

# From Global to Local: the Impact of Trade Exposure on Italian Provinces During the First Globalization

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# Summary

- This paper investigates the economic **impact of trade openness at the local level in late nineteenth-century Italy**.
- We combine data on **foreign trade** at the national level with census data **on manufacturing employment**, and with our **new estimates of agricultural employment by crop at the provincial level**.
- Compute two measures of **trade exposure** at the local level.
- Perform a **panel analysis** to test whether **changes in trade exposure** are associated to **provincial GDP growth**.

# Outline

1. Background
2. Literature: today and yesterday
3. Italy in the First Globalization (1870-WWI)
4. Data and descriptive evidence
5. The empirical strategy
6. Results
7. Robustness
8. Mechanisms
9. Conclusions

# Background

# Background

- The economic (social and political) consequences of **globalization** are (not only) nowadays one of the most debated topics.
- The **integration of markets** in particular can influence +/- many aspects of the economy:
  - boost national exports;
  - availability of cheaper inputs (including labour) resulting in lower production costs;
  - increase productivity via competition, new technologies;
  - but also induce selection (firms exit), displace local production and workers.
- Although net economic effects are in general positive, globalization has **distributive consequences** and poses many challenges.

# Background

- These dynamics are forcefully occurring since the 1990s favouring economic growth.
- Nonetheless: side effects. In many advanced economies the **less skilled part of the labour force** suffering the economic consequences of globalization: off-shoring of production, competition in goods and labour markets (Autor et al. 2013).
- Among others, Piketty (2013) and Milanovic (2016) documented the increasing **interpersonal inequality** globalization brought with it in Europe and in the U.S.
- On top of interpersonal inequality: **spatial distributional impacts**.
- Regional dimension fundamental to address the challenges of globalization (e.g. Iammarino et al., 2017; Dijkstra et al., 2018; Rodriguez-Pose, 2018).

# Background

- Recent globalization: many similarities with the **First Globalization** that occurred in the second half of the nineteenth century and ended with the outbreak of the WWI.
- Williamson (2005): in terms of macro-geographical impact, “unambiguous positive correlation between globalization and convergence”.
- Less attention has been devoted to the **regional effects within a country: lack of data** on product-level foreign trade and employment for subnational geographical units.
- A handful of papers (literature review). O’Rourke (2019) calls for further research on the link between **trade and regional inequality** in historical perspective.

# Background

What we do:

- This paper aims to (partially) fill this gap, by looking at the case of **Italy during the First Globalization** and **assessing the regional impact of openness to trade** despite the lack of official regional trade and employment statistics.

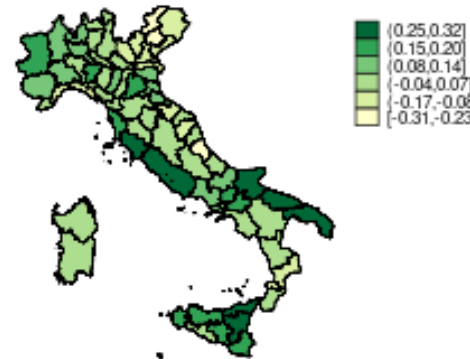


# Italy in the First Globalization

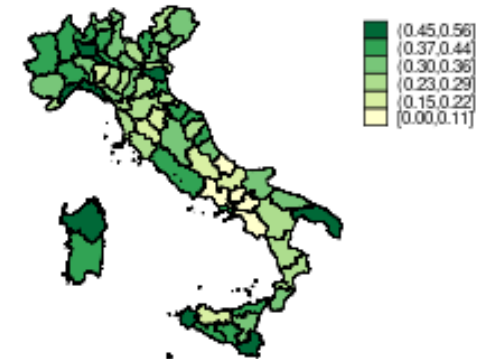
# Italy in the First Globalization

- **GDP growth** at the provincial level (the darker the green, the higher the growth).
- Italy exhibited **increasing regional inequality** in many aspects (Toniolo, 2013; Vecchi, 2017; Felice, 2018).
- **Southern Italy** lost ground. Over time growth became progressively lower with respect to the North.

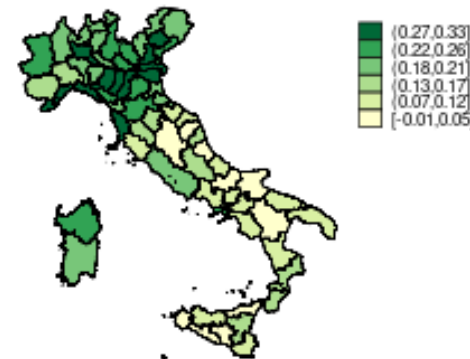
1881-1891



1891-1901



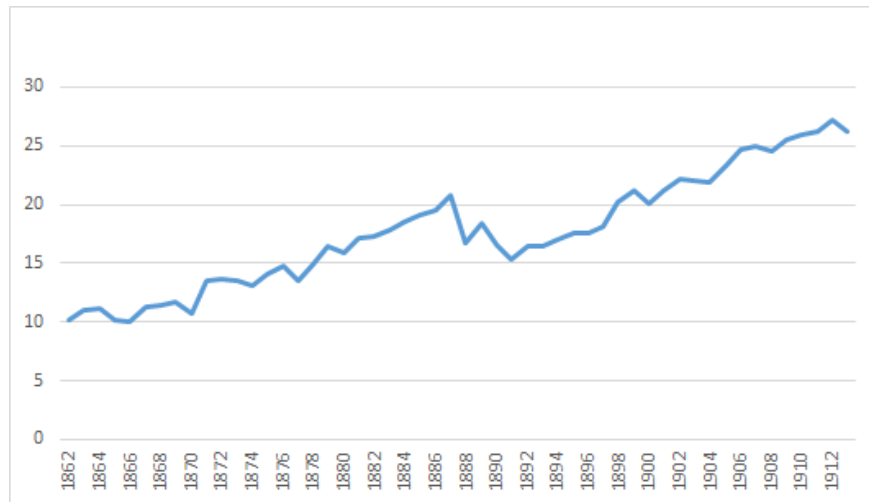
1901-1911



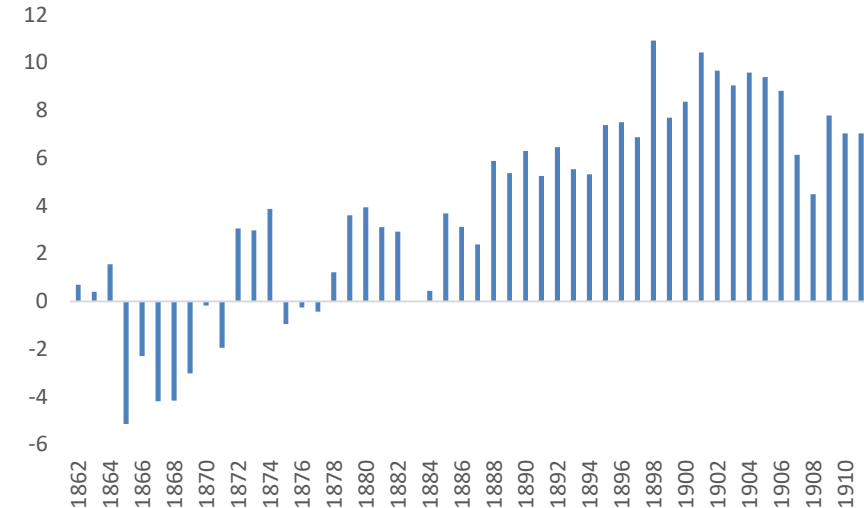
# Italy in the First Globalization

- Associated with these dynamics: noticeable **increase in trade openness** and **shift in specialization** (Federico et al. 2011; Federico and Wolf, 2013) .

Trade openness: (Imp+Exp)/GDP



Lafay index of RCA manufacturing



- The protectionist wave that led to 1887 Tariff and to Italy-France Trade War is a temporary halt along an uninterrupted process of growth.
- So: a country that progressively experimented increasing openness to international trade, a shift in specialization, but also growing territorial disparities.

# Data and descriptive evidence

# Data and descriptive evidence

To analyze international trade effects on local economic growth:

- Match **provincial employment** in tradable sectors with **international trade statistics** (SITC 4 digit: Federico et al, 2011).
- **Estimates of product-specific employment at the province-level:**
  - **manufacturing employment**, we digitize census data (Ciccarelli and Missiaia 2016).
  - real challenge is posed by the **agricultural employment figures**, for which population censuses provide only data of provincial employment (not by crop).
- Agricultural employment at the provincial level has been computed using **cultivated surfaces** (Gray et al. 2019). But: high levels of by-employment on multiple crops.
- We combined surface data with **labour per hectare intensity** (Angelini 1936; Niccoli 1898): estimate **full-time equivalent employment** for agricultural products.

## Data and descriptive evidence

- With this data, in order to measure **product-province specific international trade exposure**, we follow four simple steps and compute (Autor et al., 2013):

- **Product-specific production specialization of province  $i$  in product  $j$  as:**

$$s_{ij} = \frac{\text{employment}_{ij}}{\text{employment}_i}$$

- **Product-specific foreign trade exposures (TE) at national level** (trade in thousands of lira per worker);

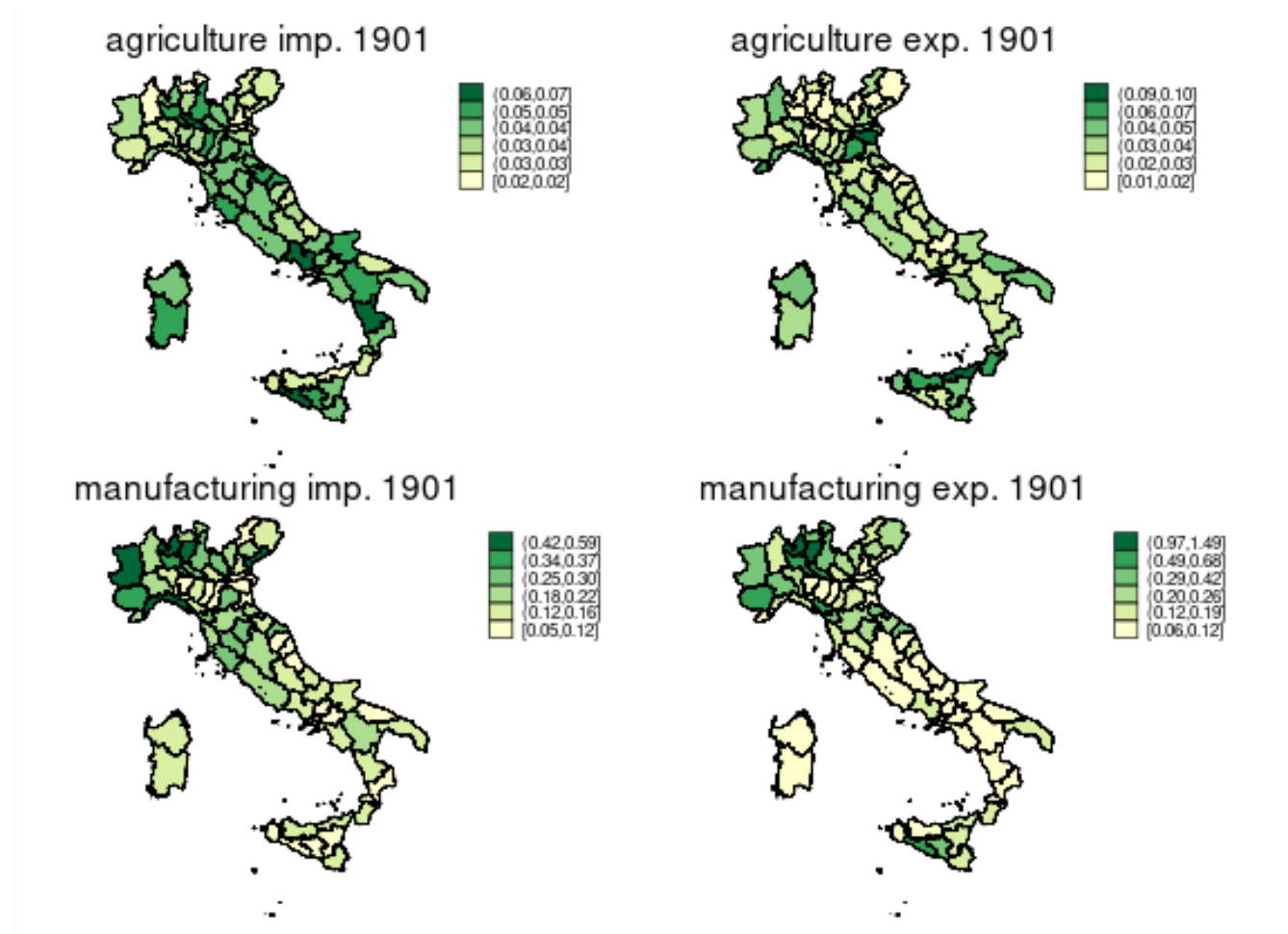
- **Product-specific trade shocks (TS) as changes in trade exposure:**

$$\text{tradeshock}_{jt} = \frac{\text{trade}_{jt} - \text{trade}_{jt-1}}{\text{employment}_j}$$

- Attribute to province **TE and TS** using  $s_{ij}$  as a weighting factor.

# Data and descriptive evidence

- **Spatial distribution of trade exposure:** North-South differences in particular in manufacturing.



# Empirical strategy



# Empirical strategy

- We estimate a simple panel model (following Autor et al. 2013):

$$\log \frac{Y_{it}}{Y_{it-1}} = \alpha_i + \alpha_t + \beta \sum_{j=1}^J s_{ij} * tradeshock_{jt} + X_{it} + \epsilon_{it}$$

- Dependent variable: provincial GDP growth.
- Main explanatory variable: trade shocks weighted by province specialization in each sector (how much a single province is exposed to trade dynamics).
- $X_{it}$  represents a set of controls.
- $\alpha_i$  and  $\alpha_t$  denote province and year fixed effects (structural time-invariant differences in provinces and average growth trends).

# Empirical strategy

- Aware this specification do not completely rule-out **concerns about endogeneity between trade exposure and growth** (due for example to local supply or demand shocks).
- We do something to mitigate.
- The **identification strategy** laid down by Autor et al. (2013) is to instrument Chinese import penetration in US with Chinese import penetration in other developed countries. See also recent Brey and Facchini (2023) (IV not different from OLS):
- Working on: **foreign supply shocks to rule out local demand and supply shocks exploiting** (which may be due to, say, a fall in transport costs or an increase in foreign productivity).

# Empirical strategy

- Still: we have **priors on expected bias of the OLS estimates** due to omitted variables.
- **Upward bias:** overestimation when sign is positive and underestimation when sign is negative (South):
  - On the one side, we expect **local demand shocks** to result in a positive correlation between imports and growth. That would lead to **underestimate the eventual negative impact of import penetration** (as in the South) and **overestimate its eventual positive impact** (as in the North).
  - On the other side, **local supply shocks**, would result in a positive correlation between growth and exports. That would lead to **underestimate the eventual negative impact of export exposure** (as in the South) and **overestimate the eventual positive impact** (as in the North).

# Results

# Results

Table A. The impact of trade shocks on provincial GDP growth

	Total		Agriculture		Manufacturing	
	(1) Import	(2) Export	(3) Import	(4) Export	(5) Import	(6) Export
Trade shock	0.360**	0.467***	-2.762*	-0.814	0.272**	0.357***
	(0.171)	(0.146)	(1.552)	(1.022)	(0.103)	(0.124)
Observations	207	207	207	207	207	207
R <sup>2</sup>	0.557	0.563	0.559	0.552	0.559	0.564
N. of prov.	69	69	69	69	69	69
Prov. FE	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes

Notes: Heteroskedastic robust standard error in parentheses. \*, \*\* and \*\*\* correspond to a coefficient significantly different from zero with a 10%, 5% and 1% confidence level respectively. The dependent variable is the GDP growth.

Back of the envelope: coeff. of 0.3 implies that an increase in 100 lira of trade per worker (about 10 per cent of total growth 1871-1911) is associated with a GDP increase by 3 p.p.

# Results

Table B. The impact of trade shocks on provincial GDP growth: North and South

	Agriculture		Manufacturing	
	(1) Import	(2) Export	(3) Import	(4) Export
Trade shock	-0.745 (1.440)	1.152 (0.949)	0.250** (0.107)	0.427*** (0.144)
Trade shock * South	-4.929*** (1.243)	-2.664*** (0.884)	-0.745*** (0.229)	-1.165*** (0.399)
Observations	207	207	207	207
R <sup>2</sup>	0.604	0.569	0.587	0.598
N. of prov.	69	69	69	69
Prov. FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Coeff. of trade shock South	-5.673***	-1.512**	-0.495**	-0.738

Notes: Heteroskedastic robust standard error in parentheses. \*, \*\* and \*\*\* correspond to a coefficient significantly different from zero with a 10%, 5% and 1% confidence level respectively. The dependent variable is GDP growth.

# Results

Table D. What drives North-South differential impact of trade shocks: disentangling employment growth and GDP per worker growth

	Agriculture		Manufacturing	
	(1)	(2)	(3)	(4)
	Import	Export	Import	Export
Panel A: Dep. var. <b>growth of employment</b>	(1A)	(2A)	(3A)	(4A)
Trade shock	2.213** (0.929)	1.247* (0.730)	0.065 (0.081)	0.066 (0.109)
Trade shock * South	-3.555*** (0.883)	-1.844** (0.716)	-0.490*** (0.144)	-0.447* (0.260)
$R^2$	0.500	0.461	0.473	0.453
Coeff. of trade shock South	-1.342	-0.597	-0.425***	-0.382
Panel B - Dep. var. <b>growth of GDP per worker</b>	(1B)	(2B)	(3B)	(4B)
Trade shock	-2.958** (1.345)	-0.095 (0.922)	0.185** (0.090)	0.361*** (0.083)
Trade shock * South	-1.374 (1.064)	-0.820 (0.799)	-0.255 (0.176)	-0.718** (0.333)
$R^2$	0.591	0.568	0.575	0.597
Coeff. of trade shock South	-4.331***	-0.914*	-0.0705	-0.356
Observations	207	207	207	207
N. of prov.	69	69	69	69
Prov. FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes

# Results

- Potential explanation is linked to **globalization affecting migration** decisions (Gray, Narciso and Tortorici EEH 2019).
  - On the import side: **Selection and reallocation (abroad)**. Competition might drive uncompetitive agents out of the market creating an excess labor supply, reducing employment and inducing migration with a further reduction in employment.
  - On the export side: (GNT, 2019) higher agricultural prices that prevailed after early 1890s are associated to migration since the resulting rise in incomes released peasants from the **poverty trap** that prevented them to migrate.
- Out-migration translated into a further reduction of employees and of growth, reinforced by positive **selection bias**: the best and the brightest left (see for example Gomellini and Ó Grada, 2013, Spitzer and Zimran, 2017).



# Results

Table E. International migration flows as a dependent variable

	Agriculture		Manufacturing	
	(1)	(2)	(3)	(4)
	Import	Export	Import	Export
Trade shock	-0.092 (0.078)	-0.098** (0.045)	-0.026*** (0.006)	-0.024*** (0.008)
Trade shock*South	0.306*** (0.067)	0.180*** (0.043)	0.047*** (0.017)	0.034 (0.022)
Observations	207	207	207	207
$R^2$	0.723	0.690	0.736	0.691
N. of prov.	69	69	69	69
Prov. FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Coeff. of trade shock South	0.214***	0.0823**	0.0212	0.0103

*Notes:* Heteroskedastic robust standard error in parentheses. \*, \*\* and \*\*\* correspond to a coefficient significantly different from zero with a 10%, 5% and 1% confidence level respectively. The dependent variable is the average international outmigration per population over the period.

# Robustness and Mechanisms

# Robustness

1. Interact year dummies with both the share of manufacturing employment and literacy (initial levels) to control **different impact the same characteristics may have over time**).
  2. Fenoaltea (2003): **a potential overestimation of textile employment**, due to women in rural areas classified as textile workers but actually doing domestic textile activities.
    1. Proposed **correction**: assuming that in each province female textile workers were the minimum between the reported number and four times male textile workers.
  3. Including **trade exposure level at t-1 rather than trade shock** as the main explanatory variable. This modification is intended to mitigate the issue of possible endogeneity between GDP growth and trade growth.
- Overall, results are confirmed

# Mechanisms

3 mechanisms which could explain why some areas were able to take advantage of increased exports in manufacturing and some others were not.

1. The effect of different access to international markets in the two areas

- We interact the import and export shocks with a dummy equal to 1 when the provincial foreign market access is above the median level (Missiaia 2016).
- We do not find any effect of foreign market access.
- Actually Northern regions had better domestic market access, Southern regions had higher international market access due to the presence of ports in the South

# Mechanisms

## 2. Different **energy endowments** of the provinces.

- We use two measures of energy potential (Missiaia 2019) expected to proxy the natural endowment of provinces rather than energy used (endogeneity with growth):
  - **total flow of rivers** in the province measured in meters per second;
  - **production of water power per worker from water mills in 1878**
- There is **no clear impact of the potential effect of easier access to energy sources**

# Mechanisms

Table F. Market access and energy endowments

	Export	Export	Export
Trade shock	0.301** (0.130)	0.237 (0.220)	0.288* (0.162)
Trade shock * Above median Foreign MP	0.184 (0.236)		
Trade shock * Above median hydro. capacity		0.173 (0.235)	
Trade shock * Above median mills capacity			0.157 (0.200)
Observations	207	207	207
$R^2$	0.559	0.566	0.566
N. of prov.	69	69	69
Prov. FE	yes	yes	yes
Year FE	yes	yes	yes

*Notes:* Heteroskedastic robust standard error in parentheses. \*, \*\* and \*\*\* correspond to a coefficient significantly different from zero with a 10%, 5% and 1% confidence level respectively. The dependent variable is the GDP growth. Hydro. capacity, is computed as the logarithm of streams of rivers per km. Mills capacity is computed as horsepowers per worker as of 1881.

# Mechanisms

3. We tested if **mechanization** played a role in being able to take advantage of the increased trade openness.
- Measure for mechanization, we use an index **horsepower per manufacturing worker**.
  - Interact import and export shocks for the manufacturing sector with a dummy equal to 1 if the province had a level of horsepower per worker higher than the median.
  - **Those provinces with higher horsepower intensity benefited more from the overall increase in trade exposure.**

# Mechanisms

Table G. Mechanization

	(1)	(2)	(3)	(4)
	Import	Import	Export	Export
Trade shock	-0.249 (0.217)	-0.102 (0.190)	-0.012 (0.182)	0.182 (0.119)
Trade shock * Above median horsepowers p. worker	0.559*** (0.179)	0.382** (0.160)	0.648*** (0.214)	0.408** (0.161)
Trade shock* South		-0.572*** (0.199)		-0.949** (0.376)
Observations	207	207	207	207
$R^2$	0.582	0.597	0.586	0.606
N. of prov.	69	69	69	69
Prov. FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes

*Notes:* Heteroscedastic robust standard errors in parentheses. \*, \*\*, \*\*\* Correspond to a coefficient significantly different from zero with a 10%, 5% and 1% confidence level, respectively. The dependent variable is the GDP growth. Horsepower consumption p. worker is computed for the whole manufacturing sector at provincial level.



# Conclusions

- This research speaks to the general debate on distributional effect of globalization at the spatial level (O'Rourke, 2019) and to the debate on Italy's North-South divide.
- Using our **reconstruction of provincial employment in tradable goods** we investigated **foreign trade effects on local growth** in Italy during the First Globalization
- Our findings can be summarized as follows.
  - **Trade shocks** (i.e., increase in trade exposure) are overall **positively associated with aggregate GDP growth**.
  - Separating trade exposure changes in agriculture and manufacturing, we find that the **positive association is driven by manufacturing**.
  - The positive effect of trade shocks is driven by the **Northern regions**.

# Conclusions

- **South**: suffered international competition and was not able to take advantage of wider markets both for agricultural and for industrial productions.
- The negative impact of trade exposure could have operated through **migration outflows** due to **selection-reallocation** (abroad) and to the **poverty trap** channels.
- This results are **robust** to possible province characteristics impact varying over to data biases (Fenoaltea bias: overestimation of woman employment in agriculture) and the introduction of lagged trade exposure.
- **Mechanization** is the most likely candidate explaining the difference in ability of taking advantage from trade in manufacturing.
- **Globalization**: spatial distributional impact; widened N-S divide. Arguably.

Thanks for your attention