

Demographic Diversity

$$P(Y_1 = 1 \mid A = 5) = 0.5$$

$$P(Y_1 = 1 \mid A = 6) = \frac{65}{100}$$

$$P(Y_1 = 1 \mid A = 5)$$

$$\frac{P(Y_1 = 1 \mid A = 6)}{P(Y_1 = 1 \mid A = 5)} = \frac{\frac{65}{100}}{\frac{50}{100}} =$$

$$\frac{65}{50} = \frac{13}{10}$$

Equal opportunity

$$P(\hat{Y}=1 | A=b, Y=1) = \frac{60}{80} = \frac{3}{4}$$

$$P(\hat{Y}=1 | A=r, Y=1) = \frac{1}{2}$$

$$\frac{P(\hat{Y}=1 | A=r, Y=1)}{P(\hat{Y}=1 | A=b, Y=1)} = \frac{1/2}{3/4} = \frac{2}{3}$$

Positive Predictive Parity

$$P(Y=1 | A=v, \hat{Y}=1)$$

$$P(Y=1 | A=b, \hat{Y}=1) = \frac{60}{65} = \frac{12}{13}$$

$$P(Y=1 | A=v, \hat{Y}=1)$$

$$\frac{P(Y=1 | A=b, \hat{Y}=1)}{P(Y=1 | A=v, \hat{Y}=1)} = \frac{\frac{12}{13}}{\frac{13}{24}} = \frac{13}{24}$$

Negative predictive parity

$$P(Y=1 \mid A=v, \hat{Y}=0) = \frac{1}{2}$$

$$P(Y=1 \mid A=b, \hat{Y}=0) = \frac{20}{33} = \frac{4}{7}$$

$$P(Y=1 \mid A=v, \hat{Y}=0)$$

$$\frac{P(Y=1 \mid A=b, \hat{Y}=0)}{P(Y=1 \mid A=v, \hat{Y}=0)} = \frac{20}{33}$$