Case Study

Government Cheese: A Case Study of Price Supports

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Abstract
In this paper, we present a case study that uses a Planet Money podcast to introduce microeconomics students to several important economic concepts. The podcast, which is about a policy intervention in the dairy industry, reveals the unintended consequences of government price supports under the Food and Agriculture Act of 1977, which increased dairy price supports through government purchases of manufactured milk products. By 1981, the government was struggling to reduce its stockpile of 560 million pounds of cheddar cheese stored in caves across the Midwest. This case study examines the history of dairy price supports and the government's resulting acquisition of millions of pounds of cheese, butter, and nonfat dry milk. Available on request are detailed teaching notes with learning objectives and background materials, questions (and answers) for student evaluation, and a table displaying meta-data for each question, such as learning objective, difficulty level, and Bloom's Taxonomy level.

1 Introduction

John Block pulled out a five-pound block of molding yellow cheese, showed it to President Ronald Reagan, and exclaimed, "We've got 60 million of these that the government owns! . . . It's moldy, it's deteriorating. . . . We can't find a market for it, we can't sell it, and we're looking to try and give some of it away" (Thomas 1981). It was 1981, and Block, the U.S. Secretary of Agriculture, was trying to decide what to do with all the cheese the government had stored in caves across the midwestern United States.

Between the years 1977 and 1981, the U.S. government had purchased and stored more than 560 million pounds of cheddar cheese. Why was the government stockpiling so much cheese? Did it overestimate the amount of cheese needed by government services? No, it had purchased the cheese and other dairy products such as butter and nonfat dry milk in an attempt to support the U.S. dairy industry.

The story of government cheese stockpiles begins during the campaign of the man who was to become president in 1977: Jimmy Carter. On the campaign trail, Carter stated, "We will make sure that our support prices are at least equal to the cost of production" (Krukones 1985). To keep that promise, President Carter would need to draft a bill raising agricultural price supports. It was this bill that ultimately led to the stockpiles of cheese.

2 Objectives and Application in the Classroom

The objective of our case study is to help introduce students to government price supports and their associated benefits and costs. Before starting this case study, students should have knowledge of supply and demand, welfare measures (i.e., consumer surplus, producer surplus, and deadweight loss) and government intervention policies (i.e., price controls, taxes, subsidies, and quotas). Our intended audience is students in principles courses; however, we have also included intermediate-level questions using

abstract demand-and-supply equations (located in the appendix and available on request from the authors).

Students are expected to apply their newly acquired knowledge on government policies to the specific case presented from the Food and Agriculture Act of 1977, also known as the 1977 U.S. Farm Bill. As a result of the bill, the government set a purchase price for cheddar cheese and announced to farmers that it would purchase as much cheese at that price as farmers were willing to sell (in hopes of supporting the dairy industry). The case study, paired with NPR Planet Money Episode 862, guides students through an analysis of the impacts of this policy on the cheddar cheese market and, in turn, the dairy industry.[1] The podcast brings to light, in an entertaining way, the potential consequences of government price supports. Introducing the case study with the podcast helps students engage with the questions in Section 9. Asking students to come to class with answers to those questions will ensure that they are prepared for class discussion.

3 Mechanics of a Price Support

A binding **price floor** is a legal minimum price, set by the government, at which a good can be sold. For the price floor to be binding, it must be set above the **equilibrium** (the point at which the supply curve and demand curves meet). In Figure 1 below, the equilibrium price is P^* and the equilibrium quantity is Q^*. The binding price floor is set at P_f. At this higher price, consumers demand fewer goods (Q_d) than the equilibrium quantity, and suppliers are willing to produce more goods (Q_s) than the equilibrium quantity. Although the suppliers would like to sell more goods at a higher price, they can only sell as many goods as consumers are willing to buy. Therefore, the new market quantity (the number of goods purchased and sold in the market) is Q_d. This quantity results in fewer transactions between sellers and buyers than would occur in a laissez-faire market.

Fewer transactions reduces the benefit to consumers engaging in market trade and results in a loss to society (deadweight loss). In Figure 2(a) below, we can define the consumer surplus before introduction of the price floor as areas $A + B + F$. **Consumer surplus** is the net benefit that a consumer receives from purchasing a good, as measured by the difference between what the consumer is willing to pay (demand) and what the consumer actually pays (market price). On the graph, the consumer surplus is the area below

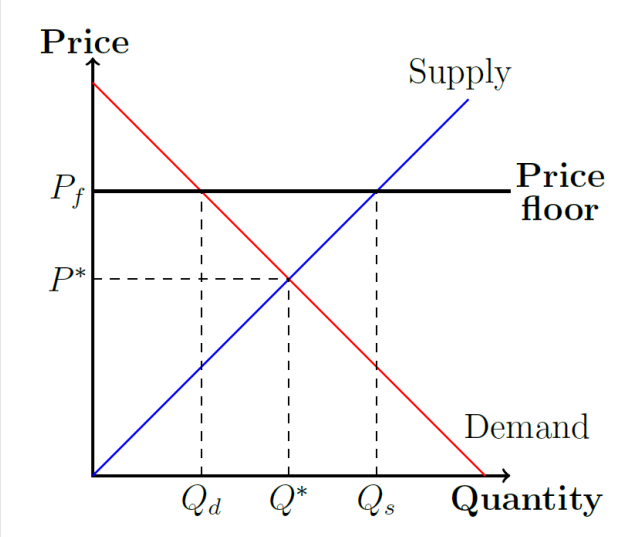


Figure 1. Simple supply-and-demand graph

[1] Instructors are encouraged to listen to the podcast, available at https://www.npr.org/sections/money/2018/08/31/643486297/episode-862-big-government-cheese, before introducing the case study to confirm that it is appropriate for their students.

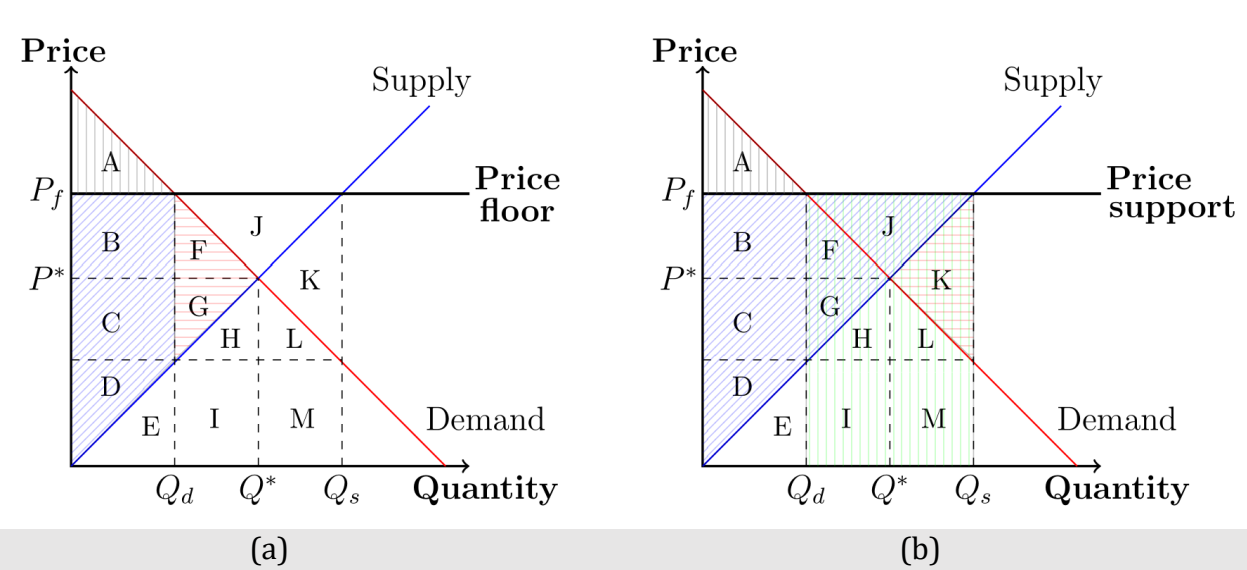


Figure 2. Surpluses, expenditures, and losses

the demand curve, above the price, and to the left of the purchased quantity. With the price floor, the consumer surplus is measured as area A (vertical gray lines). The benefit to consumers decreases with a price floor by $B + F$. The producer surplus before introduction of the price floor is measured as areas $C + G + D$. Recall that **producer surplus** is the net benefit to producers for selling a good, as measured by the difference between what the producer is willing to accept (supply) and the price the producer actually receives (market price). On the graph, the producer surplus is the area above the supply curve, below the price, and to the left of the quantity sold. With the price floor, the producer surplus is measured as areas $B + C + D$ (diagonal blue lines). In Figure 2(a), we can see the benefit to producers with the price floor decreases by area G (a loss) but increases by area B. In this situation, it is generally unknown whether producers benefit from the market intervention. However, we know that society, as a whole, experiences a loss, known as **deadweight loss**. The deadweight loss from the price floor is measured as areas $F + G$ (horizontal red lines).

A **price support**, a type of price floor, is created when the government purchases an unlimited amount of goods from a seller in a market. When the support is binding, the price that sellers receive is higher than the price they would have received had the price floor not been imposed. In Figure 1, the price support is the same as the price floor (P_f). The producers sell Q_d goods to the consumers but still produce at Q_s and sell the remaining products $(Q_s - Q_d)$ to the government. Like the price floor, the price support reduces the benefit to consumers compared to the market equilibrium (consumers are purchasing Q_d goods instead of Q^* goods). Specifically, in Figure 2(b), the consumer surplus with the price support is measured by area A (vertical gray lines). However, the producers are now better off than they would have been with both the equilibrium and the price floor. They are selling Q_s goods at a higher price of P_f rather than selling Q^* goods at a lower equilibrium price of P^* or selling only Q_d goods under the standard price floor. The producer surplus is now measured as areas $B + F + J + C + G + D$ (diagonal blue lines). As previously mentioned, the government is purchasing the surplus goods at a price of P_f, so government expenditure in Figure 2(b) is measured as areas $F + G + H + I + J + K + L + M$ (vertical green lines). The deadweight loss or loss to society is measured by area K (horizontal red lines in Figure 2(b)).

The areas are summarized in Table 1.

Table 1. Areas of surpluses, expenditures, and losses corresponding to Figure 2

	Free market	Price floor	Price support
Consumer surplus	$A+B+F$	A	A
Producer surplus	$C+G+D$	$B+C+D$	$B+F+J+C+G+D$
Government expenditure	--	--	$-(F+G+H+I+J+K+L+M)$
Deadweight loss	--	$F+G$	K

4 Dairy Price Support

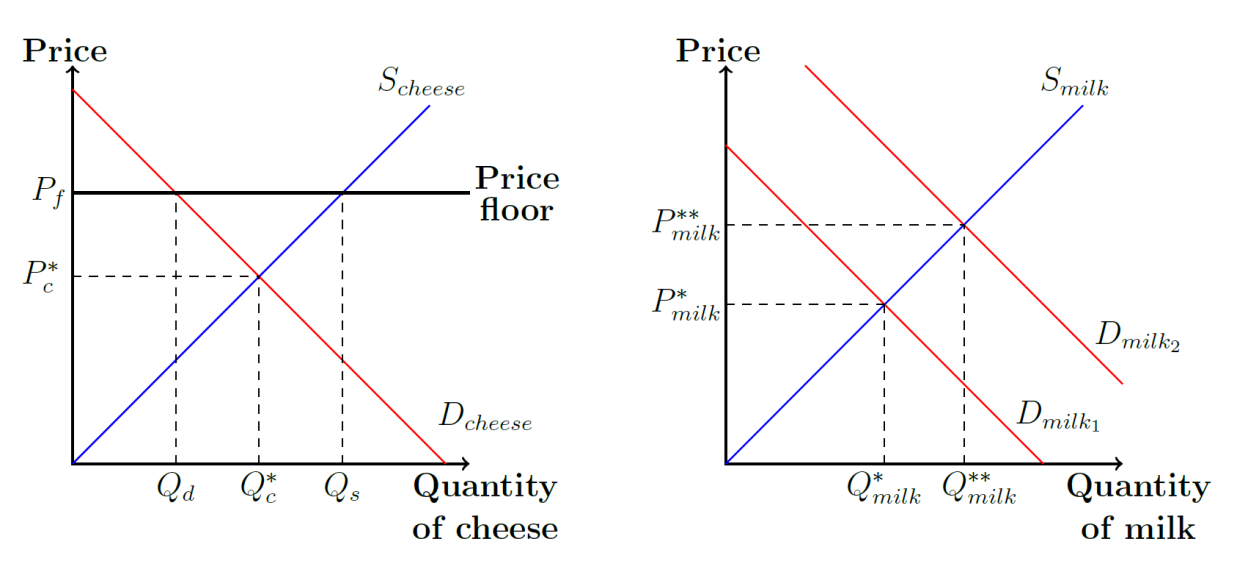
As previously mentioned, price support programs set a predetermined minimum price at which commodities can be sold. The Agriculture Act of 1949 led to the establishment of many such programs. The Milk Price Support Program (MPSP) is one of the legislatively mandated programs under the 1949 act that is designed to help provide farmers with a certain level of income.[2] The MPSP does not pay dairy farmers directly. Instead, it supports them indirectly through purchases of manufactured dairy products. Specifically, the Commodity Credit Corporation (CCC, part of U.S. Department of Agriculture, USDA) purchases manufactured milk products in the forms of nonfat dry milk, cheddar cheese, and butter at a pre-determined price.

The MPSP required the Secretary of Agriculture to set a yearly minimum price support for fluid milk and manufactured dairy products without putting restrictions on the quantity of milk produced (U.S. Congress, CBO 1979; LaFrance and de Groter 1985). Until 1981, the determination of price supports was based on a parity price—a price level at which purchasing power, relative to input prices, is the same as that in some predetermined base year (Erba and Novakovic 1995; Boehm and Stucker 1978). Parity prices were determined by a formula set at the start of each marketing year (April) and remained in effect for the remainder of the year (Heien 1977). This formula converted milk weights into a pound of nonfat dry milk, cheddar cheese, and butter, and ensured that the cost of processing the milk was covered in the price.[3] It also guaranteed that farmers received a market price for their manufactured milk products that at least equaled the set support price (Chouinard et al. 2010). If the market price for nonfat dry milk, cheddar cheese, or butter exceeded the support price, the market for these goods would be in equilibrium. Specifically, producers of these manufactured milk products would supply an amount equal to the quantity demanded by consumers (equilibrium quantity) at the prevailing market price (equilibrium price).

Government support of dairy farmers does not necessarily stem from direct purchases of milk. Instead, it can and did stem from purchases of nonfat dry milk, cheddar cheese, and butter, for which milk is an input. An increase in the production of manufactured milk products causes the demand for milk to shift right, which increases the equilibrium price and quantity of milk. Figure 3 below illustrates how a binding price support in the market for cheddar cheese will generate rising prices in the dairy (milk) market.[4]

First, in Figure 3(a), we will analyze the effect of a price support on the cheddar cheese market. Suppose this support is set at P_f. Consumers purchase Q_d amount of cheese, and the government purchases $Q_s - Q_d$ amount. Before introduction of the price support, the equilibrium price for cheese was P_c^*, and the equilibrium quantity was Q_c^*. With the government price support, cheese manufacturers want to produce more cheese (Q_s). To produce more cheese, manufacturers are demanding more milk because milk is an input in cheese production.

[2] Although the MPSP faced several legislative changes, it remained the main program supporting dairy farmers until 2014. The 2008 Farm Bill reauthorized the Milk Price Support Program as the Dairy Product Price Support Program (DPPSP).
[3] Milk is measured in hundredweight (cwt), which is equal to 100 pounds.
[4] The analysis to follow can also be applied to the nonfat dry milk and butter markets.



(a) Market for cheddar cheese (b) Market for milk

Figure 3. Simplified markets for cheddar cheese and milk

In Figure 3(b), the original (pre-price support) supply and demand are noted as S_{milk} and D_{milk_1}, respectively. Additionally, the equilibrium price is P_{milk}^*, and the equilibrium quantity is Q_{milk}^*. With the price support for cheddar cheese, cheese manufacturers are demanding more milk. This increase in demand for milk causes the demand curve to shift from D_{milk_1} to D_{milk_2}. The new demand curve for milk intersects the supply curve at a higher price and higher quantity. Therefore, the new equilibrium price is P_{milk}^{**} and the new equilibrium quantity is Q_{milk}^{**}. The new equilibrium price and quantity are higher than the original equilibrium price and quantity. Milk farmers can now produce more milk and receive a higher price.

Price supports were set by law at a certain percentage of the parity price. The specific percentage was determined by the Secretary of Agriculture. From 1950 through 1970, price supports were set between 75 percent and 90 percent of parity (Heien 1977). To support dairy farmers, the USDA provided support prices for manufactured dairy products due to the limited storability of liquid milk. Therefore, dairy price supports indirectly provided farmers with a parity income (Manchester et al. 1994). The CCC purchased both bulk and consumer-sized products of manufactured milk. The purchased bulk items at the support price were reprocessed and purchased for sale or donation. All repackaging of manufactured cheese products was completed by a third-party vendor that the CCC program contracted through a competitive bidding process (USDA 2011).

5 Before Government Cheese

The amount of manufactured milk products the government purchased and stored remained relatively low until 1976, as shown in Figures 4 and 5, respectively. From 1971 until 1976, the Secretary of Agriculture, Earl Butz, believed the government should not intervene in the agriculture sector. Butz thought government policies interfered with farmers' rights to produce as much as they would like. He no longer wanted agriculture to rely on the government through price supports. He believed that farmers should rely on the world's free food market (Risser, June 13, 1976). Farmers were asked to produce more and sell more, and government support programs were decreased. However, the reduced support, along with several other factors, started to create a domestic dairy shortage, causing President Richard Nixon to suspend dairy import quotas. These quotas were implemented to deter foreign competition in the U.S. dairy

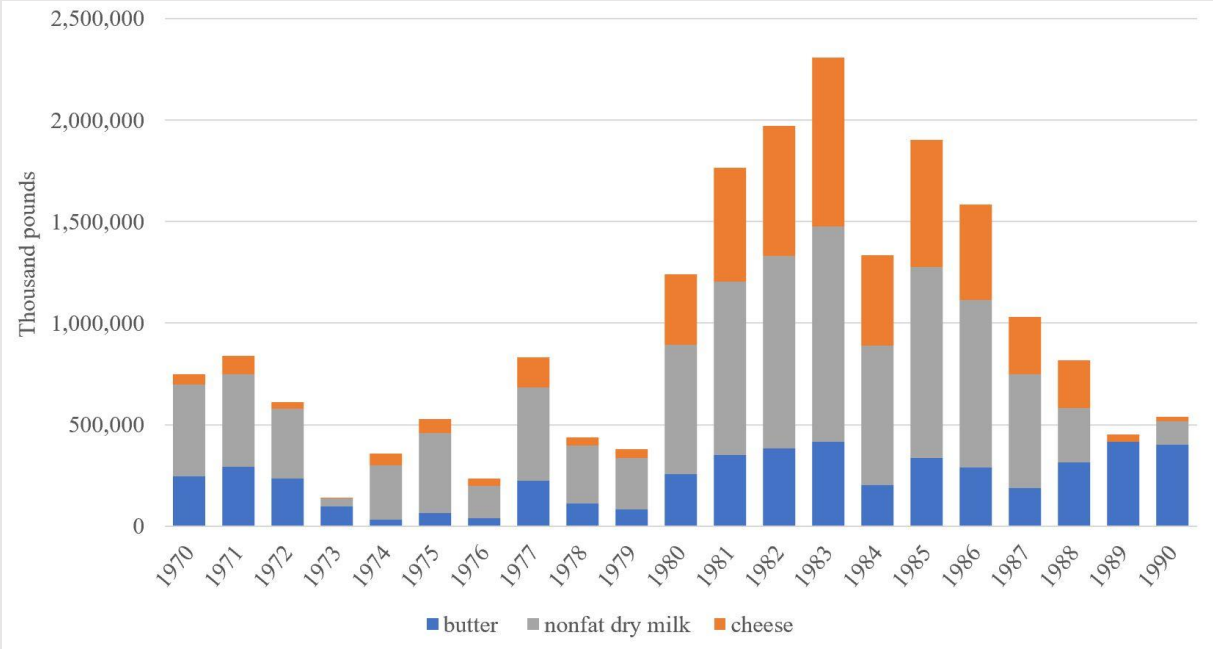


Figure 4. Government purchases of manufactured milk products (USDA 2005)

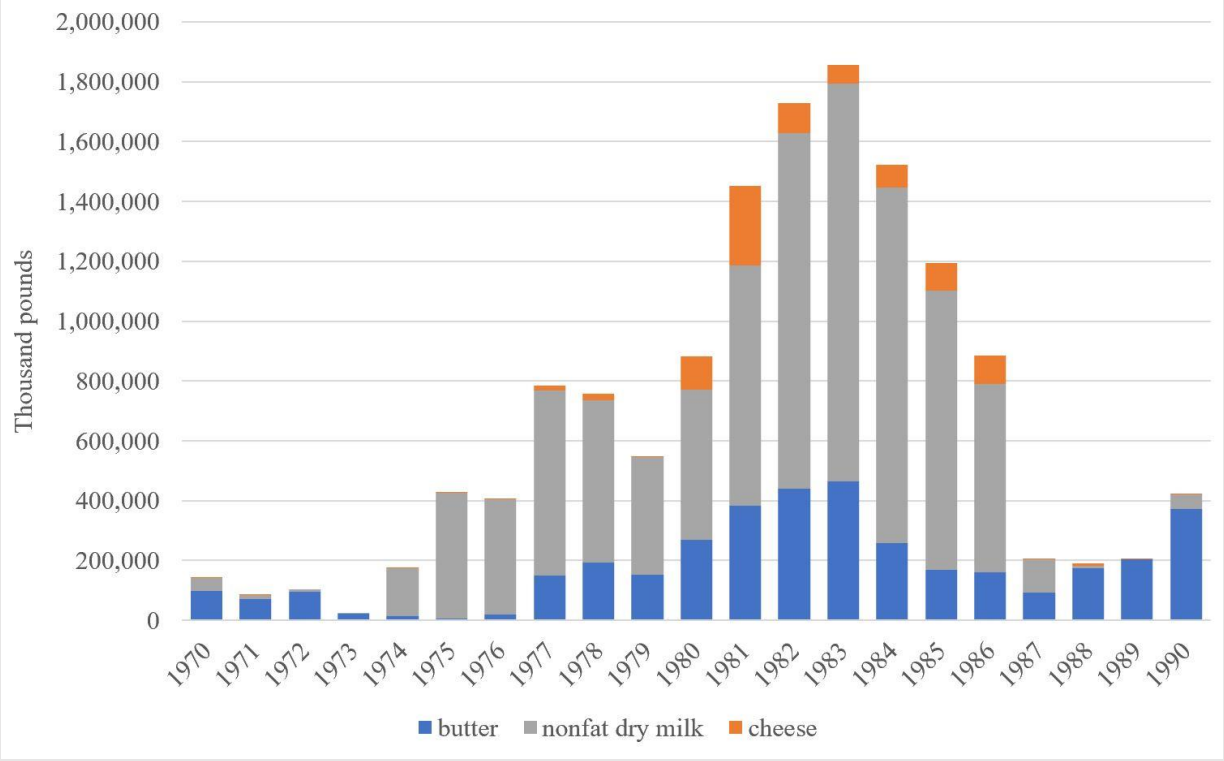


Figure 5. Government stocks/storage of manufactured milk products (USDA 2005)

industry. By suspending these import quotas, foreign dairy producers could now sell their products in the United States at a price similar to domestic milk prices. The increase in the supply of milk and milk-related products caused prices to fall, motivating farmers to lobby Congress and the 1976 presidential candidates for more government assistance/support (Erba and Novakovic 1995).

6 The Food and Agricultural Act of 1977

The Food and Agricultural Act of 1977, an extension of the 1973 Farm Bill, established support not only for dairy farmers but also for wheat, corn, cotton, rice, soybean, peanut, and sugar farmers. The act was written "to provide price support and income protection for farmers and assure consumers of an abundance of food at reasonable prices, and for other purposes" (U.S. Congress 1977).

Increasing pressure from farmers and policymakers who represented large farming communities put President Carter under the gun to make good on his promise to raise support prices during his campaign. U.S. farmers were facing economic turmoil for many reasons, including declining demand (globally), rising input costs, the removal of import restrictions, and embargos to trade with other countries as a consequence of increasing political tensions between the Soviet Union and the United States. As mentioned above, the lifting of import quotas under the Nixon administration caused domestic prices to fall as the supply of foreign-produced dairy products entered the U.S. market. Lower market prices generated a contraction of domestic production, decreasing the quantity of dairy and manufactured dairy products supplied by domestic producers. Some dairy farms exited the market. Between 1973 and 1977, the number of dairy operations decreased 21 percent while the average number of cows per operation increased 22 percent (Blayney 2002). The landscape of dairy farming was quickly becoming one of fewer and larger enterprises. The pressure to raise supports was mounting for the Carter administration.

On September 29, 1977, President Carter signed the Food and Agricultural Act of 1977 into law. This act made a couple of significant changes to the dairy price support program. First, the purchase price of manufactured milk products was to be set twice a year, rather than once a year. Additionally, the price formula was altered to include the cost of inputs to dairy farming (Chouinard et al. 2010). As a result, the support price increased by 11 percent from 1977 to 1978, and an additional 14 percent from 1978 to 1979 (USDA 2019). The increase in the support price led to increasing wholesale prices and eventually increasing retail prices (King 1978). Due to these increasing prices, unrestricted milk production, and the law of supply, the quantity of manufactured milk products purchased by the government, especially cheddar cheese, increased rapidly, as seen in Figure 4.

A portion of the cheddar cheese and butter purchased by the CCC went to school lunch and other meal support programs as well as Veterans Administration hospitals and federal prisons. The remainder was to be sent to warehouses or large underground storage caves, with the expectation that the government could sell the cheese for commercial use once the market price increased beyond the support price (U.S. Congress, CBO 1979). The government was able to send the nonfat dry milk abroad as foreign food aid through Food for Peace programs (King 1978). However, the CCC was prohibited from selling these manufactured milk products domestically for non-commercial use because doing so could depress milk prices, which would partially negate the intent of the program (Associated Press 1981a).

7 Caves of Cheese

Toward the end of the Carter administration, the federal government was spending more than $2 billion per year on manufactured dairy, as seen in Figure 6 (Erba and Novakovic 1995). By the time Ronald Reagan took office in 1981, some 20 million pounds of cheddar cheese, butter, and nonfat dry milk were being added to the government's inventory each week (Associated Press 1981a). However, as the support prices continued to increase, the government's inability to distribute surplus cheese, butter, and nonfat dry milk caused inventories to increase (Figure 5).[5] Government costs were now in the billions of dollars, and newly elected President Ronald Reagan focused on policy changes that would decrease both the inventory of cheese and butter and dairy support prices.

[5] Price supports rose to $13.10 per hundredweight in 1981 from $9.43 per hundredweight in 1977.

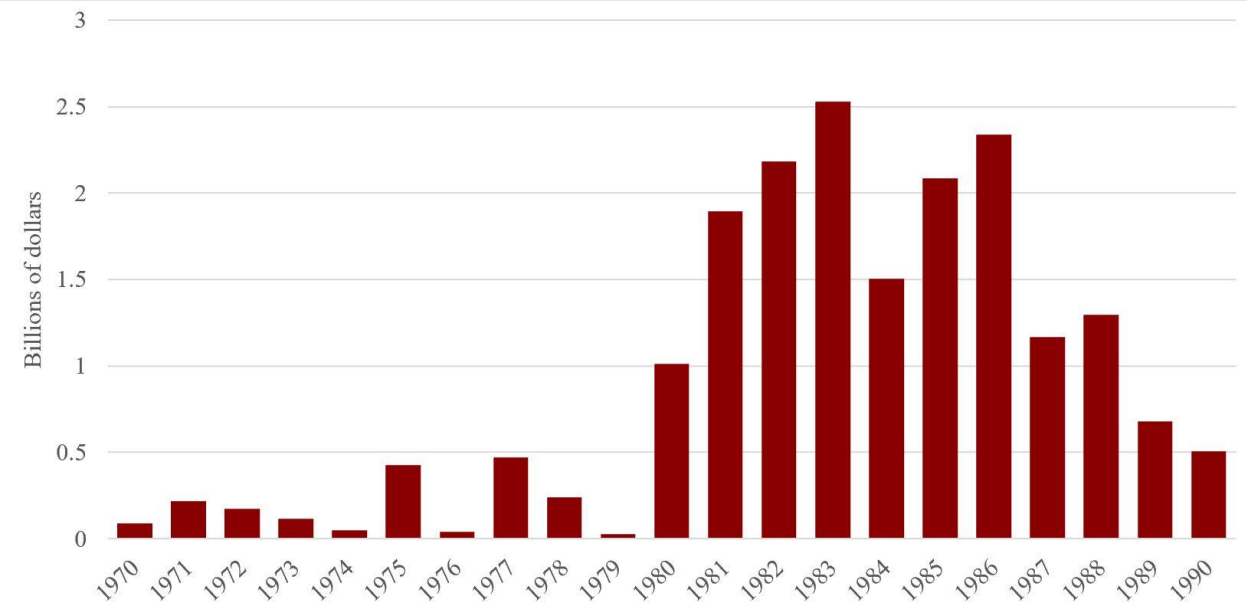


Figure 6. CCC net expenditures on manufactured milk products (USDA 1979, 1990, 2001).

In December 1981, President Reagan signed the 1981 Agriculture and Food Act, which aimed to reduce prices and the surplus of manufactured milk products. First, the bill eliminated the price support formula and outlined a minimum price support that would increase slightly once a year (Erba and Novakovic 1995). This reform was expected to decrease the amount of new cheese that the government was acquiring, but there was still the question of how to distribute the cheese stored floor to ceiling in caves throughout the U.S. Midwest. The government could not release large quantities of cheese all at once. Doing so would increase the supply of cheese, driving down prices, and this impact would not be isolated to the cheese market. Inputs used to produce cheese, that is, milk, would also be affected. In 1981, President Reagan authorized the release of an initial 30 million pounds of cheese to be distributed to states with the intent that those states would then redistribute the cheese to low-income residents through non-profit organizations (Associated Press 1981b). "Government cheese" had just been introduced to the country.

Unfortunately, this act was not as effective at decreasing government expenditures on manufactured milk products as hoped. In 1982, the government was still paying about $2 billion in milk price supports, an amount similar to that spent in previous years. Since the support prices were still high and there was no limit on how much a dairy farmer could sell to the government, farmers were producing about 10 percent more milk than the private market demanded. To make matters worse, the government stock of cheese was increasing faster than the stock of butter or nonfat dry milk, even though the cheese was being distributed to poor residents across the country (King 1982).

A second attempt to reduce U.S. milk production was included in the 1982 Omnibus Budget Reconciliation Act. This act allowed the Secretary of Agriculture, John Block, to collect a 50-cent fee for every 100 pounds of milk sold by dairy farmers. Another 50-cent deduction per 100 pounds of milk (totaling $1 per 100 pounds) was also collected but returned to farmers who decreased their milk production by a specified amount. Despite this act, farm milk production continued to increase from 1982 to 1983, causing the government inventory of manufactured milk products to continue to rise (Erba and Novakovic 1995; Associated Press 1982a; King 1983).

8 So Much Cheese: Shifting Policy

Given that imposing fees on dairy farmers did not decrease milk production, the government instead focused on expanding the policy that paid farmers not to produce. The 1983 Dairy Production Stabilization Act encouraged farmers to decrease output by paying them $10 per 100 pounds of milk if they reduced

production and thus milk sales as compared with a base amount of sales.[6] To be eligible for this payment, a dairy farmer needed to produce at least 5 percent less than his or her base amount of sales but would receive no additional subsidies for reducing production beyond 30 percent of these sales (Novakovic 1983). Additionally, the act decreased the price support for dairy products and created the National Dairy Board (NDB).

The goal of the NDB was to increase demand for dairy products through promotion and advertising activities to be funded with a $0.15 per hundredweight tax. Producers were eligible for a credit of the same amount if they were currently active in the promotion of dairy nutritional programs (Novakovic 1983). The intent of the NDB was to shift support from the government through the Dairy Product Price Support Program (DPPSP) to consumers. If it increased consumer preferences for milk and other dairy products, prices for those products would rise, and government purchases of them could be reduced.

Between 1984 and 1987, the NDB spent $78.9 million on national television advertising and an additional $43.6 million on regional television and radio advertising. The efforts of the NDB through advertising and nutritional awareness were successful in increasing the demand for milk (Ward and Dixon 1989). In short, the government was able to find another lever—demand—to support dairy farmers.

Because the government was still burdened with large stocks of butter, cheese, and nonfat dry milk, Congress then passed the Food Security Act of 1985. Under this act, the government developed the Dairy Termination Program. Approved dairy farmers were paid to cease production for five years. To pay for the program, the government collected $0.40 per hundredweight on all U.S. dairy production between April 1, 1986, and December 31, 1986, and $0.25 per hundredweight over the proceeding nine months (Stukenberg et al. 2006).

The Dairy Termination Program and declining support prices were successful in slowing dairy production growth.[7] By the 1990s, government stocks of manufactured milk products remained relatively low, as shown in Figure 5. They increased slightly from 2000 to 2003. But from 2004 until 2018, according to data published by the USDA Economic Research Service (ERS), the only stocks of manufactured milk products held by the government were 14.8 million pounds of cheese in 2008 and 4.4 million pounds of cheese in 2010 (USDA 2019).

9 Discussion Questions

The buildup of the cheese stockpile detailed in this case study exhibits the risk of unintended consequences as a result of an economic policy that ignores market forces. Efforts to distribute the cheese to low-income individuals rather than sell it in the market, out of fear of depressing dairy prices, shows how unintended consequences can be avoided when policymakers are mindful of the effects of market forces on their policy goals. Finally, the shift in policy from price supports to collective marketing of dairy products illustrates an alternative approach to policy: shifting the market equilibrium, rather than shifting the market out of equilibrium.

Throughout the case study, we have presented our analysis through the lens of the standard economic "workhorse," supply and demand. The analysis of price controls has allowed us to expose students to more complex concepts such as shortages, consumer and producer surplus, transfers, and deadweight loss. Below are several questions that will deepen students' understanding of these concepts and that can be used to evaluate the students' comprehension of the case study.

Consider the supply and demand graph in Figure 7 below. The letters are used to label areas on the graph. Use these labeled areas to answer the questions below.

[6] The base amount of sales was the amount of sales in the previous year or the average amount between 1981 and 1982.

[7] Under the Disaster Assistance Act of 1988, which sought to help dairy farmers affected by drought conditions, support prices increased in 1989, leading to higher feed prices (Stukenberg et al. 2006).

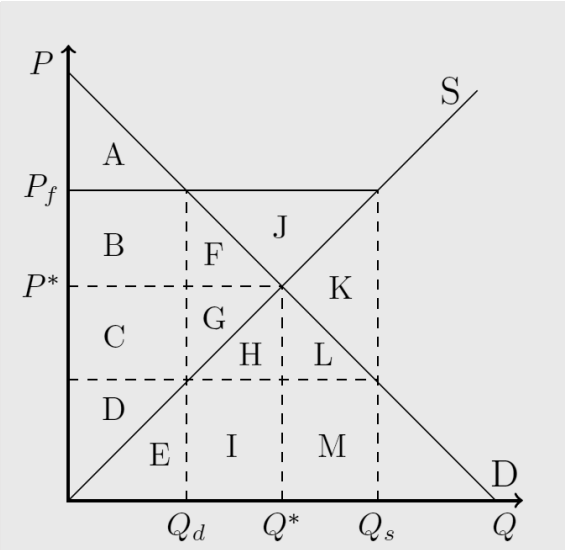


Figure 7. Simplified market for cheddar cheese

1. Using the demand-and-supply diagram in Figure 7, identify the following effects that the 1977 Farm Bill had on the cheddar cheese market.
    a. Find the consumer surplus and producer surplus before and after the policy (using the labeled areas of the graph).
    b. What area(s) represents the government expenditure on cheddar cheese?
    c. List the lettered areas on the graph that correspond to the value of the surplus cheese (transfer beneficiary surplus).
    d. What is the deadweight loss associated with this policy?
2. Using your knowledge of economics, explain why the government's concern for the milk market prevented it from releasing all the stored cheese onto the market.
3. What are other policies or programs the government could have enacted instead of a price support that also result in a higher price of P_f for farmers? Answer questions 1(a)–1(d) with each of these policies in mind.
4. In August 2018 and July 2019, the Secretary of Agriculture, Sonny Perdue, announced that the USDA would take several actions to support farmers in response to potential loss of profit from trade policies. First, the USDA's Farm Service Agency (FSA) will provide payments based on the type of commodity planted to ensure farmers receive a minimum price for their goods. Additionally, he announced a Food Purchase and Distribution Program through the Agricultural Marketing Service (AMS) to buy several types of commodities. The USDA pledged to spend $85 million in 2018 and $68 million in 2019 on the purchase of dairy products. These government-purchased products are to be donated through nutrition assistance programs (USDA 2018, 2019).
    a. Using evidence from the effect of the 1977 Farm Bill, predict what will happen to the dairy market as a result of this new price support.
    b. Would the benefits or consequences of this proposed policy change if we emphasized the fact that this price support would be implemented on the milk market instead of the cheese market? That is, are different costs associated with storing milk than with storing cheese?

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