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THE FARM SIZE ISSUE: A NEW PERSPECTIVE

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I. Introduction

At the present time there are less than half as many farms in the United States as existed in 1930. Over the past half century land area per farm increased over 2.5 times while real gross output per farm increased over six-fold. The question I shall attempt to answer this afternoon is, why have farms been getting larger and fewer in number?

Probably the most popular explanation for the drop in farm numbers and the increase in farm size is that farmers have been displaced by greater use of farm machinery. It usually is not made clear how this displacement took place. Popular phrases such as "being tractored off the farm", have a certain literary appeal but do not add much to our understanding. One might argue that as farmers purchased more machinery they laid off hired workers. Yet the amount of hired labor per farm is about the same today as in 1910 (.5 labor years). Thus it does not appear that hired labor was laid off as farmers added machinery. Instead it appears that there are fewer hired workers today than in years back mainly because there are fewer farms or employers. Thus it will be most instructive if we set aside the hired labor question and

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and focus our attention on why the number of family workers in agriculture declined by about 75 percent since 1910 leaving the remaining land to be divided up among fewer and larger farms.

If we press the family labor issue further we are told that farmers have been caught in a cost-price squeeze. Those who were unable to pay their bills or "make a living in agriculture", were forced to find work in other occupations. And those that remained in agriculture were forced to become larger in order to reduce costs and remain competitive. In other words, according to this argument farmers have been leaving agriculture because of financial hardship; they were forced to do what they did.

However, the interest in farm numbers and farm size, at least nowadays, appears to go beyond a concern over the financial condition of farmers. There seems to be a fear that large, nonfamily farm corporations will eventually replace family farms. But one should ask what is so bad about nonfamily farm corporations? Aside from possible sociological considerations,there appears to be two popular economic objections against this type of farm. The first is that large nonfamily farm corporations are not as efficient as family owned and operated farms. Consequently if family farms are forced out of agriculture, costs would increase and food would become still more expensive. The second is that large, nonfamily corporate farms may eventually gain monopoly power and force food prices up. I shall argue that both objections are invalid.

If large nonfamily corporate farms are not as efficient as family farms there is very little chance that such farms will gain a foothold in U.S. agriculture. If such farms came into agriculture and were not

as efficient as family farms then the rate of return on capital invested in corporate farms would be even lower than it is on family farms, and most certainly would be lower than in other nonfarm corporations. As a result these firms would not be able to pay dividends to their stockholders that were comparable to other corporations. If a corporation wishes to survive it must divest itself of its low return operations in order to be able to earn a rate of return on capital that will in turn allow the firm to pay a dividend comparable to other corporations. Otherwise it will not be able to raise or retain capital. In a market economy, inefficient firms, even if they are large, do not drive out the efficient ones, just the opposite occurs.

The monopoly power argument is even less plausible. For any significant degree of monopoly power to exist in an industry there cannot be over 3 to 4 firms applying the major portion of the industry's output. There is just no way that farm firms could become so large that 3 or 4 could supply a major portion of agricultural output. The special aspect of agricultural production would give rise to insurmountable management problems long before this size could be obtained. Even if there were 50 agricultural corporations, on the average one for each state, each firm would be so large as to be unmanageable. Such firms would make the giant collective farms of the Soviet Union look small by comparison. And the extreme inefficiency of these farms is well known. For example, the tiny private plots, themselves inefficient by U.S. family farm standards, still produce 27 percent of the total agricultural output of the Soviet Union while utilizing less than one percent of the agricultural land. Thus long before the number of farm corporations reached 50 or 100, a number far too large for any significant monopoly

power, the spacial problem would make the management of capital and labor extremely inefficient.

At the present time nonfamily corporate farms account for a very small proportion of all agricultural output. According to a recent USDA study entitled, "Who Owns The Land", only 2.4 percent of all farm and ranch land in the United States is owned by nonfamily corporations. In the corn belt this figure is only 1.0 percent. Thus we have a long way to go before corporate inefficiency or monopoly power become real problems. I shall therefore dismiss the nonfamily corporate farm issue and concentrate on the decrease in number and the growth in size of family farms, recognizing that many farm families have chosen to become family corporations to facilitate the finance of their operation and the transfer of ownership between generations. For policy purposes there is no reason to differentiate between corporate family farms and noncorporate family farms.

The remainder of my remarks are made up to three parts. First I shall offer an alternative explanation for the growth in size and reduction in number of family farms to the "financial hardship" explanation presented earlier. Second I'll present some empirical evidence which can be viewed as a test of this hypothesis, and lastly I'll attempt to draw some implications from this explanation regarding the structure of agriculture during the 1980's.

II. The Theory

The theory is very simple: The growth in size and reduction in number of family farms is due primarily to the growth in real nonfarm income over the years. If farm families wish to increase their incomes along with urban families they have two choices; they can either leave agriculture

and join the nonfarm labor force, which many have done, or they can increase the scale of their operations. Farm families have been able to increase the size of their farms by utilizing larger and more efficient machinery and equipment. In part, the larger and more efficient machines have been placed on the market by their manufacturers because farmers have demanded them, and in part because of new technology in the farm machinery industry. It became profitable for farmers to adopt larger machines after the price or cost of their own labor as well as hired labor had risen. (It is important to recognize that the cost of family labor to the farm is the wage that this labor could earn in its next best alternative occupation.)

Years ago when labor was relatively cheap large machines were not profitable. Farms that did try to adopt large machines and farm large acreages found that their per unit costs were higher than smaller family farms utilizing a team or two of horses or a small tractor. As a result, attempts at large scale farming, such as the "Bonanza Farms" of the Red River Valley, usually ended in failure because their unit costs were higher than smaller family farms. But as the cost of labor increased, the larger farms utilizing more and larger machines as well as more land became the more efficient mode of operation. In this case the higher priced labor is spread across a larger volume of output thereby minimizing cost of production. Farmers that remained small found that their incomes also remained small compared to urban people and to larger scale farmers. Small farmers that did not like small incomes, and most of them did not, either found nonfarm employment or adopted larger equipment and increased the scale of their operations. In either case these farmers were able to increase their incomes.

Although the main focus of my remarks is directed at full time family farms, it should be acknowledged that many small farmers have been able to remain on the farm by taking off farm employment and becoming part-time farmers. In the case of part-time farmers, the larger and more efficient machines enable them to operate farms about the size that existed 40 to 50 years ago but with a much smaller amount of labor. In this way small farmers have been able to increase their total income along with their urban counterparts or the large full time family farms. The decision to move off the farm entirely, become a part-time farmer, or to become a large full time family farm depends on a variety of circumstances including the wage and job opportunities within commuting distance of the farm, the opportunities for enlarging one's farm or acreage, and the particular preferences of the farm family itself. Whatever the route an individual family chooses, we can only infer it was the best one for that family, or it would not have been chosen.

According to this theory there is an optimum size of the full time family farm. The higher is real nonfarm income, the larger is this optimum size. Obviously the number of acres in the optimum size will differ between different types of farms such as cash grain farms versus a specialized poultry operations. It also is obvious that there is a limited amount of farm land available. Not all farms can increase in size at the same time. As is well known, the increase in the average size of farm is accomplished by the sale of land by people who choose to leave agriculture to those families who wish to stay in agriculture and become larger full time farmers. Who leaves and who stays depends on the opportunities and preferences of the individual families. Some may leave because they are not very good at farming and therefore earn a low

income in their occupation. Others may leave because they possess certain skills that allow them to earn relatively high incomes in other occupations. Therefore it is not necessarily true that only the poorest farmers have left agriculture. Some of these no doubt have left but some of the most skilled also have left in order to take advantage of superior earnings opportunities elsewhere.

Notice that this theory takes a more positive or optimistic approach to the growth in farm size and reduction in farm numbers phenomenon than the "financial hardship" explanation. I have argued that for the most part farmers have not been "tractored off the farm" or forced to leave agriculture because of financial hardship. This is not to deny that some farmers no doubt left agriculture because of bankruptcies, foreclosures, and tax sales particularly during the 1930's. But I would argue that most who have left have done so because of superior earnings opportunities elsewhere. Similarly those that have gotten larger have done so because of a desire to increase their earnings rather than an inability to make a living at their former size.

III. The Evidence

The figures presented in Table 1 clearly support the hypothesis that farmers who left agriculture did so to take advantage of higher earnings in nonfarm occupations rather than because of financial hardship or an inability to make a living from farming.

If people left agriculture primarily because of financial hardship then the rate of outmigration from agriculture should have been highest during the years that net farm income per family worker was the lowest. Yet we see from Table 1 that the opposite happened. During the pre-WWII period (1910-39) when migration out of agriculture was relatively slow

Table 1. Family Workers in Agriculture and Annual Farm and Manufacturing Earnings per Worker, Decade Averages. (constant 1978 dollars)

Decade	Family Workers in Agric. (1000)	Net Farm Income per Family Worker	Mfg. Earnings per Worker	Difference
1910-19	10124	$2947	$3875	$ 928
1920-29	9670	2132	4722	2590
1930-39	9420	1955	4940	2985
1940-49	8010	5066	8250	3184
1950-59	6411	4899	9202	4303
1960-69	4290	6481	11,271	4790
1970-78	3073	9445	12,363	2918

Sources: Columns 1 and 2: Agricultural Statistics, corresponding years. Column 3: Statistical Abstract, corresponding years. All wages deflated by the Consumer Price Index, 1978 = 100.

the net farm income per family worker was about one-third of the post-WWII average. Indeed during the early 1930's when farm income was the lowest of anytime during the past 70 years, there was a small increase in the number of family workers in agriculture. On the other hand, during the post-WWII years when net farm income per family worker nearly doubled the rate of family labor migration out of agriculture increased dramatically. The same general pattern holds true for hired workers. Therefore the evidence clearly refutes the argument that most people were forced out of agriculture because of low earnings or financial hardship.

Does the evidence support the idea that farmers left to improve their incomes? From Table 1 we see that the difference between net farm income per family worker and annual earnings per production worker in manufacturing (a proxy measure of what farm people could earn outside of agriculture) nearly doubled during the post-WWII era in comparison to the 1910-39 period. (Bear in mind that the figures are in constant 1978 dollars so the difference is real rather than because of inflated prices). Thus the evidence clearly supports the hypothesis that people left agriculture in increasing numbers during the post-WWII years because the difference between what they could earn in agriculture and what they could earn in other occupations increased substantially. The very large outmigration of farm people in the 1950's and 1960's should not be surprising in view of the large earnings gap that prevailed during this time. Even though real income per family worker increased during this period, nonfarm earnings increased at an even faster rate. The 1970s is the first decade since the 1910-14 period that the gap between farms and nonfarm earnings narrowed.

IV. The Future

Will farm people continue to leave agriculture resulting in further reductions in farm numbers and continued growth in farm size? Although no one can answer this question with certainty, we can identify a few important factors that are likely to have a bearing on the answer to this question.

It is always a risky practice to extrapolate past trends into the future, but it seems unduly pessimistic to rule out any real income growth in nonfarm occupations. On the basis of this factor one might expect a continued growth in farm size and reduction in numbers as farm people attempt to better their economic positions in off farm employment. Of course, one must recognize that at the present time the farm population is only about 3.5 percent of the total population in the United States. Obviously the number of farm people cannot continue to decline indefinitely.

What can stop the outmigration if nonfarm earnings continue to increase? As people leave agriculture the supply of agricultural products eventually will begin to grow at a slower rate than demand. When this happens the prices of a agricultural products will begin to increase relative to other prices in the economy which will have the effect of increasing farm incomes relative to incomes of nonfarm people. This is not to say the difference between farm and nonfarm income will disappear. One can think of a number of reasons why net farm income per family worker should not reach the level of earnings in manufacturing. No doubt the most important reason in the family labor figure includes many part-time farmers, farm wives who hold off farm jobs, as well as young people that are attending high school or college or working off the farm while living at home and contributing at least 15 hours per week to the farm, enough to be

counted as family labor. It is interesting to note that in 1978, income from off farm sources ($12,786 per family worker) was greater than net farm income per family worker ($10,399).[1/] Thus in 1978 total income per family worker from both farm and nonfarm sources ($23,185) was nearly double the 1978 earnings per production worker in manufacturing. The amount of off farm earnings per family worker in constant 1978 prices more than tripled between 1960, when it was $3,693, and 1978. Thus it appears that farm people have been earning more than their urban counterparts during the late 1970s when all sources of income are taken into account. Therefore the relative increase in net farm income per family worker together with the large growth in off farm earnings of farm people suggest that the out migration of farm people has about run its course and as a result farm size should stabilize in the 1980s. At the present there is very little reason to leave agriculture.

Before closing let me briefly consider two additional factors that could possibly influence the structure of agriculture in the 1980s: energy prices and land values. The relative increase in the price of fuel since 1973 has had the effect of increasing the prices of machinery and the cost of operating this machinery relative to the price of labor. Although we're not likely to go back to plowing with horses or picking corn by hand, this development should slow down the increased use of machinery on farms, or perhaps even reverse the trend. It also should have the effect of dampening, or perhaps reversing, the growth in farm size. As machinery services become more expensive relative to labor, it no longer becomes profitable for farmers to expand the use of machines while increasing their acreages, at least using farmer techniques. Those that do will find their unit costs

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1/ Farm Income Statistics, USDA, ESCS, Stat. Bul. 627, Oct. 1979, p. 31.

increasing more than those that don't. Of course, we are likely to observe some changes in techniques because of rising energy and machinery prices. Perhaps most important is the increased use of minimum tillage to save on fuel and machinery along with greater use of herbicides. This change in techniques should offset to some degree the dampening effect of higher machinery and energy prices on farm size so the net effect may not be very great, unless energy prices continue to rise more rapidly than labor costs.

What about land prices? What effect should the recent increases in the price of land relative to other input prices have on farm size and numbers? Economic theory suggests that producers will conserve on an input that has become relatively more expensive. In this case one might expect more intensive use of land, and a reduction or at least a stabilization in the number of acres per farm. However for this to occur other things must remain constant. And there is one important factor that has not remained constant: the expected selling price of the land due to expected inflation. During periods of inflation such as the 1970s, the price of land should increase more than the general price level because expected future inflation is capitalized into the present value of land. If buyers expect the price of a parcel of land to double or triple during the time they expect to own it, understandably they will be willing to pay a higher price than if they expect the price level (and land prices) to remain constant. Of course land sellers also know about inflation. They know, or at least should know, that when they exchange land for money, they receive an asset that loses it value during inflation while giving up one that retains or even increases in real value. Hence they must be compensated for this expected loss if they are to be willing to sell. Both the increase in

demand for land and the decrease in its supply on the market contribute to higher land prices during inflation. However it should be pointed out that usury laws which have prevented nominal rates of interest from rising to their market equilibrium levels have caused land prices to increase more than they would have in the absence of these laws. The same argument holds true for the price of any natural resource such as urban land, timber, petroleum, natural gas, coal, gold, silver, etc. The recent increases in the prices of oil, land and other natural resources is the result of general inflation, not the cause of it.

Land prices in the future will depend mainly on future inflation. Inflation in turn depends mainly on the rate of growth of the nation's money supply. And that depends on how much money the federal government prints to finance it deficits, which is a number no one can predict. Thus it is not very fruitful to try to predict land prices. At any rate it does not appear that land prices whatever they turn out to be will have a major impact on farm size and numbers because it is not in the interest of farmers to conserve on an input that is expected to earn a high return in the long run.

To sum up my feelings about the 1980s I believe that farm size and numbers will reach an equilibrium sometime during the decade. Total income from all sources for family workers already exceeds what they could make with full time jobs in manufacturing so the economic incentive to leave agriculture no longer exists. Energy and land prices are not likely to have a major impact on farm size and numbers. To the extent that they do have an influence, it should also be in the direction of stabilizing farm size and numbers.