Effects of the age-education structure of female workers on male earnings in Brazil

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Fertility below the replacement level in Brazil

- One of the reasons that the total fertility rate (TFR) has been decreasing below 2.1 children per woman is the increase in the proportion of female labor force participation.

- In Brazil, fertility reached below replacement level (IBGE, 2012):
  - 4.35 in 1980. – 1.90 in 2010.

- Previous studies verified regional differentials in fertility (Potter, Schmertmann e Cavenaghi, 2002; Potter, Schmertmann, Assunção e Cavenaghi, 2010), which is also observed with new data.
TFR by Brazilian macro regions, 2010

North: 2.47
Northeast: 2.06
Central-West: 1.92
Southeast: 1.70
South: 1.78

Source: 2010 Brazilian Demographic Census.
Economic inequality in Brazil

- The demographic regional differences in Brazil are related to economic inequality and the industrialization process in the country (Furtado 2003).

- Historically, industrialization was concentrated in the Southeast region.

- Because of the disproportionate concentration of wealth, the country has failed to achieve a satisfactory level of economic development.

- There may be economic growth, but there is little economic development in Brazil.
Female labor force participation

- An increase in female labor force participation could contribute to reducing economic inequality (Esping-Andersen, 2009; Esping-Andersen et al., 2002).

- In Brazil, an increase in female participation in the labor market has been occurring since the 1970s (Costa, 1990; Rios-Neto and Wajnman, 1994; Souza, 2009; Wajnman, Queiroz, and Liberato, 1998).

- This increase occurred regardless of age, race, marital status, socioeconomic status, or region of residence (Rios-Neto and Batista, 1998; Souza, 2009).

- Even with these improvements, gender inequality continues to be a serious social problem in Brazil (Alves and Corrêa, 2009).
Gender inequality

- Women continue to earn less than men, even when their education levels are equal (Alves and Corrêa, 2009).

- While differences in income have not been eliminated, they have been significantly reduced, especially within the formal labor market.

- The main concern of this study is to estimate the impact on the earnings of males in Brazil as a result of an increase in female participation within the labor force.
Previous and new estimation strategies

- Age-education transitions in Brazil provide a great deal of variation within the male labor force (15–64 years) structure between 1970 and 2000.

- Previous results indicate that older and better educated men have higher earnings.

- The distribution of the male population by age-education groups (cohort size) has a negative impact on earnings, with the greatest impact occurring for those with better educations.

- Now we include the impact of women who were participating (receiving earnings) in the labor market on male earnings.
Data and categories

- **Brazilian Censuses** microdata were aggregated into 502 micro-regions, yielding comparisons across the censuses.
- **Age** is categorized into four groups:
  - Youth population (15-24).
  - Young adults (25-34).
  - Adults (35-49).
  - Mature adults (50-64).
- **Educational attainment** was classified into three groups according to years of schooling completed:
  - No further than the first phase of elementary school (0-4).
  - Second phase of elementary school (5-8).
  - At least some secondary school (9+).
- **Earnings** in main occupation: converted to January 2002.
Men X Women

- Male real earnings are higher than female earnings in all age-education groups and years.

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<tr>
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<tbody>
<tr>
<td>Men</td>
<td>711.47</td>
<td>1,093.98</td>
<td>694.56</td>
<td>699.24</td>
</tr>
<tr>
<td>Women</td>
<td>314.40</td>
<td>430.86</td>
<td>331.22</td>
<td>363.49</td>
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- Percentage distributions of the male and female working-age population by age-education group are similar.

- Women are still employed less than men in all age-education groups and years.

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<tbody>
<tr>
<td>Men</td>
<td>80.34</td>
<td>79.42</td>
<td>78.88</td>
<td>68.46</td>
</tr>
<tr>
<td>Women</td>
<td>21.71</td>
<td>29.33</td>
<td>35.29</td>
<td>39.61</td>
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Estimation of models

- **Fixed-effects models** allow the estimation of coefficients that reflect relationships within 502 micro-regions between 12 age-education groups over time on labor outcomes.

- Regressions only include **males** in the dependent variable.

- **Dependent variable**: the logarithm of the mean real income by main occupation in a group.

- **Independent variables**: age-education indicators \((G)\), distribution of male population in age-education groups \((X)\), distribution of employed females in age-education groups \((W)\) interacted with time \((\theta)\); and area-time fixed effects \((\alpha)\):

\[
\log(Y_{git}) = \beta_0 + (\beta_1 G_{12} + \cdots + \beta_{11} G_{43}) \theta_t + (\gamma_1 X_{11} + \cdots + \gamma_{12} X_{43}) \theta_t + (\delta_1 W_{11} + \cdots + \delta_{12} W_{43}) \theta_t + \alpha_{it} + \varepsilon_{git}
\]
Male population (15–64) by year and age-education group, 1970–2000 (%)

Mean real monthly earnings in main occupation of male population (15–64) by age-education group, 2000

Obs.: Nominal income was converted to base 1 in January 2002, taking into account changes in currency and inflation.
Source: 2000 Brazilian Demographic Census.
Effects of male proportions in 502 micro-regions ($X_{11} - X_{43}$) on earnings, 1970 and 2000

### 25–34 years

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<tr>
<th>Education Level</th>
<th>Predicted 1970</th>
<th>Predicted 2000</th>
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<tbody>
<tr>
<td>0–4 education</td>
<td></td>
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<tr>
<td>5–8 education</td>
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<tr>
<td>9+ education</td>
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### 35–49 years

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The increase in female labor force participation had a negative impact on male earnings in previous decades, mainly for better educated groups (5-8 and 9+).

This impact has been decreasing between 1970 and 2000.

This might be an indication that the economy has been better assimilating female workers.

The negative impact of female labor force participation on male earnings was significant to decreasing the gender gap.

However, gender inequalities still remain in terms of labor participation and real earnings.
Final considerations

– The new models were an improvement on previous studies.

– New variables can still be included in future analyses, as this exploration is constantly changing and progressing due to the release of new data (2010 Census).

– Important public policies to further decrease income and gender inequalities in the country would have to:
  – Improve educational attainment in areas that still have a large proportion of poorly educated people.
  – Promote family planning programs in regions that still have higher levels of fertility.
  – Stimulate further increase of female labor force participation.