

Impact of mortality differentials by education level on pension wealth associated with the recent pension reform in Brazil

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Main objectives

- analyze the differential impact of life expectancy, associated with education, in the relationship between contribution and benefits in the Brazilian Public Pension Program
- compare different approaches
- estimate the value of Social Security Wealth (SSW) for different groups of workers considering differences in education and mortality levels
- contribute to the discussion of inequality in the recent pension reform.

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Why should em care?

- country is marked by large mortality differences - regional, social and educational levels
- income inequality, labor market inequality, different forms to receive retirement benefits
- pension system did not have a minimum retirement age until the 2019 reform - people could retire by years of contribution
- most people retiring under this scheme were in the upper level of the income distribution

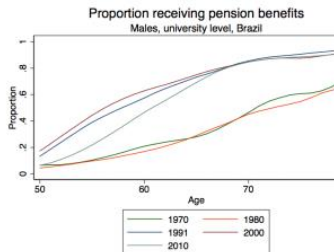
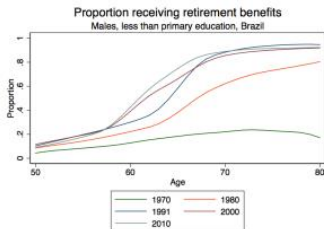
What do we know about it?

- Sanchez-Romero, et.al (2020) shows that US Social Security reduces regressivity from longevity differences, but would require group-specific life tables to achieve progressivity.
- Lee and Sanchez-Romero (2018) provide an overview of the relation between education/income and mortality and review the empirical literature on how such differences impact public transfers across socioeconomic groups
- NRC (2015) shows large effects of mortality differentials on lifetime public benefits

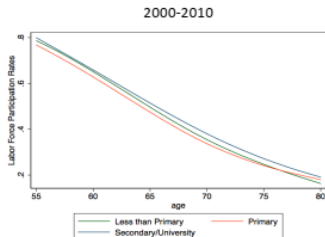
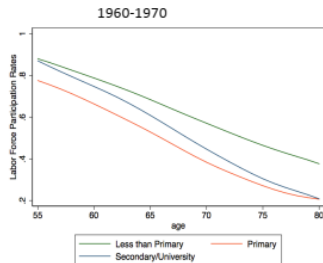
Data sources

- use PNAD data to estimate values of SSW
- mortality age profile obtain from Silva, Freire and Pereira (2016)
- Database from Brazilian pension program with rules and recent changes

Percentage individuals receiving benefits by age and educational level



Labor Force Participation by age and educational level



Use different strategies to study the problem

- followed Gruber and Wise (1999);
- calculate Social Security Wealth
- used PNAD 2017 to construct labor income and contribution age profiles
- mortality rates by educational level based on 2010 census

Social Security Wealth

- Social security wealth (SSW) is the present discounted value of the future benefits a person is entitled to receive upon retirement at a particular age

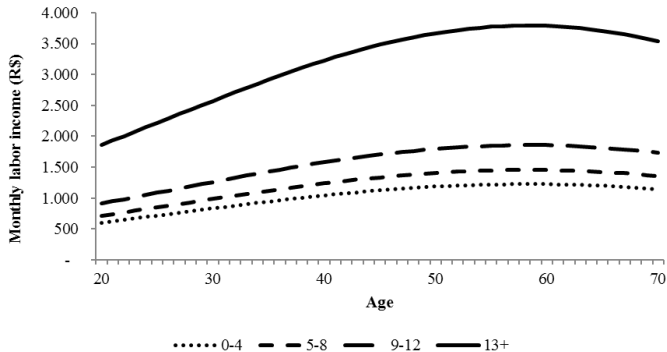
Social Security Wealth - computation

The social security wealth of a worker aged S and who is planning to retire at age R , is calculated as follows in equation 1:

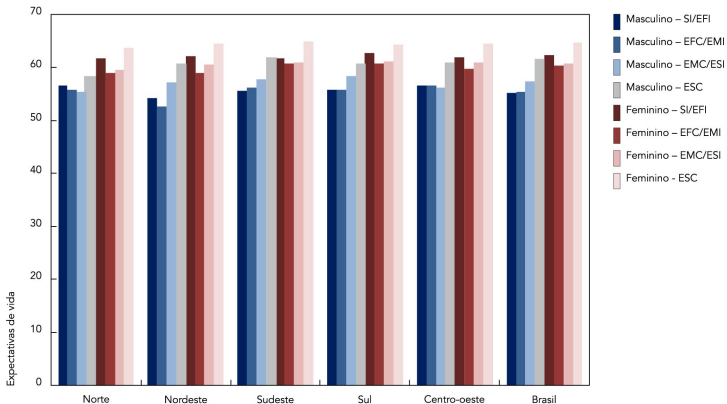
$$SSW_S(R) = \sum_{t=R}^{\infty} YPEN_t(R) \cdot a(s)_t \cdot \sigma^{t-S} - \sum_{t=S}^{R-1} c_t \cdot YLAB_t \cdot a(s)_t \cdot \sigma^{t-S} \quad (1)$$

where SSW = social security wealth, S = planning age, R = retirement age, $YLAB_t$ = labor income at age t , $YPEN_t(R)$ = pension income at age t for retirement at age R , c_t = contribution rate to pension at age t , $a(s)_t$ = probability of survival at least until age t given survival until age S , and σ = discount factor ($1/(1+r)$).

Income Age Profile by educational level



Life expectancy at age 15, by educational level



Fonte: Instituto Brasileiro de Geografia e Estatística (Censo Demográfico de 2010; <http://www.ibge.gov.br>).

SI/EFI: sem instrução e Ensino Fundamental incompleto; EFC/EMI: Ensino Fundamental completo e Ensino Médio incompleto; EMC/ESI: Ensino Médio

Situating Brazil in the Gruber and Wise study

Situating older regime in international contexto
(2015 for Brazil em 1999 for other countries)

Countries	Ret. Age	REPL60	ACCRATE (%)	TAXR60
Belgium	60	77	-5,6	82
France	60	91	-7,0	80
Italy	55	75	-5,8	81
Netherland	60	91	-12,8	141
United Kingdom	60	48	-10,0	75
Germany	60	62	-4,1	35
Spain	60	63	4,2	-23
Canada	60	20	-1,0	8
USA	62	41	0,2	-1
Sweden	60	54	-4,1	28
Japan	60	54	-3,9	47
Brazil – Regra 85/95	60	95	-1,1	36
Brazil – fator previdenciário	60	95	6	-173

Ratio of SSW due to mortality and educational levels

Age	More Educated	Less Educated
65	1,15	0,87

Concluding remarks

- The results indicate that the difference between contributions and benefits is large
- people pay less in contributions than they receive in benefits, and this difference is accentuated with a higher level of education among workers
- minimum age requirement for benefit is a good measure for the short term, but not effective in the long term.
- minimum age does not consider the differentials of the population and therefore does not follow the evolution of life expectancy over time
- creates heterogeneous incentives according to worker's characteristics such as the case of mortality differentials. The system's heterogeneity is also observed for workers with different periods of contribution to the system and earnings histories.

Obrigado

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