

The economics of tobacco taxation: there is more than just the ‘substitution’ effect

London Economics’ analysis for ESTA

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Substitution effects and income effects

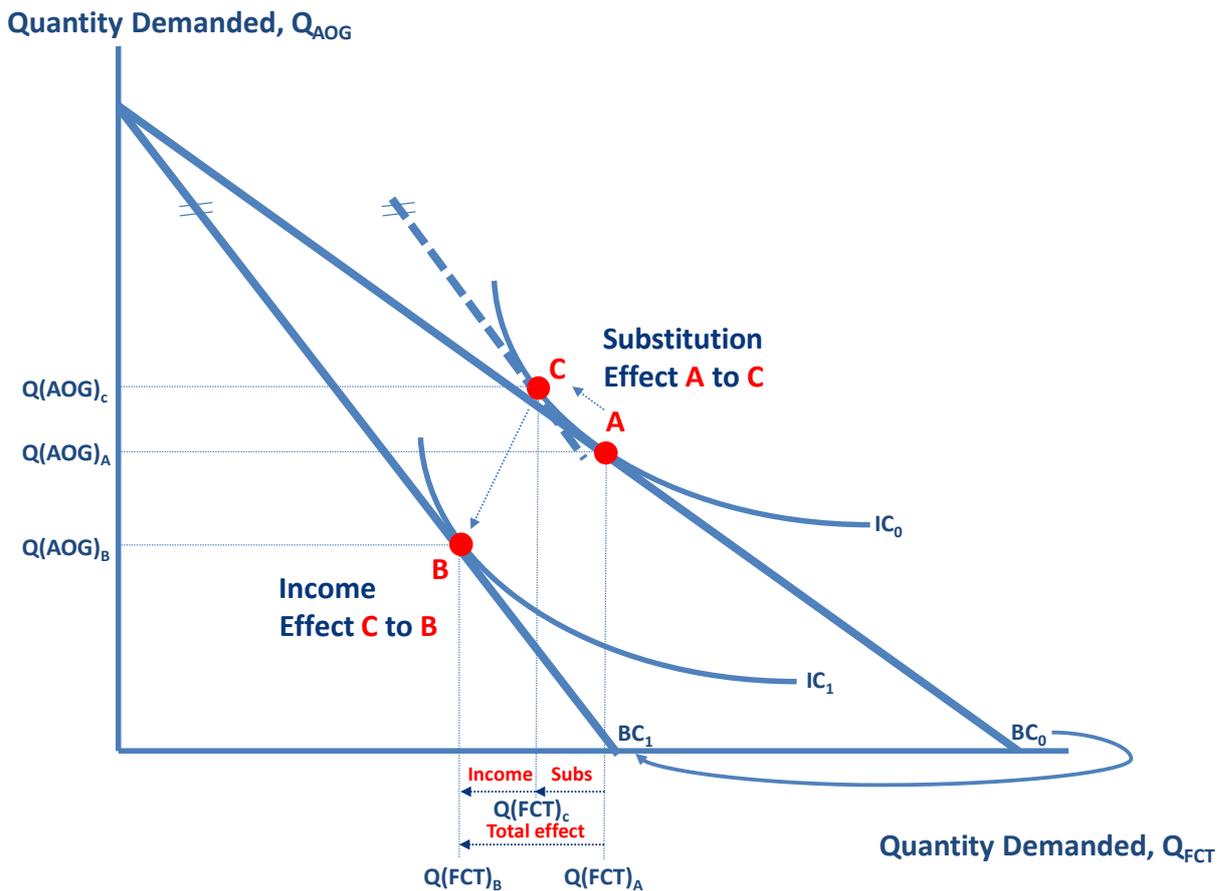
Figure 13 provides an illustration of the impact of an increase in the price of a commodity on the quantity demanded, further broken down into the **substitution effect** and **income effect**. A consumer selects their optimal point, where they are able to reach their highest level of welfare given their financial constraints. In economic terms, this is shown by the intersection (**A**) of their uppermost **indifference curve** IC_0 (representing constant levels of welfare or satisfaction) and their budget constraint or household income (BC_0). The total quantity of FCT demanded will be $Q(FCT)_A$ while the total quantity of all other goods purchased will be $Q(AOG)_A$.

Following a price increase of FCT for instance, the budget constraint pivots inwards to BC_1 . This means that the maximum quantity of FCT that can be purchased declines (if the individual’s entire income is spent on FCT), but if the decision is to consume ‘all other goods’ (AOG) only (and note that all other goods include tobacco alternatives such as FMC), the amount of ‘all other goods’ that can be purchased remains the same both before and after the FCT price increase. In practice, some consumption of FCT will continue to take place, and under the new budget constraint BC_1 , the highest indifference curve that will be achievable will be IC_1 . Therefore, the quantity of FCT demanded will be $Q(FCT)_B$ while the total quantity of all other goods purchased will be $Q(AOG)_B$. This is represented by point **B**.

However, this total effect can be disaggregated into two subsidiary effects. The first effect isolates the pure price effect or **substitution effect**, whereby the impact of the price increase is identified assuming that the consumer is no worse off than before (i.e. the individuals can reach the original indifference curve IC_0 through the receipt of additional notional income represented by a parallel shift outwards of the budget constraint BC_1 (dashed line)). In this case, as a result of the fact that the price of FCT has increased and this good now offers less value for money, there is a decline in the quantity demanded (to $Q(FCT)_C$). Conversely, for all other goods, there is an improvement in value for money, and the quantity demanded increases (to $Q(AOG)_C$). The ‘equilibrium’ position is represented by point **C**.

The **income effect** is the second constituent component of the total price effect. In this example, the additional income that was notionally offered to the consumer to allow them to reach the original indifference curve is removed. Once this occurs, the consumer optimises their welfare or satisfaction at point **B**. Consumers purchase less of everything compared to point **C**.

Figure 13: An illustration of income and substitution effects



Importantly for the analysis contained in this report, in relation to the quantity demanded of 'all other goods' (including FMC), although the impact of a price increase of FCT results in *FMC* becoming better value for money than previously the case (and resulting in an increase in quantity demanded (by $[Q(AOG)_c - Q(AOG)_A]$), it is entirely possible that the income effect $[Q(AOG)_B - Q(AOG)_c]$ will outweigh the substitution effect resulting in a net decline in the quantity of all other goods demanded (including FMC). The relative size of the two effects will be impacted by the characteristics and preferences of FCT consumers; however, **affordability factors** (which have been demonstrated to be a key differentiating characteristic between FCT and FMC smokers) will result in the income effect being more dominant than would otherwise be the case.

As such, there is every likelihood that following an increase in the price of FCT, the quantity of FMC demanded will **decline**, as FCT consumers seek more affordable options (such as cheaper duty-paid cross border or illicit products). In other words, as part of the critique of the Economist Associati (EA) analysis, it is **crucial to focus on both the income and substitution effects** (as presented here) rather than *just* the substitution effect (as presented in the EA report). Without proper evidence, nor a precise explanation of the concepts being considered, it is not consistent or intuitively correct to assume that increases in FCT prices will result in an increase in the quantity demanded of FMC.