

Economic sector, demographic composition, educational attainment, and earnings in Brazil

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Objective

- Brazil has been experiencing major changes
 - Population aging
 - Educational improvement
 - Increase of workers in the formal economic sector
 - Oscillation of earnings by economic sector
- Do changes in demographic, educational, and economic sector compositions affect earnings over time?
 - Estimate associations of individual- and area-level variables with individual earnings of male workers



Previous studies

- Brazil still experiences a high rate of jobs in the informal economic sector, which is a challenge to the economy
(Ulysea 2005; Ramos 2002; Mello, Santos 2009; Barbosa Filho, Moura 2015; Botelho, Ponczek 2011; Carneiro, Henley 2001)
- Most self-employed workers in Brazil have low education, evade tax, and are unlikely to employ other people or expand their businesses (Narita 2013; Botelho, Ponczek 2011; Bargain, Kwenda 2014)
- Informal firms are small and less productive businesses with low per capita income (Barros, Ulysea 2010)
- Previous analyzes have mixed results about whether workers in formal jobs receive higher wages than in informal jobs, controlling for their productivity

1980, 1991, 2000, 2010 Censuses

- Dependent variable
 - Natural logarithm of individual earnings of Brazilian male workers on primary occupation
- Independent variables
 - 16 age-education indicators (G)
 - Age: 15–24, 25–34, 35–49, 50–64
 - Education: less than primary, primary, secondary, university
 - Distribution of the male population in 16 age-education groups for 502 areas (X_{ga})
 - Controls: race/color, marital status, religion, region



OLS models

1. Binary variable for economic sector (*Formal*)

$$\log(Y_i) = \beta_0 + \beta_1 G_i + \beta_2 X_{ga} + \beta_3 \text{Formal}_i + \varepsilon_i$$

2. Proportion of formal workers by area (P_a)

$$\log(Y_i) = \beta_0 + \beta_1 G_i + \beta_2 X_{ga} + \beta_3 P_a + \varepsilon_i$$

3. Interaction of sector and age-education group (I)

$$\log(Y_i) = \beta_0 + \beta_1 G_i + \beta_2 X_{ga} + \beta_3 \text{Formal}_i + \beta_4 I_i + \varepsilon_i$$

4. Only formal economic sector

$$\log(Y_i) = \beta_0 + \beta_1 G_i + \beta_2 X_{ga} + \varepsilon_i$$

5. Only informal economic sector

$$\log(Y_i) = \beta_0 + \beta_1 G_i + \beta_2 X_{ga} + \varepsilon_i$$

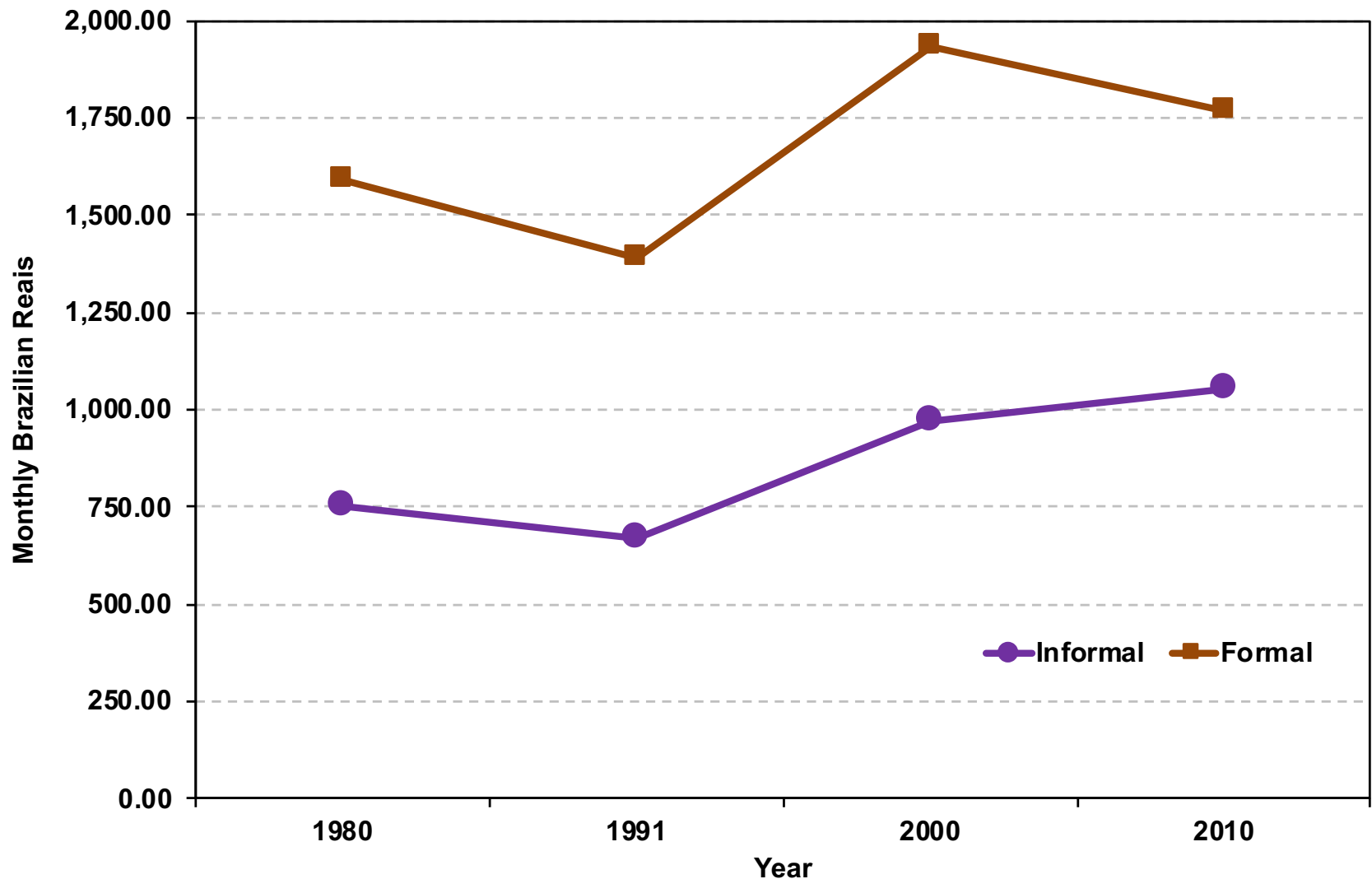
Description of sample

Year	Informal economic sector (%)	White (%)	Married (%)	Protestant (%)	Sample size
1980	22.7	61.6	56.3	5.9	4,309,110
1991	30.8	56.2	66.8	7.9	2,775,824
2000	40.9	57.8	48.7	13.5	3,305,805
2010	33.5	51.0	43.2	20.3	3,708,484

- We analyze only males in urban areas



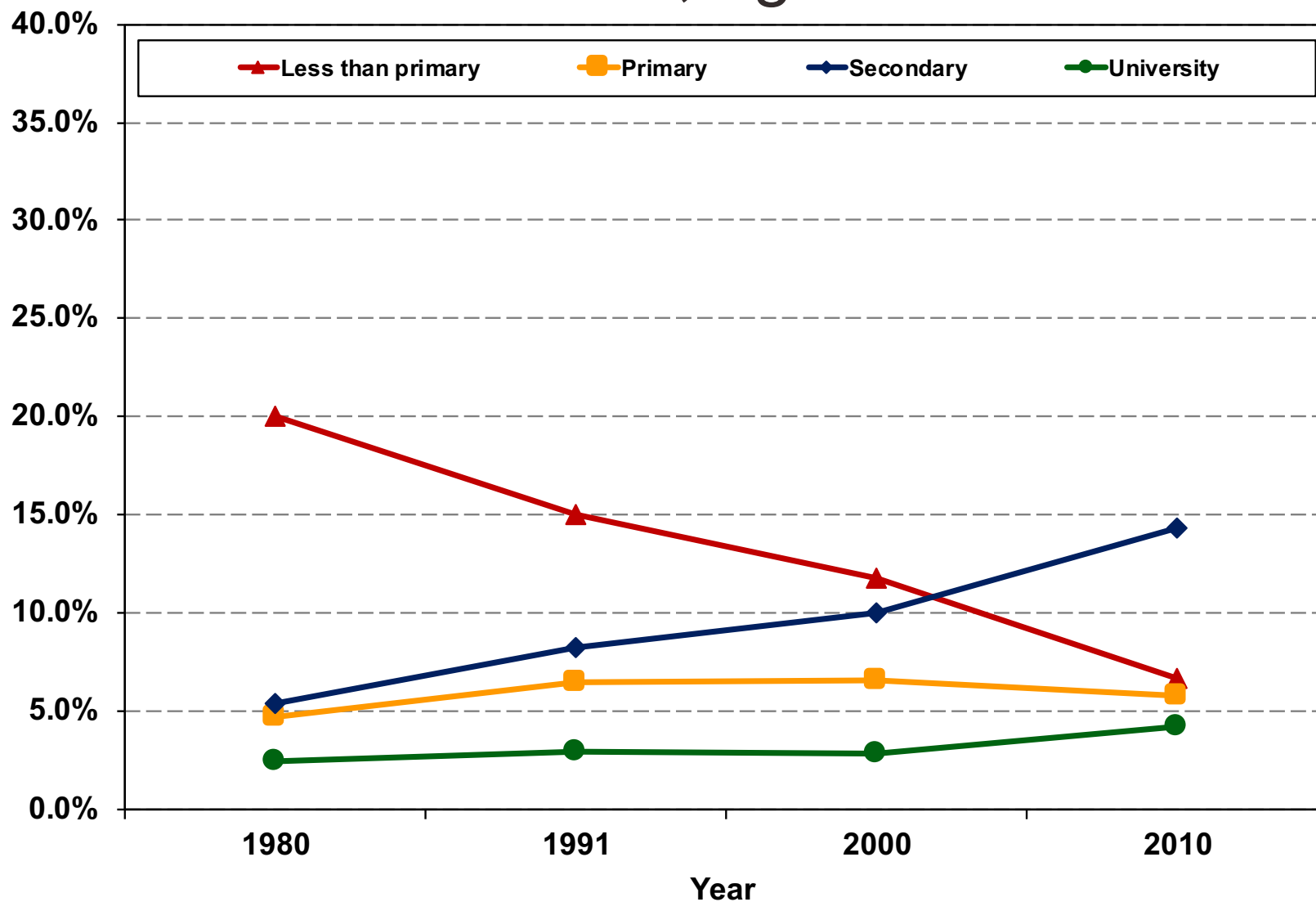
Real earnings by economic sector



Source: 1980, 1991, 2000, and 2010 Brazilian Demographic Censuses.

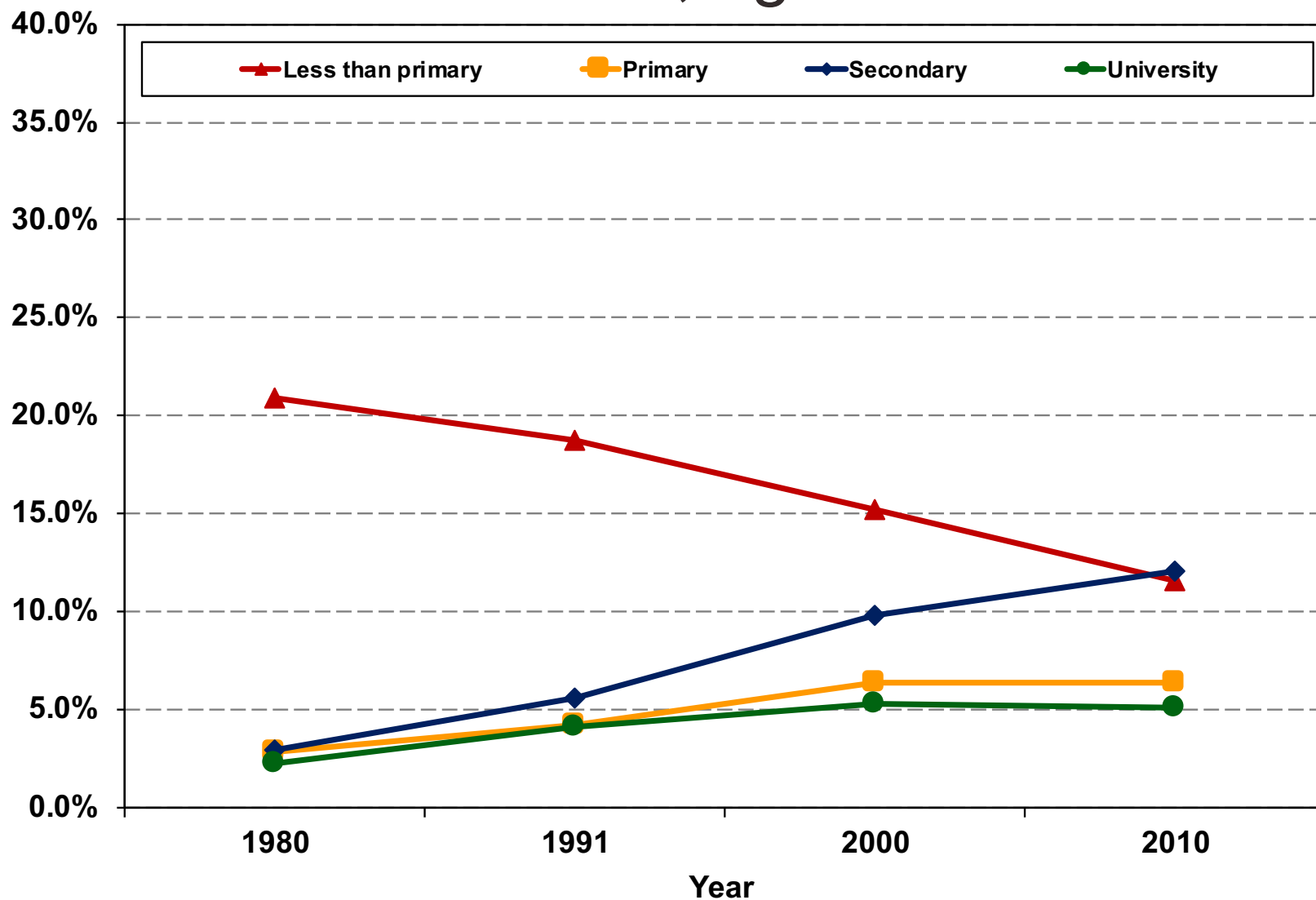
Male age-education composition

Formal sector, age 25–34



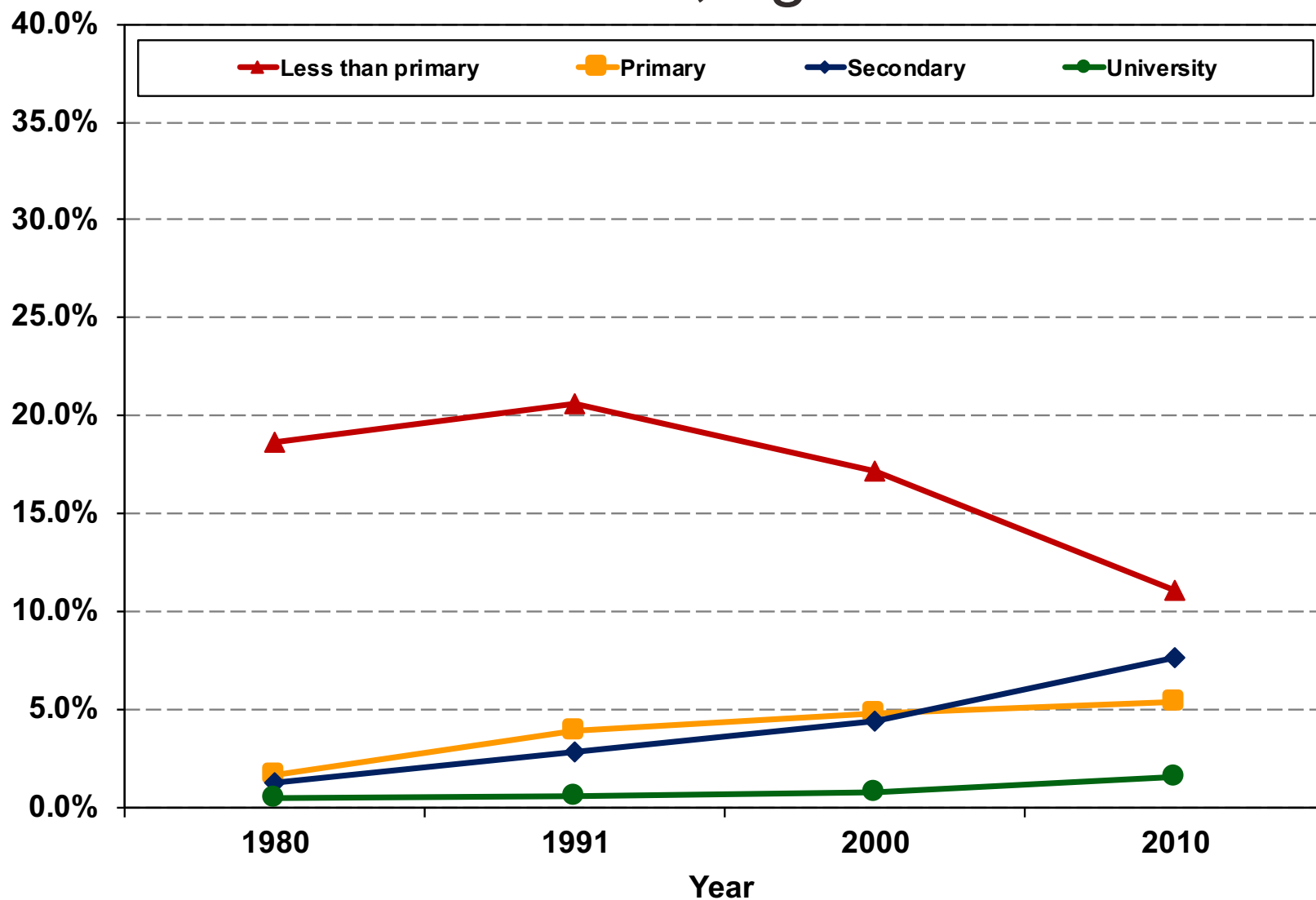
Male age-education composition

Formal sector, age 35–49



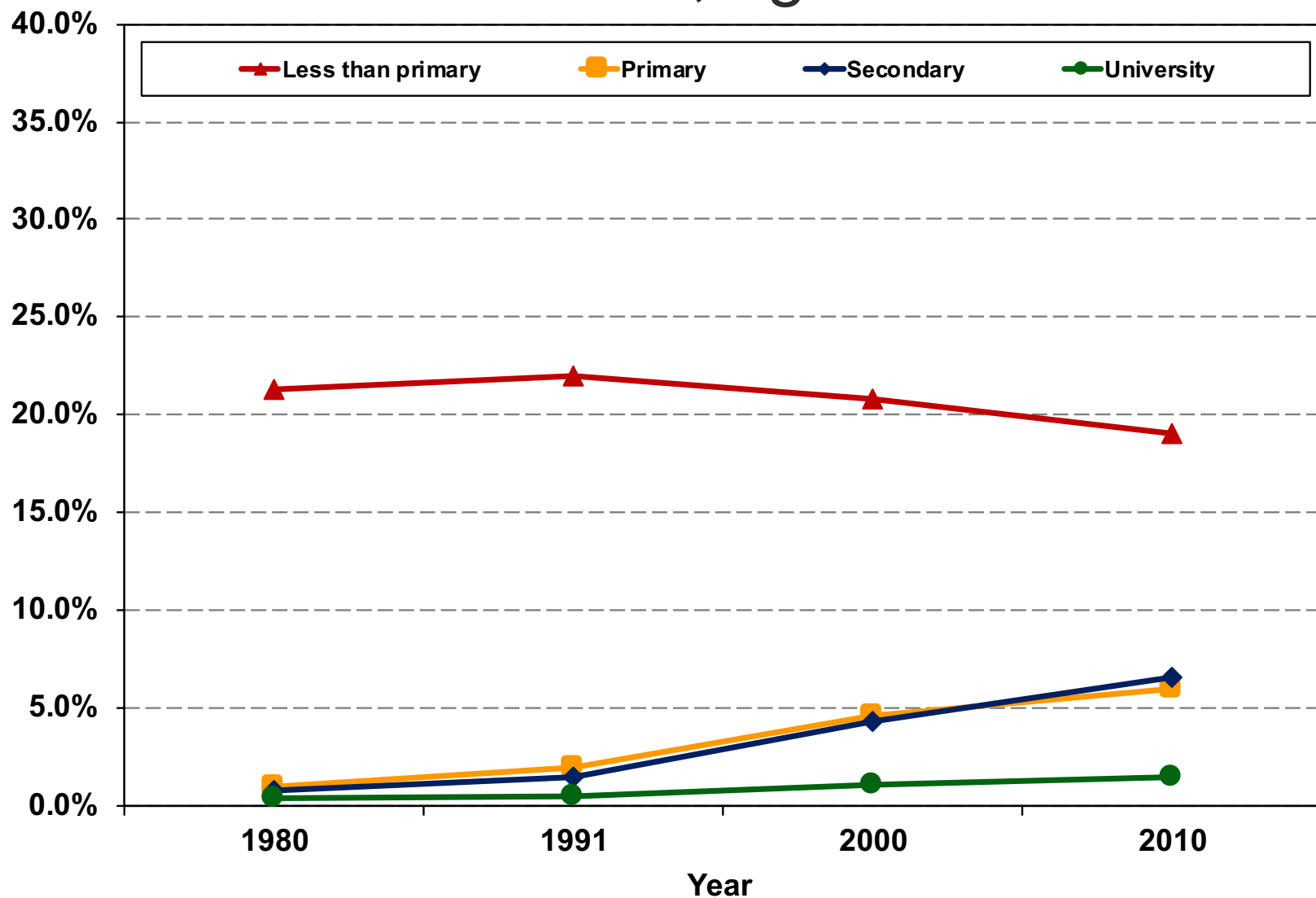
Male age-education composition

Informal sector, age 25–34



Male age-education composition

Informal sector, age 35–49

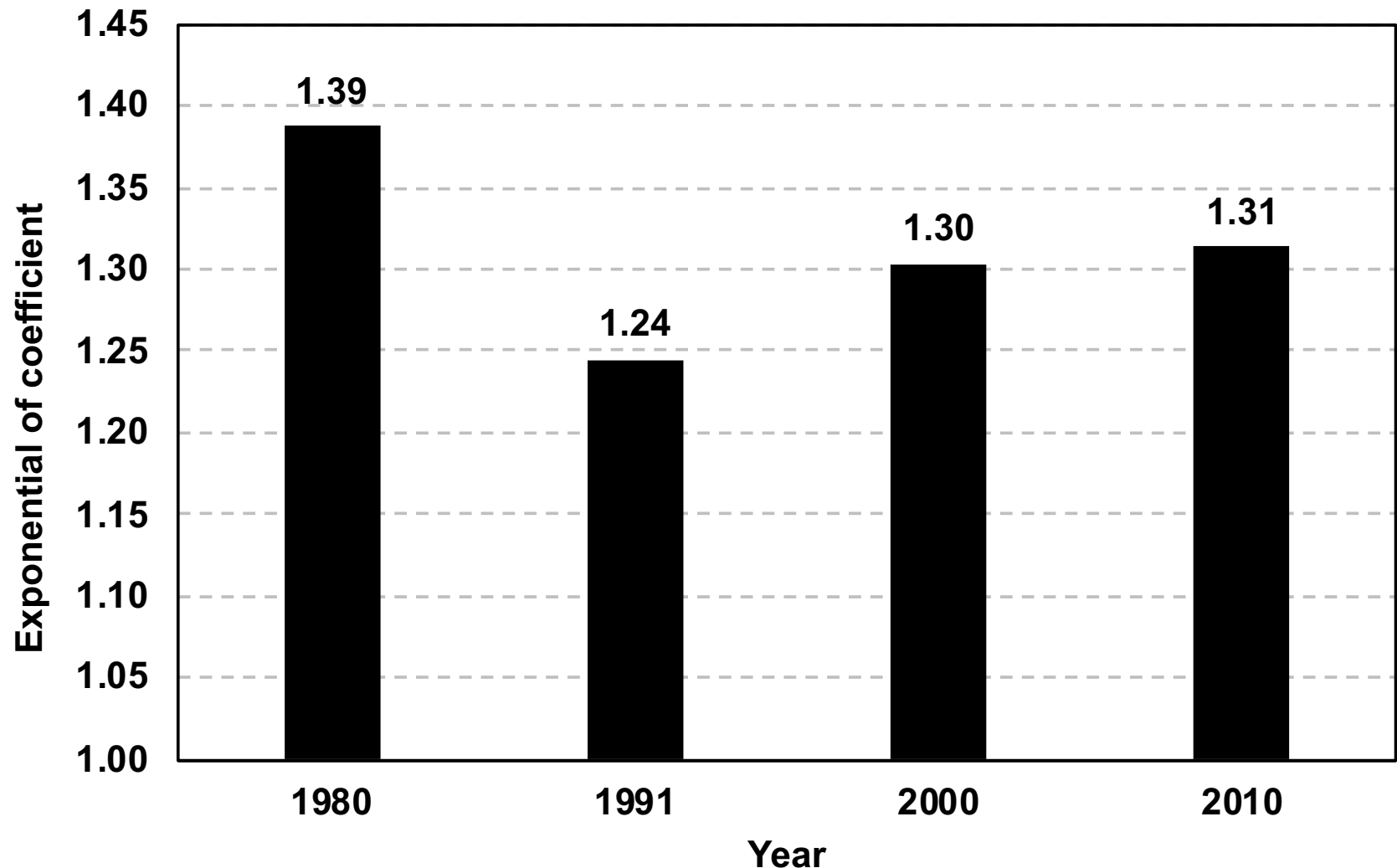


Model results

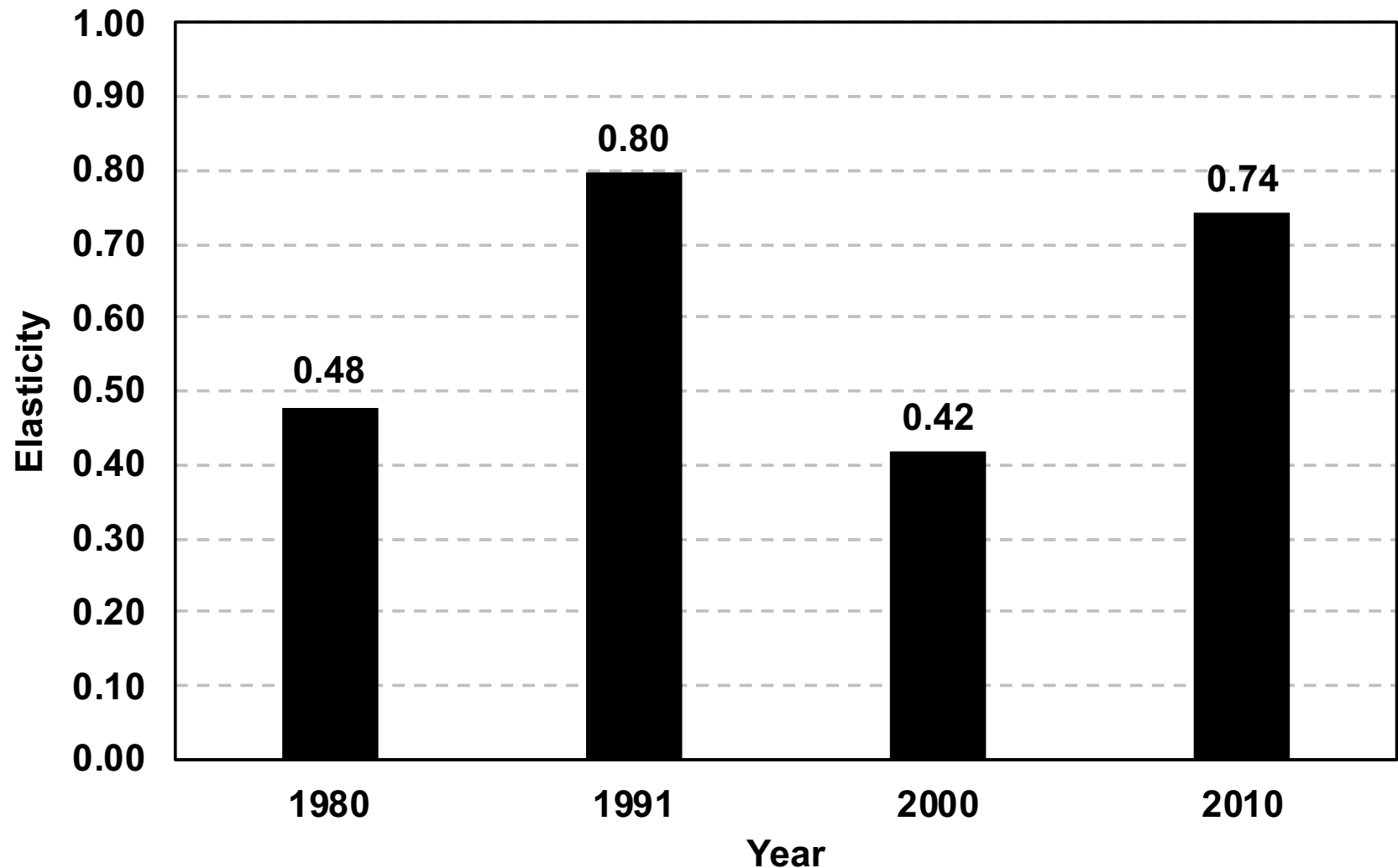
- Higher earnings: older, better educated, white, married, non-Protestant, South, and Center-West regions
- Proportions of people in age-education groups tend to have negative associations with earnings
 - Mostly among older workers and those with secondary education
- Now focus on results about economic sector...



Equation 1: Formal vs. Informal

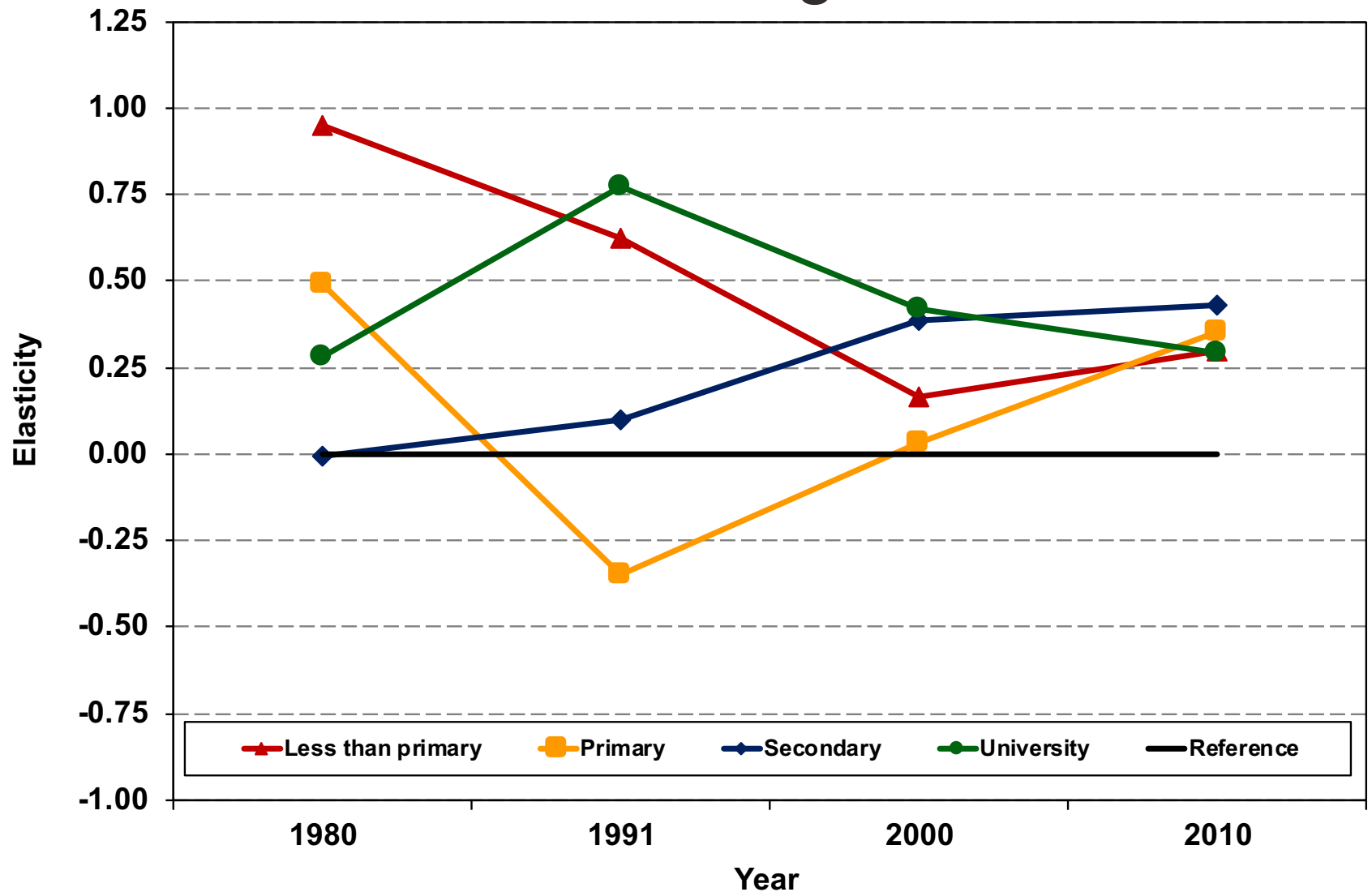


Equation 2: Effects of proportion in the formal sector (P_a)



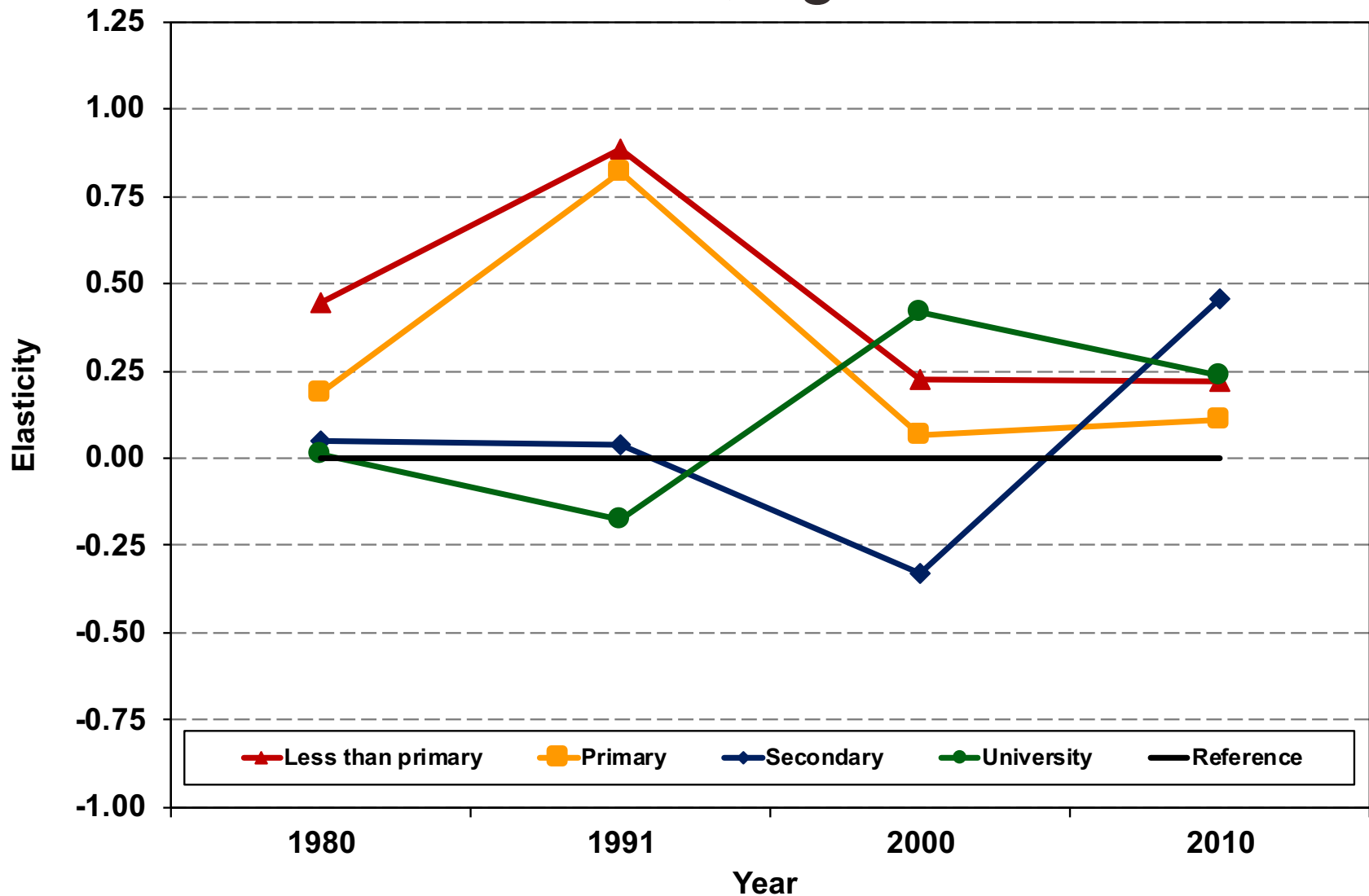
Equation 4: Effects of group proportions (X_{ga})

Formal sector, age 25–34



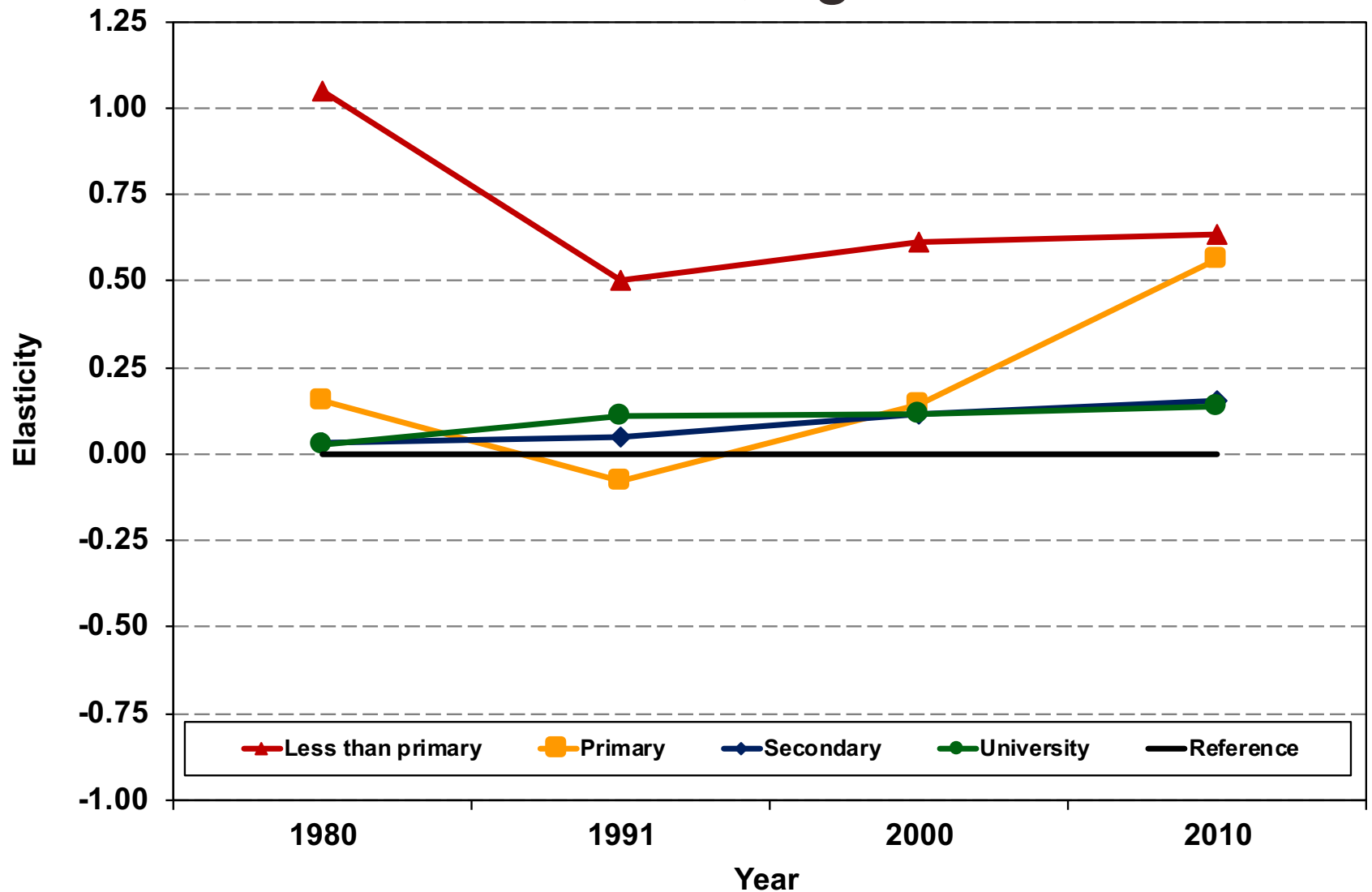
Equation 4: Effects of group proportions (X_{ga})

Formal sector, age 35–49



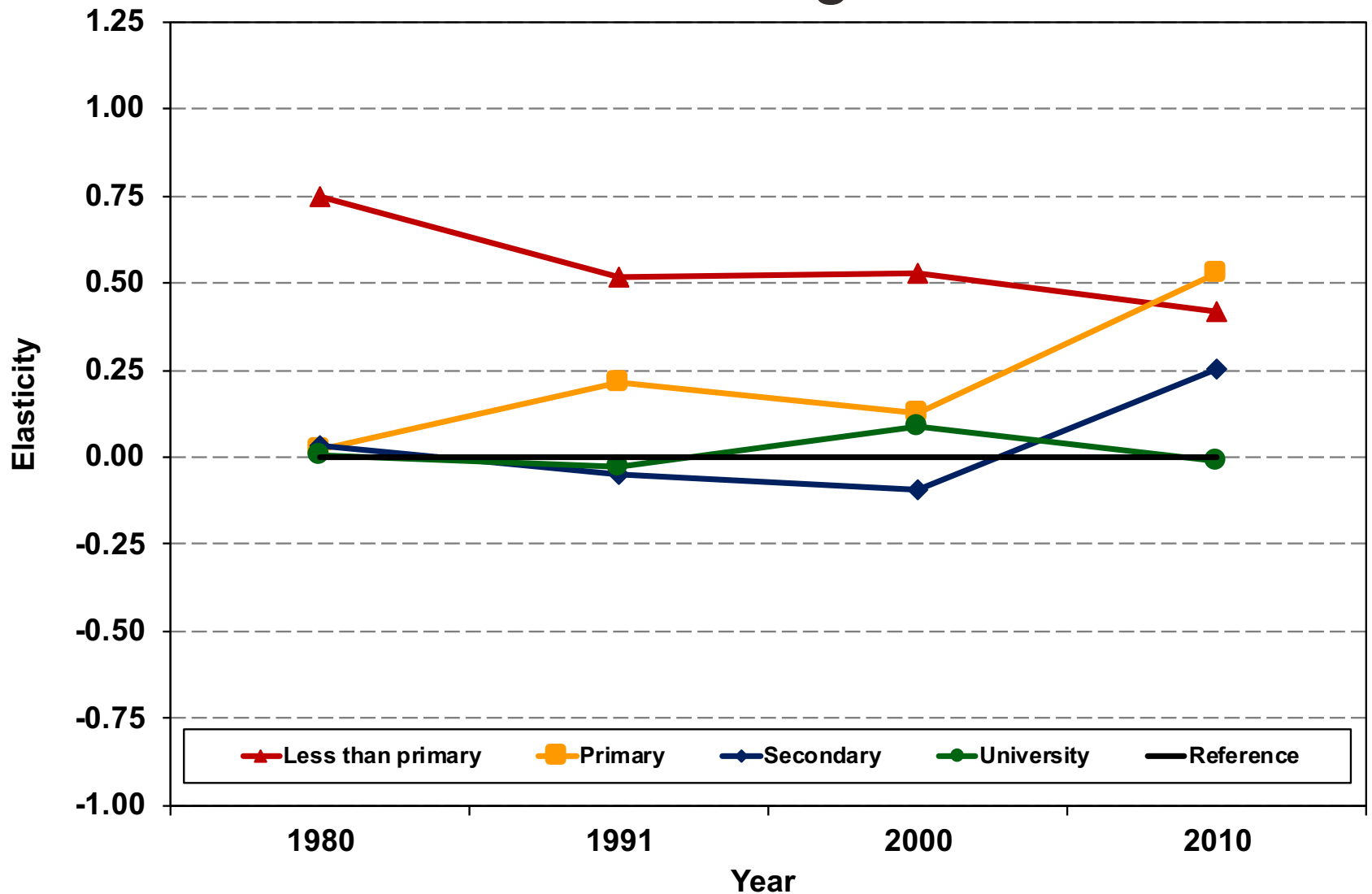
Equation 5: Effects of group proportions (X_{ga})

Informal sector, age 25–34



Equation 5: Effects of group proportions (X_{ga})

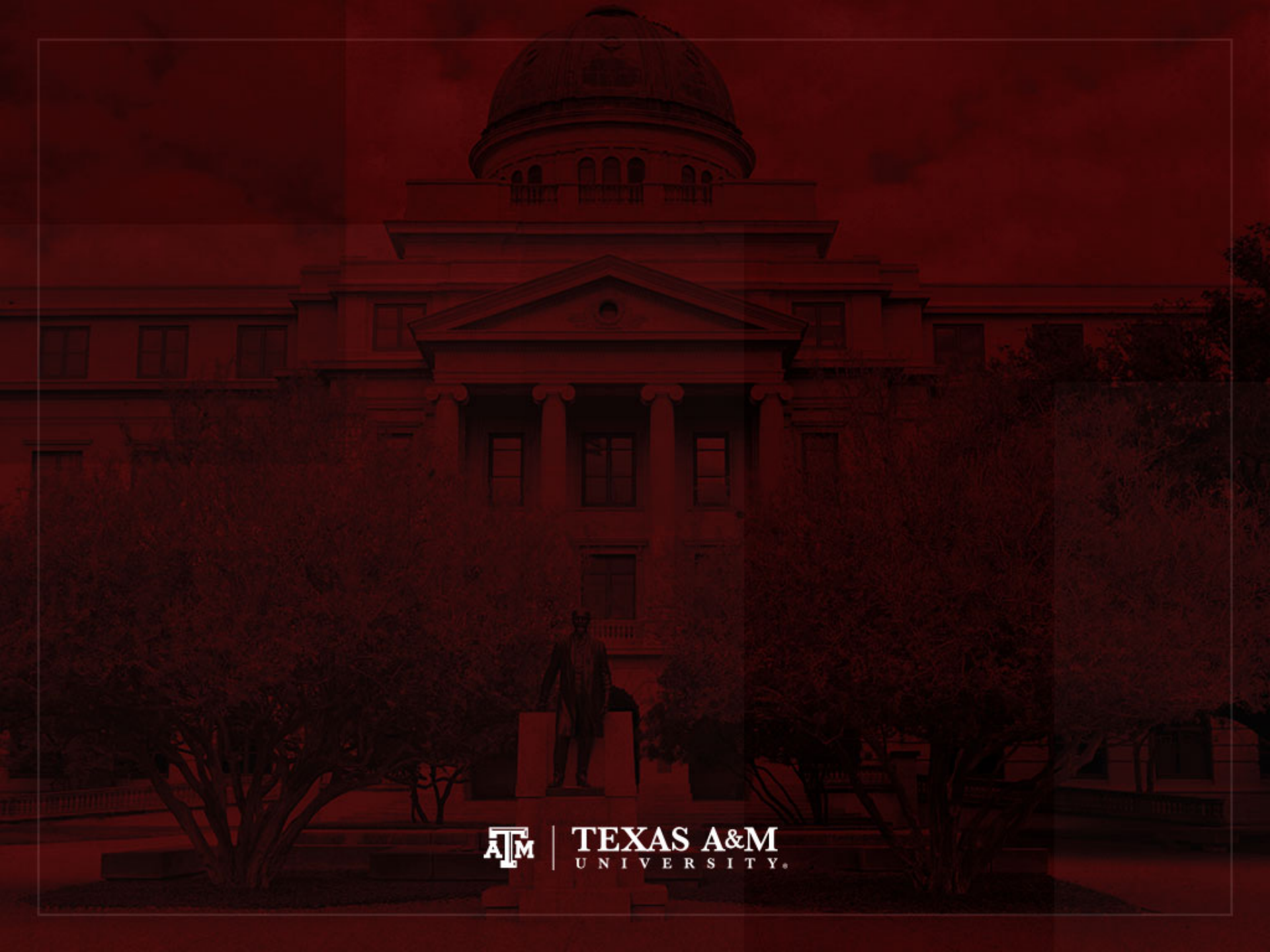
Informal sector, age 35–49



Discussion

- Informal sector tends to have younger and less educated workers with lower earnings
- Increase in proportion of workers in the formal economic sector had positive effects on earnings
 - Indication of relatively integrated labor market, instead of presenting two segmented sectors
- Effects of proportions in age-education groups vary more among workers in the informal sector
 - Indication of higher levels of economic inequality among these workers in recent years





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