

Farm size relationships, with an emphasis on California: a summary report

Increasing farm size and decreasing farm numbers have caused concern about the seemingly ever-growing concentration of agriculture's resources in fewer and fewer hands. The marketing system for inputs and products, government programs, and even publicly supported research are alleged to be geared to favor large producers. Escalating land prices and heavy capital requirements have raised substantial economic barriers to entry. Some contend that such structural changes have adversely affected rural communities, which are losing farm people, small-town businesses, and services.

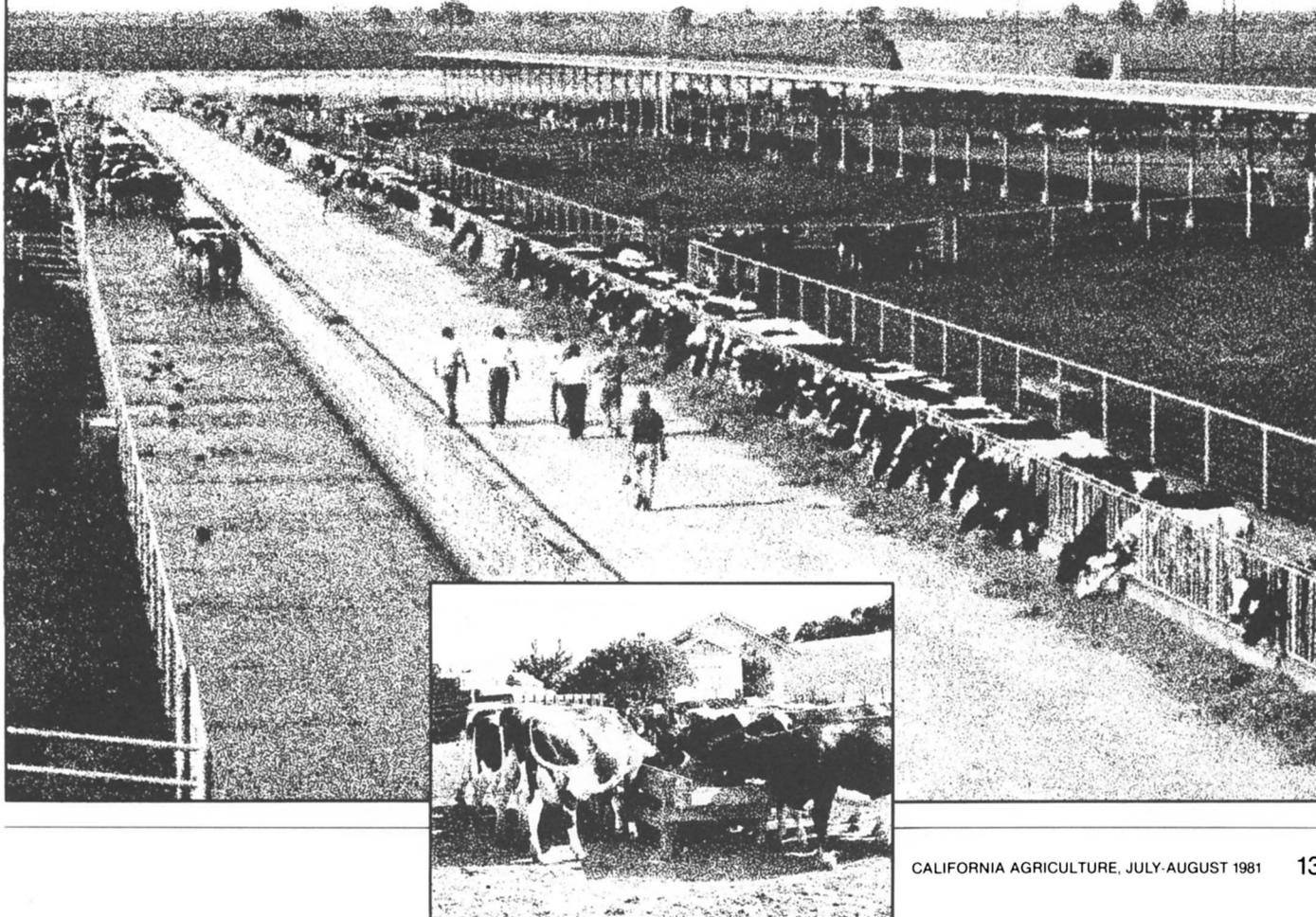
Others have noted that American agricultural production is unrivaled in efficiency and productivity. American consumers benefit from the nation's consistently abundant agricultural production in low food costs. Furthermore, agricultural commodities have become an increasingly important part of this nation's international trade.

A report on farm size, with particular reference to California, was recently completed by a group of researchers in the Department of Agricultural Economics, University of California, Davis. The group considered the topic in the broadest context,

not just as a traditional agricultural production problem. The report reviews what is known about the diverse forces affecting farm size and identifies areas needing further research. Subsequent reports will deal with specific research problems identified. Since the farm-size issue is of paramount importance in the United States and in California, this issue of *California Agriculture* highlights the findings of the Davis group. The full report is published as a Special Project report by the Giannini Foundation of Agricultural Economics. Copies may be ordered through the Giannini Foundation, 207 Giannini Hall, Berkeley, California 94720.

*Harold O. Carter and Warren E. Johnston
Principal Investigators*

Contributors include the following members of the Department of Agricultural Economics, University of California, Davis; Hoy F. Carman, Professor; Harold O. Carter, Professor; Ben C. French, Professor; B. Delworth Gardner, Professor; Warren E. Johnston, Professor; Rulon Pope, formerly Assistant Professor (now with Texas A & M University); Refugio I. Rochin, Associate Professor; and Stephen H. Sosnick, Professor. Carole Frank Nuckton, Research Associate, was the editor.



INTRODUCTION

Although recent attention has focused on increased concentration in farming, the issue of economies of size in farming is not new. The policy focus in the 1950s and 1960s was on agricultural adjustment to achieve a more economic and rational allocation and use of resources, because agriculture was thought to be plagued with persistent low returns. Research was conducted to determine how large farms should be to produce efficiently and earn adequate returns for the resources used. During the same period, cultural, biological, and mechanical innovations, as well as institutional changes, provided ample incentive for the growth of farms with adequate capital and managerial resources and the demise of many others lacking the wherewithal or incentive to continue.

According to the Census of Agriculture, in 1954 there were almost 4.8 million farms in the United States, and the average size was 242 acres; by 1978 there were only 2.4 million farms, with an average size almost twice as large (416 acres). In California, the number of farms fell from 123,075 in 1954 to 81,863 in 1978; the average size increased 100 acres, from 307 acres in 1954 to 407 in 1978.

Acreage per farm, however, is only one indicator of size, especially in California, where soils, water availability, elevation, and type of farming vary greatly from one area to another. Cost curve differences for several types of California farms are shown in figure 1, where farm size is measured by volume of farm sales on the horizontal axis.

Over the past two decades, University of California researchers have examined technical economies of scale for several regions and types of farms. With few exceptions, these studies have concentrated on the interaction of machinery technology, farm size, and production costs, based on actual farm data. Seven studies were of farms with different types of crops, at different times, and using different methodologies. To make them comparable, acreage, gross revenue, and the lowest cost-revenue ratio attained for each representative farm size were abstracted from each study. Figure 2 shows the minimum cost-revenue ratios for each representative farm size *relative* to the lowest ratio attained in the specific study. Besides illustrating economies of size found in the studies, the figure shows the variation in representative farm sizes and the range of sizes studied.

Three studies estimated economies of scale attainable in animal

production: (1) in 1963, nonfeed costs of cattle feedlots and the effect of feedlot capacity and utilization on daily costs per head were examined; (2) in 1968, the optimum combination of inputs was put together for specified capacities in turkey production plants; and (3) in 1977, economies of size were analyzed as part of a study of large-scale dairies in the Chino basin east of Los Angeles. Again, all three studies exhibited significant cost reductions as farm size increased—at least up to or beyond the medium-size operation.

The common element among all these studies is the importance of technical economies of size that result when investments for machinery and equipment are spread over increasingly large farm operations. Significant reductions in cost per dollar of revenue, arising mainly from technical economies, were reported for medium-size when compared with small farms. Most of the studies also reported that larger farms did not enjoy substantially lower unit costs than medium-size farms. Thus, cost-revenue ratios usually fell sharply over the first one or two smallest sizes and then leveled off.

This pattern suggests that technical economies of scale are not the only cost effect influencing farm size. Economies in acquiring the factors of production, such as the quantity discount offered to large purchasers, also are important.

Many forces besides costs influence the size of farming units. Indeed, the contemporary farm can be considered an integrated decision-making unit, the components of which relate to technology, government and institutions, internal organization and management, risk, product and factor market structure, as well as social and environmental factors (fig. 3).

The scale of farm organization, in turn, affects the rural community and the environment in ways not entirely understood. In this summary report, we explore several of the forces related to farm size.

RISK ENVIRONMENT AND SCALE OF FARMING

Farming activities are fraught with risk and uncertainty. Yield-fertilizer relationships vary with the weather. New sources of factor inputs or changing knowledge of their use contributes to uncertainty. Input costs and availability of energy, labor, and irrigation water can cause considerable concern. Prices of farm products are another obvious uncertainty, as is access to markets. Obtaining adequate

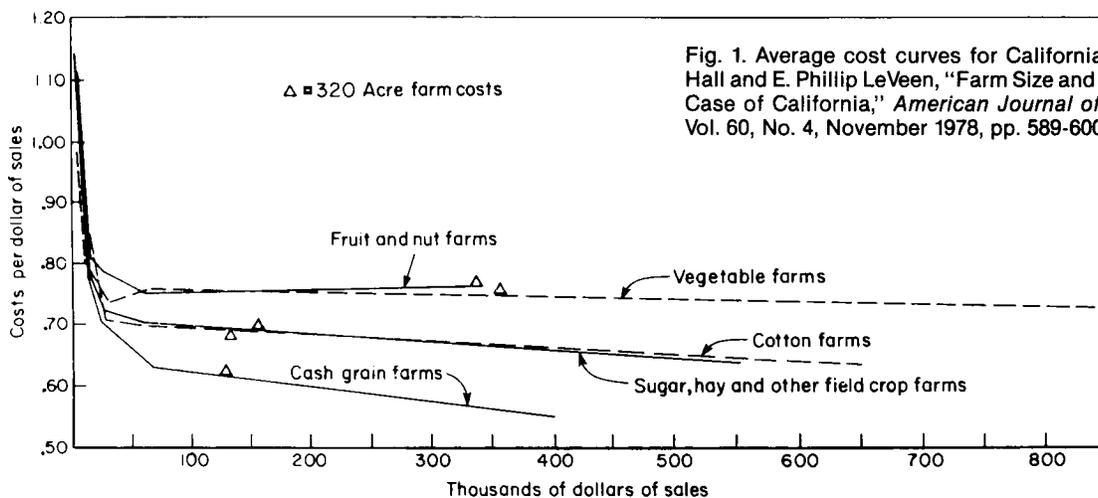


Fig. 1. Average cost curves for California farms. Source: Bruce F. Hall and E. Phillip LeVeen, "Farm Size and Economic Efficiency: The Case of California," *American Journal of Agricultural Economics*, Vol. 60, No. 4, November 1978, pp. 589-600.

credit and being able to repay loans are by no means assured. Government policies affecting price, income, regulation, and trade do not always provide the security intended. Farmers must make long-term investments in perennial crops, machinery and equipment, or even in farmland in the face of these and other uncertainties.

Small farmers are said to be less vulnerable to risk in that they will "stick it out" longer than large farmers in adverse years. Small

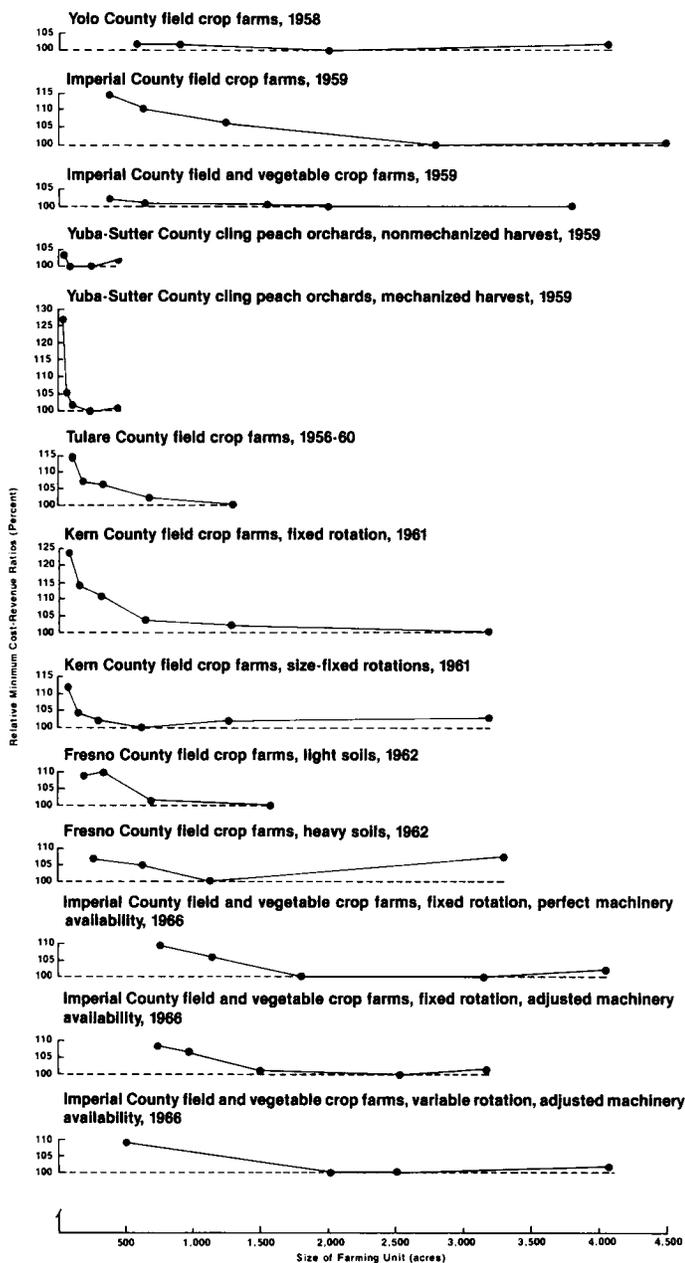


Fig. 2. Relative minimum cost-revenue ratios of representative farm sizes in studies of California crop production. "Fixed rotation" means that the same crop mix was assumed for all farm sizes under study; "size-fixed rotations" means that crop mix differs among farm sizes but is constant throughout for the same farm size; "variable rotation" means that crop mix was permitted to vary, subject only to resource constraints.

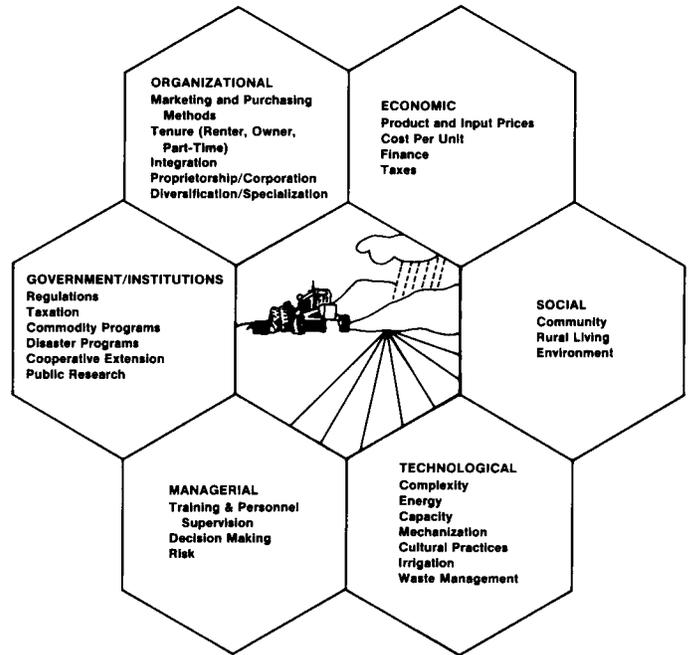


Fig. 3. Representative factors affecting farm-size relationships.

farmers have proportionately larger fixed payments from which they cannot escape but are willing to take a lower return for their own labor, management, and capital in unfavorable years. This attribute—small farmers' "staying power"—is thought to provide an important buffer for the nation's food and fiber supplies in hard times.

Some studies have found that variability in net farm income increases with farm size. The largest farms have an opportunity for higher levels of income but also are more likely to suffer heavy losses.

It has not been determined empirically whether risk is greater for large or small farms: it depends partly on what is meant by risk. It is clear, however, that optimum size for a particular type of operation may be affected whenever outside forces alter the risks that farmers face. Two such forces are governmental commodity and credit policies and the product marketing system.

Government commodity programs

For over four decades, the federal government has attempted to deal with chronic agricultural overproduction and income variability by means of various commodity programs designed to stabilize prices and to put a floor under farm income. It would appear that such an approach has substantially reduced risk to farmers, leading to several possible impacts on the structure of farming.

First, intuitively, it seems likely that stabilized prices would enhance investment in new technologies and would directly stimulate investments in land. Technological improvements may then further reduce risk, encouraging still more expansion. Labor-saving, capital-using technological changes, such as new types of machinery, appear to decrease risk by diminishing harvest vulnerability and reducing production (output) variability.

Second, governmental policies that reduce risk may lead to increased output by encouraging farmers to grow more of the protected commodity. Whether or not this leads to changes in farm size, however, has not been tested. In a multicrop situation, if risk in one crop falls so that output of that crop increases, the scale of the total

operation will not necessarily be increased.

Third, government policies that reduce risk to producers also reduce risk to suppliers, particularly to those lending capital needed for the operation. Financial resources to expand farming operations are thus enhanced. The relation between risk reduction and increased capital to agriculture, however, is complicated so that researchers find it difficult to separate out empirically the precise effects of risk-reducing government policies on suppliers.

Three types of government-supervised lending activities—Federal Land Banks, Federal Intermediate Credit Banks, and Banks for Cooperatives—are important suppliers of capital for agriculture. These three programs are generally competitive with commercial banks, although as user co-ops their interest rates may be lower. The availability of long, intermediate, and short-term credit from these institutions has an uncertain effect on farm size. Barriers to entry are reduced so that new farms can be established on easier terms. On the other hand, credit at lower interest rates facilitates expansion. Farms probably would not have expanded so rapidly had credit for the purchase of land been less readily available. According to the U.S. Department of Agriculture, a growing proportion of farm real estate purchases are made using borrowed funds.

Some people contend that the stabilizing effects of farm programs on price and income have probably benefited all sizes of farms by reducing risk and improving chances for borrowing capital. Thus, while large farms have grown, some smaller farms have also been able to expand to a viable size. Some farmers who otherwise would have dropped out have been able to remain in farming.

Landowners have gained as program benefits became capitalized into land values, but entry to the owner-operator status has become more difficult as land prices have risen. Most farm programs have probably sped adoption of new technology and the rate of increase in farm size. Farm size, however, has also increased rapidly where there have been no direct farm programs, as in livestock and specialty crops. There is limited empirical evidence on the effect of price supports and other government agricultural programs on farm size, particularly in California where federal price and income support policies have had less overall impact than in many other states.

Few government programs are specifically directed to encourage a particular scale of farm, but the net effect has probably been to increase farm size. Admittedly, some programs have been slanted toward benefiting small farmers—setting a maximum limit on government commodity payments, for example, or the 160-acre limitation policy accompanying federal water projects. Such efforts may partially offset forces operating in the other direction.

The direct benefits or costs of most policies affecting agriculture are generally thought to be distributed in proportion to the output of the farm or to the acreage operated. The direct effects, therefore, are likely to be neutral with respect to scale. It is the secondary and often unforeseen impacts that apparently affect farm size configuration. In many cases, little is known about the actual effect of a particular policy, program, or regulation on the structure of agriculture because of the many forces operating simultaneously in the economy. It is fairly clear, however, that farm commodity programs directly reduce risks, thereby indirectly encouraging expansion.

Product marketing system

Several aspects of the marketing system also affect risks. For example, forward contracting is increasing dramatically in some com-

modities. To the extent that such contracts reduce risk, farmers may be induced to expand. Also, the emergence of the futures markets for many commodities should reduce price risk for farmers, but farmers' use of the futures market seems to be limited mainly to producers who already have large operations. Marketing orders and bargaining associations may also reduce farmers' risk by stabilizing prices.

It is important to identify marketing-farming interactions that seem likely to influence the structure of agriculture and, in particular, farm size. The size, number, and location of marketing facilities may affect access to markets, thus constraining the products that may be grown economically. Consumer preferences and technical requirements of food manufacturers may call for specific raw product attributes, leading to changes in farming practices. Marketing regulations and controls may further constrain farmers' choices as to quantities and qualities of some products.

Changes in marketing and processing. New technology and changes in organization are continually altering the system by which agricultural products are assembled, processed, and distributed to consumers. Direct effects include constraints on production choices, but farming operations may also be indirectly affected by changes in size and location of marketing firms.

The technology of assembly—transporting farm products to processing and shipping points—has been altered substantially in recent decades by large-scale bulk handling methods for grains, milk, and many kinds of fruits and vegetables. Such developments, however, seem to place only the very small farm at a competitive disadvantage and even then probably not at a severe one.

Processing includes such activities as packing fresh produce, canning, freezing, bottling, and drying. Processing technology may influence planting schedules, cultural practices, applications of inputs, and harvest schedules. Changes in raw product specifications and the use of substitutes may also affect the geographic location of production and possibly the nature of contractual arrangements with growers. Larger growers, who are better able to assume the risks of innovation than are small operators, may also be more likely to adapt readily to such changes. Extension of this argument would suggest that future developments that require even more exacting raw product specifications may place smaller farms at a further competitive disadvantage. It seems likely, however, that a relatively modest-size farm could benefit from such changes.

Location and size of processing and marketing firms affect farmers' access to markets. Historically, small farm operators have been able to ship products through central markets and to choose among several processors. With the closure of many central markets, increased direct buying by large marketers, and consolidation of processing facilities, many very small farmers may find it increasingly difficult to obtain the same access to markets enjoyed by large operators.

Market access can be a serious problem for small fruit and vegetable producers. Large food retailers need large volumes of uniform-quality produce and prefer increasingly to deal directly with large producers or packing firms. Producers not able to meet volume and quality requirements face a residual market with relatively high marketing costs and correspondingly lower net returns.

Free market conditions for many commodities have been replaced or supplemented by contractual arrangements or by integration

through common ownership of production and marketing facilities. Vertical arrangements have generally been developed in an effort to reduce uncertainty and to provide closer coordination between the requirements of marketing and processing firms and the production decisions of farmers.

Vertical structure seems to have two kinds of influences on farm size. First, as closed-market arrangements increase, the market access problem is exacerbated. Farmers without such vertical ties may find it difficult to survive (or at least to produce the particular commodities affected) unless they are large enough to provide their own marketing services and to take advantage of such institutions as hedging in future markets. Second, the integrative process may favor larger scale farming operations. Although backward integration by marketing firms through ownership of farming enterprises is not widespread, those firms that do so tend to establish large farm units. More commonly, farm production and marketing-processing activities are coordinated by some type of contractual arrangements. Farms using sales contracts have much larger volumes than others, according to the U.S. Department of Agriculture. It is not entirely clear, however, whether contracting tends to result in larger farm size or large farms result in contracting. Probably the influence goes both ways.

Farmer response to changes. Farmer efforts to adapt to changing external economic conditions have resulted in (1) cooperative processing and marketing organizations, (2) the so-called "self-help" market control programs, and (3) bargaining agencies.

To maintain sales outlets, some California producers have formed cooperatives to purchase and operate processing operations. Others have formed marketing cooperatives. The costs of serving small and large farmers, however, are different. Large-volume transactions with large farms may cost less per unit so that if all costs are pooled and assigned to members equally, larger farmers may find themselves subsidizing smaller farmers. Pooling systems that better reflect these cost differences may help maintain the advantage of larger farms, thus promoting farm size expansion. Although cooperatives probably have not been of much help in preserving very small farms, they appear to have been and may continue to be a major force in permitting farms of modest size to survive.

State and federal marketing order programs, which have been applied mainly to milk, fruits, and vegetables, have given farmers greater industry-wide control of the quantity, quality, product characteristics, and rate of flow of products to markets. Also included in some fruit and vegetable programs are product research and generic advertising and promotion. Marketing orders probably have not directly affected industry concentration significantly for either dairy farmers or fruit and vegetable growers, but they may have induced expansion of farm size indirectly by stabilizing prices and reducing risk. On the other hand, to the extent that orders have enhanced prices, they may have permitted less efficient farmers to survive. The net impact of marketing orders on entry of new firms remains uncertain: higher returns and reduced risk may encourage entry while quota requirements discourage it.

Another means by which farmers have sought greater marketing control has been through group efforts to bargain with buyers over terms of sale for their products. Price-enhancement and risk-reducing effects of successful bargaining may encourage farm size expansion but also could help less efficient firms survive and encourage entry of new producers. Just as with cooperatives and

market orders, the net impact of such offsetting forces is uncertain.

Thus, the major changes in the marketing system in recent years have been (1) increased purchases by processors directly from farmers, (2) greater use of contractual arrangements, and (3) the associated decline of terminal markets. These changes have influenced farm size mainly by affecting the access of smaller farms to markets and by making it more difficult for them to function in an increasingly complex coordinating structure.

THE TAX STRUCTURE AND FARM SIZE

Farmers and other taxpayers respond to taxes and changes in tax provisions as they attempt to maximize after-tax income. It is widely recognized that some tax provisions unique to agriculture offer tax planning opportunities. Utilization of these special farm tax provisions for individual financial planning objectives may have long-run implications for the structure of agriculture.

Income taxes

Progressive income taxes and the several special tax provisions granted to agriculture may significantly alter production strategies. Progressive rates, for example, have been shown to lead a farmer who would normally avoid risk to increase output and to shift from lower to higher risk cropping patterns.

The first of the special provisions is the result of a 1915 administrative decision permitting farmers to choose between cash and accrual accounting for reporting income. The choice of cash accounting permits the current deduction of costs associated with production of income in a subsequent tax year. Major agricultural inputs, such as feed, seed, fertilizer, labor, and interest, can be deducted from income at the time the cost is incurred. These costs have been deducted from income even though an inventory existed and, in some cases, where the input was a capital expenditure. Since cash accounting ignores inventories, the farmer can control the tax year in which income is realized through storage of crops and timing of sales. The value of the tax deferral depends on the tax bracket of the farmer or investor and the leverage involved, presumably with the larger operator enjoying the greater tax advantage.

The second provision stems from a 1919 U.S. Treasury regulation allowing farmers to write off expenditures, normally capitalized in other businesses, incurred in the development of orchards and ranches. Thus, although such development costs are of a capital nature—that is, they add to the value of the asset (the orchard or ranch)—they can be deducted from other (ordinary) income the year they are incurred. The costs are subsequently recovered as capital gains when the asset is sold and are then taxed at the lower capital gains rate.

The third, from legislative action in 1951, extended capital gains treatment to livestock held for draft, breeding, or dairy purposes (and, in 1969, livestock held for sporting purposes).

The three provisions form the basis for sheltering ordinary income from taxes via both deferral and conversion to capital gains. Farmers and nonfarm investors can use these provisions to reduce their tax burden, and such actions may influence the structure of agriculture.

Agricultural tax shelter investments

The attraction of nonfarm capital into agriculture as tax shelter investments is one aspect of the structure problem that has received

attention in the media, but data are limited and evidence is circumstantial. U.S. Treasury Department data on individual tax returns reveal that the proportion of returns with farm losses increases with increases in gross income and that taxpayers in the highest income categories have an amazing propensity to lose money farming. Although these data have been used to demonstrate that tax-loss farming is prevalent, the conclusions that one can draw are necessarily limited. The Joint Committee on Internal Revenue Taxation estimated distribution of the \$1 billion subsidy in fiscal 1976 by adjusted gross income class and found that most (two-thirds to four-fifths) of the benefits probably go to ordinary farmers for whom tax shelter considerations are not the primary incentives.

After the Tax Reform Act of 1969, the limited partnership syndicate became the preferred legal form for public offerings of tax shelter investments to nonfarm investors. Large-scale syndicated offerings for cattle feeding, egg production, and vineyard and orchard development grew rapidly in numbers and dollar value in the early 1970s.

Cattle feeding, which offers tax deferral, has been the most popular agricultural tax shelter in both number of participants and total investment. Although tax shelter investments in beef breeding cattle have received considerable publicity and legislative attention, available data indicate that tax-shelter breeding cattle have been a relatively insignificant part of the total beef breeding herd. Cash accounting and capital gains treatment for beef, dairy, and hog breeding operations undoubtedly result in larger herds than would otherwise exist and probably lead to lower farm-level prices for livestock. It is also quite possible that livestock ownership is more dispersed than it would be without the special farm tax provisions.

Tax shelter investments in orchard and vineyard development have been concentrated in particular crops. Citrus and almonds were popular during the 1960s, but the Tax Reform Act of 1969 terminated their tax shelter advantage. Investor interest subsequently shifted to other crops, especially wine grapes, and significant non-farm investment also occurred in development of walnut and pistachio orchards in California.

Development of any perennial crop is based on expected profits over the life of the asset, with after-tax profits depending in part on specific tax provisions. The tax subsidy provided by current deduction of development expenses, treated as a reduction in annual costs, has probably led, therefore, to increased tree plantings in these tax-sheltered crops. Increased plantings, of course, lead ultimately to greater total production, possibly resulting in lower product prices for all—including farmers whose primary interest was not in the tax shelter advantages of the particular crop.

Corporate farms

The legal organization of the farm firm is also heavily dependent on tax laws and provisions. Although farm corporations are only a small proportion of total farms, they are increasingly important in proportion of total sales and land farmed. Recent tax rate changes favoring small corporations can be expected to promote further incorporation of farm firms.

Incorporation of a farm firm is a business decision resulting from careful planning and analysis. Although the corporate form has its disadvantages and costs—for example, time and legal accounting assistance required to organize, operate, and report—its advantages are many. Among them are fringe benefits to employees including

the farm operator, limited liability, extended business life, improvements in estate planning including easier intergenerational transfers of the farm business with savings in estate taxes, ownership security by younger members of the firm, and maintenance of the resource combinations of a growing farm business. Not the least of the advantages is in certain income tax provisions. Subchapter S, a 1958 amendment to the Internal Revenue Code, permits qualifying corporations to shift income, capital gains, and losses directly to the shareholders as is done in partnerships, thus avoiding a double tax at the corporate and shareholder level.

More important in relation to the farm-size issue is Subchapter A of 1954. Under this provision, some or all of the earnings from the farming operation can be retained within the firm, taxed at the corporate tax rate, which is lower than most individual-rate brackets, and then be used to operate the farm—or to expand the operation. Thus, the corporate farmer bidding for a parcel of land to add to his farm has a distinct advantage over another with the same income, but unincorporated.

Recent corporation tax rate changes combined with other corporate advantages will probably substantially increase the number of farm corporations in the United States. The prime candidates for incorporation are the largest farms and those interested in growth. Since many corporate farms will be committed to and will have tax savings to finance expansion, a continued movement toward fewer and larger farms is encouraged.

Estate taxes

Progressive federal estate taxes would seem to fall more heavily on large than on small farm estates. Larger estates, however, may have blunted the progressiveness of estate taxes through better planning for the intergenerational transfer of assets.

The Tax Reform Act of 1976 introduced important differentials between farm and nonfarm estates with two new provisions. The first enables qualifying farmland to be valued at its "use" rather than "fair market" value for estate tax purposes. Since use values of farmland are typically much lower than market values, estate tax liabilities are reduced for qualifying property. The estate tax advantage may encourage older persons to move toward an increased investment in land, possibly outbidding younger farmers for the same parcel.

The second provision allowed estate taxes on the first million dollars of farm property to be paid over a 15-year period with interest amortized at 4 percent. If the deferred tax can then be invested at a higher interest rate, substantial savings on the tax bill can be enjoyed.

The structural impacts of these two special provisions include (1) increased land values as farmers and others attempt to take advantage of tax provisions; (2) reduced availability of farmland, since sales of land receiving the valuation are restricted to other family members for 15 years (sales outside the family within 15 years result in a recapture of the tax savings); and (3) encouragement of absentee ownership of farmland due to the recapture rules.

Property taxes

The burden of property taxes, an important cost to agriculture, has been increasing with rising land values. Further, they may have differential impacts on small (in acreage) and large farms.

The per-acre market value of a small parcel of land is typically

higher than a large parcel of comparable land. Small parcels may be suitable for enlargement of neighboring farms, for rural building sites, or for part-time farming. Since property taxes are *ad valorem*, the small farm would have higher taxes per acre than the large farm, and thus property taxes would be a factor in economies of size. On the other hand, one would expect use-value assessment, such as California's Land Conservation Act (CLCA) of 1965, to yield greater per-acre tax reductions for small parcels of land. Large landowners, however, have more acres to subscribe to CLCA than do small landowners and so receive more total benefits. Also, if small landowners tend to be nearer urban areas, their opportunities for conversion at a profit may discourage their participation in CLCA. It remains to be seen, therefore, whether use-value assessment has actually influenced farm size in California or in other states with similar programs.

It is clear that taxes influence farmers' decision-making and investment behavior. Sufficient quantitative data to estimate the impacts on farm size of changes in some tax provisions will always be a problem, but even more difficult is the separation of tax provision effects

from other factors. Investor motives are important but cannot be fully known to the researcher. Despite the analytical limitations, the relationship between taxation and the structure of agriculture is important and should be considered in the formation of both tax and agricultural policy.

LABOR COSTS AND FARM SIZE

So far, we have investigated both internal and external forces that may contribute to farm expansion. Most studies of economies of scale in farming assume that labor costs per unit of output do not change as scale increases unless production techniques change.

There are at least nine reasons, however, why a farm's labor costs, including those associated with operator, manager, skilled employee, and hired farm labor, per unit of output may change as the size of the farm increases, even though the same production methods are used: (1) the operator spends more time on managerial tasks; (2) the farm uses more supervisory time per hour of supervised time; (3) the farm hires better quality personnel; (4) startup

Effect of Farm Size on Nine Variables Associated with Labor Costs

Variable	If a farm grows, the variable tends to	Until	Because	Hence, expenses per unit of output tend to	Unless	Researchers should study
The proportion of operator time used for management	Rise	The operator is a full-time executive	Owners want control	Fall	Fatigue offsets greater effectiveness	Effect of specialization
Supervisory time per hour of supervised time	Rise	?	Workers' fidelity falls	Rise	Specialists supervise better or supervision has fixed time	Motivation of employees
Optimal quality of complementary employees	Rise	It pays to have only top-quality personnel	Benefits are proportional to size	Fall	Higher salaries offset greater effectiveness	Which effect is stronger
Time spent on profitable tasks per unit of output	Fall	More than one person performs each profitable task	Each person has startup and windup time	Fall	Variable time per unit rises or optimal intensity of tasks falls	Effect of scale on optimal intensity
The proportion of skilled workers' time used for unskilled work	Fall	No employee does work that others would do for less pay	More skilled work is done	Fall	Skilled workers work part time or receive reduced pay	Relation of salaries to work done
Average hourly earnings of employees	Rise	?	Wages rise with ability to pay	Rise	Higher wages elicit better performance	Effect of wage rates on performance and turnover
Expenses of recruiting and managing seasonal workers	Fall	?	Labor contractors or custom operators achieve economies of scale	Fall	Those specialists have a single fee and no farm could do the job itself at lower cost without being punished for mistreating workers	Specialists' fees and treatment of workers
Legal requirements	Rise	Cash wages reach \$20,000 per quarter	Exemptions are lost	Rise	The farm violates the law	Compliance with the law
The probability that a union will seek recognition	Rise	?	Per-member organizing and service costs fall	Rise	The farm is isolated or employs people very briefly	Unions' organizing strategies

and windup time are spread over more units of output; (5) skilled employees spend less time on unskilled work; (6) the farm pays higher wage rates; (7) the farm is less likely to obtain seasonal workers through a labor contractor; (8) legal requirements concerning employee protection become more stringent; and (9) unionization is more likely. As is indicated in the table, some of these factors raise and some lower unit costs, but the span and magnitude of each effect—and the net result—are not yet known.

FARM SIZE AND THE RURAL COMMUNITY

Having looked briefly at some of the forces hypothesized to influence farm size expansion, we now focus on the impacts of increased farm size on rural communities. Indeed, some people attribute deterioration of communities to surrounding large-scale agriculture.

A rural community has been defined as a trade center, relatively densely settled by nonfarm people, surrounded by a hinterland of farm people. There really is no typical rural community in California, however. Central Valley agricultural towns are as different from North Coast communities as they are from Sierra or desert towns. Towns in which agriculture is an important part of the economy vary in size from Fresno (194,800 people in 1978), a hub of agricultural activity, to Imperial (3,240 inhabitants), a place nearly 100 percent dependent on agriculture. Although agriculture is important near some cities, such as San Diego or Santa Barbara, it is unlikely that structural changes taking place in farming have much of an impact on the quality of life there. Other communities, however, might disappear without agriculture.

“Quality of life” in a community is commonly associated with health and education facilities, recreational outlets, such as playgrounds and parks, and cultural attractions, such as theaters, restaurants, and museums. Availability of churches, stores, shops, service clubs, senior citizen organizations, and the like, are also thought to enhance the quality of life in a community. Individuals, however, vary greatly in how they value these services and differ as to the form they consider most desirable. Herein lies the problem for researchers attempting to relate the “immeasurable” quality of community life with a factor like scale or size of farms in the area. Even our perception of quality is constantly changing in response to a variety of external influences and constraints.

Discussions about the relation between farm size and rural community welfare invariably start with Goldschmidt’s 1944 study of two agriculturally dependent rural communities in California—Arvin in Kern County and Dinuba in Tulare County. The two towns were approximately the same size and were equally dependent on agriculture. Although Dinuba was much older, both had existed long enough for the development of social institutions. However, they were surrounded by agricultural operations distinctly different in scale. Analysis of economic and social conditions in the two towns revealed that the small-farm community, Dinuba, supported twice as many businesses, enjoyed a 61 percent greater volume of retail trade, supported 20 percent more people per dollar of agricultural sales, had more public services and organizations, and in several other ways was apparently a “better” place than the large-farm community, Arvin. The conclusion was that these differences rested primarily on the scale of farming on which the economy of each was based.

Several researchers are using various approaches to update Goldschmidt’s findings to test whether they are valid in the 1980s

and apply to places other than Arvin and Dinuba. To date, most results indicate a significant negative correlation between the quality of life in rural communities and the scale of surrounding agriculture, but no causal relationship has been established between the two. The two phenomena may well develop independently from other underlying common or historical factors, such as the source and availability of water and diversity of the community’s tax base.

Thus, Goldschmidt’s study is a fertile source of hypotheses that have yet to be settled by researchers. Further, times have changed since 1944. Improvements in transportation and communication have probably had just as much effect on redistribution of population and the demise of rural villages as have changes in the structure of agriculture. Rural people now have a wider choice of where to shop for goods and services, and the nearest small town may not satisfy their specialized and more sophisticated demands. Intermediate-size regional trade centers have emerged as providers of specialized economic services to the rural population, only 15 percent of which are farm people. These larger rural centers, a link between the metropolis and the countryside, also furnish supplies and product-marketing services for the area’s farmers. Meanwhile, as services in some of the nation’s villages decline, some of these same towns are experiencing unprecedented residential growth as former city dwellers seek the amenities of a rural setting. Thus, changes in rural America and California and in the structure of agriculture are an ongoing dynamic process brought about by many interrelated forces. To single out for analysis one single link—that between farm size and an unquantifiable variable, quality of community life—a cooperative research effort among economists and sociologists would be warranted.

CONCLUSION

One may conclude that the trend toward ever-larger farms has no single explanation. Although considerable evidence exists that there is a significant technical basis for economies of scale in farming, production cost savings tend to level off at medium-size units, with the least-cost point varying widely for different types of farms. Many other influences explain expansion beyond this point: the risk environment, government policies, product and input marketing system, tax structure, and farm labor costs. The difficulty for researchers as well as policy makers is that the various influences are so intertwined and confounded that singling out any one as the cause would be hazardous, indeed. Nevertheless, since the issue of farm size is one of considerable concern, it behooves university researchers to sort among the hypotheses reviewed here and try to establish empirically which are true connections and which are spurious correlations.

Opinions differ on the effects of concentration of American agriculture in fewer hands. Some view it as a threat to the social and economic fabric of the country; others see it as a natural evolution of economic forces in a highly developed economy. Increased efficiency on farms has freed all but 3 percent of our population from growing food and fiber. Yet, if most cost economies can be achieved, say, on farms with gross sales of \$75,000 to \$100,000, why should there be farms with sales of \$500,000 or more? Is the rural community worse off when surrounded by a few large farms than by many smaller ones? Agricultural economists, rural sociologists, and policy makers should continue to wrestle with this question. But we do know that both the causes and effects of changes in agricultural structure go beyond the farm boundary.