

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

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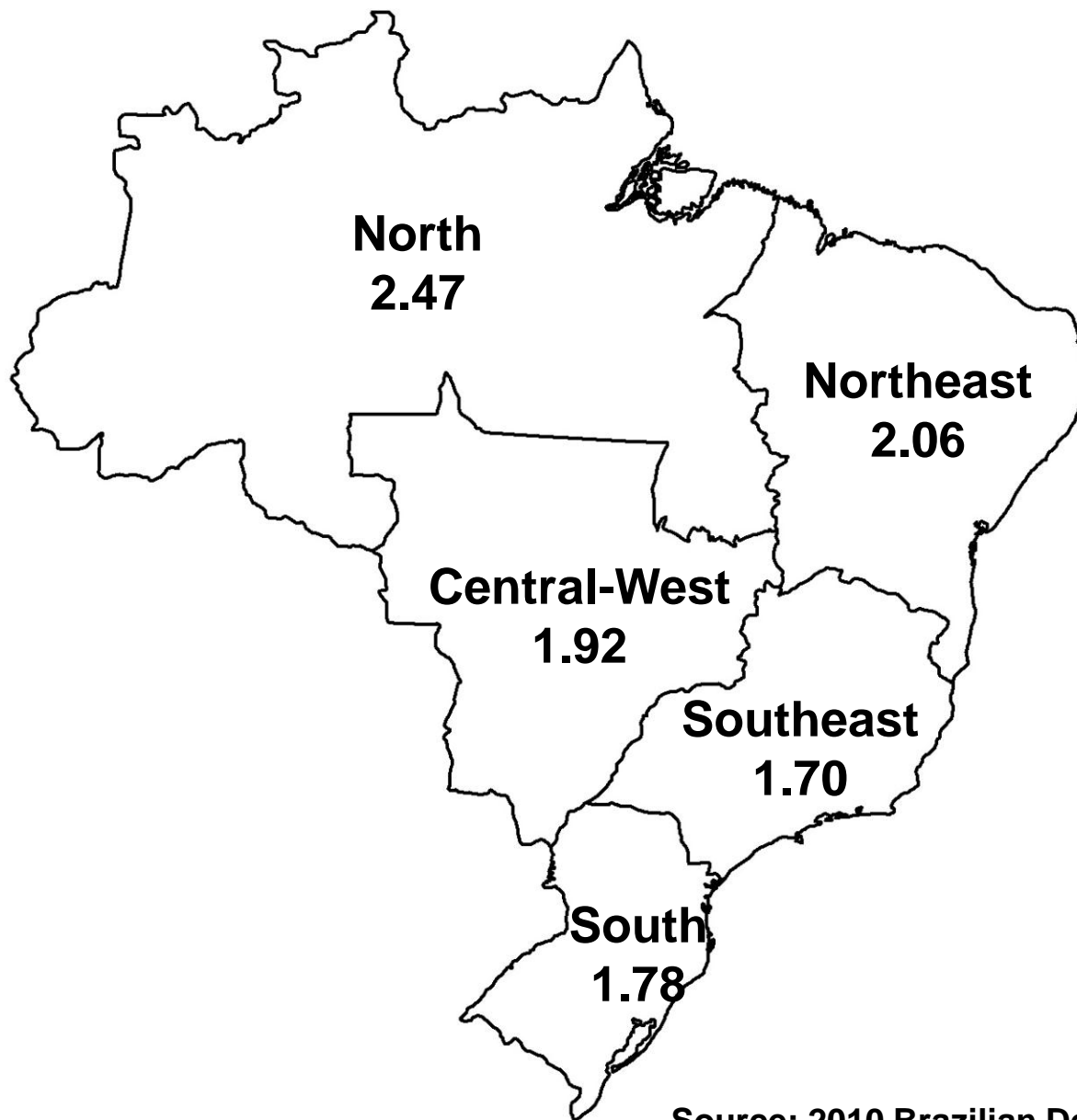
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Fertility below the replacement level in Brazil

- 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):
 - 6.28 in 1960. – 2.85 in 1991.
 - 5.76 in 1970. – 2.38 in 2000.
 - 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



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.
- **Time** (census years): 1970, 1980, 1991, and 2000.
- **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.

BRL	1970	1980	1991	2000
Men	711.47	1,093.98	694.56	699.24
Women	314.40	430.86	331.22	363.49

- 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.

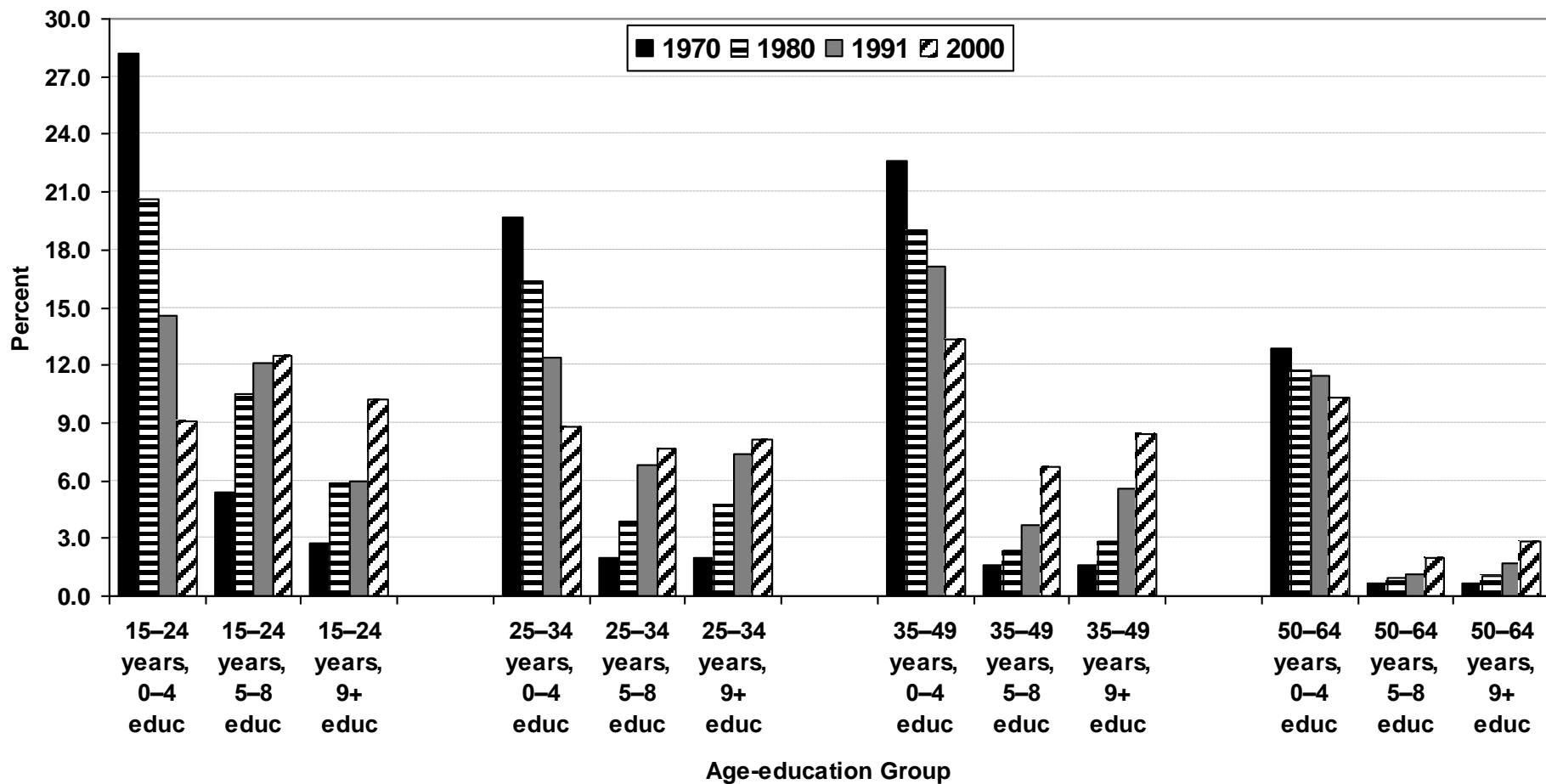
LFP (%)	1970	1980	1991	2000
Men	80.34	79.42	78.88	68.46
Women	21.71	29.33	35.29	39.61

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 (θ); and area-time fixed effects (α):

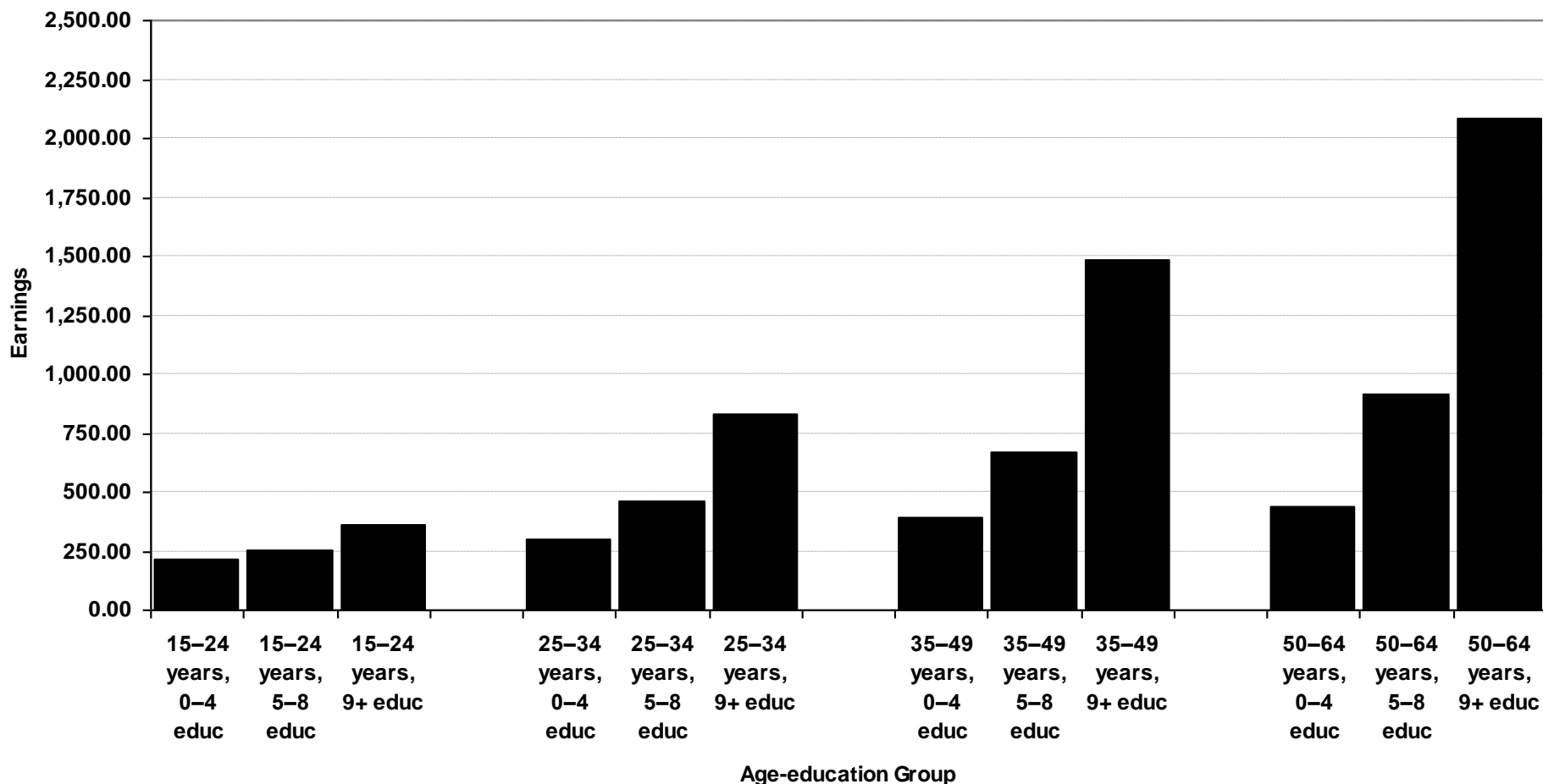
$$\log(Y_{git}) = \beta_0 + (\beta_1 G_{12} + \dots + \beta_{11} G_{43}) * \theta_t + (\gamma_1 X_{11} + \dots + \gamma_{12} X_{43}) * \theta_t + (\delta_1 W_{11} + \dots + \delta_{12} W_{43}) * \theta_t + \alpha_{it} + \varepsilon_{git}$$

Male population (15–64) by year and age-education group, 1970–2000 (%)



Source: 1970–2000 Brazilian Demographic Censuses.

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



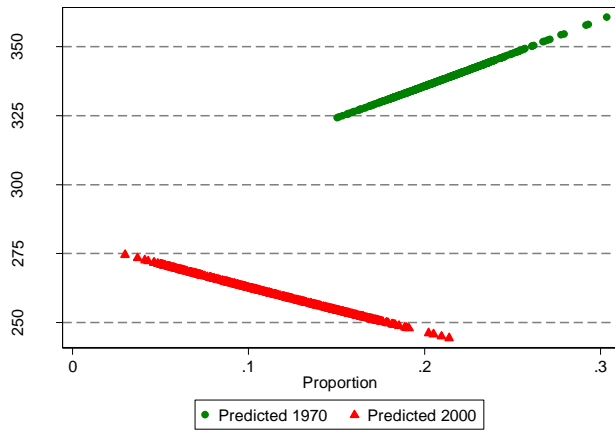
Obs.: Nominal income was converted to base 1 in January 2002, taking into account changes in currency and inflation.

Source: 2000 Brazilian Demographic Census.

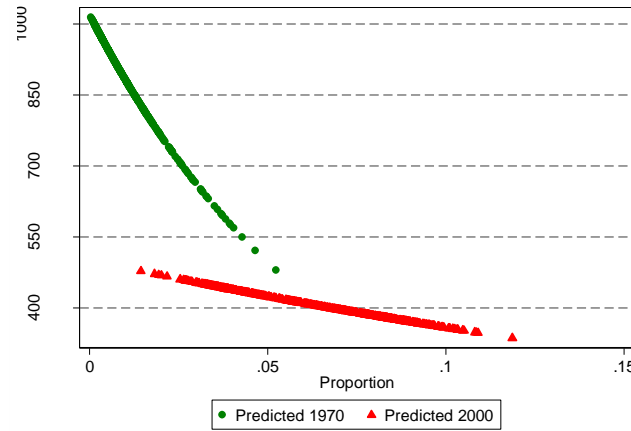
Effects of male proportions in 502 micro-regions ($X_{11}-X_{43}$) on earnings, 1970 and 2000

25–34 years

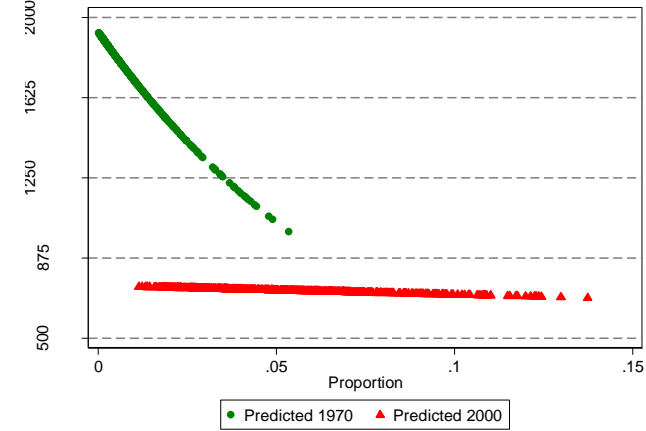
0–4 education



5–8 education

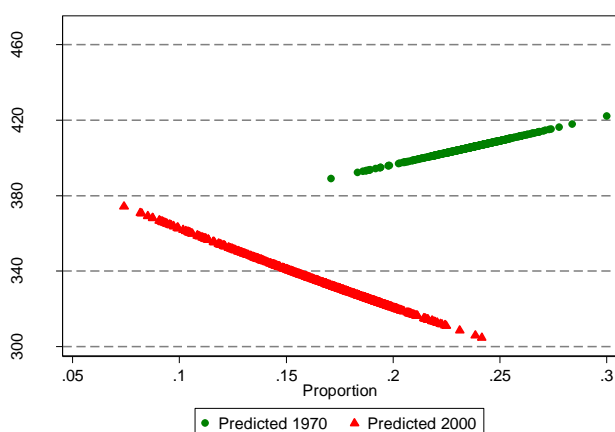


9+ education

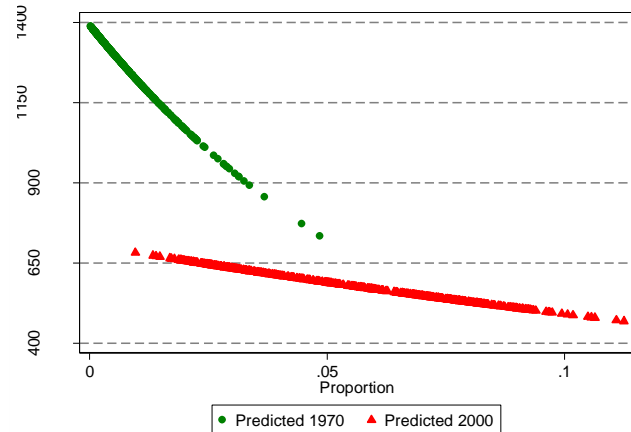


35–49 years

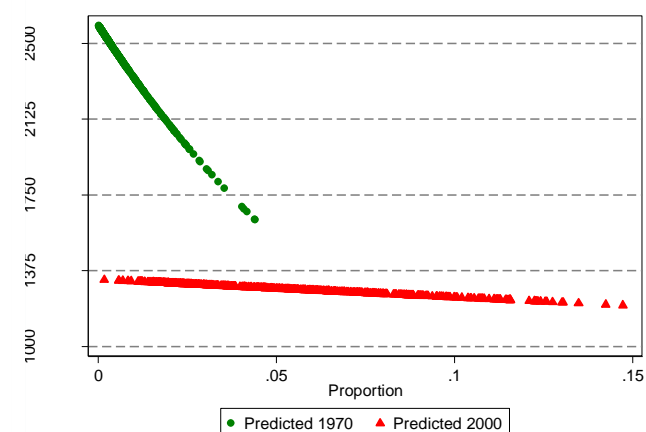
0–4 education



5–8 education



9+ education



Impact of female workers on male earnings¹⁴

- 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.