

Implications for Public Policies from Changes in Age-Education Composition

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Background

- **Demographic dividend literature has been studying impact of decreasing dependency ratio on economic development.**
- **In Brazil, age and education composition of the labor force is changing with great regional variation.**
- **“Baby boom” studies suggest that large cohorts in the U.S. depressed earnings, and effects increased with education.**
- **Our previous models estimated whether these compositional shifts have had an effect beyond the studies conducted by demographic dividend studies.**

Previous Results

- **The impact of distribution of male population in age-education groups on earnings is changing over time.**
- **The small proportional size of the least-educated groups do not have a significant impact on their earnings in more recent years.**
- **For better educated groups, the negative impact has been increasing over time with slight variations in more recent years.**
- **Compositional approach of the labor force is fruitful to expand studies in this field of economic development.**

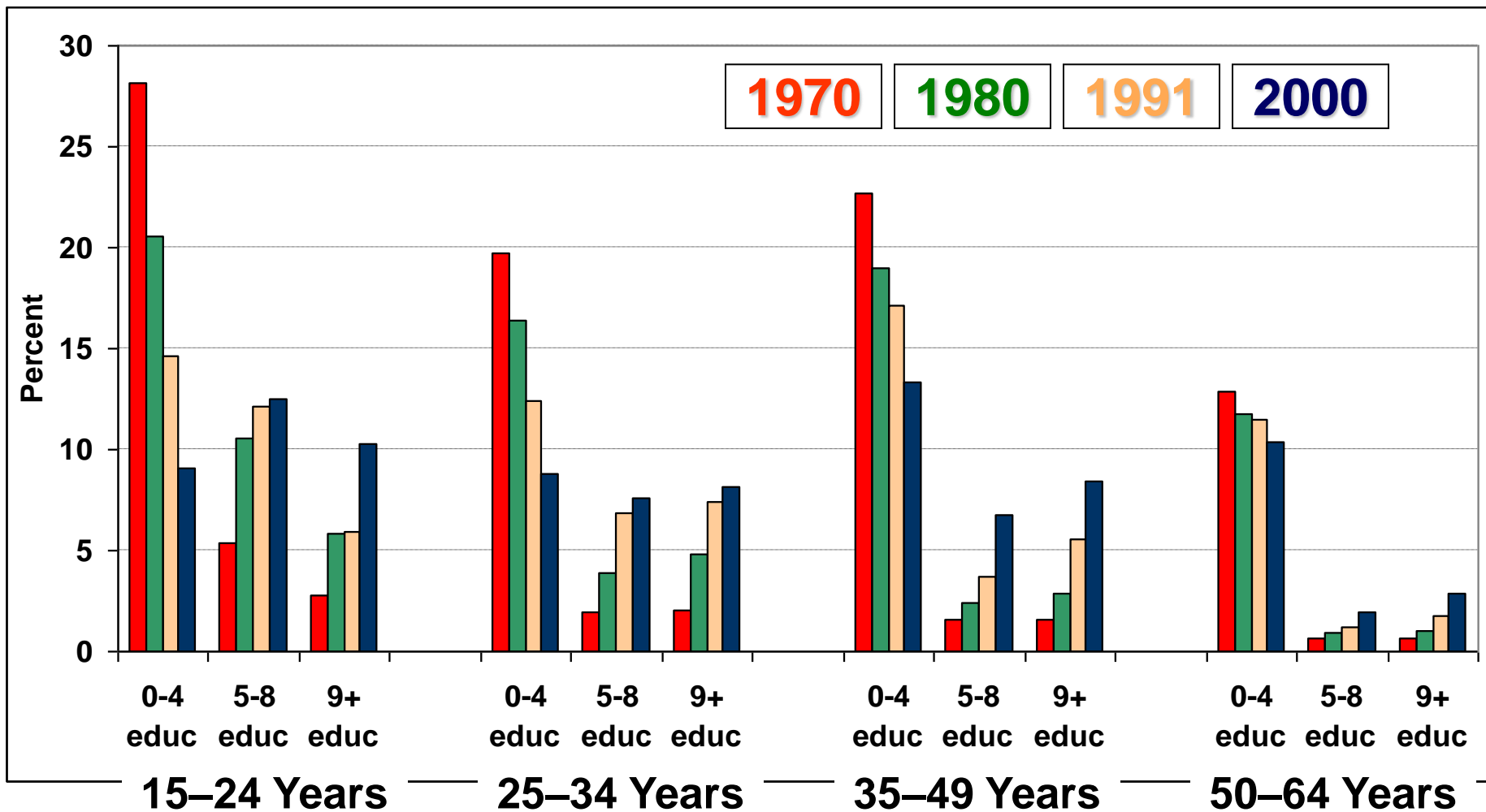
Some New Analysis

- **Some consideration should be given to the implications of public policies originating from our previous analysis.**
- **In order to measure the separated influence of age and education changes on earnings, a decomposition of these impacts was conducted.**
- **Gini coefficients are estimated in order to measure the inequality of the income distribution among age-education groups.**
- **Racial differentials in male population distribution and earnings by age-education groups are taken into consideration.**

Brazilian Censuses and Model Estimation

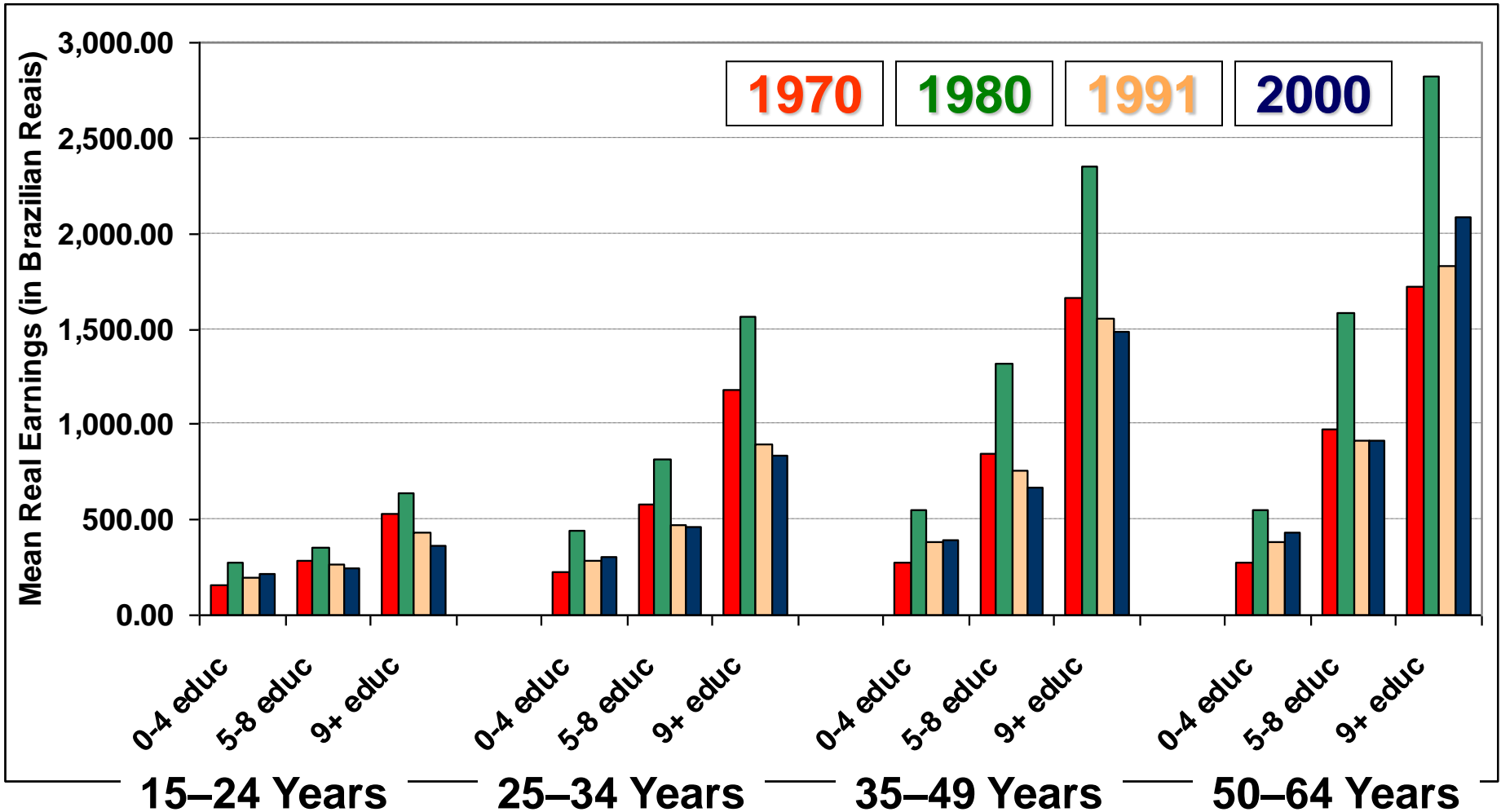
- Four age groups: 15–24, 25–34, 35–49, and 50–64.
- Three education groups: 0–4, 5–8, 9+.
- Fixed effects for 502 micro-regions (groups of municipalities) in each census (1970, 1980, 1991, 2000).
- Proportion of men in each one of the 12 age-education groups for each micro-region and year.
- Dependent variable is the logarithm of the mean real income of male workers in a group.
- Equation (1'): 11 dummies of age-education groups, 12 proportions of men in each age-education group, 69 interactions of three year dummies with groups and proportions, and 2008 fixed effects for areas*years.

Distribution of Male Population by Year and Age-Education Group in Brazil, 1970–2000



Source: 1970–2000 Brazilian Censuses.

Mean Real Earnings by Year and Age-Education Group in Brazil, 1970–2000

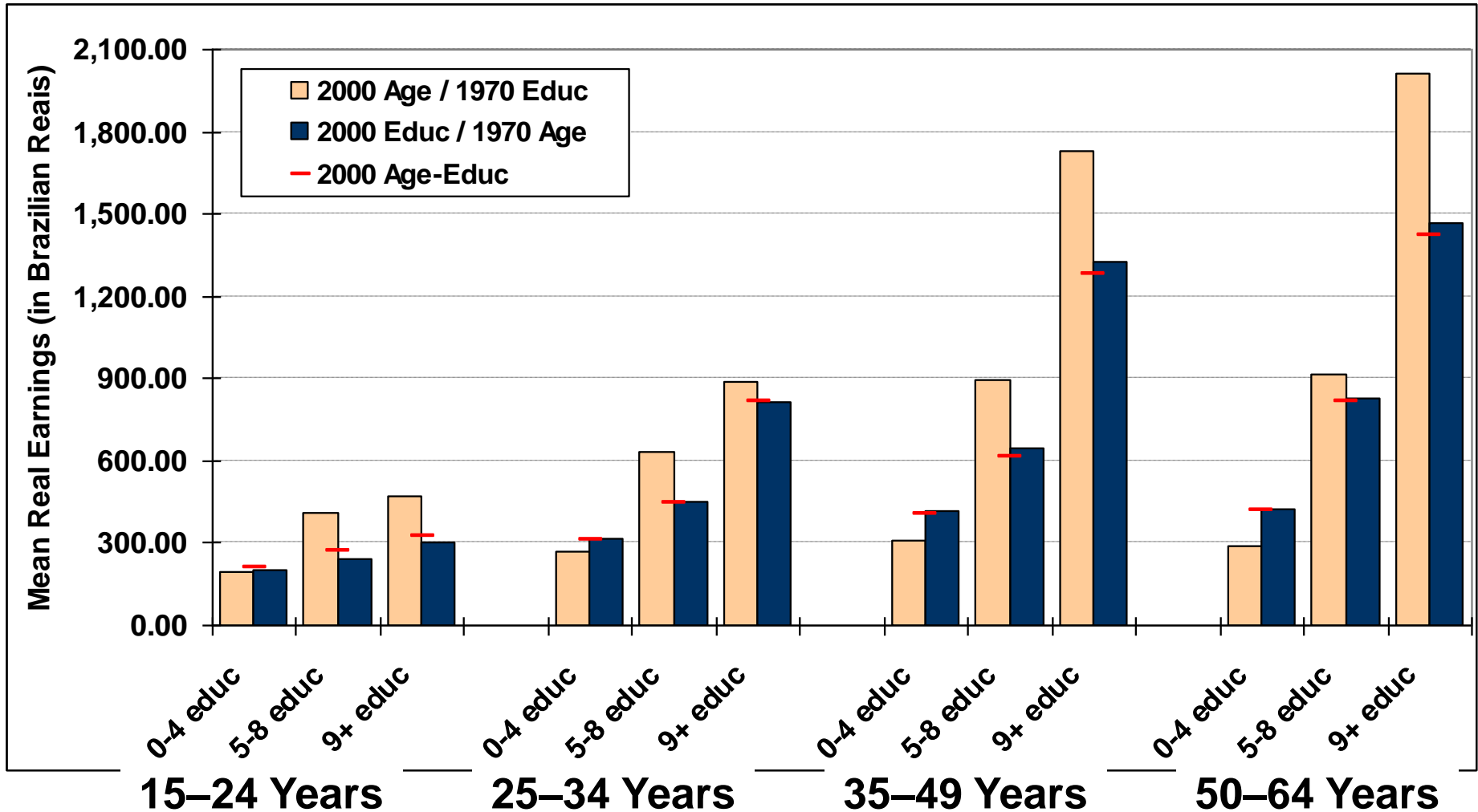


Source: 1970–2000 Brazilian Censuses.

Decomposition of Age and Education Impacts on Earnings

- **National proportions of males by age-education groups in 1970 and 2000 were used to generate two new sets of national proportions:**
 - Age composition constant from 1970 to 2000.
 - Education composition constant from 1970 to 2000.
- **The original and new compositions were used to forecast sets of earnings using coefficients from Equation (1'):**
 - 2000 earnings, using 2000 age-education structure.
 - 2000 earnings, using 2000 education and 1970 age structure.
 - 2000 earnings, using 2000 age and 1970 education structure.

Mean Real Earnings by Different Age and Education Distributions, 2000



Source: 1970-2000 Brazilian Censuses.

Inequality of Income Distribution Among Age-Education Groups

- **Gini coefficients were calculated for income variations among the following population distributions:**
 - **Original 1970 age-education distribution.**
 - **Original 2000 age-education distribution.**
 - **Age composition constant from 1970 to 2000.**
 - **Education distribution constant from 1970 to 2000.**

Estimated Gini Coefficients

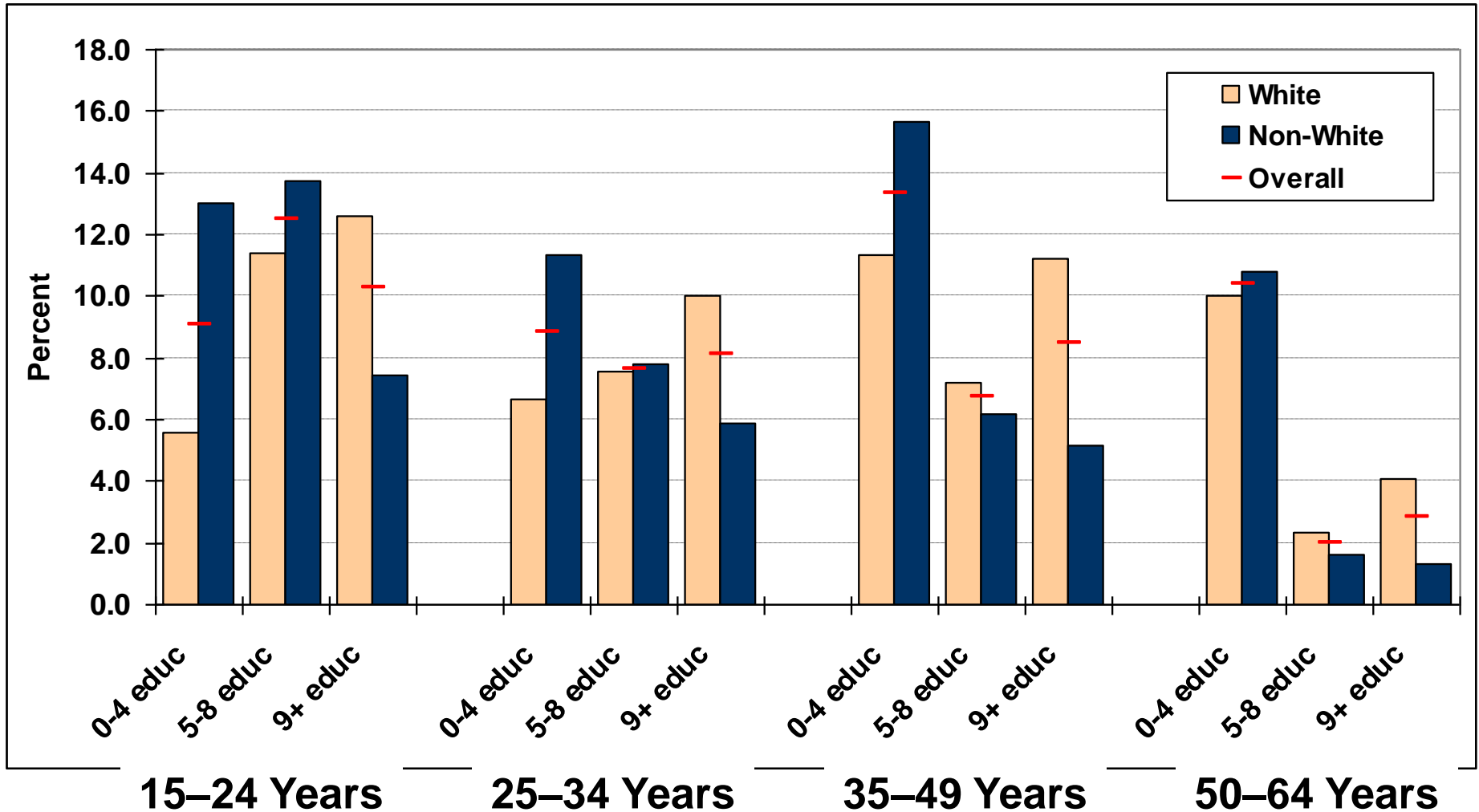
Group Order	1970	2000	1970 Age & 2000 Education	1970 Education & 2000 Age
Age-Educ	0.547	0.411	0.459	---
Educ-Age	0.813	0.414	---	0.783

- **Results indicate that the income inequality decreased from 1970 to 2000 among the groups.**
- **If the age composition had remained the same from 1970 to 2000, Gini would have had a smaller decrease (from 0.547 to 0.459).**
- **In the case of keeping the education composition constant from 1970 to 2000, Gini would have had an even smaller decrease (from 0.813 to 0.783).**

Male Population Distribution and Earnings by Race

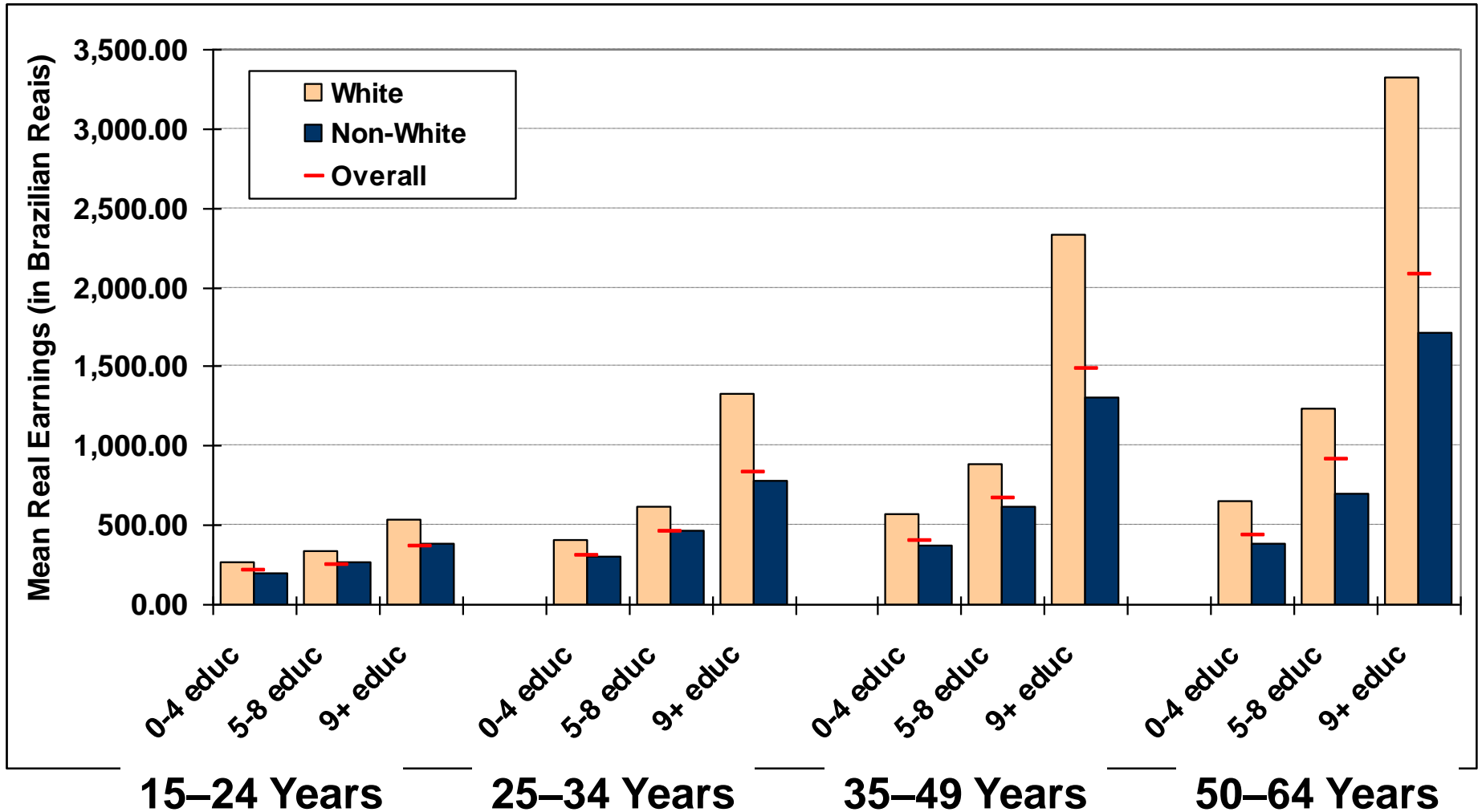
- An important aspect of the Brazilian economy is related to the difference in the male population distribution in age-education groups by race.
- “Color/Race” variable from 1980–2000 Censuses is grouped in Non-White (Black and Brown) and White.
- Yellow (Asians) and Indigenous are not included, since they are a small proportion of population (0.49% and 0.42% in 2000, respectively).

Distribution of Male Population by Race and Age-Education Group in Brazil, 2000



Source: 2000 Brazilian Census.

Mean Real Earnings by Race and Age-Education Group in Brazil, 2000



Source: 2000 Brazilian Census.

Conclusions

- **Improvements in educational attainment from 1970 to 2000 were important factors in reducing economic inequality:**
 - Rise of workers with better education lowered their income.
 - Reduction of workers with lowest education avoided an even lower income for these groups.
- **Fertility decline had a central role in the reduction of income inequality in Brazil:**
 - Smaller proportion of younger groups in the labor market improved their earnings.
 - Population aging also had an important impact in decreasing inequality.

Implications

- **Important policies to further decrease income inequality in the country would have to:**
 - **Improve education attainment in areas that still have large proportions of people with lower levels of schooling.**
 - **Promote family planning programs in regions that still have higher levels of fertility.**

- **Public policies would have to take into account that changes in age-education composition has been occurring in different levels for non-whites compared to whites:**
 - **Non-whites present slower fertility decline, slower improvements in educational attainment, as well as lower earnings.**