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

![Graph showing decomposition of earnings based on two b's being equal.](image)


Decomposition: where two b’s are not equal

![Graph showing decomposition of earnings based on two b's not being equal.](image)

Decomposition:
Jones and Kelley, 1984

1) \( a_m - a_f \): portion unexplained due to group membership

2) \( E_m (b_m - b_f) \), or \( E_f (b_m - b_f) \): portion attributed to coefficients

3) \( b_m (E_m - E_f) \), or \( b_f (E_m - E_f) \): portion attributed to background factors

4) **Interaction effect**: dollar difference involved in choosing either the male or female as standard

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Decomposition:
revisiting two methods

1) \( b_m (E_m - E_f) \): weighting differences in background characteristics by male characteristics

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 characteristics

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

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

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