Agricultural Supply Management and Antitrust in the United States System of Agribusiness

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Abstract

During the last decade the organizations of agricultural producers in the U.S. used a supply management practice, which included some form of production restrictions. The purpose of using it is to control the level of supply in order to ensure a fair level of returns to agricultural producers. A practice of using production restrictions has recently raised a lot of concerns among industry participants, lawyers and antitrust law enforcers in the U.S. The plaintiffs in a number of recent and on-going private antitrust lawsuits allege that agricultural production restrictions violate the Sherman Antitrust Act (1890). The manuscript identifies and analyzes the key legal and economic issues relevant to the nature and performance of agricultural supply management programs in the United States.

Key words: agricultural production control, antitrust, cartels, dairy industry, market power, potato industry.

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Introduction

The organizations of agricultural producers in the United States (i.e. agricultural cooperatives, associations, federations, etc.) have used a variety of supply management strategies/programs affecting production and marketing of agricultural products. These strategies vary from controlling the quantity of agricultural commodities produced to affecting the marketed product shipment patterns. The joint (collective) activities of individual agricultural producers implemented through their organizations are possible due to the Capper-Volstead Act (1922). This Act provides a *limited* antitrust exemption from the Sherman Antitrust Act (1890), which in general prohibits the joint activities of competitors aiming to restrict the amount of output and/or to increase/fix the level of output price.

During the last decade, the organizations of agricultural producers in a number of industries in the United States (dairy, potatoes, eggs, mushrooms) used a supply management practice, which included some form of production restrictions (limitations). The purpose of using it is to control the level of supply in order to ensure a fair level of returns to agricultural producers. In the modern agribusiness environment, this particular form of supply management allows agricultural producers to mitigate the adverse effects of a number of market forces affecting their profitability, such as increasing agricultural input and output price volatility, over-supply of agricultural commodities, and increasing exposure to the volatility of international agricultural commodity markets.

A practice of using production restrictions as an element of agricultural supply management by the organizations of agricultural producers has recently raised a lot of concerns among industry participants, lawyers and antitrust law enforcers in the United States (Varney 2010, Frackman and O'Rourke 2011, Hibner 2011, Manning and Welle 2012). The plaintiffs (direct and indirect buyers) in a number of recent and on-going private antitrust lawsuits allege that agricultural production restrictions violate the Sherman Antitrust Act (1890)[1].

The issue to be decided during these legal proceedings is whether production restrictions are protected by the Capper-Volstead Act. The outcomes of these litigations will have important implications for the design of supply management practices as well as related production, marketing and pricing strategies of the organizations of agricultural producers and individual agricultural producers in all agricultural commodity markets. Furthermore, the antitrust enforcement agencies, U.S. Department of Justice and U.S. Federal Trade Commission, rely on the case law in their antitrust enforcement efforts.

Objective

The objective of this research is to identify and analyze the key legal and economic issues relevant to the nature and performance of agricultural supply management programs with a particular focus on agricultural production restrictions (limitations). The analyzed agricultural supply management programs are private industry-funded and administered programs, which involve no government participation. A current research analyzing the nature, design, performance and market effects of

[1] A number of the most recent antitrust lawsuits is listed in References section of the manuscript.

supply management programs in agricultural markets as well as relevant competition and antitrust law issues is practically absent. The paper aims to conduct an analysis that would provide useful information for agricultural and agribusiness decision-makers, policy-makers, agricultural and antitrust law professionals and research scholars working in this area.

The paper is organized as follows. First, an overview of the economics of joint conduct of agricultural producers through their organizations and its legal foundation, the Capper-Volstead Act (1922), is presented. Second, the most recent experience of implementing supply management programs by the organizations of agricultural producers in the U.S. dairy and potato industries is described. The economic forces leading to the idea of supply management in these industries, the design of the supply management programs and the available empirical evidence on their market effects are discussed. The dairy and potato industries are selected for analysis because information on their supply management programs is available from public sources. Third, the current debate on the legal status of agricultural supply management practices and production restrictions is presented. The paper concludes with discussing implications of the uncertainty currently surrounding the legal status of agricultural supply management practices for agribusiness and policy decision-making process and suggests possible alternatives.

The Economics of Agricultural Supply Management and its Legal Foundation

Legal Foundation for the Joint Conduct of Agricultural Producers

Many joint activities of agricultural producers implemented through their organizations can be characterized as cartel agreements. A cartel is a group of firms, otherwise competitors, who join together for the purpose of controlling the amount of output and/or market price[2]. Cartels can be either private or public. In the latter case, a government participates in organizing and monitoring cartel activities or the government can be a part of the cartel agreement. Cartels can be either legal or illegal depending on the antitrust law regime in a particular country.

The joint activities of competitors aiming to restrict output and/or to control market price are illegal *per se* under the U.S. antitrust law. Section 1 of the Sherman Act (1890) prohibits contracts, combinations and conspiracies in restraint of trade. Price-fixing and output control agreements are considered to be the most damaging to market practices, because a decrease in the output quantity and/or an increase in the output price due to the joint conduct of competitors results in a decrease in the consumer surplus, an increase in the level of price paid by consumers and a deadweight loss.

Many joint activities of agricultural producers would potentially be subject to Section 1 of the Sherman Act, because agricultural producers are competitors. The Capper-Volstead Act (1922) provides a *limited* antitrust immunity to the joint activities of agricultural producers implemented through their organizations (Jesse et al. 1982, USDA Rural Business Cooperative Service 2002). The Congressional intent in passing the Capper-Volstead Act was to equalize the market position of agricultural producers with the market position of the middlemen. In particular, the objective

[2] For a comprehensive survey of cartels operating in different periods of history, the nature of their practices and the market effects of these practices, see Connor (2007) and Bolotova et al. (2007).

was to give agricultural producers additional market power so they could compete effectively in the market place and could earn additional income by capturing the middlemen returns. Some of the desired market effects of the Capper-Volstead Act were higher prices received by agricultural producers and lower food prices paid by final consumers.

The Capper-Volstead Act has two sections. Section 1 defines in general terms the scope of activities that are protected by the Act and sets criterions that have to be met for the organizations of agricultural producers to be protected by the Act. Section 1 allows persons involved in agricultural production to act in associations in collective processing, preparing for market, handling and marketing their products. These associations are allowed to form marketing agencies in common and to make necessary contracts and agreements to achieve their objectives.

Section 2 of the Capper-Volstead Act is concerned with potential market power that may result from activities allowed by Section 1 of this Act. The concerned conduct is monopolization and restraint of trade that lead to unduly enhanced prices. Section 2 authorizes the Secretary of Agriculture to issues a cease and desist order, if he has a reason to believe that an organization of agricultural producers monopolizes and restraints trade to such extent that the price of agricultural commodity is unduly enhanced. Section 2 of the Capper-Volstead Act has virtually never been enforced.

In summary, the Capper-Volstead Act is a *limited* antitrust exemption. First, the organizations of agricultural producers are not exempt from the predatory conduct covered by Section 2 of the Sherman Act (monopolization) and from antitrust violations involving combinations in restraint of trade with non-exempt entities, which would be subject to Section 1 of the Sherman Act. Second, Section 2 of the Capper-Volstead Act acts as a safe-guard against unduly enhanced prices caused by the conduct allowed by Section 1.

The case law performs the major role in interpreting provisions of the Capper-Volstead Act. While the existing case law in general provides a well-developed guidance on how to interpret the purpose and scope of the Act, there is some uncertainty relating to the scope of conduct (activities) protected. A potential range of activities of the organizations of agricultural producers protected by the Act is very broad. The alleged practices are subject to interpretation by courts on a case-by-case basis.

Price-fixing practices of the organizations of agricultural producers, which are illegal *per se* in other industries, is a type of conduct exempt by the Capper-Volstead Act. Some of the activities on withholding the available supply of agricultural products from the market are immune. Acquiring large market shares by growth in membership and forming associations of cooperatives are legal. However, gaining market power by using predatory means, exclusionary practices, boycotts and similar conduct are not exempt by the Capper-Volstead Act[3].

The legal status of the supply management practices recently used by the organizations of agricultural producers, in particular, the legal status of various forms of agricultural production restrictions is currently the most controversial issue related to the proper interpretation of the scope of activities exempt by the Capper-Volstead Act. First, Section 1 of the Capper-Volstead Act does

[3] See USDA Rural Business Cooperative Service (2002) for a comprehensive analysis of the Capper-Volstead Act.

not explicitly mention "supply management" and "production restrictions". Second, until very recently, the existing case law was not particularly clear about whether production restrictions were protected by the Capper-Volstead Act.

A general perception among the industry participants was that this type of activities was immune, which explained why the organizations of agricultural producers used various forms of supply/production control for a number of years. Furthermore, in terms of economics, the market effects of supply/production control are similar to the market effects of price-fixing, which is protected by the Act. Plaintiffs (direct and indirect buyers) in a number of large-scale private antitrust lawsuits currently challenge the legal status of production restrictions, which will be discussed later in the manuscript.

The Economics of Joint Conduct of Agricultural Producers:
Output Control Practices (Supply Management and Production Restrictions)

Agricultural markets are traditionally characterized as markets with perfectly competitive structures. There are many agricultural producers, and each of them produces the amount of output which is small relative to the total industry output. These producers are price-takers, who individually do not have any control over the market price. On the other hand, in light of the entire industry, the total amount of agricultural output supplied to the market each year/season is pre-determined, and market price is a function of the output quantity. In other words, agricultural producers representing the entire industry face inverse demand. Given this nature of demand, agricultural producers representing a single industry, as a group, can attempt to control the output quantity produced and supplied to the market each year, and consequently they can affect the level of output price that they receive.

The joint production and marketing decisions and corresponding conduct of agricultural producers can be analyzed using the profit-maximization models of firms with the seller market power (oligopoly and monopoly). There is a variety of these models, which vary in terms of complexity and key assumptions (linear or non-linear demand, assumptions on the marginal cost curve, static or dynamic, etc.).[4] The seller market power is measured using the Lerner Index of market power: L=(P-MC)/P, where P is output price and MC is marginal cost. The seller market power reflects the firms' (industry) ability to increase output price over marginal cost.

The most traditional profit-maximizing model used in applied antitrust analysis is the one using the assumptions of a linear inverse demand and a constant marginal cost. The price-cost outcome of this model applied in the setting of a particular industry, which is hypothesized to exercise the seller market power, is compared to the price-cost outcome of a perfectly competitive market scenario to conclude on the degree of market power actually exercised by firms with the seller market power. The industry profit is maximized when marginal revenue is equal to marginal cost. Under perfect competition, marginal revenue is equal to output price. Under monopoly, marginal revenue curve is twice as steep as the demand curve.

[4] Standard microeconomics and industrial organization text-books discuss these models and related economics concepts; for example, see Besanko and Braeutigam (2002) and Carlton and Perloff (2004). Applications of these models in antitrust analysis are presented in Harris and Sullivan (1979), Hovenkamp (1994), Cotterill (1998), Cotterill et al. (2001) and Kosicki and Cahill (2006).

The perfectly competitive and monopoly equilibriums in this model framework are shown on Figure 1. In this particular case, the ratio of the profit-maximizing monopoly output to the profit-maximizing perfectly competitive industry output is 0.5. The ratio of the monopoly price to the perfectly competitive price is 1.6. In other words, the monopoly output is 50% of the perfectly competitive output, and the corresponding monopoly price is 60% higher than the perfectly competitive price. The Lerner Index of market power is equal to 0 under perfect competition, and it is equal to 37.7% under monopoly. The oligopoly Lerner Index is greater than 0 but smaller than 37.7%.

The organizations of agricultural producers implementing supply management practices, in particular, production restrictions, act as cartels or oligopolies, who have market power over the output price. The supply management/production restrictions, if effectively implemented, can help increase the output price level relative to marginal cost. As a result, the seller market power (i.e. the Lerner Index or mark-up) increases in comparison with the market scenario without the supply management/production control. The antitrust law enforces are concerned with the effects that the output control practices have on the level of market price. An output reduction leads to two adverse market effects: an increase in the market price imposed on consumers (buyers) and a dead-weight loss (Figure 1). The market price increase due to the joint conduct of competitors is also referred to as overcharge or damage[5].

The actual market (price) effect (i.e. the magnitude of price increase) due to the joint conduct of competitors (i.e. Lerner Index if the overcharge is calculated relative to the perfectly competitive market scenario) is affected by a number of factors that can be identified using more general formulas of the Lerner Index. Table 1 presents formulas for Lerner Index corresponding to a perfectly competitive market and markets with the seller market power: oligopoly, monopoly or cartel with a competitive fringe, and monopoly.

An analysis of these formulas indicates that the magnitude of the Lerner Index (output price increase) can be generally related to: (1) the number of market (cartel) participants (-), (2) the market share of a group of firms with market power (cartel) (+), (3) the size inequality among market (cartel) participants (-), (4) the industry demand elasticity (-), and (5) the industry competitive fringe supply elasticity (-), if the competitive fringe firms are present in the industry. The plus and minus signs in the parentheses indicate either a positive or negative relationship of the factor to the Lerner Index magnitude.

The results of this analysis are in line with hypotheses (predictions) of the theory of oligopoly (Stigler 1964), which has traditionally been used to analyze cartels, their conduct and market effects of this conduct. According to this theory, factors contributing to cartel success (i.e. ability to impose a price increase) can be classified in two groups. The first one includes market structural characteristics that facilitate effective collusion, and the second one includes factors relating to the organizational structure of cartel agreements and their enforcement mechanism.

The market structural characteristics facilitating cartel conduct and contributing to its success include the homogeneity of product and purchasing commitments, a high level of market concentration, a small number of sellers, inelastic demand and high barriers to entry. Based on the

[5] An empirical analysis of cartel overcharges imposed by food industry cartels is presented in Bolotova et al. (2007).

theory predictions, classic cartels are typically formed in oligopolistic markets with a relatively small number of firms. Theoretically, oligopolists joining cartel can manage to act as a single monopolist to achieve a monopolistic price level. However, the mere presence of market structural characteristics is not sufficient for cartel success. The costs of organizing and enforcing cartel agreements are the major obstacle in achieving the monopoly price level.

Consequently, the second group of factors contributing to cartel success includes the factors relating to developing an effective cartel agreement and its enforcement mechanism (policy). This represents a real challenge for cartel participants and involves substantial costs. Each cartel member seeks to maximize its own profit and always has incentives to deviate from the agreement (often referred to as an opportunistic behavior or a cheating problem). Furthermore, cartels have to deal with non-members, who create a free-riding problem and can destroy the cartel efforts.

To be able to impact the level of market price, cartel participants should reach an agreement on price and/or output allocation, to overcome bargaining issues, to prevent opportunistic behavior of cartel members, to control the effect of non-members and finally to design and implement an effective cartel enforcement mechanism. The latter includes monitoring the commitment of cartel members to the agreement on a regular basis and punishing the members who deviate from the agreement. In summary, for collusion to be profitable, the benefits from collusion have to outweigh its cost.

The main differences between the organizations of agricultural producers implementing supply management (production control) and classic cartels are the type of market structure, including the number of participants and barriers to entry, and legal status. As compared to classic cartels, which are organized in industries with oligopolistic market structures, where there is a relatively small number of firms and high barriers to entry, the organizations of agricultural producers are organized in industries with perfectly competitive structures, where there are many firms (agricultural producers) and relatively low barriers to entry.

The type of market structure is a major determinant affecting the success of the implementation of output control strategy and the ability to increase market price. As the number of cartel participants increases, the degree of their seller market power (i.e. price increase) decreases. Furthermore, a large number of agricultural producers makes it more difficult to develop and especially to effectively enforce the output control strategy. Despite the fact that some agricultural cooperatives have large market shares, which theoretically contributes to cartel success, a large membership represents a real challenge in developing and enforcing their agreements (programs). In agricultural industries, large market shares of the organizations of agricultural producers are not likely to be reflected in a significant degree of market power, as compared to other industries.

Assuming that agricultural producers can legally implement some form of agricultural supply/output control, they are much less likely to be effective in imposing a sustainable price increase, in terms of both the magnitude and duration. A large number of agricultural producers, low barriers to entry, a presence of producers-non-members, and the size inequality of agricultural producers would make achieving a sustainable price increase more difficult. This may suggest that the size of damage (overcharge) from agricultural supply control is likely to be lower than the damage imposed by classic cartels using a similar output control strategy, though acting illegally.

Supply Management in the U.S. Dairy and Potato Industries

This section discusses supply management programs implemented in the U.S. dairy and potato industries during the period of 2003-2010. The focus of this discussion is on economic forces leading to the decision of agricultural producers to implement supply management programs, the design of supply management programs and their enforcement procedures as well as available empirical evidence on the market effects of these programs.

U.S. Dairy Industry and Cooperatives Working Together (CWT) Supply Management Program

The major economic forces that led to the idea of private industry-funded and administered supply management program in the U.S. dairy industry included: (a) a high and an increasing over time volatility of milk prices received by dairy farmers, (b) an increasing level and volatility of agricultural input prices, in particular, feed prices, (c) over-supply of raw milk, (b) a substantial decrease in the government intervention due a decrease in the milk price support, and (e) increasing exposure of the domestic dairy industry due to trade liberalization to the fluctuations taking place in international dairy markets. A market environment affected by combination of these economic forces adversely affected the financial condition of many dairy farmers.

Before discussing the nature and market effects of the supply management program implemented in the dairy industry during the period of 2003-2010, a number of important dairy industry forces that directly or indirectly led to the idea of private supply management are discussed in greater details.

A unique feature of the U.S. dairy industry has been a historically high degree of government intervention that directly and indirectly affected pricing of milk at the farm-first handler level[6]. The Federal milk price support program, which established a price floor for milk since 1949, became practically inactive in the 1980s, when the support prices was set at $9.90/cwt, which was below the market clearing level. A decrease in the government intervention through the commodity support programs in many agricultural markets was due to the international agricultural trade agreement (originally the Uruguay Round and now the WTO), which limited the amount of support that the members were allowed to provide for domestic agricultural producers. As a result of the observed decrease in milk price support, the volatility of milk price began to increase in the 1980s.

There are at least two causes of the over-supply problem in the dairy industry. First, due to a high degree of government intervention in the dairy industry pricing, dairy farmers had incentives to expand in response to periodically higher milk prices. Second, due to the improvements in animal genetics and animal management practices, the milk yield (milk productivity per cow) has been increasing over time.

To address the over-supply problem and increasing volatility of milk prices, government-sponsored voluntary supply management programs were used twice, though during a very short periods of time. The Milk Diversion Program was implemented in 1984, and the Dairy Termination Program was implemented in 1986 and 1987. The overall purpose of both programs

[6] A discussion of public policies affecting dairy industry in the U.S. is presented in Manchester (1983), Manchester and Blayney (1997, 2001 and 2004) and Brown et al. (2010).

was to reduce milk supply. In both cases, Congress authorized these programs, and they were funded partially through the dairy producer assessments and partially through the government funds. The difference was in the design and enforcement procedure of these programs.

Under the Milk Diversion Program, farmers had to agree to reduce their milk marketing by 5% to 30% from the base to receive a $10/cwt payment on the actual reduction. Under the Dairy Termination Program (herd buyout), dairy farmers who were willing to slaughter or export their dairy herd and to remain out of business for at least 5 years had to submit bids to the U.S. Department of Agriculture. The farmers with accepted bids had to dispose their cattle during 18 months to receive payments. The evidence on the effects of these programs reported in the literature indicates the Milk Diversion Program and Dairy Termination Program were more likely to have some short-term positive effects and no long-term effects[7].

The supply management program implemented in the U.S. dairy industry during the period of 2003-2010 was the first private, industry-funded and administered program. There was no government participation involved, and the participation of dairy producers was voluntarily. This supply management program was initiated by the National Milk Producers Federation (NMPF), a trade association of dairy cooperatives, and was implemented through the Cooperatives Working Together (CWT), which encompassed dairy producers and their cooperatives throughout the country. The implementation of CWT supply management program was possible due to the Capper-Volstead Act antitrust exemption.

The objective of the CWT supply management program was to balance milk supply with milk demand and to stabilize the level of prices received by dairy farmers to obtain a *satisfactory* level of farm-level milk price[8]. As mentioned earlier, the CWT supply management program was developed to mitigate the adverse effects of increasing milk price and feed price volatility, a low level of the farm gate milk price and over-supply problem. Dairy producers, who participated in CWT supply management program, marketed on average 70% of the national milk supply.

The originally designed CWT supply management included a herd retirement program, a dairy export assistance program and a milk production reduction incentives program. The herd retirement program was the major of these three programs. The purpose of this program was to remove from production the entire milking herd of selected dairy farmers. The dairy export assistance program allocated subsidies to participating dairy cooperatives on exports of butter and cheese. The milk production reduction program was implemented once at the very beginning; there was a lack of support from dairy producers for this program.

During the period of 2003-2009, CWT held 9 herd retirement rounds, during which entire herds of selected number of dairy farms were removed from the production. To make a decision on whether to conduct a herd retirement round and the scale of the round, the CWT used the guidelines

[7] For a related analysis and discussion see Gale (1990), Dixon et al. (1991), Brown et al. (2010) and McCay (2011).
[8] The nature and design of the CWT supply management program is discussed in Parkinson (2008), Siebert and Lyford (2009), Brown et al. (2010) and McCay (2011).

that included a number of economic indicators characterizing the industry condition, such as the all-milk price[9], milk production cost, milk-feed price ratio, and cow numbers among others.

During each heard retirement round, participating dairy producers had to submit their bids on how much money they were willing to accept in order to slaughter their entire milking herd. The CWT selected the bids that they were willing to accept. The producers of accepted bids were required to slaughter their entire herd during 15 days after the audit process of their production was completed. The CWT supply management program was funded through the assessments of participating dairy producers. Approximately 90% of the funds was allocated to the herd retirement program. The originally introduced in July 2003 assessment was $0.05/cwt; it increased to $0.10/cwt in July 2006.

The available empirical evidence on the effectiveness of CWT, and in particular its herd retirement program, include the estimated milk price changes (increases), changes in milk production and changes in the number of cows. According to Brown et al. (2010; Table on page 18), the number of cows removed during nine rounds of herd retirement program ranged from 24,600 heads in 2008 to 101,000 heads in 2009 (the first of three rounds implemented that year). In 2009 there were three retirement rounds that; they were a response to a dramatic decline in the level of milk price received by dairy farmers. The farmers' average bids ranged from $4.02/cwt[10] in 2003 to $6.75/cwt in 2005 (Brown et al. 2010: Table on page 19).

The reported CWT effect on all-milk price ranges from $0.22/cwt in 2004 to $1.54/cwt in 2009, with the average of $0.87/cwt increase (Brown 2009). The largest share of the magnitude of these price increases are due to the herd retirement program effect. For example, while in 2008 CWT increased all-milk price by $0.87/cwt, the herd retirement program contributed $0.78/cwt and the export assistance program added $0.09/cwt to the reported price increase. The estimated price increases are based on the Food and Agricultural Policy Research Institute (FAPRI)[11] model that incorporates dairy industry supply and demand conditions and accounts for lagged supply response. This is a structural econometric model often used to simulate the effects of policy changes on the dairy industry performance (Brown 2009, Brown et al. 2010).

McCay (2011), using milk demand elasticity and the estimated by the econometric model effect of herd retirement on milk production (i.e. reduction), reports increases in all-milk price received by dairy farmers due to CWT herd retirement program. The estimated all-milk price increases depend on the assumption on the elasticity of milk demand (McCay 2011: Table 9). Under the assumption of the demand elasticity equal to -0.1, the estimated short-run returns (i.e. price increases) are in the range of $0.21/cwt (2009, 4th quarter) to $0.62/cwt (2009, 2nd quarter). Under

[9] Pricing of practically of milk at the farm-first-handler level is regulated in the U.S. The system of Federal and State Milk Marketing Orders establishes the minimum prices that the first-level handlers (milk processors) have to pay to dairy farmers for raw milk. This system is based on classified milk pricing and pooling principles. Raw milk is priced according to its use defined by milk classes; currently there are four classes of milk. The receipts from milk processors are pooled within the orders and distributed among farmers based on the milk utilization rate in each milk class. Dairy farmers within the same Order receive the same "all-milk" price. The overview of FMMOs milk pricing is presented in Manchester (1983), Manchester and Blayney (1997, 2001 and 2004) and Brown et al. (2010).

[10] "Cwt" is hundredweight (100 pounds). The submitted bids were in $/cwt of milk to be removed through the herd retirement.

[11] FAPRI is with the University of Missouri.

the assumption of the demand elasticity equal to -0.2, the estimated short-run returns are in the range of $0.11/cwt (2009, 4th quarter) to $0.31/cwt (2009, 2nd quarter). If the demand elasticity is assumed to be -0.8, the corresponding range of all-milk price increase is $0.03/cwt to $0.08/cwt. As the milk demand becomes less elastic, the price increase effect becomes stronger.

Parkinson (2008), using the fluid milk and manufacturing milk[12] demand elasticities and the actual reduction in milk production due to CWT herd retirement program, reports the following empirical evidence for the national level and selected regions. Assuming that the average demand elasticity for manufacturing milk and fluid milk are -0.29 and -0.14 respectively, and the ratio of milk going in these two uses is 2:1, the average nation-wide milk price increase is $0.36/cwt (a 2.63% price increase) (Parkinson 2008: Table 4). If the demand elasticity for milk range from -0.22 to -0.35, the estimated average milk price increase ranges from $0.28/cwt (a 2.03% price increase) to $0.51/cwt (a 3.71% price increase).

Parkinson (2008) also examines the impact of the milk utilization rate (the ratio of fluid milk to manufacturing milk) on the price increase due to CWT herd retirement program. He uses Florida Order as an example of a high fluid milk utilization area and a Midwest Order as an example of a high manufacturing milk utilization rate (Parkinson 2008: Tables 5and 6). The average estimated price increase for Florida is $0.51/cwt (a 3.71% increase), and it ranges from $0.34/cwt (a 2.52% increase) to $0.86/cwt (a 6.30% increase). The average estimated price increase for Upper Midwest Order is $0.33/cwt (a 2.42% increase), and it ranges from $0.26/cwt (a 1.91% increase) to $0.45/cwt (a 3.32% increase).

The reviewed studies emphasize that CWT herd retirement program is likely to have a stronger short-run effect than a long-run effect. Some of the problems in effective implementation of the program are the following. First, the nature of animal reproduction process and improvement in genetics mitigates the effective impact of the supply reduction on market price. McCay (2011) analyses the effect of a slippage on milk supply by testing a hypothesis that a 1 unit reduction in milk supply due to CWT herd retirement program leads to a less than 1-unit reduction in milk supply attributed to the national herd. The econometric model results verify this hypothesis. Second, the studies emphasize a problem of free-riding. There are dairy producers who benefit from higher milk prices without participating in the program by paying assessments. Furthermore, these producers have incentives to expand their herd in response to favorable (increasing) milk prices.

It should be emphasized that milk prices at the farm-level in the U.S. dairy industry are not market-based. They are set within the system of Federal and State Milk Marketing Orders. These prices are calculated using milk price formulas, according to which milk price paid by milk processors is a function of wholesale prices of manufactured dairy products (cheese, butter and dry whey). Milk prices to be paid by milk processers are calculated and announced on a monthly basis. The cooperatives of dairy producers negotiate with milk processors the over-order premium, which is

[12] The Federal Milk Marketing Order system (FMMOs) uses four milk classes. Class I milk is milk used in manufacturing of fluid (beverage) milk products (whole milk, reduced-fat milk, etc.). Class II, III and IV milk is used in manufactured dairy products (ice-cream, cheese, butter, etc); this milk is often referred to as manufacturing milk. FMMOs price milk according to these four classes. Class I milk price is always priced higher than Class II, III and IV milk prices.

typically no more than 10% of the overall price. In this system of regulated pricing, the effect of CWT herd retirement program is to be reflected partially in the size of the over-order premium and partially in the announced (regulated) milk price.

Finally, some of dairy cooperatives operate milk processing facilities and market a wide variety of dairy products (fluid milk, cheeses, yogurt, etc.). Given a complexity of the U.S. dairy industry pricing, which involves the interaction of public pricing and private pricing systems, it is challenging to determine precisely the effect of the CWT herd retirement program on milk prices. The reported empirical evidence should be interpreted with caution.

U.S. Potato Industry and United Potato Growers of America (UPGA) Potato Supply Management

The United States potato industry used the dairy industry experience to develop and implement a potato supply management program in order to overcome similar to the dairy industry economic conditions adversely affecting the profitability of potato growers[13]. The idea of potato supply management originated in Idaho, the leading potato producing state in the country. The United Fresh Potato Growers of Idaho (UFPGI), a marketing cooperative of fresh potato growers, was organized in the fall of 2004, and the first potato supply management program was implemented in the spring of 2005. The objective of the potato supply management was to stabilize the potato supply in order to provide a *fair* level of returns to potato growers. This program was a private, industry-funded and administered program and involved no government participation. The potato cooperative acted under the Capper-Volstead Act.

The UFPGI supply management program was expected to help mitigate the adverse effects of the over-supply of fresh potatoes, a low level and high volatility of fresh potato prices received by potato growers, increasing level and volatility of potato production costs, and increasing competition from imported (Canadian) potatoes. The combination of these economic forces adversely affected the profitability of potato producers and caused frequent financial situations when the returns received by potato growers did not cover their potato production costs.

Originally the UFPGI represented 85% of fresh potato growers of Idaho. Shortly, processing and seed potato growers joined the cooperative. A national level cooperative, United Potato Growers of America (UPGA), was organized in March 2005. UPGA originally represented 70% of fresh Russet potato growers in the country. The UPGA became a coordinating mechanism for a newly created system of regional cooperatives of potato growers with similar objectives, which were joined by Canadian potato growers.

The potato supply management was originally developed to control fresh potato supply. Later somewhat similar guidelines were developed to manage the supply of processing and seed potatoes. The potato acreage management program was used to control the number of fresh potato acres planted. The potato flow control program and exchange of marketing information were used

[13] The overview of the potato supply management program and potato industry conditions are discussed in Thompson (2005), Hardesty (2007a,b), Bolotova (2009), Bolotova et al. (2008 and 2010), Guenthner (2012) and McGary and Zobell (2012).

to effectively manage the marketing of fresh potatoes throughout the marketing year. The potato supply management program was funded through the growers' assessments.

To implement the potato acreage management program, a system of base acres was introduced. The base acres for each grower were those acres where potatoes were planted during the period of 2003-2004. Each base acre was originally assessed at $50. During the first year of the program implementation, the cooperative members were required to decrease the planted area by 15% relative to the base year (i.e. 2004). If a grower chose not to reduce the planted area or to reduce it by less than 15%, he was assessed a pro-rated percentage of $50. The assessment fund was used to buy acres elsewhere in Idaho. If a grower decided to expand relative to the base year, he was assessed $100 per acre. A legitimate expansion was possible by buying or renting acres with the base. Alternatively, growers could plant acres without the base, but in this case they had to pay appropriate assessments. Field audit was conducted to monitor a proper implementation of the acreage management program.

The potato flow control program and exchange of marketing information were used to coordinate quantity of potatoes supplied to the market throughout the year. A variety of marketing information (capacity, stocks, prices, demand and supply trends, etc) was discussed during conference calls that took place once a week at the national level. The results of the discussion were summarized in a price advisory used as a recommended pricing strategy for the coming week. Other marketing activities included the removal of excess potatoes from the market by diverting them to charities, food banks and humanitarian services.

The empirical evidence available for the first few years of the potato supply management program implementation may suggest that the program was effective. Bolotova (2009), using data for all Idaho potatoes (fresh, processing, seed), reported that the Lerner Index of market power increased from 0.4% in 2004 to 11.3% in 2005 (the first year of the program implementation). A successful implementation of the potato supply management may have contributed to the observed increase in the industry Lerner Index. However, this result should be interpreted with caution. The major focus of the supply management program was originally on fresh potato market. Taking into account the evidence of the over-supply of *fresh* potatoes and the fact that fresh potato prices were below the potato production cost in 2004 and preceding years, the magnitude of the Lerner Index of market power for Idaho *fresh* potato market alone is likely to be much lower than the presented number for the entire industry (fresh, processing and seed potatoes).

Bolotova et al. (2008) reports fresh potato changes (increases) between a period without the supply management (the pre-coop period) and a period encompassing the first few years of the program implementation (the coop period). An empirical analysis based on monthly fresh potato prices received by potato growers for all potato varieties indicates that the Idaho fresh potato prices increased from $3.89/cwt in the pre-coop period to $6.63/cwt in the coop period. While this reflects a 70% increase in Idaho fresh potato price, potato production costs' increase was in the range of 10% to16%. The U.S. fresh potato prices increased from $7.78/cwt to $10.19/cwt or by 31%.

These seemingly large magnitude price increases should be interpreted with caution by looking at the level of potato price relative to the potato production cost during the pre-coop and coop periods reported in Bolotova et al. (2008: Table 5). First, the average Idaho potato price was $3.89/cwt

during the pre-coop period, and it was below the minimum level of potato production costs, which ranged from $4.63/cwt to $5.23/cwt during the same period. During the coop period, the average Idaho potato price was $6.63/cwt, which was above the maximum level of potato production costs, which ranged from $5.17/cwt to $5.96/cwt during the same period. In addition, the average Idaho potato price during the coop period, $6.63/cwt, was far below the average U.S. potato price during the coop period, $10.19/cwt, and was also lower than the U.S. average potato price during the pre-coop period, $7.18/cwt.

An empirical analysis utilizing a more disaggregated data, Idaho weekly shipping point prices for Russet Burbank, between the pre-coop and coop periods, suggests that fresh potato price increases were in the range of 47%-71% for US No1 non-size A potatoes, 14%-52% for US No 1 size A potatoes and 34%-52% for US No 2 potatoes (Bolotova et al. 2010). The shipping point prices are prices received by potato shippers, who are represented by independent potato shippers and potato growers-shippers. The shipping point prices correspond to the distribution level of the potato supply chain. The discussed studies also analyzed the effect of the supply management program on the fresh potato price volatility. The presented empirical evidence indicates that the volatility of fresh potato prices was lower in the coop period as compared to the pre-coop period in the majority of the analyzed price series.

Current Debate on the Legal Status of Agricultural Supply Management and Production Restrictions

Currently the legal status of agricultural supply management practices of the organizations of agricultural producers, in particular, the legal status of various forms of production restrictions, represents a very controversial issue. The consequences of this legal uncertainty for agricultural producers and their organizations are substantial civil penalties under federal and state antitrust laws. Under federal antitrust law, direct buyers are entitled to recover treble damages (i.e. three times the overcharge). Under state antitrust and similar statutes, indirect buyers are entitled to recover a single overcharge or up to three times the overcharges, depending on a particular state jurisdiction.

Until very recently, the existing case law was not clear on which exactly supply management and production control practices were protected by the Capper-Volstead Act. A general perception among the industry members was that this type of activities was immune. Furthermore, in terms of economics, the market effects of supply/production control are similar to the market effects of price-fixing. There is a well-developed case law establishing that the organizations of agricultural producers can fix output prices, as this is an element of marketing activities that Section 1 of the Capper-Volstead Act aims to protect.

A number of recent publications of the government officials from the U.S. Department of Justice Antitrust Division and a number of on-going federal and state private antitrust litigations indicate that the uncertainty surrounding the legal status of agricultural supply management practices remains. This situation represents a great challenge for agricultural community because it affects production, marketing and pricing decisions and strategies of individual agricultural producers and of their organizations.

A set of arguments for holding production/supply restrictions both outside and within the Capper-Volstead Act immunity are discussed by Christine Varney, a former Assistant Attorney General of the U.S. Department of Justice Antitrust Division (2010). This issue is evaluated by analyzing the language of Section 1 of the Capper-Volstead Act, existing decisions/recommendations of the government agencies (Federal Trade Commission, Department of Justice and Department of Agriculture) and the relevant case law. The summary of the analysis is presented below[14].

A number of reasons favoring the point of view that agricultural production restrictions are not immune by the Capper-Volstead Act are the following. First, the explicit list of activities included in Section 1 does not include words "production" or "supply". This list encompasses a range of marketing (post-production) activities. It reads that agricultural producers "may act together in collective processing, preparing for market, handling and marketing". One might argue that all these activities are post-production activities, and therefore they do not include production activities.

Second, any antitrust exemption is to be interpreted very narrowly, as guided by the U.S. Supreme Court. Third, a similar to the Capper-Volstead Act statute, the Fisherman's Collective Marketing Act (FCMA), which regulates fishermen activities, defines the scope of protected activities by explicitly including words "catching" and "production". The Capper-Volstead Act does not include similar words. Finally, the legislative history of the Capper-Volstead Act may suggest that Congress did not intend to include production/supply restrictions in the scope of protected activities. An approach that both antitrust enforcement agencies, Federal Trade Commission and Department of Justice, have taken is that the Capper-Volstead Act does not protect production restrictions.

A number of reasons favoring the point of view that agricultural production/supply restrictions are within the scope of the Capper-Volstead Act are the following. First, it can be argued that the scope of activities listed in the Act does encompass the whole range of activities from pre-planting through harvest, processing to sales. One might argue that effective marketing (i.e. preparing for market and marketing) includes the decision on how much to produce in the first place. Second, withholding already available agricultural output from the market might be considered as part of marketing. This may include donating this part of output to charities and/or destroying it. Actually, allowing withholding already available output but not allowing production restrictions may be more wasteful and inefficient from the societal perspective.

Third, the Act's legislative history may be used to argue that production restrictions were covered by the Act. In particular, Congress indented to treat organizations of agricultural producers as single corporations. This implies that an organization of agricultural producers, as a single corporation, can decide on how much to produce. Fourth, some limited case law may be used to argue that supply/production restrictions are protected by the Act. For example, in *Alexander vs. National Farmers Organizations* (1982), the court held that the cooperative could withhold the members' output in order to obtain a higher price. One may further interpret this legal opinion as the one suggesting that agricultural cooperatives can limit their production. Finally, there are opinions indicating that if the Fisherman Collective Marketing Act allows controlling production,

[14] Also see Ondeck and Clair (2009), Frackman and O'Rourke (2011), Hibner (2011) and Manning and Welle (2012).

the Capper-Volstead Act should protect this activity as well, although the language of the latter is somewhat different, as mentioned earlier.

The case law influences the antitrust enforcement efforts of government agencies. In particular, as indicated by Varney (2010), the outcomes of current litigations are important for the enforcement efforts of the Department of Justice. In December 2011, a U.S. district court for the first time in history addressed the issue of planting restrictions in a lawsuit against a group of cooperatives of potato growers, including the United Potato Growers of Idaho and United Potato Growers of America (*In Re: Fresh and Process Potatoes Antitrust Litigation*).

In its decision, the court concludes that production restrictions (acreage limitations) are not protected by the Capper-Volstead Act. First, by having analyzed the existing case law, the court indicates that there are no legal opinions that explicitly approve a pre-production output limitation as opposed to a post-production marketing decision. Furthermore, there are no legal opinions suggesting that the Capper-Volstead Act immunizes cooperatives who decide to collectively reduce production in order to increase market prices. Second, by analyzing the plain language of the Capper-Volstead Act, the court concludes that it does not include reducing acreage for planting.

Third, the opinion reiterates that the government agencies responsible for antitrust law enforcement in their own opinions have not approved production restrictions. Fourth, in response to the defendants' argument that production restrictions are similar to price-fixing, and it is well-established that the latter is allowed by the Capper-Volstead Act, the Judge concludes that these are not the same. This is because an individual freedom to produce more during the periods of higher prices acts as a safe-guard against the Capper-Volstead Act abuse. Finally, the Act's legislative history is used to conclude that Congress did not indicate a strong intent to give farmers opportunity to limit their production. The Judge clarifies that agricultural supply control is possible under Agricultural Marketing Agreement Act (1937).

Conclusion

Agricultural producers and their organizations had a legitimate objective when they decided to develop and implement private industry-funded and administered supply management programs, which included some form of production restrictions. The over-supply of agricultural commodities is a common problem in agricultural markets. The over-supply coupled with a rapidly decreasing level of government support of agricultural producers and an increasing exposure to the volatility of international markets, increasing agricultural input and output price volatility as well as increasing market power of buyers (food distributors, processors, retailers) create market environment adversely affecting the financial condition of agricultural producers, makes financial planning challenging and imposes additional financial stress. As suggested by the reviewed empirical evidence on the effectiveness of the supply management programs in the U.S. dairy and potato industries, these programs provided some noticeable returns to agricultural producers in terms of a higher level of price and a lower level of price volatility.

However, buyers of agricultural commodities affected by the supply management programs have challenged the legal status of the supply management practices and in particular of agricultural production restrictions in a number of recent and on-going antitrust lawsuits. In particular, the

plaintiffs argue that agricultural production restrictions violate Section 1 of the Capper-Volstead Act and therefore are violations of Section 1 of the Sherman Act, which prohibits contracts, combinations and conspiracies of competitors in restraint of trade. Until recently, the existing case law was not particularly clear about the legal status of production restrictions. During the most recent antitrust litigation (*In Re: Fresh and Process Potatoes Antitrust Litigation)* for the first time in the Capper-Volstead history, a comprehensive analysis of the legal status of production restrictions was conducted. The court decision was that Section 1 of the Capper-Volstead Act did not protect agricultural production restrictions.

The current situation involving agricultural supply management practices poses a number of legal and economic questions that deserve further analysis and discussions among industry participants, policy-makers, lawyers and researchers. Some of the issues to be analyzed and questions that need to be answered include the following.

The first issue relates to the type of agricultural supply management practices that are protected by the Capper-Volstead Act and therefore can be used by the organizations of agricultural producers. It is important to distinguish between supply management/control at the pre-production and production stages and the post-production supply management/control. Various supply management practices at the post-production stage are more likely to be protected by the Capper-Volstead Act, because they are more likely to be characterized as part of marketing activities. The organizations of agricultural producers have to use caution in developing and implementing a particular supply management practice.

The second issue relates to the alternative to production restrictions practices that the organizations of agricultural producers can use. Agricultural output price-fixing practices of the organizations of agricultural producers are within the scope of activities protected by the Capper-Volstead Act. The question for some of the organizations of agricultural producers to answer is whether some form of price-fixing may be a viable alternative to agricultural production restrictions at the pre-production and production stages. There is a well-developed case law that establish that price-fixing activities of the organizations of agricultural producers are protected by the Capper-Volstead Act, because they are part of marketing activities[15].

The next few issues are relevant for research and policy analysis. One of them deals with the actual market (price) effects of output control and price-fixing practices of the organizations of agricultural producers. It can be hypothesized that the market (price) effects of price-fixing, which is protected by the Capper-Volstead Act, may be stronger than the market (price) effects of agricultural supply management at the pre-production and production stages. In other words, from antitrust law perspective, the former is more damaging to the market than the latter.

In the case of production restrictions, there is a certain time lag between the moment the supply control is implemented and the market price adjustment takes place, an uncertainty pertaining to agricultural production process (including increasing yield over time despite the area or herd cut) and the effect of free-riders who may expand their production at the expense of participating members, which all together are likely to decrease the effect of production restrictions on the price level. At the same time, a pure price fixing at the farm-gate, which is a part of marketing activity,

[15] USDA Rural Business-Cooperative Service (2002) presents a detailed discussion of the relevant case-law.

has an immediate effect on market price. One may hypothesize whether a practice, which market effects may be more damaging, is permitted and a less damaging practice is prohibited. A rigorous empirical analysis of the market effects of various supply management practices in different agricultural markets is required to test this hypothesis.

A related policy question is the following. Agricultural production restrictions are viable means to deal with the over-supply problem and balance supply with demand. Can a legitimate price-fixing practice help address the over-supply problem? A comparative analysis of market effects of price-fixing and supply management in a particular industry setting should be conducted to answer this question.

During recent years, the nature of competition process in agricultural and food industries in the U.S. attracted a lot of attention of policy makers and industry participants (U.S. Department of Justice Antitrust Division and U.S. Department of Agriculture Initiative (2009-2010), Ondeck and Clair 2009). A lot of questions have been raised about the Capper-Volstead Act in general and its role in the modern agribusiness environment. Agricultural producers and their organizations have to keep in mind that the Capper-Volstead Act provides a very *limited* antitrust exemption. The organizations of agricultural producers first of all have to meet the standard of exempt entities established in Section 1 of the Act.

One of the requirements is that all members of the organization have to be agricultural producers and be actually involved in agricultural production. A presence of one member, who is not involved in agricultural production, removes the exemption from the joint activities otherwise protected by the Act. Another situation is when the organizations of agricultural producers are involved in combinations and contracts with non-exempt entities, which removes the antitrust protection and these agreements are potentially subject to Section 1 of the Sherman Act. Potential penalties under the U.S. antitrust law are substantial, thus providing incentives to buyers to initiate lawsuits.

Finally, the issue of the legal status and market effects of the joint activities of agricultural producers is relevant for the overall international community. Many countries have similar to the Capper-Volstead Act antitrust laws. In a modern global market environment, with a constantly decreasing degree of government support of domestic agricultural producers, the organizations of agricultural producers in many countries are more likely to use various supply management and pricing practices that are protected by their respective countries antitrust laws. At the same time, recent efforts of domestic and international antitrust law enforcement authorities have been to strengthen their antitrust laws, which consequently includes paying more attention to antitrust exemptions, including the one in agriculture.

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Edwards v. National Milk Producers Federation No. 3:11-cv-04766 (N.D.Cal.)

Alexander vs. National Farmers Organizations (1982)

Table 1. Lerner Index in Market Structures with the Seller Market Power.

Market Structure	Profit-Maximizing First Order Condition MR=MC	Lerner Index: $L = \frac{P - MC}{P}$
Perfect competition (*N*=many)	P = MC	$L = 0$
Oligopoly (*N*=few)	$P \times (1 + \frac{\theta_i}{\varepsilon_{Q,P}}) = MC_i$	*For a single firm* $L_i = \frac{P - MC_i}{P} = -\frac{\theta_i}{\varepsilon_{Q,P}}$ *For the industry* $L = \sum_{i=1}^{N} s_i \times \frac{s_i}{\varepsilon_{Q,P}} = \frac{1}{\varepsilon_{Q,P}} \times \sum_{i=1}^{N} s_i^2 = \frac{HHI}{\varepsilon_{Q,P}}$
Monopoly/Cartel with competitive fringe (*N*=1+fringe)		$L = -\frac{1}{\frac{Q}{Q_{cartel}} \times \varepsilon_{Q,P} + \frac{Q_{fringe}}{Q_{cartel}} \times \varepsilon_f}$
Monopoly (*N*=1)	$P \times (1 + \frac{1}{\varepsilon_{Q,P}}) = MC$	$L = \frac{P - MC}{P} = -\frac{1}{\varepsilon_{Q,P}}$

HHI is Herfindahl–Hirschman Index: $HHI = \sum_{i=1}^{N} s_i^2$. N is the number of firms in the industry.

$\varepsilon_{Q,P}$ is the industry demand elasticity: $\varepsilon_{Q,P} = \frac{dQ}{dP} \times \frac{Q}{P}$. ε_f is the elasticity of competitive fringe supply: $\varepsilon_f = \frac{dQ_f}{dP} \times \frac{P}{Q_f}$.

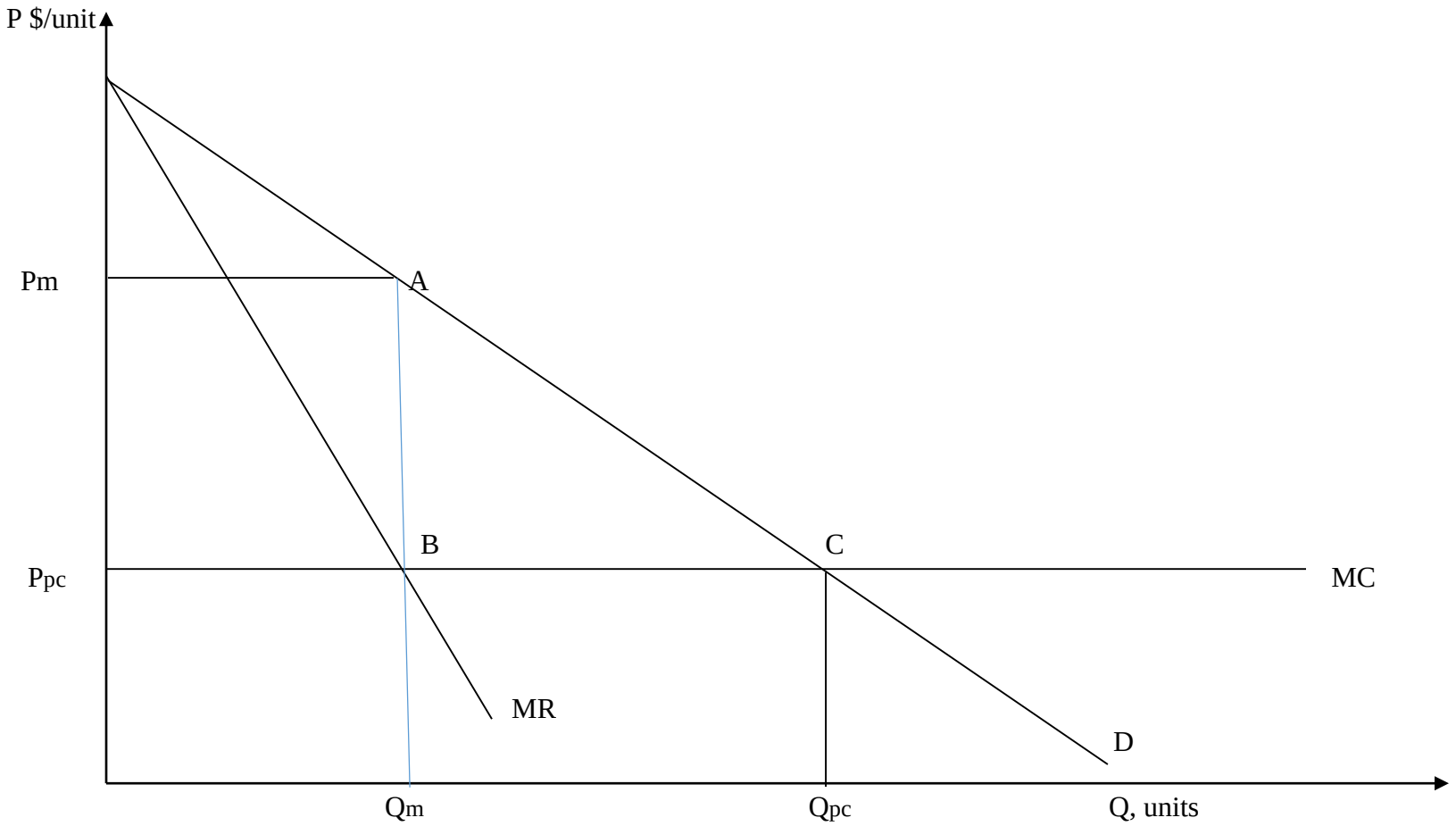

Figure 1. Perfectly Competitive (Qpc; Ppc) and Monopoly (Qm; Pm) Equilibriums.

Triangle ABC is a deadweight loss due to monopoly market power. Rectangle PpcPmAB is a monopoly overcharge. Trapezoid PpcPmAC is a reduction in the consumer surplus due to monopoly power.