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THE STRUCTURE OF FARMING IN THE NEXT DECADE*

by

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The Structure of Farming in the Next Decade*

Teaser: I'm pleased to tell you that the farm crisis is over. There will be no more big surprises in agriculture. Exports will soon rise enough to raise prices above support levels. The demand for inputs will rise steadily. Debts can be serviced and the government can get out of agriculture.

I'd love to give a talk like that and most of you would like to believe it. However, the current picture is less pretty.

Economic prediction is ordinarily an extrapolation of trends. Tomorrow will differ from today as today differs from yesterday. Thus the student of current and recent events can give some evidence for his projections, and can claim some semblance of objectively. Unfortunately, questions about such projection techniques are especially troublesome in the mid 80s. All of you have lived through the soaring seventies and the disappointing 80s. Many things have come unglued. It is reasonable to ask which of the long term trends can survive all the turmoil that we have experienced.

Lets review briefly what has happened in the past 15 years with the hopes of seeing the ways those events are impinging on long term trends in the structure of farming. In 1971 we had a good crop year after the big scare from the Southern corn blight of 1970. Cattle feeding was growing rapidly in the commercial lots of the High Plains, but Cornbelt cattle feeders were holding their own because of a rapid growth in the demand for fed beef. There were probably less than 200 hog units that were marketing 5000 head apiece and these typically had such short life spans that their lenders must have been holding their breaths. Crop farms were steadily expanding as farmers adopted to larger and larger equipment and modern fertilizer and pesticide handling

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methods. However, Earl Heady's economic research group at Iowa State felt confident that the family farm in which the family provided most of the labor, capital and management, was still the most efficient size farm in the Cornbelt. Ag exports ran $8 billion in 1971, and were in line with the very slow improved trend of the past 20 years. Western Europe and Japan were our major agricultural markets. Just 15 years ago, but it was truly another era.

You recall how the huge Russian grain purchases of 1972 abruptly set off a new era. Soon after that the successes of OPEC were causing a worldwide upheaval in oil prices. Among its consequences was a tremendous flow of OPEC funds into US banks. How to recycle those dollars was a theme of the mid-70s that was partially answered by large loans to many of the developing countries. Meanwhile the value of the dollar fell relative to many currencies during the 1970s thus effectively reducing the prices of US grains in terms of marks, yen, and pesos. Many of these developing countries used the proceeds from their borrowings of recycled petrol dollars to finance purchases of grain. A few countries such as South Korea and Taiwan successfully industrialized in those years and became good customers for our grains. It was a golden era in U.S. agriculture although inflation made things seem better than they were. Our exports grew at an incredible 8% per year during the 70s. Far more grain was being traded than at any time in world history and the United States seemed to be the chief beneficiary. We not only had the farm production capacity but we had the elevators, ports, barges and railroads to handle it. You will recall that transportation facilities were strained and so was productive capacity at times. One summer in the mid 60's we embargoed the sale of soybeans to keep from running out before the new crop. Yet these were minor exceptions in the midst of good fortune. Farm prices and incomes were good. Since World War II, decision making in agriculture had

focused more on anticipated capital gains than on cash flow. Low and even negative real rates of interest during the 1970s fanned the inflationary flames of the land market. After all, the value of land should move opposite to interest rates.

Then abruptly in 1979 the Federal Reserve terminated that era of low interest rates. Other forces were also at work. The new era of supply economics produced huge budget deficits. Interest rates soared. Mr. Block became Secretary of Agriculture in 1981 with a pledge to continue expanding exports and had to watch them shrink nearly every year. What happened to exports? When it became obvious that many of the LDCs could not service their debts, the big banks turned off the credit spigot. No more credit, no dollars to buy U.S. grain. There was a worldwide recession in the early 80's that also reduced food demand. The value of the dollar had reversed and was now on the rise. More-over, the 1981 farm act had written in high support prices to match the currently high market prices. However, when market prices needed to fall, the support prices left the U.S. as the high priced source. Perhaps even more important was a burst of agricultural productivity in many parts of the world. Some of it was a delayed response to the good prices of the 70's. Some of the increased productivity was a payoff to agricultural research in the various nations. England now averages 100 bushel an acre wheat and Holland has even higher yields. The old worn-out soils of Europe are producing like crazy. France is now among the biggest grain exporters. U.S. exports have fallen in both volume and price. We hope that 1986 will be the end of the drop in our exports, but some respected forecasters see very little recovery before 1989 or 90.

Thus the 80's gave U.S. agriculture and agribusiness a double whammy of high interest costs and lower farm income. The deflated value of farm land in

the Cornbelt fell by nearly 50% from 1981 to 1985. Many farmers had developed a combination of long term debt and production credit that had not been covered by cash flow alone but rather by cash flow plus paper capital gains on the farmland. When paper gains turned into paper losses, the paper houses collapsed. My parents and their neighbors in the Great Depression tightened their belts, cut personal spending to the bone and hung on until WWII prices bailed them out. In the 1930s labor constituted 1/2 the inputs into agriculture, so cutting family living was an important shock absorber. Today, labor constitutes 1/8 the inputs into farming. Cut family living by 1/2 and you still haven't done much. Instead the belt tightening has been on reduced capital purchases--especially of tractors and equipment and delayed maintenance. Machinery costs are 1/3 the inputs. In our MIR records, machinery purchases ran twice the size of the depreciation accounts in the late 70s. The last few years, machinery purchases are running one-half of depreciation. The stock of human and physical capital in agriculture is deteriorating and the effects in terms of higher costs will arrive soon. Nevertheless, many farmers couldn't cut enough costs to continue to operate in this new economic era of the 1980s. Falling land values eliminated their net worth. The personal trauma has been worsened by the fact that the rest of society including many farmers are prosperous even as these overleveraged farmers go down the tube. Farmers under 45 years of age in the central U.S. are the group hardest hit. Unfortunately, many agribusinesses, lenders, and rural communities have been hit equally hard. The nonmetropolitan counties comprise 4/5 of all counties but have only 1/4 the nation's population. Their economic base has generally taken a beating in the 80s and governmental services of all sorts are beginning to show the effects.

Several years ago I noted in a textbook that farm policy responds mainly to events--that the two parties differ far more in rhetoric than in actions. Farm policy in the 1980s has been remarkable for the outstanding rhetoric in support of free markets and the astonishing sums spent on government intervention. Nor is the end in sight for this schizophrenia. Land diversion and other sorts of production controls are resorted to by governments that are hard pressed by mounting surplus and huge budgetary costs. One can only hope that the next big program to reduce overproduction is run better than the infamous PIK of '83. There is little doubt that farm programs will be affecting farm structure during the rest of the 1980s although it is difficult to guess the exact nature of those effects. I still hear people talking about reducing the number of farms in order to cut farm output. It is purchased inputs, not farmers, that contribute most to farm output. The main beneficiary of the present farm program is farm suppliers. As the generosity is squeezed out of these programs in the next few years the suppliers of farm inputs will feel the pain.

Structural Change

Concerns about the structure of agriculture are not new. Almost 30 years ago as the outline of the revolution in broiler production became evident, many people asked if a similar vertical integration was the wave of the future for the rest of agriculture. Some 18 years ago, I asked in a paper if we might be moving toward a Corporate Farmhand agriculture in which much of farming would be owned and managed by large corporations. Two years ago, in a seminar on our campus, a white-haired agribusinessman from Kirksville asked if we are moving toward a landlord/peasant agriculture. While none of those 3 questions can be answered entirely in the negative, their answers are mainly no. But let me back up for a moment to talk about structural trends.

May I call your attention to the rise of 4 major structural trends in the past quarter century.

(1) The rise of a dual agriculture with larger-than-family farms at one end of the spectrum and over a million part-time farmers at the other end.

(2) The rise of the part-owned, part-rented farm.

(3) The rise of factory-type enterprises in poultry, hogs, cattle feeding and even dairy.

(4) The rise of contract production in broilers and turkeys and to a very limited extent elsewhere.

According to some observers, these trends have already made the traditional family farm an endangered species. These trends have certainly been watched with interest by related agribusinesses. The rise of a dual agriculture has been commented on quite widely in the past 3 or 4 years. Agribusiness must be concerned with volume and thus they usually focus on the top 7 or 8 of the farms that market 50% of farm output. For various reasons, Missouri typically trails structural trends in farming by several years rather than being in the forefront or even being average. Hence, we typically have to look outside Missouri to spot the trends.

Let me raise one caution about this dual agriculture. The inflation of the 1970s exaggerates some of the numbers. When one deflates farm sales, between 1974 and 1982, the increase in the number of farms selling above $250,000 is only one-half as great as it appears in the Census. Between 1974 and 1982, the number of mid-sized farms as measured in acres fell while the number of very small and very large size farms rose. However the changes are not as striking as one might expect. The number of farms from 100 to 259 acres fell 17% and those from 260-499 fell 13%. The number of farms under 50

acres rose 25% while the number of farms of 2000 or more acres rose only 4%. This visual shows the changes for the past half century and projects 15 years ahead. While one hears a great deal about those farms selling a half million dollars or more of sales, it is important for Midwesterners to realize that 2/3 of those farms' sales were poultry, cattle, F & V and nursery stock. In other words, while there is a dual agriculture, it is developing more slowly and more unevenly than often believed.

Less attention has been given to the rise of the part-owned and part rented farm. At the last census part-owners owned 26% of the land in farms and rented an additional 27%. They are todays typical farmers. Only 11% of the land was in the hands of full tenants. Since WWII full tenancy has declined as much as partial tenancy has risen (Phil Raup, paper at AAEA July 29, 1986). Many of these non-farmer landlords inherited their ownership or are retired farmers who now rent to relatives or to the neighbors. There are some large investor landlords as well; sketchy evidence indicates their national holdings are relatively small. Thus these data do not support the fears of my agribusiness friend that we are moving toward a landlord/peasant agriculture. Partial ownership may be a most effective way of keeping some off-farm capital in farming while holding down the leverage of the operator. I don't believe that the present accumulation of land in the hands of lenders will change this picture significantly. In a few areas, foreign or domestic investors may increase their holdings. However, in the main, land will be purchased by the neighbors.

I see the number of crop farms getting smaller as the number of farms exceeding 1000 acres slowly rises. Many of these will be family farms while some will be larger. I do not foresee any giant factories in the field for the major crops of the Midwest. We have been living with this structural

trend for the last half-century. I expect further evolution rather than a dramatic discontinuity in crop farming.

When one looks at the animal end of agriculture the trends are different and more dramatic. A corporate farmhand type of farming may be developing. Certainly, an industrial type of agriculture is found in eggs, turkeys, hogs, cattle feeding and even in a few dairy regions. An Irish firm has made headlines with its plans to start a dairy unit in Georgia involving several thousand cows. Southern California has long had large factory-type dairies.

Cattle feeding went industrial in the 1960s. The first year of data on feeding by size of lot was in 1962 when 1/3 of the cattle were fed in commercial lots (those of 1000 head capacity). That year there were only 5 lots in the country with individual capacities of 32,000 head or more. In contrast, about 4/5 of the cattle are now fed in commercial lots and most of these are in lots of 32,000 or more head capacity. Anyone who has visited a large feedlot has surely been impressed with the factory-like operation. Cattle feeding is a high-capital, high risk business and the ins and outs of financing and income taxes are a fascinating story. It is pretty obvious that income tax policy has been good to the custom feeders and to the big lots that service those customers. I doubt seriously that tax reform will have sufficient impact to lead to any significant restructuring back toward the farmer feeders. It has long been my hypothesis that rich Iowa corn ground subsidized numerous cattle feeding operations, until the recent hard times called a halt to those prestigious exercises.

Some of you may have seen an article in the WSJ on October 1 that argued that tax reform was going to alter drastically the nature of both cattle feeding and cow-calf operations. Some analyst with a large brokerage firm was even quoted as saying "ranchers will sign supply contracts with packers even

before their calves are born, the same way chicken producers do." That broker knows even less about the beef business than he knows about the chicken business.

Hogs were once found on almost every farm. In 1900, 93% of all farms--some 4.3 million of them--reported having some hogs. Even at mid-century, 3 million farms had hogs. The era from 1950 to 1974, I call the commercialization of hog production. The number of farms fell from 3 million down to 474,000--only one farm in five was reporting hogs in 1974. Only 374 of those farms reported sales exceeding 5,000 head while another 10,000 reported sales exceeding 1,000 head. Some of you will recall that the large 5,000 head and up units were just beginning to prove themselves in those days. Several units had failed earlier because they couldn't handle breeding or mortality problems. Quite a lot of these larger units avoided many problems by buying all their feeder pigs and simply running finishing floors.

The period since 1974 can be called the industrialization era of hog production. Growth in output has been almost entirely in units marketing 1,000 or more head while the numbers of smaller units have fallen rapidly. The general prosperity of Cornbelt crop farming in the 1970s was an important factor. The 10 to 30 sow operation so common on many Cornbelt farms quickly became a nuisance that was either expanded into a major enterprise or was shut down. As the management problems of confinement operations came under control, there was a rapid trend toward total confinement. The hog factory was clearly the trend of the times. The 1970s were generally a prosperous time for hog producers and the income tax policies of the period certainly encouraged a plowing back of earnings into more facilities.

The 1982 Census recorded 315,100 hog producers. Whereas those producers selling 1,000 or more hogs annually had a market share of 7% in 1964 and 25%

in 1974, they had nearly doubled to a 48% share in 1982. Their market share of the 5,000 head-plus units tripled from about 4% in 1974 to about 12% in 1982.

My colleague, Glenn Grimes, and I have documented the evolution of the large unit in the hog industry. Since our first study 12 years ago, we have used the subscription lists of a major hog magazine to learn as much as we could about the larger units. We are planning another such survey this winter.

Our studies indicate that about 2/3 of the marketings of hogs from units of over 5,000 come from units of over 10,000. We know there are numerous units in excess of 50,000. Of course, the progress of the two giants--Tyson Foods and National Farms--is well known. While the Tyson organization has its finishing farmed out over a broad area in a manner akin to broilers, National Farms produces its 350,000 hogs a year on a single farm and entirely with hired labor--the Corporate Farmland model, if you please.

According to a recent study of economies of size by Van Arsdall and Nelson, the larger hog producers realize substantial economies of size because they are typically more efficient by several physical measures as well as on price performance and input costs. According to their studies, units producing 10,000 head in the 1980-83 period had total costs of production about $8.50 per cwt. less than the industry average. Not surprisingly, they concluded that size will continue to shift upwards.

A confinement hog unit with a 5,000 head capacity needs to operate at full capacity to minimize its average costs. Such a unit cannot play in and out games on the basis of expected hog corn ratios. Our studies have shown that these units have a strong tendency to keep on growing--their only adaptation to expected bad prices may be to postpone expansion until the

future looks brighter. These units have a high proportion of cash costs for purchased feed, labor, utilities and interest. When prices get really bad, the red ink can flow pretty deep. We don't know how many big overleveraged units have bit the dust in the 1980s--you people have better information sources than I on that topic. Certainly the present high hog/corn ratios should revive many producers who have been hurting. It is my judgment that large factory operations have sufficient advantages that these long run trends will continue, albeit with some interruption here in the mid 1980s. This does not mean that a really good small operator cannot still get started in the hog business. But such superior managers cannot afford to remain small because competition will make small the returns per hog. Thus the small superior hog producers will ordinarily get big or get out. Either way the large units will produce most of the country's hogs.

New technology may give a further boost to the larger specialized producers. You have probably read stories about porcine somatotropin -- a natural protein hormone regulating the growth process. It appears quite possible that by the early 90s, we will have commercially available this substance that dramatically increases feed efficiency and leanness. Pork may be able to compete more effectively with poultry on both a cost and leanness health basis. Such innovations tend to be used earliest and most advantageously by the largest producers. So it's my judgment that this substance will speed up the trend toward larger units of hog production.

The changes in the hog business like those in cattle feeding and poultry qualify as major structural revolutions in agriculture. A few economists have argued that any such structural revolution requires a shift in scenery--a migration to another region. Their logic is that new, large operations will be more readily started in a new area where the old ways are not embedded.

They point to the shift of broilers south and cattle feeding west as examples. They have not used turkeys as an example, because the shift to new areas was fairly minor. It is now clear that the hog industry does not fit the model. Large units did get off to a faster start outside the Cornbelt and large units have a larger share of area output outside the Cornbelt than in it. However, the percentage of hogs produced in the Cornbelt has been about 80% for the past quarter century. There has been a slow shift from east to west within the region. Hogs are tied closely to cheap feed, so I expect them to continue to be produced in the same areas as now. Between 1974 and 1982 the percentage share of large hog units grew more rapidly in the Cornbelt than outside it. The structural revolution in hogs is not passing by the Cornbelt.

The 4th major shift listed in postwar agricultural structure was the rise of contract production in poultry and to a limited extent elsewhere. Ninety percent of broilers and 60% of turkeys are produced under production contracts and the rest are produced directly by the processors. They are the prime examples of production contracts. There are a few other examples such as vegetables for canning.

There has been much confusion on this topic because people often confuse marketing and production contracts. The USDA even published a table a few years ago that treated all contracts as production contracts. A marketing contract is simply a sale/purchase before delivery with the farmer retaining production direction and product risks until delivery to the processor. Marketing contracts have only a minor impact on farm structure and farm decision making. A production contract by a processor puts him into farm production--he provides most of the inputs, owns the growing plants or animals, takes most of the production risks and all the price risks during the full production period. A production contract agriculture such as broilers

has far fewer risk takers and decision makers than the type of agriculture that most of us know.

The latest thing in hogs is the putting-out system. There are those with capital who furnish pigs and feed to farmers and pay a piece-wage for feeding out. This exercise in production contracts seems mainly to reflect the presence of cash-starved farmers with unused facilities, although there are also stories of new facilities being financed. I doubt that this system can compete in the long term against a National Farms or any well run large unit. However, its too new for us to be sure. Today's good hog prices are encouraging the expansion of these systems. I should note that Gold Kist seems to have run successfully a version of this structure in the Southeast for several years.

I may be too skeptical of the prospects for production contracting in hogs because I remember the enthusiasm with which these schemes were promoted some 20 years ago. Almost every large packer and feed company was peddling some sort of production contract or had one on the drawing board. Outside the south, those early attempts failed. Generally the type of Midwestern farmers who would sign up were not the ones that the integrators wanted. Now there may be more good producers who will raise somebody else's hogs because they cannot get the capital to finance their own.

Dairying and cow-calf operations have been the animal enterprises least affected by structural changes. I'm quite confident that the typical cow-calf herds of the 1990s will be nearly as small as today. The average size herd in 1982 included only 36 beef cows, down from 40 head in 1974. About 70% of the beef cows were in herds of less than 200 head. The beef cow herd utilizes mainly pasture and forages that have little or no alternative values. These forage supplies are split up into hundreds of thousands of ownership units. A

majority of these herds are associated with part-time farming. While there are significant economies of size in larger herds managed as units, there is no economical way to assemble most of the pasture land east of the 100th meredian into large ranches. Hence the present structure of widely varying sizes of cow-calf operations will continue.

It's more difficult to project the future for dairying. The thousand head milk factory has long existed in Southern California and Hawaii. Presumably the factory has not spread into more humid areas such as Wisconsin because of the abundance of cheap forage. But what of new technologies? There has been much talk about bGH, the bovine growth hormone, since new gene splicing techniques made feasible its commercial production. A maximum increase of 25% per cow over the entire lactation is believed possible. The commercial use of bGH within a few years will put intense pressure on the present price support program that already suffers from surpluses. It will also increase the ratio of concentrate feed to forages and may contribute to economies of size in dairy herds. On the other hand, bGH could also spark some sort of production quota system that could hinder the structural evolution of dairying. Family farmers and their cooperatives are more in control of their industry in dairying than anywhere else in agriculture. While technology and economics suggest the possibility of some radical structural change in dairying, I'm inclined to think that it is at least 10 to 20 years down the road.

One of the imponderables is the effects of government policies--both current and future. The monetary and fiscal policies of the past decade bear considerable responsibility for the farm financial crisis. Policies of various governments around the world have contributed to the current worldwide surplus in food production. Another contributor in the United States appears

to be a declining demand for animal products. Our main domestic market for grains is to convert them into animal products and that market is slipping. This surplus poses severe difficulties for farmers and agribusinesses. Yet many people still refuse to admit that it exists. So our bins burst with grain and the government gets deeper and deeper into agriculture while trying to get out. We simply have too much land and commercial inputs producing food and especially grains. We undoubtedly will see new attempts to reduce our production. I don't think that they will have any major impact upon the structure of crop farming but that possibility has to be flagged.

To sum up, I've argued that the structure of agriculture can only be understood commodity by commodity. Generally, that large part of animal agriculture that can be put efficiently into factories is either there or is being put there. Farmers, as we have understood the term, may have few special advantages in operating factories. As yet, outside poultry, most producers own only single factories, but there seems to be no reason why that multiple-factory firms of considerable size will not emerge. That trend has already emerged in cattle feedlots.

The gradual separation of animal agriculture from cropping is of major consequence for numerous aspects of farming--such as the seasonality of labor requirements, the reduced diversification of enterprises and greater sensitivity to what happens to prices and yields of 2 or 3 crops, the difficulties of farmers agreeing in the political process, etc.

Likewise, I've argued that commodities involving extensive use of land such as cow-calf operations and the major field crops are not amenable to industrialization. In my home area in N.W. Missouri at the beginning of this century, a farmer named Rankin accumulated and operated 30,000 acres of cropland. I've seen a picture of 52 horse-drawn cultivators lined up in a

6,000 acre corn field. That farm was later dispersed totally. The huge brick barn for his teams now houses the Mulebarn theatre of Tarkio College. We may see some modern counterparts of the Rankin farm, but generally supervision of many workers and machines across vast acreages has not been very feasible.

The wide dispersion of land ownership in this country is another important factor that discourages giant crop farms. I don't foresee any major change in that dispersed ownership pattern in the next decade. Corporate farming in this country in the next decade will be far more important in poultry and livestock production than in the big-ticket crops and ranching.

Implications for Agribusiness

Marketing farm supplies to the big animal and poultry units will more and more resemble industrial marketing. Purchasing from those animal factories will involve more negotiation and more contracting. I think ownership vertical integration will increase on the animal side but at a fairly slow pace.

The structure of agriculture is like a supertanker. It changes directions slowly. There is little reason for any alert agribusiness to be surprised by it.