Demographic Change and Economic Development at the Local Level in Brazil

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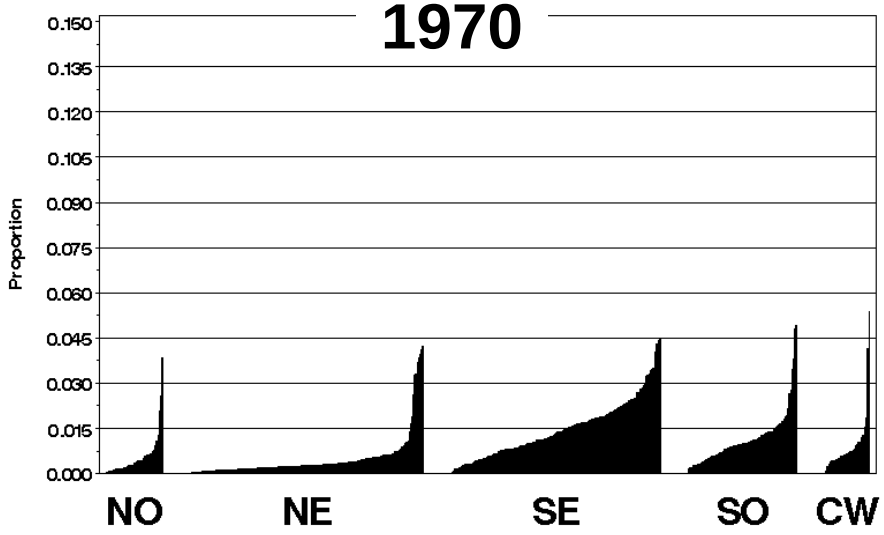
Project

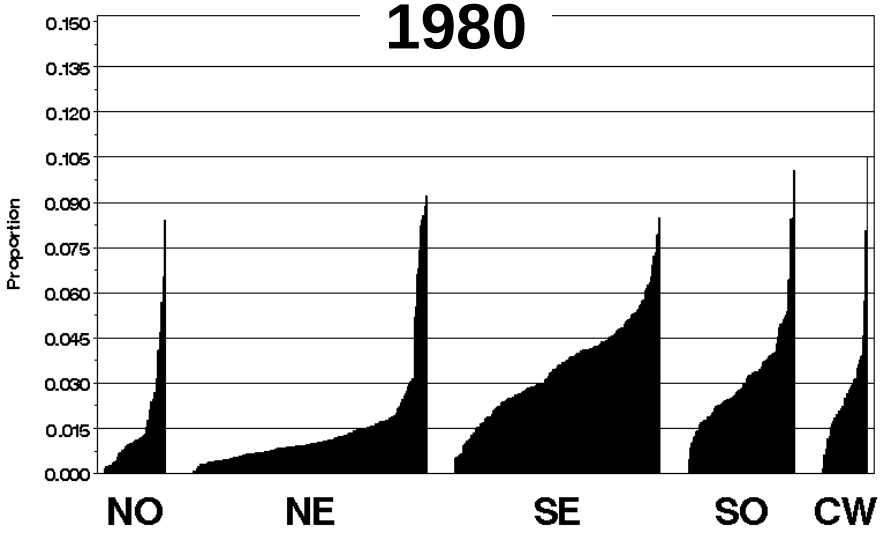
- The main focus of the demographic dividend (DD) literature has been on the direct impact of the decreasing dependency ratio on economic development.
- However the age and education composition of the Brazilian labor force is also undergoing drastic shifts with great regional variation.
- "Baby boom" studies suggest that large cohorts in the US depressed earnings, and effects increased with education.
- The main question is whether these compositional shifts in Brazil have had an effect beyond the formal labor force equations estimated by DD studies.

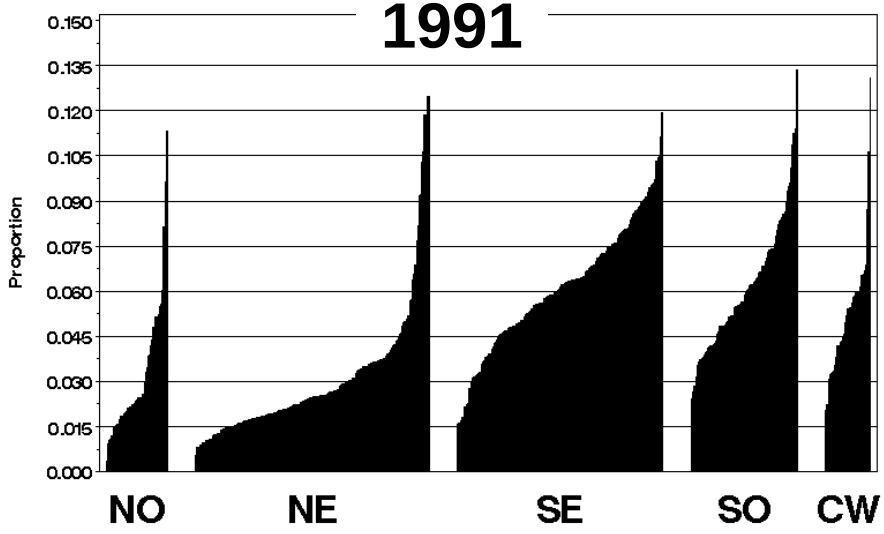
Data

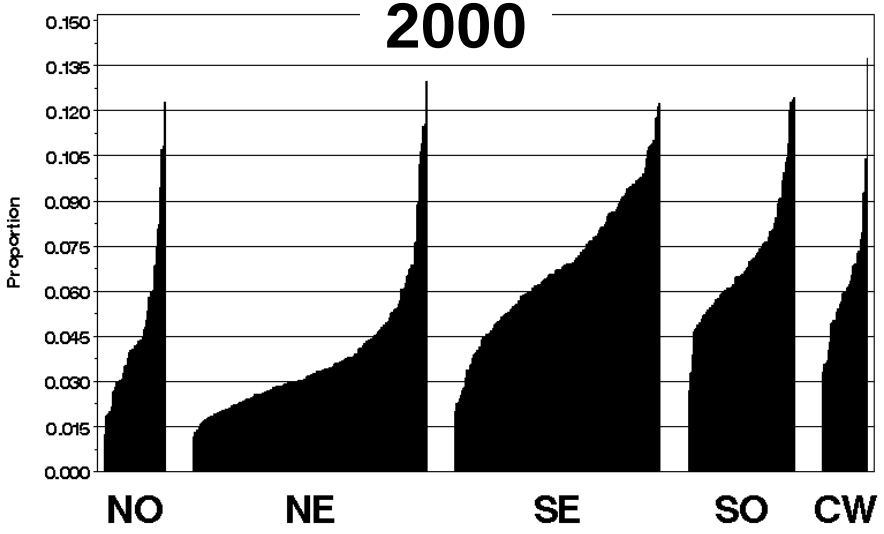
- Microdata from the 1970–2000 Brazilian Censuses.
- Municipalities are aggregated to the micro-region level, yielding 502 comparable areas across the four censuses.
- Age is categorized in four groups: 15–24, 25–34, 35–49, and 50–64.
- Educational attainment is classified in three groups according to completed years of schooling: 0–4, 5–8, 9+.
- We calculate the proportion of men in each one of the 12 age-education groups for each year and micro-region.

Proportion of Men with 25–34 Years of Age and 9+ Years of Schooling in 502 Brazilian Micro-regions, 1970–2000 Censuses

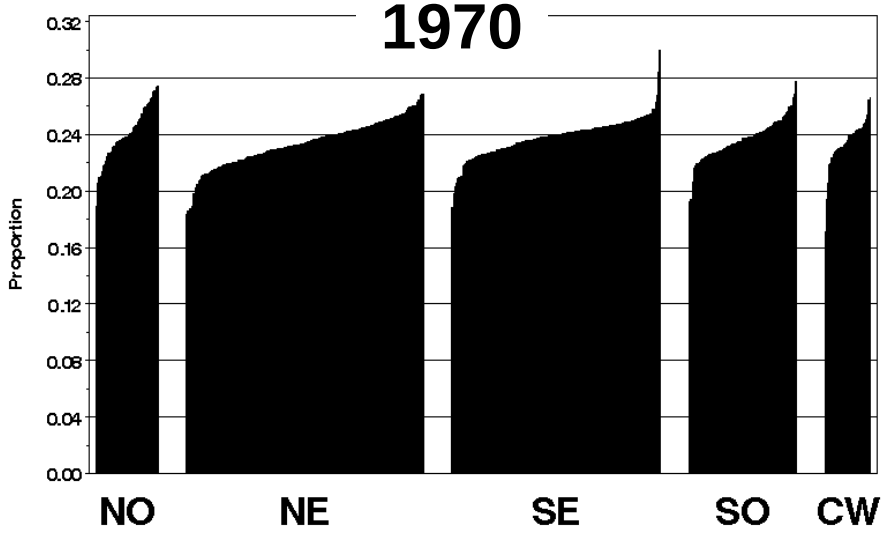


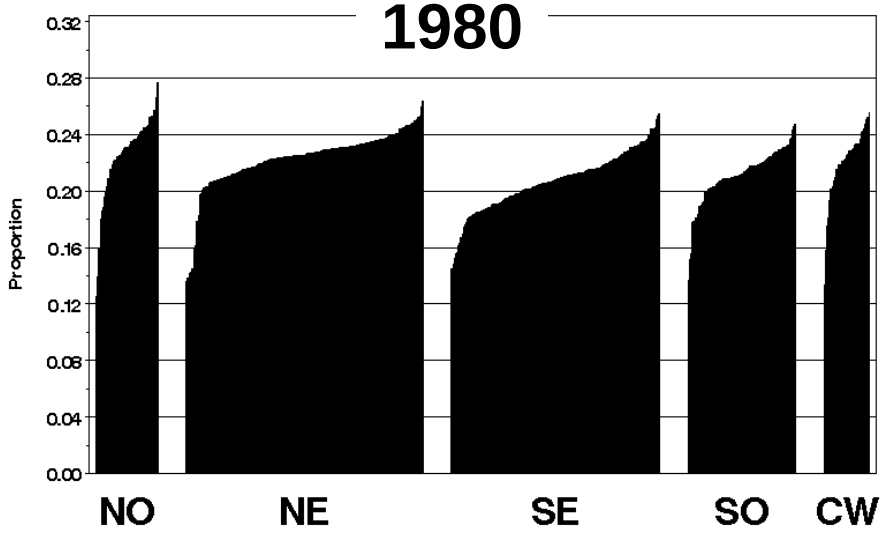


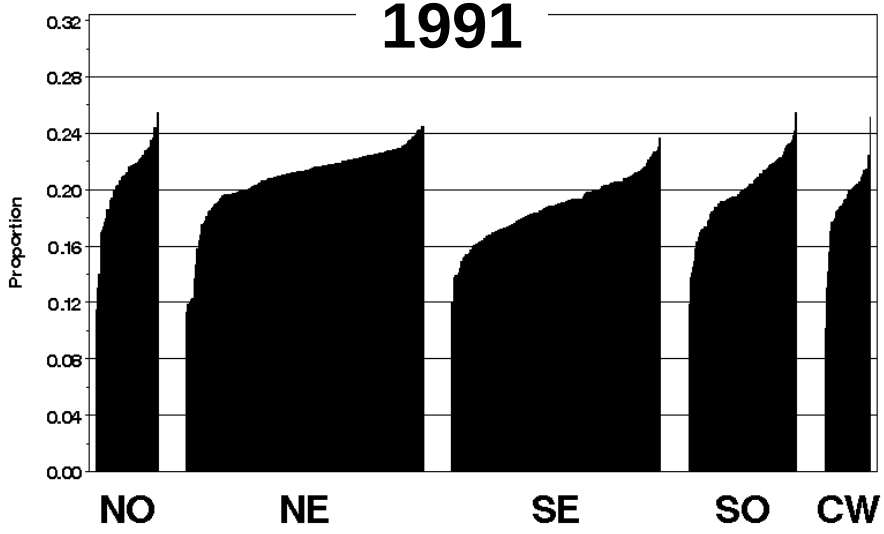


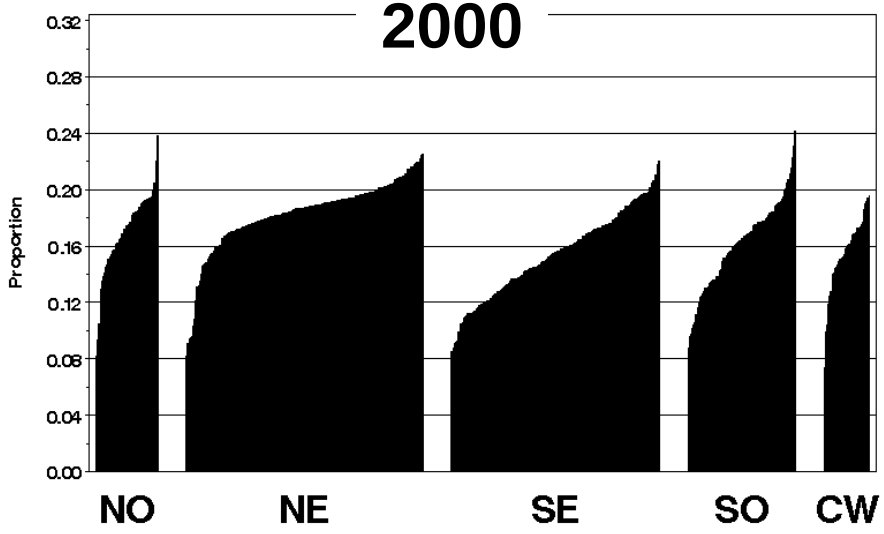


Proportion of Men with 35–49 Years of Age and 0–4 Years of Schooling in 502 Brazilian Micro-regions, 1970–2000 Censuses









Estimation of Models

- We rely on the variation in the distribution of males by age and education within each area, at a point in time, to identify the effects of interest (fixed-effects models).
- This approach is made possible by the differences across areas in the changes in the relative sizes of the cells.
- The dependent variable is the logarithm of the mean real income of male workers in a group.
- Equations estimated in this study are inverse demand functions, which indicate the impact of exogenous changes of the demand for labor on wage rates.

Main Models

- **OWN-EFFECTS: within each area (i), at each time (t), income is predicted by the proportion of people in each one of the age-education cells (c). Giving 12 regressions:**

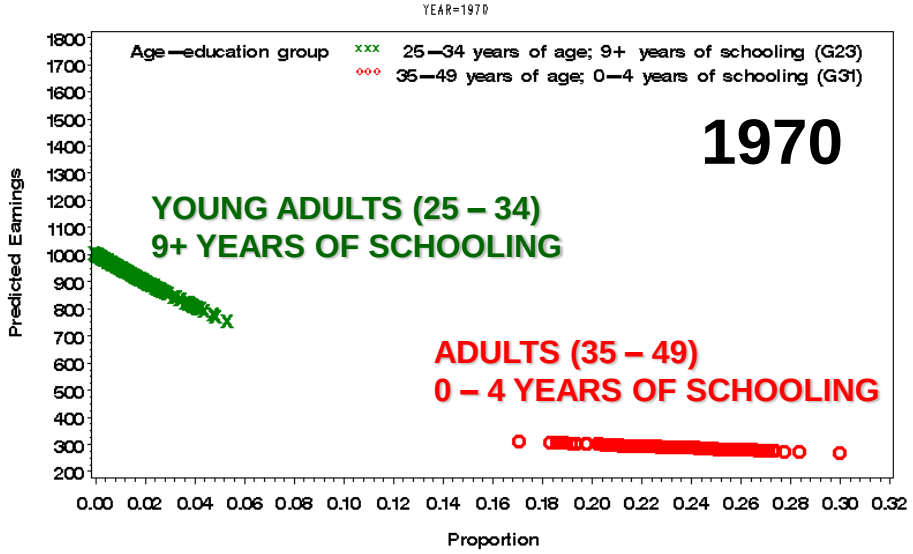
$$W_{itc} = \beta_0 + \beta_1 X_{itc} + \upsilon_i + \theta_t + \varepsilon_{itc}\ ,\ \ i = 1\ldots K;\ t = 1\ldots T$$

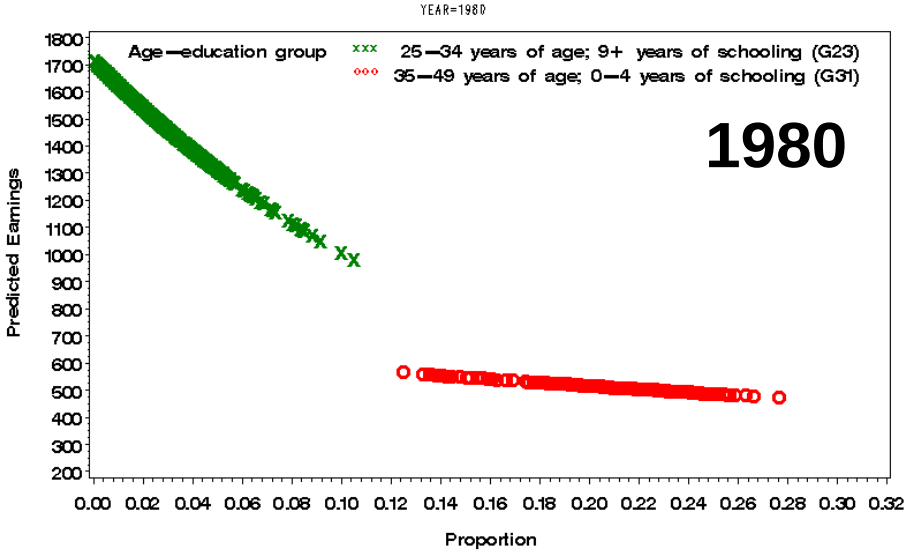
- **CROSS-EFFECTS: adding cross-proportions.**

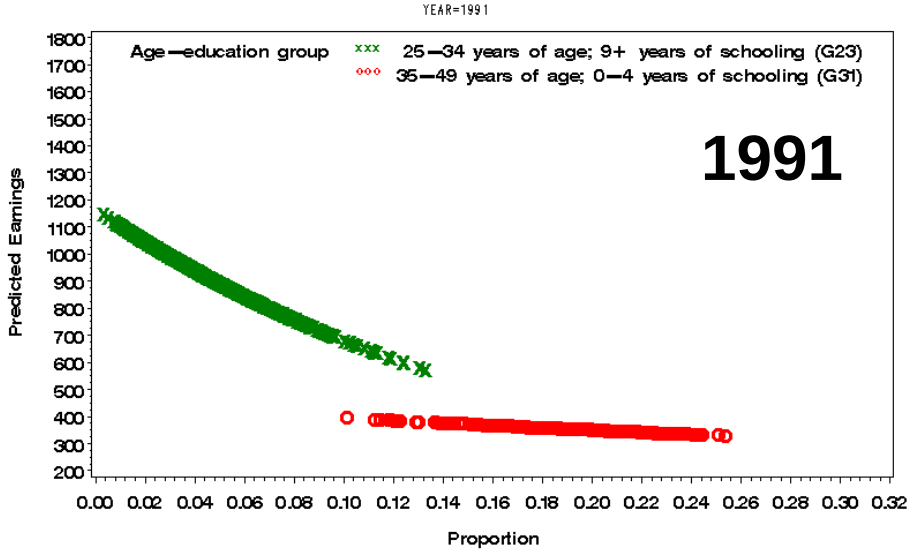
$$W_{itc} = \beta_0 + \beta_1 X_{itc} + \beta_2 X_{itc'} + \upsilon_i + \theta_t + \varepsilon_{itc}\ ,\ \ i = 1\ldots K;\ t = 1\ldots T$$

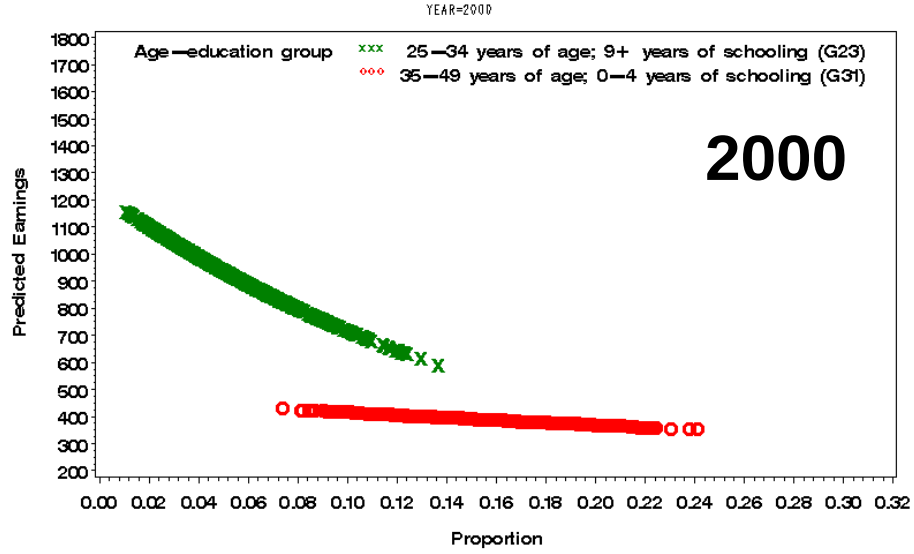
- **We also add interactions of proportions with three year indicators.**

Predicted Earnings from Own-Effects Model by Proportion of People in 502 Brazilian Micro-regions, 1970–2000









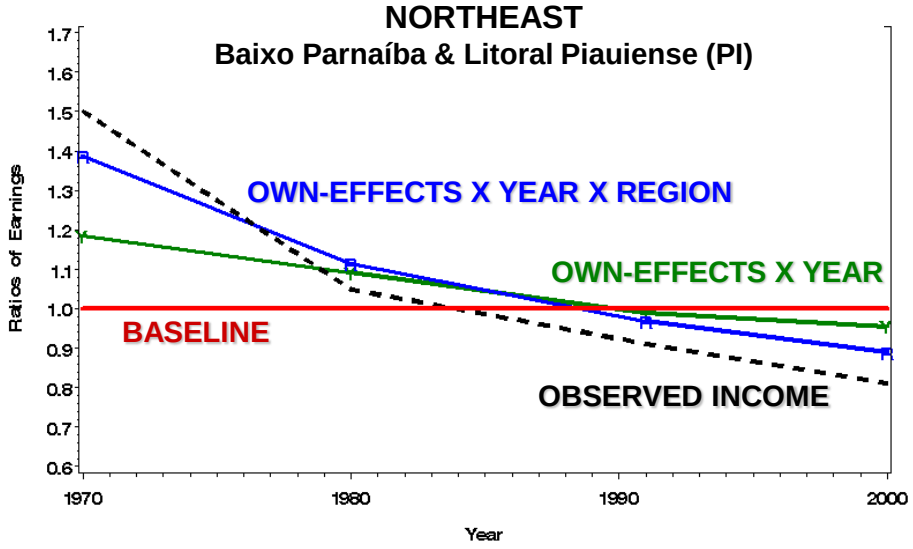
Extra Models

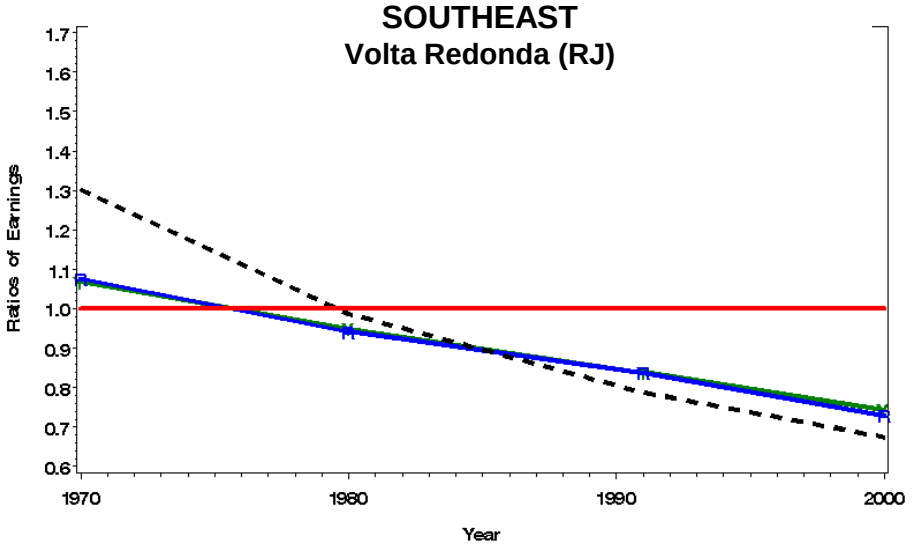
- Estimate models allowing for both time and area fixed effects.
- Add interactions of age-education proportions with micro-region-size indicators.
- Use female labor force participation and migration rate as dependent variables to measure their correlations with own-effect proportions.
- Include female distributions to allow for the cross-effects of their relative quantities on male relative wages.
- Utilize interactions of proportions with major-region indicators.

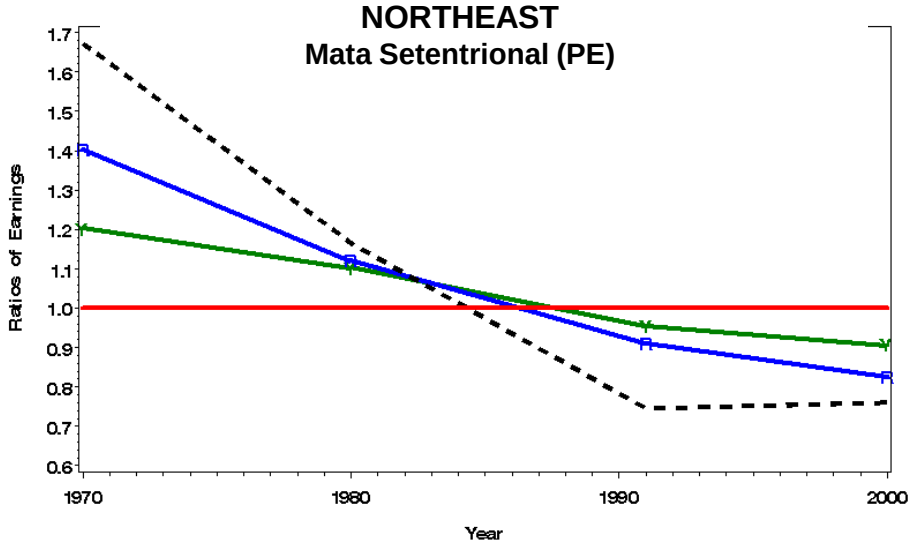
A Way to Graph the Results

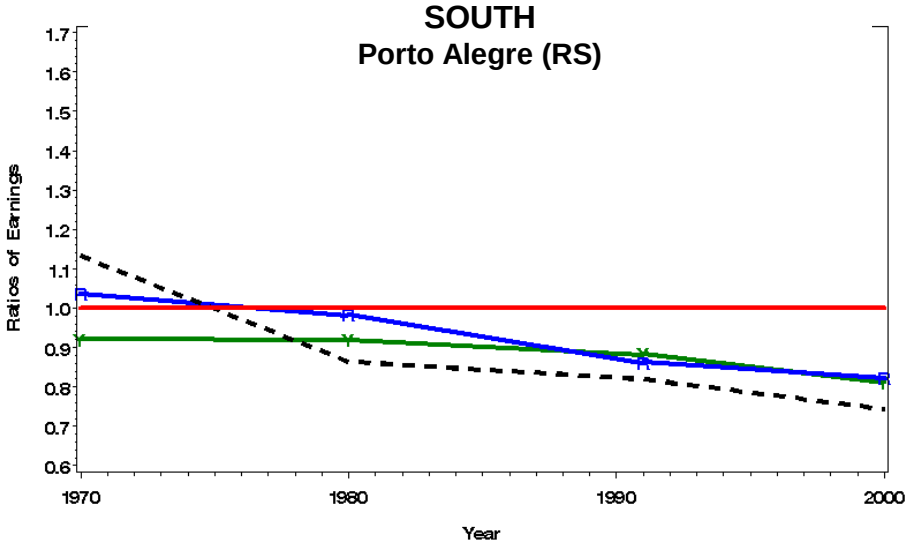
- Too many coefficients to look at.
- Calculate a simple model, containing just indicator variables for year and age-education group.
- For a given microregion and age-education group, we calculate ratios of the following earnings to those predicted by the simple model:
  - 1) Predicted earnings from model with Own-Effects X Year.
  - 2) Predicted values from model with Own-Effects X Year X Region.
  - 3) Observed earnings.

OWN-EFFECTS X YEAR X REGION
Adults (35–49), Medium Education (5–8), 1970–2000









Are Factor-prices Elasticities Robust?

- **Inter-micro-regional migration was ignored:**
  - **If we could control for the assumption that migrants move to areas with better job opportunities, the effects would have been even more negative than what was found.**
- **Marginal cost was specified as constant, because there is no information on the scale of production in each area:**
  - **If we could control for the assumption that more skilled workers are located in areas with better job opportunities, we would get even more negative elasticities for these groups.**

Conclusions and Implications

- **Relative group size matters with greatest negative impacts on income for groups with more years of education.**
- **The increasing relative scarcity of unskilled workers is no longer contributing to an increase in their relative earnings.**
- **Relative supply affects relative wages less than in the past, as implied by fewer negative numbers over time.**
- **Improvement in educational attainment and fertility decline were important factors to reduce economic inequality.**
- **Compositional approach of the labor force is fruitful to expand studies in this field of economic development.**

Following Work

- **Gravity models can be used to generate attraction and repulsion measures among micro-regions, in order to control for migration flows.**
- **Use of instrumental variables in order to estimate the predicted female economically active population, and to include women in both sides of the equations.**
- **We intend to test whether age and education groups in Mozambique are competitive in the labor market and present a negative pressure on their own wage.**