Agriculture: Its Structure and Competitiveness

Linda M. Dingbaum
University of Northern Iowa

AGRICULTURE:
Its Structure and Competitiveness

by Linda M. Dingbaum

The field of industrial organization can help an economy function more efficiently by examining the performance of particular industries. In such an examination, economists customarily use the industrial organization paradigm, which consists of the market structure-conduct-performance framework, to analyze a specific industry. Market structure is often the first and most important element investigated because it determines conduct, which in turn determines performance (Clarkson 1982). Therefore, market structure will be the main concern of this paper which will examine the agricultural industry.

Structural elements consist of those characteristics of a market that strategically affect the nature of the competitive process within the industry (Metcalf 1969). They include barriers to entry, size and distribution of firms, cost structure, market instability, and government intervention. In this paper, each of these facets will be analyzed in detail for agriculture to determine the extent to which the structure of this industry corresponds to the structure of a purely competitive industry.

Barriers to Entry

Barriers to entry, one element of market structure, involve the relative ease or difficulty experienced by new sellers attempting to enter an industry and are determined by the advantages established sellers have over potential rivals. One type of barrier is economies of scale, which arise when a firm cannot achieve the lowest unit production cost until it attains a relatively large proportion of the total industry output. Applied to agriculture, this type of barrier is generally not very relevant because farming can be profitable on a small scale (Metcalf 1969).

The initial capital requirement to enter the industry may also act as a barrier to entry. The investment required to engage in farming can vary. Generally, to operate on a small scale, only a modest sum is needed to rent a few acres of land, lease some equipment, and obtain the necessary supplies. Like economies of scale, this barrier is relatively uninhibiting to potential entrants.

The final entry barrier concerns the product itself. An entry barrier may arise if the final product is differentiated because of distinguishing characteristics such as brand name, advertising, or complementary products. This barrier, while very prominent in other industries, is virtually nonexistent in agriculture because buyers of farm products are relatively indifferent as to the origin of the product. Since all entry barriers are low, one attempting to enter the agricultural industry would appear to encounter very few difficulties.

Size and Distribution of Firms

A second element of market structure is the size and distribution of firms in the industry. Statisticians ordinarily classify the size of farms by number of acres. Currently, farming operations in the United States range from one acre to 1,000 or more acres, with the average farm approximately 440 acres (Schiller 1986, p. 306).

In determining the size of an operation, a farmer must consider many variables because there are advantages to producing on both large and small scales. Technical relationships exist among resources used in agriculture that cause the average product to increase or decrease in response to a change in farm size. In addition, there are financial advantages and disadvantages to large scale operations.

Technical advantages develop because of more economical operations. First, as the size of the farm increases, the cost of buildings can be spread over more output. Second, larger operations may be able to reduce labor costs through division of labor or task specialization. This is almost impossible with small operations. Finally, specialized and expensive equipment can be used more and thus be less costly, on the average, with a larger operation. This results from the increased productivity per acre of items such as labor, fuel, and miscellaneous materials, as the specialization of farm machinery increases with the size of the farm (Cohen 1965). However, if the farm continues to expand, these savings will level off as the machines reach and surpass the optimum size for the particular acreage in operation. According to Halcrow (1980), this concept is supported by the evidence that a large family farm tends to realize the same advantage from technical efficiencies that the larger scale operations achieve. The key, then, to the realization of these economies is to carefully match the proper equipment with the corresponding scale of operation.

Technical disadvantage results from a scale too large for the managerial talent employed. Beyond a certain size, the efficiency of large firms can decrease as supervision becomes more difficult and thus more costly. Also, a farmer may lose some control over operations as authority is delegated. Furthermore, the quality of the output may be reduced, since hired workers do not share the farmer's financial interest in the quality of the product. Because the difficulties concerning both production and financial management tend to increase in direct proportion to farm size, management, like equipment, must be employed in precise proportion to farm size.

Pecuniary advantages, on the other hand, are more prevalent among larger scale firms than are technical advantages. This situation is attributable to quantity discounts, improved bargaining power, contract purchases, and lower marketing costs resulting from large volume and contract sales. However, large firms also encounter a pecuniary disadvantage as a result of increased tax expense as well as higher labor and management costs per unit of output (Halcrow 1980). Therefore, as in the case of technical efficiencies, pecuniary advantages and disadvantages must each be considered for different scales of operation in order to fully realize the benefits.

Empirical evidence indicates that, overall, farms generally experience technical economies of scale up to the level of a large family farm. Beyond a size of approximately 600 acres, however, technical diseconomies set in (Halcrow 1980, p. 347). It has been found, though, that additional pecuniary advantages at this scale may outweigh these disadvantages. The precise interaction, then, of the economies and diseconomies of scale are dependent on the specific set of circumstances in each case (type of farming, condition of land, condition of machinery, weather, etc.), thus explaining the successful existence of both large and small scale farming operations.

The advantages of large farms appear to have surpassed the advantages of small farms because the average size of farming operations has risen continually since the Second World War. Recent findings indicated that only 5.5 percent of all farms are as large or larger than 1,000 acres, but these farms include more than 40 percent of total farm acreage (Adams 1986, p. 1). In the past four decades, the trend has been toward fewer and larger farms. This trend is expected to continue, fueled by the recent farm foreclosure crisis (Edwards, Smith, and Peterson 1985). Thus, it appears that the size of farms will continue to increase in the future.

Cost Structure

Cost structure, a third characteristic of a market, concerns the classification of expenses into either fixed or variable costs and the proportion of each component relative to total expenditures. Fixed costs typically include property taxes, interest on outstanding debt, and depreciation. Examples of variable costs in the agriculture industry are seed, utility, and labor

expenses. Empirical evidence indicates that the proportion of fixed to total costs is high in the agricultural sector, approaching 50 percent (Weiss 1980, p. 40). If it continues to rise, this proportion may adversely affect the future ease of entry into the agricultural industry.

Market Instability

A fourth element of structure, especially applicable in the agriculture industry, is market instability. Agriculture seems to be afflicted with price changes more often than other industries, and the range within which these prices vary appears to be more extensive. The causes of these fluctuations originate in the very nature of agriculture.

Any variation in retail prices usually results in an equal absolute change in the return received by farmers because the marketing process absorbs virtually nothing. Thus, the farmer must bear the full effect of a price change. Cohen (1965) has identified three basic reasons for this. First, the supply of agricultural products is perfectly inelastic because the output of individual farmers cannot be altered in the short run. Second, the supply of distributors' services is elastic because most would be more willing to accept less volume than a reduced rate of return. Thus, when prices decline, the reduced return is shifted back to the farmer. Finally, many of the organizations offering marketing services such as local grain elevators, co-op's, and corporate buyers, possess a considerable amount of market power. Consequently, because of the unfavorable bargaining position, the relatively weak farmer must accept the prices charged.

Seasonal variations also afflict the agricultural industry. These variations exist on both the demand and the supply side. The demand for particular farm products increases at certain points during the calendar year. Supply is also more plentiful at specific times. Unfortunately, though, these supply peaks usually do not coincide with demand peaks and, consequently, an infinite cycle of surplusses and shortages develops. Theoretically, according to the "market mechanism," prices increase during shortages and decrease during a period of surplus. In this way the market adjusts price in accordance with existing conditions. For the sake of market adjustment, the farmers must deal with widely variable prices.

Annual and cyclical fluctuations are the last reason for inherent price variability. Fluctuations occur in yield and depend to a great extent on weather conditions. Since a farmer can only change output plans in the long run, equilibrium in the market period must occur through price adjustments. Cyclical fluctuations in demand also exist for some products. These cycles are usually not predictable so they are beyond the farmer's control (Cohen 1965). Again, since the farmer is powerless, prices will change, and instability will persist. The effects of this phenomenon are highly visible in the recent economic history of farming.

The first intense farm depression developed in the early 1920s. Before this crucial time in farming, there existed a favorable supply-demand relationship for farm products, resulting from an expanding population, recurrent wars, and low productivity due to less advanced technology. However, the end of World War I was the beginning of a seemingly never-ending farm problem.

After the War, European countries no longer demanded as much American food. Consequently agricultural exports fell from nearly $4 billion in 1919 to approximately $2 billion in 1921 (Schiller 1986, p. 298). At the same time, American soldiers were returning from abroad to attend to their farming operations, which increased supply dramatically. This increased supply coupled with the decreased demand hurled the agricultural industry into the Great Depression approximately ten years before the rest of the United States. To illustrate, the average income per farmer fell from approximately $2,600 in 1919 to only $885 in 1932. The primary cause, of course, was a 75 percent decrease in farm product prices during this period (Schiller 1986, p.

298). Unable to survive these conditions, smaller farming operations began to disappear. This is a trend that still continues today.

The second farm depression began in 1980 and still exists at this writing. Schiller (1986), like many agricultural economists, believes that this depression is as bad as, or even worse than, the Great Depression because the real income for farmers is actually lower now than it was in the 1920s. However, unlike the 1920's depression, this one was caused by increased production costs rather than decreased prices. Increased fuel and fertilizer costs and skyrocketing interest rates were the main culprits contributing to these high production costs. Because prices did not rise in proportion to costs, farmers found themselves in a very tight squeeze from which many did not, and many more will not, escape (Schiller 1986). The devastating effects of these two farm depressions, then, acted as a catalyst for government intervention in the economy.

Government Intervention

Even though this need was obvious soon after the First World War, government officials were still reluctant to interfere with the agricultural market mechanism. After much debate, however, farm programs were introduced in response to the demands of the people through New Deal legislation of the 1930s. According to Cohen (1965), the government justified these interventions with several basic reasons, most of which are still applicable today.

First, since farming is predominantly a small scale industry, the farmer has an unfavorable bargaining position relative to that of a large scale distributor. Next, maintaining the current standard of living requires an increasingly smaller proportion of the population to produce necessities. This, with rising productivity and a slow exit of resources out of agriculture, results in a relatively depressed industry. The nature of supply itself is another justification for intervention. The supply of agricultural goods cannot be

adjusted in the short run so equilibrium must be achieved through price fluctuations and this can have devastating effects on farm incomes. These circumstances, combined with social and political pressure, finally compelled the government to initiate farm policy.[1]

In the 1930s, when the agricultural industry was well into its first depression, the government responded with several programs to aid the farmers. This was the beginning of large amounts of government intervention, and it still continues today with many of the same programs. Schiller (1986) has divided these programs into three distinct types: 1) price supports and supply restrictions; 2) cost subsidies; and 3) direct income supports.

Price supports and supply restrictions are instituted for the purpose of raising and stabilizing the prices of farm products. The first legislative effort in this area was the 1933 Agricultural Adjustment Act, established to restore the purchasing power of farmers to that of 1914 by raising farm product prices. To accomplish this, the government paid farmers to voluntarily reduce crop acreage, thereby reducing supply and driving prices upward. A problem soon developed, however, when the U.S. Supreme Court ruled that the government possessed no power to pay farmers not to produce. Consequently Congress quickly passed the Soil and Conservation and Domestic Allotment Act, which authorized the government to pay farmers for growing soil-conserving products. With this act, Congress got around the Supreme Court ruling and supply was still effectively reduced. This type of price support, along with farmers' cooperative activities, import restrictions, and government-bought surpluses, makes up an important program that is a basic and effective component of farm policy today.

Another type of government program seeks to lower production costs through cost subsidies. In effect, a government subsidy slows the rise of marginal costs, making production more profitable, thus increasing output. This subsidy is most visable when it is in the form of cash or reduced taxes. However, the

government also subsidizes agriculture by providing basic research, insurance, marketing, grading, and inspection services at lower prices.

The last type of government program is direct income support designed to allow farmers and their families to achieve the same standard of living as their city counterparts. Unlike price supports and cost subsidies, this program has the advantage of providing farmers with income security without distorting output and market prices. Deficiency payments in which farmers are directly paid the difference between actual and parity prices, are the primary form of direct income support. Though distortions with this program are less severe, it is not a popular method because farmers consider it charity. They would rather have higher price supports. This has been illustrated in recent history and still holds true today.

Recent farm policy has been primarily concerned with reducing supply. One controversial program was the Payment-In-Kind (PIK) Program of 1983. By paying farmers with surplus grain, it encouraged farmers to take a percentage of their land out of production. The program itself was successful, but it did not solve the problem. It is unlikely that any program will solve the problems that plague the agricultural industry because government policy has been aimed at supporting farm prices and incomes in the short-run instead of seeking a remedy for the real problem of long-run resource allocation (Halcrow 1980). Thus, the only permanent solution to the farm problem is to reallocate resources away from agriculture. This, however, is highly unlikely because of the unfavorable social and political effects that would occur.

Competitiveness?

The industry of agriculture is traditionally used in classrooms to explain the concept of pure competition. An industry is said to be purely competitive only if it demonstrates specific characteristics. Agriculture seems to illustrate all of these: a large number of sellers, a homogeneous product, no individual producer influence on the market price, no barriers to entry, and the absence of nonprice competition.

But is agriculture purely competitive? With the substantial amounts of government interference that occur in agriculture, this industry can hardly be viewed as purely competitive. Maybe it would be more accurate to view agriculture as an industry that was once purely competitive but since has become regulated. Also, recent trends raise questions about whether it will remain as "competitive" as it is now. In the past decade farmers have been involved in a substantial amount of incorporation. There is a strong trend toward fewer and larger farms, a characteristic of oligopoly, or at least monopolistic competition. With farm size increasing, the capital requirement necessary to compete will also increase. This could create a substantial barrier to entry and reduce the industry's competitiveness. Also, in dealing with their present situation, farmers are banding together. If members of the group continue to act as one, they may be able to exert a substantial amount of influence over the market. This, too, will affect its competitiveness. These possible events, in addition to the presence of government intervention, indicate that economists should question the use of agriculture as an example of a purely competitive industry. It does not appear to be a good example at all.

Note

[1] For a discussion of the theoretical basis of these policies, see Cohen (1965).

REFERENCES

Adams, Walter. *The Structure of American Industry.* New York: MacMillan Publishing Company, 1986.

Clarkson, Kenneth and Miller, Roger. *Industrial Organization.* New York: McGraw-Hill, 1982.

Cohen, R.L. *The Economics of Agriculture.* Cambridge: James Nisbet Company, 1965.

Edwards, Clark; Smith, Matthew and Peterson, Neal. "The Changing Distribution of Farms by Size," *Agriculture Economics Research,* Fall 1985, 37, pp. 1-16.

Halcrow, Harold. *Economics of Agriculture.* New York: McGraw-Hill, 1980.

Metcalf, David. *The Economics of Agriculture.* Baltimore: Penguin, 1969.

Schiller, Bradley. *The Microeconomy Today.* New York: Random House, 1986.

Weiss, Leonard. *Case Studies in American Industry.* New York: John Wiley and Sons, 1980.