BUDGETARY AND SOCIAL MOTIVATIONS TO PURCHASE: AN EQUILIBRIUM DIFFERENCIAL PRICE

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Abstract

To put on the same level budgetary and social purchase motivations, we develop an original expenditure function based on Veblen's (1899) theory of conspicuous consumption and various evolutionary concepts (Simon, 1987; Langlois, 1996). This fonction evaluates the part of budget allocated by a consumer to the purchase of a specific good ("*allocated expenditure function*") in the decision to purchase for one branch of consumption. From this function, we can show that there is an differential price equilibrium where preference for a specific variant offsets the differential price of this variants.

Keyword : demand function, opinion, social motivation, budget motivation, differential price
JEL classification: D11, D91, E21

1. Introduction

In many circumstances the decision of consumer to purchase a good cannot adequately be depicted by the law of demand of the traditional theory. This law of demand is an inverse relation of quantity demanded and price: the higher the price of the product, the less the consumer will demand. This law is based on the standard idea that the price is only a budgetary constraint. But the price can be interpreted in several ways. For instance, the price can

be a quality indicator of good: high price show a high quality. It can be also a quality indicator of consumer. In this way, demand can increase in relation to price as demonstrated by Veblen (1899) for leisure class consumption.

But if conspicuous consumption theory explain some particular cases of consumption, as snob effect, in standard consumption theory the quest for social status is still an exception. Indeed, the standard theory distinguish the taste factors (preferences) from possibility factors (price, income) when they are inextricably linked in the practice (Broussolle, 2005). So, a consumer with both social motivations and budget limits will have to make a choice that satisfies both these motivations.

The need to quality or the conspicuous consumption leads an high opinion of expensive variants. On the other hand, the choice to purchase an expensive variant reduces the consumer's purchasing power[1] and budget constraints may lead to the choice of a cheap variant. The decision to purchase a more or less expensive variant depends on the balance of power between these conflicting motivations. For instance, some empirical observations on the signifiant success of "own brands" (or store brands), which have a higher price than "first price", shows that the cheapest product is not always the one that is chosen.

To analyse this specificity, we consider several variants of goods with differentiated prices, and we propose an original "*allocated expenditure function*" which represents the two sides in the decision to purchase a specific variant.

Variant notion require to introduce Lancaster's (1966) characteristic approach that considers preferences on variants (groups of goods) with the same characteristics. However, the notion of preferences assumes that consumer can rank these different goods. In a bounded rationality framework, because of to computational limitation, satisfying need requires the consumer to engage in a process of problem solving (Simon, 1987). The consumer's needs and the problem solving process have a hierachical structure (Langlois, 1996). Thus, within some evolutionary concepts, the process of purchase is sequential (Nelson, 1970) and the decision of consumer to purchase is about only

[1]Based on the same budget level, a consumer that purchases a good that costs twice as much as the average good will be able to plurchase only half the quantity of this good than the consumer that chooses the cheapest version.

one good. So, the consumer does not arbitrate between all goods, but only between different variants of one good (substitute products). In addition, the assumption that preferences are objectively defined does not take into account the consumer's perception highlighted by Kahneman and Tversky (1979)[2]. We adopt the notion of *opinion* usually applied to innovation diffusion (Arthur, 1994) or financial markets (Miller, 1977; Orlean, 1989) to express the subjectivity of preferences. This opinion applies only to the specific variant of the good being considered in the decision making.

2. Demand function of differentiated goods

The "*allocated expenditure function*" (EA function) describes the budget constraint and the social motivation for purchasing a specific good. Generaly, the shape of demand function give an indication on the nature of good. We consider that all good can be demanded for their statut through the price, and that all consumers have some degree of social motivation (snob effect), which should be taken account of in the general consumption theory.

Let us consider one branch of consumption; the consumer decision to purchase depends on the differential prices between the different variants of the good. We use the notion of "*Real Budget in Term of good*" (RBT) to describe the relative budget for the consumption of a specific variant. Assume two variants, x_1 a specific variant and x_2 a composite variant, priced respectively at p_{x_1} and p_{x_2}, and B a level of available budget for regular consumption (without fixed consumption and saving). If $p_{x_1} > p_{x_2}$, *RBT of* x_1 ($B^r_{x_1}$) explains the diminution of purchasing power if the consumer purchases x_1.

$$B^r_{x_1} = \frac{B}{1+s} \qquad \text{where} \qquad s = \frac{p_{x_1} - p_{x_2}}{p_{x_2}} \tag{1}$$

where p_{x_1} is the reference price. So, the differential price (s) expresses the proportional difference in price from the price of the composite good (or the average of other good prices). For instance, if $p_{x_2} = 2.p_{x_1}$, the purchasing power of the consumer that chooses x_1 is reduced by 50%.

The EA function of x_1 depends on the RBT of x_1 and on the consumer's opinion of x_1 (β_{x_1}) which is partly driven by social considerations. So, the

[2]Utility in prospect theory is not an absolute given, but depends on the individuals subjective perception.

opinion on the good is linked to the differential price s. The form of the demand function is simply multiplicative, revealing a budget proportion:

$$EA(x_1) = B^r_{x_1}(s) \,.\, \beta_{x_1}(s) \tag{2}$$

where $\beta \in [-1, 1]$. $B^r_{x_1}(s)$ explain that the consumer can and $\beta_{x_1}(s)$ that he wants. So, the budget diminution lead by a positive differential price can be offset by positive a opinion.

Opinion on the good evolves as the differential price varies: in the traditional case, β_{x_1} is a decreasing function with respect to p_{x_1}, and the price-elasticity of opinion ($\varepsilon_{\beta/s}$) is negative; in the Veblen case, β_{x_1} is an increasing function, and the price-elasticity of opinion ($\varepsilon_{\beta/s}$) is positive. We assume that some level of demand already exists. Therefore, the objective of this function is not to study the demand level, but the levels of the variations leading to the variations in differential prices.

3. Price variation and Offset Point

An increase in p_{x_1} leads to a positive variation of s. If $\Delta s > 0$ has a negative effect on $B^r_{x_1}$, it can also potentially have some potential positive effect on β_{x_1} which will offset this decrease.

Proposition 1 *There is an Offset Point (variation level of s) where opinion variation offsets budget variation.*

When the differential price varies, EA variation depends on the price-elasticity of budget ($\varepsilon_{R^r_{x_1}}/s$) and the price-elasticity of opinion (ε_{β}/s). These variations can be written as:

$$\Delta EA(x_1) = \left(1 + \Delta s \,.\, \varepsilon_{R^r_{x_1}/s}\right)\left(1 + \Delta s \,.\, \varepsilon_{\beta_{x_1}}\right) - 1 \tag{3}$$

$\varepsilon_{R^r_{x_1}/s} = -\frac{s}{1+s}$, so, the condition of having a positive variation is:

$$\left(1 + \nu\ \Delta s \,.\, \varepsilon_{\beta_{x_1}}\right) > \frac{1}{\left(1 + \Delta s \,.\, (-\frac{s}{1+s})\right)} \tag{4}$$

In the $\Delta s > 0$ case, when $\varepsilon_{\beta_{x_1}} > 0$, there is a variation level of s where the variation in RBT of x_1 offsets the variation in opinion β_{x_1}. This is the *Offset Point* (O) defined by:

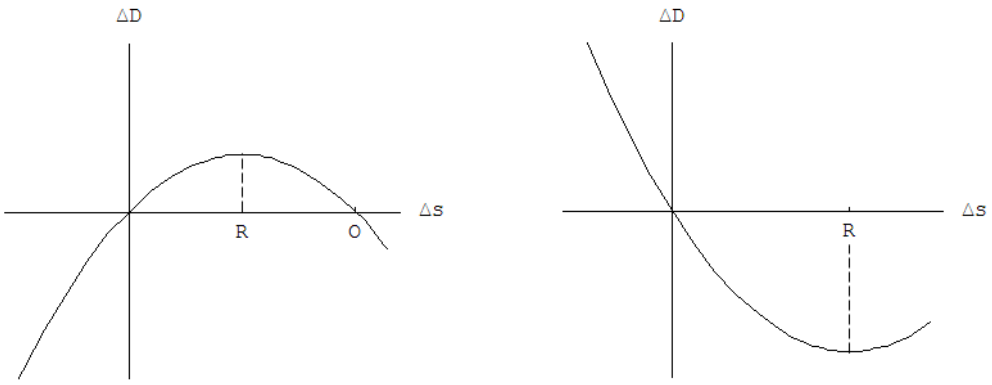

Figure 1: EA variation function and *Reversal Point* (R) with s positive, for positive (left) and negative (right) elasticity

$$O = \frac{\varepsilon_{\beta_{x_1}} - s + \varepsilon_{\beta_{x_1}}.s}{\varepsilon_{\beta_{x_1}}.s} \tag{5}$$

The consumer with positive opinion elasticity increases the part of the budget allocated to x_1 consumption ($\Delta EA(x_1) > 0$) to the point that the budget reduction becomes less important as shown in fig. 1 (left).

4. Variation intensity and Reversal Point

We examine EA stucture of variation according to differential price variation. $\Delta s > 0$ means that differences in prices increase whatever order the relation between p_{x_1} and p_{x_2} ($s < 0$ or $s > 0$) is.

Proposition 2 *The increase in the part of the budget allocated to x_1 consumption decreases in intensity with respect to the differential price increase.*

If $s > 0$, $\Delta s > 0$ leads to a variation in EA as a parabolic function with a maximum when the elasticity of opinion is positive, and with a minimum value when it is negative. These cases are illustrated in fig. 1. Conversely, if $s < 0$, $\Delta s > 0$ leads to a maximum value when the elasticity opinion is negative and to a minimum value when it is positive.

In the positive elasticity of opinion case, the Δs-intercept of the EA variation function gives the *Offset Point* and the shape of the EA variation

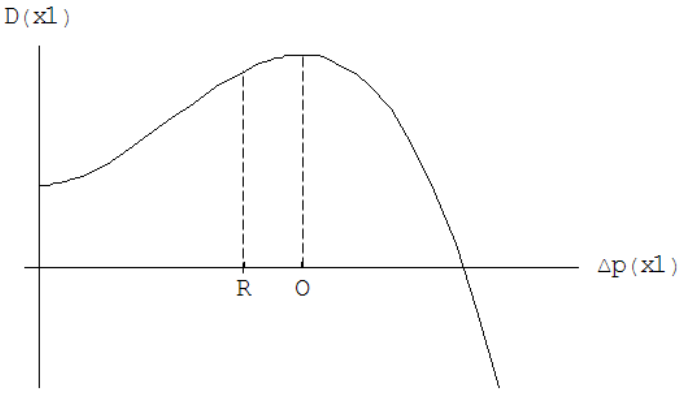

Figure 2: EA function and *Offset Point* (O) and *Reversal Point* (R) with s positive for positive elasticity

function explains the variation intensity. Thus, the extremum shows the change in variation intensity. This inflection point in the EA curve indicate that there is a slowdown in the increase in the part of budget allocated to x_1 consumption. This is the *Reversal Point* (R) and is defined by:

$$R = \frac{\varepsilon_{\beta_{x_1}} - s + \varepsilon_{\beta_{x_1}}.s}{2.\varepsilon_{\beta_{x_1}}.s} \tag{6}$$

In fig. 2 we can see that the EA function increases and at an increasing rate, then increases at a decreasing rate, and finally falls down. In other words, first, small intervals of variations lead to a more than proportional increase in demand then the increase slows, and, finally when p_{x_1} becomes too high, demand decreases.

5. Initial differential price and equilibrium differential price

The value of the *Offset Point* (O) depends on the price elasticity of opinion β_{x_1} and on the initial price differential s. Examination of the differential price influence shows that the value of O follows a hyperbolic function centred on point A which depends on the elasticity level (cf. figure 3)

Proposition 3 *There is an equilibrium differential price (level of s) which depends on the elasticity of opinion where opinion offsets budget. At this*

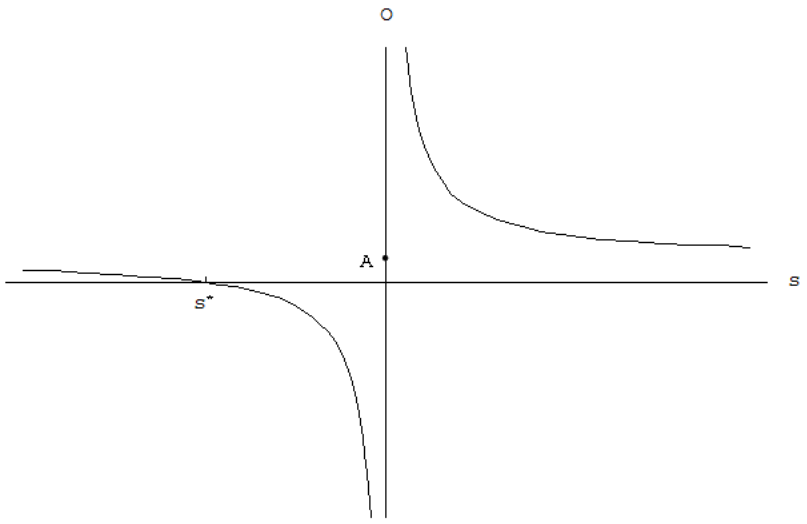

Figure 3: Offset point function in respect to initial differential prices with $\varepsilon_{\beta_{x_1}} = -1$ (classical case)

point any variation leads to a decrease in the part of budget allocated to x_1 *consumption.*

We can see that there is a value of s where $O = 0$. This means that a differential price exists for which any variations in prices ($\Delta s > 0$ or $\Delta s < 0$) lead to negative variations in EA. At this point, the opinion of differential of price offsets exactely offsets the power of purchase. Thus, it is an *equilibrium differential price* defined by:

$$s^* = -\frac{\varepsilon_{\beta_{x_1}}}{\varepsilon_{\beta_{x_1}} - 1} \tag{7}$$

Fig. 3 depicts the traditional case in which opinion elasticity is negative, s^* is negative. This means that the consumer's optimum allocation for x_1 is reached when $p_{x_1} < p_{x_2}$ but only in some proportion that depends on the price elasticity of opinion.

The value of s^* in respect to elasticity is depicted in fig 4. In the traditional case, s^* is included in $[-1, 0]$. This characteristic represents the influence of two antagonist motivations: the budget contraint that leads the consumer to purchase a less expensive good, and the social motivation that leads to the purchase of a good that carries some social signal.

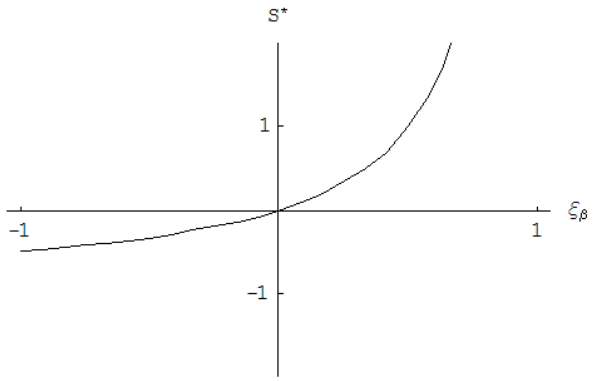

Figure 4: s^* function with respect to elasticity of opinion

In the Veblen case, opinion is an increasing function with respect to price, so s^* is positive. Thus, the optimun allocation in x_1 is reached when the price of a particular good is higher than the price of the composite good.

6. Conclusion

The function shape described above allows the inclusion of social motivations (i.e. conspicuous consumption or need of quality) within the general framework. We can suppose that a degree of snob effect exists for all consumers, up to the point that the budget constraint becomes more important than a positive opinion.

The existence of an *equilibrium differential price* shows that the lowest price is not necessarily preferred even in conditions of severe budget limitations. This may explain the signifiant success of "own brands", which have a higher price than the "frist price" products, but are less expensive than the average price of branded goods. These products represent 45% of the products sold in supermarkets in Europe and 25% of the products sold in US supermarkets.

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