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Economic Linkages Between Agriculture and
Other Sectors Within Rural America*

by

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1986
Agricultural Economics Library
Policymakers and researchers have long been concerned about the economic well-being of rural areas and the nature of the interaction between farming and community rural areas. Numerous conferences have also been held on these topics over the years, especially during periods of economic slowdowns. Early policy intervention often equated the well-being of rural areas with the income levels and performance of the agricultural sectors. Noncommodity programs such as Rural Electrification, water systems, and transportation improvements aimed at providing services to farmers, also benefited many small rural communities.

Limitations on transportation and communication techniques restricted the distance residents would travel for goods and services. Inputs were acquired locally and much of the processing of agricultural products was done locally in town creameries, meat lockers, and feed mills. Rapid advances and adoption of new technology on and off the farm in the post WW II era began to change these relationships. In the Midwest, farm mechanization displaced farm labor in large numbers. Changing retailing patterns and the growth of shopping malls and regional centers also changed shopping patterns and affected the viability of mainstreets in rural communities.

*Presented at the American Agricultural Economics Association Annual Meeting, Reno, Nevada, July 1986.

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While these changes in agriculture have had adverse impacts on rural communities, other forces are creating changes in the way rural residents earn their livelihood. Transfer payments infused substantial sums of money into rural areas and allowed many retirees to stay in rural communities. Transportation and communication improvements and lower wage scales have enabled many rural communities to diversify their economic base into manufacturing and service industries. However, not all these trends have affected rural areas uniformly. Access to major interstate highways and population centers, are important logistical features giving some communities advantages over isolated communities in sparsely populated regions. As communities struggle with the challenge to remain viable in a changing socio-economic environment, it is important to gain an understanding of the role of agriculture and its links to the general economy of rural areas.

This paper examines in more detail the relationship between agriculture and communities in rural areas. This examination will review some of the conventional literature on the subject, present historical secondary data and use input-output results to illustrate the linkages between agriculture and the economy of rural communities in the state of Iowa. Since this relationship differs over geographical regions as well as over time, a review of these spatial and temporal patterns will be made. Although many of the agriculture-rural community issues are similar in other regions, the focus of this review will be Midwestern agriculture.

Previous Studies

One of the earliest and best known inquiries into the relationship between the structure of agriculture and the viability of rural communities

was conducted by a rural sociologist Goldschmidt in 1947 (Goldschmidt). This study in California found that a region with a large farm, corporate structure of agriculture resulted in less viable communities than in regions with smaller, more dispersed structure of agriculture. Although strong criticisms have been raised with Goldschmidt's methodology (Hayes and Olmstead), this study has been very influential in framing research questions and raising policy discussion regarding the relationship of agriculture to rural communities. In addition to Goldschmidt's anthropological approach, other methodologies ranging from surveys (Heffernan and Lasley) to linear programming (Sonka and Heady) have been consistent in suggesting that the increased size, reduced numbers, and increased mechanization of farms tend to lead to a socioeconomic decline in rural communities. At the sociological level, these structural changes in rural society lead to concentration of land ownership, and reduced levels of participation in community institutions such as voluntary organizations, churches and the political system. These effects appear to be greatest in rural communities that are relatively small and located in relatively unurbanized areas. On the other side of the issue is whether farmers would be viable if they had not enlarged their operations to take advantage of changing technology.

More recently, the implications of a changing agriculture structure on population and the demand for public services has been modeled for an Oklahoma community by Woods and Doeksen (Woods and Doeksen). This analysis was driven by an input/output model with results for a changing agricultural sector impacting the inputs to agriculture and population changes affecting demand for local services. In a similar, but less detailed study, Otto and Meyers

used input/output techniques, to examine the implication of the long run agricultural outlook for the nonagricultural sectors in the state of Iowa.

Historical Perspective

These input/output approaches provide a static view of the linkages between agriculture and rural communities. In order to gain a better perspective of the dynamic nature of this relationship it is helpful to take a long run view of several indicators of the farm and community. The historic economic linkage to agriculture continues to dominate economic performance of most Midwest states. As indicated by Figure 1 most of the agriculturally dependent counties are in the western cornbelt. This map prepared by the USDA indicates the counties with a least 20 percent of total personal income is from agricultural sources in the 1975-79 time period. This agriculture dependency is also consistent with a lower percentage of farmers working off-farm in the western cornbelt (Figure 2). Although the nonfarm employment has increased in the Midwest states since 1960 (Table 1), much of the employment in the nonmetropolitan and less urban states remains agriculture related. As agricultural exports soared during the 1970s, Midwest states outperformed the U.S. in employment, personal income and population growth. Observe from Table 1 that nonagricultural employment increased 28 percent in the United States between 1970 and 1980. Only three Midwest states--Illinois, Indiana, and Missouri--did not achieve this level. Similar conclusions follow for personal income and population trends and changes (Table 2 and Figure 2).

As well, the secular downward trend in the population of the Midwest, due in large measure to agriculture technology is evidenced in Figure 2. Of

Figure 1. Agricultural Dependent Counties
Agricultural Counties

SOURCE: Deavers and Brown

Figure 2.

POPULATION TRENDS RURAL & URBAN

1950 & 1985

Table 1. Total Nonfarm Employment for Midwestern States and U.S., 1960-1984
(in thousands)

	1960	1970	% Change 1960-1970	1980	% Change 1970-1980	1984	% Change 1980-1984
U.S.	52,898	70,664	34	90,564	28	95,882	6
Iowa	680	881	30	1,110	25	1,080	-3
Illinois	3,417	4,337	27	4,892	13	4,697	-4
Indiana	1,429	1,847	29	2,137	16	2,178	2
Kansas	557	677	22	949	40	977	3
Minnesota	926	1,309	41	1,770	35	1,883	6
Missouri	1,349	1,654	23	1,969	19	2,044	4
Nebraska	380	481	27	631	31	644	2
South Dakota	139	176	27	237	35	247	4
Wisconsin	1,186	1,535	29	1,945	27	1,990	2

Source: U.S. Department of Labor, Handbook of Labor Statistics, 1985.

Table 2. Total Personal Income for Midwestern States and the U.S., 1960-1983
(Millions of Dollars)

	1960	1970	% Change 1960-1970	1980	% Change 1970-1980	1983	% Change 1980-1983
U.S.	398,843	803,922	102	1,156,715	168	3,175,250	47
Iowa	5,539	10,725	94	26,829	150	37,240	39
Illinois	26,620	50,232	89	119,474	138	165,635	39
Indiana	10,136	19,433	92	49,235	153	66,929	36
Kansas	4,640	8,490	83	23,199	173	33,335	44
Minnesota	7,168	4,851	107	39,445	166	51,976	47
Missouri	9,096	17,360	91	43,603	151	63,587	46
Nebraska	2,945	5,587	89	13,968	150	63,587	46
South Dakota	1,246	2,093	68	5,390	158	8,096	50
Wisconsin	8,684	16,703	92	44,262	165	61,645	39

Source: U.S. Commerce Department, BEA.

course, these population changes are not evenly distributed within states. Metropolitan areas have grown faster than rural areas. Evidence since 1980 shows that the population losses have been more widespread in rural farm than in nonfarm areas. In Iowa, for example, the rural area declines have more than offset population growth in the metropolitan areas. These population changes have been fueled, in part, by growth in average farm size and a corresponding growth in farm numbers.

The peak year for nonagricultural employment in the Midwest states was 1979. Farm prices and farm income began a decline during this period from the relatively favorable levels of the 1970s as export markets contracted. Nominal net farm income fell by more than 100 percent from 1980 to 1983 in 5 of the 9 Midwest states (Table 3). Declines in nonagricultural employment in Midwestern states were led by dramatic declines in manufacturing, which is closely tied to agriculture in many areas of the Midwest. Service sector employment in aggregate has continued to increase, albeit slowly, reflecting more the fast growth in the service sector than the relationship to farm income. But, this positive trend in the service sector may not hold for most of the smaller communities dependent primarily on agriculture.

In addition to the across state differences, considerable differences exist in the local economic bases in substate areas. Figures 3-5 conducts an instate comparison of the economic bases of counties in agriculturally dependent counties to conditions in counties adjacent to SMSAs for several states.

These graphs reveal several interesting patterns in the development of these areas. The nonfarm dependent counties adjacent to the SMSAs have a much more diversified economic base and a lower dependence on agriculture than the

Table 3. Net Farm Income for Midwestern States and U.S., 1960-1983 (Millions of Dollars)

	1960	1970	% Change 1960-1970	1980	% Change 1970-1980	1983	% Change 1980-1983
U.S.	11,517.0	14,381.0	25	21,239.0	48	16,100.0	-24
Iowa	612.4	1,080.8	76	836.4	-23	-217.4	-126
Illinois	537.0	629.8	17	520.5	-17	-584.5	-212
Indiana	352.3	363.7	3	590.6	62	-129.7	-122
Kansas	369.9	538.7	36	529.6	-2	596.8	13
Minnesota	455.3	816.6	79	1,191.2	46	734.6	-38
Missouri	389.3	447.6	15	293.0	-35	-59.7	-120
Nebraska	328.6	468.6	43	182.6	-61	84.9	-111
South Dakota	272.6	328.2	20	342.9	4	468.1	37
Wisconsin	386.7	576.6	49	1,430.0	148	972.4	-32

Source: USDA Economic Indicators of the Farm Sector.

Figure 3.

TRANSFERS AND FARM INC. AS % OF TPI

COLUMBIANA AND PAULDING COUNTIES OHIO

Figure 4.

TRANSFERS AND FARM INC. AS % OF TPI

BREMER AND TAYLOR COUNTIES IOWA

Figure 5.

TRANSFERS AND FARM INC. AS % OF TPI

SEWARD AND WAYNE COUNTIES OF NEBRASKA

agricultural dependent counties. Although it is a small sample, these SMSA adjacent counties had a smaller percentage decline in the number of farms and had a higher percentage of farm operators working off-farm at least 100 days than the state average. This result is consistent with numerous studies indicating that the availability of off-farm employment opportunities have enabled many farmers to remain in farming. This income source has been especially helpful during the recent period of financial stress in agriculture.

Another pattern evident in both the agricultural dependent and SMSA adjacent counties is the increasing importance of transfer payments as a percentage of total personal income. These monies have become important to the economic development strategies for many communities as they have been indexed to inflation and have allowed many elderly to stay in rural communities and support services. Dividends, interest and rents have also exhibited a dramatic increase as a share of total personal income. These nonwage forms of personal income have broadened the range of basic income and have allowed many communities to remain viable during times of stress in agriculture.

This review of historical indicators of performance in the farm and nonfarm sectors of several Midwestern states indicates an evolving relationship between farm and the rural community as well as distinct differences depending on location within the state and within the county which is difficult to generalize. Input-output analysis is a tool which provides a snapshot or static view of the contribution of agriculture to the nonfarm sectors of the economy. Various states have constructed input-output models to analyze impacts of economic change at state or substate levels. The particular illustration in this paper will utilize an input-output model

developed for the state of Iowa with links to the outlook for agriculture under conditions expected during the 1985 Farm Bill.

The outlook for agriculture is based on analysis of the 1985 Farm Bill conducted by the Food and Agricultural Policy Research Institute (FAPRI). This analysis at the national level incorporates the influence of macro-economics policies on supply and demand conditions in U.S. agriculture (Johnson et al.) The Iowa analysis is done by linking Iowa markets to national commodity markets. The nonagricultural sector impacts are estimated by linking to the results of the agricultural sector analysis using an input-output model for the state. (See Miernyck for a more detailed discussion of input output analysis).

A projection of the major results for Iowa agriculture for the years of the 1985 Farm Bill is presented in Figure 6. Total receipts includes cash receipts from marketings, government payments, and other farm income. Receipts less variable costs is an aggregate indicator of the performance of Iowa's agriculture that accounts for variable production expenses and shows a stable pattern due to the contribution of government payments. Debt servicing depreciation and returns to operator still need to be considered in order to estimate net farm income (Otto and Meyers).

The aggregate output in the agricultural sector at the beginning of the 1985 farm bill and at the end of the period provide an estimate of the final demand change which has indirect and induced effects on the nonagricultural sectors of the Iowa economy. A summary of the total impact on various sectors of the Iowa economy is presented graphically in Figure 7. The impacts are summarized into the agriculture, agricultural related manufacturing and services, trade, and all other categories. The total output is related to the

Figure 6.
IOWA FARM RECEIPTS

Figure 7.

OUTPUT PROJECTIONS UNDER FSA85

direct output through the input-output multiplier. The decline in output projected by the end of the 1989/90 period for Iowa is primarily the result of lower prices and fewer planted acres because of government programs for corn.

This cursory look at the linkages between agriculture and rural communities suggests that agriculture is not likely to be a strong engine of growth in the region. The flows of this model have been one way; estimating agriculture's impact on the general the economy. The composition and functions of a rural community's economy can also affect the structure and performance of agriculture at the local level.

Use of an input output model also stresses the role of output in driving the economy. In the case of agriculture, sufficient excess capacity exist so that most of the agricultural resources would continue to be used with minimal impact on output if additional farmers were forced out of agriculture for financial reasons. However, as Doeksen has pointed out in his simulations, population changes are likely to have the largest impact on communities through affecting demand and support for services (Doeksen).

Although these techniques are relatively aggregate, they do provide a means to examine agriculture and rural communities linkages and the impacts of various policies on rural areas. These techniques however, do not provide insights into which policies should be used to influence income and employment in rural areas. Continued research is needed to identify these relationships.

Summary and Conclusions

This paper has examined the changing pattern of the relationship between agriculture and rural communities over time, as well as, some of the differences which exist over different geographical regions. These patterns show

that agriculture and its linkages is an important part of the economic base in rural areas with a higher degree of agricultural dependence in the less populated areas such as the Western farm belt. Overtime other sources of personal income have grown in relative importance in all rural areas. These linkages are evident in PIK type policies where reductions in the volume of production had severe effects on the agricultural sector.

Many of the changes occurring in rural areas have been heightened by increased linkages to the macroeconomy. Inflation and higher interest rates have affected exports and production costs for agriculture as well as the manufactured products in rural areas. On the other side, these macroeconomic forces have increased returns on investments for rural residents and indexing of many retirement pensions has provided a secure source of income for a large segment of the community's population.

Although farm policy was never intended to be the salvation of rural communities, the present economic conditions in agriculture make the chances of economic relief through agricultural policy exceedingly remote. Rural area policies will need to be addressed outside the framework of agricultural commodity policies. Aggregate statistics suggest that changes such as improved communication and transportation technology have resulted in rural areas being integrated into the overall economy. However, the occurrence of farm financial problems and difficulties for rural areas suggest that special attention needs to be addressed to helping these distress areas adjust.

Currently, policies affecting rural communities are formulated through a variety of federal department and offices such as Commerce, Labor, Transportation, EDA, SBA, FHA, just to mention a few. Because these programs cut across departmental lines and are not focused on rural areas, much of the

effectiveness of their efforts is diminished. In an era of increasingly tight federal budgets, it becomes more important for these agencies and offices to exert stronger coordination and focusing of programs for depressed economic areas.

In summary, while rural areas have been changing dramatically, agriculture with its linkages to other sectors will remain an important part of the local economic base in rural areas. In recent years both, the agriculture and nonagricultural sectors have become increasingly integrated into the national and international economies. This increased exposure creates a need for better information and a better understanding of these forces and strategies that will help rural residents adjust to these changes. Such strategies will be important as the massive changes of the past several decades are likely to continue creating new challenges for all citizens concerned with the well-being of rural areas.

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