

Changing Demand for Dairy Products and How This May Affect Dairy Production in the U.S.

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Introduction

Milk equivalent per capita disappearance of all dairy products has been increasing since the mid 1970s, but not all dairy products have enjoyed increased sales. Over that more than 40 year time period, cheese has been a bright star for the dairy industry and more recently, products like yogurt have seen dramatic increases. But, during that same time period, products such as cottage cheese, nonfat dry milk, and ice cream have been in decline. During much of this time, per capita fluid milk sales have been in decline, but even within that segment, category shifting has occurred. Initially, there was a significant move away from whole milk toward lower fat products, but in 2015, that trend was reversed. Changing patterns of consumption will always mean that the dairy industry must be prepared to meet the customer at the point of sale.

Basic Concepts and Calculations for Domestic Dairy Product Consumption

Words such as sales, demand, disappearance, and availability are all used in discussions of domestic dairy consumption and each can be relevant in certain instances. Consumption usually refers to the amount of a product used by individuals or businesses (food processors, restaurants, etc.) during a particular period of time, such as a month, quarter, or year. For fluid milk products, actual sales data

are reported and these provide a reasonably accurate indication of how much product was consumed. *Demand* is often used as a general descriptor about market conditions (such as “demand is up”), but economists use that term more specifically to describe the *relationship* between a quantity demanded (sales) and various factors including price, incomes, population, etc. *Disappearance* describes how calculations of “consumption” are typically done, using information on production, stocks, imports, exports and other factors to arrive at an estimated quantity of product that is not otherwise accounted for—which is often defined as domestic *Availability*.

The most comprehensive data for a discussion of longer-term trends in domestic dairy product consumption are published by the Economic Research Service (ERS) of USDA. For fluid milk, the data are from actual commercial sales figures, compiled based on data from regulatory agencies, such as the Dairy Division of the Agricultural Marketing Service of USDA or the California Department of Food and Agriculture. Consumption calculations for other products are typically made using the concept of “disappearance,” which estimates what was consumed based on accounting for the sources and uses (supply and utilization) of products. For total milk “disappearance,” this calculation would include the elements shown in Table 1. Milk fed to calves is subtracted to calculate the

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milk available for human consumption. To this are added the milk equivalents in imports and beginning stocks to arrive at a total supply. The “milk equivalent” concept is used to convert pounds of product to pounds of milk (for example, one lb of cheese equals 10 lb of milk) for the purposes of an aggregated calculation such as this one. The use of milk equivalents often represents a gross approximation because most dairy products contain dairy components (fat, protein, and lactose) in proportions different than the original milk, and this sometimes results in the use of milk equivalent calculations based on butterfat and(or) solids-not-fat.

The calculation then subtracts the uses of milk (equivalents) other than by consumers (broadly defined as households and businesses), including exports, shipments to US territories (technically, not part of exports), and ending stocks of products. This calculation results in “commercial disappearance.” Once the commercial disappearance is calculated, it is often of interest to examine this as an amount per person (per capita) using data on the total US population. This calculation is the basis for much of the information about aggregate consumption of dairy products in the US and is frequently used in analysis of factors influencing per capita demands using time-series data. These data are available through 2013 and serve as the basis for much of the subsequent analysis and discussion. It is worth noting that calculating consumption as a residual is conceptually different than the way in which economists conceive of demand for the product arising from personal preference or business decisions.

Although these calculations provide an overall indication of the growth (or lack of it) in different dairy product categories, they have some important limitations for the purposes of predicting future consumption. First, because they adjust consumption for imports and exports,

any rapid change in trade can have an effect on domestic consumption. A rapid increase in exports, for example (without a correspondingly rapid increase in domestic production), would reduce commercial disappearance in the US, but this would not be an indication of a reduction in demand for the product—rather quite the opposite. This effect typically has been short-term in the past, but it may have increasing importance in the next decade. Second, the data do not allow determination of the marketing channels through which different products are sold and how those are changing over time. Fluid milk sales are primarily retail, but cheese is sold through both retail and foodservice, and many dry dairy products are sold primarily to other dairy product² or food manufacturers. These different marketing channels and their development can be of importance to determining future consumption trends. Finally, despite the numerous categories that are reported, the level of disaggregation may obscure the different performance of individual products (perhaps down to the level of Stock Keeping Units (SKU) at the retail level). Although yogurt consumption has grown at a rapid rate during the past decade, recent evidence suggests that the “Greek yogurt” category has grown even more rapidly. Organic fluid milk sales (for which sales information is available) have grown more rapidly than for the “conventional” fluid milk categories. In addition, in 2015, whole milk sales increased while low fat and skim milk sales declined.

Review of US Dairy Consumption Patterns, 2004 to 2013

Per capita domestic consumption of dairy products has been growing steadily since reaching a low point in 1974 (Figure 1), although it remains considerably lower than during the first half of the 20th century. Expressed in milk equivalents per capita (based on butterfat in this case), overall dairy product consumption has

²An empirically important example is the use of non-fat dry milk in cheese production because it increases cheese yields.

increased 72 lb/person since the mid-1970s, a compound annual growth rate (CAGR) of 0.4% per year. However, this modest overall growth obscures the much more dramatic shifts in the composition of dairy consumption that have occurred since 2000.

Fluid milk products have the largest per capita consumption amounts (Figure 2); fluid and related products accounted for one-third of total milk equivalent consumption in 2013. However, both the amounts and the growth rates during the past decade differ by product category. For beverage milk, the four most important categories (in order of decreasing per capita consumption) are reduced fat milk, whole milk, skim milk, and lowfat milk. The reduced fat and lowfat milk categories have seen relatively small increases in per capita consumption during the past decade, whereas skim milk and whole milk have experienced decreases (with the noted exception of whole milk in 2015). Yogurt consumption has grown substantially during the past decade, and flavored lowfat milk, cream, and sour cream have experienced growth in per capita consumption.

Dairy products other than fluid and related account for about two-thirds of domestic per capita consumption on a milk-equivalent basis and have also experienced varying growth patterns. Frozen dairy products and cheese have higher per capita consumption (Figure 3). Both American and other types of cheese have experienced growth in per capita consumption since 2004, whereas per capita consumption of frozen dairy products and many of its component products have decreased by a relatively large amount. Many other manufactured dairy products have experienced growth in per capita consumption, with the exception of dry whey. Yogurt is included in this figure to indicate its importance relative to non-fluid products, and it is clear that growth in per capita yogurt consumption is large compared to other products.

The changes in per capita consumption can also be compared based on CAGR during the period from 2004 to 2013 (Figures 4 and 5). The per capita consumption of fluid milk and related products overall has experienced modest negative growth (-0.5% per year) during the past decade. Within the category, however, are products like yogurt that have experienced rapid growth. The traditional beverage milk categories have modest per capita growth at best, and both skim and whole milk have experienced negative growth rates during the decade of 2004 to 2013. There is a clear substitution of lowfat flavored milks for flavored whole milk, and cream and specialty products like eggnog have seen growth rates of greater than 2% per year. The fastest growth rates for products other than fluid are for yogurt (more than 7% CAGR) and dry or condensed products (Figure 5). Both cheese categories reported (American and other) and butter have experienced growth faster than the average for all dairy (again, expressed as milk equivalents). Fluid milk products, frozen dairy products, whole milk powder (WMP), and dry whey have experienced significant reductions in per capita consumption during the past decade.

Changes in per capita consumption are relevant, but it is also important to consider the effects of population growth, which for the US averaged about 0.9% per year during 2004 to 2013. The CAGR for total domestic consumption indicate some patterns similar to those for per capita consumption (Figures 6 and 7). The CAGR for total domestic consumption of yogurt was more than 8% per year, and flavored lowfat milks, cream products, and eggnog grew at rates around 4% per year during 2004 to 2013. Lowfat and reduced fat milk consumption grew somewhat faster than the population. A number of fluid milk products (especially whole milk) experienced decreases in total consumption because the decrease in their per capita consumption was larger than

the increase in population. For products other than fluid, the largest increases in total domestic consumption occurred for NDM (and for dry milk products more generally), but evaporated and condensed skim milk, cheese products, and butter also experienced growth rates of around 2% per year. Lowfat cottage cheese and ice cream experienced growth of less than 1% per year. Frozen desserts, WMP, and dry whey experienced decreased total consumption during the past decade.

Organic fluid milk products are not explicitly identified in the availability calculations from ERS, but other sources report monthly sales data for organic whole and reduced fat milk since January 2006. Organic milk consumption more than doubled from 2006 to mid-2013; the CAGR was 13.6% per year (hence higher than the other product categories reported in Figure 6). Despite the rapid growth, organic milk sales accounted for less than 5% of total fluid milk sales in 2013.

The reduction in domestic dry whey consumption (Figure 7) merits additional discussion. Production of dry whey has not declined at nearly the rate suggested by the CAGR of less than -6% per year (Figure 8). Production of dry whey was about 9% lower in 2013 than in 2004, with a CGAR of -1.0% per year. Domestic consumption has fallen by more because a larger proportion of the dry whey produced is exported (therefore subtracted from domestic availability) and domestic production of whey protein concentrates and lactose has grown rapidly (Figure 8), but these are not included in the categories reported by ERS. Thus, the dry whey number is not a particularly good indication of the growth in domestic or total consumption for the whey product category.

It is also relevant to consider the extent to which growth in consumption for each of the

products has contributed to increased demand for milk components. Although ERS provides an overall milk equivalent consumption value, it does not indicate which conversion factors were used for individual product categories. Thus, it is challenging to arrive at a detailed accounting. It is commonly noted that much of the increase in the demand for farm milk over the past decade arises from growth in cheese consumption due to its relatively rapid growth and its large share of milk use throughout the period. As noted above, cheese consumption grew at a CAGR of 2% during the past decade and total cheese consumption increased by about 1.7 billion lb - a 15% increase over 2000. A rough estimate of the proportion of the increase in total milk production this represents is to multiply the 1.7 billion lb of cheese by the approximate conversion factor of 10 lb of milk per lb of cheese. The 17 billion lb of milk equivalent resulting from increased domestic cheese consumption is more than 75% of the increase in US milk production from 2004 to 2013, 21 billion lb per year. Thus, although there has been rapid growth in domestic consumption of many products—some much faster than cheese—the growth of domestic cheese consumption has been a major factor in the expansion of the industry.

Review of Factors Influencing US Dairy Consumption Patterns

A variety of factors affect the domestic consumption of dairy products. These include *economic factors* (prices of products and their variation, household incomes, consumer confidence), *demographic factors* (population growth, ethnic mix, household size and composition), *health and nutrition information* (research on the health impacts of dairy products, dietary trends or fads), *consumer tastes and preferences* (interest in new flavors and different foods, proportion of food consumed

away from home) and *business strategies* (research and development, new product introductions, promotion, generic or branded advertising). Many of these factors have been analyzed with formal (for example, econometric modeling) or informal (for example, implied correlation between trends in consumption and a specific factor) approaches. However, many of the more recent formal studies of factors affecting consumption use cross-sectional data from a sample of households³ (rather than “commercial disappearance” data over time) and do not systematically examine the impact that these factors have had on consumption trends. Moreover, the limited data on many of the factors above make it challenging to determine with accuracy the role that each of the factors plays in determining longer-term trends. Detailed household level data only apply to categories of dairy products consumed at home (and typically purchased through retail outlets) and therefore do not provide insights on consumption through food service or by other food manufacturers. Moreover, even the results of formal studies often differ in their findings based on the time period, the number of product categories analyzed, the methods used, and other differences in their approach. As a result, it is challenging to assess the contribution of each of these factors to longer-term trends, and I adopt a rather selective approach to discussion of them.

Most studies of household-level demand have used econometric models to determine the impact of prices (of the product itself on other products) and demographic characteristics on dairy product consumption (Chouinard et al., 2010; Davis et al., 2010). In general, these studies find that dairy product consumption is sensitive to prices, household income or expenditures, and selected demographic factors. Studies using

household level data (and shorter time intervals) tend to find greater responsiveness to prices than those using time-series data or more aggregated time intervals. Fluid products tend to have less responsiveness⁴ to prices than other products analyzed. Consumption of most products increases with increased household income or expenditures; although Davis et al. (2010) found that for 12 dairy product categories, consumption increased roughly proportional to total household expenditures (that is, the expenditure elasticity is close to 1.0).

Although the studies reporting the responsiveness of consumption to prices and incomes do not usually allow us to draw conclusions on aggregate consumption over time, they provide a basis for claims that increasing real incomes and decreasing real dairy product prices are among the primary drivers of changes in demand. Real income per capita and dairy product consumption have both increased since the 1970s (Figure 9), but the relationship is by no means a perfect one. Moreover, prior to 1974, there was an inverse relationship between the income and per capita consumption of dairy products (Figure 1). There has also been a decline during the past decade in the average ratio of the Consumer Price Index (CPI) for all dairy products and the overall CPI (Figure 10), although the trend is small and has been punctuated with periods in which dairy prices had increased faster than consumer prices overall.

Other studies have argued that demographics and changes in food-spending patterns have more influence than prices and income on consumption trends. Kaiser (2005) found that for 1995 to 2004, changes in the proportion of the population with children under

³One motivation for the use of cross-sectional data is that statistical methods consistent with economic theory are reasonably well developed (e.g., Davis et al., 2010) and commonly used. Another motivation is the availability of detailed data from vendors such as IRI and Nielsen.

⁴Typically, this discussion is framed in terms of whether demand is “elastic” or “inelastic”, which are defined as the percentage change in quantity consumed divided by the percentage change in price being greater than 1 (bigger percentage change in quantity than price) or less than 1 (smaller percentage change in quantity than price), respectively. Often, this has more important implications for pricing policy, either by individual firms or governments, than on longer-term trends.

5 years old were more important than changes in real retail prices to explain the decline in per capita fluid milk consumption. The same study also found that the growing Hispanic population and increases in per capita food consumed away from home had a much larger impact than household income on per capita demand for cheese. Demographic characteristics of the household have frequently been found to have influence on dairy product consumption. The recent study by Davis et al. (2010) found that household size, age of the principal shopper (defined in that study as “the household head”), household composition (for example, single person household, presence of children in selected age categories), education, ethnicity, region of the country, and income category (different from expenditures) had statistically significant impacts on purchases of some dairy products. Per capita expenditures on food away from home have grown to represent nearly half of total food expenditures in recent years and are certainly highly correlated with per capita dairy product consumption (Figure 11). However, it is neither entirely clear what the direct impact on increased eating away from home is on dairy product consumption nor is the future pattern of food consumption clear in the current economic environment. After a long period of increases, expenditures in per capita on food away from home have changed little since 2008.

Another factor cited by many analysts as affecting trends in dairy product consumption is increased consumer awareness of the health impacts of diet. There have been a number of trends in dieting and nutrition during the past decade, including low-fat, low-carb, and “functional foods” (e.g., Sharma, 2005). The US dairy industry has provided significant funding to research potential health claims, especially the role of calcium in osteoporosis and how low-fat dairy products can support weight loss. The shift towards lower average

fat consumption in beverage milk consumption seems to support this trend. However, it is not entirely clear how additional information of this type has affected long-term trends. Williams (2005) discussed the use of health claims on foods by consumers, stating that “consumers do not clearly distinguish between nutrient content, structure-function, and health claims.” Although he notes “there is some evidence that the use of health claims improves the quality of dietary choices and knowledge of diet-disease relationships,” the overall effects are not clear. In the US, per capita consumption of butterfat has continued to rise⁵, despite the emphasis during much of the past decade on consuming low-fat dairy products. Even with the beverage milk category, the *reduction* in amount of per capita butterfat from decreased whole milk consumption (until 2015) is essentially equal to the *increased* butterfat from increased consumption of cream products.

Price volatility is a factor that has been mentioned more frequently in recent years as likely to influence future growth in dairy product demand. The argument is made that retail consumers dislike price changes and the food manufacturing and food service industries want to avoid large changes in their input costs (or costs associated with changing their ingredient mix). Various segments of the dairy industry have expressed concern that the recent increase in price variation will create permanent losses in sales (compared to a situation with less price variation) as retail and food industry buyers seek alternatives to dairy that exhibit less price variation. This argument has not been empirically evaluated, although one study (Maynard, 2000) provides some initial insights. Maynard (2000) examined whether retail sales of fluid milk were affected by four alternative measures of retail price variation. He found that the retail price changes themselves did not have an influence on sales, but that deviations from

⁵The ERS food availability per capita uses milk equivalents expressed in terms of butterfat, so an increase in per capita availability also implies an increase in butterfat consumption.

the prices expected by consumers (under two different assumptions about how consumers would form those expectations) did have an impact on sales. However, because the effects of unexpected increases and decreases were roughly equal in size, he concluded that there is not likely to be a persistent negative effect on sales due to volatility as long as both types of deviations occur with equal frequency. Because this study addressed only retail sales of fluid milk and used data from a period in which price variation was less than it has been in recent year, it is not a definitive answer to the question about how price variation will influence future trends in dairy product consumption.

Another factor that is often cited when referring to growth in US domestic consumption is dairy policy. Much of this discussion involves implicit or explicit criticisms of the Dairy Product Price Support Program (**DPPSP**) and Federal Milk Marketing Orders (**FMMO**). The DPPSP is argued to have reduced innovation (particularly for dry dairy products) because it provides a guaranteed market outlet for only a limited number of standardized products. Risk-averse dairy processing companies (especially cooperatives), it is argued, therefore have fewer incentives to develop new products and invest in new processing facilities. The impact of this effect on overall dairy product consumption has not been systematically examined. The minimum price regulation under FMMO is frequently indicated to have the effect of increasing prices for fluid milk and decreasing prices for manufactured products (e.g., Stephenson, 2003) and higher prices sometimes are argued to be an important factor in the declines in fluid milk consumption. However, there are three main issues with this argument. First, most of these comparisons about price and consumption impacts are made assuming a perfectly competitive milk market in the absence

of minimum price regulation, but it is not clear that this assumption is justified (Paggi and Nicholson, 2011). Second, some analyses have indicated that factors other than price are more powerful explanations for the decline in fluid milk sales—consistent with different patterns of per capita consumption for different fluid milk products. Finally, if milk pricing under FMMO decreases manufactured product prices (such as cheese) this would have a positive effect on consumptions of milk equivalents that could offset the negative effect of higher fluid prices⁶. Thus, the effect of policy on consumption during the previous decade is not well understood, despite its potential importance. Future policy developments (discussed below) may have a larger impact on domestic consumption and trade during the next 10 years.

An important conclusion from the foregoing is that many factors affect trends in per capita and total consumption of dairy products. Although some of these factors have been explored through formal economic analysis, the results from these studies are not always consistent. Other factors have been hypothesized and receive a good deal of discussion but have not (yet) been formally analyzed in a single consistent framework. In addition, the factors that may drive trends in dairy demand in the future may vary from those in the past. One implication is that accurate longer-term predictions of changes in dairy production consumption are difficult.

Projected Growth Rates of US Dairy Product Consumption through 2020

A number of studies have projected future US dairy product consumption or growth rates. Some of these studies are derived from the annual outlook (and forecast) cycle and are undertaken by USDA and the Food and

⁶The reduction in fluid sales would need to be more than 10 times the increase in cheese consumption to result in a reduction in per capita milk equivalent consumption.

Agricultural Policy Research Institute (**FAPRI**)⁷. The methods used to develop these forecasts often are neither described in detail nor are the product categories defined in the same manner for each forecast. The USDA outlook, for example, forecasts total milk equivalent consumption based on fat or nonfat-solids calculations (Table 2). FAPRI (2010) forecasts future US consumption for 12 dairy product categories, and FAPRI-ISU forecasts four major product categories. There are notable differences among the forecasts from the different organizations and with the observed growth rates during 2004 to 2013 (Table 2). USDA (2011) projects continued overall growth in dairy products at 1.3%, but as noted previously, the growth rates for different products vary a great deal. FAPRI (2010) and FAPRI-ISU (2011) differ in both the signs and magnitudes for three of the four product categories for which there is overlap (butter, NDM, cheese, and fluid), and most differ a good deal from the rate of growth observed during the past decade. The inconsistencies in these projections and the limited information about how the forecasts were developed makes it challenging to use these estimates to develop assumed growth rates (necessary for subsequent analyses).

Schmit and Kaiser (2006) provide a more detailed discussion of the development of projected growth rates for fluid milk and cheese. They used information from previous studies of the impacts of demographic shifts and other factors to project consumption of fluid milk and cheese through 2015. A major motivation was to examine the extent to which projections of population and consumer food-spending patterns would extend or alter previously observed consumption trends. They developed a partial equilibrium model of the US domestic dairy sector that segmented the industry into retail, wholesale, and farm markets. Fluid milk

and cheese were explicitly modeled, but other manufactured dairy products (e.g., butter and frozen products) were considered exogenous. The model simulations projected a growth rate for per capita fluid product consumption of -0.43% per year, which when combined with population growth would result in modest growth in fluid sales. The authors note that this is a slower rate of decline than that observed in the decade prior to their work but is roughly consistent with the growth for 2004 to 2013 (Figure 4). Cheese consumption per capita was projected to grow at 0.82% per year, or somewhat more slowly than the observed growth for 2004 to 2013 (Figure 5).

Conclusion

On a milk equivalent basis, per capita domestic disappearance for all dairy products has been increasing for more than 40 years. During that time, the dairy industry has seen significant category shifts among products that are in favor (for instance, cheese and yogurt) and those that suffered a loss of demand (examples include ice cream, cottage cheese, and higher fat dairy products). However, the growth in domestic demand (including population growth and per capita increases) has not been enough to offset the increase in productivity of milk production.

Milk production per cow has been a remarkable linear growth of just about 284 lb/cow/yr of milk. This growth outpaces domestic demand and implies either the need to continually reduce the U.S. cow herd or to seek new markets for dairy products. The U.S. dairy market has pursued exports as the opportunity for new growth and with it comes a somewhat different product mix that is demanded for our domestic markets. There continues to be new opportunities for dairy product sales, but the

⁷FAPRI is a collaboration between the University of Missouri and Iowa State University. The FAPRI 2010 projections are from the University of Missouri, and the FAPRI-ISU projections are from Iowa State. Different researchers at the two institutions develop these projections.



industry must be nimble to take advantage of them.

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Table 1. Calculation of commercial milk disappearance in the US, 2014.

Element of Calculation	Amount, million lb per year
Supply	
Milk production (+)	206,046
Fed to calves (-)	869
Milk for human use (=)	205,177
Imports (+)	4,315
Beginning Stocks (+)	11,173
Total supply (=)	220,665
Utilization	
Exports (-)	12,444
Shipments to US territories (-)	943
Ending stocks (-)	11,223
Commercial disappearance (=)	196,055
Per capita Calculation	
US Population, millions	318.9
Per capita disappearance (lb)	614

Table 2. Projected compound annual growth rate (CAGR) per year for US consumption of selected dairy products, previous studies.

Product or Category	Observed CAGR	Schmit and Kaiser (2006)	FABRI (2010) ^a	FAPRI-ISU (2011) ^a	USDA Outlook (2011) ^a
Period for which rate applies	2000 to 2009	2005 to 2015	2009 to 2019	2010 to 2020	2010 to 2020
Butter	1.1%		-0.4%	1.7%	
NDM	4.8%		-2.8%	2.0%	
Total Cheese	1.1%	0.8%	0.5%	2.4%	
American	0.6%		0.7%		
Other	1.4%		0.5%		
Total Fluid	-0.4%	-0.4%	-0.3%	0.3%	
Whole	-3.2%		-2.2%		
2% fat	0.3%		0.9%		
Lowfat	0.1%		-0.4%		
Other	-1.2%		0.5%		
Ice Cream	-2.4%		-0.4%		
Evaporated & Condensed	2.3%		2.1%		
Butterfat					1.3%
Solids Not Fat					1.3%

^aCalculated based on consumption projections expressed as quantities.



Figure 1. Per capita domestic availability of milk equivalents from 1910 to 2014.

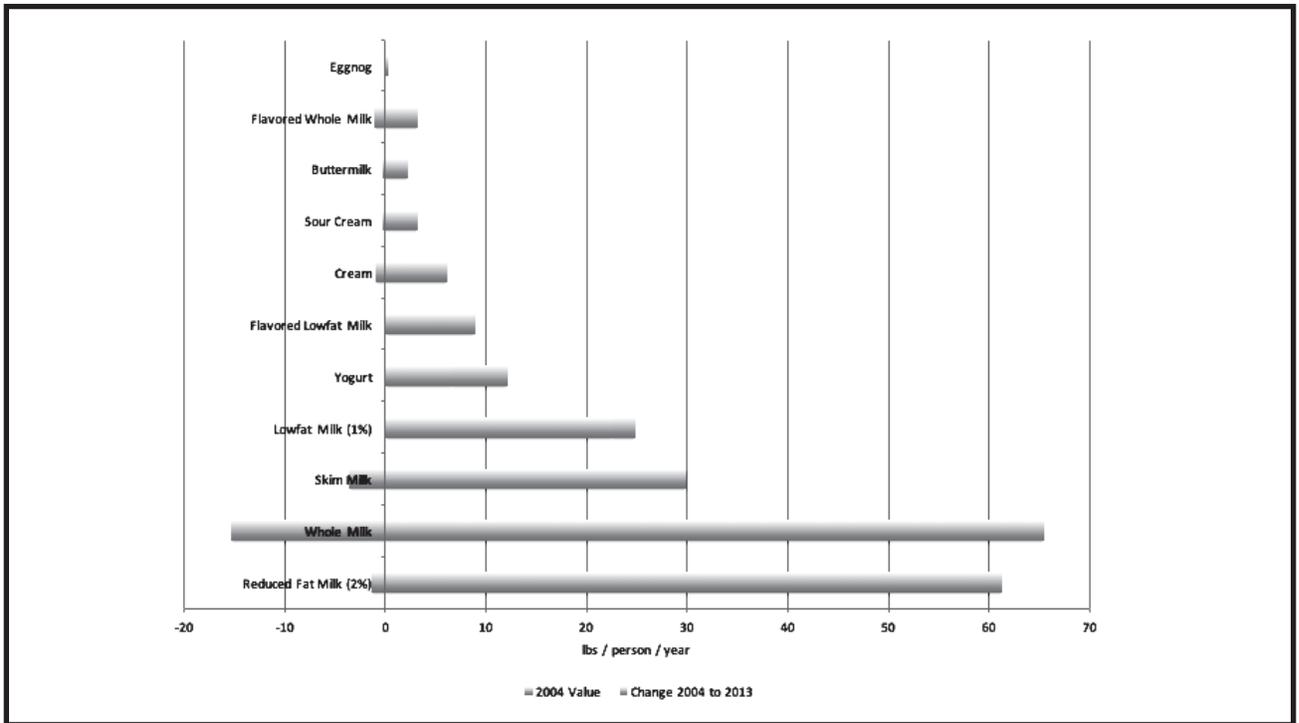


Figure 2. Per capita domestic availability of fluid and associated products in 2004 and changes from 2004 to 2013.

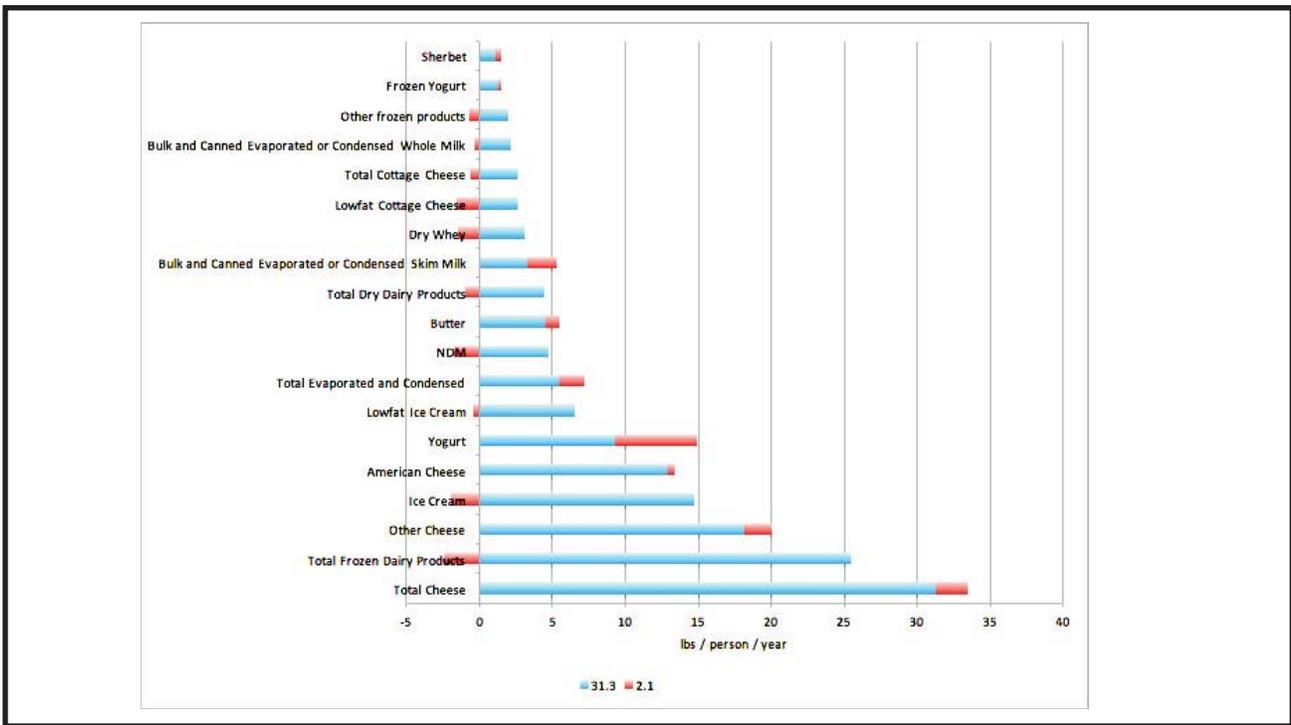


Figure 3. Per capita domestic availability in 2004 of selected products and changes from 2004 to 2013.

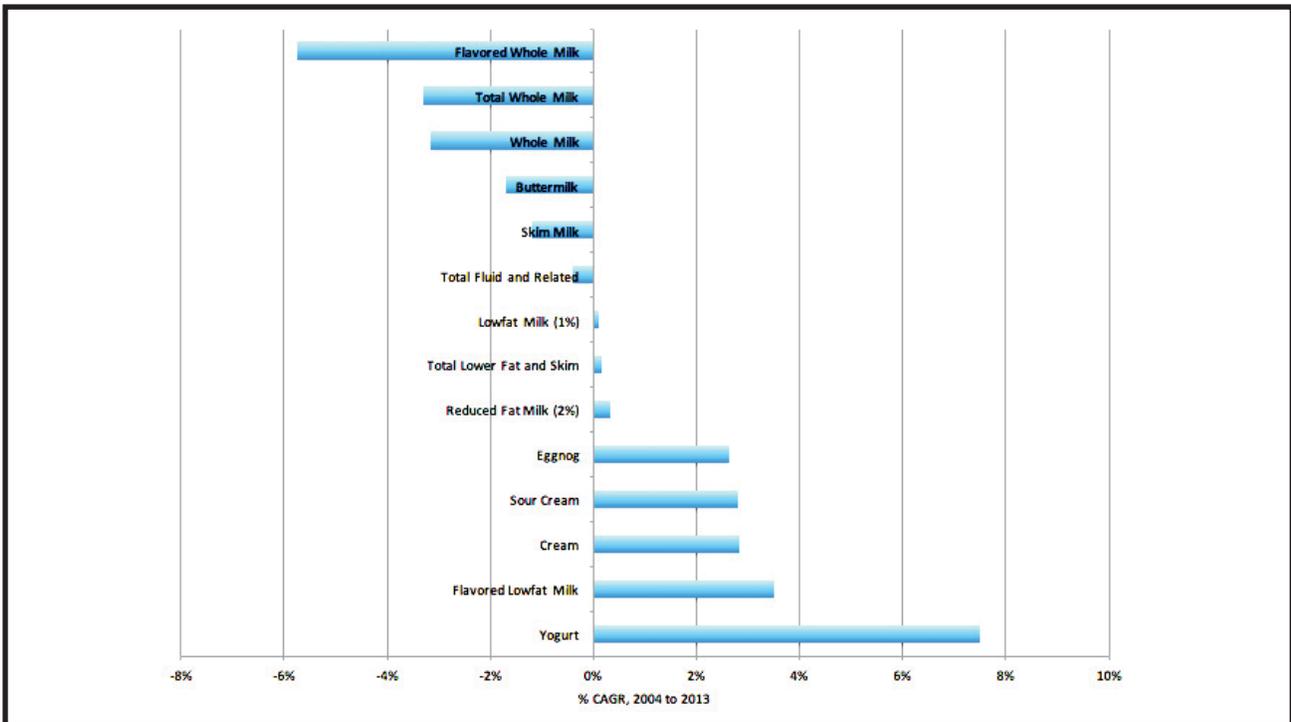


Figure 4. Compound annual growth rate (CAGR) for per capita domestic availability of fluid milk and related products from 2004 to 2013.

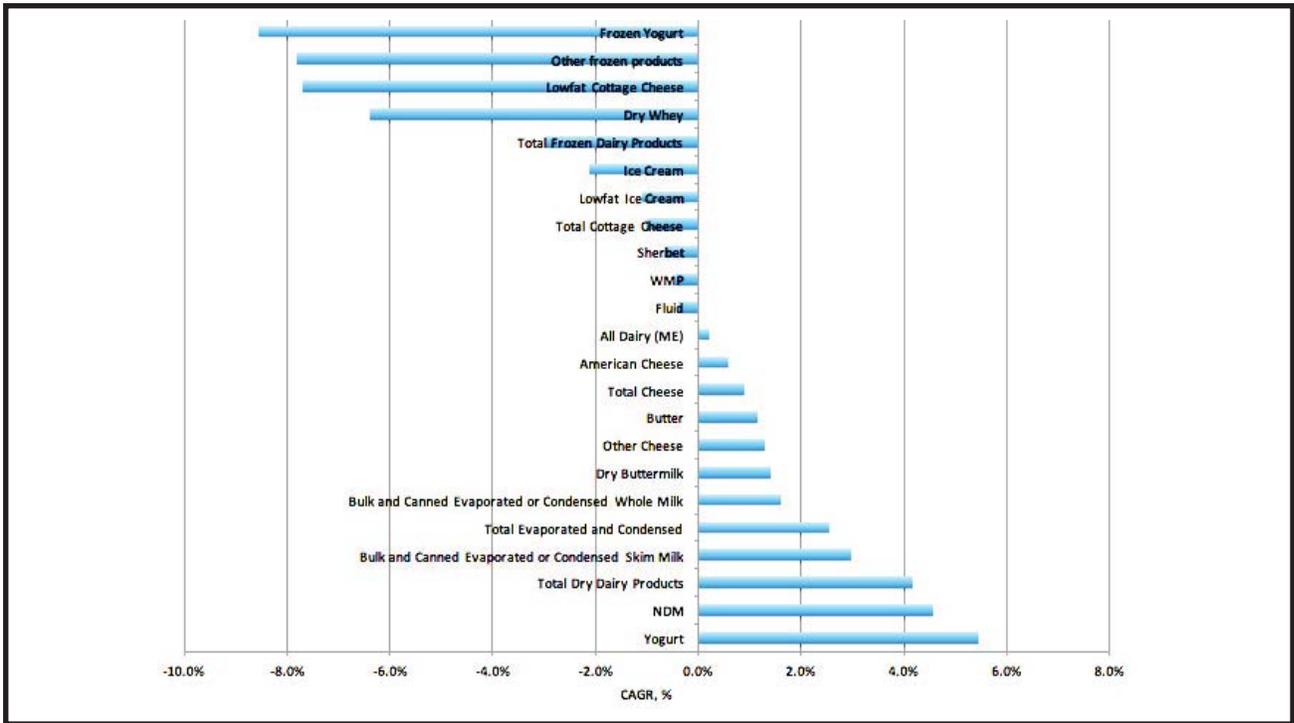


Figure 5. Compound annual growth rate (CAGR) for per capita domestic availability of selected dairy Products from 2004 to 2013.

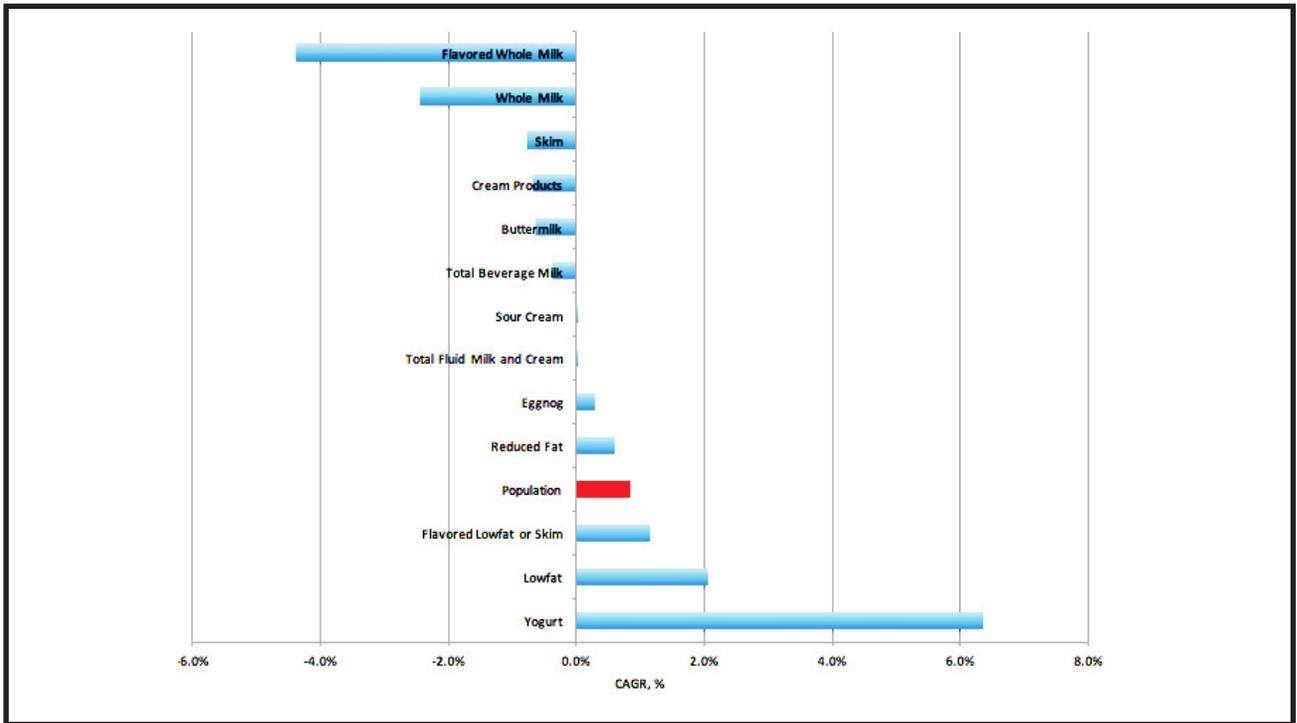


Figure 6. Compound annual growth rate (CAGR) for total domestic availability of fluid milk and related products from 2004 to 2013.

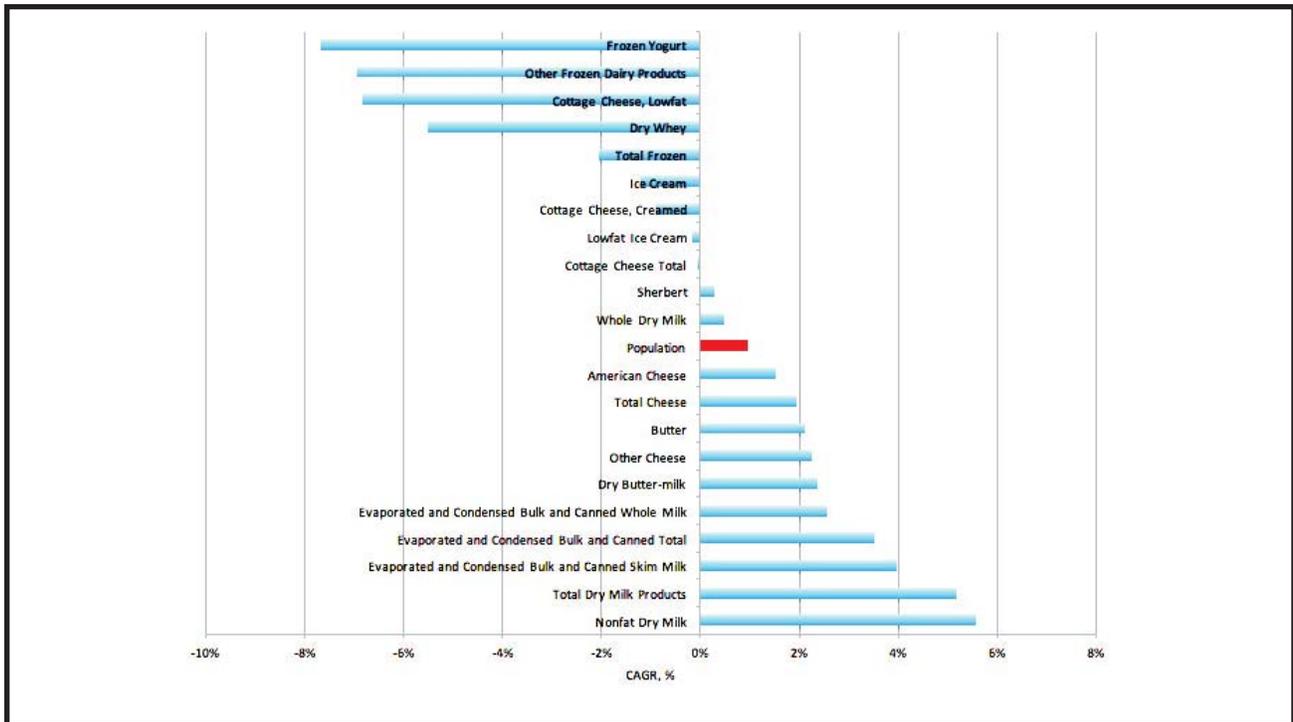


Figure 7. Compound annual growth rate (CAGR) for total domestic availability of selected dairy products from 2004 to 2013.

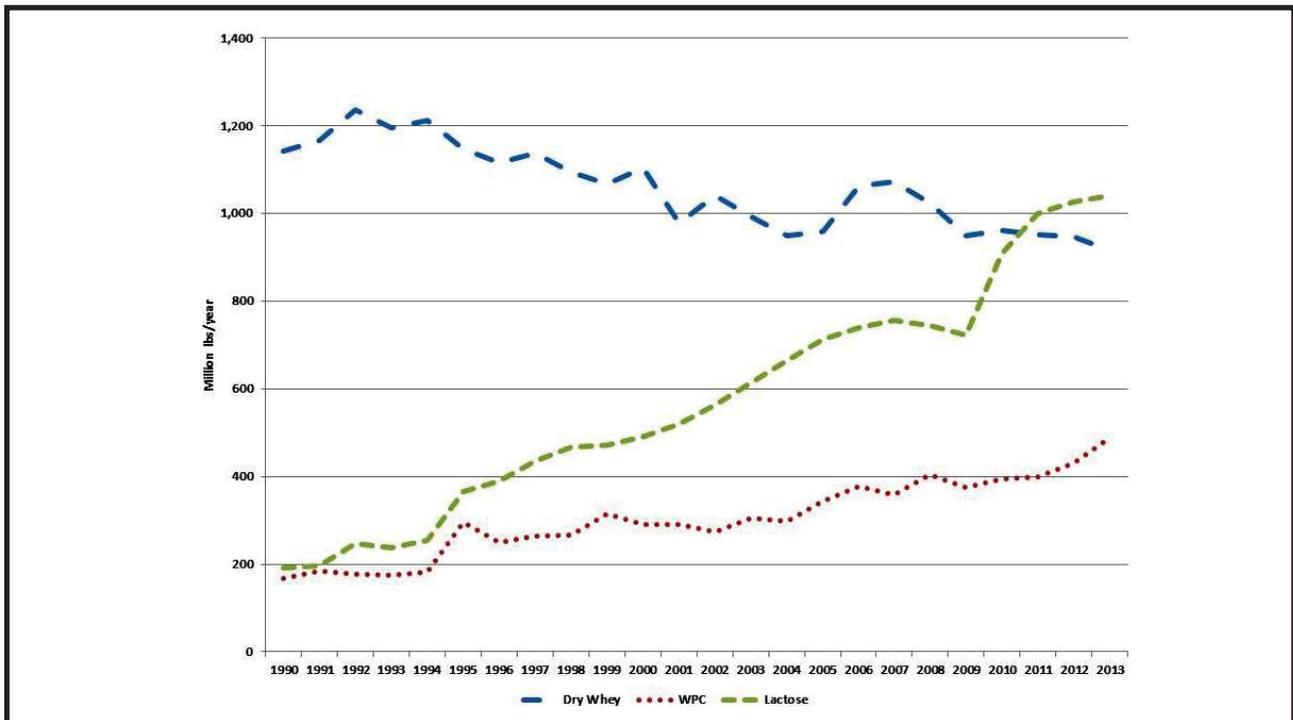


Figure 8. Domestic whey product production from 1990 to 2013 (WPC = whey protein concentrate).

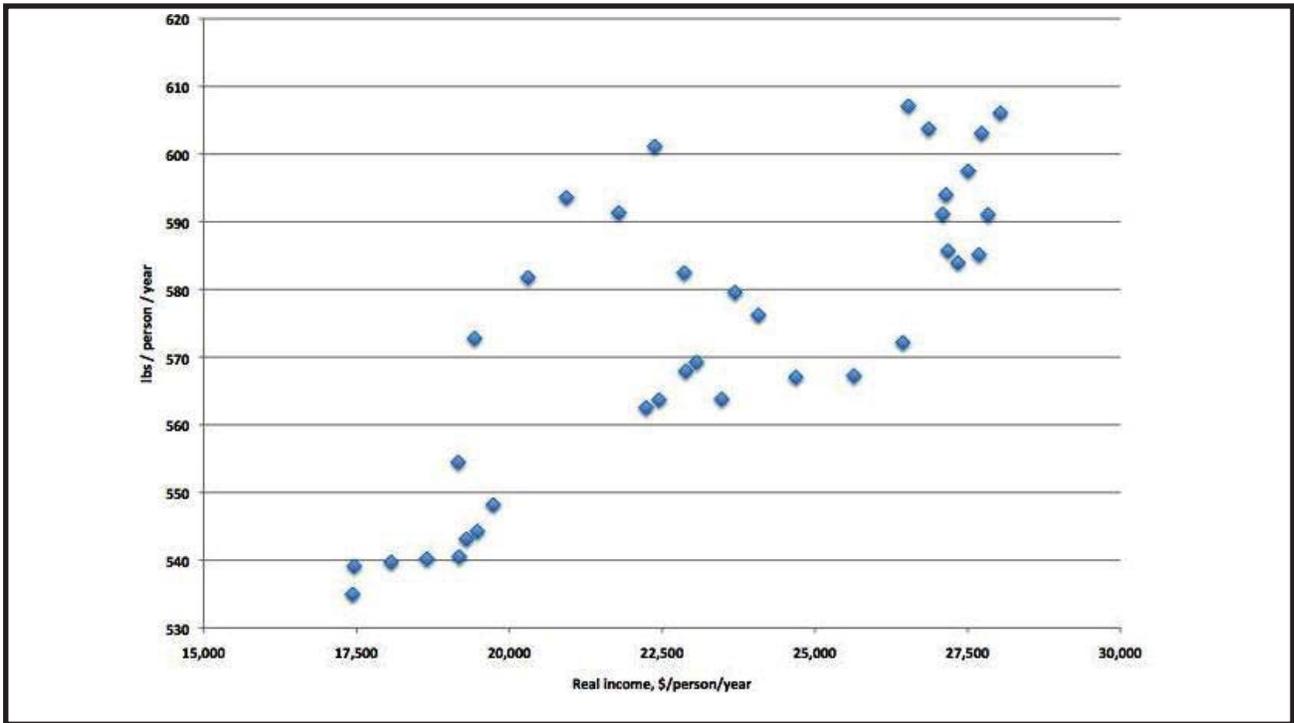


Figure 9. Per capita dairy consumption (milk equivalent) and real income per capita, annual data from 1974 to 2013.

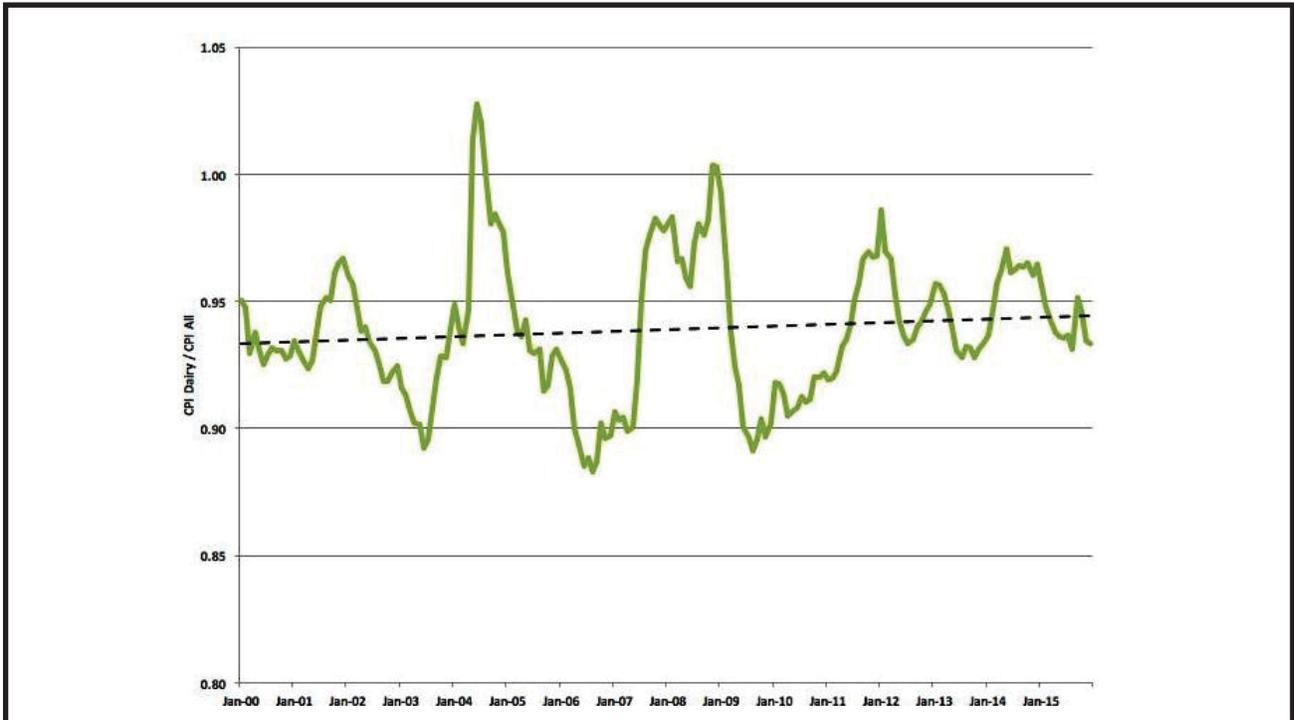


Figure 10. Ratio of dairy consumer price index (CPI) to overall CPI, Monthly January 2000 to July 2015.

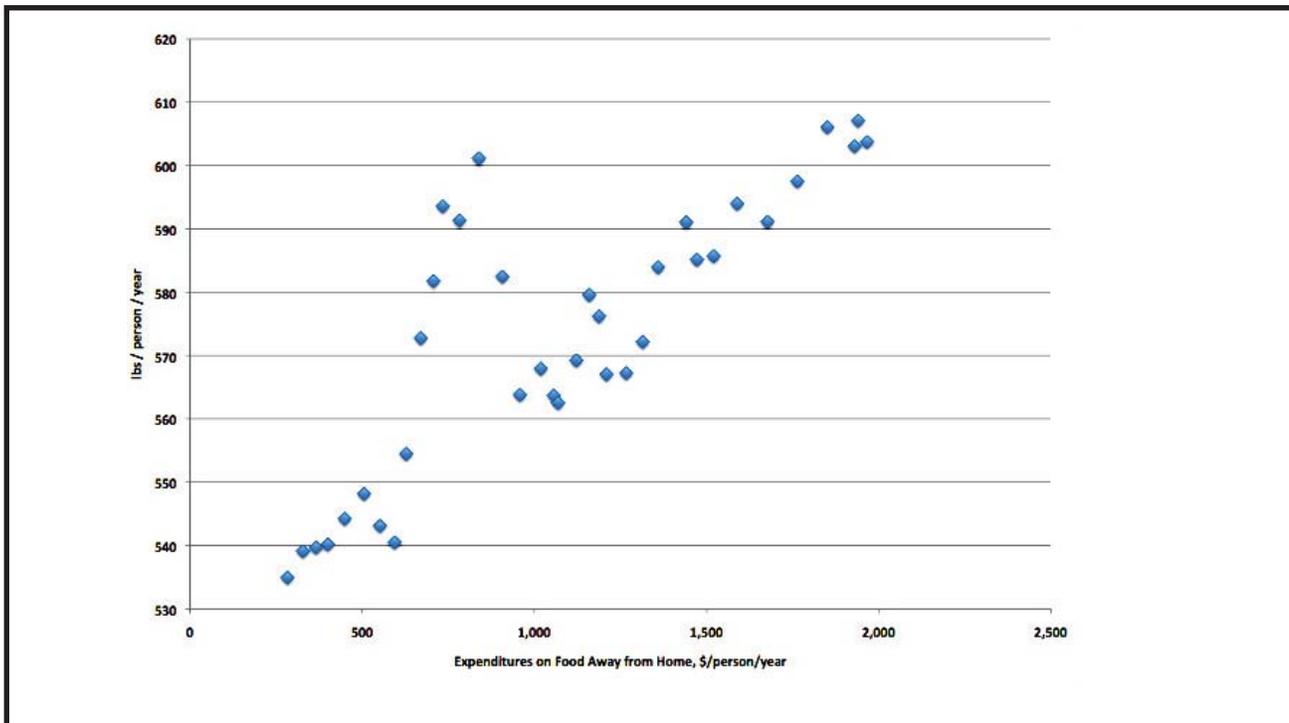


Figure 11. Expenditures on food away from home and per capita consumption of dairy products, annual data from 1974 to 2013.