

$$Y_a = f_Y(W, a, U_Y), \in \{0, 1\}$$

Causal Parameter:

$$\Psi^F(P_{U,X}) = P_{U,X}(Y_1 = 1) - P_{U,X}(Y_0 = 1) = E_{U,X}(Y_1) - E_{U,X}(Y_0)$$

Causal Risk Difference

$$\Psi(P_0) = E_0[E_0(Y | A = 1, W1) - E_0(Y | A = 0, W1)]$$

Causal Risk Difference:

$$\Psi(P_0) = E_0[E_0(Y | A = 1, W1) - E_0(Y | A = 0, W1)]$$

$$= \sum_{w1} [E_0(Y | A = 1, W1 = w1) - E_0(Y | A = 0, W1 = w1)] P_0(W1 = w1)$$

Also holds under the randomization assumption:

$$Y_a \perp A | W$$

$$\text{Target: } \Psi^F(P_{U,X}) = E_{U,X}(Y_1 - Y_0)$$

Positivity Assumption:

$$\min_{a \in A} P_0(A = a | W = w) > 0 \text{ (i.e.) } 0 < P_0(A = 1 | W = w) < 1$$

for all w for which  $P_0(W = w) > 0$

Target Causal Parameter:

$$E_{U,X}Y_1 - E_{U,X}Y_0$$