a 50 years old active male customer

$\text{elasticity} = Pr[\text{resp}_i = 0 | \text{male}_i = 1, \text{active}_i = 1, \text{age}_i = 50] \cdot \text{active}_i \cdot \beta_2$

$$= \frac{1 \times 0.914}{1 + \exp(-2.488 + 0.954 \times 1 + 0.914 \times 1 + 0.07 \times 50 - 0.069 \times (50/10)^2)}$$

≈ 0.22

50 years old inactive male customer

$\text{elasticity} = Pr[\text{resp}_i = 0 | \text{male}_i = 1, \text{active}_i = 0, \text{age}_i = 50] \cdot \text{active}_i \cdot \beta_2 = 0$

$$y = \frac{Pr[\text{resp}_i = 1 | \text{active}_i = 1] - Pr[\text{resp}_i = 1 | \text{active}_i = 0]}{Pr[\text{resp}_i = 1 | \text{active}_i = 0]} = \left(\frac{\exp(\beta_2) \cdot z_i}{1 + \exp(\beta_2) z_i} - \frac{z_i}{1 + z_i} \right) / \frac{z_i}{1 + z_i}$$

$$= \frac{\exp(\beta_2)(1 + z_i)}{1 + \exp(\beta_2) \cdot z_i} - 1 / 1 = \frac{\exp(\beta_2) - 1}{1 + \exp(\beta_2) \cdot z_i}$$

$\frac{1}{1 + \exp(\beta_2) \cdot z_i} = Pr[\text{resp}_i = 0 | \text{active}_i = 1].$

$\text{elasticity} = [\exp(\beta_2) - 1] Pr[\text{resp}_i = 0 | \text{active}_i = 1]$

50-year-old active male customer.

$$y = (\exp(0.914) - 1) \frac{1}{1 + \exp(-2.488 + 0.954 \times 1 + 0.914 \times 1 + 0.07 \times 50 - 0.069 (\frac{50}{10})^2)}$$

≈ 0.35

Kunyu HE