

PINK TECH: DID COMPUTERS AND THE INTERNET REDUCE THE GENDER WAGE GAP?

Evidence From Brazilian Data

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Agenda

1. Introduction

2. Tasks

3. Empirical Strategy

4. Results

5. Final Remarks

Motivation

- In the last decades, there has been an increase in female participation in the Brazilian labor market and a (small) reduction in the average wage differential between men and women.
- Gender differences persist in the distribution of workers between industries and occupations, and in their degree of formalization of employment. Proportionally, there are more women employed in the Personal Care, Domestic Services, Education and Health sectors. In the Domestic Services sector there is a high degree of informality and a majority of female workers.
- The entry of more women in the labor market coincided with the surge of computer use and internet availability in the country.

Research Objectives

Our goal

We investigate whether the tasks associated with certain occupations with a greater female presence contributed to the closing of the gender gap in employment levels, job formalization, and wages.

Our working hypothesis

The heavy presence of women in abstract or manual non-routine intensive jobs favored female workers in the face of technological changes. Women were more likely to work jobs either complemented by technology or not easily substituted by the later.

Women in the labor market (Brazil, 2000 - 2010)

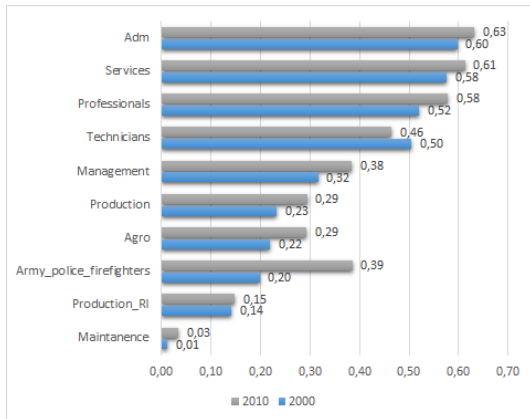


Figure 1: Female participation in the labor market (category of occupation)

Tasks (I)

The classification of tasks in each occupation follows the occupational categories in the 2010 census that were classified by Reis (2016) according to the description of job tasks given by the Brazilian Code of Occupation (CBO).

Example: CBO code “2512” == Economists.

CBO_4 Tasks description

- 2512 Analyzing economic environment
 - 2512 Elaborate projects (economic, market research, economic viability etc)
 - 2512 Execute projects (economic, market research, economic viability etc)
 - 2512 Participate in strategic and short term planning
 - 2512 Evaluate collective impact policies
 - 2512 Manage economic-financial programming
 - 2512 Act in internal and external markets
 - 2512 Examining business finance
 - 2512 Exercise mediation, expertise and arbitration
 - 2512 Communicate
 - 2512 Demonstrate personal skills
-

Tasks (II)

Non-routine abstract (NRA) tasks

- “researching”, “analyzing”, “evaluating”, “planning”, “negotiating”, “coordinating”, “teaching”, “selling”...

Non-routine manual (NRM) tasks

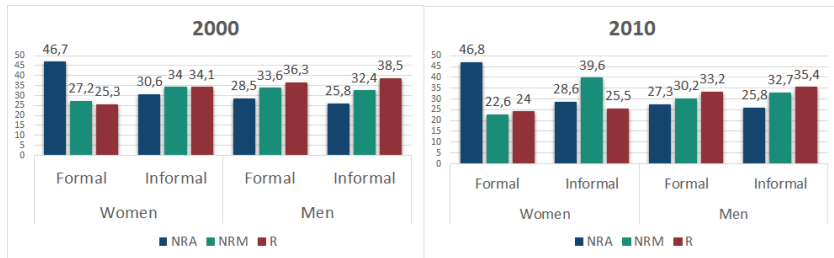
- “repairing”, “renovating”, “serving”, “cleaning”, “accomodating”...

Routine (R) tasks

- “operating”, “distributing”, “assembling”....

Tasks (III)

Proportion of Tasks performed in different labor markets (Brazil):



Empirical Strategy: First Step

$$\log(y_i) = b_0 + b_1 age_i + b_2 age_i^2 + \sum_{k=1}^K \alpha_k dummy_{ik} + \mu_j + u_i \quad (1)$$

$$emp_i = b_0 + b_1 age_i + b_2 age_i^2 + \sum_{k=1}^K \alpha_k dummy_{ik} + \mu_j + u_i \quad (2)$$

$$\Delta\mu_j = \mu_{2010j} - \mu_{2010j}$$

Outcomes included: log of earnings, dummy equal to one for working, dummy equal to one for formal employment. $\Delta\mu_j$ is the change in the average value of the outcome in region j . $\Delta_g\Delta\mu_j$ is the rate of convergence in the gender gap.

Empirical Strategy: Second Step

$$\Delta_g \Delta \mu_j = \delta_0 + \delta_1 RSH_{2000j} + \delta_2 Internet_{2007j} + \delta_3 \Delta_g ShareRoutine_{2000j} + x_j + \gamma_s + \varepsilon_j \quad (3)$$

Strategy

We follow Autor, Dorn and Hanson (2015) and Autor and Dorn (2013) to measure the degree to which local markets are specialized in routine job activities.

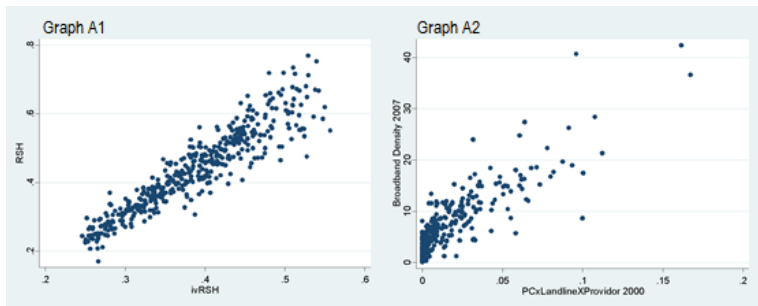
$$RTI_k = \ln \ln \left(T_{k,t}^R \right) - \ln \ln \left(T_{k,t}^M \right) - \ln \ln \left(T_{k,t}^A \right)$$

$$RSH_{jt} = \left[\sum_{k=1}^K L_{jkt} I \left(RTI_k > RTI^{p66} \right) \right] \left(\sum_{k=1}^K L_{jkt} \right)^{-1}$$

Empirical Strategy: Instrumental Variables

$$ivRSH_{2000j} = \sum_{i=1}^I E_{i,j,t-1} R_{i,-j,t-1}$$

$$ivInternet_{2007j} = Computers_{j2000} * Telephones_{j2000} * Providers_{j1999}$$



Results (I)

Table 1: Working population (Brazil, 2000-2010)

	2000	2010
Share of women working	44%	54%
Share of men working	74%	76%
Share of persons working over population (16-64)	59%	65%

Results (II)

Table 2: Women participation in the labor market by Occupational Group

	Share of women in 2010	Decenial increase since 2000 (pp)
Professionals (only teachers)	76%	5%
Administrative and clerical	63%	3%
Services and sales retail and wholesale	61%	4%
Professionals	49%	5%
Technitians (High school degree)	46%	-4%
Management	38%	7%
Production	29%	6%
Agriculture, fishing, and forestry	29%	7%
Production (RI)	15%	1%
Army, police force and firefighters	5%	1%
Maintenance workers	3%	2%

Results (III)

Table 3: Basic statistics of the variables of interest

	(1)	(2)	(3)	(4)
	$\Delta_g \Delta_t$ Log earnings	$\Delta_g \Delta_t$ Formal job	RSH	Internet Density
Mean	3.43	-0.04	0.34	12.84
Std. dev.	0.39	0.04	0.08	11.44
	Share routine	Providor	Computer	Telephone
Mean	-4.51	0.61	0.10	0.37
Std. dev.	3.58	0.29	0.07	0.19

Note: Author's calculations with census data. All variables are dated from the beginning of the period in 2000, except internet density measured in 2007. Gender gaps in wages and job formality consider the change between the 2010 census minus the 2000 census. 413 observations at the microregion level. Population weighted statistics.

Results (IV)

Table 4: Regression Results (I)

VARIABLES	$\Delta_g \Delta_t$ Formal	$\Delta_g \Delta_t$ Share working	$\Delta_g \Delta_t$ Log earnings
RRH	0.185*** (0.065)	0.215*** (0.046)	0.420*** (0.087)
Internet Density	0.000 (0.000)	0.000 (0.000)	0.003** (0.001)
$\Delta_g \text{RoutineTasks}$	-0.001 (0.001)	0.002** (0.001)	0.001 (0.002)
Observations	413	413	413

Results (V)

- Comparing two local markets, an increase in 10 pp in the initial presence of routine-intensive jobs improves the gender wage gap by 4.2 pp, the share of employed persons gap by 2.2 pp and, the formalization gap by 1.9 pp.
- A local market with 10 more internet connections corresponds to 0.03 percentage points relative gain for female wages, but no relative gain in female job formalization or share employed.

Results (VI)

Table 5: Regression Results (II)

VARIABLES	$\Delta_g \Delta_t$ Formal	$\Delta_g \Delta_t$ Share working	$\Delta_g \Delta_t$ Log earnings
RCN	-0.357*** (0.124)	-0.374*** (0.093)	-0.597*** (0.229)
Internet Density	0.002** (0.001)	0.001** (0.001)	0.004** (0.002)
$\Delta_g \text{RoutineTasks}$	-0.001 (0.001)	0.002** (0.001)	0.002 (0.002)
Observations	413	413	413

Final Remarks (I)

- We searched for potential explanations to the reduction in gender employment and wage gap since the 2000s studying the tasks usually performed by men and women in different occupations.
- We present evidence that women are performing more non-routine tasks than routine tasks compared to men.
- We contribute to the gender wage gap studies by analyzing the mechanism that connects the reduction of the gap and the realization of job tasks by women.

Final Remarks(II)

- The results indicate that in markets more specialized in routine tasks the growth of wages, employment, and job formality for women is relatively higher than for men, thus closing the gender gap.
- Moreover, we find that the gender wage gap closes faster in markets with higher internet density.

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