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RESEARCH IN ECONOMICS AND RURAL SOCIOLOGY

DO BUDGET CONSTRAINTS INDUCE UNHEALTHY FOOD CHOICES IN POOR HOUSEHOLDS?

Recommendations are made by nutritional policies aiming at improving food quality. What is the social impact of these nutritional standards? Are they more difficult to accept by low income populations? It is appropriate to check to what extent, on a theoretical level, nutritional recommendations may be fulfilled with a low food budget. Some studies indicate food consumption of poor populations is influenced by financial constraints. Do these constraints have a significant impact on the foods consumed, possibly inducing nutritional deficiencies? This opens the debate on the relevance of an interventionist policy on food prices.

Food consumption in low income populations

Epidemiological surveys show that disadvantaged people are more exposed to nutritional deficiencies, obesity, cardiovascular diseases and cancer than others. This could, at least partly, be explained by the unfavourable impact of budget constraints on food choice. Several studies show that it is not easy to eat healthily at a low cost.

Food consumption surveys reveal that the consumed quantities from certain food categories by poor households differ from those consumed by the rest of the population: they are lower for fruit and vegetables, especially fresh ones, and fish; they are higher for cereals and other starchy food (Caillavet, 2005).

As to expenditures, disadvantaged households dedicate a larger part of their budget to food (22% for households below the poverty line against an average of 18%, see frame 1). The difference, in absolute level of expenditures, is important, with the food expenditure of the population below the poverty level staying very low per capita (4€ per person and per day against 6.3€ for the population as a whole, see frame 1).

Strong disparities appear in average retail prices (or unit value, obtained by dividing the household expenditure by the purchased quantity for a given group of products), revealing specific purchase strategies. This may be related to the quality of products, the level of food processing and transformation, the type and size of packaging and the kind of shopping places. For example, vegetable oils bought by poor households cost an average of 1.6€ per litre and 2.1€ for the population as a whole. Likewise, meat delicatessen bought by poor households cost 7.1€/kg versus 8.8€ for the population as a whole (Secodip data, 2000). In fact, the relative price hierarchy of food prices *within* large food categories is not necessarily the same for disadvantaged

people and the rest of the population. This may have an impact on the nutritional quality of diets.

Nutritional quality /Food price ratio

Is it possible to get a nutritionally optimal diet with a very small budget? The minimum cost strictly required to fulfil all the nutritional recommendations (NR) for the French population (see frame 2) was estimated at 3.2€ per day and per adult, using linear programming (Darmon et al., 2005b). Poor people, however, in particular food aid recipients, only have an average of 2.5€ per day to spend on food. Meeting the full set of NR with 3.2€ per day implies marked changes from habitual food patterns in the general population. This may not be acceptable and could represent an additional risk of stigmatisation and social exclusion (Darmon et al., 2005b). In particular, to have a nutritious diet at a very low cost, one should increase the consumption of pulses, whole grain cereals, tinned fish, offal, fruit juice, dried fruits and nuts, which is not necessarily attractive for all as far as taste is concerned. As a whole, these results suggest that poor people probably cannot afford to consume diets that fulfil all the nutritional recommendations, even if they have the desire to change their dietary habits and the knowledge of nutrition to do that.

Moreover, such an approach is theoretical because it models the behaviour of a person who would have optimal solving skills and a perfect knowledge of nutritional recommendations, and wish to apply them at the lowest price possible. In fact, quantitative studies rather suggest that individuals facing economic constraints choose diets that provide their energy needs while remaining as close as possible to the habitual food patterns observed in the population as a whole.

This behaviour was modelled by linear programming. This time, the purpose was not to meet all nutritional requirements at the lowest price, but to cover energy needs

with a progressively decreasing food budget, while departing as little as possible from the average food intake of the population (Darmon et al., 2002).

Results show that the most rational way to decrease diet costs, without modifying energy intake, is to decrease the amounts spent on foods which contribute the most to total diet cost. These foods are flesh foods (fish and meat), fruit and vegetables. On the other hand, cereals, which are already the main energy contributor in the diet consumed on average in the general population, occupy an increasing place when the cost constraint is strengthened. This induces a dramatic and negative impact on dietary quality. Decreasing diet costs induces an important increase in energy density, because fresh products with a high water content are replaced by non perishable dried foods and refined products. The Vitamin C content significantly decreases, as well as the contents in most other vitamins and minerals. Budget constraints seem to orient towards unhealthy food choices and diets of low nutritional quality, which is likely to favour nutrient deficiencies as well as obesity and chronic diseases.

Several studies confirm that there is a positive link between estimated diet costs and the consumption of fruit and vegetables, and a negative association between diet cost and the consumption of sweet products and energy-dense foods. Figure 1 shows that people who pay more for a given quantity of dietary energy (that is to say who are in the highest quartile of “energy cost”, EC4) have a lower dietary energy density and higher intakes of antioxidant vitamins, in spite of lower energy intakes (Andrieu et al., 2005).

However, are healthy recommended foods more expensive than others? The positive link observed between the cost of diets and their nutritional quality also exists between the cost and the nutritional quality of individual *foods*. Indeed, energy-dense foods are inexpensive sources of energy but they generally have a low content in essential nutrients (Darmon et al., 2005a, figure 2, see frame 2) while foods recommended for a healthy diet, such as fruit and vegetables, lean meat and fish are often more expensive than energy dense foods (with the noteworthy exception of starchy foods). Dairy products occupy an intermediate place in this hierarchy. Therefore, the current structure of food prices does not seem to favour the practice, by disadvantaged populations, of recommendations which advise consuming diets of low energy density, rich in fruit and vegetables, and of high nutrient density.

Could a modification of relative food prices make healthy foods less expensive and non healthy foods more expensive? To answer that question, we shall try to determinate consumption sensitivity to income and price variations.

Income and price impact on food choices

An income variation has a stronger impact on households below the poverty line than on the rest of the population, especially regarding cereal products, fat foods, fruit and dairy products (see figure 3). For instance, as regards disadvantaged people, a 1% income increase would induce a 1% purchase increase of cereal products, 0.9% of fruit, and 0.6% of fat foods (respectively 0.2%, 0.4% and 0.2% for the population as a whole). But results may strongly vary as

soon as we come to a more detailed breakdown of the products listed and we take into account the influence of fundamental variables (age, education...). Current debates are well illustrated by the case of two strategic nutritional categories.

In the case of fat foods, the greater price sensitivity of poor households is confirmed, especially in households which have a low education level. Many substitution and complementary mechanisms may be observed that are not in other households. For example, an increase in the price of butter (via a “fat tax” for instance) would entail a decrease in the purchased quantities of this product as well as certain oils, and a modification in the distribution of consumption within oils and fat content foods. These series of effects make it difficult to foresee the final consequences on the reduction of the total amounts of consumed fat foods and on the interactions with other foods having a less visible content of grease for the consumer (meats, dairy products...) which are the main sources of saturated animal fats which are bad for the health.

As for fruit and vegetables, poor households from the first income quartile favour processed food consumption, unlike better-off households which favour fresh products (a 1% drop in fresh fruit prices would entail a 0.9% increase in consumed quantities for disadvantaged households and a 1.2% increase for well-off households, see figure 4). The impact of variations in income and prices on purchases indicate the coexistence of two categories among disadvantaged households. For the first category, price variations (or income ones) do not induce a variation in the whole fruit and vegetable purchases (only fresh fruit purchases would increase if there were a fall in fruit and vegetable prices). These households are deprived for several reasons (low income, low level of education, limited food expenses). For these households only a direct food aid would be adapted (transfers in kind). On the other hand, the second category of households is very receptive on the global level (a decrease in fruit and vegetable prices would lead to an increase in consumption of all forms of fruit and vegetables). These households have young children, an average standard of education and appear to cumulate budget and time constraints. In this case an intervention on fruit and vegetable prices as well as an income improvement would be of great benefit (Bertail and Caillavet, 2003).

Targeting disadvantaged populations: an important challenge for interventionist policies on budget constraints

Intervention tools which help promote healthy food choices, especially in the poorest segments of the population, act on two levels: a nutritional one (production standards, information and education, advertisement control...) and an economical one (price, income, labelling standards...). These measures do not appear of equal importance in case of poor households. If, in general, households’ greater sensitivity to price and income shows the importance of economic policies aimed at modifying relative prices, these policies do not lend themselves well to population targeting.

A price intervention on a food product will apply to all households but an additional cost (tax) will put a greater strain on disadvantaged households which dedicate a larger

share of budget to food. The weakness of expenditure per capita leads these households to make the most of relative price hierarchy among categories of products thanks to special purchasing strategies in a formal economic logic (decisions on shopping places, on product quality, on processing degree...). Therefore, for these households, a price variation induces a multiplicity of effects (case of fat foods) making the implementation and control of a direct interventionist policy more difficult.

A policy aiming at lowering the costs of some products (fruit and vegetables) would remain desirable even when it did not preferentially consist of a measure targeting disadvantaged populations. An intervention on fresh food markets (action on production or distribution prices, VAT cuts...) would benefit disadvantaged people but would not reduce nutritional inequalities since well-off households would profit more from them. Hence the importance of an intervention on population groups with homogeneous consumption behaviour, which are easier to target. Nevertheless, for a quite constrained section of the population, there are strong limits to action for re-allocating consumption towards healthier products through food prices at a constant budget, while the low budget itself leads to selecting energy sweet and fat foods

Perspectives

The modification of consumption patterns to fulfill nutritional criteria seems difficult to obtain merely through a price policy, because this would require that healthy foods are not more expensive sources of energy than foods rich in fat, sugar and salt. Nutritional information and education should be a priority. But this tool is not sufficient in the case of constrained populations. To attenuate the deleterious impact of the relative price hierarchy among the poor, actions on prices to improve the nutritional quality of diets in these populations should be considered, either through the rigorous implementation of targeting (actions limited to certain areas or networks of subsidized institutional catering...), or through policies concerning the whole population and that would have positive repercussions on poor households within a rationale of social integration. At all events, these measures do not exclude actions aimed at increasing income (social minima) or food budget (delivery of food purchase coupons restricted to healthy foods such as fruit and vegetables) for disadvantaged households, easy to target in this way. In parallel, interventions on food suppliers are necessary in order to reinforce the nutritional quality of low-cost foods (standards of production) and their visibility (labelling), ensuring that it is at least equivalent to that of higher cost labels products.

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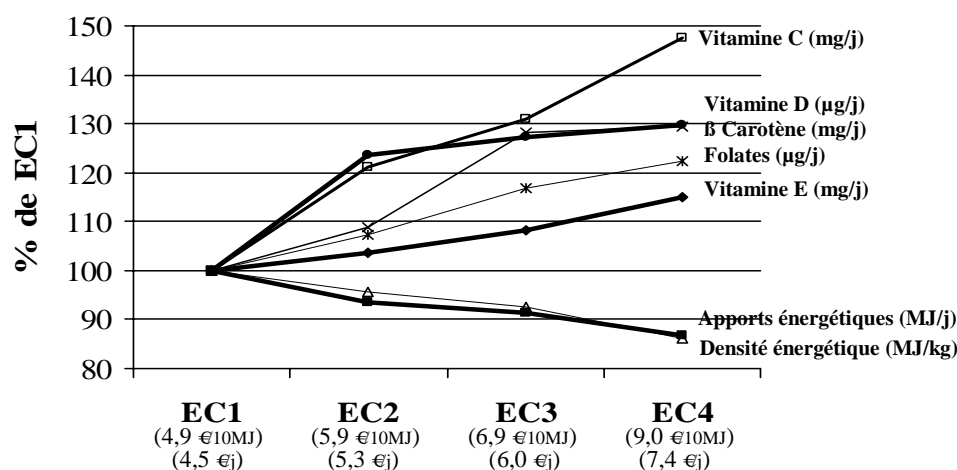
Frame 1: Disadvantaged populations in France

Here, disadvantaged populations represent the poorest populations. Depending on the studies and on available data, they include:

- Households below the poverty threshold: according to the Eurostat definition households which have a family income below 60% of the median income, *i.e.* 732€/month/consumption unit (CU) in 2000 (Insee's Family budget survey). They represent 15% of the population and spend 4€/per day and per UC for food while the average daily expenditure for food in France is 6.3/ CU (Caillavet 2005).

- Households in the first quartile of income per CU: the distribution of adjusted family income is calculated from the number of consumption units in the household according to Oxford-OCDE scale. According to this definition, the 25% households with the lowest income are considered poor (Secodip data). Disadvantaged populations are not fully described by the income criterion. Therefore, the difficulty in defining poverty and identifying heterogeneous populations must be underlined.

Figure 1- Evolution of daily energy intakes, dietary energy density and anti-oxidant intakes per quartile of energy cost (EC) of adults living in France (EC in €10MegaJoules, according to (Andrieu et al.; 2005)



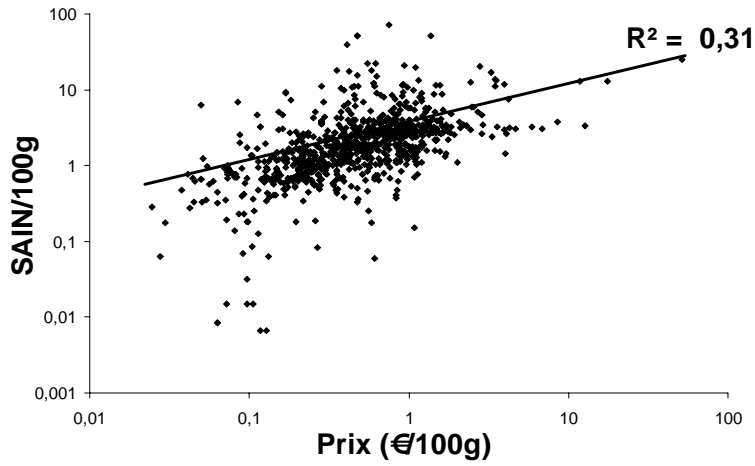
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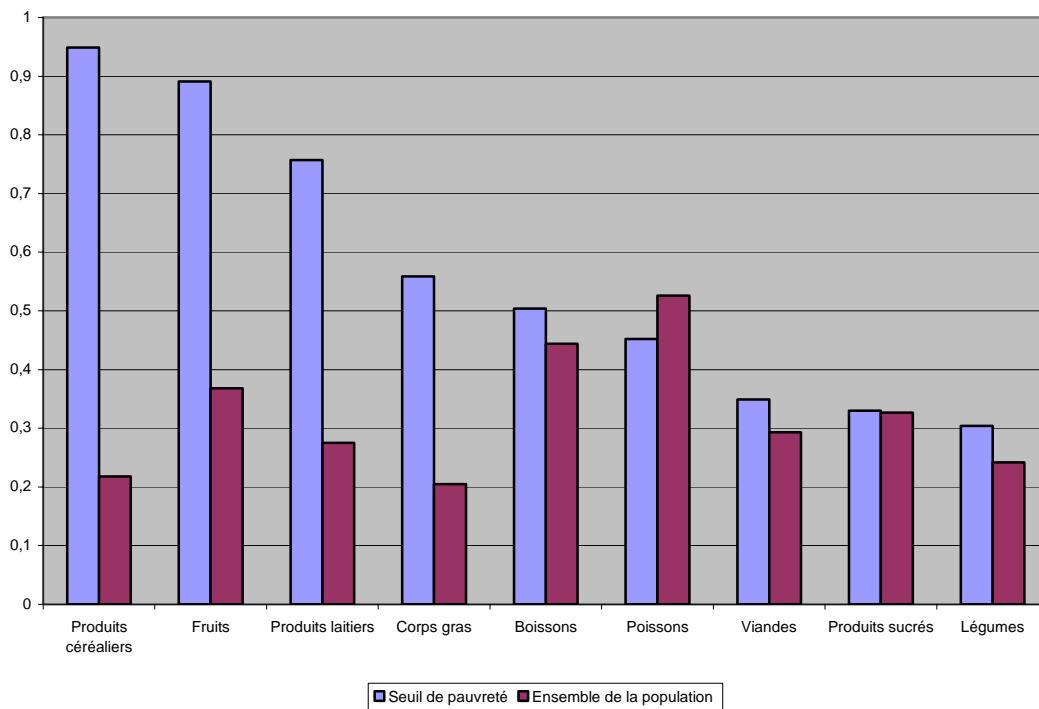
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Figure 2 – Correlation between 637 current food prices and their nutritional quality, measured by NAS/100g (Nutrient Adequacy Score), according to (Darmon et al., 2005a)



**Figure 3 – Income impact on food at home consumption of households below the poverty line
Income elasticity**



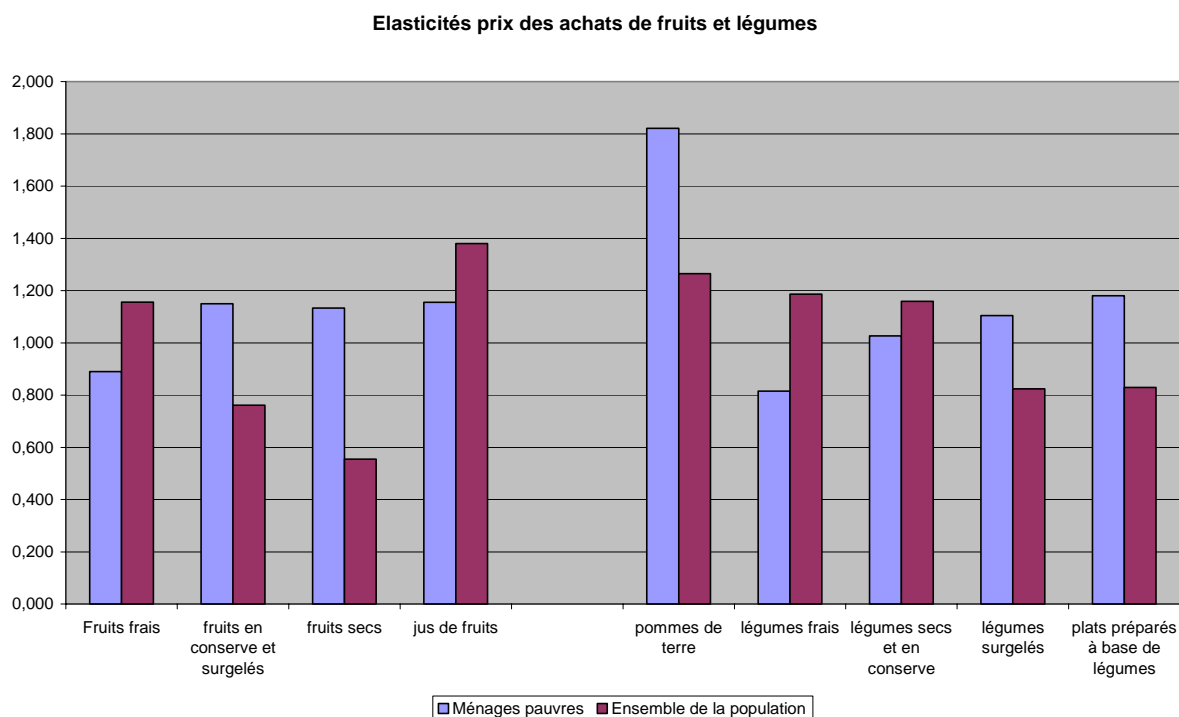
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Figure 4 – Impact of a price decrease on purchases of vegetables and fruit in poor households (1st income quartile) - Price elasticity



Frame 2: Nutrition and Food

There are two types of nutritional recommendations, nutrient-based or food-based:

- nutrient-based recommendations (NR) are a full set of recommendations, including an adequate balance between the energy contributed by proteins, lipids and carbohydrates and appropriate intakes of fatty acids, fibres, vitamins and minerals.
- the French National Health Nutrition Program provides food-based dietary guidelines which promote increased consumption of fruit, vegetables and fish, and reduced consumption of foods rich in fat, sugar and salt. This, by decreasing energy density and increasing nutrient density, will help to get diets of higher nutritional quality. Energy density is the quantity of calories per 100 g in a food or a diet: the higher it is (for instance in foods rich in fat and sugar), the higher the risk for an individual of consuming more calories than necessary, thereby increasing the risk of putting weight. Nutritional density measures the quantity of nutrients provided by 100 kcal of food or diet. It is, then, an indicator of good nutritional quality: the higher it is, the higher the content in essential nutrients relative to the energy content, which limits the risk of vitamin and mineral deficiencies.
- The NAS (Nutrient Adequacy Score) is an indicator of the degree of adequacy of foods to nutritional recommendations. A positive relationship was found between the nutritional quality of individual foods, measured by NAS, and their prices.