Testing – 6.2 Informal tests

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Informal tests are designed to identify early inconsistencies between the estimated model and a priori expectations. We describe here the two most common tests performed in practice.

For many variables in the utility function, we have a clear idea about the sign of their coefficient. For instance, the coefficient of the cost variable is always expected to be negative. Indeed, everything else being equal, a cheaper alternative is preferred to a more expensive one. If the estimated value of the coefficient does not have the expected sign, the issue must be investigated.

The second test consists in changing the units of the utility function, typically into monetary units. Suppose that the cost variable c_{in}, expressed in CHF, appears in the utility function:

$$U_{in} = \beta_c c_{in} + \beta_1 x_{in1} + \beta_2 x_{in2} + \cdots \tag{1}$$

The values of the coefficients are impossible to interpret as such. Not only their units are not intuitive, but they are also confounded with the scale parameter.

As the utility function has no unit, the units of the coefficient β_c are 1/CHF. Therefore, if the utility function is divided by β_c, it is expressed in CHF:

$$U'_{in} = c_{in} + \frac{\beta_1}{\beta_c} x_{in1} + \frac{\beta_2}{\beta_c} x_{in2} + \cdots \tag{2}$$

The ratio of the parameters can now easily be interpreted, as it is expressed in monetary units. Moreover, as the coefficients at the numerator and the denominator are scaled in the same way, the scale cancels out.

A typical example in transportation is the coefficient of the travel time variable. If travel time is expressed in minutes, the coefficient β_t of travel time is in 1/minute. In the utility function expressed in monetary units, the

ratio β_t/β_c is expressed in CHF/minute. It is called the *value of time*, or the willingness to pay for travel time savings. The value of time is often reported in the literature. Therefore, the value that is obtained after estimation can be compared to published value.

But the interpretation of the willingness to pay is not restricted to the value of time. The willingness to pay to improve the value of other variables can also be calculated and interpreted.