# Choice with multiple alternatives – 5.2
# Specification of the deterministic part

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1. It is the classical linear specification:

$$V_{in} = \cdots + \beta_c c_{in} + \cdots .$$

2. The derivative of the utility function with respect to price should depend on price. Any nonlinear specification would do. A typical specification involves the log:

$$V_{in} = \cdots + \beta_c \log(c_{in}) + \cdots .$$

3. It is a piecewise linear specification:

$$V_{in} = \cdots + \beta_{<25} c_{in,1} + \beta_{\geq 25} c_{in,2} + \cdots ,$$

where

$$c_{in,1} = \begin{cases} c_{in} & \text{if } c_{in} < 25 \\ \\ 25 & \text{otherwise} \end{cases}$$

and

$$c_{in,2} = \begin{cases} 0 & \text{if } c_{in} < 25 \\ \\ c_{in} - 25 & \text{otherwise} \end{cases}$$

4. The beta coefficient must depend nonlinearly on income. Classical specifications include:

$$V_{in} = \cdots \beta_c \log(I_n) c_{in} \cdots ,$$

and

$$V_{in} = \cdots \beta_c \left(\frac{I_n}{I_n^{ref}}\right)^\lambda c_{in} \cdots .$$