

**DISCUSSION OF “UNCONDITIONAL CONVERGENCE
IN THE MEXICAN MANUFACTURING SECTOR
(1988-2018)”**

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BIS CCA RESEARCH CONFERENCE:

**"GROWTH, PRODUCTIVITY AND MACRO
MODELLING IN THE AMERICAS"**



UNIVERSITY OF
TORONTO

WHAT DOES THE PAPER DO?

- Examines whether there has been unconditional and/or conditional convergence in the Mexican Manufacturing Sector from 1988-2018 (Beta & sigma-convergence)
- Proposes some possible reasons for the findings

CONTRIBUTIONS

- Very few studies that focus on convergence in Mexican manufacturing productivity over long time periods
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- Very few studies that focus on convergence in Mexican manufacturing productivity over long time periods
 - (This paper & Cabral, R., López Cabrera, J. A., and Padilla Pérez, R. (2020))
- Interesting to explore since:
 - Manufacturing is a key sector in the Mexican economy
 - Rodick (QJE, 2012) suggests cross-country convergence in manufacturing & forces should be stronger within a country
 - Significant policy changes that could alter convergence among regions (GATT, NAFTA, China enters WTO)

CONTRIBUTIONS

- New data created
 - Digitized data for 1988 and 1993 years from physical records to allow for longer timeseries for Economic Censuses data (*Censos Económicos, CE*)
 - ***Important since GATT (1986), NAFTA (1994)
 - Careful documentation of the differences in results between using the data
 - Compares CE data to set based on GDP and Employment data (PIBE+ENOE) from *PRODUCTO INTERNO BRUTO POR ENTIDAD FEDERATIVA* and the Mexican Employment Survey (*Encuesta Nacional de Ocupación y Empleo*).
- Explicitly considers measurement error

RESULT #1-DIFFERENT DATA SETS CORRELATED FOR LABOUR PRODUCTIVITY MEASURES

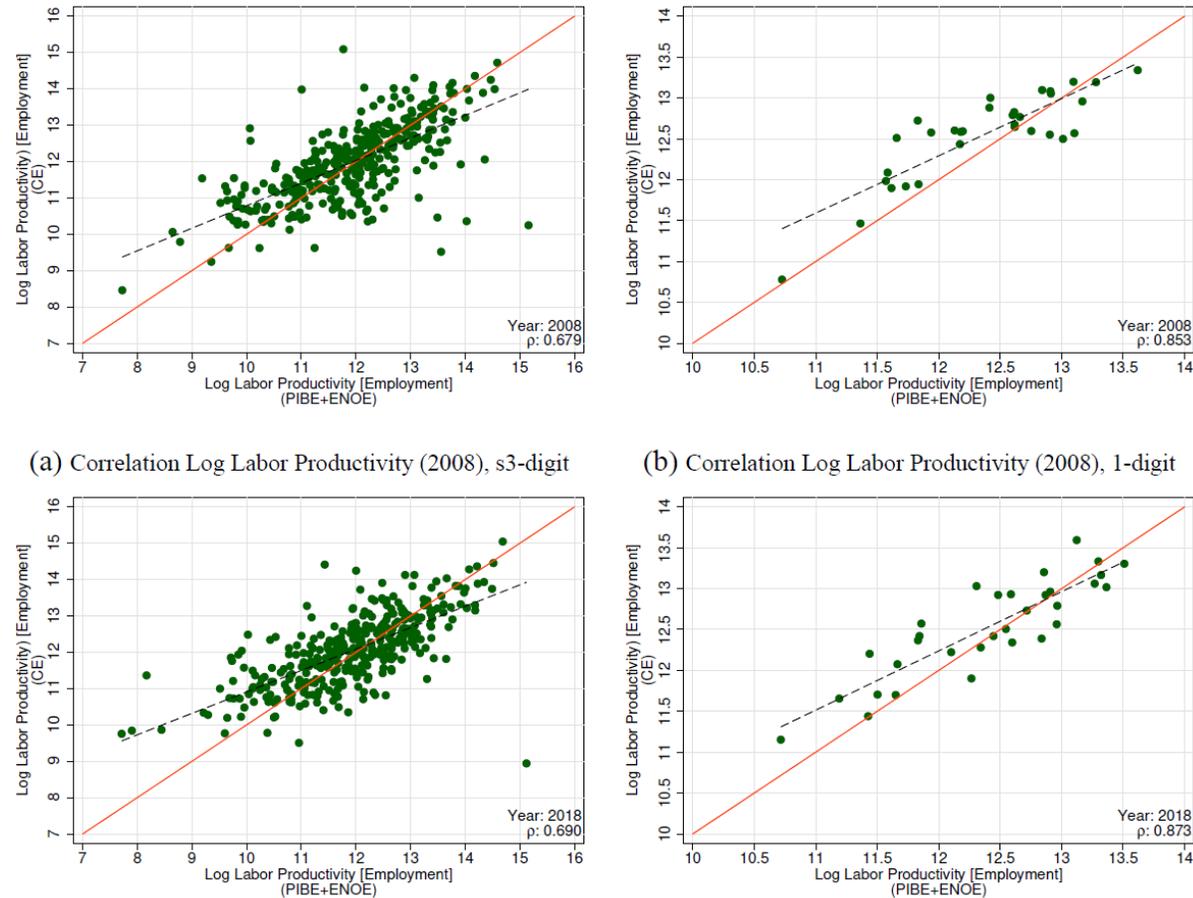
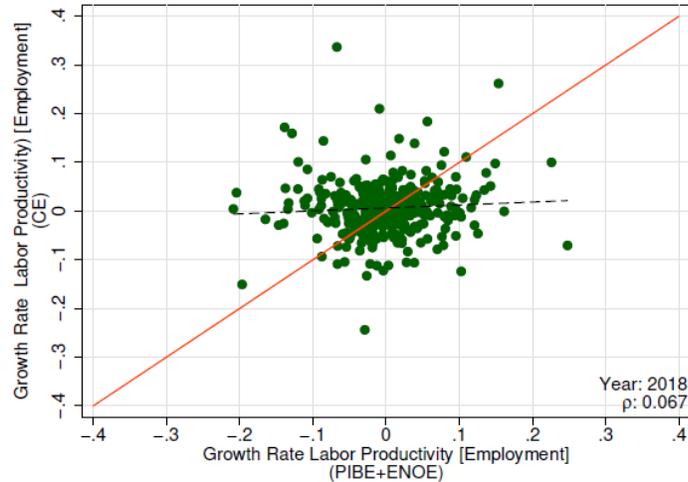
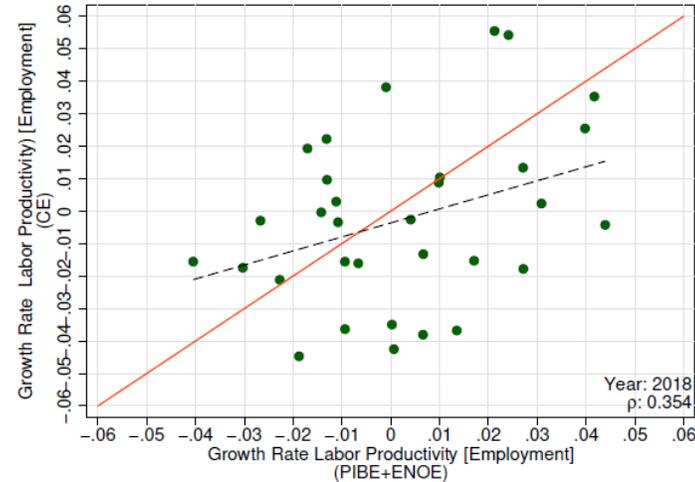


Figure 3: Correlation of Growth and Log Labor Productivity across datasets (2008-2018).

RESULT #1-... BUT NOT HIGHLY CORRELATED FOR LABOUR PRODUCTIVITY GROWTH



(e) Correlation Growth in Labor Productivity (2008-2018), s3-digit



(f) Correlation Growth in Labor Productivity (2008-2018), 1-digit

Figure 3: Correlation of Growth and Log Labor Productivity across datasets (2008-2018).

Notes: The sample includes all SCIAN s3-digit manufacturing industries, except 324-326. Data sources: CE; PIBE; ENOE.

RESULT #2: CONVERGENCE SIGNIFICANT AT 3-DIGIT LEVEL, NOT AT 1-DIGIT LEVEL

- Numbers for s3-digit indicate convergence between top 10% and bottom 10% regions would close ~81 years.

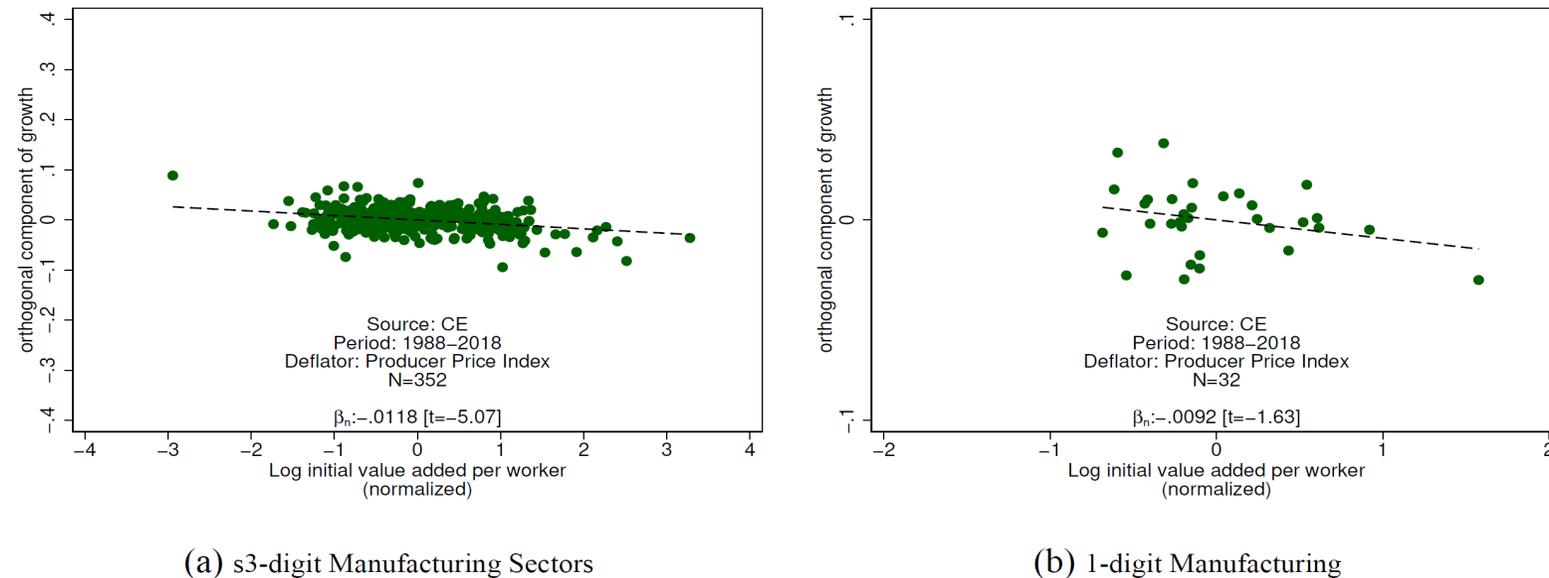
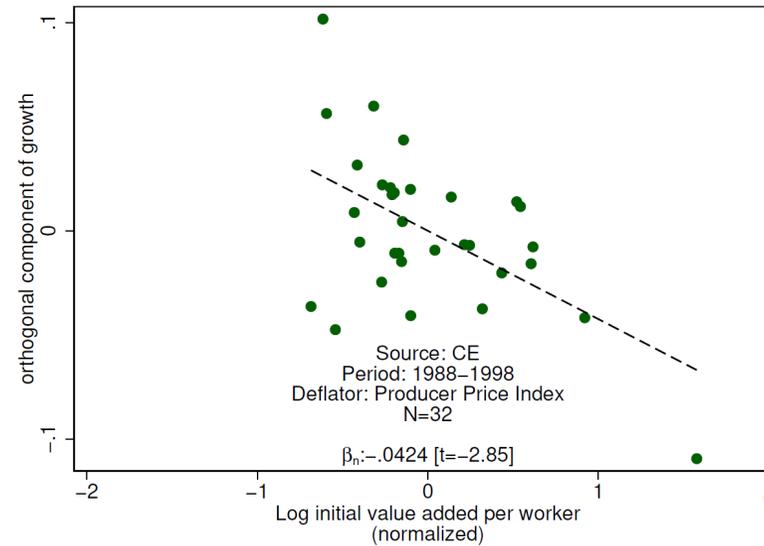
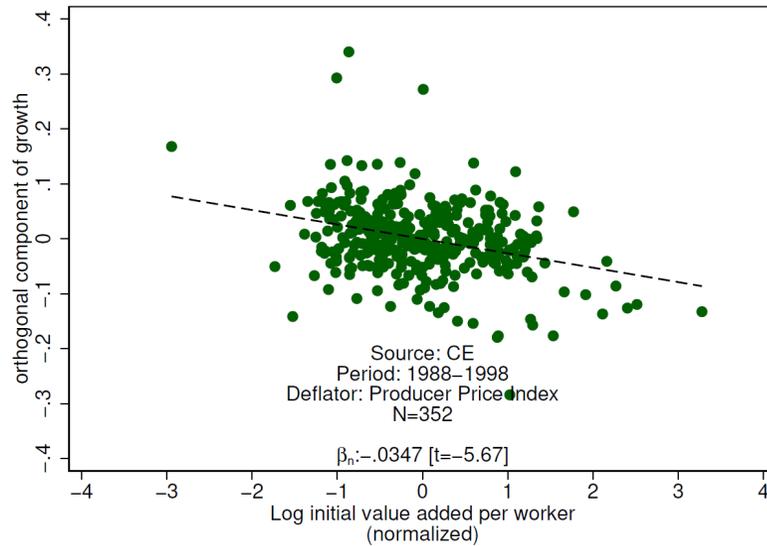


Figure 4: Convergence in s3-digit Manufacturing Sectors and Manufacture-wide Labor Productivity

Notes: Estimates from (3). The sample includes all SCIAN s3-digit manufacturing industries, except 324-326. t-statistic from clustered standard errors at the state level. Data sources: CE.

RESULT #3-DIFFERENCES SEEN ACROSS DECADES

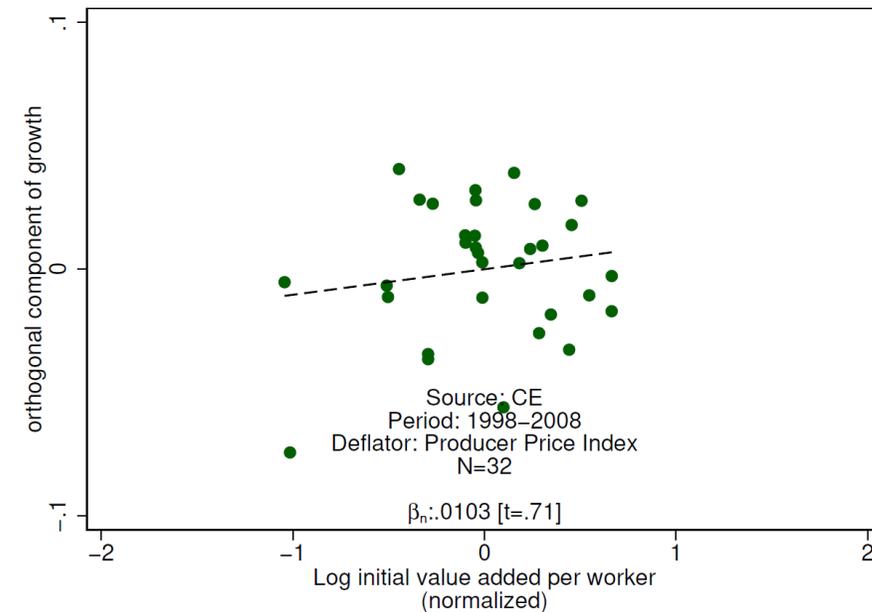
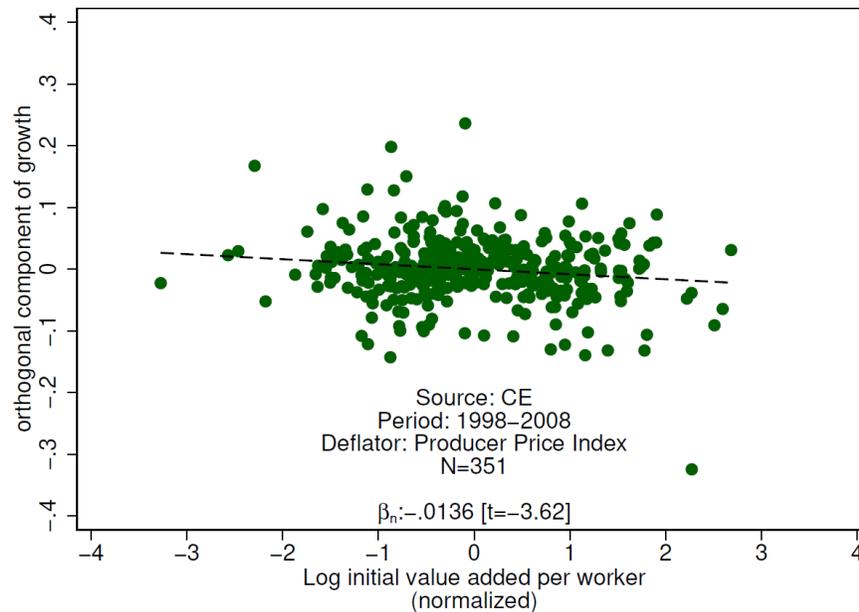
- Relatively strong convergence occurs pre-2000 (3.47% for s3-digit, an 4.24% for 1-digit)



(a) 1988-1998

RESULT #3-DIFFERENCES SEEN ACROSS DECADES

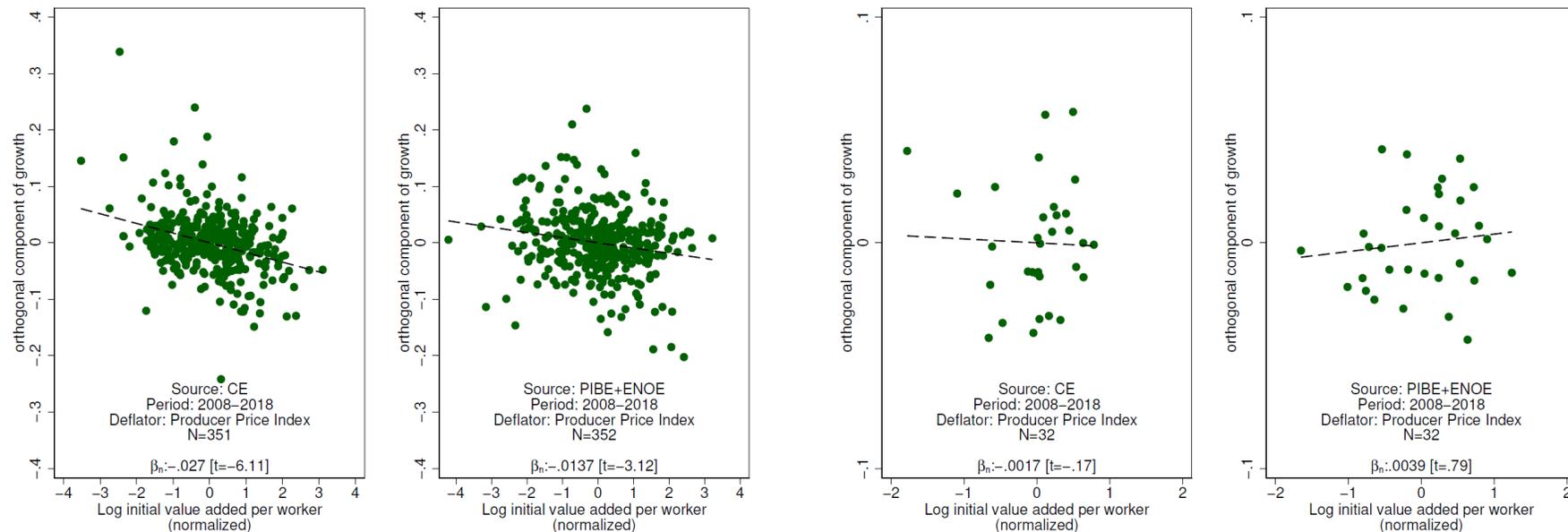
- Convergence seems to slow and/or stop in early 2000s



(b) 1998-2008

RESULT #3-DIFFERENCES SEEN ACROSS DECADES

- Post 2008 –evidence suggests some convergence in at 3-digit level, but not at 1 -digit



(c) 2008-2018

Figure 5: Convergence in 3-digit Manufacturing Sectors and Manufacture-wide Labor Productivity by Decade

RESULT #4: EVIDENCE OF UNCONDITIONAL CONVERGENCE IS WEAK

- Robustness checks echo findings above
- IV results show that the estimated convergence may be an upper bound
- For the case of s3-digit industries, it drops by approximately 70% and 50% (indication of measurement error)
- Extrapolating implies s3-digit convergence over 1988-2018 $< 1\%$ per year

RESULT #5-SIGNIFICANT DIFFERENCES IN BETA-CONVERGENCE ACROSS INDUSTRIES

- Follows Rodrik (2012) and looks at industry convergence for the 11 groups across regions
- 5 industries showed unconditional convergence (1988-2018)
- The industries with stronger convergence: Beverage and Tobacco Product Manufacturing (312), Textile Mills+Textile Product Mills (313-314) and, Wood Product Manufacturing (321). Machinery *et al.* (333-336)

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*****Convergence seems to happen downwards. -> certain states that were leaders in the past, had decreases in labor productivity, which aided convergence.**

RESULT #6-CASE FOR SIGMA-CONVERGENCE ALSO WEAK (FIGURES 9-11)

- There are some significant differences seen depending on the data used to examine the evolution of the SD of log(productivity) post 2003

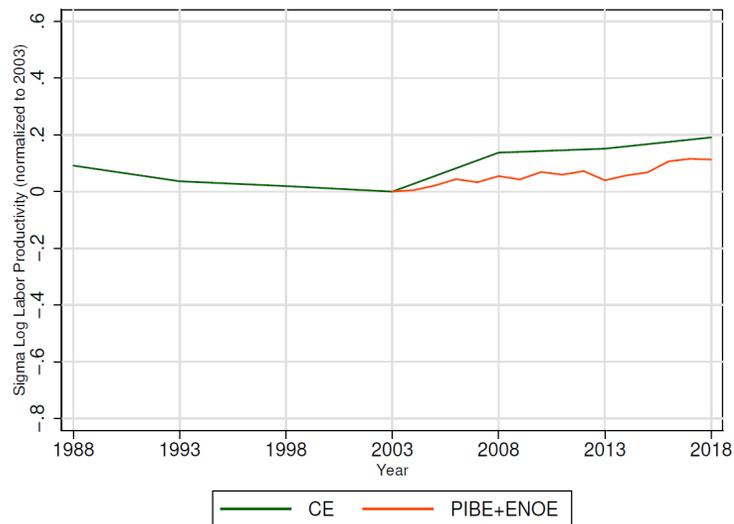
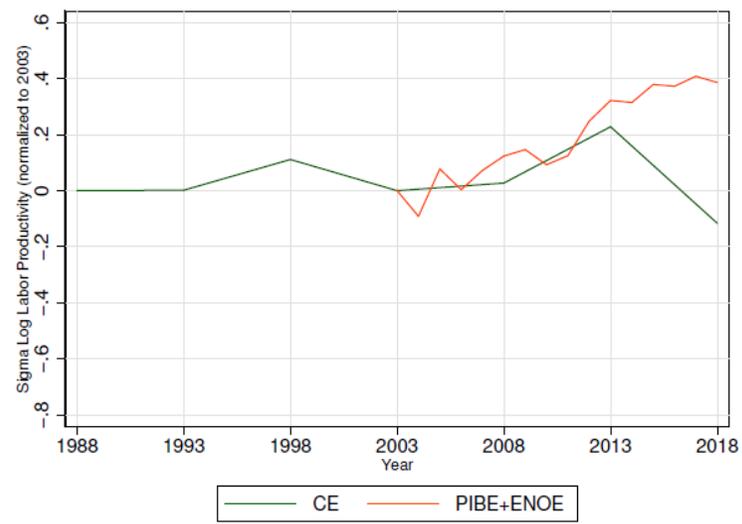
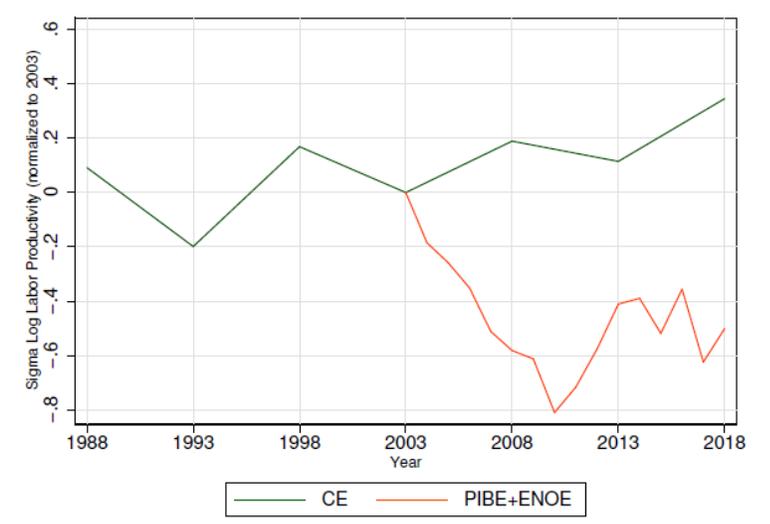


Figure 9: Sigma Manufacturing Log Labor Productivity



(c) 313-314: Textile Mills; Textile Product Mills



(d) 333-336: Machinery Manufacturing; Computer and Electronic Product Manufacturing; Electrical Equipment, Appliance, and Component Manufacturing; Transportation Equipment Manufacturing

RESULT #7: LIBERALIZATION POLICIES MAY EXPLAIN SOME REGIONAL DIFFERENCES

These policies:

- Strengthened of ties between US and Mexico (Chiquiar (2005))
- Cause reallocation from Center to North (Hanson (1998))

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Findings:

For full period (1988-2018)

- North and Central regions had fastest convergence at 3-digit level
- Center had highest for 1-digit level

For Decades:

- Strongest convergence seen 1988-1998 for North and Central
- Divergence seen in South (1-digit level) but not at 3-digit level

MAIN TAKE-AWAYS

- Some evidence of Beta-convergence for Manufacturing sector, but it is weak for period 1988-2018
- Evidence stronger using 3-digit data than for 1-digit
- Evidence that convergence was stronger for many sectors and regions in the 1988-1998 period

SO WHAT HAPPENED AROUND THEN?

OTHER FACTORS INFLUENCING RESULTS CONSIDERED

$$\hat{y}_{ij} = -\beta \ln y_{ij} + \gamma \text{Determinant}_{ij} + \lambda \text{Determinant}_{ij} \times \ln y_{ij} + D_i + \epsilon_{ij}$$

1. Informal Sector

2. China shock (i.e., China's entry to WTO in 2001)

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1. Informal Sector (not found to be significant)

2. China shock (i.e., China's entry to WTO in 2001)

-could help explain change post 1998 but more work would need to be done to explore this

-causation vs correlation

FINAL COMMENTS & SUGGESTIONS

- Nice paper
- Uses standard techniques but brings new data to the table
- Interesting set of findings
- Some results need a bit more explanation
 - Reasons for differences in between the 1-digit and 3-digit results for the southern region in 1988-1998 period,
 - Post-2003 differences in SD of log(productivity) for machinery manufacturing

FINAL COMMENTS & SUGGESTIONS

Conclusion sums up the remaining key question:

“While this study suggests that the underperformance of critical industries and a lack of reallocation played a major role, it is not clear why these trends began during this period.”

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Author points to:

1. China-shock as a potential reason for differences starting 2003 **interesting but need to consider what else may influence both the slowdown and the pickup later
2. Possible future work on relationship between misallocation (wide-spread barriers to resource allocation) and convergence

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***May want to consider a few other avenues

FINAL COMMENTS & SUGGESTIONS

- Could the cross border differences in adoption rates of tech also play a role?

***Effects of automation in high income countries may spill over through global supply chains*

FINAL COMMENTS & SUGGESTIONS

Two channels to consider for trade flows:

- Shift in relative production costs could cause low-income, labour abundant countries to lose relative cost advantage in producing certain goods (possible reshoring) – Rodrik (2018)
- Increase in efficiency of robot-adopting firms in the North causes Northern firms to increase production -> more demand for intermediates (might help developing countries)

FINAL COMMENTS & SUGGESTIONS

- Baur, Flach, Gourevich (2022) – Examines the effect of Robotization in OECD countries on Latin American Exports
 - In response to robot adoption, find exports in same industry decrease, but exports increase for products along the value chain

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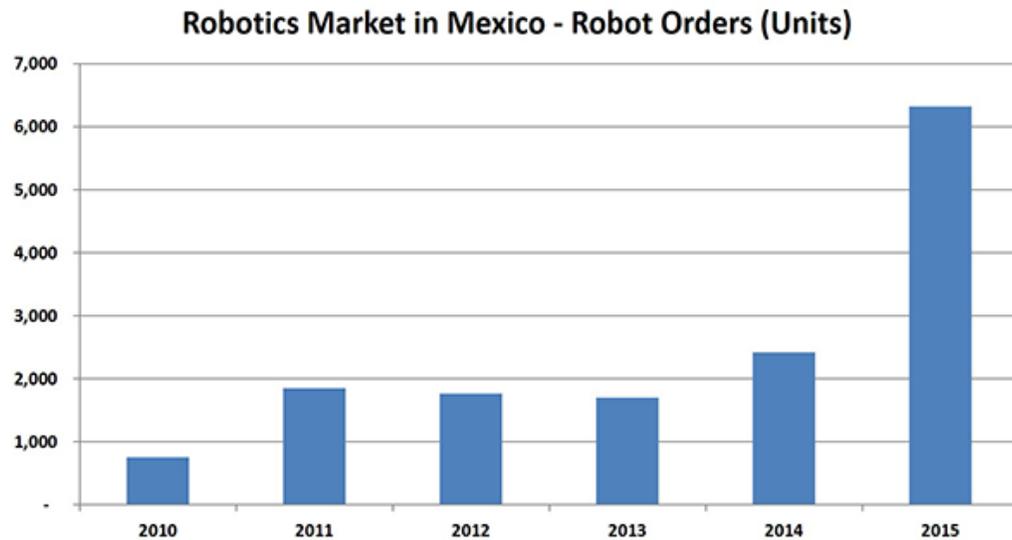
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 - IFR report (2021) Avg. Robots per 10000 employees in Manufacturing: North Am. 153, **US 228**, Canada 165, and **Mexico 44**
 - Automotive industry: Mexico **356/10,000** employees, vs US **1,287/10,000**

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 - Automotive industry: Mexico 356/10,000 employees, vs US 1,287/10,000
- Adoption is in many sectors in Mexico & NAFTA partners (Automotive, Plastics, Chemicals, Electronics, Food & Beverage,...)

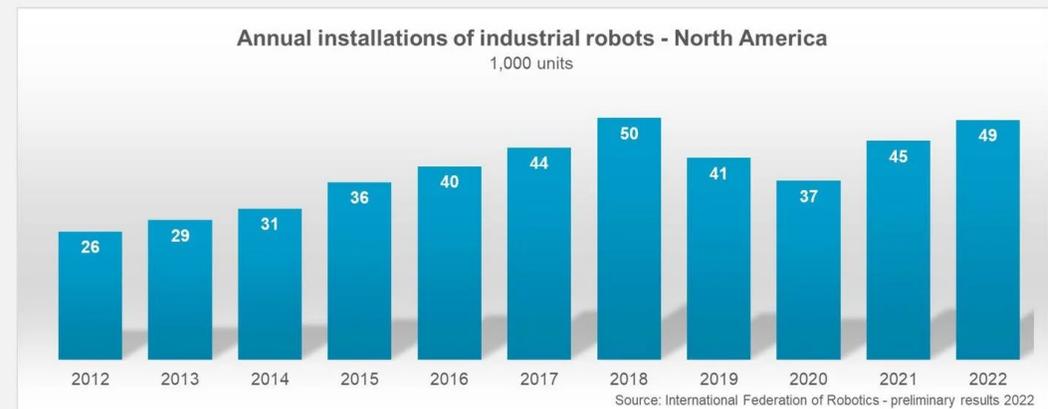
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- The Pickup in investments might help explain some of the post 2008 pickup



Mexico's robotics market breaks sales records in 2015. (Courtesy of the Robotic Industries Association)

North America approaching all-time high



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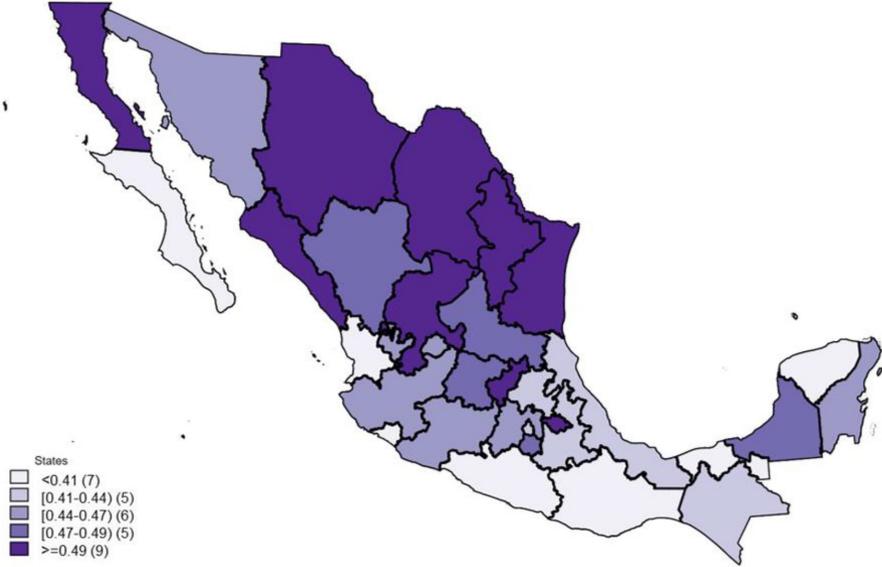
- Looking at Service sector convergence might also help differentiate between stories on reasons for differences across decades

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- Looking at Service sector convergence might also help differentiate between stories on reasons for differences across decades
- Bloom et al (2022) examine management measures across regions in Mexico
 - Argue greater misallocation is a key driver of the worse management practices
 - Differences seen in service industries vs manufacturing may be due to different exposures to international factors (e.g., GATT, NAFTA)
 - The data sources they use may be useful in creating other metrics you can use to look at differences between regions

REGIONAL DISTRIBUTION OF MANAGEMENT (BLOOM ET AL. (2022)) SCORES VS CHINA SHOCK

Management Scores



China-Shock

