms	1,156	1,156	1,156	1,156	1,156	1,156	1,156
Observations	8,092	8,092	8,092	8,092	8,092	8,092	8,092
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Trade$_{2010}$ Volume $\times$ year	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Effect of immigration on exports - Control for trade with FTA partners

	(1) Total	(2) High-Income	(3) OECD	(4) Low-Income	(5) LAC	(6) EU	(7) N. America
	Including trade volume in 2010 with Europe × Year dummies as an additional control						
Share of Immigrants	0.102***	0.099***	0.487***	0.295***	0.003	0.071	0.218*
	(0.021)	(0.022)	(0.139)	(0.108)	(0.075)	(0.108)	(0.120)
F-statistic	172.05	172.05	172.05	172.05	172.05	172.05	172.05
	Including trade volume in 2010 with USA × Year dummies as an additional control						
Share of Immigrants	0.102***	0.099***	0.493***	0.309***	0.001	0.051	0.230*
	(0.023)	(0.023)	(0.143)	(0.120)	(0.073)	(0.111)	(0.133)
F-statistic	168.01	168.01	168.01	168.01	168.01	168.01	168.01
	Including trade volume in 2010 with Costa Rica × Year dummies as an additional control						
Share of Immigrants	0.119***	0.120***	0.500***	0.346***	0.072	0.130	0.276**
	(0.024)	(0.025)	(0.130)	(0.122)	(0.083)	(0.095)	(0.133)
F-statistic	179.63	179.63	179.63	179.63	179.63	179.63	179.63
	Including trade volume in 2010 with South Korea × Year dummies as an additional control						
Share of Immigrants	0.118***	0.116***	0.500***	0.370***	0.073	0.093	0.280**
	(0.024)	(0.024)	(0.138)	(0.129)	(0.076)	(0.104)	(0.129)
F-statistic	147.13	147.13	147.13	147.13	147.13	147.13	147.13
Number of firms	1,156	1,156	1,156	1,156	1,156	1,156	1,156
Observations	8,092	8,092	8,092	8,092	8,092	8,092	8,092
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm initial cond. × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Trade$^j_{2010}$ Volume × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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Effect on value exported at the level of the variable of interest (dt), department

	(1) Total	(2) High-Income	(3) OECD	(4) Low-Income	(5) LAC	(6) EU	(7) N. America
Share of Immigrants	0.151***	0.122***	0.088***	0.531**	0.135***	0.070*	0.101
	(0.025)	(0.025)	(0.029)	(0.236)	(0.050)	(0.038)	(0.191)
F-statistic	117.33	117.33	117.33	117.33	117.33	117.33	117.33
Number of departments	16	16	16	16	16	16	16
Observations	112	112	112	112	112	112	112
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Departmental FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Departmental GDP$_{2000}$ × year	Yes	Yes	Yes	Yes	Yes	Yes	Yes

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IV internal validity test (pre-trends) - Trade-creation effect

(a) Exporting dummy (all)

(b) Exp. dummy (cond. exported prev. year, all)

(c) Exported value

(d) Exported value HI

(e) Exported value OECD

(f) Exported value LI

(g) Exported value LAC

(h) Exported value EU

(i) Exported value NA

(j) P. of exporting OECD

(k) P. of exporting LI

(l) P. of exporting LAC

(m) P. of exporting EU

(n) P. of exporting NA
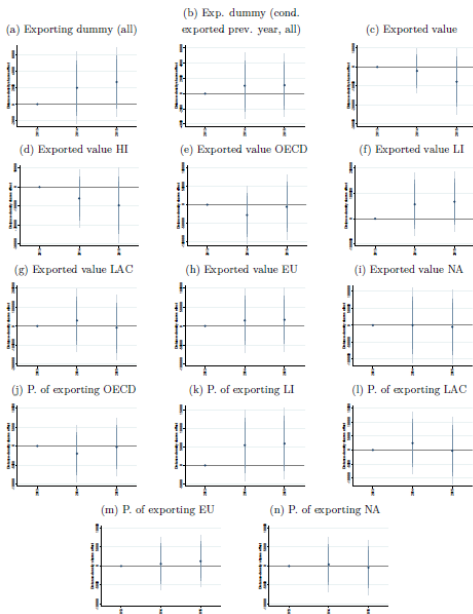
IV internal validity test (pre-trends) - Mechanisms

(a) Average wage

(b) Avg. wage white-collars

(c) Avg. wage blue-collars

(d) Employment

(e) Empl. white-collars

(f) Empl. Blue-collars

(g) Skill-upgrading white-collars

(h) Skill-upgrading blue-collars