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RESEARCH IN ECONOMICS AND RURAL SOCIOLOGY

PRICE, TASTE OR DIETETICS: HOW TO EXPLAIN THE CONTINUITY AND CHANGE IN FOOD PROVISIONING BY THE LADIES OF THE SAINT-CYR CONVENT-SCHOOL IN THE 18th CENTURY

The food supplies at the Convent-School of Saint-Cyr come close to offering the conditions of a laboratory experiment for the analysis of alimentary practices and norms of consumption. The data provides an historical take on our current preoccupations with the possibilities of modifying food habits by way of prices or by the dissemination of information. Food prices do not explain the how and the why of the supplies at Saint-Cyr, whose aristocratic status compelled it to respect certain consumptions. However, the managers were apparently informed about dietary recommendations which do much to account for the secular changes in this institution's food habits. Thus, historical research produces substantial knowledge on the determinants of food purchases; it also offers the opportunity to test the pertinence of a variety of methodologies used to explain (and act upon) the contemporary world.

Material abundance, cautious management

The royal foundation of Saint-Louis in Saint-Cyr was among the richest French convent-schools. And also among the most select since, between 1686 and 1793, it accommodated about 3,000 orphaned girls from the impoverished aristocracy. Surrounded by sixty nuns – the “Ladies” – and attended by thirty auxiliary sisters, 250 girls aged seven to twenty received an education that included handicrafts as well as history, geography, dance and theatre (the pupils' age structure shows no significant variation over the 18th century). In total 340 people lived in comfortable material conditions provided by the generous financial means granted by the Royalty. But at Saint-Cyr wealth did not imply prodigality. On the contrary, rigour is what characterized temporal supplies: administrative rules instructed “the person who will be in charge of the purchases not to stop at one sole merchant of each sort who may possibly abuse her trust but must go to all stalls and shops to locate the best merchandise and to find merchants who will sell goods at a lower price”. Waste was prohibited. Caution and measure presided over the institutional handling of the purse strings. The exhortation was all the more important as guidelines recommended buying everything and forgoing any institutional production (vegetable garden or henhouse). Meticulously consigned accounting data therefore afford a reliable record of the food consumed at Saint-Cyr.

A plethora of calories, nutritional deficiencies

If the diet at Saint-Cyr resulted from stringent management and stood in stark contrast to the ostentatious food consumption at the Royal Court of Versailles, neither pupils

nor teachers suffered. During the 18th century, corn, butcher's meats, butter, milk and eggs provided about 2,000 calories per day and per capita. Foodstuffs that are difficult to quantify completed these supplies: fresh and preserved fish consumed on days without meat and during Lent, game, poultry, a great number of vegetables and fruit (apples, cherries, pears and plums), olive oil, honey, sugar (we estimate daily sugar consumption per person at up to 10 grams – or 40 calories – in around 1780 when it reached its zenith) and Gruyère or Comté cheese (but not the Roquefort so prized by the aristocracy). With filtered water as the sole beverage because wine was only served in case of illness, daily consumption per capita was certainly over 2,500 calories, including non-quantified dishes.

If the contrast with the monotony of popular food is patent, the search for variety also proceeded from dietary vigilance. “We need not only to nourish our pupils”, said the institution's founder Madame de Maintenon in 1691, “but to see them grow. Look after their good health”. Food purchases represented between a quarter and a fifth of the Saint-Cyr budget (Graph 1) and, in spite of a tendency towards restrictions from 1740 on, the number of calories (table 1) and the structure of energy supplies (graph 2) showed great stability throughout the 18th century. Corn and meats, the biggest budget items among food expenses (graph 3) provided respectively 60% and 25% calories (the quantities of consumed bread were calculated from the quantity of corn delivered). This resulted in an excess of proteins in the food served to boarders, when compared to today's recommendations (table 1). But calorie abundance and medical concerns do not necessarily ensure a nutritional balance. Compared to contemporary optima, food availabilities at Saint-Cyr were characterized by a large

insufficiency in calcium and iron (game could partially ease the latter). The available amount of calcium increased from 214mg/day at the beginning of the period to 340mg/day at the end of the period. This nutritional improvement, incidentally insufficient in comparison with modern recommendations which are up to 1200mg/day for women from 12 to 20 years old, was due to the threefold increase in milk consumption; it went from 50 ml up to 160 per head between the beginning and the end of the century.

Market effects?

Budget constraints (which depended on the income from property) and the careful attention given to market prices invite an examination in terms of relative prices in order to account for the evolution of quantities purchased during the century. The model of demand (see frame) immediately raises the question of the realism of the hypothesis. Correlations are good: in fact, the R^2 , higher than 0.60 in six out of nine equations, is never lower than 0.40 but seems higher when the series is agitated or, as in the case of milk, contains a trend. The income effect on purchasing seems to confirm common sense: corn and eggs – and to a lesser extent butter – appear to be insensible to income variations, no surprise for a rich institution. Butcher's meat appears to be a little more reactive insofar as an income increase entailed a similar rise in expenses while the other items follow the tracks of luxury goods; their expenses increased more than proportionally when income was rising. Everything looks as if an income increase led to a reinforcement of food diversity. One could even surmise that the market solved health problems that traditional medicine ignored and could not cure: improvement in available calcium (by way of milk consumption) emerges as a happy externality of the interplay of food prices.

This reasoning would be justified if a higher number of coefficients of the explicative variables were significant. Indeed, less than half of the variables produce a significant effect on supplies. For example, the price of butcher's meat had a significant influence only on the expenses made to buy meat and corn; it is inoperative on the other seven budget items. Moreover, expenses to buy butcher's meat are not affected by prices paid for eggs, milk and butter. The lack of significant coefficients impedes any conclusion on elasticity, that is to say, on reciprocal influences of different prices on the various accounting items (with or without adjusting to income levels). In spite of Mrs de Maintenon's order that the accountant behave like a "good housekeeper" and be notable for "her economical behaviour", the budget parts that we constructed after the event do not explain purchasing.

The search for the economic determinants of food purchases in the short term could stop here. However, as a trend seems to capture the dynamic, an analysis of the relative importance of every explicative variable could be of some benefit. One might be tempted to conclude that the instrumental variable is the main cause of the static model's good adjustment. Yet this needs examination, in particular by making the model itself dynamic. In the meantime, time series raise the question of the stability of tastes. The static model presumes their stability in time: yet could they have changed in the course of the 18th century?

When prices do not explain purchasing

The increase in milk consumption entailed a certain but limited cost at Saint-Cyr: from the beginning to the end of the 18th century, it generated an additional expense of 3.8% in comparison with the amount of the complete budget items. In other words, stability of purchases would have led to savings (as is the case for all other expenses, except eggs; their additional expense is around 1.4%, while the average consumed quantity stays the same with one egg per day and capita). The price of milk had little effect on consumed quantities. It fluctuated between 1703 and 1788, without any upward or downward tendency, while the purchased volume increased. Note, in passing, the very weak correlation between annual price variations for a pint of milk and variations of consumed quantities (R^2 close to 0), an observation that also applies to meat ($R^2=0,02$), corn ($R^2=0,09$), wine ($R^2=0,19$), eggs ($R^2=0,27$) and butter ($R^2=0,39$). This takes us back to the short term but still shows that price variations had little effect on purchasing. Cookery and demographic elements being stable at Saint Cyr, it seems reasonable to think that purchasing depended on other criteria. The hypothesis of stability of taste can be verified by an examination of the economical efficacy of food provisioning. The test consists in supposing that the composition of the basket consumed at the beginning of the century stayed the same throughout the observed period. With the help of current prices, expenses can be calculated at different moments to see if effective purchases corresponded to the rational solution, that is to say, to the one that generated the least cost (Chalfant, Alston 1988).

This test confirms that prices and income are not sufficient to explain the dynamics of food provisioning at Saint-Cyr. Several times during the century, Saint-Cyr's bursar would have done better to keep the same selection in order to achieve savings. In comparison with effective expenses, the alimentary combination of the beginning of the century would have produced a 5% saving in 1740. The one of 1760 would have saved 4% in comparison with the purchases made during the 10 years preceding the French Revolution. Changes in supplies are all the more significant in that it would have been feasible and even economically preferable to buy the basket of the 1780s at the beginning of the century. Therefore, the changes in the composition of the institution's basket are not due to economic conditions since the financial capacity to buy larger quantities of milk existed as early as 1700; what was missing was the desire (or the incentive) to do so. A reduced offer – and not the lack of taste – might also have been the reason for limited supplies. Beyond that question, an irrevocable methodological observation remains: a static econometrical model does not allow an interpretation of the dynamics of food consumption at Saint-Cyr.

From social constraints...

Saint-Cyr managers strove for a diversified diet but were subjected to social expectations. These constraints limited their room for manoeuvre and their possibilities of substitution. The young ladies ate but "the best corn in France" transformed into white bread ("it was excellent", remembered a former pupil around 1750), and hardly less than a pound per day and capita. Same quantity, same criterion of quality for meat, an ostentatious food if there

was one: cheap cuts were excluded from consumption which could not fall below one pound per day and capita without compromising the aristocratic status of the institution. Alternating with days without meat (including the period of Lent which was scrupulously observed), meat consumption averaged 200 grams (7 ounces) per day over the year. This is where the economical principle got overturned. Better have too much meat and distribute what was left to the village poor, “but that seldom happened”, than be at fault with the canons of aristocratic consumption.

...to the re-evaluation of healthy milk properties

What about representations that link food to health? The infirmary may well be the key to the increase in milk consumption in the 18th century. Traditional dietetics had little esteem and hardly any use for milk and dairy products. “It is a suspicious food, little compatible with adult digestive organs”, summarized Diderot and d’Alembert’s authoritative *Encyclopédie* in 1765. But this suspicion receded in the face of a growing acknowledgement of milk’s therapeutic properties. Its slow re-evaluation concerned pulmonary illnesses, quite common at Saint-Cyr which was built on badly drained marshlands. As one pound of meat did not seem enough for convalescent girls, a little quantity of milk seemed to be administered to patients suffering from

phthisis, pleurisy, pneumonia, rheumatism and even dysentery and diarrhoea. Since aristocratic households did not show any markedly increased consumption in milk in the 18th century, it is conceivable that medical advice may have modified institutional food supplies.

Historical reasoning builds up from the empirical reality it tries to explain. If, implicitly or explicitly, it has recourse to theoretical models, nothing seems further from it - when it is well understood - than to fit data into a preconceived frame. Too often facts remind us that no sound interpretation can be constructed by the mechanical use of techniques. Thus, in spite of its formal elegance and relative internal coherence, in no way does the static econometrical model based on price variations explain the changes in the food basket at Saint-Cyr during the 18th century. The distinction between the short and the long term induces the mobilization of other explicative elements such as tastes and “medical” instructions. Beyond the substantial lessons, the retrospective view (which, let us remind ourselves, can be associated in the social sciences to the laboratory experiment in the applied sciences), helps discriminate, confirm or refute theories. This also shows that there can be no applied science without critical vigilance. History may indeed be more narrative than model. It is scientific nonetheless (*Le modèle et le récit*, 2001).

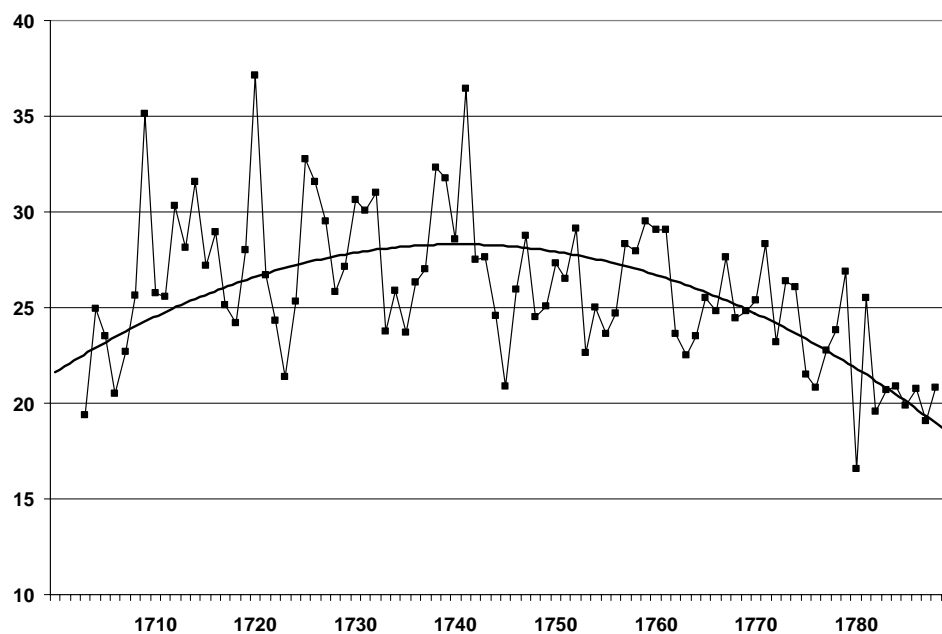
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Graph 1 – Food expenditures as part of the total budget



Graph 2 - Structure of daily energy supplies (per capita and per day)

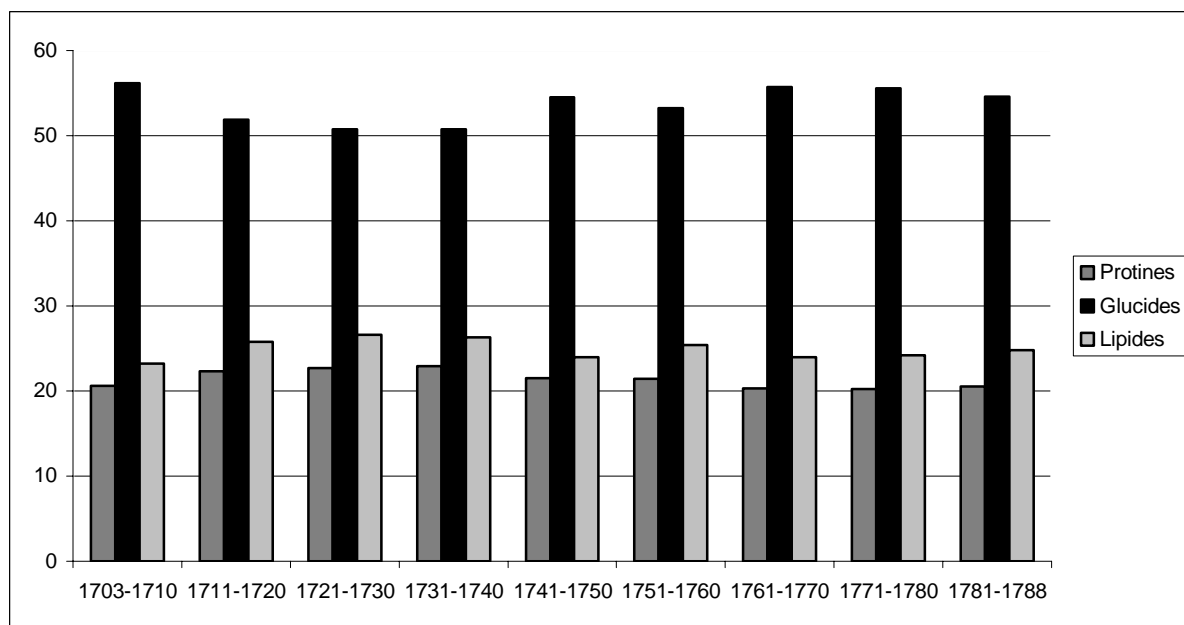
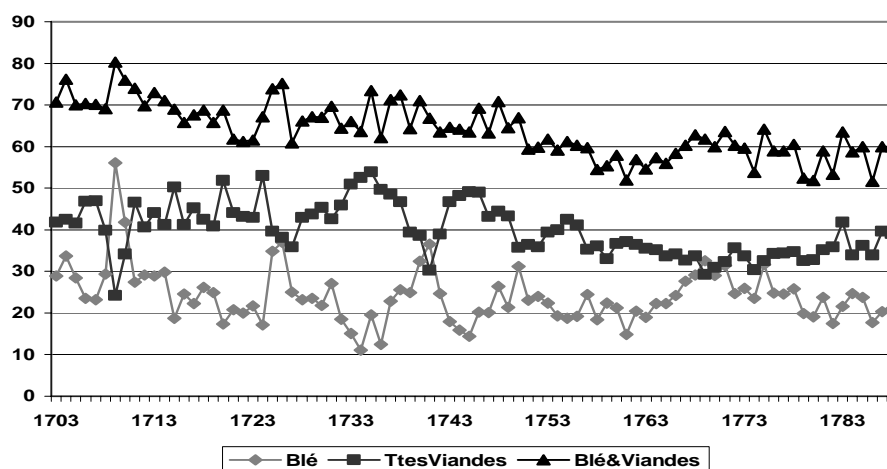


Table 1 – Development of principal food supplies (per capita and per day)

	Bread	Butcher's meat	Milk	Butter	Eggs	
	Kilos	Kilos	Litres	Kilos	Unités (50 gr)	
1703-1710	0,444	0,212	0,05	0,014	0,9	
1711-1720	0,387	0,241	0,07	0,012	0,9	
1721-1730	0,371	0,244	0,09	0,020	0,9	
1731-1740	0,383	0,259	0,10	0,011	0,8	
1741-1750	0,445	0,239	0,11	0,012	0,9	
1751-1760	0,410	0,223	0,12	0,013	1,0	
1761-1770	0,419	0,190	0,11	0,013	1,0	
1771-1780	0,409	0,184	0,12	0,013	1,0	
1781-1788	0,420	0,200	0,16	0,014	1,0	
Calories						Total
1703-1710	1217	445	31	102	80	1875
1711-1720	1059	506	44	92	78	1779
1721-1730	1016	513	54	90	77	1750
1731-1740	1048	543	62	86	68	1807
1741-1750	1220	502	72	87	79	1960
1751-1760	1123	468	74	100	91	1856
1761-1770	1146	399	71	100	85	1801
1771-1780	1121	386	76	100	82	1765
1781-1788	1150	420	99	103	93	1865
Part calories (%)						
1703-1710	64,9	23,7	1,7	5,4	4,3	100
1711-1720	59,5	28,4	2,5	5,2	4,4	100
1721-1730	58,1	29,3	3,1	5,1	4,4	100
1731-1740	58,0	30,0	3,4	4,8	3,8	100
1741-1750	62,2	25,6	3,7	4,4	4,0	100
1751-1760	60,5	25,2	4,0	5,4	4,9	100
1761-1770	63,6	22,2	3,9	5,6	4,7	100
1771-1780	63,5	21,9	4,3	5,7	4,6	100
1781-1788	61,7	22,5	5,3	5,5	5,0	100

Graph 3 - Percentage of corn and meat in total food expenditures



Frame: the system of demand

The system of demand explains the variations of budget parts according to prices and food expenses. Owing to available information, six budget parts, for which we also have prices, have been constructed – corn, butcher's meat, butter, milk, eggs and wine. Other foodstuffs, for which we have only partial quantities, have been put into three other groups – meat-fish-cheese, fruit and vegetables, other products). This gives 6 series of prices and nine series of budget parts. At mid-century, the inclination of certain series of purchased quantities seems to be changing and a dummy variable tests the possibility of an alteration in preferences. The following model has been estimated.

$$w_{it} = \alpha_{i0} + \alpha_{i1}D_t + \sum_{j=1}^6 \gamma_{ij} \log(p_{it}) + \beta_i \log(x_t / P_t) + u_{it}, \quad i = 1, \dots, 9$$

An instrumental variable has been introduced in order to correct the possible biases of simultaneity. It has a significant influence on the results of the estimation, noticeable when it is modified (a quadratic instead of a linear trend). Let us note that the presence of such a trend does not always conform to reality – there always remains the possibility of a stochastic trend – and that it does not resolve autocorrelation problems of errors which tend to plague time series. Moreover, this model is static and ignores the dynamic nature of the studied data.