

Section 12

Econ 152

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Introduction

Today, we'll briefly review principles behind the Oaxaca decomposition and go through an example problem.

Oaxaca Decomposition

Suppose we're interested (as usual) in wages as a function of schooling. So our model is

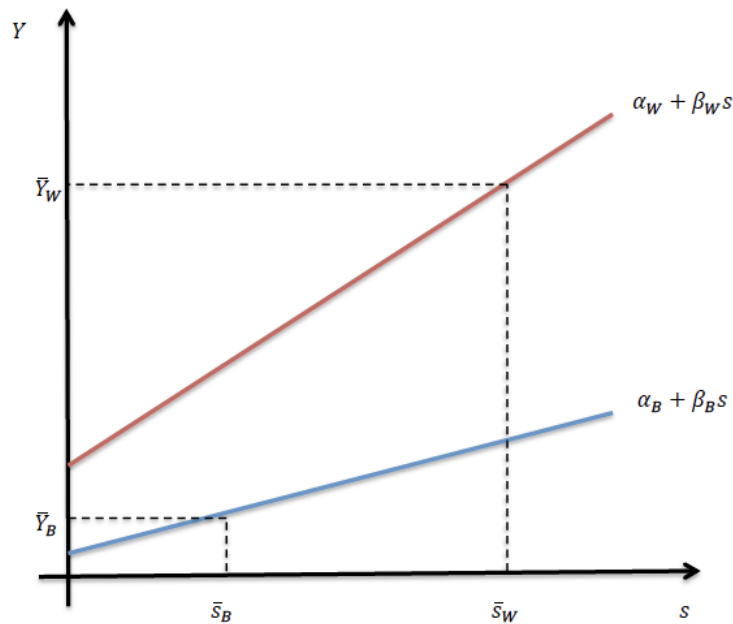
$$Y = \alpha + \beta \times s$$

where s is years of schooling. Now we're also interested in the question of discrimination. Let's say we have white and Black portions of the population, and we allow them to have potentially different α 's and β 's:

$$Y_W = \alpha_W + \beta_W \times s$$

$$Y_B = \alpha_B + \beta_B \times s$$

If we plot average levels of schooling for the two groups, we get a graph like this:



Exercise 1.

- Which group has higher earnings at baseline ($s = 0$ schooling)? Which has higher returns to schooling?
- Which group has higher average schooling?
- Which group has higher average earnings?

The main idea. Suppose the two groups had the same average level of schooling. If there were no discrimination, they would earn the same average wage. Any difference is due to discrimination. (Are there any issues with this interpretation?)

We want to decompose the total difference in earnings into two portions:

- Difference due to difference in s
- Difference due to different α 's and β 's ("discrimination")

Procedure:

1. Write out the total average difference:

$$\begin{aligned}\Delta &= (\alpha_W + \beta_W \bar{s}_W) - (\alpha_B + \beta_B \bar{s}_B) \\ &= (\alpha_W - \alpha_B) + \beta_W \bar{s}_W - \beta_B \bar{s}_B\end{aligned}$$

2. What if the two groups had the same level of education? Let's say they both had \bar{s}_B (it doesn't matter which value you pick)

$$\begin{aligned}\Delta_{discr} &= (\alpha_W + \beta_W \bar{s}_B) - (\alpha_B + \beta_B \bar{s}_B) \\ &= (\alpha_W - \alpha_B) + \bar{s}_B (\beta_W - \beta_B)\end{aligned}$$

This difference is "discrimination". (What if $\alpha_W = \alpha_B$ and $\beta_W = \beta_B$?)

3. The rest left over is "non-discrimination" – the part explained by the difference in schooling.

$$\begin{aligned}\Delta_s &= [(\alpha_W - \alpha_B) + \beta_W \bar{s}_W - \beta_B \bar{s}_B] - [(\alpha_W - \alpha_B) + \bar{s}_B (\beta_W - \beta_B)] \\ &= \beta_W \bar{s}_W - \beta_W \bar{s}_B \\ &= \beta_W (\bar{s}_W - \bar{s}_B)\end{aligned}$$

Exercise 2. Suppose earnings for white and Black workers are given by the following:

$$Y_W = 10,000 + 3,000s$$

$$Y_B = 8,000 + 2,000s$$

and average schooling among the two groups is

$$\bar{s}_W = 12$$

$$\bar{s}_B = 11$$

1. What would average earnings for Black workers be if they were paid like white workers?
2. Decompose the difference in average earnings into a portion explained by difference in schooling and a portion explained by discrimination.