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1977

*rice*  
*Quance*

POTENTIAL FARM-SIZE IMPACTS OF  
GOVERNMENT PRICE AND INCOME SUPPORT POLICIES

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Declines in the price of grains during the spring and summer of 1977 have rekindled congressional debate over the need for government price and income policies for agriculture (Woods, Penn, and Henderson). One concern relative to these types of programs is that such programs tend to materially alter the farm-size distribution in the nation's agriculture. Indeed, Quance and Tweeten indicate that the support policies in effect from the 1930's through the 1960's had more of an impact on farm size than did policies directly aimed at altering the farm-size distribution (such as the Resettlement Act or the Farmers Home Administration).

In this paper, potential impacts of government price and income policies on farm size are investigated. To address this issue a set of potential farm program provisions are compared with respect to benefits for commercial farms of different size. The data used in this example are consistent with crop production on corn and soybeans cash-grain operations in the northern half of Illinois and were obtained primarily from summaries of the Illinois Farm Business Farm Management Association.

The three farm-size categories considered are grouped in ranges of 260-499 acres, 500-799 acres, and greater than 800 acres. The average sized farm in each group in 1975 was 390, 620, and 1,140, respectively. Henceforth, for ease of communication, we will refer to these groups as Small, Medium, and Large farm categories. With farms of this size, it is important to note that this analysis is directed entirely towards commercial cash grain farms and does not address effects on subsistence or part-time farming operations.

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Characteristics of these farm-size groupings are given in Table 1 (Wilken and Kesler)<sup>1/</sup>.

After delineating the farm sizes to be evaluated, the next data problem involved specifying the income and price policies to be considered. The approach taken in this paper was to consider a number of hopefully plausible specifications for such policies and then evaluate farm-size impacts that result. For this analysis we contemplate a farm program in effect for a series of five years. Such an occurrence might result, for example, from a cycle of favorable weather throughout the crop producing regions of the world.

The basic set of price levels adopted for this analysis is presented in Table 2. These prices are at levels approximately consistent with those which were under consideration in the House of Representatives. Increases in the corn target price level over the period reflect moderate inflation and modest yield increase assumptions. Although actual loan rates will probably be at the discretion of the Secretary of Agriculture, the rates chosen here are at levels which might be consistent with the target prices used. Allotments for deficiency payments are set at 80 percent of the planted acres in each year.

As cited earlier, the objective of this paper is to consider possible

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<sup>1/</sup> To conduct this analysis, certain parameters regarding the particular farming operations had to be specified. First year yields were set at 130 bushels per acre for corn and 35 bushels per acre for soybeans for all farm-size groupings. Per acre yields were increased by 3 bushels for corn and .5 bushels for soybeans for each year of a five year period. These absolute increases are consistent with recent yield trends for these areas. For each farm size it was assumed that the farm operator had purchased one half of his land base for \$1,000 per acre, five years previous to the first year of the analysis. The other half of the land base was assumed to be rented on a 50/50 crop share basis. Financial assets were set at levels sufficient to survive such a five year period even without income and price programs. The amount of such assets were proportionally equivalent for the farm sizes considered.

farm-size effects of income and price policies assuming several policy variations. To accomplish this task, alternative policy provisions are hypothesized. These are:

Table 1. Selected Characteristics in 1975 of Northern Illinois Cash-Grain Farms Enrolled in the Illinois Farm Business Farm Management Association

	Farm-Size Grouping		
	Small	Medium	Large
Average size (acres)	390	620	1,038
Range in size (acres)	260-499	500-799	800+
Number of farms in sample	321	255	108
Unpaid labor (months)	11.9	12.7	15.3
Hired labor (months)	1.9	5.0	12.4
Remaining capital costs in machinery, auto, buildings, and fence (dollars)	39,276	59,674	86,710
Cash operating expenses (dollars)	36,471	59,388	99,586

Table 2. Basic Target Prices and Loan Rates Used in the Analysis

Year	Target Price	Loan Rate	
	Corn	Corn	Soybeans
1	\$1.85	\$1.75	\$3.50
2	2.10	2.00	4.30
3	2.15	2.00	4.30
4	2.20	2.00	4.30
5	2.25	2.00	4.30

- A) A situation where no income and price program is in effect. For this instance, market prices are assumed to be 10 percent less than the loan rates of Table 2 (Quance and Tweeten). This situation will serve as a base condition to which outcomes incorporating some price and income policy provision can be compared.
- B) The second condition incorporates the loan rates and target prices of Table 2. For this circumstance as well as the remaining situations, market prices are assumed equal to the loan rate.
- C) The third situation assumes the imposition of a mandatory 10 percent set aside for corn as a precondition for receipt of deficiency payments. Two subsets of this situation are:
- C1) The farmer participates in the program and idles 10 percent of the operation's corn acreage to receive the deficiency payment.
- C2) The farmer does not participate, therefore foregoing the deficiency payment. It is assumed that enough other farmers participate so that the market price received by this farmer will be at the loan rate even though this operator doesn't participate.
- D) A fourth circumstance, incorporating a set of higher target prices, is also considered. These target prices are set 20 cents per bushel higher than those in Table 2. The same loan rates as in Table 2 and no set aside provision are assumed for this situation.

At this point, it is important to note that the purpose of this analysis is not to evaluate the adequacy of the price levels and provisions just described. And those provisions specified should definitely not be viewed as projections of what support price levels should be. Rather those pro-

visions are intended only to represent plausible conditions if government price and income programs were in effect for a period of years.

Because the goal of the paper is to investigate farm-size impacts, the assumption was made that those policies would be in effect in each year of a five year period. It is possible that such policies, although enacted, may not be in effect for every year of the near future. This possibility was not explicitly considered in the analysis because in those years the existence of such programs would probably not have any major farm-size effects.

### Results

To indicate any differential farm-size impacts, the variable, returns to family labor and management, is computed for each farm-size grouping and policy situation<sup>2/</sup>. Returns to family labor and management are defined as yearly cash receipts (from sale of crops, deficiency payments, if any, and other income) minus cash expenses, depreciation, and an interest charge for capital investment. The interest charge is computed using 4 percent of the acquisition value of farmland and 8 percent for other capital.

Estimates of the average annual returns to family labor and management are shown in Table 3. For this discussion the returns variable is estimated for the operator only, where the operator owns one-half of the land base and share rents the remainder on a 50/50 crop share lease.

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<sup>2/</sup> To generate the numeric estimates presented in this section of the report, a farm budget simulation model was developed. This model generates estimates of income and expenditures over the five year period for each of the farm-size and government policy situations described previously. The driving force for this model is the assumption that the farmer operator (under the external forces specified) is attempting to maintain a continuing farming operation and to maximize yearly after-tax income. The internal mechanism through which after-tax income is affected is the decision to replace depreciable assets used in the farm business utilizing tax management devices such as accelerated depreciation and investment tax credit.

Table 3. Average Annual Returns to Family Labor and Management Over Five Year Period a/

Farm-Size Grouping	No Program	Program			
		<i>No Set Aside</i>		<i>10 Percent Set Aside</i>	
		Base Target Prices	High Target Prices	Doesn't Participate	Participates
(Dollars)					
Small	3,853	9,425	11,766	8,009	10,225
Medium	6,082	15,683	18,196	12,754	16,620
Large	10,550	26,422	29,631	21,181	27,621

a/ Capital charges are assessed at a 4 percent rate for the acquisition value of land and 8 percent for other capital.

If no income and price policy were in effect and market prices were at levels 10 percent below the loan rates of Table 2, average returns to family labor and management are estimated to fall sharply from recent levels. The no program estimates of Table 3 are at levels approximately 25 to 30 percent of actual returns in 1975. Additionally these estimated returns vary directly with the size of farm. Relative to the Small farm category, the five year average returns are over \$2,200 greater for the average Medium farm and almost \$6,700 greater for the Large farm grouping.

Similar patterns of average annual returns to family labor and management are indicated among the three farm-size groupings for each of the four situations where a government policy is in effect. However, in each of those situations, the absolute level of returns is sharply higher than without such provisions. For the four situations where government policies are in effect, average returns for the Small category are \$9,856, for the Medium category are \$15,813, and for the Large farm category are \$26,213.

Although the absolute returns are sharply higher for the program situations, the relative position of the different farm-size groups is not greatly affected. With no program, the average returns to family labor and management on Small farms are 63 percent of the returns on Medium farms and 37 percent of the average returns on Large farms. Averaged over the four

policy situations, these same relationships are 62 and 38 percent for the Medium and Large farm groups, respectively.

To highlight the magnitude of the increased returns associated with the specified policies, the estimated gain in average returns is shown in Table 4 for each policy situation. Under the conditions stipulated, the values of Table 4 indicate sizeable gains from support policies. These gains range from a minimum of slightly over \$4,100 for Small farms to more than \$19,000 for Large farms and the higher target prices. For each policy postulated, the absolute gains are directly related to size of farm. Absolute increases for the average Large farm are more than twice the gains for the average Small farm and are at least 60 percent greater than for the average Medium farm. Taking an average over the four provisions specified, the gain in returns is \$6,003 for the Small farms, \$9,731 for the Medium farms, and \$15,664 for the Large farm category.

Table 4. Average Annual Gain in Returns to Family Labor and Management

Farm-Size Grouping	<i>No Set Aside</i>		<i>10 Percent Set Aside</i>	
	Base Target Prices	High Target Prices	Doesn't Participate	Participates
(Dollars)				
Small	5,572	7,913	4,156	6,372
Medium	9,601	12,114	6,672	10,538
Large	15,872	19,081	10,631	17,071

Certainly the data of Table 4 suggest a sizeable disparity in the distribution of absolute benefits from support policies such as stipulated here. Of course, a considerable differential in returns would also exist if no program had been in effect. Another factor to consider is that the farm-size groupings are not homogeneous with respect to the amount of resources devoted to production. To look at the question of the effect of



support policies on resource returns, two additional sets of data are presented.

In Table 5, the cumulative gains have been adjusted by the number of man-years of family labor devoted to the farming operation. Conversion of the average returns to account for differing amounts of unpaid labor results in a reduction in the disparity of absolute benefits exhibited in the data of Table 4. But even though the differential is reduced, the level of absolute benefits still varies directly with farm size and is higher for the farms in the Large grouping. The gain in annual returns per man-year of family labor for Large farms is at least 30 percent greater than for Medium farms and is at least 80 percent greater than for Small farms.

Table 5. Average Annual Gain in Returns to Family Labor and Management per Man-Year of Family Labor a/

Farm-Size Grouping	<i>No Set Aside</i>		<i>10 Percent Set Aside</i>	
	Base Target Prices	High Target Prices	Doesn't Participate	Participates
	(Dollars)			
Small	5,628	7,993	4,198	6,436
Medium	9,058	11,428	6,294	9,942
Large	12,400	14,907	8,305	13,337

a/ In 1975 northern Illinois farms enrolled in the FBFM system used 0.99, 1.06, and 1.28 man-years of family labor for the Small, Medium, and Large farm groupings, respectively.

But each of the farm-size groupings implies a considerably different level of capital investment in the farming enterprise. To evaluate the effect of these income and price policies on return to capital for each farm size, the gain in rate of return to investment was calculated. Estimates for each situation are presented in Table 6. (Here, gain in rate of return on investment is calculated by dividing the average annual gain in return to capital and management by initial investment). In contrast

to the variables presented previously, the direct relation between absolute benefits and farm size is much less apparent for this variable. Although the rate of return does not tend to vary directly with the farm size, the range of this variation is always one percent or less. If we average these relative returns over all four policies, the resulting percentages are 4.5, 4.8, and 5.1 percent for the Small, Medium, and Large groupings, respectfully. These data indicate that if a major goal of price and income policy is to remunerate capital investment, differential benefits by size of farm may not be too severe for the types of provisions considered here.

Table 6. Average Annual Gain in Rate of Return on Investment a/

Farm-Size Grouping	<i>No Set Aside</i>		<i>10 Percent Set Aside</i>	
	Base Target Prices	High Target Prices	Doesn't Participate	Participates
	(Percent)			
Small	4.2	5.8	3.1	4.8
Medium	4.7	5.9	3.6	5.1
Large	5.0	6.0	4.1	5.4

a/ Gain in rate of return on investment is defined as the average annual gain in return to capital and management divided by initial investment. For this table, land is valued at the specified acquisition value. If the land asset has been valued at something more nearly approaching current market value, the gain in returns estimated would consistently have been reduced to one-fourth of the levels shown above.

An alternative way to consider the question of differential farm-size benefits is to consider how the gains from the price and income policies might be spent on farms of differing size. One aspect of family farm expenditures which might be interesting to consider is that of consumption expense for family living. Utilizing an updated farm family consumption formula originally developed by Vandeputte, insights as to the effects of these government policies on family living levels can be suggested.

Table 7 compares consumption estimates when no program is in effect with the consumption estimates averaged over the four policy provisions. Assuming a family of four for each farm-size category, the increase in consumption expenditure is significantly higher for the Medium and Large categories than for the Small farm category. For the former categories the increase in consumption is approximately \$2,400 annually compared to \$1,600 for the latter farm-size grouping.

However, if the increase in consumption expense is compared to the corresponding gain in returns to family labor and management, a different pattern emerges. On Small farms, almost 30 percent of the gain in returns would be consumed whereas only 15 percent of the gain would be spent on consumption items in the Large farm group. This relationship implies an advantage for larger farms interested in expansion as relatively more of their gain in returns can be diverted to investment items.

These last data should not be interpreted as necessarily binding for all individual farm families. Certainly, any particular growth-oriented small farmer could divert all of the gain in returns to investment activities. However, the data of Table 7 do imply that generally we could expect smaller farmers to be under relatively more pressure to direct a larger portion of any gains in returns from support policies to consumption items.

Table 7. Estimates of Average Annual Consumption Expenses

Farm-Size Grouping	No Program	Average of Four Policy Situations	Increase in Consumption	Increase in Consumption as a Percentage of Gain in Returns
Small	11,471	13,123	1,652	28
Medium	13,347	15,711	2,364	24
Large	15,268	17,671	2,403	15

SUMMARY

The analysis described in this paper evaluated direct farm-size effects of government price and income support policies. Three farm-size categories, consistent with cash grain operations in Northern Illinois, were considered. For a five-year period, a computer budgeting model was used to estimate outcomes if no program were in effect and for situations assuming several alternative program provisions.

For the conditions stipulated here, price and income policies were shown to have absolute benefits which were directly related to size of farm. The gain in annual return to family labor and management was \$6,000 for Small farms, \$9,700 for Medium farms, and \$15,200 for Large farms. However, these gains did not significantly alter the distribution of returns between the three farm-size categories. Returns to family labor and management on the average Small farm remained at approximately 60 percent of returns on Medium farms and about 40 percent of those on Large farms both with and without the farm policy being in effect.

Additionally, it was indicated that return to capital investment is not greatly altered because of the presence of price and income policies. Although the gain in return on investment does tend to vary directly with farm-size, the difference in that gain between farm sizes was relatively small.

When the consumption aspect of the family was considered, however, a potential advantage for larger operations was indicated. If marginal increases in consumption can be assumed to decline as income expands, smaller operations would be expected to devote relatively more of the gains from the price and income policies to consumption items. This greater consumption relative to gain in returns was shown to occur for small farms even though the absolute increase in consumption because of farm policies was greater on the larger farming operations.

Two cautions should be noted regarding the analysis just discussed. First each farm-size category was given the same relative financial position at the initial point of the analysis. And no mechanism was incorporated to consider the effects of greater price certainly on farms of differing size. Certainly farms with relatively greater debt would benefit from greater price stability. It is also possible that larger farms might be better able than small farms to utilize greater price stability in borrowing for expansion purposes.

Secondly, if a set aside provision is in effect, larger farming operations should have a greater advantage in competing for additional farmland. If a constant percentage of the corn base is retired, more excess capacity is made available on larger rather than smaller farms. The pressure of such excess capacity would be expected to encourage farmers to rent or purchase additional tracts of land. In this competition, however, larger farmers with the greater excess capacity would have a relative advantage.

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