Farm Size and the Future Of Rural Communities*

Gerald Marousek, Professor and Agricultural Economist

Although American agriculture has been adopting new technology for more than 100 years, the rate of adoption has greatly accelerated in recent decades. This technological revolution has resulted in important changes in rural America. Fewer, larger farms have reduced employment opportunities in agriculture. This in turn has affected the viability of towns in farming areas. Changes in agricultural technology, in farm size and in farm-area towns have had important economic and social effects on rural communities.

This report summarizes a study of the economic impact of farm size alternatives on the Jerome-Wendell community in southcentral Idaho. The study has two objectives: (1) to measure the relative economic importance of small farms and large farms and (2) to estimate the income, output and employment effects of farm size alternatives on the total community.

Study Area and Approach

The Jerome-Wendell community is similar to many rural communities in America. Farming is the basic and long-established industry. Crop and livestock production is diversified; farm size and structure vary, including part-time, single family and partnership arrangements. The towns within the area include a crossroads village (Wendell) and the seat of county government (Jerome). Twin Falls, a regional trade center, is adjacent to the study area.

Examination of past trends showed that the community has experienced the changes in farm size structure, agricultural employment opportunities and population movements which have taken place generally in rural America over the last generation.

Input-output analysis was used to measure the economic interrelationships among the industries in the study area. Income, employment and output multipliers were derived for 22 local industries. The multipliers were then used to

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make forecasts of final demands to reflect alternative structural changes over a 5-year period.

Agriculture composed two industries in the model: small farms, defined as those having less than $25,000 in gross sales of farm products in 1974 (the base year), and large farms, those with $25,000 or more gross farm sales. This approximates the boundary between the contracting and the expanding sectors of agriculture in the study area in 1974. The model also included 4 local nonfarm agricultural industries and 15 non-agricultural industries, plus households. Government was considered to be outside the regional model.

Economic Structure

The economic structure of the agricultural sector is summarized in the following points:

1. Small farms as defined in this study represented a relatively small economic sector. They provided 12% of total employment, 7% of consumer spending and 4% of household income. Large farms provided 15% of total employment within the study area, 7% of the consumer spending and 25% of household income.

2. Small farms also represented a relatively small market for the output of local businesses. They purchased about 1% of the output of other farms, 3% of the output of nonfarm agricultural industries and 2% of the output of nonagricultural industries. Large farms purchased 8% of the output of other large farms, 12% of the output of small farms, 10% of the output of nonfarm agricultural industries and 4% of the output of nonagricultural industries.

3. Small farmers spent a relatively larger portion of their production expenditures locally than large farmers (59% vs. 55%). Large farms outspent small farms in total dollars with local merchants in 1974, $20.4 million compared with $4 million.

4. Small farms required fewer man-years of labor per farm and as a sector, and exhibited a higher labor-output ratio than large farms.

5. Small farm households had more off-farm employment than large farm households — an average of

228 person-days off the farm compared with 124 for large farm households.

6. About 22% of the small farmers sampled expected to cease farming within 5 years, while all large farmers expected to stay in production.

7. Small and large farm households each spent $1.3 million locally. Small farm households provided a 10% smaller aggregate market than large farm households, but showed a higher propensity to spend locally.

Economic Interdependence

Knowledge of economic interdependence helps one understand the structure of the Jerome-Wendell economy and the process through which local industries influence regional economic activity at different rates. One cannot conclude that the dollar output of an industry determines its degree of interdependence with the remainder of the regional economy. While the largest industries might employ the most people or produce the most output, they do not necessarily contribute proportionally to the generation of total regional income, output and employment.

Two factors determine the degree of economic interdependence of an industry with the rest of the regional economy: (1) the amount of its purchases from other local industries and (2) the effect of these purchases on the economic activities of the other local industries.

When an industry purchases its supplies from local sources the dollars spent remain within the community. Small farmers spent proportionally more locally than did large farmers, with the exceptions of intra-farm transactions, purchases of professional services and labor payments to households. Thus, although large farmers spent more locally in absolute terms, small farmers showed higher first-round capacity to generate economic output. Both farm sectors purchased a higher percentage of their inputs locally than did retail and service sectors.

However, the initial local purchases alone are not sufficient to insure high levels of interdependence. The industries supplying inputs must in turn have high purchase levels from local industries to insure high interdependence. That is, the degree of economic interdependence depends not only on where dollars are spent in the first transaction, but what happens in successive transactions as well.

Total Requirements and Multipliers

An expanding industry increases local economic activity through three interrelated stages of spending: (1) direct effects of the industry's purchases in the community, (2) indirect effects of the resulting transactions between other local industries and (3) induced effects on consumption by local households because of larger wage payments. Conversely, a shrinking industry brings about a decrease in demand from direct, indirect and induced sources.

The total input requirements for large farms can be used to illustrate the sources of economic activity. To sustain a $1 increase in **final demand** for farm commodities, large farms must increase their output by $1.10. Because of economic interdependence the increased large farm output requires small farms to increase output by $0.03, agricultural services by $0.05, other local industries by $0.35 and labor supplied by households by $0.34. The sum of the total requirements

on the local economy equals the output multiplier — 1.87 for the large farm sector. A $1 increase in the final value of output produced by large farms in the Jerome-Wendell area is accompanied by an increase of $1.87 in total economic activity in the community (Table 1).

Multipliers measure economic interdependence in terms of different variables such as output, income and employment. Several types of multipliers are useful because industries having a high multiplier for one variable will not necessarily have high multipliers for others. Multipliers show the effect on regional output, income or employment of an additional dollar of final product demand, dollar of income or man-year of employment for the industry. In rural areas with low income, high unemployment and high out-migration, regional multipliers can assist in determining which economic activities can do most to improve income and employment. The following paragraphs give the multipliers for small and large farms and indicate how they rank with the multipliers for other Jerome-Wendell industries.

Output Multipliers. The output multiplier for both large and small farms was 1.87. Only one other industry had an output multiplier higher than large and small farms: professional services output multiplier was 2.

Income Multipliers. The income multiplier for small farms in the region (1.45) exceeded that for large farms (1.34). Both of these, however, were exceeded by the income multipliers for farm product raw materials (3.98) and construction trades (1.61).

Employment Multipliers. The employment multiplier for small farms (1.15) was smaller than that for large farms (1.62). Farm product raw materials had the highest employment multiplier (3.06) and large farms were second, but small farms ranked 10th among the 22 local industries.

Growth Projections

The multipliers were used to analyze the effects of growth on the total Jerome-Wendell economy. Five sets of forecasts were made, each using different assumed rates of growth over a 5-year period beginning in 1974 (Table 2).

1. Minimal growth set: economy maintains 1974 demand level while small farm ouput increases or decreases 5% per year.

2. Moderate growth set: economy grows 3% per year while farm output increases 3% per year, remains constant or decreases 3% per year.

3. High growth set: economy grows 5% per year while small farm output increases 5% per year, remains constant or decreases 5% per year.

4. Total displacement set: small farm sales to export fall to zero at end of 5 years while the agricultural sector grows 3% or 5% per year, or all industries grow 3% or 5% per year; small farm production continues to satisfy intermediate demand for large farms.

5. Structural reverse set: large farm output declines to 50% of 1974 level at end of 5 years and small farms take up the slack while the agricultural sector grows 3% or 5% per year, or all industries grow 3% or 5% per year.

Output Impacts. Only in the minimal growth set when small farms contracted 5% per year for 5 years did total

Table 1. Output, income and employment multipliers for local industries, Jerome-Wendell study area, 1974.

Industry	Output multiplier	Income multiplier	Employment multiplier
Large farms	1.8729	1.3423	1.6157
Small farms	1.8694	1.4464	1.1546
Agricultural services	1.3234	1.1821	1.2077
Construction trades	1.6457	1.6131	1.2185
Farm product raw materials	1.8337	3.9758	3.0553
Printing and publishing	1.2701	1.1554	1.0631
Miscellaneous manufacturing	1.3175	1.1083	1.0457
Utilities	1.1342	1.3208	1.1525
Farm equipment dealers	1.2349	1.1793	1.1691
Agricultural chemicals	1.1461	1.1910	1.2364
Hardware	1.2964	1.1500	1.1144
Clothing stores	1.1542	1.1398	1.1147
Food stores	1.1775	1.1534	1.1291
Petroleum products	1.2909	1.2465	1.3210
Automotive and transportation	1.4852	1.2655	1.2377
Furniture	1.3659	1.1580	1.1486
Restaurants	1.6370	1.1735	1.1261
Miscellaneous retail	1.6988	1.1403	1.1455
Finance, insurance, real estate	1.3874	1.1467	1.1963
Professional services	2.0050	1.1267	1.1418
Other services	1.8495	1.1775	1.1241
Households (labor)	1.6610	undefined*	undefined*

*The direct income and employment coefficients for households are effectively zero although mathematically undefined.

Table 2. Output, income and employment impacts under five sets of economic growth projections, Jerome-Wendell study area.

	Output	Income	Employment
	(thousands of dollars)		(man-years)
Base year levels (1974)	195,066.0	37,041.7	4,022
1. Minimal growth set			
Run 1: Small farms expand	197,363.2	37,379.2	4,197
Run 2: Small farm decline	192,662.4	36,679.1	3,807
2. Moderate growth set			
Run 1: Small farms expand	226,173.6	42,941.0	4,662
Run 2: Small farms constant	224,872.9	42,747.2	4,460
Run 3: Small farms decline	223,767.5	42,582.6	4,549
3. High growth set			
Run 1: Small farms expand	248,178.5	47,114.4	5,104
Run 2: Small farms constant	245,922.0	46,778.3	4,998
Run 3: Small farms decline	244,153.9	46,515.0	4,915
4. Total displacement set			
Run 1: Agriculture grows 3%	203,614.9	38,844.5	3,906
Run 2: All industries grow 3%	226,145.0	43,239.2	4,378
Run 3: Agriculture grows 5%	209,881.9	39,978.6	4,006
Run 4: All industries grow 5%	248,147.3	47,442.7	4,782
5. Structural reverse set			
Run 1: Agriculture grows 3%	203,729.5	37,599.8	5,123
Run 2: All industries grow 3%	226,260.1	41,994.4	5,587
Run 3: Agriculture grows 5%	209,935.0	38,535.8	5,417
Run 4: All industries grow 5%	248,280.5	45,999.9	6,193

output decline from the 1974 level of $195.1 million to a projected level of $192.7 million. In all other cases total output increased with the highest level, $248.3 million, projected in the structural reverse set with all industries growing at 5%.

Income Impacts. The only instance where total income was less than the 1974 level of $37 million also occurred in the minimal growth set with small farms declining ($36.7 million). The highest level of total income, $47.4 million, was projected in the total displacement set with agriculture growing 5% annually.

Employment Impacts. In three projections employment declined below the 1974 level of 4,022 man-years: the minimal growth set with small farms declining (3,807 man-years), the total displacement set with agriculture growing 3% (3,906 man-years) and with agriculture growing 5% (4,006 man-years). Thus, only when all industries, including agriculture, grew 3% or 5% per year were the negative employment effects of total small farm displacement offset.

The highest employment level, 6,193 man-years, was projected in the structural reverse set with all industries growing at 5%. However, at all projected growth levels in the structural reverse set employment exceeded that of other alternatives.

Summary

The outcome of the minimal economic growth set confirms that regional output, income and employment would fall below 1974 levels only under conditions of no growth in both the large farm and nonfarm industries combined with relatively rapid decline in the number of small farms. The results of the moderate and high economic growth sets indicate that if all industries in the economy grow, regional income, output and employment would exceed base year levels regardless of final demand for the output of small farms.

The total displacement set results show that, although increases in area output and income would occur under all levels of growth, employment would be above the 1974 level only if nonfarm industries grow at a moderate or rapid rate.

The results of the structural reverse set lead to the conclusion that, should small farms increase their share of final demand for farm products within even moderately expanding agricultural demand and despite no growth in nonfarm industries, net increases in area output, employment and income would be achieved.

Policy Considerations

The economic trade-off brought into focus in the study of economic interdependence in the Jerome-Wendell community is essentially between income and employment. Displacement of small farms by large farms results in greater regional income; increasing the number of small farms yields greater regional employment. Agricultural output is comparable for the two farm size structures.

In the broader context of rural development, the economic dependence of small rural towns on an agricultural sector including small farms is related to trading patterns, proximity to regional growth centers, opportunities for nonagricultural development, demographic patterns and other factors. Although each community is in a unique situation, many similarities exist. This study provides a framework for understanding economic interdependence in rural communities and indicates how public policies and private economic endeavors which affect farm size have varying impacts on communities.

A wide range of policy alternatives is suggested by these results. At one extreme, the process of economic change which results in fewer and larger farms, rural to urban out-migration and declining rural towns can be accepted as socially desirable. The benefits to society are assumed to exceed the costs of change to the individuals affected. Public policy would then center on alleviating the economic and human costs incurred by small farmers and dependent rural communities.

At the other extreme, the continued existence of viable small farms and rural communities can be accepted as worthy in and of itself. Policies would be followed to assure the continued survival of small farms and small towns, regardless of economic efficiencies foregone by society as a result.

The relative merits of these extreme positions and various alternatives between them cannot be assessed by economic analysis alone. Each has a set of costs and benefits for individual farmers, rural communities and society.