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AGRIBUSINESS MANAGEMENT

A REVIEW OF THE FARM MACHINERY AND EQUIPMENT INDUSTRY

It probably comes as no surprise to most American farmers when I say that machinery and equipment purchases now constitute the single largest expenditures for total agricultural production inputs. According to the U.S. Department of Commerce, 1980 sales for farm machinery and equipment totaled over \$13 billion in the U.S. Such production inputs have contributed immeasurably towards increasing our productivity as American farmers are the most efficient producers of food and fiber in the world. Yet the price of these inputs has risen abruptly within the past decade. Using a price index based upon 1967, farm machinery and equipment prices reached 337 (from a base of 100) by September of 1980. By comparison, the price index for other farm production inputs had reached 256 and the well-known Consumer Price Index stood at 249. In a recent study by the Office of Policy Planning of the Federal Trade Commission¹, it was suggested that some of this price rise may be attributable to increased concentration amongst manufacturers, distributors, and retailers. The contents of this study and other related documents examine closely the changing structure, conduct, and performance of the nation's largest agribusiness sector. Such changes impact directly the entire agribusiness sector and warrant further review. Of this nation's seven major manufacturers of farm machinery and equipment, two have hovered on the brink of financial collapse

¹ Leibenluft, Robert F. "Competition in Farm Inputs: An Examination of Farm Industries." O.P.P., F.T.C., February 1981.

throughout most of the last decade. More recently, International Harvester, one of the two largest firms, has acknowledged financial difficulties and the need for restructuring. This action, alone, suggests the need for a review of the industry, both past and present.

Market Considerations

There is little doubt that farming has dramatically increased its level of mechanization since World War II. Given my age, I personally experienced the transition from horsepower of the hay-burning variety to horsepower of the fuel-burning variety. My own children look at me in a state of bewilderment as I attempt to describe my youthful experiences with a team of mules, a two-row cultivator, and a corn field in southern Illinois. The current array of production equipment is mind boggling. Tractors, of course, now account for more than 25 percent of all farm equipment sales and most firms which manufacture tractors also produce a full line of tractor-powered machinery, self-propelled equipment and miscellaneous attachments and implements. As such, they are often characterized as "full-line" producers. Other manufacturers known as "long-line" producers are generally smaller and more specialized. They produce machinery for a sub-sector of the total agricultural market. Still others known as "short-line" producers concentrate their production on machinery or equipment used selectively in the production of particular crops or animals. Long- and short-line firms generally compete in less concentrated markets where the barriers to the entry of new competitors are relatively low. For these reasons, most attention has been focused upon those full-line producers,

particularly those operating in the all-important tractor and harvesting machinery sub-markets.

The demand for farm machinery has certainly changed since my days in the cornfields of southern Illinois. Such changes have doubtless had their effect on the structure of the industry. For example, it can be shown that the demand for farm machinery is now highly volatile, peaking in 1974-75 as commodity prices rose, and then dropping off precipitously as economic conditions weakened and interest rates rose. Additional instability in the demand situation can even result from seasonal variations. Like the purchase of most durable products, the purchase of machinery is more easily postponed during hard times than is the case for other agricultural inputs such as fuel, feed, chemicals, etc. The farmer has always shown himself to be a very adaptable creature, extending the life of older equipment during periods of depressed commodity prices and then aggressively purchasing new machinery following the year of the bumper crop. While some input industries (e.g., fertilizer) have attempted to lengthen their season of peak business activity, it is interesting to note that 17 percent of new farm equipment sales occur between the period of April to October. For some specialized types of machinery, this sales period is even more concentrated. This factor, alone, creates a formidable burden for smaller companies and dealerships as they are less able to carry a year-round labor force.

In addition to the volatility in demand, it is surprising to note that the overall demand for farm machinery has grown only slowly in recent years. U.S.D.A. data show that during the 15-year period ending in 1978, there was actually a decline in the number of tractors employed in U.S. agriculture. Yet this statistic is clouded by the knowledge that our tractors in use have grown larger, more powerful, and much more costly. For example, while the

number of tractors used dropped almost 9 percent during this period, the total tractor horsepower employed rose just over 38 percent and the value of that equipment increased by 65 percent. Some leveling off of this trend is expected as we approach limits in the amount of arable land and as the growth in average farm size tapers off. Those manufacturers seeking to expand their production have sought to expand into non-farm equipment areas. To the extent that new manufacturers have been able to enter the market, they have done so through the development of very specialized equipment normally based upon a new technology.

As our agricultural machinery and equipment has grown larger, technologically more complex, and more costly, an additional demand factor has entered the market, i.e., interest rates and financing. If one is to manufacture, distribute, and retail farm machinery successfully today, the ability to provide buyer financing is now critical. Last year, for example, the typical U.S. manufactured farm tractor sold for between \$35,000 and \$80,000. At this price level, dealers must not only compete with regards to the product they offer, they must also offer a competitive financing program. Hence, major manufacturers have established large credit divisions to serve both their dealerships and their farmer customers.

The useful life of most new farm machinery or equipment is tied to a 5-10 year period. Replacement parts and related services become, therefore, an integral part of the marketing strategy. Hence, in addition to financing and credit provisions, machine reliability and services and repair facilities are crucial concerns. In fact, one industry survey² revealed that the most important considerations in buying new farm equipment, in order of importance, were: (1) dealer proximity

² Angus Research Corp. "The Farm Equipment Industry." March 1979.

and reputation, (2) product capability, (3) product reliability, and (4) price.

Current Market Structure

When Cyrus McCormick invented the reaper and John Deere developed the steel moldboard plow, little was known about the giant agribusiness firms these actions were to foster. By the beginning of the 20th century, substantial consolidation at the manufacturing level had already occurred. Needs at the distribution and retail levels were such that this was necessary for survival. By 1977, there remained only about a dozen companies still operating within the industry. Based on a 1979 study, 95 percent of all farm tractor sales were accounted for by John Deere, International Harvester, J. I. Case, White Farm Equipment, Allis-Chalmers, Ford, and Massey Ferguson. Steiger (an affiliate of I.H.) and Versatile had achieved a significant share of the market for larger 4-wheel drive units. Perhaps as a result of competitive pressures, some of these companies have recently elected to specialize in a selected segment of the farm equipment market, while actively expanding into the production of non-farm equipment. J.I. Case, for example, has acquired six construction equipment manufacturers since 1967, while at the same time reducing its farm machinery line to the production of tractors alone. Ford has also reduced its line of equipment and trade news has suggested that they may exit the tractor market also.

Allis-Chalmers remains a full-line manufacturer, but has greatly expanded its involvement in the processing equipment market. Recent financial difficulties for both Massey Ferguson Ltd. of Canada and the White Motor Corp. have been chronicled in the Wall Street Journal (November and September 1980). In addition, of the two companies remaining, International Harvester is reported to be "on the brink of bankruptcy" (Newsweek, November 23, 1981). Much of their

difficulty is attributed to their earlier loss of market share, as John Deere and Co.'s reputation for dependability and its exploration of a growing market for 4-wheel drive tractors pushed I.H. into a defensive mode.

Larger Tractors and Foreign Imports

The trend towards larger tractors is a well documented one. Several U.S. manufacturers have totally discontinued their production of tractors with less than 40 horsepower (excluding garden tractors). Yet some demand for smaller tractors remained and by the 1970s, Japanese firms began to fill the gap. No less than eight Japanese firms now export small tractors to the U.S., and by the late 1970's, it was estimated that 43,000 such units valued at \$201 million were sold here. These companies have not, however, expressed an interest in the large tractor market and appear reluctant to take on the major U.S. manufacturer in this area.³

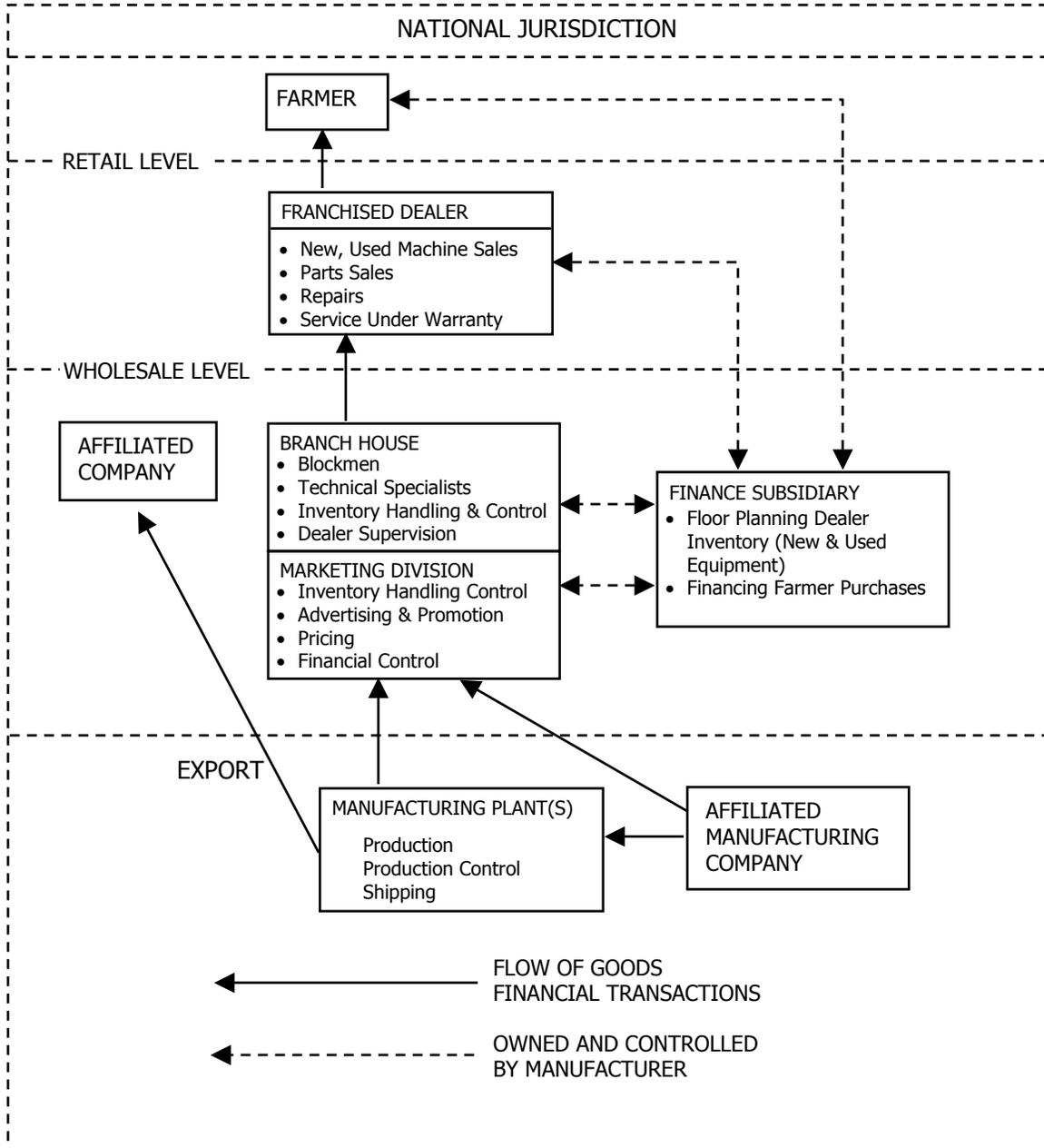
The Distribution System

At the retail level most farm machinery and equipment is sold through a network of independent franchised dealers. As shown in Figure 1, U.S. manufacturers use a system of "branch houses" which serve as regional sales offices and warehouses for products and parts. Only in rare cases where manufacturers have been unable to find suitable dealers, do they actually own retail facilities. Experience has shown most manufacturers that independent operators are more strongly motivated and tend to propagate and maintain stronger customer loyalties.

An attempt by a manufacturer to integrate forward into retailing is often met with the defection of affected salesmen and service personnel. In fact, as early as 1914, an antitrust consent decree prevented International Harvester from establishing a retail unit in a community already

³ "Tractors from Japan." *Implement and Tractor*, November 7, 1980.

Figure 1
Distribution System for Major Farm Machines in North America



Source: Council on Wage and Price Stability, Report on Prices for Agricultural Machinery and Equipment (May 1976)

served by an independent dealer. It is no great surprise to learn that such dealerships are growing larger and fewer in number. According to the National Farm and Power Equipment Dealer Association, the average dealership had, in 1979, an annual gross sales of \$2.3 million and a net worth of \$324,000. Just nine years earlier they reported sales at \$600,000 and a net worth of \$115,000. The economies of such retail operations provide ample incentive for such growth. A study at the University of California indicated that average dealer cost per dollar of sales declined from \$1.025 at \$500,000 of annual sales to \$.892 at \$3,750,000 of sales. Such economies of scale resulted from a better utilization of a dealer's fixed investment and the more efficient use of the labor force.

Structure, Conduct, and Performance

In the FTC study of R. F. Leibenluft, it was concluded that substantial barriers to entry characterized the farm machinery and equipment industry. The importance of an established dealer network was cited as a major deterrent to new competitive entries into the market. High product loyalty amongst farm-users is somewhat more difficult to quantify, but was also credited with discouraging major new competition entries. No doubt the major deterrent, however, rests with the extensive economies of scale in the manufacturing process. An attempt was made in 1969 to synthesize the costs of manufacturing tractors at varying levels of production. These data are now over a decade old but they did show that the manufacturer's return on investment rose from 11.8 percent to 44.8 percent as annual production was increased from 20,000 to 90,000 units.⁴ It is interesting to note that at the time of this Canadian study, tractor production had reached an all-time record output of 275,000 units and has declined since. While substantial savings appeared possible for the high

volume manufacturers, declining unit sales since 1970 suggest one major factor underlying the current financial difficulties of the large companies. As existing manufacturers are now operating well below that economically most attractive level of production, there exists little incentive for new manufacturers to enter the market. Further, the capital requirements for the construction of new manufacturing facilities and for the establishment of a commensurate dealership network has reached an astronomical level.

Even more cogent is the knowledge that it would be extremely difficult for a new manufacturer to achieve a sales volume commensurate with an economic level of production. While product differentiation in the tractor market is not that "real," farmers do place a tremendous importance on a perceived difference in the dependability, durability, and serviceability of their particular choice of product line. Such brand associations, when coupled with a long-established dealership loyalty, make for formidable barriers to new entrants. To be sure, foreign producers of smaller tractors have a good knowledge of the U.S. market and a growing brand loyalty of their own. Yet it would seem obvious that what has happened to the U.S. automobile market will most likely not occur in the machinery and equipment industry. Unlike small compact cars, small tractors are not a reasonable substitute for the larger U.S. products. Moreover, foreign manufacturers are not providing a full line of tillage and harvesting equipment needed in the U.S. farming sector.

In search of measures of market conduct and performances, one is confronted with a lack of valid data and established criteria. Looking first at some measure of profitability, one is confronted by the knowledge that many major U.S. manufacturers are now faced with adverse financial conditions. This somewhat contradicts an earlier Canadian study which suggested that retail prices are

⁴ McDonald, N. "Farm Tractor Production Costs: A Study in Economies of Scale." *Royal Commission on Farm Machinery*, 1969-1971.

higher than might be expected had the market been more competitively structured. According to data published in Moody's Industrial Manual (1980), the major U.S. manufacturers reported after tax returns on equity of 12-17 percent during 1977-79. After tax returns on sales reached 3-7 percent during this same period.

The Leibenluft study reports the following observations: (1) prices may have been placed at higher levels to help retain the viability of those financially stressed U.S. manufacturers, hence preventing the foreign acquisition of their facilities, (2) U.S. and Canadian prices for tractors up to 75 horsepower were priced 30 to 45 percent above their European-manufactured competitors, while the costs of the inputs and distribution expenses accounted for only half of this differential, (3) arbitrage, as practiced through dealer restrictions, reduced the level of foreign price competition, (4) there existed an apparent lack of interest on the part of U.S. farmer organizations about farm machinery prices, (5) the price impact of major technological breakthroughs (rotary combines) has been muted by an industry practice of licensing these improvements to competing companies after having been exploited by the originating firm for only one or two years, and (6) despite some recent changes in models and styling, advertising expenditures generally used to exploit such changes remain at less than 1.5 percent of sales revenue.

As noted above, overall profits for farm machinery manufacturers do not appear to be excessive and many are operating under conditions of financial stress. A survey by the Farm and Industrial Equipment Dealers Association in 1979 showed that at the dealer level overall net operating margins averaged 15.5 percent, yielding a net profit on sales of 1.29 percent. This represented quite a decrease in level of profitability from the mid-1970's when the agricultural economy was booming and dealers' net profit

reached 6 percent of sales.⁵ Looking beyond profit on sales, however, we find that in 1979, the average dealer realized a 7.78 percent return on total assets employed and a 26.6 percent return on owners' equity. During the decade of the 1970's, after adjusting for inflation, Leibenluft reported that while the dealer's owner-equity increased by only 57 percent, his net profits grew by 163 percent. He further asserts that the industry: (1) has failed to operate at lowest achievable costs, (2) reflects a lack of modernization, (3) was slow at moving into more basic kinds of product research, (4) has been slow in making safety improvements, and (5) unnecessarily ties up excessive amounts of capital in inventory.

Summary

In the total market for all agricultural production inputs, farm machinery and equipment constitutes the single largest sector. The importance of this agribusiness sector has taken on an even greater significance as prices have risen most rapidly since 1967. For this and other reasons, the industry came under some institutional scrutiny. The market for farm machinery and equipment has changed much since the early 1970's, reflecting to a large degree, adjustments which have occurred in the food and fiber producing sector. A half dozen "full-line" manufacturers remain as a dominant force in the production, distribution, and retailing of farm tractors and combines, although foreign manufacturers now fulfill an important role in providing low-horsepower tractors. The industry, and the market for their products, remain volatile and susceptible to seasonal variations. The level of demand for major products, tractors especially, has diminished in recent years and despite the fact that gross sales have increased, many manufacturers are financially stressed. The industry remains heavily dependent

⁵ "How Dealers' are Picked Clean by Inflation." *Implement and Tractor*,

upon a franchised retail-dealership system where dealer reputation, financial arrangements, repair services, and customer brand loyalty fulfill as important a role as does product differentiation.

A recent investigation by the F.T.C. regarding industry structure, conduct, and performance raises numerous questions and produces some anomalies. The findings suggest that prices are unnecessarily high relative to competitive expectations. Contradicting these assertions are the facts that market structure has changed little in the past

decade, profit levels appear modest for the major manufacturers, and all but one major company seems to have experienced financial difficulties.

Given the importance of this agribusiness sector, it would seem that we must all focus more attention on the fortunes and future of our farm machinery and equipment industry.



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