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Agricultural industrialization, anticorporate farming laws, and rural community welfare

Thomas A Lyson§

Department of Rural Sociology, 133 Warren Hall, Cornell University, Ithaca, NY 14853, USA;
e-mail: tal2@cornell.edu

Rick Welsh¶§

PO Box 5750, Department of Humanities and Social Sciences, Clarkson University, Potsdam, NY 13699, USA; e-mail: welshjr@clarkson.edu

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Abstract. The effect on rural communities of shifts in US agriculture toward a system dominated by large-scale industrial production is a central problematic in the sociology of agriculture. Despite the importance of agriculture structure and practice to US society, most research on this topic has been confined to specialized journals. And though research in this area has found negative effects on rural communities from agricultural industrialization, there is a dearth of inquiry into public policy remedies. Using data on 433 agriculture-dependent counties in the USA, we find that counties in states with laws that limit nonfamily corporate entry into farming score higher on important welfare indicators, and that the laws mitigate negative impacts on rural communities from industrial farming.

Introduction

Since early in the 20th century US agriculture has been increasingly characterized by a loss in farm numbers, increasing average farm scale, increases in the use of hired labor on farms, vertical integration of farming with off-farm businesses, and upsurges in contract farming (Lobao, 1990; Lobao and Meyer, 2001; Welsh, 1997a). These changes have been uneven across time and place, but in general they have characterized the development of US agriculture in the 20th and early-21st centuries, and have caused some observers to argue that agriculture is ‘industrializing’ (Lobao and Meyer, 2001; Welsh, 1997a). The potential for industrial farming to displace the traditional family-labor farm has caused public concern within and outside rural USA.

Today, as US agriculture turns down the path of a new century, a more tightly choreographed food system is emerging. According to Mark Drabenstott, an economist with the Federal Reserve Bank of Kansas City, in a speech given in San Francisco on 8 November 1999: “The key component in this choreography is a business alliance known as a supply chain. In a supply chain, farmers sign a contract with a major food company to deliver precisely grown farm products on a pre-set schedule”. For farmers in the USA, continued industrialization of the food system will mean that a much smaller number of producers will articulate with a small number of processors in a highly integrated business alliance. Drabenstott estimates that “40 or fewer chains will control nearly all US pork production in a matter of a few years, and that these chains will engage a *mere fraction* [italics added] of the 100 000 hog farms now scattered across the nation.” In a similar vein, the Chief Executive Officer of Dairy Farms of America (the USA’s largest dairy cooperative), Gary Hanman, recently noted that “We would need only 7468 farms [out of over 100 000 today] with 1000 cows if they produced 20 857 pounds of milk which is the average on the top four milk producing states” (Northeast Dairy Business, 1999, page 11). The consequences are clear: “supply chains

¶ Corresponding author.

§ No senior author. Authors contributed equally.

will locate in relatively few rural communities. And with fewer farmers and fewer suppliers where they do locate, the economic impact will be different from the commodity agriculture of the past” (Drabenstott speech, San Francisco, 8 November 1999).

Large multinational food corporations are increasingly taking on the task of organizing and coordinating the production, processing, and distribution of food. Today, mass-production food processors and distributors along with mass market retailers are becoming dominant fixtures in the US food economy. The degree of concentration has reached the point at which the ten largest US-based multinational corporations control almost 60% of the food and beverages sold in the United States (Lyson and Raymer, 2000). The sheer size of the multinational food giants also has important consequences for farmers and their farms. “Size brings economic power and this is particularly significant when set against the structure of the farming industry with its large number of relatively small producers. Some of the most dramatic recent changes in agricultural marketing reflect the power of these new markets to extract their requirements from the farming industry” (Hart, 1992, page 176). Large processors and retailers centralize their purchases of farm products. Because they seek large quantities of standardized and uniform products they have considerable power in dictating how and where agricultural production takes place. And in some instances, the corporate reach of the multinational corporations extends inside the farmgate.

Data from the US Census of Agriculture show that corporate farms account for a small but growing share of all farms and a significant and growing share of farm sales. Whereas most corporate farms are family-based organizations, nonfamily corporations are a significant player. Census data show that nonfamily corporations with more than ten stockholders operated 1075 farms in 2002. These farms are unusually large with sales per farm of over \$5 million per year. In comparison, family farm corporations averaged only \$670 000 in sales per year in 2002.

In this paper we examine the impact on communities of state-level public policy attempts to limit, in a number of ways, the corporate penetration of agriculture. Such public policies have been described as ‘anticorporate farming laws’ because they place restrictions, or even prohibitions, on the ability of nonfamily corporations to engage in agricultural production. We situate our research within a broader social science framework that is anchored to the early theoretical and empirical works of C Wright Mills and Melville Ulmer (1946; 1970) and Walter Goldschmidt (1946; 1978), who documented the corrosive effects of corporate capitalism on the social and economic well-being of urban and rural communities. We also describe, and then examine empirically, how some states are establishing anticorporate farming laws in an attempt to mute the negative social and economic consequences of corporate agriculture (see Welsh and Lyson, 2001).

The Goldschmidt hypothesis

In the mid-to-late 1940s a US Senate Special Committee commissioned two reports in order to explore the potential relationship between the concentration of economic power at the community level and the social and economic well-being of local residents and communities.

Mills and Ulmer (1946) studied three matched pairs of small-to-medium-size US cities. Two pairs provided big-business–small-business contrasts, and the third provided an intermediate case. Mills and Ulmer were particularly interested in evaluating the “effects of big and small business on city life”. In the foreword to their report, Senator James E Murray, Chairman of the Special Committee that commissioned the study, noted that “for the first time objective scientific data show that communities in which small businesses predominate have a higher level of civic welfare than comparable communities dominated by big business” (cited in Mills and Ulmer, 1946, page v).

In particular, Mills and Ulmer (1946, pages 1–2) found that small-business communities provided a more balanced economic life than did big-business cities. They also found that levels of social and economic welfare were appreciably higher in small-business cities.

Goldschmidt (1946) focused his comparison on two “communities of large and small farms” in California: Arvin and Dinuba. According to Goldschmidt’s description, Arvin was a community dominated by farms substantially larger than those found in Dinuba, which was a community surrounded by small farms. However, Arvin and Dinuba were similar in other characteristics, including population size, shared value systems, and social customs, and were “part of a common system of agricultural production, best understood as industrialized” (Goldschmidt, 1978, page 393; see also Lyson et al, 2001). Therefore, Goldschmidt believed that a comparison of the relationship between the agricultural structure and the community welfare of the two communities would be informative.

Goldschmidt concluded from his research findings that residents of Arvin realized a lower standard of living and quality of life than did residents in Dinuba—a fact attributable to the difference in the agricultural structure surrounding the two communities. To Goldschmidt, the scale of farming was directly linked with stratification patterns in the two communities (Lobao and Meyer, 2001). In his words: “The reported differences in communities may properly be assigned confidently and overwhelmingly to the scale of farming factor” (Goldschmidt, 1978, page 284; Lyson et al, 2001).

Analysts in the Goldschmidt tradition argue that increasing farm scale coupled with a decrease in the number of farms has the potential to negatively impact communities through a number of mechanisms. The primary vehicles for negative impacts are the concentrated control of critical productive assets and the selling of labor by substantial numbers of workers in order to subsist, as opposed to running their own small farming operations. Communities dominated by large numbers of small-to-moderate-size farms manifest broad-based control over productive assets and an increased economic independence of their citizens. The latter situation results in dispersed political power and an increased well-being of community residents (see Goldschmidt 1946; 1978; Lobao, 1990; and Lyson et al, 2001).

Linda Lobao and Katherine Meyer (2001) find that research in the Goldschmidt tradition can be separated into three generations, with the first generation being the original study. The original study’s findings were very controversial and led to the closing of the Bureau of Economic Analysis of the US Department of Agriculture (USDA). This backlash explains why the second generation of Goldschmidt studies did not develop until years later in the 1970s. These studies picked up the original arguments and attempted to discern, usually through quantitative methods, whether farm scale and community welfare were negatively or positively associated (Buttel et al, 1990). This cohort of research was criticized for, among other things, not containing sufficient control variables and this led to a third generation of quantitative models that were more completely specified (Lobao and Meyer, 2001).

Thomas Lyson et al (2001) recently altered the traditional approach to understanding the relationship between farm scale and community welfare. They argued that although negative relationships can be discerned between the increasing dominance of large-scale farming and rural community welfare, the relationship can be mediated by the presence of a “civically-engaged and economically independent middle-class”. By taking account of variables such as voting rates, church attendance, and the percentage of self-employed, Lyson et al were often able to reduce the negative impacts of large-scale farming variables on measures of rural community welfare. In addition, the civic engagement variables, which tended to be more reliable and stronger predictors

of positive rural community welfare than the large-scale farming variables that tended to have negative associations with community welfare.

However, Lyson et al (2001) did not specify any intervening mechanism that might account for the moderating influence of an engaged citizenry. Nor did they consider the extent to which groups of farmers and their allies may take measures, such as developing and implementing public policy, to impede or mitigate potential negative outcomes from the overarching structural shift to fewer, larger farming operations. And farmers and farmer groups have a history of organizing to petition national and sub-national governments around a number of issues including perceived threats from structural shifts toward large-scale and corporate-oriented agriculture (Mooney and Hunt, 1996; Welsh, 1997a). State anticorporate farming laws constitute one public-policy intervention that might reflect the outcome of the efforts of a citizenry concerned about the potential negative impacts of structural change in US agriculture on rural communities.

Anticorporate farming laws

Nine Midwestern states have adopted laws that restrict corporate involvement in agriculture. The nine states are Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Wisconsin (Pedersen and Meyer, 1995). The laws were put into place between 1974 and 1975 for all states but Nebraska. Nebraska's constitutional amendment (Initiative 300 or I-300) restricting corporate agriculture was put into place in 1982. The laws, called anticorporate farming laws, vary from state to state but in general are intended to restrict corporate involvement in agriculture in order to protect family-farm agriculture (Powers, 1993; Welsh et al, 2001). For example, Minnesota's anticorporate farming law specifically states that it is in the interests of the state to promote and protect:

“the family farm as a basic economic unit, to insure it as the most socially desirable mode of agricultural production, and to enhance and promote the stability and well-being of rural society in Minnesota and the nuclear family.” (Welsh, 1997b, page 9).

Anticorporate farming laws are not necessarily intended to slow down or impede many of the changes occurring in US agriculture. For example, the laws do not address issues concerning hired labor or the increasing scale of the farming units in general. Rather, the laws are designed to regulate or proscribe the entry of particular types of organizational forms based on ownership arrangements, most commonly nonfamily corporations, into production agriculture. This is accomplished through actions such as restrictions or regulations on ownership of farmland or downward vertical integration of livestock processing with production (Welsh, 1998). The principal idea here is that unincorporated farming units might find it difficult to compete with incorporated farming units because the latter enjoy liability advantages and possibly enjoy advantages in other areas such as acquiring financing and paying taxes (Welsh, 1998).

Primarily, anticorporate farming laws restrict corporations and other investment-type organizations from engaging in farming. The restrictions are generally applied to nonfamily corporations and limited partnerships (Pedersen and Meyer, 1995). Family corporations are often exempted from the laws if they have certain characteristics. These characteristics might include a maximum number of unrelated (that is, nonkindred) shareholders or the presence of at least one shareholder living and working on the farm (Pedersen and Meyer, 1995). Additionally, family-farm corporations might have to earn a minimum percentage of their gross income from farming in order to be permitted to engage in farming (Welsh, 1998). If a farm is the type of corporation that is not proscribed, or is not a scrutinized entity (for example, general partnership, sole proprietorship), then there are no restrictions placed on the farm (Pedersen and Meyer, 1995).

If a business is not authorized to engage in farming then a number of restrictions can apply. For example, there may be restrictions on the amount of farmland that can be owned (Dahl, 1991). In addition, other activities could be restricted under the laws. For example, Iowa's anticorporate farming law bans packer feeding of livestock (Hamilton, 1995). Generally the laws limit the flexibility of corporations to vertically integrate and expand operations. The laws may even limit the ability of nonfamily corporations to coordinate production and processing through contract production, though this constraint is uneven across states and commodity systems and is highly contested (Hamilton, 1995; Pedersen and Meyer, 1995). The intent of the laws is to discourage the development of a nonfamily-based corporate agriculture and to retain an agricultural industry that is dominated by family-owned, family-operated and family-controlled production units.

However, over time there have been efforts to relax or rescind the laws (see Hamilton, 1995; Pedersen and Meyer, 1995; Powers, 1993). Structural change in US agriculture, especially livestock agriculture, has brought with it pressure to allow more flexibility for agribusiness firms in Midwestern states to move toward greater integration and coordination between agriculture production operations and firms in the processing and/or input supply sectors. The poultry industry has led the way in establishing these arrangements (Thu and Durrenberger, 1998). Efforts to convince the legislatures, or the citizens, of states with anticorporate farming laws to relax such laws have often been met with resistance by individuals and groups (Welsh, 1998). Because of these conflicting interests and desires, the outcome of efforts either to relax the laws or to strengthen them has been mixed. In 1991 Oklahoma clarified its laws in order to allow corporations to have more flexibility. Missouri exempted three counties from its law in 1993 and Kansas allowed for county exemptions to its law beginning in 1995. On the other hand, South Dakota strengthened its law in 1988 (Hamilton, 1995) and again in 1998 through popular referendum (WORC, 1998). Welsh et al (2001) have demonstrated that making changes in the laws can influence outcomes such as changes in the percentage of acres owned by nonfamily-farm corporations.

What is apparent from the various efforts to change the laws is that those parties in favor of, and those who are opposed to, corporate involvement in agriculture believe that the laws have some relevant impacts. Otherwise it would not be a rational action either to oppose or to support the laws. In addition, it is clear from the complexity of the laws, and from the detail in which those entities to be regulated or proscribed are defined and described, that they are constructed carefully and with a great degree of purpose. Incorporation is allowed but only under certain conditions. Likewise, absentee ownership is permitted but limited. The architects of the laws have attempted to allow economic flexibility on the part of firms to grow and expand, but have attempted to limit the degree to which production agriculture departs from the family-farm model (Welsh, 1998).

The mere existence of laws that prohibit nonfamily corporate participation in a central and important economic activity is probably surprising to sociologists not familiar with agriculture. However, the existence of these laws can be explained by several factors. The anticorporate farming zone comprises states that have traditionally depended on agriculture as a major source of economic activity. Also, aspects peculiar to agriculture have historically impeded the ability of investor-held corporations to enter into agricultural production. These aspects have included: barriers to capital to make sufficient returns on investment in agriculture as a result of seasonality and other biological barriers; farm family members providing a knowledgeable and productive workforce; and family farms providing a legitimization function for the industry with respect to optimizing state subsidies to agriculture (Lobao and Meyer, 2001,

pages 110–111). These factors, combined with a persistent agrarian ideology which insists that household-based production is preferable to corporate production (Mooney and Hunt, 1996; Welsh, 1997a), help to explain the persistence of household-based production in agriculture long after it disappeared in other sectors (Buttel et al, 1990). Such factors also explain the presence of a constituency for the establishment of public policy that shields family-farm agriculture from corporate penetration.

The laws do not proscribe large-scale farming. Rather, they establish parameters within which farms of all sizes operate. By restricting nonfamily corporations from entering production agriculture, and by regulating absentee ownership and shareholder arrangements, the laws attempt to keep control over decisionmaking at the farm level. Farm owners and operators are more likely to be the same people if the farm is family owned, if the numbers of nonfamily shareholders are limited, and if those shareholders tend to be present on the farm. With these restrictions, large-scale farming may be less detrimental to rural communities.

Data and analysis

We examine agriculture-dependent counties (compare Cook and Mizer, 1995), which we define on the basis of two criteria: first, at least 75% of the total land in a county must have been farmland in 1982 and 1992; second, at least 50% of total gross receipts for goods and services in the county must have originated from agricultural sales in 1982 and 1992. These measures were derived from the 1982 and 1992 Censuses of Agriculture and from variables contained in the 1982 and 1992 Economic Censuses.⁽¹⁾ There are 433 counties that fit these criteria (see Lyson et al, 2001). Of the 433 counties, 292 are in states with anticorporate farming laws.

In addition, we use data from the 1982 and 1992 Censuses of Agriculture to construct a measure of large-scale, absentee-owned farming in a county. For 1982 we combine the following three variables: (1) the percentage of agricultural sales in a county accounted for by farms with sales of \$500 000 or more; (2) the percentage of farm operators in a county that reside off-farm; and (3) the percentage of tenant farms in a county. A principal-components analysis shows that the three variables together form one factor that accounts for over 50% of the variance, with an eigenvalue of 1.51. Eigenvalues of greater than 1.0 indicate that a factor is statistically significant (table 1).

For the 1992 cross-sectional analysis, we use the same three variables, but add a fourth variable (not available in the 1982 Census of Agriculture) that taps the percentage of hired farm labor (with respect to all hired farm labor) on the largest farms in the county. This variable adds a labor-intensity component to the factor scale. The factor accounts for 52.35% of the variance and has an eigenvalue of 2.1. For both scales, a high factor score is associated with counties characterized by large-scale, industrial-like farm operations, whereas a low factor score is associated with counties in which smaller-scale, family-type farms predominate (Lyson et al, 2001). We chose these variables in order to construct an index that reflects the rhetoric of family-farm advocates. That is, individuals and groups that are likely to favor anticorporate farming laws and family-based agriculture, are also likely to hold Jeffersonian ideals regarding the primacy of small-to-moderate-sized family-owned and family-operated farms (see Hamilton, 1996; Welsh, 1998).

⁽¹⁾ The USDA has constructed a typology of US counties in which 'farming dependent' is one type. The USDA defines farming-dependent counties as nonmetropolitan counties in which farming contributed a weighted annual average of 20% or more of the total labor force and population income over the three years from 1987 to 1989. Because farm-related incomes are generally low, we felt that a better measure of agricultural dependency should focus more on the economic and geographic scope of the farming enterprise and not on the income which farming generates.

Table 1. Indices of large-scale agriculture [source: US Census of Agriculture (Census Bureau)].

Large scale agriculture variables	Factor loading (1990/1992)	Factor loading (1980/1982)
Farms with sales over \$500,000 share of total sales (%)	0.751	0.768
Operators residing off farm (%)	0.722	0.772
Tenant farms as a percentage of all farms	0.636	0.632
Hired labor on largest farms as a percentage of all hired labor	0.777	na
Eigenvalue	2.1	1.585
Percentage of variance	52.350	52.80

na—not available.

To probe for differences between large-farm and small-farm communities, Goldschmidt identified a variety of measures of socioeconomic welfare, including income distribution, housing conditions, and a general-level-of-living index. To measure rural community welfare we use two frequently employed measures that reflect aspects of community economic health (Horn, 1993; OECD, 1997), and a third variable that measures overall farm economic performance in a county. The community economic health measures relate to years (circa) 1980 and (circa) 1990 and come from machine-readable data files—County Statistics File 4 (US Bureau of the Census, 1992). The two measures are (1) the percentage of families in poverty; and, (2) the unemployment rate (three-year average).⁽²⁾ The farm economic performance variable is the percentage of farms reporting cash gains in the county, and is derived from the Census of Agriculture for 1992 (see Lyson et al, 2001).

Our analysis differs from Goldschmidt's in a number of important ways. For example, Goldschmidt reported differences in mean percentages or absolute levels in order to discern the impacts of farm scale on community welfare. However, we attempt to parallel Lobao (1990) and use both cross-sectional and lagged-panel linear regression analyses.

The *cross-sectional analyses* regress the set of community welfare variables circa 1990 on a measure of farm scale derived from the 1992 Census of Agriculture, anticorporate farming law variables and important control variables, taken from the Census of Agriculture and the US Census.

In a *lagged-panel design*, independent variables are measured at an earlier time than are the dependent measures. Additionally, lagged-panel models also include dependent variables measured at an earlier time as explanatory variables. The inclusion of a lagged-panel design in conjunction with a cross-sectional analysis is more rigorous than cross-sectional analysis alone because lagged-panel analysis provides an assessment of the effects of farm scale and anticorporate farming laws on *changes* in community welfare over time. For the lagged-panel analyses, we use dependent variables from the 1990 cross-sectional analyses and regress them on independent measures circa 1980 (see Lyson et al, 2001).

To assess the impact of the anticorporate farming laws we construct a binary variable which denotes whether a county is within a state with an anticorporate farming law (1 = anticorporate state; 0 = otherwise). In addition, a number of control variables are included to account for other possible factors influencing the community

⁽²⁾ The three-year averages for this and subsequent variables concern the years 1991, 1992, and 1993 for the cross-sectional and lagged-panel dependent variables and years 1981, 1982, and 1983 for the lagged-panel regressors.

Table 2. Sources of dependent and control variables.

	Source
<i>(a) Dependent variables</i>	
Percentage of family poverty	Census
Percentage of unemployed (three-year average)	Bureau of Labor Statistics ^a
Percentage of farms with cash gains	Census of Agriculture ^b
<i>(b) Control variables</i>	
Personal income (\$)	Census ^a
Percentage of college graduates	Census ^a
Percentage of ethnic group	Census ^a
Percentage of state workforce unionized	Statistical Abstract of the United States
Percentage of farms of all types	Census of Agriculture ^b
Region	US Department of Agriculture/Economic Research Service

^a US Bureau of the Census (1992).

^b US Bureau of Census (1984; 1994).

welfare variables. All control variables are measured at the county level unless otherwise indicated. The control variables included in the analysis are the percentage of the population that are college educated; the mean personal income; the natural logarithm of the percentage of the population that are Native Americans; the natural logarithm of the percentage of the population that are Black Americans; the percentage of the state workforce that is unionized; and the agricultural region. The sources both of the dependent and control variables used are provided in table 2.

The natural logarithms of several independent variables are calculated to correct for skewness in the data. Control variables are included in an attempt to isolate the effects of the variables of interest: in this case the farm-scale variable and the anti-corporate-farming-law variable. Controls are included that may potentially influence both poverty and unemployment rates at the county level and the percentage of farms earning cash gains. For example, it is often found that Native American and Black American populations endure higher poverty rates and higher unemployment rates than other groups. Therefore, controlling for these variables adds confidence that it is the impact of the laws that has been measured and not other influences that might be contained within states with anticorporate farming laws.

Regarding the 'agricultural region', the Economic Research Service of the US Department of Agriculture has developed county-level region variables. These regional variables have been developed to identify "areas with similar types of farms intersected with areas of similar physiographic, soil, and climatic traits, as reflected in USDA's Land Resource Regions" (Economic Research Service, 2000). We control for two regions: (1) the 'Heartland' region, which primarily consists of the 'corn belt'; and, (2) the 'Prairie Gateway' region, which primarily comprises Texas, Oklahoma, and Nebraska. Controlling for agricultural region is necessary for studies that investigate outcomes related to agricultural structure. And by taking account of agricultural region, we can have more confidence that we are measuring the effects of the laws within the states rather than merely measuring regional impacts. In addition, by considering the percentage of the state workforce that is unionized, we not only account for a potential important predictor of the dependent variables, but we also partially control for other state-level effects. Again this gives us more confidence that the effects are a result of the anticorporate farming laws and are not consequences of other state and regional effects.

We use structural equation modeling that incorporates both measurement and structural models (see Lyson et al, 2001). The latent variable representing the farm-scale factor (table 1) represents the measurement models. Standardized regression coefficients are reported from maximum likelihood estimation (Arbuckle and Wothke, 1999). The normed fit index assesses how well the model fits the data. Scores range from zero (no fit) to unity (perfect fit), with an acceptable fit generally being a score above 0.90 (Bentler and Bonnett, 1980). Structural equation modeling is an appropriate technique to use for studies that attempt to describe outcomes such as 'community welfare' through proxy variables. Taking into account the potential for multiple paths of association and for relationships between independent variables is an approach which can probably be recommended for investigating how rural communities fare under particular social and economic relationships through necessarily partial measures.

For both the cross-sectional and lagged-panel analyses, we construct three models. The first model includes all variables *except* the anticorporate-farming dummy variable. The second model adds this dummy variable but deletes the industrial-farming latent variable. The third is the full model that incorporates all variables. In this way we can discern the initial relationship between the large-scale farming variable and rural community welfare. We can then measure the association between anticorporate farming laws and rural community welfare, and discover if adding the anticorporate dummy influences the initial relationship between farm scale and rural community welfare.

Results

We turn first to family poverty (table 3). In model A the farm-scale variable is positive and statistically significant and in model B the anticorporate-state binary variable is negative and significant. In the full model, model C, the farm-scale variable remains positive, but is substantially reduced in magnitude. The coefficient of the anticorporate dummy variable is slightly reduced in magnitude. The same relationships are evident in the lagged-panel analyses (models D, E, and F). The results indicate that large-scale

Table 3. Standardized coefficients for the regression of family poverty on farm scale, anticorporate-farming binary variable, and control variables using cross-sectional and lagged-panel analyses.

Explanatory variables	Cross-sectional analysis (1990)			Lagged-panel analysis (1980–90)		
	A	B	C	D	E	F
Anticorporate state	–	–0.219†	–0.180†	–	–0.111†	–0.103†
Farm scale	0.253†	–	0.096*	0.131**	–	0.051
Family poverty 1979				0.771†	0.756†	0.753†
Personal income	–0.639†	–0.645†	–0.645†	0.019	0.020	0.012
Percentage of college graduates	–0.034	0.000	–0.006	–0.012	–0.005	–0.008
Ln (percentage of Native Americans)	0.216†	0.187†	0.202†	0.223†	0.216†	0.218†
Ln (percentage of Black Americans)	0.140†	0.143†	0.123†	0.120***	0.133†	0.121†
Percentage of workforce unionized	0.008	–0.103†	–0.075**	0.089***	0.034	0.047
Heartland region	–0.088**	–0.058*	–0.053*	–0.077**	–0.058**	–0.058*
Prairie Gateway region	–0.154†	–0.071**	–0.106***	–0.048	–0.007	–0.024
Normed fit index	0.969	0.984	0.960	0.983	0.986	0.982

* Significant at $p < 0.10$; ** significant at $p < 0.05$; *** significant at $p < 0.01$, † significant at $p < 0.001$.

farming is associated with higher poverty levels in farming-dependent counties; and that farming-dependent counties in states with anticorporate farming laws have lower relative poverty levels than farming-dependent counties in states that do not have anticorporate farming laws. But the results also suggest that large-scale farming in states with anticorporate farming laws has much less of an impact on county-level poverty than in states without such laws. The anticorporate farming law seems to mitigate the negative impact of large-scale farming.

A similar set of results is obtained regarding the percentage of farms earning cash gains (table 4). However, in this case the farm-scale variable actually changes signs after the anticorporate dummy variable is added to the full model (models C and F). The initial effect of large farm scale is negative. However, it becomes positive after taking into account whether or not a county is located in a state with an anticorporate farming law. In both the cross-sectional and lagged-panel analyses the farm-scale variable is not significant.

Table 4. Standardized coefficients for the regression of the percentage of farms earning cash gains on farm scale, anticorporate-farming binary variable, and control variables using cross-sectional and lagged-panel analyses.

Explanatory variables	Cross-sectional analysis (1990)			Lagged-panel analysis (1980–90)		
	A	B	C	D	E	F
Anticorporate state	–	0.249†	0.270†	–	0.211†	0.244†
Farm scale	–0.123	–	0.065	–0.010	–	0.131
Percentage of farms earning cash gains 1987 ^a				0.381†	0.363†	0.363†
Personal income	–0.010	0.003	0.003	0.023	0.039	0.022
Percentage of college graduates	0.043	0.009	0.005	0.008	0.007	0.000
Ln (percentage of Native Americans)	–0.117**	–0.117**	–0.099**	–0.038	–0.053	–0.032
Ln (percentage of Black Americans)	–0.101*	–0.060	–0.071	–0.094	–0.021	–0.065
Percentage of workforce unionized	–0.082	0.024	0.042	–0.012	0.036	0.068
Heartland region	0.168***	0.117**	0.117**	0.042	–0.005	–0.002
Prairie Gateway region	–0.218†	–0.252†	–0.269†	–0.228†	–0.237†	–0.272†
Normed fit index	0.972	0.985	0.973	0.979	0.987	0.980

^a Cash gains data are not available before 1987.

* Significant at $p < 0.10$; ** significant at $p < 0.05$; *** significant at $p < 0.01$, † significant at $p < 0.001$.

Concerning unemployment (table 5), the same patterns are repeated. Farm scale is associated with higher unemployment, but the anticorporate variable seems to mediate this relationship. In the cross-sectional analysis (models A, B, and C), the size of the farm-scale effect is reduced in the full model. In the lagged-panel analysis (models D, E, and F), the sign on the farm-scale variable is again changed after adding the anticorporate variable. This suggests an interactive effect between anticorporate farming laws and large-scale farming. Anticorporate farming laws seem to mitigate negative impacts on farming-dependent communities from large-scale farming.

Table 5. Standardized coefficients for the regression of the percentage of unemployed on farm scale, anticorporate-farming binary variable, and control variables using cross-sectional and lagged-panel analyses.

Explanatory variables	Cross-sectional analysis (1990)			Lagged-panel analysis (1980–90)		
	A	B	C	D	E	F
Anticorporate state	–	–0.295†	–0.198†	–	–0.173†	–0.095†
Farm scale	0.430†	–	0.250***	0.433†	–	–0.310†
Percentage of unemployed 1980				0.571†	0.592†	0.581†
Personal income	–0.231†	–0.245†	–0.237†	–0.116***	–0.54*	–0.98***
Percentage of college graduates	–0.259†	–0.208†	–0.226†	–0.138†	–0.100†	–0.128†
Ln (percentage of Native Americans)	0.305†	0.257†	0.282†	0.252†	0.184†	0.221†
Ln (percentage of Black Americans)	0.224†	0.274†	0.223†	0.044	0.172†	0.075
Percentage of workforce unionized	0.387†	0.210†	0.291†	0.212†	0.091**	0.178†
Heartland region	0.045	0.065	0.076*	–0.089**	–0.082**	–0.071*
Prairie Gateway region	–0.220†	–0.076*	–0.165***	–0.128**	0.027	–0.076
Normed fit index	0.970	0.983	0.971	0.971	0.984	0.981

* Significant at $p < 0.10$; ** significant at $p < 0.05$; *** significant at $p < 0.01$, † significant at $p < 0.001$.

Discussion and conclusions

It is critical that we recognize and address the fact that control of today's food system rests primarily with powerful and highly concentrated economic interests, and not with local communities or even government (Heffernan, 1999; Lyson and Raymer, 2000). Corporate interests are likely to continue to influence the food system in the direction of increased economic globalization. However, states have many tools which can be used to prevent corporate interests from gaining complete control of the food system from plow to plate. And, as we have demonstrated here, there are important social and economic reasons to do so.

The Goldschmidt hypothesis maintains that large-scale, industrial farming has negative effects on rural communities. Although our findings support this assertion in some respects, they also indicate that a large farm scale is not inherently negative for rural communities. Rather, the impact often depends on the public policy environment. That is, the primary concern regarding agriculture structure and rural community welfare is not farm scale, but rather, it is corporate integration and coordination of farming with food manufacturing. The authors of anticorporate farming laws appear to have realized this because the focus of the laws is on limiting the reach of nonfamily corporations into agricultural production (for example, banning packer feeding of livestock). Regarding their effect, we find that the laws are likely to have been beneficial to rural communities. Agriculture-dependent counties in states that restrict or regulate corporate agriculture are more likely to score higher on the measures of community well-being than are states without such laws. In addition, the laws seem to mirror the effects of the "civically-engaged and economically independent middle-class" of Lyson et al (2001). That is, the laws act as mediators for farm scale and mitigate potential negative impacts of large-scale farming on rural communities. It may be that such laws

are intervening mechanisms that enable the beneficial impacts of a civically engaged and economically independent middle class.

There are of course other models for regulating industrial agriculture, and for providing sheltering institutions for less industrialized forms of agricultural production (Castle, 1998). However, for US agriculture, anticorporate farming laws appear to have had the beneficial impacts that their authors and proponents intended. Our findings should provide starting points for public policy development and debate concerning the realization of widespread and sustainable benefits from US agriculture.

Another important question to be answered with future data is the impact that changes in the laws have had on the community health indicators we investigated. Our analysis is historical in that we have only been able to consider data from circa 1980 and circa 1990. Throughout the 1990s the laws have been altered and more recent Census data should reveal the impacts of those changes.

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