



*This (slightly technical) economic digest is prepared by Dr Samih Antoine Azar, Professor of Economics and Finance at Haigazian University.*

Menu costs are the costs of changing reported unit costs by a given firm to the public or to its customers. Unit costs in turn vary with inflation, and inflation variability. In an open economy, inflation and currency depreciation are intertwined. In Lebanon both average currency depreciation and volatility have lately witnessed dramatic fluctuations. Therefore, it has become evident to most businesses that selling prices ought to be adjusted for these fluctuations in order to keep the normal turnover and flow of the merchandise and preserve the supply chain. In economic terms, additional menu costs must be balanced by the revenue from selling at the adjusted (higher) prices; and if business aims at minimizing menu costs the marginal menu cost must equal the marginal revenue from changing (and increasing) prices.

This digest develops a simple model of menu costs. It also calculates the optimal menu costs involved for 1000 individual goods and items, like for a super market. The direct and indirect overhead menu costs necessary to adjust prices is assumed to vary non-linearly with turnover, or market sale and demand  $Q_i$ . The complete model is relegated to the appendix.

The minimization results in an average  $Q_i$  of 118.73, for  $\theta = 1$ , as  $\theta$  varies between 0 and 2. The coefficient of 118.73 represents the constant marginal cost in LBP of changing prices on one unit of a representative good. If  $\theta = 1.5$ , which is quite a reasonable conjecture, then average  $Q_i$  is 1,293.72. This implies that when the change in cost is LBP 1,293.72 then the business will decide to change the menu price. Such a change will in the case of Lebanon follow from a depreciation of the exchange rate.

For the period between October 2019 and June 2022, the average monthly inflation rate was 7.48% and the average monthly depreciation of the exchange rate was 8.60%. The inflation pass-through is the ratio of the two averages, and stands at 87%, in such a way that a 10% decline in the foreign exchange value leads to a 8.7% rise in domestic inflation. Therefore the trigger for changing the menu price will take place when the foreign exchange rate loses  $\frac{1,293.72}{0.87} = 1,487.03$ , or the round-up figure of LBP 1,500. Simply put, if the exchange rate increases by LBP 1,500, like for example from 60,000 to 61,500, then the super market will decide to change the menu list.

Two observations are in order. First, note that the LBP 1,500 is an average estimate: some goods need to have a much higher trigger rate than LBP 1,500 and others a much lower trigger, depending on the relative magnitude of prices. Second, unfortunately the price of the US dollar has varied by more than LBP 1,500 per day lately, so the daunting implication is that supermarkets need to change prices as often as daily. This, as might happen soon, will prompt supermarkets to list prices in US dollars and convert them to LBP at the daily market exchange rate on the cash register!

### Appendix:

Mathematically, the model is set as follows:

- (1) Menu cost per item  $i = f(Q_i)$  with  $i = 1, 1000$

Where the function  $f(.)$  is non-linear. I will assume that the non-linearity varies between 0 and 2. As such, with  $\Theta$  as the non-linear elasticity parameter, the menu cost will equal:

- (2) Menu cost per item  $i = (Q_i)^\Theta$  with  $\Theta$  between 0 and 2

Total menu costs for all goods are the summation of individual costs:

- (3) Total menu costs =  $\sum_i (Q_i)^\Theta$

Therefore, the program is to minimize (3) relative to individual demand quantity  $Q_i$ .