

Why did the industrial diet triumph? The massification of dairy consumption in Spain, 1965-1990*

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Why did the industrial diet triumph?

The massification of dairy consumption in Spain, 1965-1990*

The rise of a mass, agri-industrial diet after the Second World War was crucial for the culmination of the nutritional transition that Western countries had been involved in since the second half of the nineteenth century. But, why did the industrial diet triumph? This article takes the massification of dairy consumption in Spain 1965-1990 as a study case. Using a newly constructed database and qualitative material within an evolutionary socioeconomics framework, the article reaches two conclusions. First, the massification of dairy consumption was linked to most households' transition to a softer budget constraint, which was driven mainly by increasing household incomes (and only secondarily by the consumer price reductions caused by food industrialization). And, second, the reason why the softening of the budget constraint played such a major role was that it was joined by a substantial increase in consumer trust in dairy products, which in turn resulted from industrial standardization. The article is in line with recent work that underlines the discontinuity in diet change brought about by food industrialization, but questions that the latter's major contribution was of a quantitative, price-related nature and suggests that more attention should be paid to the qualitative, preferences-related dimension.

I

The great transformation undergone by the Western diet in the nineteenth and twentieth centuries was originally conceptualized as a 'nutritional transition'. Between

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around 1850 and 1970, Western populations would have gradually abandoned their traditional, precarious diet. The modern diet would feature not only higher food intakes but also a restructuring of the food mix – crop-based foods, cereals and other basic grains in particular, would not play as crucial a role as in the past, while livestock-based foods such as meat, milk and eggs would become increasingly important. This perspective had been anticipated by historian Maurice Aymard in the 1970s and became very influential after it was more systematically elaborated by nutritionist Barry Popkin and geographer David Grigg in the 1990s.¹ Popkin and Grigg not only described what the nutritional transition was, but also explored its determinants. Their view of causation was primarily macroeconomic, linking the nutritional transition to modern economic growth. In Grigg's words, the nutritional transition would have been 'prompted by the long term rise in real incomes that followed industrialization'.²

By the time the Popkin-Grigg view became influential, however, a more complex view of diet change was beginning to take shape through the works of the Montpellier school of agri-food economics and the sociological theory of food regimes. In terms of description, the new view did not identify one single, long-term nutritional transition, but rather a succession of two distinct consumption regimes – before and after food production became a large-scale, industrial pursuit. For instance, according to the leader of the Montpellier school, Louis Malassis, diet change between around 1850 and 1950 would have been influenced by the industrialization of food production, but would have taken place mostly on the basis of non-processed foods. It would have been between 1950 and 1980 when a 'mass, agri-industrial diet' would have triumphed.³

¹ Aymard, 'Pour une histoire de l'alimentation' ; Popkin, 'Nutritional patterns'; Grigg, 'Nutritional transition'.

² Grigg, 'Nutritional transition', p. 247.

³ Malassis, *Trois âges*. See a convergent account in the seminal contribution to food regime analysis; Friedmann and McMichael, 'Agriculture and the state system'.

In terms of causation, the new view downplayed macroeconomic variables and highlighted the major role played by mesoeconomic transformations in the food production chain instead. Diet change after the Second World War, in particular, was seen as a direct outcome of the making of an industry-dominated food system. Food industrialization would have generated major productivity gains that would have been largely transferred to consumers through diminished food prices, which in turn would have made meat, milk and (more generally) processed foods more easily affordable for all social strata. For sociologists working on food regime theory, in particular, this would be an era characterized by a ‘cheap food economy’, ‘premised on generalized [...] standardization of diets’.⁴

This new view is the one that has eventually become most popular among food historians. As an illustration, the influential interpretation by Peter Scholliers stresses that after 1945 food-related changes took place on a much larger scale and at a much higher speed than in any previous periods. There would have been an acceleration of technological innovation and organizational change in all nodes of the food chain (farming, processing, transportation, retailing), as well as an unprecedentedly rapid transformation in diets.⁵ In Scholliers’ words, ‘the gradual but definite fall of real food prices (...) co-created and was even a condition of the so-called era of mass consumption in many countries after 1950’.⁶ Even Grigg in later works eventually incorporated the ‘long-term decline in the real price of food’ to his account of diet change in the modern West.⁷

⁴ Magnan, ‘Food regimes’, p. 379.

⁵ Scholliers, ‘Post-1945 global food developments’. See also the authoritative states of the art by Brassley, ‘Food production’, and Petrick, ‘Industrial food’, for Western Europe and North America respectively.

⁶ Scholliers, ‘Post-1945 global food developments’, p. 347. The quote refers to the mass consumption of food and non-food items, but captures well Scholliers’ main argument in relation to food consumption.

⁷ Grigg, ‘Changing geography’, p. 2. Even in this latter formulation, though, Grigg does not explain falling food prices from a food system perspective, but merely as a result of rising agricultural productivity.

There are, however, at least two weaknesses in this conventional wisdom. The first of them is of an empirical nature. Both the older and the newer views of diet change have been based mostly upon impressionistic evidence coming from secondary sources. We lack detailed studies of the way in which movements in consumer income and food prices softened the budget constraint that households were facing by the time they were considering the possibility of transitioning towards the new diet. In the absence of such studies, it is difficult to conclude that the mesoeconomic causes of diet change (such as the industrialization of food production) were more powerful than the macroeconomic determinants (such as economic growth) –or the opposite.

A second weakness is of a conceptual kind. The debate implicitly revolves around the budget constraint that households were (or were not) facing, but leaves little room for consumer agency. The debate revolves around the economic possibilities of consumers, but does not consider whether for a given budget constraint consumers were (or were not) predisposed towards consuming the carrier foods of the nutritional transition. The issue has been commonly resolved by assuming in a generic way that the emergence of modern nutritional science, backed and manipulated by States and food companies, would have oriented consumers in directions that favoured the progress of the nutritional transition and the industrial diet.⁸ Recent works on the history of food quality, however, give us a less linear view of the way in which consumers constructed their opinions about food. The technical biographies of specific foods, such as the ones produced by historian Alessandro Stanziani and geographer Peter Atkins, reveal the existence of a recursive interaction between producers, consumers, technicians and the State in order to delimitate the physical and chemical properties that a given food item should possess in order to

⁸ See for instance Dixon, 'From the imperial to the empty calorie'; Biltekoff, 'Critical nutrition studies'; and Grigg, 'Changing geography'.

legitimately claim a given food name.⁹ An important topic in this literature is the way in which the introduction of industrial methods of food processing created a new context in which social interaction aimed at setting food standards would become both more conflictive and more productive. The issue of the qualitative differences between processed foods and natural foods, or between different types of processed foods, has however received almost no attention in accounts of the nutritional transition and the triumph of the industrial diet.

The case study that follows tries to make a contribution to the debate by facing the empirical and conceptual shortcomings identified above. The rest of the article is organized as follows. After this introduction, section II presents the study case and motivates its relevance for the broader debate. Section III presents a conceptual framework and the empirical strategy linked to it. Section IV explores the results. Section V provides an analytical discussion of those results. The conclusions in section VI summarize the main arguments by providing a brief chronological narrative and reflecting on the general implications of the study.

II

The case selected here is that of dairy products in Spain between the 1960s and the 1980s. Spain may be an interesting case because it gives us a particularly striking contrast between the two historical stages discussed above.¹⁰ Both the nutritional

⁹ Stanziani, *Histoire de la qualité alimentaire*; Atkins, *Liquid materialities*, and ‘Long genealogy of quality’.

¹⁰ The following is based on Cussó, ‘Estado nutritivo’; Cussó and Garrabou, ‘Dieta mediterránea’; Pujol and Cussó, ‘Transición nutricional’; Germán, ‘De la historia agraria’; and Abad and Naredo, ‘Sobre la “modernización”’.

transition and the industrialization of food production had already been underway in the century prior to around 1960. Especially during the decades before the Civil War of 1936-1939, food intakes had become more abundant, more regular and (even if slightly) more diverse. A modern food processing industry, in turn, had been taking shape since the second half of the nineteenth century, becoming one of the major branches in the early stages of the country's industrialization.

However, by 1960 Spanish consumers were far from having completed their nutritional transition, and Spain's food system was far from being industry-dominated. On the demand side, calorie intakes may have been sufficient and widely similar across social groups, but most diets remained poor in proteins, vitamins and key minerals such as calcium. The consumption of meat and milk, in which major gaps between higher- and lower-income groups existed, had actually become a very visible marker of social status among households. On the supply side, the commercialization and consumption of farm output was taking place mostly through traditional, small-scale, unspecialized channels and networks rather than through those related to the processing industry.

Drastic change took place after 1960, though. On the demand side, the consumption of meat, milk and eggs became widespread among all status groups, while the consumption of basic, crop-based foods (such as those based on cereals and legumes) decreased. On the supply side, the food processing industry grew rapidly and became the major node of the food system. The integration of farmers in industry-dominated networks escalated, as did the proportion of processed foods within the country's total food supply.

The case of dairy products is representative of these trends. Still by the mid-1960s, Spain's level of dairy consumption was very low for Western standards. The consumption of liquid milk, in particular, had been on the rise since the late nineteenth century, but

mostly among high-income groups and in a tiny strip of Atlantic-climate regions in the north of the country. For low-income groups, milk was too expensive a product. Outside the Atlantic-climate strip, the production of cow's milk under the (by then prevailing) organic technologies was very costly because rainfall was scarce and irregular and this imposed a heavy constraint on the availability of meadows and natural pasture lands. Due to this combination of supply- and demand-side obstacles, the spread of milk consumption was taking place very slowly. By 1965 around one quarter of Spain's population did not drink any milk on a regular basis. This was not compensated in a substantial way by higher levels of consumption of dairy products other than liquid milk. In contrast to northern European countries, butter was not popular (in large measure because vegetal fats, olive oil in particular, were widely available). And, in contrast to other southern European countries, cheese consumption was low (in spite of cheese production being mostly free from the environmental constraints alluded to above) and there had never been an autochthonous tradition of producing fermented milks (such as yoghurt) whether on a domestic or on an industrial scale.¹¹

In the quarter century after 1965, however, a dramatic transformation took place (figure 1; table 1). The consumption of dairy products grew very rapidly, especially between the mid-1960s and the mid-1970s. The product that led the way was liquid milk, especially processed liquid milk. By 1990, the consumption of liquid milk (and increasingly cheese and yoghurt as well) had become massive and was widespread across all social groups and regions in the country. It was probably one of the fastest-growing

¹¹ Hernández Adell, 'Difusión de un nuevo alimento'; Muñoz Pradas, 'Consumer populations'; Nicolau and Pujol, 'Variaciones regionales'; Calatayud and Medina-Albaladejo, 'Leche sin prados'; Collantes, "'Because they just don't want to'". For an international perspective on dairy consumption, see Valenze, *Milk*; Velten, *Milk*; Wiley, *Re-imagining milk*; and Smith-Howard, *Pure and modern milk*.

experiences in European dairy history and it allowed for a substantial convergence to the dairy consumption levels prevailing in most of Western Europe.¹²

[FIGURE 1]

[TABLE 1]

The massification of dairy consumption made a major contribution to Spain's progress in biological living standards during the period. Prior to dairy massification, calorie and protein intakes had already risen well above biological needs, but most population suffered from severe calcium deficiency. Spain was actually one of the Western European countries where heights were lowest. After the 1960s, conversely, most households were able to correct the calcium deficiency problem and the boost in dairy consumption was joined by an equally remarkable boost in heights.¹³

These demand-side developments coincided with major changes on the supply side. Still by 1965, dairy farmers sold merely one quarter of their milk output to dairy processors. There were actually just a few processors and most of them were involved in the secondary market niche of condensed and powdered milk. Around 85 per cent of the milk drunk by consumers was raw milk that they would buy from dairy farmers or small traders. By 1990, however, an extended group of processors were buying from farmers more than three quarters of the latter's milk output and were selling consumers almost 80 per cent of the milk that they drank.¹⁴ This extraordinarily rapid process of dairy

¹² Collantes, 'Dairy products'.

¹³ Cussó, 'Estado nutritivo'; Martínez-Carrión, 'Living standards'; Trescastro-López *et al.*, 'Malnutrición y desigualdades'. Regional variations in heights are consistent with this argument; see Pérez-Castroviejo, 'Biological welfare'.

¹⁴ Collantes, 'Places in common'; *id.*, 'Dairy products'.

industrialization is in many ways reminiscent of what the literature has described for the West's food system after 1945.

The case of dairy products in Spain is also representative of the broader historiographical trends presented in the introduction. Early accounts, especially that by José Manuel Naredo, explained rapid growth in dairy consumption as a consequence of economic growth and the subsequent rise in household income. This would have made it easier for consumers to afford foods that, as was the case of milk, had a relatively high income elasticity (a sort of stylized fact that Naredo incorporated exogenously to the analysis).¹⁵

Later explanations, however, have emphasized supply-side transformations instead. Alicia Langreo, for instance, has put consumption growth in relation to the industrialization of milk production and the changes taking place in State policy. The Franco regime had implemented an active policy in favour of dairy industrialization as early as 1952, but it was only from 1966 onwards when the policy would have become truly successful. The major instrument of this policy was the creation of a network of so-called 'milk centrals' – private companies that received a public licence to produce pasteurized milk within a given local area under price conditions set by the State. Langreo's interpretation is that the price conditions set by the State in the early days of this policy implied profit levels that were too low, while the policy revision that took place in 1966 restored profitability and the incentives for investment in milk processing. This in turn would have made it possible for populations outside the rainfall-abundant regions of the country to become regular drinkers of milk at reasonable prices.¹⁶ The interpretation proposed by Josep Pujol and Xavier Cussó also stresses the role played by

¹⁵ Naredo, *Evolución de la agricultura*, pp. 259-260. Consistently with this, recent research identifies low household income as the key obstacle to the unfolding of Spain's nutritional transition in the early twentieth century; see Gallego, 'Obstáculos comerciales'.

¹⁶ Langreo, *Historia de la industria láctea española*. See also Domínguez, 'La industria láctea'.

the introduction of industrial technologies for food processing. Under an organic technological regime, the climate conditions prevailing in most of Spain would have hindered the development of a nutritional transition, especially the spread of meat and milk consumption. It would have been food industrialization, of which dairy industrialization would serve as a suitable illustration, what would have freed Spain's food system from such constraints and would have allowed for dairy (or, for that matter, meat) consumption to become massive.¹⁷

III

The conceptual framework used here is based on Malassis' theoretical synthesis about food consumption. Malassis proposes that changes in food consumption can be explained by developments in three areas: consumers' demand capacity, producers' supply capacity, and the socio-cultural context. Demand capacity basically depends on household income and its social distribution. The relative price of foods would give an indication about the evolution of supply capacity. Finally, the socio-cultural context includes a large number of variables which would influence consumers for or against particular food items and practices. Socio-cultural variables would range from objective variables, such as household organization or the settlement structure of the population, to subjective variables such as consumers' qualitative preferences.¹⁸

¹⁷ Pujol and Cussó, 'Transición nutricional'. See also M. González de Molina, D. Soto, J. Infante and E. Aguilera, '¿Una o varias transiciones? Nuevos datos sobre el consumo alimentario en España (1900-2008)', paper presented at the XIV International Congress of the Spanish Agricultural History Society. For a case study of diet change in the meat sector, see Clar, 'La soberanía del industrial'.

¹⁸ Malassis and Padilla, *Économie agro-alimentaire*, pp. 225-30; Malassis, *Trois âges*.

This conceptual base can be integrated in the broader framework of evolutionary socioeconomics.¹⁹ The state of each of the three (groups of) variables presented above would result from selection environments that are semi-autonomous from one another. This allows for a variety of possible paths of diet change, depending on the degree up to which developments in each of these semi-autonomous spheres fit well with one another. The coming together of propitious developments in macroeconomic, mesoeconomic and socio-cultural terms would lead to the emergence of food consumption regimes, such as the one identified by Malassis for the period 1950-1980 (the mass, agri-industrial consumption regime). A lower degree of coherence would result in transitional intervals, such as those that some studies have found for periods both before and after the triumph of the industrial diet.²⁰

A simple empirical strategy can be used in order to operationalize this conceptual framework. It consists of two distinct levels.²¹ The first of them deals with the economic possibilities of consumers and investigates the household budget constraint faced by the latter. We can approach this empirically by observing household income and the relative price of particular foods. More specifically, we will follow the strategy that both Malassis and Scholliers borrow from economist Jean Fourastié: given the price of a given food item in a given moment in time, we will measure the proportion of its income that an average household would have to spend in order to secure the purchase of some benchmark quantity of that food item.²² Decreases in that proportion would indicate a softening of the budget constraint and, moving one step beyond Malassis or Scholliers,

¹⁹ There are several different strands of both evolutionary economics and socioeconomics. What comes next is based on the history-friendly strands represented by economists Freeman and Louçã, *As time goes by*, and surveyed by sociologist Hellmich, 'What is socioeconomics?', pp. 16-17, respectively.

²⁰ Collantes, 'Dairy products'; id., "'Because they just don't want to'".

²¹ See a related (albeit not identical) differentiation in Mintz, *Tasting food*, who uses the notions of 'outside meaning' and 'inside meaning' to refer to 'grand changes' and 'daily life' variables, respectively.

²² Malassis and Padilla, *Économie agro-alimentaire*, pp. 248-257 ; Scholliers, 'Post-1945 global food developments', pp. 345-348.

we may decompose the respective contributions of income and prices to said softening. In our case, this would allow us to confront the macroeconomic hypothesis, which attaches great importance to income growth, with the mesoeconomic arguments that highlight the impact of food industrialization on consumer prices.

A second level of analysis deals with consumer preferences and orientations. Two consumers may be facing the same budget constraint and still behave differently if their qualitative valuations of the food items under study are different. Economic calculations are, following sociologist Mark Granovetter, embedded in assessments and orientations of a not strictly (or perhaps not even remotely) economic nature.²³ In our case these assessments and orientations are crucial because they define the empirical field over which changes in income and prices exert an impact on consumer behaviour. An indirect empirical approximation to this is what we may call the responsiveness factor – the ratio between change in consumption and change in price-adjusted purchasing power. Even though this is not an elasticity from a formal point of view, the intuition behind it is more or less similar. As a matter of fact, we would expect that, as is the case with conventional elasticities, responsiveness factors would decline gradually as the life cycle of a product unfolds. In the early stage of the product life cycle, consumption grows much more rapidly than price-adjusted purchasing power. The product enters next a more mature stage in which consumers are still responsive to increases in purchasing power, but not as much as before. Finally, when the last stage of the life cycle sets in, consumers become barely responsive to changes in the economic situation and consumption may even decrease as consumers become more interested in other, more novel products.²⁴

²³ Granovetter, 'Economic action', classically argues that individual economic action is embedded in a wider set of social, cultural and political institutions.

²⁴ See Martin and Sunley, 'Conceptualizing cluster evolution', for a review of the literature on product life cycles.

The main quantitative source used here are the household budget surveys conducted by the Instituto Nacional de Estadística for 1964/5, 1973/4, 1980/1 and 1990/1.²⁵ They provide data on consumption of the main dairy products, household expenditure (which can be used to calculate implicit consumer prices), and household income. Except for the 1973/4 survey, the information is disaggregated by products, income groups and provinces. This is a highly reliable source for the study of food consumption in Spain.²⁶

It is more controversial whether this source can be used for the study of household income, since it seems to suffer from some under-reporting bias.²⁷ The results that are presented in the next section, though, would be similar if we used income data from alternative sources such as national accounts. In order to consider scale economies in household consumption, a conventional Luxembourg equivalence scale has been applied.²⁸ The results are virtually identical if other alternatives (such as an Oxford scale) are chosen, or if we choose to apply no equivalence scale at all.

When it comes to dairy prices, the province-level implicit prices contained in the source have been weighed by province populations (the most disaggregated spatial unit for which data are available). This gives a more realistic picture of the budget constraint faced by the average household than nation-level implicit prices. The problem with nation-level implicit prices is that in the early part of our period the milk market was poorly integrated on a national scale and there were large regional differences in both consumption and prices, which biases nation-level implicit prices towards the experience of high-consumption, low-price provinces and against that of low-consumption, high-

²⁵ INE, *Encuesta de presupuestos familiares*.

²⁶ See Collantes, 'Evolución del consumo de productos lácteos', for detailed source criticism.

²⁷ Torregrossa, 'Sticky income inequality'.

²⁸ Population figures were taken from Nicolau, 'Población'. The scale was calculated for census years first and interpolated to the rest of years later.

price provinces.²⁹ Anyway, the discrepancies between the results presented next and the results that we would get if we used nation-level implicit prices are minor and actually run against the arguments defended here.

It was necessary to perform some manipulations upon the raw data in order to improve their comparability over time and, in some cases, produce plausible conjectures about the order of magnitude of some variables which were not directly observable. The social and territorial categories of the surveys, for instance, were homogenized.³⁰ The general price index was used to deflate nominal expenditure and nominal prices.³¹ The absence of consumption data in the 1973/4 survey was dealt with by assuming that the observable growth in the 1964/5-1980/1 period had been distributed between the pre- and post-1973/4 subperiods in the proportions that can be derived from an alternative, indirect source: the food balances estimated by the Ministry of Agriculture on an annual basis.³²

In order to obtain data for processed versus raw milk, the available figures for sterilized versus other (raw and pasteurized) milks for 1980/1 and 1990/1 were used, while the consumption shares of each type of milk were triangulated with the nominal price data for sterilized, pasteurized and raw milk provided by an alternative source for 1988: the food consumption panel published by the Ministry of Agriculture, Fisheries and Food.³³ It has been assumed that the very stable price ratios between these three types of milk that can be observed for the 1980s were there in 1964 as well. This is an arbitrary assumption, but a sensibility analysis based on other possible alternatives reveals that the price ratios should have undergone changes of a truly disproportionate magnitude in order

²⁹ See for instance Ramos, 'Industria láctea'.

³⁰ See Collantes, 'Más allá de los promedios', for details.

³¹ Instituto Nacional de Estadística, www.ine.es, 'Índice general de precios'.

³² Ministerio de Agricultura, *Agricultura española*; id., *Anuario*; MAPA, *Anuario*.

³³ MAPA, *Consumo alimentario*.

for the results presented here to be affected in any substantial way. All in all, this is clearly the most conjectural element in the article's quantitative base.

The quantitative information has been complemented with qualitative material taken from a systematic review of the two main professional dairy journals in the period: *Revista Española de Lechería* (the publication of which had started in 1951) and *Industrias Lácteas Españolas* (which was published for the first time in 1978). These journals provide a very heterogeneous set of materials, ranging from scientific articles to editorial pieces, as well as business news and advertisements. The information that these materials provide about consumers' desires and anxieties will be useful in order to interpret and explain the quantitative results (the responsiveness factors, in particular).³⁴

IV

The budget constraint that Spanish households were facing at the start of the period was remarkably hard. The subsequent massification of dairy consumption was strongly linked to the transition towards a softer constraint (table 2). In order to measure this, we may fix the consumption benchmarks of 100 kilograms of milk, five kilograms of cheese and/or 10 kilograms of yoghurt per person and year. Each of these represents a modest threshold of regular consumption – approximately, one cup of milk every day, a 100-gram portion of cheese every week and/or a couple of yoghurts per week. Still by the mid-1960s, the average household had to use more than four per cent of its income in order to purchase 100 kilograms of milk. This value would have increased over six per cent in case that the household had added five kilograms of cheese per person and year.

³⁴ See DuPuis, *Nature's perfect food*, for a defense of this sort of material, especially advertisements, as a source of information about consumer orientations.

[TABLE 2]

Is this much? Or is it little? Obviously, one may always argue that spending six per cent of the household's income was perfectly feasible as long as other consumption objectives were sacrificed. In this absolute sense, the budget constraint was clearly not unsurmountable. In a relative sense, though, the constraint was remarkable. Taking into consideration the proportions of household income that were absorbed by other expenditures (most of which were on basic needs such as food, dress and housing), the average household did not actually allocate more than four per cent of its income to purchasing milk and cheese.³⁵

Furthermore, the budget constraint faced by the average household does not capture well the economic obstacles that prevented many households from becoming regular consumers of dairy produce. In the lowest income quartile, for instance, buying 100 kilograms of milk per person and year would have absorbed as much as the prohibitive figure of almost 12 per cent of household income. Consumers in the Mediterranean and the South regions were facing a significant budget constraint as well. It is not surprising that, under these circumstances, the consumption levels of low-income households and the two mentioned regions remained well below the country's average.

In the following years, however, the budget constraint became much softer. Around 1980, the economic effort that the average family had to make in order to reach the very same benchmarks had decreased to around one half of what it had been in the mid-1960s. The budget constraint became softer for all social groups and regions. This was particularly remarkable for low-income groups and for the traditionally low-

³⁵ See Maluquer de Motes, 'Consumo', for a general overview of consumption trends.

consumption regions of the Mediterranean and the South. A telling comparison is that by the end of the period the consumption of one cup of milk every day in the South (the poorest region in the country) required a household budget effort lower than that which the high-income households had had to face back at the start of the period. Figure 2 shows how those provinces in which the budget constraint was originally hardest and milk consumption was lowest gradually transitioned towards the area in which other provinces had been from the start – an area in which the budget constraint was soft and milk consumption was widespread.

[FIGURE 2]

In summary, the budget constraint became softer and this favoured a rapid increase in dairy consumption and the latter's diffusion even across those income groups and regions that had traditionally lagged behind. Having said that, what was more important for the softening of the budget constraint? Was it the evolution of consumer income or the evolution of dairy prices? Table 3 shows that in general terms it was the increase in household incomes. In the crucial case of milk, the period of fastest-growing consumption (1964-73) was actually a period during which the relative price of milk was even slightly on the rise, as it had already been the case (albeit more sharply) in the late 1950s and early 1960s.³⁶ Only during a brief period in the 1970s did the decrease in milk prices become the major element in the softening of the budget constraint. In the case of the main dairy product other than milk, cheese, the income effect was always dominant and there was also a moment (in this case, 1973-80) in which the relative price increased and, therefore, made a negative contribution to the softening of the household budget

³⁶ Collantes, 'Nutritional transitions'.

constraint. In the case of yoghurt, the data available for the 1980s show the income effect dominating slightly over the price effect.

[TABLE 3]

Breaking down these results according to social and territorial categories confirms that the income effect generally prevailed over the price effect (table 4). There is only one case, the case of milk in the Mediterranean region in the early part of the period, in which we find a price effect of a magnitude similar to that of the income effect. For this to happen, the lowest rate of household income growth had to combine with the highest initial prices and the largest subsequent price reduction. Province-level data reveal that in only eight out of fifty provinces (most of them belonging precisely to the Mediterranean region) the price effect was larger or similar to the income effect. Beyond these exceptions, the income effect prevailed clearly over the price effect for most disaggregations and products.

[TABLE 4]

If we move into the area of consumer orientations, table 5 gives an estimation of responsiveness factors for those products and periods for which making the calculation is possible. At first sight, the factors are unsurprising and seem to reflect the life cycle trajectory of each product. In the early years of the period, the responsiveness factor of milk is below one, but still quite high. This corresponds to an intermediate stage in the product life cycle, so that households still react to increases in purchasing power by adjusting their consumption level upwards. As milk consumption spreads, though, the

product enters a more mature stage in which the responsiveness factor is smaller and eventually becomes negative. Starting as it does from a very low initial level of consumption, cheese shows responsiveness factors that are higher, even if similarly declining over time. The results for the 1980s prefigure the transition, which would culminate in the next decade, towards a new regime of dairy consumption featuring the substitution of milk by cheese and refrigerated desserts as key products.³⁷

[TABLE 5]

The intriguing point lies in the integration of these responsiveness factors into a longer-run picture, especially in the crucial case of milk. In figure 3 we can see that milk does not follow a conventional life cycle curve – the responsiveness factor does not decrease gradually. The responsiveness factor was very high in the earlier part of the twentieth century, but by the years prior to the start of our period it had fallen to almost zero. That is, consumption experienced almost no change in spite of a remarkable increase in households' purchasing power taking place. Had such a responsiveness factor persisted during our period, the softening of the budget constraint that we have found above would have had barely any effect upon consumption. However, what actually happened is that the responsiveness factor came to be much higher. Consumers not only improved their economic capacity to buy milk, but also became more favourably oriented towards milk consumption.

[FIGURE 3]

³⁷ Collantes, 'Dairy products'.

A social and territorial disaggregation does not suggest much about the making of this higher responsiveness factor. The responsiveness factors of income groups and provinces follow a fairly conventional life cycle curve: as figure 4 shows, those income groups and provinces that had higher initial levels of consumption tended to be less responsive than those other groups and provinces for which the product life cycle was at an earlier stage. The problem is that this cross-section pattern cannot help us at answering the longitudinal question of why then the aggregate responsiveness factors of 1964-73 or even 1973-80 were higher than those of 1958-64, when consumption was actually much lower in the latter period.

[FIGURE 4]

The interesting disaggregation is the one that we can perform according to the type of milk that was consumed. If we abandon the assumption of milk as a homogenous good, we find an enormous difference between the responsiveness factor of raw and processed milk (table 6). The responsiveness factors of raw milk are negative and increasingly so. Processed milk, on the contrary, had attached a very high responsiveness factor at the start of the period. Actually, the sharp rise that we find in aggregate consumer responsiveness from the mid-1960s onwards, which apparently suggested a somewhat anomalous product life cycle, results from the conjunction of two conventional life cycles – an early one for raw milk and a later one for processed milk (figure 5). The raw milk cycle had entered the stage of stagnation by the late 1950s, when more than 85 per cent of milk was still consumed raw, but it was not until around one decade later that processed milk began to capture significant shares of the market and it was not until around two decades later that processed milk eventually displaced raw milk as the main type of milk

consumed in Spain. This mismatch made the aggregate responsiveness factor fall to very low levels in the late 1950s and early 1960s and created the conditions for the factor to rise again as processed milk led the way to mass consumption from the mid-1960s onwards.

[TABLE 6]

[FIGURE 5]

V

It is time now to discuss the evidence presented in the previous section. In line with the mesoeconomic interpretations that have been dominating the debate lately, there seems to be a case for arguing that food industrialization was crucial for diet change. However, the main contribution of food industrialization was not of a quantitative, price-related nature (as is claimed by this literature), but of a qualitative, preferences-related nature. The argument that follows considers successively the quantitative and the qualitative dimensions of diet change.

On purely quantitative grounds, there is more life in the macroeconomic interpretation of the nutritional transition than is usually acknowledged in the increasingly influential mesoeconomic accounts. This is so at least in the study case chosen here. From a macroeconomic perspective, Spain was one of the fastest-growing countries in the West during this period, especially in the early part of it (which, as we have seen, was the key moment for the massification of dairy consumption). This was also a period in which inequality in income distribution decreased. In consequence, most households

experienced a rapid increase in income, which allowed for a major revolution in consumption patterns. Food, taken as a whole, lost importance within household budgets and, for the first time ever, the expenditure in goods and services that were not directly related to the satisfaction of basic needs became significant. It was precisely then when Spanish social scientists started to talk about the making of a ‘consumer society’ – probably an imprecise expression from a historical point of view, but very revealing of the intensity with which contemporaries experienced these transformations.³⁸

In comparison with these changes in the macroeconomic sphere, the mesoeconomic changes at the food system level were not so profound, at least when it comes to their impact on the price of dairy products. It is true that the price perceived by dairy farmers fell early and steadily (table 7). This was related to technological upgrading, especially through biological innovations such as the substitution of autochthonous breeds by Frisian, high-yield cows.³⁹ Lower farmer prices, however, did not translate automatically into lower consumer prices. Until around the mid-1970s, the sum of the costs and profits added by dairy processors and commercial intermediaries actually increased, which more than cancelled out the effect of decreasing farmer prices upon consumer prices.

[TABLE 7]

It is not possible to provide here a full analysis of the causes, but they seem to be related to the structural problems that pervaded the articulation of a modern dairy chain in Spain. Most processing plants were too small to seize scale economies properly.

³⁸ Prados de la Escosura, *Progreso económico*; id., ‘Inequality’; Maluquer de Motes, ‘Consumo’; Alonso and Conde, *Historia del consumo*.

³⁹ Calcedo, ‘Crisis, evolución y cambio’.

Moreover, for much of the year many of them were operating well below their potential capacity.⁴⁰ Furthermore, the State policy of licensing local monopolies was distorting the economic geography of the dairy chain, favouring the proliferation of processing plants in territories where dairy farming was weak.⁴¹ Finally, the successful revision of dairy policy that took place in 1966 was successful precisely because it allowed for a rise in the profitability of dairy processing. During the previous decade and a half, the price transmission chain fixed by the State had implied profit rates that were too low and after 1966 the State tried to stimulate investment in dairy processing by fixing price bands that were more favourable to processors.⁴²

It has to be noted that, alongside these processing-related issues, there were remarkable commercialization costs, both upstream and downstream from the processing plants. Upstream, the cost of collecting raw milk, an activity that was only very partially internalized by processors, was among the highest in Europe because the collection networks were very fragmented due to the presence of a large number of small farms, many of them located in remote areas in the country's northernmost region.⁴³ Downstream, there was much fragmentation in retailing too – small family businesses prevailed with little capacity to exert a substantial downward pressure on consumer prices.⁴⁴

Of course, there was some gradual mitigation of these structural problems, especially from the mid-1970s onwards. The creation and expansion of the first supermarket and hypermarket chains generated large efficiency gains that had an

⁴⁰ Astarloa, 'Las compensaciones de la Administración'; Martos, 'Las empresas lácteas españolas en la hora de Europa'.

⁴¹ Collantes, 'Places in common'.

⁴² Langreo, *Historia de la industria láctea*; Domínguez, 'La industria láctea'.

⁴³ Briz, 'Anotaciones al mercado lácteo'; Martos, 'Las empresas lácteas españolas en la hora de Europa'; *IIE*, 'Éxito', pp. 18-19.

⁴⁴ Collantes, 'Food chains'.

important impact on consumer prices. Moreover, large retailers quickly positioned milk as a hook product: they set extraordinarily low prices in order to attract consumers to their shops. In a way that remained perfectly legal until 1996, supermarkets often sold milk at below-cost prices.⁴⁵ In the area of milk processing, in turn, plants and companies became larger as a result of mergers, takeovers and internal expansion strategies. Moreover, the gradual orientation of both processors and consumers towards long-life, UHT (ultra-high temperature) milk increased the competitive pressure within the industry. One major reason for this was that the production of UHT milk was not subject to the restrictions to inter-firm competition (for instance, local-level production licences) that structured the supply of pasteurized milk.⁴⁶

By the time retailers and processors had entered this stage, however, the great expansion of dairy consumption was over. In fact, it has been suggested along Schumpeterian lines that it was precisely the de-acceleration of demand what led the dairy chain towards a long phase of restructuring around an ever smaller number of large-size business units and farms.⁴⁷ The dairy chain did not generate remarkable price reductions while the pressure of demand was high. It did so only when said pressure began to loosen. Furthermore, it is interesting to see that the eventual reduction in consumer prices was possible in spite of, and not because of, the evolution of costs and profits in the dairy processing industry (table 7 above). Put briefly, the consumer price of milk needed some time to decline and, when it eventually did, the cause was not dairy industrialization.

The crucial contribution made by dairy industrialization did not have to do with prices, but with consumer trust. Processors were actually producing a commodity that was substantially (some 20-25 per cent) more expensive than the substitutive good that

⁴⁵ Collantes, 'Food chains'.

⁴⁶ Langreo, *Historia de la industria láctea*.

⁴⁷ Collantes, 'Food chains'.

consumers had available – raw milk.⁴⁸ And yet, as the evidence on responsiveness factors presented in the previous section suggests, consumers were much more interested in the new, expensive milk than in the traditional, cheaper version. As the period progressed, the consumption of raw milk became more and more circumscribed to low-income groups, while most consumers seemed more than willing to pay a quality premium for processed milk (figure 6).

[FIGURE 6]

According to many testimonies, processed milk was widely perceived as qualitatively superior to raw milk because it was more reliable. At the start of the period, in the early 1960s, consumers were well aware of the health benefits of drinking milk, which were insistently voiced by both physicians and State-led promotional campaigns. However, most milk available for purchase was raw milk, and consumer trust in raw milk was deteriorated. Frauds, adulterations and intoxications were very common in the raw milk chain. As in many other European countries at an earlier date, this was due to the presence of asymmetric information and the weakness of collective and public action when it came to setting quality standards and enforcing anti-fraud legislation.⁴⁹ In contrast, dairy processors supplied a standardized product that did not entail any health risks and had not been subjected to any fraudulent adulterations. The great contribution of dairy industrialization to the massification of consumption was not making available milk that was particularly cheap, but milk that was trustworthy. This happened only after

⁴⁸ Collantes, 'Evolución del consumo'.

⁴⁹ Collantes, "'Because they just don't want to'".

the mid-1960s, when the growth of Spain's processing industry made it possible that large quantities of processed milk be for the first time available in all parts of the country.⁵⁰

This interpretation is consistent with an analysis of the promotional campaigns launched by dairy processors during the period. In the remainder of this paper it is not possible to undertake that analysis in a systematic way, but at least one main message can be presented: quality, defined mostly in terms of security and reliability, was the major theme in the commercial messages that dairy processors sent to their potential consumers. This focus on quality was an attempt on the part of processors to capitalize on consumers' anxiety about fraud and adulteration as common elements in the experience of consuming raw milk. In the later part of the period, all four dairy processors that made the largest expenditure in advertising, all of them leading brands (with a joint market share close to 40 per cent), placed quality and reliability at the forefront of their public communication strategy (table 8). An exploration of other important brands (some ten brands with a joint market share of about one third) shows that this was a general trend.⁵¹ The generic promotional campaigns launched by the State stressed the greater security of drinking processed milk as well.⁵² The message was further reinforced by complementary initiatives taken by dairy processors on a local scale, such as allowing their plants to be regularly visited by housewives and schoolchildren.⁵³

[TABLE 8]

⁵⁰ Langreo, *Historia de la industria láctea*. Prior to that, cheapness had even become a suspicious attribute; see *REL*, 'Información', pp. 54-55, for a particularly revealing testimony.

⁵¹ This claim is based on a systematic revision of hundreds of advertisements published in *Revista Española de Lechería* and *Industrias Lácteas Españolas*. The data on brands and market shares come from Martos, 'Las empresas lácteas españolas en la hora europea', p. 28.

⁵² See for instance Ministerio de Agricultura, Pesca y Alimentación, 'Campaña', pp. 26-27.

⁵³ Lacasa, 'La publicidad', p. 22.

Interestingly, this is in contrast with the commercial messages sent by the main yoghurt producers, a relevant control case because none of them was simultaneously involved in milk production. Quality was completely absent from yoghurt advertisements, which were oriented towards stressing health benefits, freshness or the links between yoghurt consumption and self-consciously ‘modern’ lifestyles. Unlike milk, yoghurt had always been an industrial, standardized product that consumers did not associate with fraud, food scares or scandals.⁵⁴

The ubiquity of quality and trustworthiness in the commercial messages sent by milk processors is consistent with the interpretation proposed here. For a consumer who was aware of the alleged benefits of milk consumption and had an income level way above that of previous generations, the key issue was to overcome the qualitative problems of (raw) milk. Consumers became more receptive to milk because processors made it more trustworthy.

VI

As late as the mid-1960s, dairy products were not a major element in the Spanish diet. For many households, especially those of low income and those located in regions where dairy farming was poorly developed, purchasing dairy produce on a regular basis implied too big an economic effort. Moreover, the low quality of the dairy products actually available in the market (raw milk, in particular) was making consumers less and less willing to use any increases that might take place in their purchasing power to buy more dairy produce. Spain’s level of dairy consumption was among the lowest in the

⁵⁴ *REL*, ‘Bibliografía’, p. 35.

West, and calcium deficiency was a major nutritional problem. During the quarter-century that followed, this situation changed drastically. Dairy consumption grew very rapidly and became massive, while Spain's calcium intake made it for the first time into the bands set by international dietary recommendations.

This great transformation can be explained within a conceptual framework that integrates the theoretical synthesis by economist Louis Malassis in an evolutionary framework. The massification of dairy consumption resulted from the emergence of a high degree of structural coherence in the co-evolution of three groups of semi-autonomous factors: demand capacity, supply capacity, and consumer preferences. Rapid economic growth, especially until the mid-1970s, translated into rapid growth in household incomes, which in turn greatly softened the budget constraint that households were facing. This was joined by the making of a modern dairy chain, led by an emerging milk processing industry. The rise of dairy industrialization, together with biological innovation in dairy farming, mitigated the inflationary pressures that had been experienced in the milk market in the years prior to the mid-1960s. In time, (especially from the mid-1970s onwards), supply-side changes (especially in retailing) would eventually favour a reduction in consumer prices, which reinforced the effect of increasing household income on the budget constraint. Finally, these changes in income and prices had a large impact on actual consumption because consumers became more favourably oriented to dairy products than in the recent past. The main reason was that dairy industrialization made processed milk available in large quantities all across the country. Processed milk was not cheaper than raw milk (which until then had been the main type of milk consumed), but it was more trustworthy. Once processed milk became a real option, consumers became interested again in devoting some part of their increasing purchasing power to buying more milk.

It is true that coherence between these different developments was not complete. In particular, the move towards an industry-dominated dairy chain did not lead to rapid, major consumer price reductions. There were important shortcomings in both milk processing and commercial intermediation, and this prevented supply-side changes from substantially reinforcing the effect of increasing household incomes. All in all, the degree of structural coherence was remarkable, especially if we take the years prior to the mid-1960s as the reference for comparison. In the 1950s and early 1960s, household income was increasing rapidly, but this did not lead to rapid increases in dairy consumption because supply-side problems produced dairy inflation and deteriorated consumer trust. From the mid-1960s onwards, the boost that took place in dairy industrialization strengthened the coherence of the mesoeconomic sphere with a macroeconomic sphere that had been evolving in a sufficiently propitious way for quite some time.

What are the broader historiographical implications of this case study? The case basically confirms the newer view of modern diet change that is associated to food regime theory, the Montpellier school of agri-food economics or recent food history – namely, that the West's nutritional transition from the mid-nineteenth century to the late twentieth century was actually a sequence composed of two distinct food consumption regimes: before and after food came to be produced mostly by industrial companies using mass production systems. Nevertheless, the study presented here presents an alternative perspective on the causes why food industrialization created this discontinuity.

Much has been written about processors' capacity to supply cheap food and, consequently, to foster the spread of a new kind of diet in post-1945 Western societies. In our study case, however, we do not find much of that: the contribution made by food industrialization to softening the household budget constraint was secondary in relation to income growth. By focusing almost exclusively on the food system mesoeconomic

level, approaches like food regime theory tend to ignore that the decades after 1945 were exceptional not only because of the making of an industry-led food system, but also (and perhaps more relevantly) because economic growth in the West was faster than ever before or ever after. It is necessary to take into account this macroeconomic golden age before assuming that it was food industrialization what led the expansion of consumers' economic possibilities. Furthermore, it has to be considered that the macroeconomic golden age, through its effect on household incomes, could not but make it more difficult for the food system to generate large, rapid price reductions for those products that were still at an expansive stage in their life cycle. The issue is empirical in the end and illustrates the problems of approaching diet change through impressionistic evidence and little connection to broader literatures on socio-economic change (as is commonly the case in food regime theory).⁵⁵

In our case, the discontinuity brought about by food industrialization was rather of a qualitative nature. The key was not that industrial food was cheaper than organic food (actually, it was more expensive), but that it was standardized. Present-centred social science literature has often portrayed industrial, mass-produced food as low-quality food, especially when discussing the so-called 'quality turn' that in the last thirty or forty years has been led by organic and artisan food, territorial denominations, slow food and short food chains, all of which can be read as attempts to transcend industrial food.⁵⁶ Historians have often projected this image of industrial food as low-quality food backwards in time. However, we would do well in suspecting that each new consumption regime may have had some quality turn of its own – some turn towards new varieties of food products that

⁵⁵ This applies mostly to food regime analysis; see Friedmann, 'Commentary', for revealing insider criticism on this. See also Hamilton, 'Analyzing commodity chains', for outsider criticism on similar grounds. However, it also applies to the increasingly influential current in food history that is based on post-modern epistemologies; see Pilcher, 'Introduction', for illustrations.

⁵⁶ Goodman and Redclift, 'Modernisation'.

were qualitatively different from (and from some point of view perceived as superior to) the varieties that had been available until then.⁵⁷ For the myriad of consumers whose everyday decisions built the triumph of the industrial diet, the possibility of gaining access to standardized food and getting rid of the reliability problems that were associated to organic and/or traditional foods may well have been truly perceived as a quality turn. Industrial food was not high-quality food in gastronomic, nutritional or sensorial terms, but it was good enough for consumers to be willing to pay a quality premium for it – that is, just what vanguard, post-industrial food consumers do today when transitioning to a diet rich in organic foods and smaller-scale productions. It has been suggested that the current food consumption regime is defined by consumers undertaking much qualitative substitution within food groups (for instance, substituting whole milk by fat-free milk and probiotic fermented milk), but it is likely that analogous, organic-by-industrial substitutions were already taking place in the decades after the Second World War.⁵⁸

An open question is, of course, how generalizable the insights provided by this study case are. The case of Spain, an economy that grew faster than the Western average during most of the period, may entail some bias for the argument defended here about income growth as the major driver of the expansion of consumers' economic possibilities.⁵⁹ Perhaps in other Western countries, where economic growth was slower and/or the nutritional transition was at a more advanced stage, the price effect may have played a more prominent role. The choice of dairy products for this study may have entailed some additional bias in the same direction. Milk is among the food products with a more complex, conflict-laden technical biography.⁶⁰ Perhaps the qualitative discontinuity brought about by industrialization was not so sharp for other food products.

⁵⁷ See also van Otterloo, 'Fast food'.

⁵⁸ On qualitative substitutions, see Malassis, *Trois âges*.

⁵⁹ See Prados de la Escosura, *Progreso económico*.

⁶⁰ Atkins, *Liquid materialities*; id., 'Long genealogy'; Stanziani, *Histoire de la qualité alimentaire*.

This does not mean that the case studied here should be seen as an anomaly, though. After all, the period after 1945 was a macroeconomic golden age all across the West, which raises the threshold beyond which the price reductions generated by food industrialization could become a major force in the softening of the budget constraint. On the other hand, almost all food product groups, and not just dairy products, underwent important transformations in composition, texture and taste as a result of the substitution of organic or semi-artisan production methods by large-scale, industrial methods. This must have created substantial room for food industrialization to exert the kind of qualitative impact found in this article.

Future research may clarify whether the hypotheses posed here are pertinent and, if so, the ways in which they should be qualified and revised. The conceptual framework and empirical strategy used for this study case may be applied to other countries and products in order to move forward in that direction.

Footnote references

- Abad, C. and Naredo, J. M., ‘Sobre la “modernización” de la agricultura española (1940-1995): de la agricultura tradicional hacia la capitalización agraria y la dependencia asistencial’, in C. Gómez Benito y J. J. González, eds., *Agricultura y sociedad en la España contemporánea* (Madrid, 1997), pp. 249-316
- Alonso, L. E. y Conde, F., *Historia del consumo en España: una aproximación a sus orígenes y primer desarrollo* (Madrid, 1994).

- Astarloa, J. R., 'Las compensaciones de la Administración por renunciar a las concesiones administrativas de las Centrales Lecheras no son lo esperado por las industrias', *Industrias Lácteas Españolas*, 86 (1986), pp. 9-13.
- Atkins, P. J., *Liquid materialities: a history of milk, science and the law* (Farnham, 2010).
- Atkins, P. J., 'The long genealogy of quality in the British drinking-milk sector', *Historia Agraria*, 73 (2017), pp. 35-58.
- Aymard, M., 'Pour une histoire de l'alimentation: quelques remarques de méthode', *Annales: Économies, Sociétés, Civilisations*, 30 (1975), pp. 431-444.
- Biltekoff, C., 'Critical nutrition studies', in J. M. Pilcher, ed., *The Oxford handbook of food history* (New York, 2012), pp. 172-190.
- Brassley, P., 'Food production and food processing in western Europe, 1850-1990: some conclusions', in Y. Segers, J. Bieleman and E. Buyst, eds., *Exploring the food chain: food production and food processing in Western Europe, 1850-1990* (Turnhout, 2009), pp. 281-287.
- Briz, J., 'Anotaciones al mercado lácteo en España', *Revista de Estudios Agrosociales*, 99 (1977), pp. 35-79.
- Calatayud, S. and Medina-Albaladejo, F. J., 'Leche sin prados: los factores ambientales e institucionales en el consumo lácteo (Valencia, 1870-1936)', *Ayer*, 105 (2017), pp. 157-185.
- Calcedo, V. 'Crisis, evolución y cambio en la ganadería de vacuno de leche de la España húmeda (1950 al 2000)', in R. Domínguez, ed., *La vocación ganadera del norte de España: del modelo tradicional a los desafíos del mercado mundial* (Madrid, 1997), pp. 207-286.

- Clar, E., 'La soberanía del industrial. Industrias del complejo pienso-ganadero e implantación del modelo de consumo fordista en España: 1960-1975', *Revista de Historia Industrial*, 36 (2008), pp. 133-165.
- Collantes, F., 'La evolución del consumo de productos lácteos en España, 1952-2007', *Revista de Historia Industrial*, 55 (2014), pp. 103-134.
- Collantes, F., 'Dairy products and shifts in Western models of food consumption since 1950: a Spanish perspective', *Rural History*, 26, 2 (2015), pp. 249-268.
- Collantes, F., 'Más allá de los promedios: patrones de segmentación del consumo de productos lácteos en España, 1964-2006', *Investigaciones de Historia Económica*, 11, 2 (2015), pp. 103-115.
- Collantes, F., 'Food chains and the retailing revolution: supermarkets, dairy processors and consumers in Spain (1960 to the present)', *Business History*, 58, 7 (2016), pp. 1055-1077.
- Collantes, F., 'Places in common: exploring the economic geography of the food system through the case of Spain's dairy chain', *The Low Countries Journal of Social and Economic History*, 13, 4 (2016), pp. 17-40.
- Collantes, F., 'Nutritional transitions and the food system: expensive milk, selective lactophiles and diet change in Spain, 1950-1965', *Historia Agraria*, 73 (2017), pp. 119-147.
- Collantes, F., "'Because they just don't want to": dairy consumers, food quality, and Spain's nutritional transition in the 1950s and early 1960s', *Agricultural History*, 91, 4 (2017), pp. 536-553.
- Cussó, X., 'El estado nutritivo de la población española 1900-1970. Análisis de las necesidades y disponibilidades de nutrientes', *Historia Agraria*, 36 (2005), pp. 329-358.

- Cussó, X. and Garrabou, R., 'Dieta mediterránea y transición nutricional moderna en España', in L. Germán, J. Moreno and R. Hernández, eds., *Economía alimentaria en España durante el siglo XX* (Madrid, 2009), pp. 25-63.
- Dixon, J., 'From the imperial to the empty calorie: how nutrition relations underpin food regime transitions', *Agriculture and Human Values*, 26, 4 (2009), pp. 321-333.
- Domínguez, R., 'La industria láctea en España, 1830-1985', in C. Barciela and A. di Vittorio, eds., *Las industrias agroalimentarias en Italia y España durante los siglos XIX y XX* (Alicante, 2003), pp. 457-495.
- DuPuis, E. M., *Nature's perfect food: how milk became America's drink* (New York, 2002).
- Freeman, C. and Louçã, F., *As time goes by: from the industrial revolutions to the information revolution* (Oxford, 2001).
- Friedmann, H., 'Commentary: food regime analysis and agrarian questions: widening the conversation', *Journal of Peasant Studies*, 43, 3 (2016), pp. 671-692.
- Friedmann, H. and McMichael, P., 'Agriculture and the state system: the rise and decline of national agricultures, 1870 to the present', *Sociologia Ruralis*, 29, 2 (1989), pp. 93-117.
- Gallego, D., 'Obstáculos comerciales y salariales a la transición nutricional en la España de comienzos del siglo XX', *Investigaciones de Historia Económica*, 12, 3 (2016), pp. 154-164.
- Germán, L., 'De la historia agraria a la historia de la economía alimentaria', in L. Germán, J. Moreno and R. Hernández (eds.), *Economía alimentaria en España durante el siglo XX* (Madrid, 2009), pp. 7-23.
- Goodman, D. and Redclift, M., 'Modernisation and the international food system: re-articulation or resistance?', in C. Sarasúa, P. Scholliers y L. van Molle, eds., *Land*,

- shops and kitchens: technology and the food chain in twentieth-century Europe* (Turnhout, 2005), pp. 120-138.
- Granovetter, M., 'Economic action and social structure: the problem of embeddedness', *American Journal of Sociology*, 91, 3 (1985), pp. 481-510.
- Grigg, D., 'The nutritional transition in Western Europe', *Journal of Historical Geography*, 22, 1 (1995), pp. 247-261.
- Grigg, D., 'The changing geography of world food consumption in the second half of the twentieth century', *Geographical Journal*, 165, 1 (1999), pp. 1-11.
- Hamilton, S., 'Analyzing commodity chains: linkages or restraints?', in W. Belasco and R. Horowitz, eds., *Food chains: from farmyard to shopping cart* (Philadelphia, 2008), pp. 16-26.
- Hellmich, S. N., 'What is socioeconomics? An overview of theories, methods, and themes in the field', *Forum for Social Economics*, 46, 1 (2017), pp. 3-25.
- Hernández Adell, I., 'La difusión de un nuevo alimento: producción y consumo de leche en España, 1865-1936' (Ph.D. thesis, Universitat Autònoma de Barcelona, 2012).
- ILE [*Industrias Lácteas Españolas*], 'Éxito de las V Jornadas Lactológicas', *Industrias Lácteas Españolas*, 93 (1986), pp. 9-24.
- Lacasa, A., 'La publicidad y su importancia en el conjunto de productos lácteos', *Revista Española de Lechería*, 14 (1990), pp. 17-26.
- Langreo, A., *Historia de la industria láctea española: una aplicación a Asturias* (Madrid, 1995).
- Magnan, A., 'Food regimes', in J. M. Pilcher, ed., *The Oxford handbook of food history* (New York, 2012), pp. 370-388.
- Malassis, L., *Les trois âges de l'alimentaire: essai sur une histoire sociale de l'alimentation et de l'agriculture* (Paris, 1997).

- Malassis, L. and Padilla, M., *Économie agro-alimentaire, III. L'économie mondiale* (Paris, 1986).
- Maluquer de Motes, J., 'Consumo y precios', in A. Carreras and X. Tafunell, coords., *Estadísticas históricas de España, siglos XIX-XX* (Bilbao, 2005), pp. 1247-1296.
- Martin, R. and Sunley, P., 'Conceptualizing cluster evolution: beyond the life cycle model', *Regional Studies*, 45, 10 (2011), pp. 1299-1318.
- Martínez-Carrión, J. M., 'Living standards, nutrition and inequality in the Spanish industrialisation. An anthropometric view', *Revista de Historia Industrial*, 64 (2016), pp. 11-50.
- Martos, P., 'Las empresas lácteas españolas en la hora de Europa', *Industrias Lácteas Españolas*, 128 (1989), pp. 35-45.
- Martos, P., 'Las empresas lácteas españolas en la hora europea: mercado y dinamismo industrial', *Revista Española de Lechería*, 12 (1989), pp. 24-30.
- Ministerio de Agricultura, Pesca y Alimentación, 'Campana de orientación al consumo de leche pasteurizada', *Industrias Lácteas Españolas*, 56 (1983), pp. 26-27.
- Mintz, S. W., *Tasting food, tasting freedom: excursions into eating, culture, and the past* (Boston, 1996).
- Muñoz Pradas, F., 'Consumer populations and nutritional transition in Spain in the twentieth century: a methodology for their reconstruction', *Histoire & Mesure*, 26, 2 (2011), pp. 131-173.
- Naredo, J. M., *La evolución de la agricultura en España* (Barcelona, 1971).
- Nicolau, R., 'Población, salud y actividad', in A. Carreras and X. Tafunell, coords., *Estadísticas históricas de España, siglos XIX-XX* (Bilbao, 2005), pp. 77-154.

- Nicolau, R. and Pujol, J., 'Variaciones regionales de los precios de consumo y de las dietas en España, en los inicios de la transición demográfica', *Revista de Historia Económica*, 24, 3 (2006), pp. 521-553.
- Pérez-Castroviejo, P. M., 'Biological welfare during the economic development of the Basque Country: Biscay, 1850-2000', *Revista de Historia Industrial*, 64 (2016), pp. 183-212.
- Petrick, G. M., 'Industrial food', in J. M. Pilcher, ed., *The Oxford handbook of food history* (New York, 2012), pp. 258-278.
- Pilcher, J. M., 'Introduction', in J. M. Pilcher, ed., *The Oxford handbook of food history* (New York, 2012), pp. xvii-xxviii.
- Popkin, B. M., 'Nutritional patterns and transitions', *Population and Development Review*, 19, 1 (1993), pp. 138-157.
- Prados de la Escosura, L., *El progreso económico de España (1850-2000)* (Bilbao, 2003).
- Prados de la Escosura, L., 'Inequality, poverty and the Kuznets curve in Spain (1850-2000)', *European Review of Economic History*, 12, 3 (2008), pp. 287-324.
- Pujol, J. and Cussó, X., 'La transición nutricional en Europa occidental, 1865-2000: una nueva aproximación', *Historia Social*, 80 (2014), pp. 133-155.
- Ramos, M., 'La industria láctea catalana', *Revista Española de Lechería*, 87 (1973), pp. 25-28.
- REL [*Revista Española de Lechería*], 'Información', *Revista Española de Lechería*, 23 (1957), pp. 53-56.
- REL, 'Bibliografía', *Revista Española de Lechería*, 111 (1979), pp. 31-43.
- REL, 'Informe', *Revista Española de Lechería*, 19 (1990), pp. 12-15.

- Scholliers, P., 'Post-1945 global food developments', in P. Freedman, J. Chaplin and K. Albala, eds., *Food in time and place: the American Historical Association companion to food history* (Oakland, 2014), pp. 340-363.
- Smith-Howard, K., *Pure and modern milk: an environmental history since 1900* (New York, 2014).
- Stanziani, A., *Histoire de la qualité alimentaire: France XIX^e-XX^e siècles* (Paris, 2005).
- Torregrosa, S., 'Sticky income inequality in the Spanish transition, 1973-1990', *Revista de Historia Económica*, 34, 1 (2016), pp. 39-80.
- Toutain, J.-C., 'La consommation alimentaire en France de 1789 à 1964', *Économies et Sociétés*, 5, 11 (1971), pp. 1909-2049.
- Trescastro-López, E. M., Galiana-Sánchez, M. E., Pereyra-Zamora, P., Moncho, J., Nolasco, A. and Bernabeu-Mestre, J., 'Malnutrición y desigualdades en la España del franquismo; el impacto del complemento alimenticio lácteo en el crecimiento de los escolares españoles (1954-1978)', *Nutrición Hospitalaria*, 29, 2 (2014), pp. 227-236.
- Valenze, D., *Milk: a local and global history* (New Haven, 2011).
- van Otterloo, A. H., 'Fast food and slow food. The fastening food chain and recurrent countertrends in Europe and the Netherlands (1890-1990)', in C. Sarasúa, P. Scholliers and L. van Molle, eds., *Land, shops and kitchens: technology and the food chain in twentieth-century Europe* (Turnhout, 2005), pp. 255-277.
- Velten, H., *Milk: a global history* (2010).
- Wiley, A. S., *Re-imagining milk: cultural and biological perspectives* (New York, 2011).

Official publications

INE [Instituto Nacional de Estadística], *Anuario estadístico de España* (Madrid, 1858-2016).

INE, *Encuesta de presupuestos familiares* (Madrid, 1965-95).

INE, *Encuesta continua de presupuestos familiares* (Madrid, 1988-98).

Ministerio de Agricultura, *La agricultura española en 1968* (Madrid, 1968).

Ministerio de Agricultura, *La agricultura española en 1972* (Madrid, 1972).

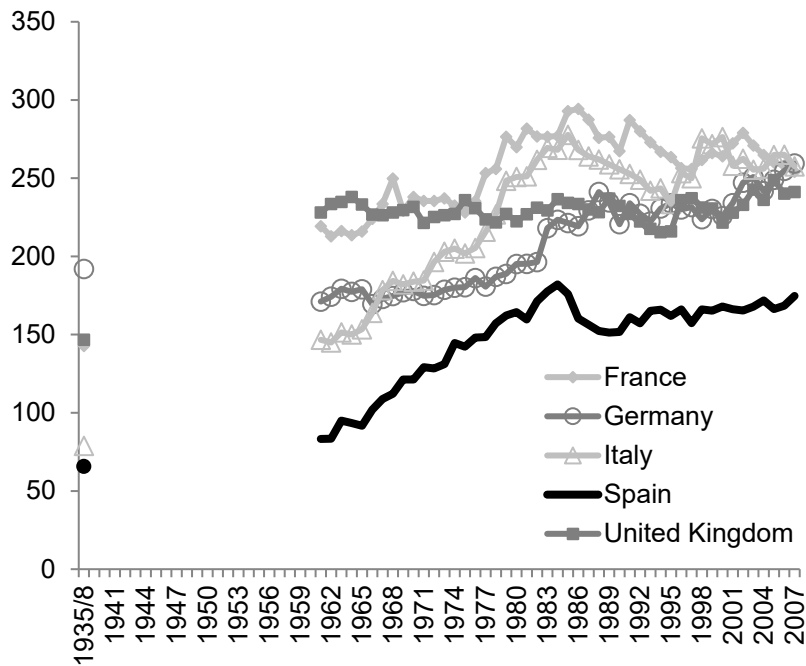
Ministerio de Agricultura, *Anuario de estadística agraria, 1975* (Madrid, 1975).

Ministerio de Agricultura, *La agricultura española en 1977* (Madrid, 1977).

MAPA [Ministerio de Agricultura, Pesca y Alimentación], *Anuario de estadística agraria, 1983* (Madrid, 1983).

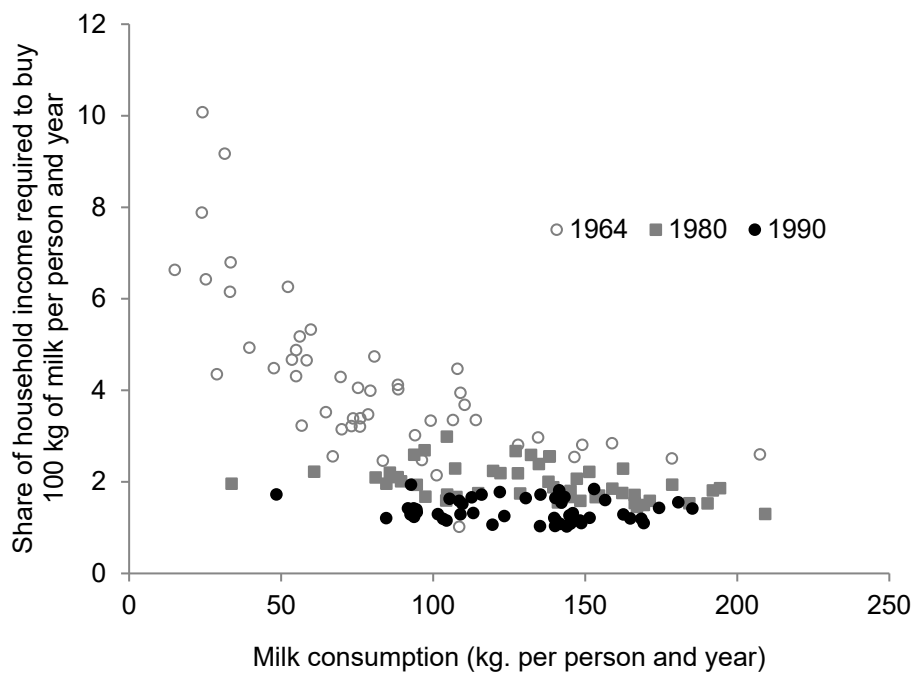
MAPA, *Consumo alimentario en España* (Madrid, 1989-91).

Figure 1. Consumption of dairy products (primary equivalent kilograms per person and year; butter excluded)



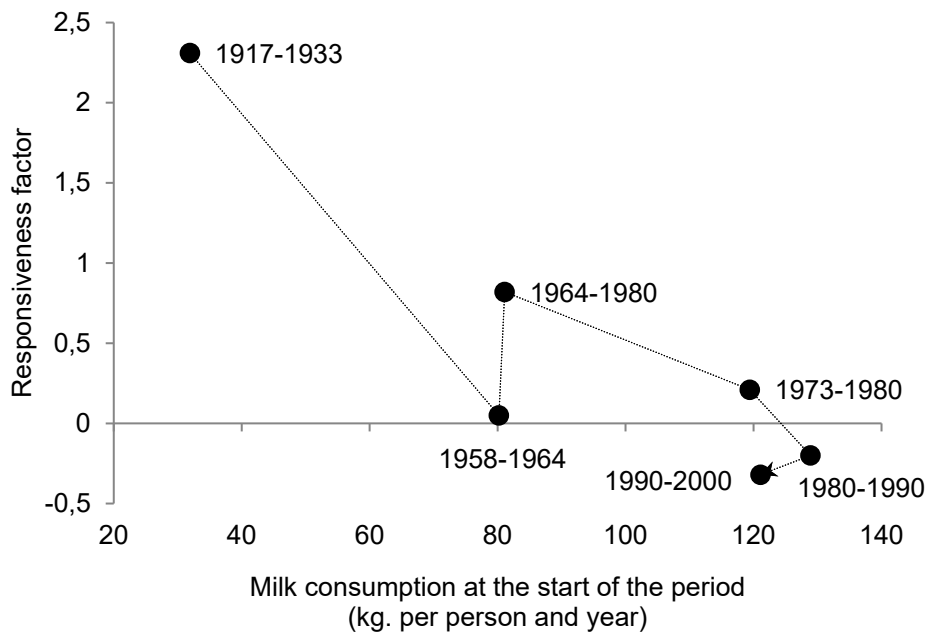
Sources: Toutain, 'La consommation alimentaire', p. 1955, for 1935/8; FAO (www.faostat.fao.org, 'Food balances') from 1961 onwards.

Figure 2. Budget constraints and milk consumption in 1964-1990: a province-level perspective



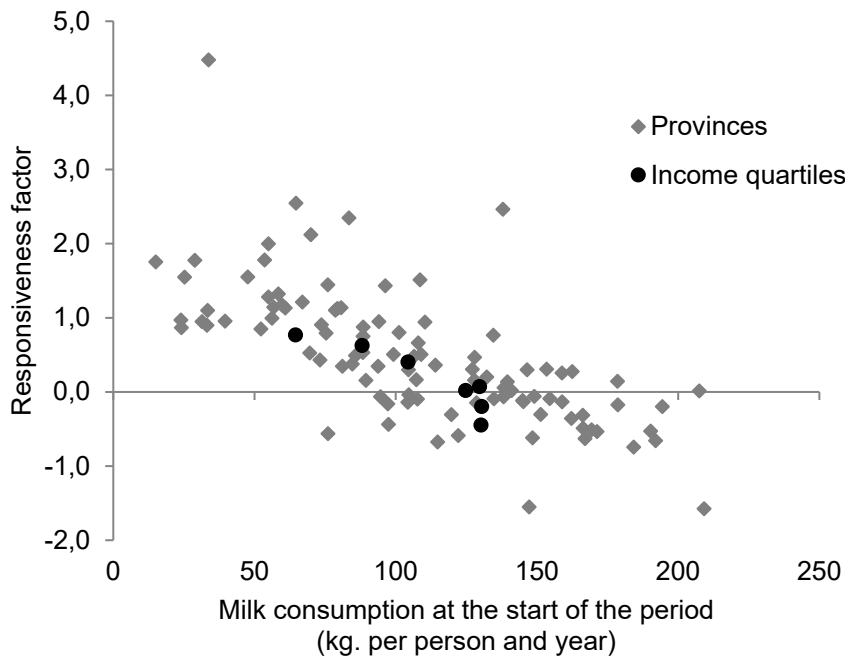
Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Figure 3. Consumer responsiveness and initial consumption levels: the long-run picture



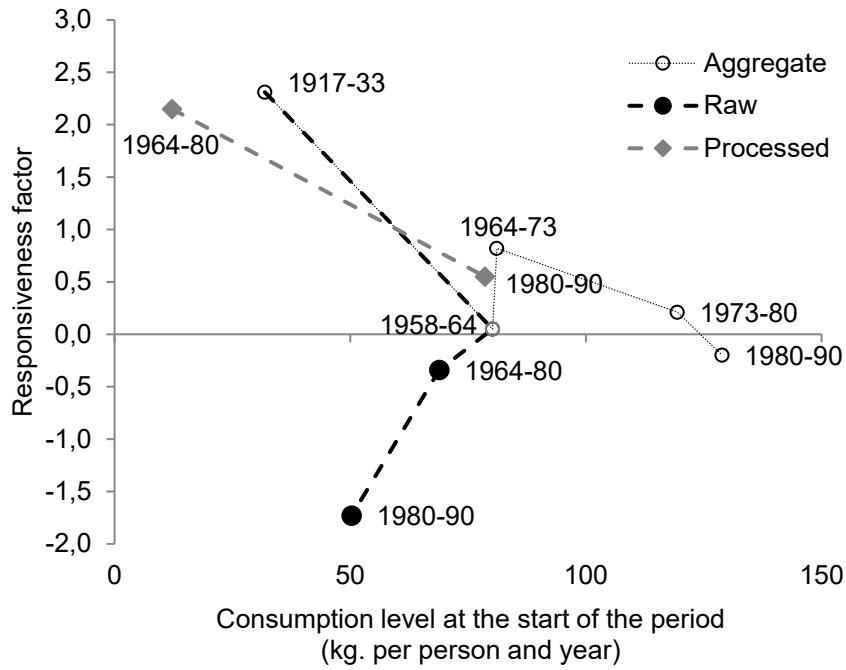
Sources: 1917-1933 and 1958-1964: Collantes, 'Nutritional transitions'; 1964-1990: table 5; 1990-2000: INE (*Encuesta continua de presupuestos familiares*; www.ine.es).

Figure 4. Consumer responsiveness and initial consumption levels, 1964-1980 and 1980-1990: a disaggregated view



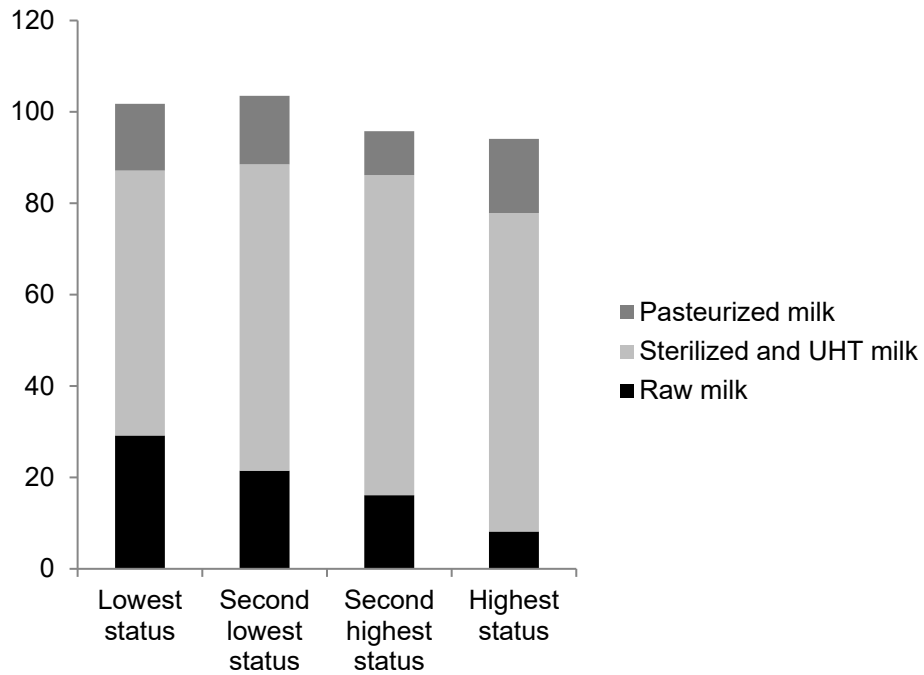
Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Figure 5. Consumer responsiveness curves: raw and processed milk



Source: INE, *Encuesta de presupuestos familiares*; MAPA, *Consumo alimentario*; figure 3. See main text for details.

Figure 6. Consumption of raw and processed milk by status groups in 1990 (litres per person and year)



Source: MAPA, *Consumo alimentario*.

Table 1. Basic data about the consumption of dairy products in Spain

	1964/5 ^a	1973/4 ^a	1980/1 ^a	1990/1
Consumption (kg. per person and year)				
Liquid milk	81.1	119.4	128.9	130.7
Broken down by income level ^a				
First quartile	60.4		129.7	133.3
Second quartile	67.6		124.8	125.6
Third quartile	85.2		130.4	120.7
Fourth quartile	101.6		130.2	111.0
Broken down by region				
North ^b	142.3		172.8	153.1
Interior ^c	86.9		145.9	132.5
Mediterranean ^d	51.6		99.7	99.3
South ^e	53.6		123.1	117.5
Cheese	1.5	4.2	4.3	5.7
Other dairy products	3.3		9.8	14.3
Total	85.9		143.0	150.7
Calorie shares (%)				
Raw milk	75		29	14
Processed milk ^f	13		53	58
Other dairy products	12		18	28

Table 2. Household budget constraints for dairy consumption

	1964/5	1973/4	1980/1	1990/1
Share of household income hypothetically required to buy (...) per capita (%)				
(A) 100 kg. of liquid milk	4.4	2.7	1.9	1.3
Broken down by income level				
First quartile	11.8		3.4	2.8
Second quartile	6.0		2.6	1.7
Third quartile	3.9		2.0	1.2
Fourth quartile	2.2		1.2	0.7
Broken down by regions				
North	2.9		1.6	1.2
Interior	3.7		1.7	1.2
Mediterranean	4.9		1.8	1.3
South	5.8		2.4	1.7
(B) 5 kg. of cheese	2.0	1.1	1.1	0.7
(C) 10 kg. of yoghurt			0.7	0.4
(A)+(B)	6.4	3.8	3.0	2.0
(A)+(B)+(C)			3.6	2.4
Share of household income actually allocated to buying (...) (%)				
Liquid milk and cheese	3.7	3.9	3.3	2.3
Liquid milk, cheese and yoghurt			3.6	2.6

Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Table 3. *Change in dairy-specific purchasing power: decomposition of income and price effects*

	1964-1973	1973-1980	1980-1990
Change in dairy-specific purchasing power (%) ^a			
Liquid milk	5.3	5.2	3.1
Cheese	6.6	0.3	4.4
Yoghurt			4.4
Change in household income (%) ^b	5.4	1.5	2.5
Change in consumer prices (%) ^c			
Liquid milk	0.1	-3.6	-0.6
Cheese	-1.2	1.2	-1.9
Yoghurt			-1.9
Contribution to change in product-specific purchasing power (%) ^d			
Liquid milk			
Income	101	30	79
Price	-1	70	21
Cheese			
Income	82	503	56
Price	18	-403	44
Yoghurt			
Income			56
Price			44

Notes: ^a $(Y-P)$, where Y is the annual compound rate of change in income and P is the annual compound rate of change in the relative price of each dairy product; ^b Annual compound rate of change in household income per adult equivalent (Luxemburg scale); ^c Annual compound rate of change in the average of provincial prices deflated by the general price index and weighted by population; ^d The contribution of income change is measured as: $Y / (Y-P)$; the contribution of price is: $-P / (Y-P)$.

Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Table 4. *Income contribution to growth in dairy-specific purchasing power (%)^a*

	Milk		Cheese		Yoghurt
	1964-1980	1980-1990	1964-1980	1980-1990	1980-1990
By income level					
First quartile	85	100	86	75	69
Second quartile	84	84	86	63	62
Third quartile	86	82	97	62	62
Fourth quartile	80	76	95	61	57
By region					
North	100	84	92	70	45
Interior	90	77	103	55	59
Mediterranean	49	69	91	53	58
South	69	99	106	57	57

Notes: ^a Defined as in table 3, except that prices are weighted by consumption instead of population due to limitations in the data. A comparison of both procedures for Spain as a whole shows that weighing by consumption may entail an upward bias not larger than 10 points for milk in 1964-1980 and entails no bias for all other products and periods.

Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Table 5. *Average consumer responsiveness to changes in dairy-specific purchasing power*

	Milk			Cheese			Yoghurt
	1964-1973	1973-1980	1980-1990	1964-1973	1973-1980	1980-1990	1980-1990
Change in consumption ^a	4.4	1.1	-0.6	12.0	0.2	2.8	2.9
Change in product-specific purchasing power ^b	5.3	5.2	3.1	6.6	0.3	4.4	4.4
Responsiveness factor ^c	0.82	0.21	-0.20	1.82	0.81	0.63	0.65

Notes: ^a Annual compound rate of change in consumption (%); ^b $(Y-P)$, where Y is the annual compound rate of change in income and P is the annual compound rate of change in consumer prices; ^c $C / (Y-P)$, where C is the annual compound rate of change in consumption.

Source: INE, *Encuesta de presupuestos familiares*. See main text for details.

Table 6. *Average consumer responsiveness to changes in milk-specific purchasing power, by types of milk*

	Raw milk	Processed milk	Milk (aggregate)
1964-1980	-0.34	2.15	0.56
1980-1990	-1.73	0.55	-0.20

Sources: INE, *Encuesta de presupuestos familiares*; MAPA, *Consumo alimentario*; figure 3. See main text for details.

Table 7. Price transmission along the milk chain (constant 2013 euros per litre)

	1964	1973	1980	1990	Annual compound rate of change (%)		
					1964-	1973-	1980-
					1973	1980	1990
Farmer price (<i>A</i>)	0.95	0.83	0.61	0.46	-1.5	-4.4	-2.7
Processor price (<i>B</i>)	1.12	1.12	0.94	0.93	0.0	-2.5	-0.1
Consumer price (<i>C</i>)	1.24	1.33	1.09	1.00	0.8	-2.8	-0.8
Processing costs and profits (<i>B</i> – <i>A</i>)	0.17	0.29	0.33	0.47	6.1	1.9	3.6
Distribution costs and profits (<i>C</i> – <i>B</i>)	0.12	0.21	0.15	0.07	6.4	-4.7	-7.3

Sources: farmer price: INE, *Anuario* (1973, 1981 and 1991); processor price, 1964-1980 (monetary output divided by material output): INE, *Anuario* (1966, 1975 and 1982); processor price, 1990 (triangulation of price transmission data for 1989 and real farmer and consumer prices for 1990): *REL*, 'Informe', p. 18; consumer price: INE, *Encuesta de presupuestos familiares*. All prices deflated by the general price index (INE, www.ine.es, *Índice general de precios*). In order to ensure comparability with the other prices, provincial consumer prices are not weighted by population, but by consumption levels.

Table 8. Advertising orientations among major dairy companies in the 1980s

	Investment in advertising (current million pesetas), 1988	Main production	Main theme in advertising, c.1985
Danone	2,421	Yoghurt	Freshness
Pascual	2,020	Milk	Quality
Kraft Leonesas	1,060	Cheese	Health
Industrial Quesera Menorquina	611	Cheese	Reliability
La Lactaria Española	368	Milk	Quality
Sodial	367	Yoghurt	Health
Mantequerías Arias	366	Cheese	Freshness
Clesa	358	Milk	Quality
Uniasa	336	Milk	Reliability

Sources: major companies in terms of advertising investment: Lacasa, 'La publicidad', p. 20; advertisements: *Revista Española de Lechería*, 121 (1981); *Revista Española de Lechería*, second series, 1 (1985); and *Industrias Lácteas Españolas*, 135 (1990).