A paradox of little pre-purchase search for durables: the trade-off between prices, product lifecycle, and savings on purchases.

Malakhov, Sergey

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Sergey Malakhov
Ph.D., Applied Economics,
Pierre-Mendes France University,
Grenoble, France

A Paradox of Little Pre-Purchase Search for Durables: the trade-off between prices, product lifecycle, and savings on purchases.

Abstract

The paper describes the microeconomic trade-off between prices, savings on purchases, and the time horizon of the consumption-leisure choice during the search for different products. When marginal costs of the search are equal to its marginal benefit, the time of search is proportional to products' lifecycles and it is inversely proportional to starting prices.

When the reserve maximization model describes the optimal consumption-leisure choice, it doesn't directly separate the labor from the search (Malakhov 2011b). However, this approach doesn't seem to be methodologically inconsistent. In terms of leisure working and searching are equivalents. Moreover, sometimes both "working" and "searching" result in the same activity, like begging for a cigarette or hitchhiking. All these activities reduce leisure time in favor of consumption.

Nevertheless, the problem of labor-search separability can create a methodological confusion. This confusion results in attempts to separate the search from the labor with specific utility functions of the search process, which are designed to explain anomalies of consumer behavior.

D.Grewal and H.Marmorstein (1994) wrote:

"Previous studies have consistently found that most consumers undertake relatively little pre-purchase search for durable goods and do even less price-comparison shopping,.. (when) prices of the more expensive products tend to exhibit the greatest variation across stores. Given the aforementioned evidence regarding the price variation of big-ticket items, it appears that many consumers engage in considerably less price search than is predicted by the economics-of-information theory."

R.Thaler (1987) documented that anomaly in the following manner:

"One application of marginal analysis is optimal search. Search for the lowest price should continue until the expected marginal gain equals the value of the search costs. This is likely to be violated if the context of the search influences the perception of the value of the savings. In Thaler (1980), I argued that individuals were more likely to spend 20 minutes to save $5 on the purchase of a clock radio than to save the same amount on the purchase of a $500 television."

We can check the results of that experiment by the simple extension of the reserve maximization model. Suppose an individual who is ready to give up 10 hours of leisure to get (i.e., to work and to search for) a big-ticket item Q_{bti} and only 2 hours of leisure to get a cheap item Q_{ci}. We can substitute the marginal $\partial P/\partial S$ value in the key equation of the reserve maximization model (1) by the mean $\Delta P/\Delta S$ value, which is much easier for our individual to plan and to compare with another mean value of the wage rate w. If we take the value $\Delta S = S$ and the value ΔP as a constant for both items, we have:

$$Q\frac{\partial P}{\partial S} = w\frac{\partial L}{\partial S} \qquad (1)$$

$$Q\frac{\partial P}{\partial S} = \frac{\partial P}{\partial S} = \frac{\Delta P}{\Delta S} = w\frac{\partial L}{\partial S} = w\frac{H-T}{T} = -w\frac{L+S}{T};$$

$$\Delta P = -w\frac{L_{bti}+S_{bti}}{T}\Delta S_{bti} = -w\frac{L_{ci}+S_{ci}}{T}\Delta S_{ci};$$

$$\Delta P = -w\frac{10}{T}S_{bti} = -w\frac{2}{T}S_{ci};$$

$$5S_{bti} = S_{ci}$$

When the individual finally makes these both purchases, he realizes that he has spent five times more on the search for the cheap item than on the search for the big-ticket item (Malakhov 2011a).

This simple simulation introduces the general relationship between prices, savings on purchases, and search. If we re-arrange the key equation of the reserve maximization model, we can get the correspondence between potential labor income $wL_0 = w(L+S)$ and the price level P_0:

$$\frac{\partial P}{\partial S} = w\frac{\partial L}{\partial S} = w\frac{H-T}{T} = -w\frac{L+S}{T};$$

$$T\frac{\partial P}{\partial S} = dP(S)_{S=T} = -P_0 = -w(L+S) \qquad (2)$$

$$P_0 = w(L+S)$$

Now, when we compare purchases of two items, we have:

$$\frac{\Delta P_i}{\Delta P_j} = \frac{w(L_i + S_i)}{w(L_j + S_j)} \frac{S_i}{S_j} = \frac{P_{0i}}{P_{0j}} \frac{S_i}{S_j} \qquad (3)$$

Indeed, when people plan to save the same amount on purchase of different items ($\Delta P_i = \Delta P_j$), the time of search is inversely proportional to starting prices. If we come back to the "clock radio – TV set puzzle", we can see that if the search for \$5 savings on the purchase of the \$25 clock radio takes from 10 to 20 minutes, the search for \$5 savings on purchase of the \$500 TV set should not be more than a minute. So, the proposal of a reliable friend to go to the other store for \$5 discount on TV looks ridiculous.

People hardly plan savings on purchases of big-ticket items in the same manner like they plan savings on purchases of cheap items. But if they try to save proportionally to starting prices ($\Delta P/P_0$ is constant), they will spend the same time on the search for durables and on the search for necessities ($S_i = S_j$).

The $\Delta P/P_0=k$ assumption corresponds to the Weber-Fechner law on psychophysics in consumption (Thaler 1980, Lindsey-Mullikin and Grewal 2006), but the following $S_i = S_j$ conclusion doesn't go beyond the economics-of-information approach. The Equation 3 only highlights reasons why G.Stigler had paid attention to the role of that law in the development of economic thought much earlier than he wrote "The Economics of Information", where the Weber-Fechner law was indirectly presented by the statement of the relationship between expected savings and expenditures (Stigler 1961). However, when people spend the same time on the search for different items, this phenomenon can really create an illusion that they engage in considerably low price search for important items, because one can expect that the search should be proportional to the importance of an item, i.e., to its starting price.

The analysis of search tactics will not be complete if we do not consider the product lifecycle and the time horizon of the consumption-leisure choice. The explicit time horizon T completes the presentation of the relationship between price P_0, price difference ΔP, and optimal search $S^*=\Delta S$:

$$S^* = \Delta S = \Delta P \frac{T}{P_0} \quad (4)$$

The set of assumptions ($P_0 = wL_0 = w(L+S)$; $\partial P/\partial S = \Delta P/\Delta S$) simplifies the description of the decision-making process, but this simplification looks really casual. The actual search tactics can modify planned values but it cannot change the general relationship between them. ***The optimal search is proportional to the time horizon of the consumption-leisure choice and it is inversely proportional to the price level.***[1] The expected savings ΔP from given search ΔS depend not only on the price dispersion, but also on the trade-off between the price level and the time horizon of the consumption-leisure choice. If the price is disproportionally high relative to the product lifecycle, we expect to save more.

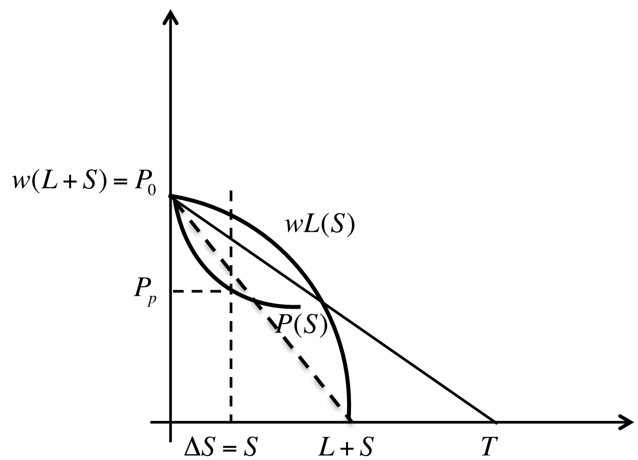
The analysis of the paradox of little pre-purchase search for big-ticket items provides a good illustration of decision-making under price uncertainty and it exhibits the correspondence between the reserve maximization model and the classical model of individual labor supply:

$$MRS(HforQ) = \frac{Q}{L+S} = -\frac{w}{\partial P / \partial S} \partial^2 L / \partial S \partial H = -\frac{w}{\partial P / \partial S} \frac{1}{T} = \frac{w}{P_O} \quad (5)$$

The individual starts to search at the price level P_0, which corresponds to his willingness to pay. The P_0/T ratio tells him that he will find the interesting $\partial P/\partial S$ value, which will be equal to the planned $\Delta P/\Delta S$ value (Fig.1). We can see that $\partial P/\partial S \neq w$.

[1] Although the inverse relationship between price and search seems to be an anomaly, it has deep roots in economic activity. Our example becomes more convincing if we present home production in a form of a "search", where the $QP(S)$ curve represents different combinations of inputs. When we decide to change shutters, we can buy either painted or unpainted shutters, or we can buy only boards to construct shutters ourselves. Moreover, we can buy unpainted big door shutters and boards for small window shutters. The difference between the painting of door shutters and the constructing of window shutters corresponds to the difference between the search for the big-ticket item and the search for the cheap item.

Fig.1



This consideration is ensured not only by the $\partial^2P/\partial S^2>0$ assumption. If $\partial P/\partial S = w$, we have $\partial L/\partial S = -1$. However, it means that either $(L+S) = T$, or $\partial H/\partial S = 0$. Both these equations are not realistic. When $\partial H/\partial S \neq 0$, the propensity to search is $\partial L/\partial S \neq -1$, and due to the diminishing marginal productivity of labor we have $\partial^2L/\partial S^2<0$[2]. Finally, the consumer finds the purchasing price P_p, which a) equalizes marginal benefits of search with its marginal costs; b) maximizes the reserve for subsequent purchases $R(S) = wL(S) - P(S)$, and, c) exhibits the actual or real willingness to pay.

Of course, another individual with higher wage rate will stop the search before. The step-by-step analysis of his individual *MRS (H for Q)* (Equation 5) discovers his higher absolute propensity to search $w\times|\partial L/\partial S|$ and higher willingness to pay $WTP = P_0$, which can be easily enlightened by the price discrimination. This consideration only confirms the need for further methodological as well as empirical studies of the relationship between reservation price, hypothetical, and real willingness to pay. Although the search itself affects the value of the *MRS (H for Q),* the value of the purchase price P_p does not. It is true,

[2] If we take into consideration higher overtime wages, we meet the S-shaped $wl(S)$ curve. However, when an individual gives up overtime work in favor of search, he increases not only the time of search but also the time of leisure (the value $\partial^2L/\partial S\partial H$ becomes negative). In addition, we have the same result when $|\partial P/\partial S|>w$. When markets are really imperfect, individuals voluntarily give up labor in favor of search and they subsequently increase leisure time.

because the purchase price has no relation to the problem how to maximize utility of current consumption and leisure, and it serves only for subsequent purchases.

The purchase price is presented only indirectly in the general relationship between prices, savings on purchases, the search, and the time horizon of consumption-leisure choice:

$$\frac{\Delta S}{T} = \frac{\Delta P}{P_0} \quad (6)$$

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