1. GLS Chapter 2, Question 17

(a) Elasticity of demand is

\[ E_D = \frac{\% \Delta Q^P}{\% \Delta P} = \frac{-2.5\%}{10\%} = \frac{-0.025}{0.1} = -0.25 \]

(b) The total revenue is

\[ TR = P_{soda} \times Q_{soda} \]

The impact of the bottlers’ price change on total revenue can be estimated by using the fact that the percentage change in a product of two numbers is approximately equal to the sum of the percentage changes in the product’s components. Therefore,

\[ \% \Delta TR \approx \% \Delta P_{soda} + \% \Delta Q_{soda} = 10 - 2.5 = 7.5 \]

Thus, in approximate percentage terms, the impact of the bottlers’ price change on total revenue was a 7.5% increase.

We could also calculate the percentage change exactly. (I found this a more straightforward way.) To calculate the change directly, we use the following logic.

\[
\frac{\text{total revenue}_{after} - \text{total revenue}_{before}}{\text{total revenue}_{before}} = \frac{(1.1P_0)((1 - 0.025)Q_0)}{P_0Q_0} - \frac{(P_0 - Q_0)}{P_0Q_0}
\]

\[
\frac{\text{total revenue}_{after} - \text{total revenue}_{before}}{\text{total revenue}_{before}} = \frac{(P_0Q_0)(1.0725 - 1)}{P_0Q_0} = 0.0725
\]

Hence, the total revenue increased by 7.25%.

(c) In order to increase Sal’s volume of his sales by 8%, the following equation needs to be
solved:

\[
E_D = \frac{\%\Delta Q^D}{\%\Delta P}
\]

\[
\%\Delta Q^D = \%\Delta P \times E_D
\]

\[
8\% = \%\Delta P \times -2.66
\]

\[
\%\Delta P \approx -3.0075
\]

To meet his goal, Sal has to lower the price by approximately 3%.

(d) The initial expenditure is given by

\[
TE = P_{pizza} \times Q_{pizza}
\]

Yogi’s total expenditure when using the new vendor’s services is

\[
TE^* = 0.6P_{pizza} \times Q_{pizza}^*
\]

\[
0.6P_{pizza} \times Q_{pizza}^* > P_{pizza} \times Q_{pizza}
\]

\[
Q_{pizza}^* > \frac{10}{6}Q_{pizza} = \frac{5}{3}Q_{pizza}
\]

That percentage change must thus be at least \(\frac{5-3}{3} = \frac{2}{3} = 66.7\%\)

Since \(TE^* > TE\), Yogi’s pizza consumption must have increased by at least 66.7%. Therefore,

\[
E_D = \frac{\%\Delta Q}{\%\Delta P} < -1
\]

indicating that Yogi’s elasticity of demand for pizza is elastic.

2. GLS Chapter 2, Question 20

The income elasticity of demand is the percentage change in demand given a percentage change in income.

(a) What sign might you expect the income elasticity of demand to have if the good in question is Swedish massages?
Remember that $E_I = \frac{\%\Delta Q}{\%\Delta I}$, where $I$ is income. As income increases (so the denominator is positive), do we expect that consumption of $Q$ (here, Swedish massages) increases or decreases? We expect that the consumption of massages increases, on average, with income. Therefore, the sign of $E_I > 0$.

(b) What sign might you expect the income elasticity of demand to have if the good in question is Ramen noodles?

We expect that as people get wealthier, they are less likely to eat Ramen noodles. This suggests that $E_I < 0$.

(c) What sign might you expect the income elasticity of demand to have if the good in question is table salt?

Suppose that consumption of table salt is relatively independent of income – it’s pretty cheap, so even if you are poor you can buy it. This suggests that $E_I = 0$.

Suppose instead that when you are richer you eat out more and eat at home less. In this case, wealthier people consume less table salt than poor people, and $E_I < 0$.

Alternatively, you could argue that people consume more table salt when they are wealthier; they use it more freely, or have more dinner guests. In this case, $E_I > 0$.

Any well-reasoned answer is accepted.

3. Find two peer-reviewed (this means published in a reputable academic journal) estimates of either the price elasticity of demand or the price elasticity of supply for the good of your choice. I encourage you to try using the EconLit database for this search. Cite the sources for your estimates, and interpret them.

A good answer here includes (a) clear citations and (b) clear interpretations.