

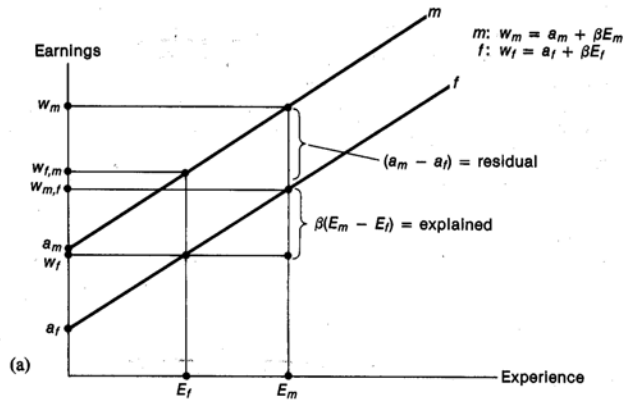
Decomposition of Differences in Means

- **Regression**: what percent of variation in dependent variable explained by independent variables
- **Decomposition**: what proportion of gap between two populations explained by independent variables

Decomposition: two explanations

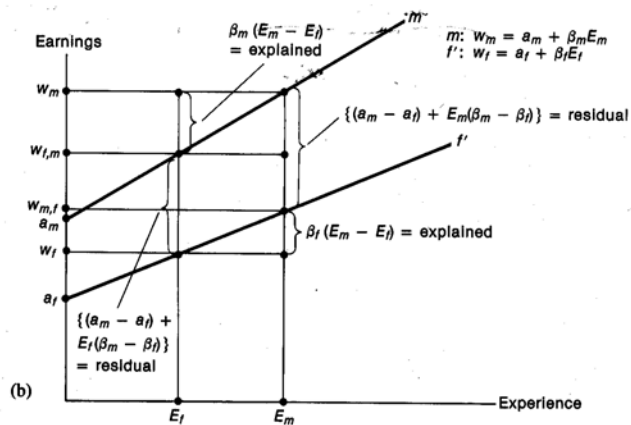
- **Composition factors** (“legitimate”): groups differ in their values on the independent variables
- **Rates of return** (“illegitimate”): groups differ in rates of return to independent variables
- Estimate by **regression standardization**

Decomposition: where two b's are equal



Source: Claudia Goldin. 1990. Understanding the Gender Gap.
New York: Oxford University Press, p. 85.

Decomposition: where two b's are not equal



Source: Claudia Goldin. 1990. Understanding the Gender Gap.
New York: Oxford University Press, p. 85.

Decomposition:

Jones and Kelley, 1984

- 1) $\mathbf{a}_m - \mathbf{a}_f$: portion unexplained due to group membership
- 2) $\mathbf{E}_m(\mathbf{b}_m - \mathbf{b}_f)$, or $\mathbf{E}_f(\mathbf{b}_m - \mathbf{b}_f)$: portion attributed to coefficients
- 3) $\mathbf{b}_m(\mathbf{E}_m - \mathbf{E}_f)$, or $\mathbf{b}_f(\mathbf{E}_m - \mathbf{E}_f)$: portion attributed to background factors
- 4) **Interaction effect**: dollar difference involved in choosing either the male or female as standard

Decomposition:

revisiting two methods

- 1) $\mathbf{b}_m(\mathbf{E}_m - \mathbf{E}_f)$: weighting differences in background characteristics by male slopes

Jones and Kelley: “Blinder’s privilege model,” or how much would men’s income be reduced if we decreased their background factors to those of women?

Decomposition:

revisiting two methods

2) $b_f(E_m - E_f)$: weighting differences in background characteristics by female slopes

Jones and Kelley: “Deprivation model,” or how much would women’s income be increased if we increased their background factors to those of men?

Decomposition: technical information

$$(w_m - w_f) = [(a_m - a_f) + \sum X_f (b_m - b_f)] + \sum b_m (X_m - X_f)$$

Diagram illustrating the decomposition of the wage gap:

- Diff in intercepts: $(a_m - a_f)$
- Diff in slopes: $\sum X_f (b_m - b_f)$
- Diff in means: $\sum b_m (X_m - X_f)$

Source: Claudia Goldin. 1990. Understanding the Gender Gap. New York: Oxford University Press, p. 86.

Decomposition: good sources

- I use the decomposition method in Claudia Goldin's, *Understanding the Gender Gap*, 1990, p. 86
- Other good cites (for these and additional cites, see the course bibliography):
 - Duncan, 1968
 - Jones and Kelley, 1984
 - Roos, 1981
 - Roos and Hennessy, 1987
 - Wellington, 1994