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## THE ENTRY-GROWTH-EXIT PROCESSES IN AGRICULTURE\*

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## INTRODUCTION

The recent emphasis in farm management research has centered on issues of financial management and firm growth. Consequently, a number of studies have identified and evaluated alternative production, financial and marketing strategies that result in growth or expansion of the farm firm.<sup>1</sup> These studies have explicitly or implicitly assumed that the firm is a viable economic unit and the ownership structure will not change during the growth process. Thus, the life cycle of the firm has been severed from the typical life cycle of the entrepreneur, and the financial, economic and human problems of entry and exit of farm entrepreneurs into and out of the agricultural production sector have not been confronted. The following discussion will briefly review the characteristics of the life cycle of the family firm and indicate why entry-exit problems are particularly acute in the agricultural production sector. Then, specific micro and macro issues that merit empirical investigation, including the firm and industry implications of coordination (or the lack thereof) of the entry and exit processes, will be identified and discussed.

## THE FAMILY-FIRM LIFE CYCLE

In the agricultural sector which is characterized by the individual entrepreneur rather than the management team, the firm frequently exhibits a life cycle that parallels the life cycle of the entrepreneur.

Thus, the farmer-entrepreneur and his firm will pass through at least three stages during his farming career [15, p. 2]. The first stage of the family-firm life cycle is the entry or establishment stage. In this stage, the entrepreneur evaluates the opportunities in farming compared to other occupational alternatives and determines whether or not to enter the industry. Once this determination is made, the new entrant must acquire the "critical mass" of capital resources and managerial ability which are necessary to establish a viable economic unit that will generate a competitive income and is capable of growth.

The second stage can be identified as the stage of growth and survival.<sup>2</sup> During this stage, the entrepreneur attempts to extend his resource constraints by acquiring the services of additional inputs through purchase or lease. Issues such as new techniques of production, increased labor efficiency, reducing unit costs and expanding sales are major concerns during the growth and survival stage. The capital requirements of the typical farm firm expand rapidly during this stage resulting in continued utilization of debt as well as equity sources of funds. In addition, in many geographic areas such as the Great Plains and the Southwest, a major consideration during this stage is maintaining a debt-equity structure that will guarantee survival of the firm during years of drought and/or low product prices. In the latter stages of growth emphasis may shift from expansion to consolidation of previous gains and stabilization of income [15, p. 3].

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\*Oklahoma State Agricultural Experiment Station Journal Article No. 2633.

<sup>1</sup> See [76, 29, 67, 52, 12, 31, 49, 13, 4, 26, 43, 45, 50, 53, 88].

<sup>2</sup> An alternative term that has been used to identify this stage is expansion and consolidation. Regardless of the nomenclature used, the issues and objectives during this stage are the same. See [15, p. 2].

The third stage in the family-firm life cycle is the exit or disinvestment stage. Two major processes are involved in this stage, the process of retirement and the process of intergeneration transfer of property. During retirement, the entrepreneur attempts to reduce his management responsibilities while maintaining sufficient control of the farm assets to generate adequate retirement income. Simultaneously, estate plans that will implement lifetime or testamentary transfers of farm property and the managerial responsibility associated with that property to the next generation can be developed. Thus, with proper coordination of the exit processes of retiring farmers and the entry process of beginning farmers, the life cycle of the firm can be severed from the typical life cycle of the entrepreneur.

### CHARACTERISTICS OF THE FARM PRODUCTION SECTOR

Five characteristics (among others) of the agricultural production sector make the entry and exit problems particularly severe. First, farm firms have historically attempted to exploit economies of size and new technologies involving large amounts of capital. In 1964, 24,364 farms in the U.S. had a value of land and buildings in excess of \$500,000, while the value of land and buildings on 187,000 farms was in excess of \$150,000.<sup>3</sup> Census figures indicate that over 19% of the commercial farms in Oklahoma were valued in excess of \$150,000 in 1969 [19, p. 106]. The capital requirements of farm firms have exhibited substantial growth since 1950. For example, the average size of the Southern Plains winter wheat farm, as measured by total capital investment, increased from \$58,000 in 1950 to \$110,320 in 1963 [3, p. 32]. Projections indicate that capital requirements of this winter wheat farm will increase to \$194,000 by 1975 [71, p. 16]. With the consistent increase in the market price of land and other input items and the growth in farm size, the growing capital requirements of the viable farm firm will present increasingly complex and costly entry and exit problems for farmers.

Not only are the capital requirements of farm production units increasing over time, these capital inputs are frequently highly illiquid and not readily marketable. Although farm land can usually be rented to another commercial farmer, specialized facilities such as dairy equipment and specialized crop

machinery must frequently be converted to cash at a salvage value that is substantially less than the productive value of the asset. These losses occur because of the limited demand and the specialized management needed to use specialized assets efficiently. Even with readily marketable assets such as real estate and standardized machinery, losses may result from brokerage and selling commissions and capital gains taxes. Brake and Lee estimate that a minimum loss of 15% of the asset value will occur when farm assets are liquidated for retirement purposes [14]. Losses of this magnitude usually do not occur when liquidating the non-farm estate of stocks and marketable securities. Liquidation losses can also be incurred in the process of settling the farm estate. A survey in Iowa indicated that 91% of the estates analyzed did not possess sufficient liquid assets to pay estate settlement costs and death taxes in case of an unexpected death [75]. Thus, the predominance of illiquid assets in the typical farm estate encourages estate planning and the coordination of the entry and exit processes to facilitate the continuation of a viable farm business and avoid the potential of high liquidation losses.

A third characteristic relates to the ownership, control and financing of agricultural assets. Most farm and ranch businesses are organized as sole proprietorships. In addition, the management function and the financial function of farm and ranch firms are usually performed by the owner-entrepreneur. Thus, in contrast to the publicly owned corporation where the management functions and responsibilities are separated from ownership, the farm often disintegrates when the farmer retires or dies because arrangements for succession of competent management and entrepreneurial personnel have not been made.

A fourth characteristic is the changing age distribution of farmers in the U.S. Census data indicates that the average age of farm operators increased from 47.6 years in 1950 to 51.7 years in 1964 [17, p. 527]. Approximately 40% of the U.S. farm operators were 55 years of age or older in 1964, and 17.4% of the operators were 65 or older [17]. In Oklahoma, 4,881 commercial farm operators were 65 and older and 11,528 farmers were between the ages of 55 and 65 in 1964. By 1969, the number of farmers in Oklahoma who were 65 and older had almost doubled to 8,015. Farmers between the ages of 55 and 65 also increased to 15,256. Over 45% of

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<sup>3</sup>See [18, p. 242]. If the value of machinery and livestock inventories is added to this land and building value, substantially more farms would be included in these two size categories. Woods has estimated that approximately one million farms have total assets approaching \$200,000 per farm in 1970. Of this one million farms, 600,000 had average total assets of almost \$250,000 and 240,000 farms had average assets of \$350,000; see [90].

the commercial farm operators in Oklahoma were 55 years of age or older in 1969 [20]. Thus, a substantial number of farmers will be leaving agriculture within the next decade through retirement or death. These farmers must either be replaced or their resources will be combined with the resources of other viable farm firms.

A final characteristic that results in difficult entry-exit problems in agriculture is the value system of the farm family. For many farm families, farming is not only a business; it is a way of life. Thus, the farm assets, particularly the land, become an integral part of the family structure, an heirloom in many cases. Because of this attitude, most farm families desire to keep the farm assets within the family structure even when transferring property between generations rather than sell the farm assets and transfer to the heirs an equivalent cash value. In addition, many farmers and their families desire to have the farm firm continue as a "going concern" even after the parents have died, in the hope that this continuation of the farm operation will be a living memorial to the parents' work and sacrifice.

#### A TAXONOMY OF ENTRY-EXIT RESEARCH

A number of entry-exit issues of both a micro and macro nature evolve from the previously identified characteristics of the agricultural production sector. The specific nature of these issues, relevant current studies and additional research needs will now be discussed. Because of the wealth of literature available on the growth process, micro and macro issues related to farm firm growth will be discussed only as they relate to the entry and exit processes.

##### Micro Issues

The micro issues in the entry-exit area can be classified into five groups: (1) problems of entry of farmers into the agricultural industry; (2) retirement problems of farmers exiting from the industry; (3) problems of intergeneration transfers of farm property; (4) coordination of the entry-exit processes; and (5) theoretical issues in decision modeling. Our major concern with respect to the micro issues will be the efficiency of the individual production unit.

*Entry into Agriculture.* Historically, a substantial number of new entrants have moved into agriculture via the "agricultural ladder" [59, p. 13 and 65]. Thus a potential entrant began his career as a hired hand and through diligent work and wise spending, he accumulated sufficient funds to purchase a set of machinery. Subsequently, the new entrant became a renter, then a part-owner of real estate, and finally the pinnacle of success was reached with full ownership of land as well as machinery. Although the process required family sacrifices, the resource requirements were sufficiently modest that this procedure could work successfully for the diligent worker.

However, with the substitution of capital for labor, the rapid price increase in durable resources (particularly land) and the expanding capital requirements of the economically viable farm firm, the "agricultural ladder" is no longer a viable source of new entrants. Not only is it virtually impossible to acquire sufficient capital resources through this historically successful procedure, it also does not provide the financial and entrepreneurial training that is so important for a successful new entrant in today's agriculture. However, alternative sources of new entrants and methods of entry have not been well identified. In fact, we know very little about the type and quality of resources required of beginning farmers, what "critical mass" of these resources is necessary to be successful in the 1970's, or what strategies might be used successfully in the future to obtain this "critical mass."<sup>4</sup>

Except for analysis of the minimum resources required to obtain specified income levels, the entry problems of farmers have not been emphasized by researchers [27, 28, 82]. In the early 1960's, Brake and Wirth analyzed the family and financial characteristics of beginning farmers in Michigan. They found that most new entrants worked on the family farm to acquire the necessary initial capital, and that the beginning debt and asset positions and the debt to net worth ratio were all higher for recent entrants compared to farmers who began in the earlier part of the twentieth century [15, pp. 1-10]. In a more recent study, Thomas concludes that whereas the opportunities in farming look bright for beginning farmers with excellent managerial ability, little

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<sup>4</sup> By "critical mass" we mean that quantity of resources necessary for a new entrant to meet family living requirements and have a reasonable chance to survive as a member of the agricultural production sector. A number of studies have indicated that different minimum levels of resources are required to meet various minimum consumption requirements. In addition, recent studies of the growth processes of Southern Plains farms in an environment of production uncertainty indicate that without a "critical mass" of resources and equity capital, the probability of survival over a 20 year period is only about .10. See [40] and preliminary results from a joint USDA-Oklahoma State Experiment Station Project entitled, "Economic Analysis of the Growth and Survival Strategies of Farm Firms in the Southern Great Plains," 1973.

opportunity exists for the individual with only average management skills [84].

Epperson and Bell have analyzed alternative institutional sources of credit to determine their policies regarding beginning farmers [33]. They indicate that since more institutional lenders use collateral as the basis for making a loan, new entrants are effectively limited to family help or inheritance as sources of capital. Epperson and Bell also indicate that security of tenure is necessary to become established in farming. Thus, longer tenure leasing arrangements may be required for the potential entrant into agriculture [33, p. 19]. Watzek interviewed a number of beginning farmers in Indiana to determine the relationship between financial success and family assistance, education, farm size and organization and beginning financial position [89]. He found that about 80% of the farmers interviewed received family assistance to get established in farming and that part-time farmers made very limited financial progress.

To investigate the entry problems, survey procedures might first be used to describe and classify the various historical and current methods utilized by farmers to enter the agricultural sector. Methods of acquiring funds to obtain the land and capital resources will probably include gifts and inheritances, father-son partnerships or corporations, renting and leasing, contractual arrangements (installment land contracts), savings from part or full-time employment in the non-farm sector, debt institutions such as FHA and climbing the "agricultural ladder." Information on the procedures used to acquire and maintain entrepreneurial and managerial capabilities such as high school and/or college education, extension short-courses and workshops, special work experience or training programs, etc. could also be gathered. The financial progress of successful new entrants as well as the characteristics of those who failed in their attempt to enter the industry could be documented. In addition, the role of various farm advisors such as bankers, vocational agricultural instructors, youth leaders and farm organizations and extension personnel in encouraging or discouraging new entrants should be ascertained. Names of new entrants and their date of entry may be available from government sources such as ASCS and FHA records. An alternative source of information on new entrants would be the records and contacts of vocational agricultural instructors in rural communities.

Next, minimum resource analysis techniques such as minimum resource programming can be used to estimate the minimum land, labor and physical capital requirements for successful entry into farming

in the future. These minimum resource analyses must include realistic coefficients to reflect economies of size and price appreciation in durable assets. The minimum requirements must obviously be estimated for different farm types such as wheat farms, cow-calf ranches, dairy farms, etc. Estimates of the impact of entrepreneurial and managerial efficiency on the "critical mass" of resources required could be determined by sensitivity and analysis of selected price and input-output coefficients.

Once the "critical mass" estimates have been made, historical methods of acquiring resources can be evaluated as to their usefulness for new entrants of the future. Decision models that include the alternative methods of resource acquisition could be used in this analysis. Consistent with the limited equity of most new entrants, these models could be structured to minimize the equity capital requirements subject to the constraints imposed by financial institutions and customary lease and rental arrangements and a minimum profit restriction [67]. This evaluation may also require a critical analysis of the resource markets for land and operating inputs, the institutional structure of the debt and equity capital markets and the programs and effectiveness of the various educational institutions and the extension service. Such an evaluation will provide the basis for recommendations concerning the need for new institutions or changes in current markets and institutions to facilitate the entry of young farmers into agriculture. These recommendations might concern a new venture capital market for young farmers (organized by a consortium of rural banks for example), collateral (as opposed to repayment ability) requirements of debt institutions, different leasing or contractual arrangements, the utilization of joint venture arrangements, tax incentives for new entrants or those who assist new entrants, a market for discounting land contracts and new extension education programs.

*Retirement Strategies.* Few farmers plan for their retirement years. Thus, little consideration is given to such issues as the goals of retirement and how to accomplish these goals. The retirement income needs, the sources of retirement income, the tax and Social Security problems of retiring or the problems of renting or selling the farm. For many farmer-entrepreneurs, a successful retirement may include a contribution to society through holding a public office or becoming more active in civic affairs. Other retired farmers may be gainfully employed in the farm input supply or product merchandising sector of the agricultural economy. Only limited information is available on the types of employment and activities available to retiring farmers and the qualifications needed to be successful in these

activities. It is possible that many farmers would prefer to retire before they actually do if they knew that they could still make a contribution to society during the retirement years.

For those farmers who desire to retire from the pressures of continued employment, information is needed on pre and post retirement strategies that can be used to generate the income needed during the retirement years. Retirement decisions that must be made before the time of retirement concern the investment of funds in insurance and/or annuity policies, mutual funds, bonds and self-employed retirement income plans. Once a farmer has retired, the income that is forthcoming from Social Security and various retirement funds will be a major determinant of the consumption level and standard of living. Unless proper planning occurs, the retiring farmer may have to sell some of the farm assets to retire comfortably.

Some of the retirement needs of Michigan farmers have been analyzed by Brake and Lee [60, 14]. They evaluated alternative methods of converting farm assets to retirement income including farm rental and business liquidation. Brake and Lee caution that substantial capital losses can occur in converting farm assets to more liquid retirement assets. An extension publication by Smith discusses the income requirements of retiring farmers and the major sources of retirement income. Smith emphasizes the importance of tax considerations in retirement planning and the investment decisions that must be made before the time of retirement. He also provides a form with the appropriate instructions that can be used to estimate the retirement income available from Social Security, farm property and savings and investments [80]. A similar extension publication is available in Oklahoma [69]. Other more theoretical discussions of the economics of retirement are also available.<sup>5</sup>

As a first step in analyzing retirement problems, the retirement income requirements of various classes of farmers could be estimated using survey procedures and family consumption budgets. Because the rate of inflation is an important determinant of prices of consumer goods, the impact of this factor on the cost of living projections should be specifically analyzed. Once these estimates have been obtained, the economic efficiency of using alternative methods to provide the needed retirement income can be evaluated using comparative budgeting and stochastic

simulation procedures. Not only must preretirement decisions such as investment in alternative retirement funds be considered, but different methods of converting farm assets to retirement income including the sale, lease or rental of land and other capital items for different types of farming operations must be included in the analysis.

The evaluation of alternative income sources should also include public and private employment opportunities for retired farmers. These opportunities could be evaluated as to their income potential, qualifications required, dignity of the work, flexibility of the work schedule and utilization of the abilities and experience of the farmer. For example, the potential of exploiting the entrepreneurial talents of retiring farmers by employing them as advisors and consultants for beginning farmers with such agencies as Farmers Home Administration might be investigated.

*Intergeneration Transfers.* Although many farmers spend a substantial amount of time making production and investment decisions which will increase firm and estate size, little consideration is given to the problems of transferring the firm and estate to future generations. Substantial economic losses can occur if the proper strategy is not used to transfer a large estate from a retiring farmer to his heirs. These potential losses are attributable to the estate, inheritance and gift taxes, the liquidation losses and reduction in size economies, and the legal and management fees that are incurred in the process of transferring property between generations. For example, the settlement costs on a \$155,000 Oklahoma estate owned jointly by two parents with no estate plan could amount to \$32,663 or 21.1% of the estate.<sup>6</sup> With a simple life estate plan, the cost could be reduced to \$16,958 or 10.9% of the estate. In addition, family arguments and other non-economic problems may arise without adequate planning.

The prevalent attitude and objective of farm families to transfer a "going concern" to the heirs also has implications for estate planning. To facilitate the accomplishment of this objective, plans must be developed to transfer not only the specific assets, but MORE importantly, the entrepreneurial and financial responsibilities associated with these assets from the parents to the heirs. Plans to transfer these responsibilities must obviously be made and partially

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<sup>5</sup>See [6] and the references cited therein; also see monthly issues of *The Social Security Bulletin*.

<sup>6</sup>As indicated by our earlier discussion, there are a substantial number of farms in the U.S. that have a capital investment of \$155,000 or greater.

implemented before the death of the parents.

Although a number of extension publications have been written on the intergeneration transfer process and the importance of estate planning, research on these problems has been limited.<sup>7</sup> Harl concluded a study in 1965 which utilized a simulator with a linear programming subroutine to analyze the interactions between estate planning decisions and the corporate form of business organizations [38]. His main objective was to determine the economic advantages or disadvantages of the corporate form of business structure compared to the sole proprietorship during the process of firm growth and intergeneration transfer. Following Harl's study, Harrison applied a multi-period linear programming model to the estate planning problem of the elderly farm estate holder in Illinois, and Allwood made a similar application to Missouri farms [1, 41, 61].

A study of the estate settlement costs incurred by sole-proprietorship farmers has been recently completed at Washington State University [79]. A similar study of the settlement costs for different types of transfer methods and business organizations has been completed by Buss at Oklahoma State [16, 68]. Buss' study indicates that the two part marital deduction will and the life estate result in the lowest death tax liability and estate administration fees. Extension oriented computer programs that can be used to analyze insurance requirements and death taxes for various farm situations have been developed by Hepp and others at Michigan State [46, 47]. Graham et. al recently reported a number of case studies of Arkansas farm estates [36]. In particular, their study emphasizes the necessity to tailor the estate plan, particularly the will, to the specific estate and family characteristics.

In a recent Indiana study, Boehlje analyzed the interrelationships between the processes of creating and transferring the farm firm estate [8, 9, 11]. He found that high growth rate creation plans were associated with the best estate management strategy. Transfer plans that included substantial amounts of gifts, even taxable gifts, were also included in the best strategy. When both parents are alive, a larger proportion of a given size estate can be transferred to the heirs than when only one parent is alive. Boehlje also found the highest transferred value strategy also exhibited the lowest risk of unexpected death and that a properly developed dynamic estate management plan can offset the progressive structure of the estate tax rates and result in the heirs receiving a LARGER proportion of an increasingly LARGER estate.

Data on the amount of property that is transferred each year between generations because of death of the parents and the specific cost incurred in these transfers is unavailable. A survey of county court records could provide this information. In addition, a randomly selected group of farmers could be surveyed to determine the major features of the estate plans currently being used and the relationship of these features to family-estate characteristics such as estate size and composition, age of the parents, number of children, education levels, etc. The reasons for not planning for the orderly transfer of property between generations could also be ascertained. This descriptive information could be useful input in the analyses to be discussed shortly and in the evaluation of the effectiveness of educational programs on estate planning.

The cost data obtained from the surveys could be combined with tax rate schedules, legal regulations and other information to evaluate the economic consequences of using alternative estate transfer methods such as different types of wills, gifts, life estates, business organizations, trusts and property ownership arrangements. Decision theoretic models solved with simulation procedures could be used in this analysis so that the time and uncertainty elements of the estate management problem can be recognized. In addition, data from the surveys and conflict-resolution concepts from sociology could be used to evaluate and resolve the family disagreements that may arise when alternative estate transfer plans are developed and implemented. The ability of different business organizations such as the partnership and the corporation to facilitate the transfer of property and managerial and financial responsibilities should also be analyzed.

An attempt should be made to extend not only the empirical results of the above analyses, but also the analytical procedures. Thus, simplified operational analysis procedures that can be used by extension for field application could be developed. Such analysis procedures may include an estate tax calculator, a gift tax calculator, partnership income sharing calculator, break-even analysis of various trust arrangement, etc.

*Entry-Exit Coordination.* Concern for the entry problems of beginning farmers has led to recent research on the farming opportunities for farm youth [63]. A recent study by Lu, Horne and Tweeten, indicates that one of six farm boys can expect to obtain an adequate farming unit in the U.S. during the period 1965 to 1974. An adequate farm unit is

<sup>7</sup>See [62, 72, 70, 39, 21, 36, 48, 51, 56, 77, 81, 68, 10, 30].

defined as a farm with gross sales of \$20,000 or greater. The farming opportunities vary widely between geographic regions with the best chances of obtaining an economic unit in New England (1 in 3.5) and the Pacific States (1 in 3.8) and the worst chances in the South Atlantic (1 in 7.5) and East South Central States (1 in 8.3). In Oklahoma, it is estimated that 24% of the farm boys will find an economic farming opportunity [63, p. 11]. A recent survey of Oklahoma farm youth found that approximately 26% of the farm boys are planning to farm. These state estimates suggest that the supply of new entrants is almost equivalent to the new farming opportunities available. However, the problem of matching the new entrants with specific farming opportunities or the coordination of the entry and exit processes must still be resolved.

The intergeneration transfer of property and responsibility provides one coordinating mechanism between the processes of entry or establishment and exit or disinvestment in agriculture. Through the transfer process, the parents can relieve themselves of managerial and financial burdens of operating the farm and the heir(s) can establish entrepreneurial competence and a resource base in the agricultural sector. However, if the processes of entry and exit are not well coordinated, family conflicts can arise and significant discontinuity losses can occur. Proper estate planning and transfer coordination is even more important when the potential new entrant is not a family member and the heirs have no interest in the farm. In this situation, the transfer arrangement must not only treat the heirs equitably, but it must also provide an incentive for the non-family farm operator to efficiently manage the farm.

With the exception of peripheral treatment in some estate planning studies, the problems of coordinating the entry and exit processes of farmers have received only limited attention from researchers. Multi-owner business organizations such as the corporation, the partnership and the business trust might be expected to have a number of advantages in facilitating the entry and exit of farmers. The circumstances when these organizations would be useful and their relative efficiency in entry-exit coordination should be evaluated. The role of management incentive and compensation programs and low equity financial arrangements, whether through governmental agencies such as FHA or private individuals in the form of the installment contract, in coordinating the entry and exit processes should be further evaluated. The usefulness of long

term leases, the economic advantages to both parties of leases between new entrants and retiring farmers and the lease terms that each party desires should also be analyzed. The potential of a recent proposal by Carlin and Reinsel to develop a governmentally administered annuity program that would enable a retiring farmer to convert his farm real estate and improvements to cash retirement income should be evaluated [22]. This program would not only assist the retiring farmer in solving his liquidity problems, it could also provide a pool of farm resources that would be made available through appropriate lease or purchase arrangements to new entrants into the farm sector. In addition, analysis of suggested tax incentive programs such as the elimination or deferment of capital gains tax on property sold or transferred to a qualified new entrant is required.

*Theoretical Issues in Decision Modeling.* It has been suggested in the previous discussion that decision models may be useful in analyzing some entry-exit problems. At least three theoretical problems must be confronted in the development and use of these decision models. The first problem concerns the inclusion of the time dimension in the analysis. The very nature of a process implies that events will occur in a particular sequence. In addition, the coordinating of various processes also implies a particular sequencing of events. Consequently, to accurately portray the sequence of events in a process and the interrelationships between processes, the analysis must include the time dimension.

The second problem relates to the proper specification and measurement of the utility function. In the analysis of intergeneration transfers and entry-exit coordination mechanisms in particular, at least two utility functions, both of them multi-dimensional, must be considered. For example, the parents' utility in the estate management problem can be specified as a function of the value of the estate transferred to the heirs, a security level of assets, and the ability to direct the distribution of the property [10, pp. 3-4]. Similarly, the utility function of the heirs can be specified as a function of the same variables. However, the specification of multi-dimensional utility functions is extremely complex and interpersonal comparisons of utility have a questionable theoretical basis at best. Thus, pragmatic assumptions which allow the researcher to specify a quantifiable and theoretically consistent



utility function are necessary.<sup>8</sup>

A third theoretical problem concerns the evaluation of utilities in an uncertain environment. A number of decision rules have been suggested for evaluating utilities depending upon the knowledge available about the possible states of nature [24, pp. 119-163; 32; 5, pp. 550-568]. If a probability distribution for the states of nature is known, an expected value or expected value-variance indifference system can be used. When complete uncertainty exists, various game theoretic criteria have been suggested. However, Luce and Raiffa indicate that identification of the decision problems, the alternative strategies and the states of nature results in sufficient knowledge to generate an a priori probability distribution for the states of nature [64, p. 300]. This subjective probability distribution can be used to obtain a Bayes strategy. Specifically, a Bayes strategy is a strategy that maximizes the weighted average of the utilities that will occur under each state of nature, the weights being specified by an a priori or posterior probability distribution [64, p. 313; 24, p. 136]. The Bayes formulation also allows the researcher to systematically include new information in the analysis such as the impact of a disease on the probability of death or a drought on the probability of financial failure.

### Macro Issues

The utilization of alternative procedures to coordinate the entry and exit processes has implications for the agricultural industry and rural communities as well as individual farm firms. Issues and researchable hypotheses in three areas will be briefly reviewed: (1) the structure of the agricultural industry, (2) the issues of income and wealth distribution, and (3) the impact of entry-exit coordination on agri-business firms and rural communities. Our research suggestions in the macro area will require an analysis of equity considerations and the distribution of costs and benefits as well as the efficiency of food production. As suggested by social welfare analyses, equity considerations involve access to opportunity as well as distribution of income and wealth.

*Structures of the Agricultural Industry.* Substantial interest has been expressed in recent years in the

future structure of the agricultural sector [2, 23, 66, 73, 74, 83]. Four structural characteristics of the industry are of interest: (1) the size structure, (2) the ownership structure, (3) the age structure, and (4) the financial structure.

Much of the recent analysis of the structural implications of the entry and exit processes has been concerned with the size, ownership and age characteristics of the farming industry [44, pp. 231-263, 488-515]. Clawson and Tolley and Hjort summarized the production policy, farm number and resource adjustment implications of the changing age distribution of farmers in the early 1960's [25, 86]. Their results suggested the need for additional emphasis on manpower planning and occupational training programs as an integral part of agricultural policy to facilitate the adjustments of the farm labor force to declining farm opportunities. Kanel used cohort analysis procedures to document that the total number of farmers decreased from 1950 to 1960 primarily because few young people had been able to enter farming [55]. However, his results also indicated that these younger farmers expanded their farms to higher gross sales classes at a more rapid rate than the older farmers. More recently, Tolley and Johnston used a modified cohort analysis procedure to estimate the elasticity of supply of farm operators and the changes in farm numbers for different management and gross sales categories [54, 85]. They found that the supply elasticity decreased significantly as age increased and that in general, young entrants entered the farming sector in the higher sales classes and retiring farmers exited from the lower sales classes. Tolley also indicated that the decline in farm numbers can be explained by the replacement of many low management by fewer high management farms. Thus, he concludes that agriculture is being transformed from a low income industry to one that will have an income distribution above that of the national average in the future.

A number of hypotheses concerning the structural impact of different entry and exit strategies must still be tested. For example, it can be hypothesized that if prospective entrants with no family assistance have difficulty acquiring the necessary resources to enter farming, the age distribution in agriculture will become increasingly skewed to the higher ages. Similarly, increased

<sup>8</sup> As an example, utility in a recent study of the estate management problem was assumed to be a linear function of the present value of the net estate transferred to the heirs during the planning horizon. This specification of the utility function is a simple extension of the Fisher criterion of maximization of the purchasing power of a bundle of investment. See [34, 35]. However, this purchasing power is not measured in terms of withdrawals for direct consumption by the parents, but in terms of withdrawals for transfer to the heirs. The discount rate is assumed to be equal to the borrowing rate of interest. Thus, the major difference between this measure of utility and that used in most investment analyses is the inclusion of the event of death and the resulting capital transfers during the planning horizon. A minimum constraint on the amount of property that must remain in the estate is used to incorporate the security goal in the analysis.

consolidation of farms might be expected if young entrants are restricted from entering the industry. In contrast, the development of long-term leasing arrangements and the utilization of low equity land contracts to assist new entrants may result in fewer pressures for farm consolidation and an age distribution that is less skewed to the higher age brackets. However, these entry-exit coordination mechanisms would be expected to result in a higher debt-equity financial structure and possibly more separation of the ownership and management functions in the agricultural industry of the future.

The most common method of entry-exit coordination, the intergeneration transfer of property, has significant implications for the future structure of agriculture. In the farm sector, most intergeneration transfers are characterized by the principle of equal devolution. Thus, when the parents die, the farm property is divided equally among the heirs, irrespective of their interest in the management and operation of the farm firm. If two or more of the heirs aspire to begin farming, but are not personally compatible, equal devolution would reduce the pressures for farm consolidation. However, the possible reduction in size economies for these two smaller farms may jeopardize their potential for growth and survival. If the farm heirs are compatible and form a multi-owner business organization (a partnership or corporation, for example), current trends to larger farm size would not be abated. By encouraging the transfer of the farm as a "going concern" and the continuity of management, the use of multi-owner business organizations to coordinate the entry and exit processes (whether or not within the family structure) might be expected to normalize the age distribution of farm operators and skew the size distribution to larger farm sizes.

Different structural implications result when non-farm heirs acquire ownership of a portion of the farm assets through the intergeneration transfer of property. If the non-farm heirs maintain their ownership of the farm assets, increased separation of the ownership and the management of farm assets will occur. If the non-farm heirs desire their share of the inheritance in cash, their portion of the farm assets may be sold to the farm heir or a third party. To buy these assets, the farm heir must usually acquire additional debt capital. Consequently, a changing financial structure that involves the substitution of debt for equity capital will result in this situation. Sale of the property to a non-family farm operator who already owns or controls a sizable operation might again be evidence of farm consolidation and a distribution that is skewed to larger farm size.

It is evident that coordination (or the lack thereof) of the entry and exit processes will have significant implications for the structure of agriculture. It is beyond the scope and purpose of this discussion to suggest what future structure is desirable. However, research is needed to inform those who make this determination of the impact of current and proposed institutions and public policies on the coordination of the entry and exit processes and the resulting size, age, ownership and financial structure of agriculture.

*Income and Wealth Distribution.* As suggested by Tolley, alternative solutions to the entry and exit problems of farmers will influence the income and wealth distribution in both the farm and non-farm sectors through structural changes in the agricultural sector and more directly, through the federal and state tax regulations [85, p. 492]. Structural changes that are evidenced by larger farms will result in increased concentration of income and wealth in the hands of fewer farm families. The impact of structural changes on the efficiency of production of agricultural commodities and the resulting cost of food to the consumer will also effect the real income of the non-farm sector.

A more direct linkage between entry-exit solutions and income and wealth distribution in the agricultural sector is provided by the state and federal tax legislation and state laws of descent. One of the basic purposes of the current income, estate and gift tax regulations, as evidenced by their progressive structure, is to redistribute income [7, pp. 1-30]. Yet, numerical estimates of the impact of these tax laws and other intergeneration transfer regulations on the distribution of income and wealth in the agricultural sector are not available. Considering the number of farmers who will be forced by age considerations to transfer their estates in the next two decades and the limited estate planning done by most farmers, it can be hypothesized that current regulations may result in the redistribution of concentrations of wealth in the agricultural sector to other farm or non-farm families. In contrast, the development and utilization of entry-exit coordination mechanisms to circumvent these tax and intergeneration transfer regulations would result in increased concentration of income and wealth in the hands of a few farm families and reduced tax revenues to fund income redistribution programs.

A number of changes in the federal tax laws are currently being discussed by members of Congress. These suggested changes include such proposals as taxing capital gains at death, increasing the estate tax rates, and combining the gift and estate tax schedules

and regulations on exemptions and deductions [42]. The impact of these proposed changes on the entry and exit processes and the consequent structure and distribution of income and wealth in the agricultural sector must be considered in evaluating their desirability.

*Agri-Business Firms and Rural Communities.* The methods used to solve various entry and exit problems in agriculture will influence not only the farm sector, but also agri-business firms and rural communities. Recent research suggests that as farm firms become larger, they bypass local suppliers and acquire their purchased inputs from wholesalers or directly from the manufacturer [57, 58, 87]. Consequently, if solutions to entry and exit problems result in larger farms, a decline in the market share of local input supply firms might be expected. Other solutions that affect the financial structure of farm firms may result in increased demand for trade credit from input supply firms. Changes in tax legislation would also be expected to influence local real estate markets.

Financial intermediaries in particular are influenced by the methods used to coordinate the entry and exit processes of farmers. Federal Land Bank data on the reasons for buying and selling a farm provide some indication of the potential role of financial intermediaries in assisting entering and exiting farmers. This data indicates that in the U.S. in 1971, 26.3% of the farm sales were to settle estates and 16.9% were because of retirement. Approximately 21.3% of those farmers buying land in 1971 were attempting to establish a farm operation.<sup>9</sup> Thus, a substantial volume of the services performed by financial intermediaries may involve the financing of new entrants and the purchases from exiting farmers. In addition, changes in the size structure due to the entry and exit of farmers will influence the supply of funds in the form of demand and time deposits in rural areas.

Finally, financial intermediaries have a vested interest in the entry and exit problems of their clients. Without adequate estate planning and entry-exit coordination, these financial intermediaries incur repayment risks on intermediate and long-term loans. Thus, if the current farm manager dies unexpectedly and a competent replacement is not available, the ability to repay the loan from earnings will be severely impaired. Consequently, financial intermediaries should receive direct benefits from the evaluation and development of estate plans and

mechanisms to coordinate the entry and exit processes of their farm clients.

## CONCLUSION

Agricultural industry with its atomistic structure has been frequently used as the classic example of perfect competition. However, it is questionable whether agriculture possesses one of the basic attributes of the perfect competition model, unrestricted entry and exit. The growing capital needs of the viable farm firm along with the illiquidity of these capital assets, the predominance of the sole proprietorship structure, the age distribution of farmers and the value system of the farm family make the entry and exit problems particularly severe for farm firms.

A number of researchable issues in the entry-exit area have been outlined here. With respect to priorities, it is anticipated that an understanding of the decision processes and decision environment at the firm level would be an important input into the macro and industry oriented analyses. The highest pay-off research at the micro level would probably involve analysis of alternative entry-exit coordination mechanisms. This initial research effort could emphasize micro issues, but might also be structural to provide information for later macro analyses. A study of the entry-exit coordination mechanisms would also require at least a confrontation if not a complete solution to the issues in decision modeling of multi-dimensional, interpersonal utility comparisons and utility evaluation in an uncertain environment.

Through proper coordination, the exit process for a retiring farmer may provide the resources and opportunity for a new entrant to move into the farming sector. The results of this coordination have implications for the structure of agriculture and the distribution of wealth and income as well as for the individual firm which should be of interest to all students of the agricultural industry.

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<sup>9</sup> Unpublished data, Federal Land Bank Management Information System, Omaha, Nebraska and Research Department, Federal Land Bank of Wichita, 1972.

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