1 Compensated demand in logs

The reason we transform all the quantity and prices in logarithms is that under this transformation the slope of the demand function is the elasticity of compensated demand.

Specifically, instead of a compensated demand function in the space (p, q) we draw one in the graph $(\ln p, \ln q)$.

The slope of the demand function in this graph is:

$$\frac{d \ln q}{d \ln p} = \frac{\frac{dq}{q}}{\frac{dp}{p}} = \eta$$

where η is the elasticity of compensated demand for food.

To write down this expression we use the fact that:

$$d \ln q = \frac{1}{q} dq$$

Remember that, if we have $\ln q$ on the horizontal axis then the slope of the demand function is $\frac{1}{\eta}$.