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The Butterfat Boom Has Just Begun



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Key Points:

- Once cast as nutritional villains due to their high saturated fat content, full-fat dairy products fell out of favor beginning in the 1970s. Nutrition research in the past 15 years suggests full-fat dairy has a much more nuanced role – and potentially protective effect – on health, and consumers have responded.
- From 1966 to 2010, butterfat production levels in farm milk held in a tight range of 3.65% to 3.69%, initially due to demand lost to margarine and later, health concerns. Since nutritional science moderated its stance on saturated fats, butterfat composition has been on a meteoric climb, moving to a record 4.08% in 2022.
- U.S. milk and butterfat production both had parallel growth at 24%, respectively, from 1995 to 2010. Then from 2011 to 2022, butterfat pounds grew by 27% while total milk pounds shipped fell off the pace at just 15% growth.
- Domestic demand has been the biggest driver for butterfat as consumers are eating rather than drinking their dairy these days. Long-term demand trends indicate butter, cheese, cream for upscale coffees, ice cream, and other frozen desserts will continue to grow.
- Export markets are also a significant opportunity for butterfat. When measured on a milkfat basis, the U.S. exported just 5.9% of its milk production as dairy products in 2022. Dairy product exports leapt to 23.4% when measured on a skim-solids basis after butterfat has been skimmed from milk prior to manufacturing those dairy products.

Introduction

While record butter prices have been making headlines in the fall and early winter for back-to-back years, the butterfat story has been churning up positive momentum for over a decade. That’s because animal fats, in particular, butterfat, are back in vogue from a dietary standpoint. This is taking place against the changing backdrop of nutritional research findings on cardiovascular disease and obesity.

EXHIBIT 1: Butterfat content in milk shipped from dairy farms, 1924 to 2022



Source: USDA-NASS

The butterfat reverberation

In early 1900s America, butter was a staple, delivering nutrition and energy to dinner tables. From 1909 to 1942, per capita butter consumption stood above 16 pounds per person, according to the first data collected by USDA. Whole milk also ruled menus, with Americans drinking 384 pounds or 44.5 gallons of fluid milk per year at the market zenith in 1945. Those were among the consumer demands that propelled high component levels on dairy farms; butterfat content in milk shipped from dairy farms topped out at 3.98% in both 1944 and 1945 (*Exhibit 1*).

Time magazine captured this development on the cover of its March 26, 1984, edition: “Cholesterol. And Now the Bad News...” it read. To drive the point home, the headline was accompanied by an image with a bacon-and-eggs frowny face.

Thirty years later, *Time* declared “Eat Butter” on the cover of its June 23, 2014, edition, with the secondary headline, “Scientists labeled fat the enemy. Why they were wrong.” Butter, and its main ingredient, butterfat, was no longer a bad food.

By then, the dairy industry was already undergoing a metamorphosis. Butterfat content in the national bulk tank had already begun a monumental meteoric rise. That, of course, took root because Americans, who were reading the evolving nutritional science, had begun eating more full-fat dairy years before *Time* and other mainstream media outlets began to cover the demand shift. Market analysis indicates this butterfat trend has far more upside and there are underserved butterfat markets both in the U.S. and abroad.

Following World War II, the butterfat content in milk and butter production itself began to shift, first induced by wartime rationing and then by the growing price-based competition from margarine in the 1950s (*Exhibit 2*). American physiologist and dietician Ancel Keys also began some of his related, long-term studies on the diet-heart hypothesis that centered on the concept that saturated fats caused heart disease. However, the results of those studies, and the public awareness of those results, didn’t really break through until the 1970s and 1980s. The *Time* magazine cover story in 1984 marked the full-blown emergence of this attitude.

Effect on milk pricing formulas

Milk pricing formulas evolved with the changing market conditions to favor milk pounds in many Federal Milk Marketing Orders (FMMO). As full fat slowly fell out of favor, butterfat levels slumped from the high of 3.98% in 1945 to 3.69% by 1966. For the ensuing 44 years, butterfat held in a tight window ranging from 3.65% to 3.69%, according to USDA data.

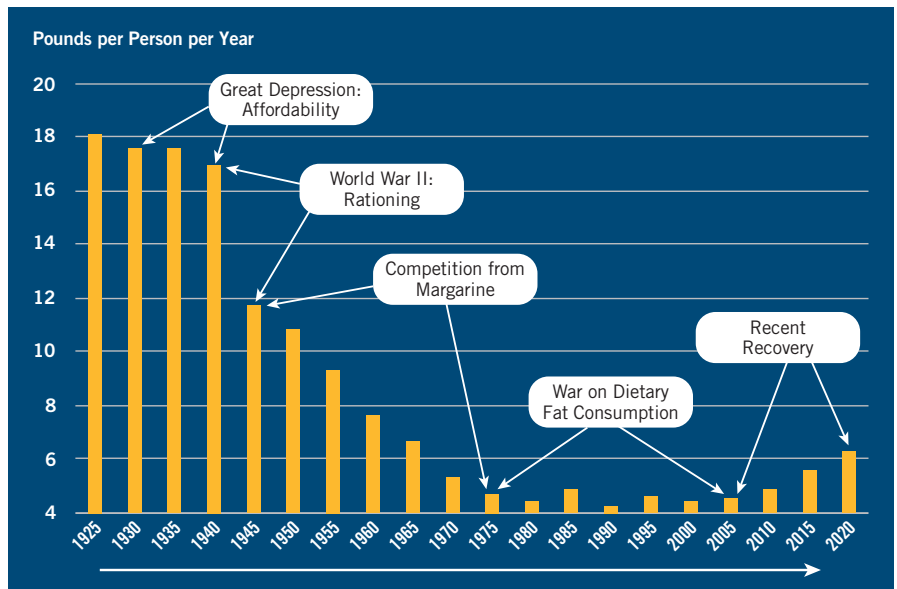


EXHIBIT 2: Nearly a century of onslaughts on U.S. butter consumption

Markets never remain in a vacuum. Cheesemakers and other manufacturers who crafted high-solids dairy products had long known that some milk yielded more cheese and butter when compared to other dairy-farm shipments. In 1982, Utah State University researchers developed a new cheese yield pricing formula that better recognized the full contribution of butterfat and proteins to dairy-product yields.

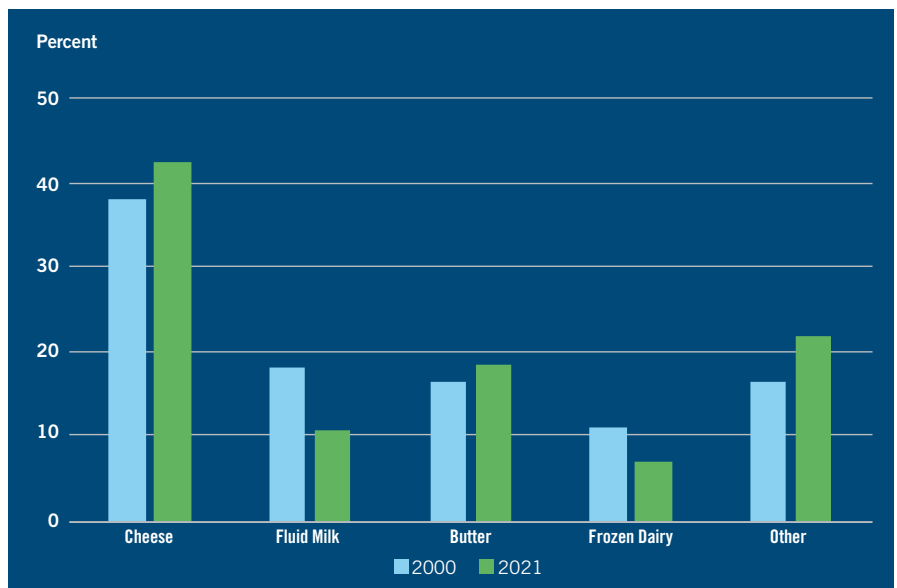
The new concept became known as Multiple Component Pricing (MCP). The Great Basin FMMO centered in Utah became the first order to implement the idea in April 1988. Fast forward to the present, and over 92% of the nation's milk supply is priced using MCP formulas. This includes California, which entered the FMMO system in 2018. The economic incentives for the supermajority of the nation's dairy farmers are in place to send higher component milk to processors.

Before butterfat began to bounce back and *Time* magazine reported the updated research on animal and saturated fats, cheese consumed 38% of the nation's milkfat supply in 2000. Cheese was followed by fluid milk, 18.1%; butter, 16.5%, and frozen dairy products, 11.1%. In those days, cheese and butter accounted for 54.5% (*Exhibit 3*).



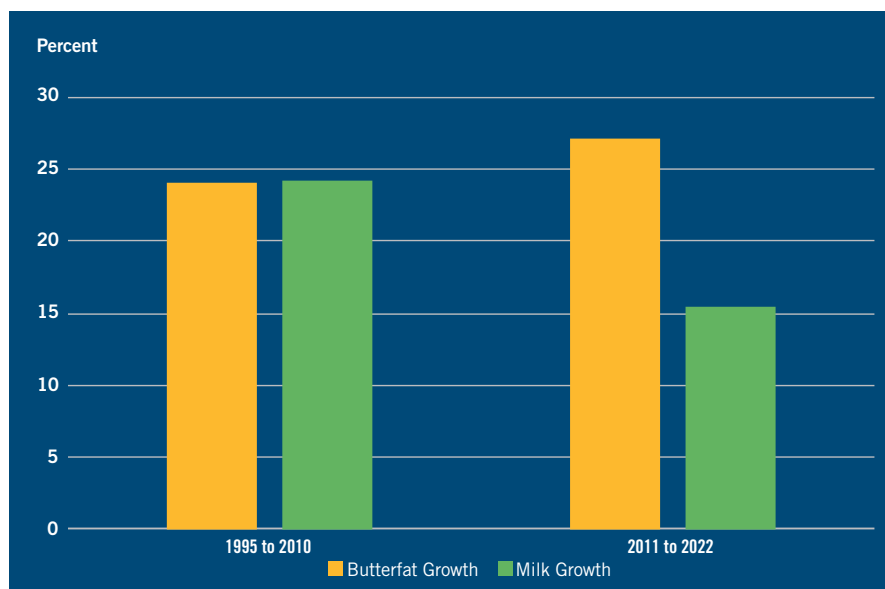
Source: Peter Vitaliano of National Milk Producers Federation; USDA-ERS

EXHIBIT 3: More than 60% of milk fat production today goes to cheese and butter



Source: USDA-ERS

EXHIBIT 4: Growth in butterfat production outpaced milk production by nearly 8%



Source: USDA-ERS

By 2021, that number climbed to 60.7% with cheese notching a 42.3% and butter 18.4% share. Fluid milk, 10.6%, and frozen dairy, 7%, rounded out the top four in the dairy product mix. As an aside, some cheese types do not require high butterfat levels. That's where separators play an important role, to separate cream from milk and its other components.

The drive for higher solids milk caused butterfat levels to soar. The breakout began to take place as butterfat moved to 3.71% in 2011, busted out to 3.84% in 2017, and forged ahead to 3.92% in 2019. By 2021, butterfat broke past the 4% threshold and pushed past the previous historic high of 3.98% last recorded during the height of World War II. Given strong market signals, butterfat levels moved higher to 4.08% in 2022.

Consumer demand certainly has been a driver, as well as producer push and processor pull. In several regions, some farmers face supply caps known as base excess programs, which place limits on the pounds of milk shipped from each farm. However, in nearly every case, those same base excess plans place no limits on the pounds of solids – largely butterfat and protein – shipped from each farm. Hence dairy producers had incentive to improve milk's component composition.

That unfolding dynamic shows up in the major shift in component percentages cited earlier.

Butterfat outpaces milk

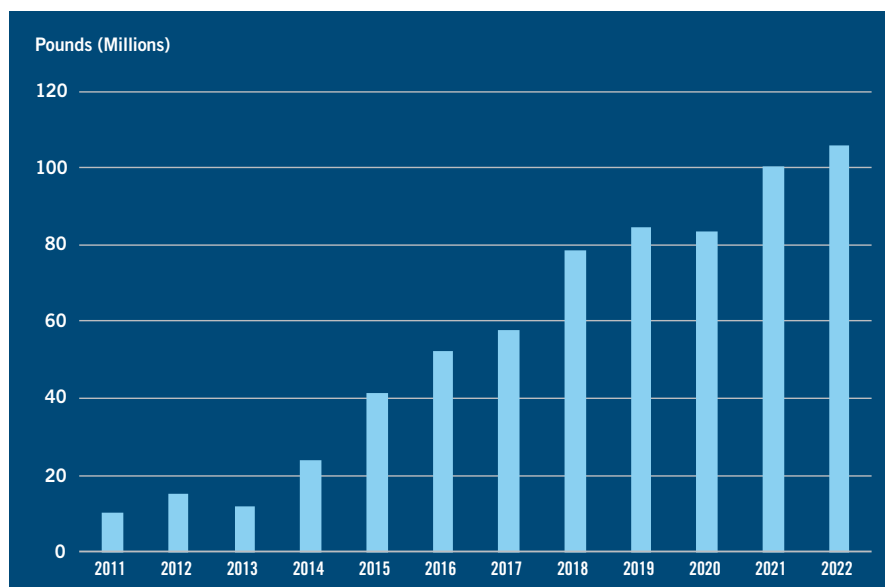
There was a time when milk production and butterfat production were synonymous. That is no longer the case. When measured by pounds, milk and butterfat production mirrored one another from 1995 to 2010, each growing a collective 24%. During that time, U.S. milk production grew from 155.3 billion pounds to 192.9 billion pounds. Meanwhile, butterfat output moved from 5.7 billion pounds to 7.1 billion pounds.

Then they diverged. From 2011 to 2022, butterfat pounds grew 27%. During that same time, milk pounds shipped from farms fell off the pace posting a smaller 15% gain (*Exhibit 4*). Total shipments of butterfat from U.S. dairy farms grew from 7.3 billion pounds to 9.3 billion pounds. On the flipside, 2011 milk production totaled 196.3 billion pounds and grew to 226.5 billion by 2022. Given the dairy product pull, growth in butterfat pounds has become a more important metric to measure on-farm production growth as USDA data has revealed an 8% spread between milk and butterfat pounds in the past 12 years.

Dairy cows are quickly evolving

Several factors have influenced the spread between milk and butterfat. Without a doubt, on-farm feeding programs have played a major role in improving butterfat production. While pivotal, the full impact of feeding is extremely difficult to quantify. Then there's the dairy herd itself. Some dairy analysts like to point to the "browning" of the nation's dairy herd, referring to the influx of Jersey sires. However, to move the national milkfat level from 3.66% to 4.08% in just 12 years involves more than just breed makeup. It involves genetic selection.

EXHIBIT 5: U.S. butter imports have grown 10-fold in just over a decade



Source: USDA-ERS

Today the supermajority of dairy farms breed their cows and heifers via artificial insemination from cryogenically frozen bull semen. And according to the National Association of Animal Breeders (NAAB), the trade association for the artificial insemination companies, 89.9% of U.S. semen sales were from Holstein bulls and another 9% were Jersey sires when the butterfat boom began in 2010. Fast forward to 2022, the Holstein share shrunk to 81.5% and the Jersey share grew to 15.3%. Despite Jersey's significant growth, Holsteins still represent four out of five cows in the U.S. dairy herd but they are now genetically screened via a DNA-based test known as genomics. A genomic test can reveal 70% of the genetic ability of a young calf years before it becomes a milk cow. This science has shortened generation intervals and expedited genetic gains. The largest impact has been realized on production traits. In short, genomics has dramatically shifted butterfat composition in recent years.

The science is picking up steam in the marketplace: In just an eight-month window from December 2022 to August 2023, dairy farmers ran 1 million tests bringing the national total to 8 million genomic tests. While milkfat

percentages hovered between negative and neutral from 1995 to 2016, by 2017, expressed breeding values for milkfat percentages moved to a positive 0.02% and leapt to 0.14% by 2021 – indicating that dairy farmers are selecting for this trait.

Processors process pounds, not percentage. That being the case, the growth in pounds is equally impressive. For Holsteins, the butterfat pounds' upward movement over milk pounds was a near match. From 1995 to 2010, butterfat and milk pounds grew 17.1% and 13.8%, respectively. Then butterfat pounds

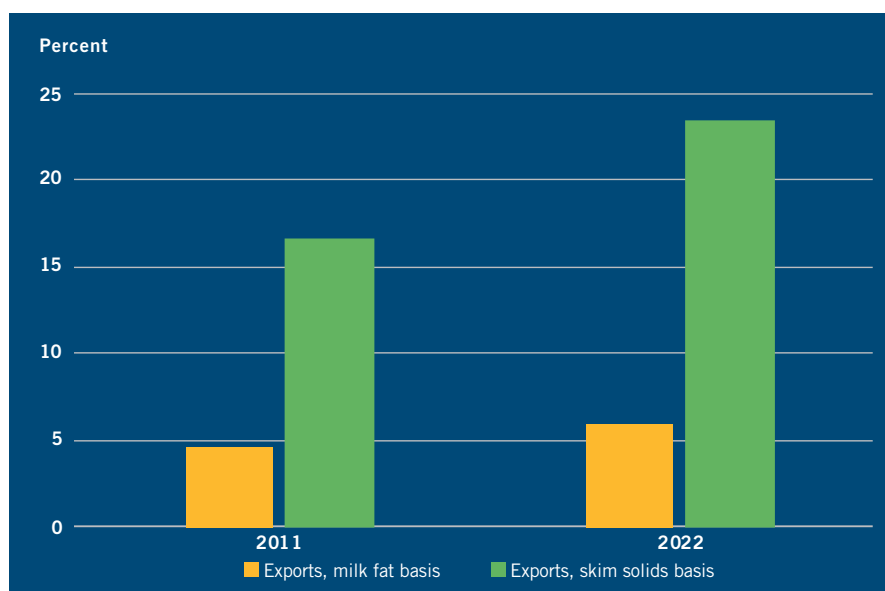
posted a 19.2% growth and leapfrogged the lagging milk production that moved only 7% from 2011 to 2022, according to data from the Council on Dairy Cattle Breeding (CDCB).

The milkfat shortfall

Despite this significant growth in butterfat production, tremendous upside potential still exists largely because the U.S. remains a milk-fat deficit nation. While U.S. milkfat production grew 27% from 2011 to 2022, moving from 7.3 billion pounds to 9.3 billion pounds, milk fat imports into the United States exploded by 120.6%. According to the USDA, the U.S. imported 130.4 million pounds of milkfat in 2011 and that number leapt to 287.7 million pounds by 2022 – a 157.3-million-pound shift.

Of course, butter as a product category has been a major part of that narrative (*Exhibit 5*). In 2011, the U.S. imported just 10.2 million pounds. By 2022, that number bounded 10-fold to 105.8 million pounds – largely lifted by imported Irish butter that contains 82% butterfat vs. domestic sources at 80%.

EXHIBIT 6: Skim solids, low-milkfat products dominate dairy product exports



Source: USDA-ERS

The situation amplified and the gulf between the two measurements moved to 17.5%. In 2022, the U.S. exported just 5.9% of its milk production as dairy products when measured on a milk-fat basis. That number leapt to 23.4% when measured on a skim-solids basis after butterfat has been skimmed from products (*Exhibit 6*). In addition to producing enough supply of butterfat, the other hurdle for exports is that U.S. butterfat prices are often the highest among major dairy-export regions. That makes domestic markets the first opportunity to fulfill when it comes to filling butterfat markets.

To simply fill domestic butter demand, milkfat composition in the national bulk tank would have needed to climb to 4.13% in 2022. Of course, that calculation doesn't account for the 2023 growth in butter sales and other full-fat products to meet the growing domestic consumer demand.

America's dairy product export narrative also shows significant upside potential for butterfat. When the butterfat boom began in 2011, the U.S. was exporting 4.6% of its milk production on a milk-fat basis. That compares to 16.6% on a skim-solids basis after the cream had been skimmed off and retained for domestic markets. That represented a 12-percentage-point spread between milkfat and skim-solids measurements.

Future product prospects

Overall, the market picture is rather clear. The long-term demand trends for dairy products indicate butter, cheese, cream in upscale coffees, ice cream, frozen desserts, and other nutrient-dense dairy products will continue to grow sales volume both in the United States and the world as more people realize middle-class incomes. Given those projections, the upward climb in butterfat levels in farm milk will continue to grow. That also means that continued innovation in premium butter, butter spreads, and development in the butter board phenomenon will bring value to producers, processors, and consumers alike. ■

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