

# CHINA SHOCK AND FEMALE LABOR MARKET PARTICIPATION IN BRAZIL

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Juliana Cristofani – Federal University of ABC

Ana Claudia Polato e Fava – Federal University of ABC

Mônica Yukie Kuwahara – Federal University of ABC

# The Presentation



Context: China Shock and Brazilian Formal Labor Market



Related Literature



Empirical Strategy

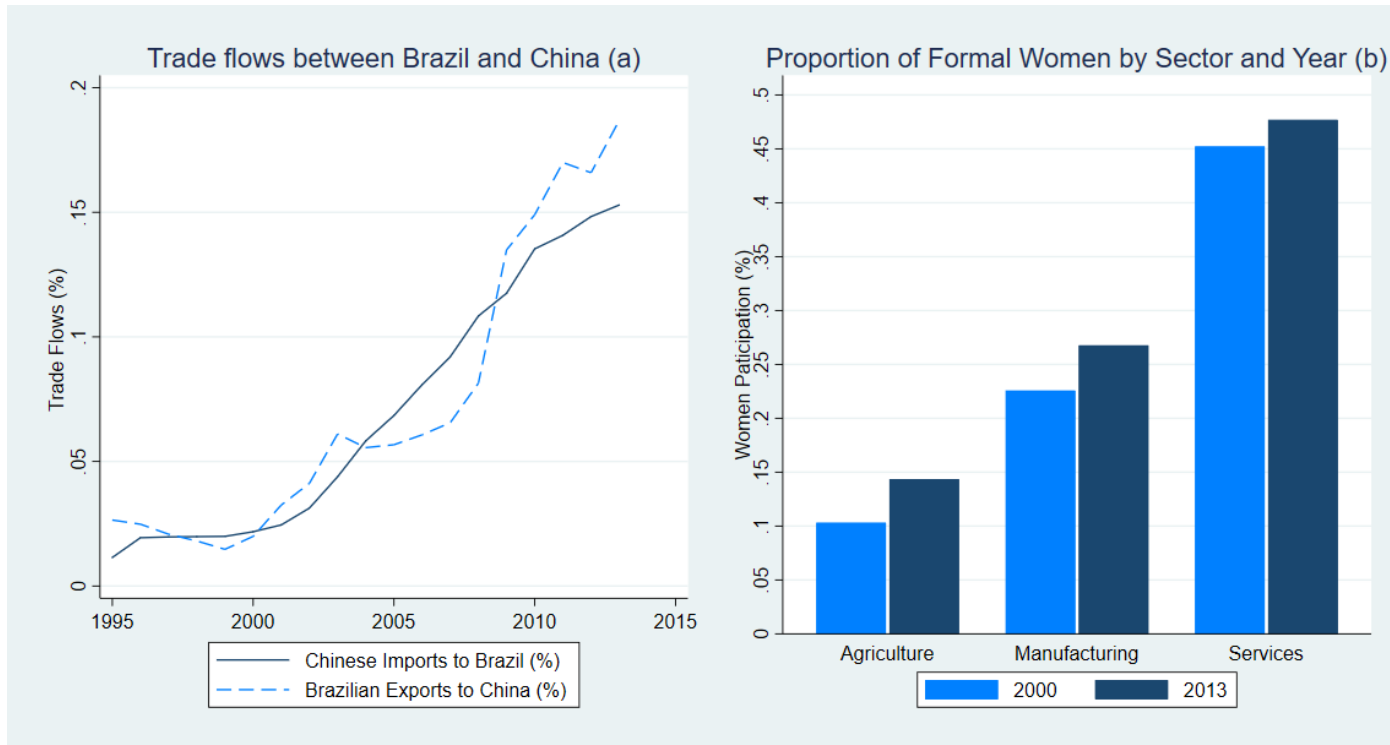


Data and Main Results



Final Remarks

# Context: China Shock and Brazilian Formal Labor Market



Sources: BACI database and RAIS microdata, 2021.

- In last century's final years, China experienced a fast economic growth, expanding its trade relations: China shock (Autor et al., 2013; Acemoglu et al., 2016);
- In Brazil, the China Shock effects are spread by two channels (Costa et al., 2016):
  - Rise of commodities exports to China;
  - Rise of manufactured imports from China.
- In a similar period, the Brazilian formal labor market also grew, with more women occupying formal jobs.

# The Study: China Shock and Brazilian Formal Labor Market

- **Main goal:** Identify whether Chinese international trade expansion was able to improve the female labor market conditions in Brazil between 2000 and 2013, by answering two questions:
  - Does the China shock increase women's participation into the formal labor market?
    - **Model 1:** Effects on women's participation by microregion.
  - Does the China shock increase formal women's wages when compared to their male counterparts?
    - **Model 2:** Effects on the gender wage ratio (female/male) by microregion.

# Related Literature

## Brazil had a trade liberalization in 1990, based on import tariffs' reduction

- Workforce from most exposed industries and microregions were negatively affected (Arbache and Corseuil, 2004; Dix-Carneiro; Kovak, 2017; Kovak, 2013; Ulyssea and Ponczek, 2018).

## China Shock

- In U.S., the effects for manufacturing workers were negative (Autor et al., 2013; Acemoglu et al., 2016);
- In Brazil, the exports channel tends to benefit workers, while the imports channel doesn't (Costa et al., 2016).

## Literature of how trade shocks affects women in Brazil

- Analysis of how the imports channel affects women (Benguria; Ederington, 2017; Cavalcanti et al., 2020; Gaddis; Pieters, 2017).

Our contribution: Analyze the effects of both China Shock channels on formal female workers in Brazil.

# Empirical Strategy

- Estimation of the China Shock effects on formal women's outcomes in each Brazilian microregion (Autor et al., 2013; Costa et al., 2016)
  - **Data:** RAIS - Brazilian formal labor Market Census; BACI Database - trade flows between countries

$$\Delta Y_{mt} = \beta_1 IS_{mt} + \beta_2 XD_{mt} + Z'_m \beta_3 + \varepsilon_m \quad (1)$$

$\Delta Y_{mt}$ :

- $\Delta Relative_{participation}$  = Variation in the proportion of formalized women by microregion
- $\Delta \ln Wage_{female/male}$  = Variation in the log of female to male (hourly) wage ratio by microregion

Measures of how each Brazilian microregion was exposed to trade with China

$$IS_{mt} = \sum_j \frac{L_{jm,2000}}{L_{j,2000}} \frac{\Delta I_j}{L_{m,2000}}, \quad \Delta I_j = -V_{CjB,2013} - V_{CjB,2000} \quad (2a)$$

$$XD_{mt} = \sum_j \frac{L_{jm,2000}}{L_{j,2000}} \frac{\Delta X_j}{L_{m,2000}}, \quad \Delta X_j = V_{BjC,2013} - V_{BjC,2000} \quad (2b)$$

j = sector;  
 m = microregion;  
 t = year;  
 L = Formalized labor force;  
 $V_{BjC}$  = Trade flows between Brazil and China (US\$ 1000)

$Z'_m$ : Covariates by microregion in 2000 => average age, proportion of workers with high school or college education, average wages, cubic polynomial of income per capita, formal women's (ln) employment

$\varepsilon_m$ : Error.

## Empirical Strategy – Instrumental Variables

- The measures of changes in Brazil-China trade patterns might also be capturing some internal shocks
  - **Solution:** Instrumental variables strategy (Autor et al., 2013; Costa et al., 2016):

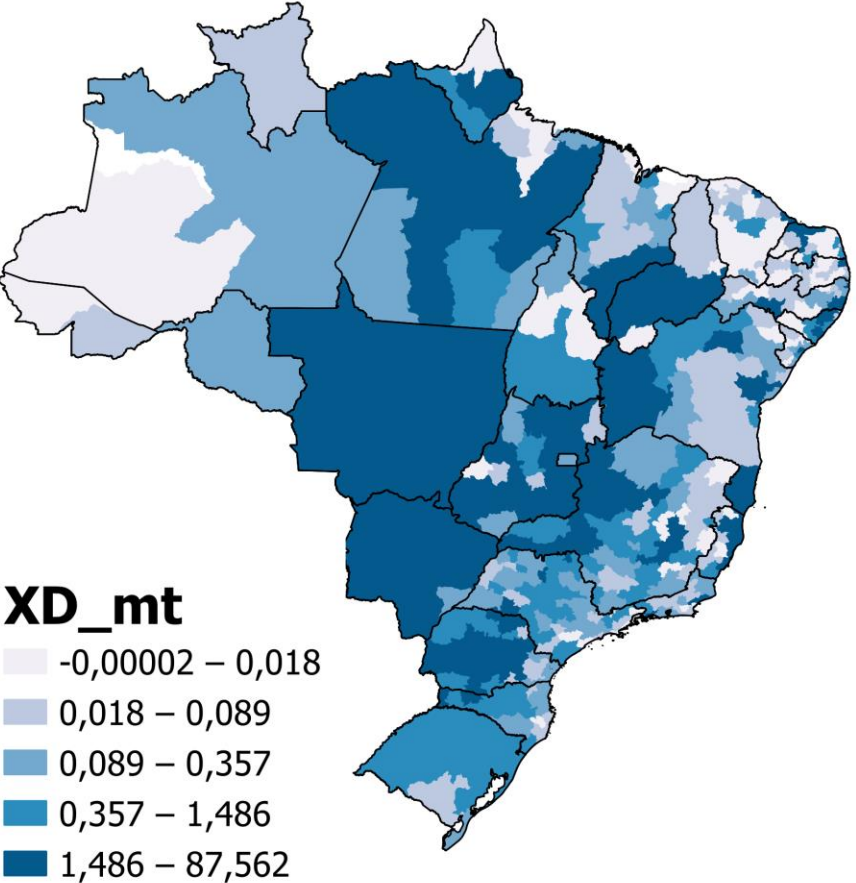
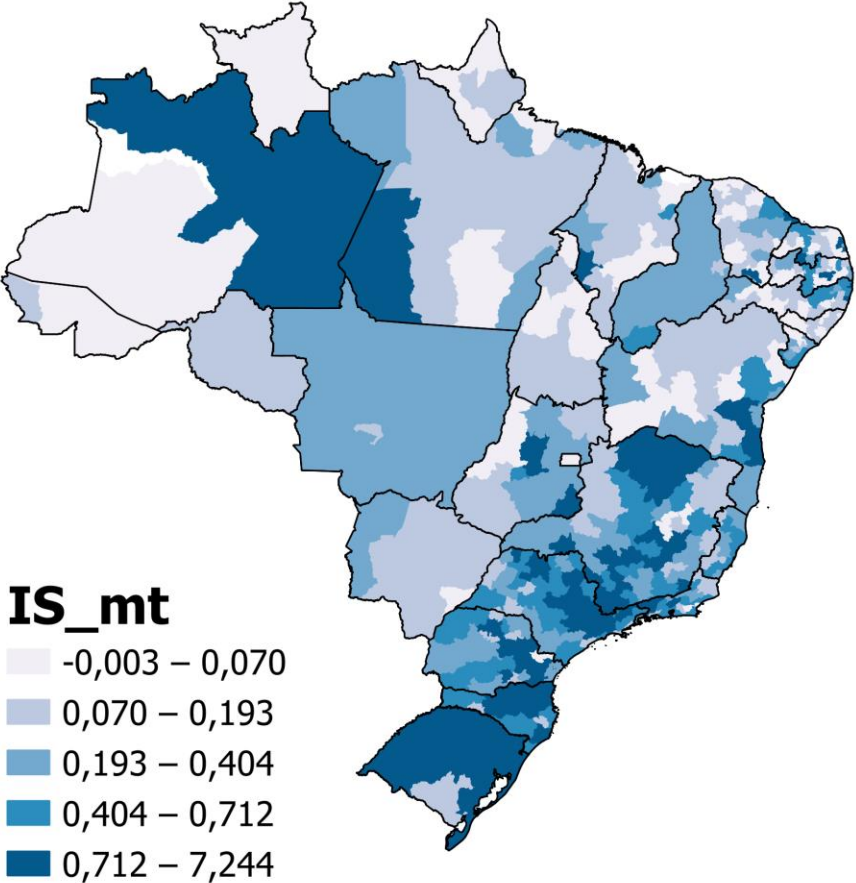
$$\text{ivIS}_{mt} = \sum_j \frac{L_{jm,2000}}{L_{j,2000}} \frac{\Delta I_j^*}{L_{m,2000}}, \quad \Delta I_j^* = V_{OjC,2013} - V_{OjC,2000} \quad (3a)$$

$$\text{ivXD}_{mt} = \sum_j \frac{L_{jm,2000}}{L_{j,2000}} \frac{\Delta X_j^*}{L_{m,2000}}, \quad \Delta X_j^* = V_{OjC,2013} - V_{OjC,2000} \quad (3b)$$

$V_{OjC}$  = Value (US\$ 1000) of exports (imports) from China to the other countries in the database (except Brazil).

# Geographic Distribution of China Shock's Metrics ( $IS_{mt}$ e $XD_{mt}$ )

N = 411 microregions



Sources: BACI database and RAIS microdata, 2021.



## Description and Summary of Variables by Microregion

Variable	Mean	Std. Dev.
$\Delta Relative_{participation}$	0.0381	(0.0802)
$\Delta \ln Women_{employment}$	0.9852	(0.3470)
$\Delta \ln Men_{employment}$	0.8111	(0.4191)
$\Delta \ln Wage_{female/male}$	0.0877	(0.2178)
$\Delta \ln Women_{hourly\ wage}$	1.2906	(0.2556)
$\Delta \ln Men_{hourly\ wage}$	1.2029	(0.1931)
$IS_{mt}$	0.4986	(0.7096)
$XD_{mt}$	2.1594	(7.7427)
$ivIS_{mt}$	24.3211	(32.3083)
$ivXD_{mt}$	34.4260	(100.9242)
In Women's employment 2000	8.9209	(1.5144)
In Men's employment 2000	9.4223	(1.6946)
Average Age 2000	34.2680	(2.0377)
% Workers with High School	0.2445	(0.0831)
% Workers with College Education	0.0513	(0.0327)
Average Monthly Wages 2000	0.4168	(0.1574)
Income per Capita	158.01	(91.07)

Sources: BACI database and RAIS microdata, 2021.

**Table 1: Effects of China Shock on Employment of Formal Women and Men by Microregion**

	OLS (1)	OLS + FE (2)	2SLS (3)	2SLS + FE (4)
<i>Panel A: <math>\Delta</math>Relative participation</i>				
$IS_{mt}$	<b>-0.563*</b> (0.332)	<b>-0.639***</b> (0.243)	<b>-0.554*</b> (0.315)	-0.429 (0.318)
$XD_{mt}$	<b>-0.063***</b> (0.022)	<b>-0.091***</b> (0.028)	-0.049 (0.083)	-0.100 (0.071)
<i>Panel B: <math>\Delta \ln Women_{employment}</math></i>				
$IS_{mt}$	-3.18 (2.05)	-2.03 (2.44)	-3.00 (2.36)	-1.40 (2.91)
$XD_{mt}$	0.371 (0.230)	<b>0.212**</b> (0.106)	0.200 (0.300)	0.335 (0.326)
<i>Panel C: <math>\Delta \ln Men_{employment}</math></i>				
$IS_{mt}$	-0.393 (2.04)	1.28 (2.61)	-0.259 (2.39)	1.17 (2.86)
$XD_{mt}$	<b>0.634***</b> (0.232)	<b>0.563***</b> (0.184)	0.416 (0.300)	<b>0.685*</b> (0.411)
Observations	411	411	411	411
State Fixed Effects (FE)	No	Yes	No	Yes

Notes: Robust standard errors with mesoregion cluster in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 2: Effects of China Shock on Hourly Wages of Formal Women and Men by Microregion**

	OLS (1)	OLS + FE (2)	2SLS (3)	2SLS + FE (4)
<i>Panel A: <math>\Delta \ln Wage_{female/male}</math></i>				
IS <sub>mt</sub>	1.57 (0.968)	<b>2.37*</b> <b>(1.20)</b>	<b>2.08*</b> <b>(1.12)</b>	<b>2.11**</b> <b>(1.03)</b>
XD <sub>mt</sub>	-0.120 (0.080)	-0.061 (0.073)	-0.052 (0.176)	-0.207 (0.233)
<i>Panel B: <math>\Delta \ln Women_{hourly wage}</math></i>				
IS <sub>mt</sub>	1.62 (1.13)	3.64** (1.42)	2.26 (1.56)	<b>3.38***</b> <b>(1.29)</b>
XD <sub>mt</sub>	0.334** (0.137)	0.325*** (0.105)	1.38** (0.687)	<b>1.24**</b> <b>(0.614)</b>
<i>Panel C: <math>\Delta \ln Men_{hourly wage}</math></i>				
IS <sub>mt</sub>	-0.153 (1.02)	0.959 (0.948)	0.0130 (1.38)	1.02 (1.12)
XD <sub>mt</sub>	0.467*** (0.119)	0.416*** (0.113)	1.46** (0.673)	<b>1.51**</b> <b>(0.762)</b>
Observations	411	411	411	411
State Fixed Effects (FE)	No	Yes	No	Yes

Notes: Robust standard errors with mesoregion cluster in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3: Heterogeneity Results by Structural Characteristics - Effects of China Shock on Outcomes of Formal Women and Men by Microregion**

	Microregions More Educated (1)	Microregions Less Educated (2)	Richest Microregions (3)	Poorest Microregions (4)	Microregions More Populated (5)	Microregions Less Populated (6)
<i>Panel A: <math>\Delta Relative_{participation}</math></i>						
IS <sub>mt</sub>	-0.103 (0.281)	<b>-1.07**</b> <b>(0.539)</b>	-0.719 (0.491)	0.409 (0.949)	-0.009 (0.243)	-0.202 (1.07)
XD <sub>mt</sub>	-0.008 (0.052)	0.007 (0.047)	0.015 (0.039)	0.002 (0.372)	0.208 (0.151)	-0.007 (0.120)
<i>Panel B: <math>\Delta \ln Wage_{female/male}</math></i>						
IS <sub>mt</sub>	0.585 (1.14)	<b>3.22**</b> <b>(1.53)</b>	<b>3.78***</b> <b>(1.36)</b>	<b>7.26**</b> <b>(3.46)</b>	1.73 (1.24)	<b>7.39**</b> <b>(3.43)</b>
XD <sub>mt</sub>	-0.028 (0.128)	<b>-0.468***</b> <b>(0.145)</b>	0.015 (0.178)	-1.48 (1.75)	0.043 (0.370)	-0.526 (0.321)
Observations	137	137	137	137	137	137

Notes: All models are estimated by 2SLS with State Fixed Effects; Robust standard errors with mesoregion cluster in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4: Effects of China Shock on Outcomes of Formal Women and Men by Microregion: Short, Medium and Long Terms**

	Short Term (2000-2005) (1)	Medium Term (2000-2010) (2)	Main Specification (2000-2013) (3)	Long Term (2000-2015) (4)
<i>Panel A: <math>\Delta Relative</math> participation</i>				
IS <sub>mt</sub>	<b>-4.91***</b> (1.10)	<b>-1.24***</b> (0.393)	-0.429 (0.318)	<b>-0.795**</b> (0.384)
XD <sub>mt</sub>	<b>-1.19*</b> (0.627)	<b>-0.139*</b> (0.0824)	-0.100 (0.071)	-0.119 (0.114)
<i>Panel B: <math>\Delta \ln Wage_{female/male}</math></i>				
IS <sub>mt</sub>	<b>-15.1***</b> (4.39)	-1.18 (1.76)	<b>2.11**</b> (1.03)	1.62 (1.29)
XD <sub>mt</sub>	-3.20 (2.50)	-0.479 (0.355)	-0.207 (0.233)	-0.292 (0.344)
Observations	411	411	411	411

Notes: All models are estimated by 2SLS with State Fixed Effects; Robust standard errors with mesoregion cluster in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: Robustness Checks - Effects of China Shock on Outcomes of Formal Women and Men by Microregion**

	Main Specification (1)	South America Instrument (2)	Latin America Instrument (3)	BRICS Instrument (4)	Placebo Test (1995-2000) (5)
<i>Panel A: <math>\Delta Relative</math> participation</i>					
IS <sub>mt</sub>	<b>-0.429</b> <b>(0.318)</b>	<b>-0.701***</b> <b>(0.258)</b>	<b>-0.313</b> <b>(0.436)</b>	<b>-0.577**</b> <b>(0.258)</b>	<b>0.247</b> <b>(0.425)</b>
XD <sub>mt</sub>	-0.100 (0.0708)	-0.135 (0.131)	-0.131 (0.134)	-0.059 (0.104)	<b>0.0656</b> <b>(0.0740)</b>
<i>Panel B: <math>\Delta \ln Wage_{female/male}</math></i>					
IS <sub>mt</sub>	<b>2.11**</b> <b>(1.03)</b>	<b>2.87***</b> <b>(1.07)</b>	<b>2.41**</b> <b>(1.03)</b>	<b>3.00**</b> <b>(1.29)</b>	<b>0.195</b> <b>(1.75)</b>
XD <sub>mt</sub>	-0.207 (0.233)	0.329 (0.447)	0.362 (0.455)	-0.222 (0.291)	<b>0.238</b> <b>(0.334)</b>
Observations	411	411	411	411	411

Notes: All models are estimated by 2SLS with State Fixed Effects; Robust standard errors with mesoregion cluster in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

# Final Remarks

This paper is focused on the China shock effects on formal female workers in Brazil, between 2000 and 2013

## Regarding the imports channel:

- In microregions most exposed, the China shock worsened the women's entry in formal labor market in some specifications;
- For those who remained in the formal market, there was a relative improvement in terms of wages.

## Regarding the exports channel:

- The effects were positive for both formal women and men's hourly wages.

## Other Results

- Formal female workers experience rises in relative wages in disadvantaged regions - less educated, poorest, and less populated;
- Considering China shock effects in short, medium and long terms:
  - Negative for formal women's relative employment;
  - For formal women's relative wages: negative in short term, and positive on the long term.

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# THANK YOU!

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Juliana Cristofani - [juh.cristofani@gmail.com](mailto:juh.cristofani@gmail.com)

Ana Claudia Polato e Fava - [ana.fava@ufabc.edu.br](mailto:ana.fava@ufabc.edu.br)

Mônica Yukie Kuwahara - [monica.kuwahara@ufabc.edu.br](mailto:monica.kuwahara@ufabc.edu.br)