FARM FINANCIAL MANAGEMENT RESEARCH

A THEORETICAL ANALYSIS

U.S. DEPARTMENT OF AGRICULTURE ☐ ECONOMIC RESEARCH SERVICE ☐ ERS-389

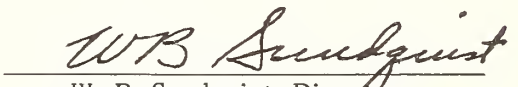
Foreword

Farming has changed in the last several decades from a primarily land- and labor-based activity to an industry with substantial and rapidly growing financial, technological, organizational, and managerial components. To minimize the problems accompanying these changes and to provide the basis for sound decisionmaking, farm economics research needs also to take on new dimensions. To fulfill this need, Bostwick was asked to prepare this benchmark statement on the subject of financial management.

Several new research dimensions are suggested in the report which has two major objectives:

(1) Defining an important subject-matter field--financial management--and its component terms, processes, and functions in a manner that permits feasible and effective research to be undertaken on the topic.
(2) Suggesting some of the core problem areas and topics falling under the financial management topic and toward which research inquiry should be directed.

In defining terms relating to financial management in this report, a number of terms are given meanings different from their traditional ones. This seemed a necessary procedure in order to focus, with operational concepts and researchable propositions, on the subject of financial management. The final test of the merit of these new meanings for traditional terms should be that of their usefulness--initially, in concept development, and subsequently in empirical inquiry and problem solving.



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FARM FINANCIAL MANAGEMENT RESEARCH
A Theoretical Analysis

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Introduction

Farmers have been managing their financial and other resources for five millennia that we know of. Agricultural credit was an acknowledged problem in rural China in Confucius' era--nearly two and a half millennia ago. Public servants wrote what they thought were answers then, though with perhaps less formal research than we require today. Some time before the zero was added to the number system, governments were concerned about the public interest in resolving the problem of uncertain farm incomes due to uncertain yields and fluctuating prices.

The technology of wheat production, for instance, is rather more complicated in Cheyenne County, Kans., now than it was 4,000 years ago for a farmer in Assyria. But both of these producers faced problems of obtaining control of their production resources, of allocating the proceeds of their efforts among the family, the requirement of the next crop, the demands of the grain dealer who had lent the seed, and other needs.

Agricultural production still requires a combination of land, labor, time, and bits of other goods and services that are directed by a human intelligence toward some definite goal. This much at least has been true for all of the places and times and products since production was started. But the process takes place now in a maze of technology and information and social, economic, legal, and cultural impediments that would astound and dismay our predecessors. It does, in fact, astound and dismay us. The researcher's job is increasingly hard, though we have the advantage of the accumulated sophistication denied to the civil servants of previous ages.

We erect higher and more impenetrable barricades of specialization. Our hope is that if we can reduce the area of our concern just a little more, we shall at last be able to deal with our now very limited research problems. This specialization by some thousands of researchers allows us to deal with some fewer thousands of neat little research problems. But we pay for this success by not dealing adequately with the unexplored territory between specialists, nor with the problems that do not happen to fit inside any one specialization. And it seems, too, that the unexplored territory and those awkwardly shaped problems are increasing faster than the number of researchers. This appears to be the case now with respect to research in farm financial management.

A lot of work has been done, a lot is underway, and the volume will probably increase. Now is not too soon to pause and to try to view the problems--the researchable problems at least--that might be fitted behind a remodeled barricade to be labeled "Farm Financial Management: Now and in the Future."

Definitions and Viewpoints

A VIEWPOINT

Financial management is the managerial process applied to financial resources. It therefore partly overlaps the area generally conceded to farm production management. In general, production management concerns problems of resource organization for agricultural production, while financial management concerns itself with the financial means by which the required resources may be controlled.

These two kinds of management are separated for functional research purposes, even though they often are not separated in practical farming situations. Research in farm financial management assumes the existence of physical resource requirements.

The viewpoint of financial management is similar to that of gestalt interpretations of human behavior. Management is seen as a congeries of goals, attitudes, values, experiences, expectations, learning, and present action choices. The variables of, and relationships among, all of these phenomena are germane to an understanding of financial management processes. Unfortunately, the social sciences have only begun to study these phenomena separately, and in modest combination. We may not as yet predict, on any valid statistical bases, human behavior as exhibited by functioning financial managers. But we can organize research in the area from the gestalt point of view. It is one thing to assume constants for some of the intuitively variable relationships, and quite another not to realize that the relationships are indeed variable in the real world.

The area to be included behind this new barricade is something called "farm financial management." What is this? The purpose of this report is to define those three words and expressions ancillary to them, so that they are both precise and as meaningful as possible for an area of research. The definitions that follow do not come from a standard dictionary, nor are they always given the content that is standard in the trade jargon of economics.

Terms are defined here for the greatest utility in farm financial management research. Definitions made for other purposes are to be judged in those other contexts.

RESOURCES

Utility is that which has value; that which is desired by someone for some purpose. Grass has utility for a hungry cow; the cow has utility for the husbandman; therefore, grass has utility for the husbandman who has a cow to put on it. Money is a useful index to utility, but not a universal one, and not the only one. Production is the process of creating utility. Agricultural production is the process of creating utility in biological forms. Agricultural production, under this definition, includes such activities as fishing, tree growing, the production of wheat and peanuts and artichokes and hogs, etc. We limit ourselves to specific forms of agricultural production in defining specific research projects, but not in a general definition.

A resource is an available means of production. Agricultural resources are that subset of means that are available to agricultural production. All available means are included, not just those that actually are used in a given production process. One should further define the term resource, in view of the ubiquitous obtrusion of this term in the literature of agricultural economics. One reads of the land resource, the credit resource, the labor resource, the managerial resource, the technological resource, and even the cultural and socioeconomic resources. If everything in creation is a resource, the word has no precise meaning, and ought to be dispensed with, rather than dispensed.

Agricultural production depends on some combination of three sets of resources, which can be called production, financial, and human. Production resources are those allocated directly to the production process. Financial resources are those used only indirectly in the production process, but that have direct monetary values. Financial resources may be converted into production resources, and the outputs from the production process may again be translated into financial resources. Human resources may be used in the production process, and have no direct monetary value otherwise. Production resources are expressed in quantity terms, such as acres of land, bushels of grain, hours of tractor use. Financial resources are expressed only in dollars of value. Human resources are expressed as quantities or qualities of labor or both, experience, technical skills, etc.

GOODS AND SERVICES

Resources have a second dimension in which one might distinguish the two categories "goods" and "services." The category of goods includes objects from which utility may be derived either directly or indirectly and to which ownership may be attached (ownership here being understood in the legal sense).

A service, on the other hand, is not an object but the attribute of an object. Services may be used directly or indirectly in the production process, but they cannot be owned per se.

Services may be acquired through ownership or temporary control of a good from which the service flows, or by the temporary control of an entity (person or thing) providing the service.

Some goods and services are listed below by resource categories. Following this list is a brief discussion of those that may not be acceptable a priori, under the conventional wisdom of production economics.

Goods and Services By Resource Categories

I. Production Resources

A. Services:

1. tilling, seeding, cultivating, irrigating, feeding, breeding, raising (livestock), sheltering, repairing, harvesting
2. transporting and communicating
3. information and advice on production processes

B. Goods:

1. land, machinery, livestock
2. seed, fertilizer, gasoline, hand tools

II. Financial Resources

A. Services:

1. credit systems
2. insurance systems
3. tax systems

B. Goods:

1. use-rights to land
2. use-rights to capital goods: buildings, fences, wells, ditches, machinery, livestock
3. use-rights to production goods: grain, fertilizer, water, insecticide, feed, fuel
4. certificates of value; money, savings deposits, stocks and bonds, warehouse receipts, promissory notes

III. Human Resources

A. Services:

1. labor
2. knowledge and skills

Services have been defined as attributes of objects which have utility for the process to which they are allocated. Production services are then attributes which have utility for the production process, and they are inputs to that process. Production services are used up in the production process, though not all at the same rate over time. Financial services are also attributes of objects, the objects in this case being institutional structures. Human services are attributes of people, and they too are used up in the production process, though perhaps in a slightly different sense. The important point is that services are attributes having utility, and that they have a flow with respect to time which is as irreversible as time itself. Labor may be allocated or not today, but today's labor is only allocable today--not yesterday or tomorrow. Likewise, the credit system may be tapped and allocated today or not, but it will be a different system tomorrow, with a different utility for the investment or production processes.

The category of financial goods might not be in the form most familar to researchers from a viewpoint other than farm financial management, and perhaps can profit from a little discussion. Something economists habitually refer to as the "land resource" is chosen to illustrate the categorization processes.

Item 1 under Financial Goods is something called the "use-rights to land." Why this strange name, and why not simply consider land as an expected production input? One may define "land service" under the Production Resource Service category. This would be, according to the definition of a service, attributes of land that have utility for the production process, but which cannot be owned. This category is a semiabstraction similar to the "land activity" used in linear programming. It would serve the same function of separating the physical thing from the attributes of the physical thing that contribute to the agricultural production process.

The category that economists and others call "land" implicitly includes much more than the physical thing. It includes all natural phenomena relevant to agricultural production. Rainfall,

temperature, length of day, wind, hail, frost-free season; where shall we include them? They are not labor nor capital nor management, nor explicitly included at all in the traditional theory of production. Implicitly, they must lie within the extended meaning of the classical resource "land." One fixes these natural phenomena when one chooses a particular location in space and in time as the locus of a production process. One chooses a surveyed locus and then perforce gets these attached stochastic attributes. A locus sufficiently distant from the first would have a somewhat different range of values in the stochastic attributes. This is the only sense in which one can "manage" the natural phenomenal components of the "land service."

But one cannot "own" these phenomena in any meaningful sense. These certainly must be considered as variables relevant to the production process, but they are attached willy-nilly to a physical extension called "land" and may not be separated from it. Furthermore, one does not allocate a certain quantity of the "land service" to production per se. One allocates a package of services as technological production systems, and some of these have a land service component. How could one conceive of seeding or tilling, even abstractly as a set of input coefficients, without the land service component? There is no "land service" in the listing of production resource services. By the same reasoning, there is no "tractor service," or "fertilizer service," or "seed service," included there. These and other things are components, coefficients, in an equation which are taken as given and called "Seeding service." Land, tractors, seed, etc., are production "goods," whose services may be allocated to the production process.

Under the category of financial goods, there are listed use-rights to various goods. These goods are not called "land," "buildings," "fertilizer," etc. Goods, according to the definition, are objects from which utility may be derived, and which may be owned. The utility of "land" as a financial good is the right to allocate the services flowing from the thing we call "land." It has no intrinsic value (utility), except as a resource allocated to some process. Use-rights are specific as to both areal and temporal locus. The areal locus for "land" is a surface survey, for a tractor it is a serial number, for a cow it is a brand. If a use-right is held to infinity on the temporal locus, it is called a title of ownership. If the use-right is held for a finite and specified temporal locus, it is called a lease or rental contract.

Use-rights are financial, not production goods, since they do not enter directly into the production process, but may provide the use of a good from which production services flow. The use-right to land, as a financial good, may be owned or it may be leased from or to a second party. The desired purpose is the financial product that obtains from its allocation to production services; thence to the production process. One may also own the use-rights to land as a financial good, and may assign these rights to a second party for direct return of financial product. Whether or not the second party then allocates his use-right as a financial service to agricultural production is only of academic interest--it in no way affects the attribute of the use-right as a financial good held.

The traditional resource category "land" is somewhat casually dismissed without ever being viewed in a way that adds to our understanding of the financial management process. This thing "land" is viewed here as being composed of two distinct and separable components. One component is viewed as a coefficient in a production equation, which is acquired entirely from the process of production management and not further examined. The other component is a use-right that is important to the financial management process.

The owner of the use-right may allocate this financial good to production services in his own operation, as is the case with the traditional entrepreneurial farm firm. The manager then is engaged in two separate but related processes, one called production management, the other called investment management. These processes may also be separated so that the use-right to the land is owned by an investment manager, and leased by him to a production manager in a different firm. This is the case with the traditional tenant farm-firm, or with extensive livestock ranches where the use-right is owned by the public and leased or rented to the production manager. Agricultural producers who buy the use-right to Taylor Act lands in the form of an annual 100-cow grazing permit, or the primary use-right to 10 acre-inches of water from a river (also public domain), or 3.2 acres of tobacco acreage allotment (the production privilege being in the public domain), all understand

the difference between the use-right as a financial good, and the allocation of this financial good to production services. This difference may well be critical to realistic research in farm financial management.

RESOURCE FLOWS

Figure 1 puts together a concept of the flow of resources through a farm firm. The contents of the four categories of goods and services shown in figure 1 were indicated in the listing of these definitions. There are three processes coexisting in the farm firm which together make up the firm's activities. Goods and services flow through these processes according to the strategies devised by the manager. The exception is the consumption process relating to the farm family, where human service resources may be allocated to consumption, but there is no offsetting flow of product back into the system--presumably the output of the consumption process is a form of utility.

Five distinct flow paths may be traced beginning with financial goods and ending there, and a sixth flow which begins in financial goods and ends in the consumption process. A couple of examples of these flows follow.

Financial services includes the credit and the insurance systems. Credit services may be used to obtain specified use-rights such as that to a quantity of fertilizer, and this production service may then be allocated to the production process. The result is some positive or negative addition to the body of financial goods; perhaps in the form of use-rights to a quantity of grain; perhaps in the form of a reduction in the preexisting quantity of money. The credit service may also be allocated to the investment process, such as the acquiring of a perpetual use-right to land. The investment process then produces a positive or negative quantity of financial goods over time.

The financial service of the insurance system is not allocable to production services, but only to the investment process. This allocation may return either positive or negative additions of financial goods. We think of insurance as an investment with a stochastic functional relationship to financial goods. It is parallel to the stochastic components of the use-rights in land service. It is desirable to the extent that these two components are inversely related in the production of financial goods. For example, one invests financial goods (money) to acquire the insurance service, in the expectation that when the financial goods flowing from the production process are willy-nilly low, the financial goods (money) flowing from the insurance investment process will be willy-nilly high.

FARM AND FIRM

Research in farm financial management deals with a thing called the farm firm. The word "firm" is of the language of economics, and is commonly supposed to carry the same basic connotation over into the sublanguage of agricultural economics. A firm is taken to mean a business entity. It may be defined by enumerating the resources it includes, and the purposes for which these resources are to be organized. A further supposition is that farm is a word modifying firm; that a farm is a particular subspecies of firm.

The term "farm" connotes a physical entity. It is a set whose members may include such readily enumerable things as land, buildings, machinery, cows, and hay bales. The purposes or goals of a farmer include the combination of these entities for the creation of agricultural products such as cows, hay bales, tobacco, wheat, and eggs.

Farm financial management includes the provision of the above sorts of physical entities required for agricultural production. It also includes activities which are related to agricultural production only indirectly or not at all. Thus, research in farm financial management focuses on the farm aspect of firms whose primary purposes include the management of resources associated with agricultural production. The firm may, and often does, include subsets of resources that are not "farm," but that are appropriate to minor purposes of the parent "firm." The firm has goals toward which the manager works. A "farm" is assumed to be a major resource set, chosen as an appropriate means for achieving these goals, and including the major proportion of the goals and resources of the "firm." Research in farm financial management is, therefore, concentrated on the "farm" goals and resource sets, but it also includes problems that may confront the manager of the "firm." These may not be concerned directly with agricultural production. It is assumed

RESOURCE FLOWS OF FARM FIRMS

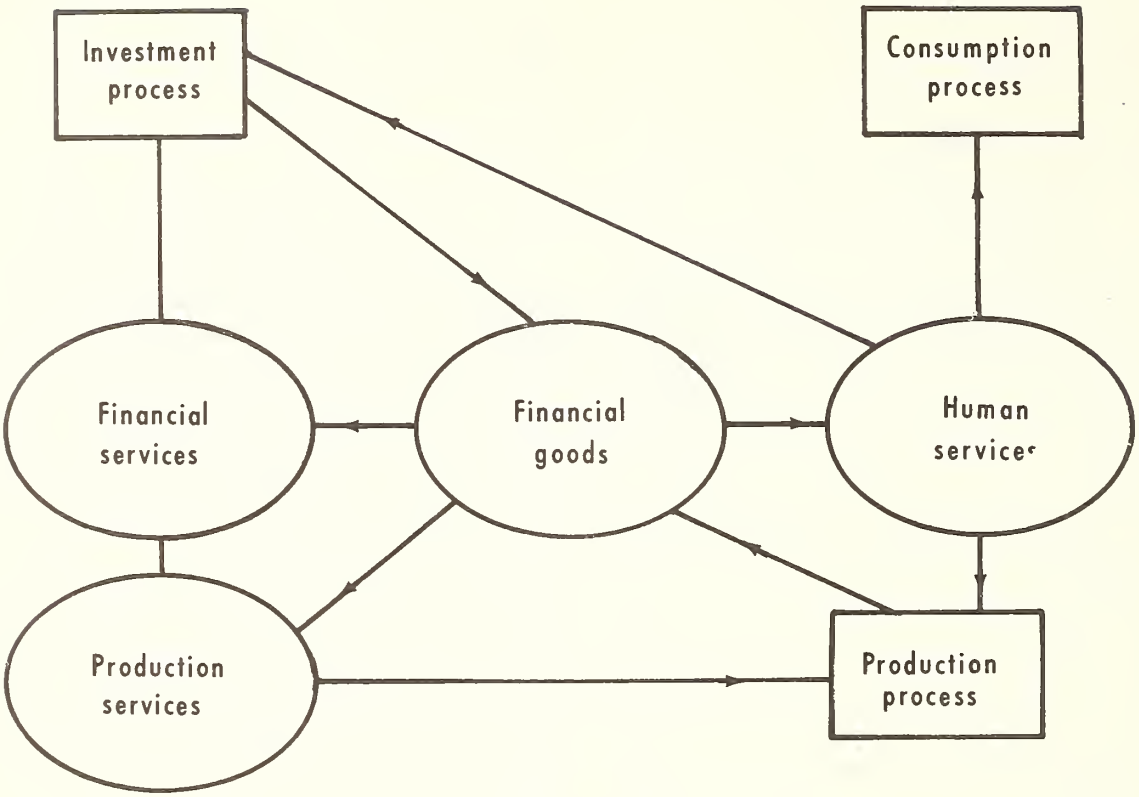

Figure 1

that research in farm financial management is not productive under the limiting assumption that the farm is the only resource set included in the firm, or the companion assumption that agricultural production is the only appropriate means toward realization of the firm's goals.

MANAGEMENT AND MANAGERIAL GOALS

Management is the process of directing and controlling the time-related flow of resources toward the creation of whatever forms of utility the manager desires. The manager is the person (natural or legal) who does the directing and controlling. Therefore, management is not a resource, but is a process of making decisions about resources. Management is an abstraction, while managers are not. We do not measure management, although we may try to measure, assess, and evaluate the results of the management process. Traditionally, we assign the products of this qualitative-quantitative assay to the person identified as the manager.

The goals of management are the types and quantities of utility-forms desired by the manager. Goals then, are the desired results of the direction and control of a flow of resources through the firm. These results are subscripted in terms of time, quantity, and form, and perhaps other attributes as well.

Logic and observational evidence both suggest that the goal set of a farm manager is usually a hierarchy of goals, attitudes, and appropriate means, and often enough a degree of logical conflict between these. One reason that all firms do not look and behave alike is that they are not all trying to achieve the same things, by the same means, at the same time. Individual goals may rise and fall in the hierarchy over time, and may be added to and canceled from the set altogether.

The hierarchy viewed at present time t will not be the same when viewed from present time

t+n. The greater the difference between t and n, the greater the difference that is likely to obtain between the two goal sets. The goals that are sought over a production cycle of a year may be relatively well defined and unchanging over that span of time. The goals that are sought at the beginning of an investment cycle of 30 years may change considerably before that cycle is complete. Since the future is uncertain, it is reasonable that proximate goals are more explicitly defined and bear more weight in the decision process than distant ones. To assume a maximum likelihood of survival, plus a maximum rate of growth in total resources, plus a maximum net farm income, plus a maximum rate of growth of equity, plus a minimum restriction of the managerial decision space, leads at once to different sets of appropriate means, ceteris paribus. If such a conflicting set of goals is assumed by the researcher in financial management, he simultaneously improves the reality and the complexity of his research.

Managerial goals must be modified by the means that are thought to be appropriate to these goals. Means that exhibit a certain a priori logic to the researcher may or may not seem appropriate to the real-life manager. Objective reality is considered in terms of attitudes and values, and then becomes the subjective reality of the manager. For instance, the use of credit is not included in the feasible set of means by the manager who has a strongly negative attitude towards debt. Since attitudes and values change over time, the feasible set of means must change over time.

The researcher in farm financial management, then, is faced with goal sets and a set of feasible means toward these goals, all of which vary in content and valence with time. The manager aims at a set of targets of varying distinctiveness, which move and change shapes over time. The means by which he hopes to hit these targets also change over time. Moreover, the decision to employ certain means must be taken in the present, while the velocity and trajectory of these present decisions can only be certain in the future, where present aims and commitments may be irrevocable, costly, fortuitous, or egregious.

Thus, farm financial management is very much of an art, and very little yet of a science. The purpose of research is to change this imbalance. It is useful, over the short run, to be able to solve managerial problems regarding some "optimal" combination of resources with respect to a given goal. It is also useful to be able to describe appropriate ways of moving from present circumstances toward some ideal position. But instant adjustments are not within the domain of the possible for most farm firms. So research in farm financial management must be concerned with the flow of decisions by which managers might move from a present state toward a more desired one.

Present managerial decisions are compounded of what is recognized from the past, of expectations of the future, and of the various constraints of the present exogenous and endogenous environments. Managerial knowledge in the real world is never complete or symmetrical with respect to any of these three time-stages, and may well contain areas of complete ignorance, along with areas of uncertainty, risk, and certainty. Research in farm financial management must include the problems of managerial decision processes within these contexts.

THE MANAGERIAL PROCESS

Figure 2 is a diagram of the process of management of farm firms. There are five spaces: manager, goals, and three decision spaces labeled financial, production, and human. The manager has been defined as the person who directs and controls resource allocations, and who defines the utility toward which the allocation is aimed. The space labeled "goals" in figure 2 includes the utilities toward which management is directed, and perhaps some ways of making decisions or of combining resources that are considered to have utility in and of themselves, in addition to their value as means toward a production end. Thus, the diagram includes directional arrows from decision spaces toward goals, and vice versa.

In any specific case, the managerial process may not happen to include decisions in the financial resource or the human space. But a case which does not include decisions in the production space does not fall within our definition of a farm, and we exclude it from the area of our concern. Thus, the three necessary conditions to a management process for farm firms are (1) a manager, (2) a set of goals, and (3) the necessity for production decisions. Financial resources and human decisions are included as sufficient conditions to a farm financial management process.

MANAGEMENT OF FARM FIRMS

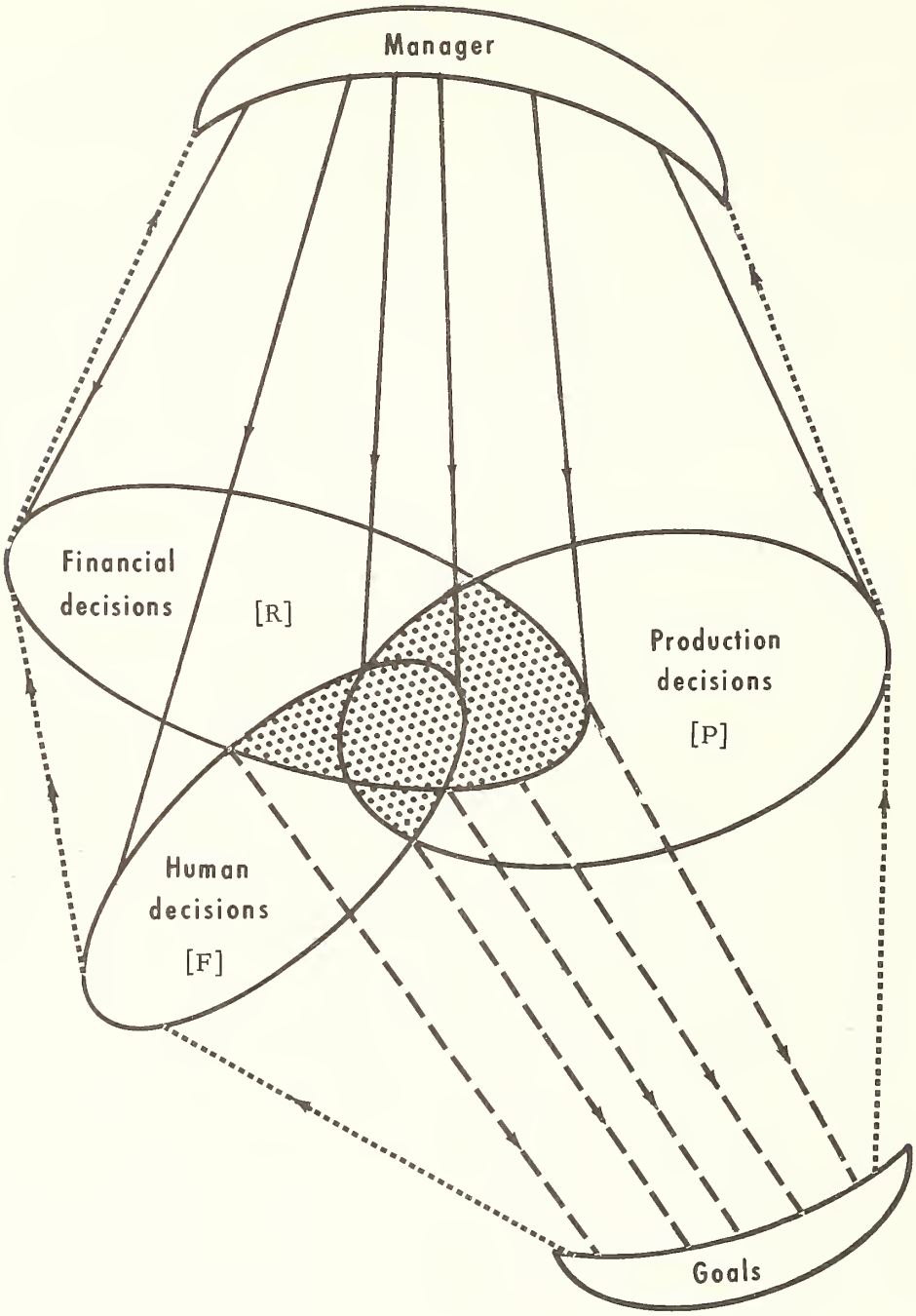

Figure 2

The term "decision" requires that there be at least two alternative ways of manipulating resources toward a given goal set. If there is no choice, there is no decision involved, and therefore no management. Choice among alternatives includes alternate decisions at one point in time, at different points in time, and the choice of deciding now or at some future time with respect to some single action. As an example of the time variable in a unitary decision, consider the farmer who knows that he will seed wheat, but abstains from seeding until he thinks the soil moisture is adequate. A similar decision involving alternative actions at one point in time would be the choice between seeding wheat, barley, grain sorghum, or oats for hay.

Decisions are complicated by the dynamic character of the manager, as well as of the decision environment. The manager has the ability to learn over time and to add to and redefine elements in his goal set. Choices are further complicated by the fact that the manager must make decisions and take actions appropriate to them, and the consequences of these actions are certain only ex post facto. Certainty is prohibited by the combination of less than perfect understanding of causal relationships, and by the manager's inability to control completely all of the factors that determine the result of a decision. The manager may make decisions from some combination of risk and uncertainty; he cannot make them from the basis of certainty; and he ought not to make them from the basis of ignorance.

Farm financial management requires additional decision choices in the areas of financial and of human resources. It is further required that the flow of resources to be managed be uncertain for all future time periods, and that this flow be identified by both time and volume subscripts. Thus, the management process is considered to be dynamic with respect to the time and quantity variables, and with respect to both endogenous and exogenous environmental influences on the decision maker.

Production Decisions

If one dips a hand into these three spaces labeled "decisions," in figure 2, what sorts of things might one draw forth? One can define the contents of these three spaces by listing some of the more important elements to be found there, though this is not the definition of a closed set. Let [P] be the set of elements included in the space labeled "Production Decisions" in figure 2. These elements are all of the decision processes relevant to the production activities of the farm firm. Some of the generalized groups of elements in this set are described below.

(1) Selection of production enterprises: Decisions here involve estimates of the production services that are required to engage in alternative types of production activities economically, and of the financial goods that might result from them. Thus a Northern Iowa farm firm manager might calculate the income that could be expected as consequences of engaging in fluid milk production, compared with the real alternatives of a cash grain operation.

(2) Production systems: These must be considered prior to the selection of basic enterprises, and also whenever technology provides alternative ways of producing any given class of output. Decisions here include such things as rates and types of fertilizers to be applied, the economies and costs that could result from the adoption of a new machine or practice.

(3) Income-Generating Capacity: This must be estimated for the various production resources before such estimates may be used as inputs to decisions on the adoption of new production systems or enterprises. Periodic estimates of income-generating capacity with respect to resource input requirements may occasionally show the advisability of a change in enterprises or in production systems. The cash grain producer who has been custom-hiring his harvesting may discover that, at some point in his scale expansion, it costs less to own and operate his own combine.

(4) Production and Price Risks and Uncertainties: These are deeply involved in the area of production decisions as sets of probability or expectational modifiers, to be applied to the input and output estimates of other elements.

(5) Combinatorial Considerations: These include such decision areas as estimates of the optimal input mix to achieve a given scale of output, and the optimal resource mix for growth at some given rate. An example is the least-cost feed-gain ratio for hogs for a specified period, where feed and time are the variables.

Financial Decisions

[R] is the set of decisions in the space labeled "Financial Decisions" in figure 2. The elements in this set include decisions relevant to the manipulation and management of the financial resources that flow through the farm firm. The set includes decisions on investment in resources that contribute to the production activities of the farm firm. It also includes investment decisions that allocate financial resources to firm-nonfarm investment.

Flows of financial goods may be generated either internally or externally with respect to the farm firm, and allocations of financial goods may be made to either internal or external (exogenous) purposes. Figure 3 shows in a schematic form the various possibilities for financial resource flows through the farm firm. The three sources of financial goods pertinent to farm financial management are those resulting from production and investment and inflows from exogenous (nonfirm) sources. Financial goods may be allocated to production, investment, and consumption, or to exogenous purposes. The relationships indicated by the numbers on each of the financial flows in figure 3 are discussed below.

1. Financial goods may be created as a result of the production process. This is commonly assumed to be the primary goal of production.
2. Financial goods may also be the result of exogenous inflows, such as Government payments under the wool program.
3. Financial goods are sometimes created as a result of the investment processes of the farm firm. Examples would be the addition to financial goods resulting from ownership of the use-rights of land, machinery, and livestock services. Equally relevant examples are the financial goods created by investments in corporate stocks or a savings account.
4. Financial goods of a type similar to those created by investments may flow into the firm from exogenous sources. Examples would include resources inherited, retirement benefits received beyond inputs, poker winnings, etc.
5. The double flow between the two groups of financial goods indicates that one form of financial goods may be transformed into another without benefit of any investment or production process having taken place. One may exchange the use-rights in land or grain (upper group) for cash (lower group) and vice versa, as seems appropriate to the manager.
6. One major category is the exchange of financial goods for production services, which are then allocated to production. Use-rights in a tractor may be combined with other components in a production service, and the package allocated to cultivating the corn crop.
7. This flow arrow only indicates that financial goods flowing from investment are coequal to those flowing from production as allocations to production.
8. Financial goods that flow primarily from production may be allocated to investments, as for example the designation of use-rights in wheat from this year's crop as a reserve against the uncertainties of next year's flow from production.
9. Financial goods that flow primarily from investment may also be allocated to investment, and are therefore firm activities having nothing to do with the production processes of the farm. An example would be the earnings from a stock portfolio allocated to a further investment in the stock portfolio.
10. Financial goods flowing from production may be allocated as outflows to exogenous destinations. Examples would include gifts, donations of public and private sorts, and poker losses.
11. Financial goods may flow from production to consumption, if the farm firm includes a family. An example would be the allocation to household consumption of the use-right to milk produced on the farm.
12. Financial goods may also flow from investment to consumption by the farm family. Example: The farmer cashes in 100 shares of common stock and sends his son off to study cow raising at the local college.
13. Financial goods flowing from investments may be allocated to an exogenous outflow about as easily as goods from the production process. The winner of a big

FARM, FIRM, AND EXOGENOUS FINANCIAL RESOURCE FLOWS

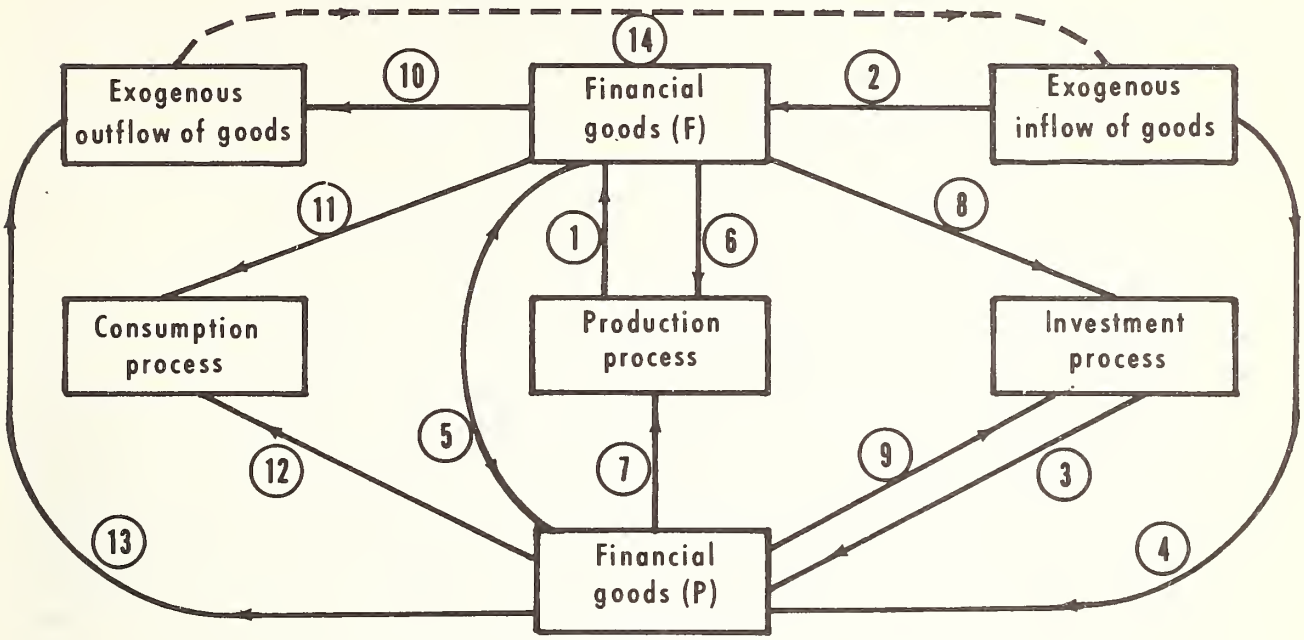

Figure 3

poker pot doesn't care where the money came from, just that it came.

14. The flow indicated by the broken line is more or less nonrelevant to farm and firm resource flows. It reflects the presence of transfer payments in the economy. If there were no outflows of tax payments, there might not be an inflow of social security payments.

Perhaps it would be well to point out a few of the irregularities in this diagram before passing on. Notice that the outflow categories of "Consumption" and "Exogenous Outflow" are one-way allocations outward, and that the category "Exogenous Inflow" is a one-way source inward. This means, in effect, that the manager is dealing in part with financial resources that flow from and to the exogenous domain outside of his direct control. He can estimate the direct and indirect relationships that exist between allocations of resources to such purposes as production costs, investments, and the inflows that each might produce. But his decision space and his effective control are both limited with respect to the minimal family consumption costs, and to the exogenous inflows and outflows.

Human Decisions

The last of the three decision spaces in figure 2 is the set [F] which we have labeled "Human Decisions." This space includes all of the elements relevant to the decisions of the farm family. It occurs because of the proprietary nature of most farm firms, and is not always necessary in farm financial management. In the case of a farm firm operated by a salaried manager, family living decisions may not be in any way directly involved with the production or financial resource decisions of the farm firm, and [F] is then an empty set for our purposes.

When this decision space is relevant, it would include the following elements:

(1) Family resources such as skills, knowledge, and energy that are possessed by family members and available as inputs to the production activities of the farm firm. For these are inputs we traditionally charge an imputed or noncash cost. These inputs are not, therefore, directly involved in the farm financial management decisions, though they may be involved indirectly.

(2) Direct consumption expenses of the farm family over the short run would include allocations for food, housing, clothing, and transportation. These costs exist as a first call on the financial inflows available to the farm firm. They will be covered at some minimal level even before allocations are made to production expenses and the repayment of financial obligations (credit).

(3) Longrun expenses of the family would include such things as travel, higher education, recreation, and provision for retirement. These allocations are variable over the short run, but generally must be satisfied sooner or later during the investment horizon of the farm firm. They are somewhat in the nature of investments, in that the decision space must include both quantity and time of allocation, together with the basic decision of whether or not to allocate resources to these elements.

(4) The security requirements of the farm family include minimum income guarantees, as well as accident, life, and health insurance. This is the risk and uncertainty aspect of the family living space, and is similar to the probability element in the production decision space previously discussed.

FARM FINANCIAL MANAGEMENT

In the previous pages an attempt has been made to define the area of farm management by means of a listing of the five spaces that might be included in it. We are now ready to abstract from this definition those elements that should be included in the subset called farm financial management.

Earlier in this report, there was a definition of farm financial management, including three necessary spaces, called manager, goals, and production decisions, along with two sufficient spaces called financial resource decisions and human decisions. Some of the elements that should be included in each of these spaces were listed.

Farm financial management is the allocation and control of the flow of financial resources through the farm firm. This might be represented schematically as the areas of overlap in figure 2. These areas are isolated in figure 4. There are four subspaces produced by the overlapping of the three decision spaces, plus the appropriate subsets of the manager and goals spaces. The areas of concern are the conjoint sets in figure 2. These four subspaces involving farm financial management decisions are described below.

[PR] includes all of the elements which are common to the decision spaces of production and financial resources. It probably includes the majority of the researchable problems in farm financial management. Examples of elements in this subspace would include a decision involving a choice between acquiring a perpetual or a 1-year use-right to land services. A perpetual use-right requires a large investment of financial goods, generates a flow lasting to infinity, and restricts the decision space in future time periods. Acquiring a 1-year use-right to land services requires a much smaller quantity of financial goods, adds to the resource flow only for 1 year, and permits the decision to be made again under the possibly altered environment of the succeeding year.

A second example might involve the choice between allocating financial resources to a set of production services with a low but highly probable quantity of financial goods resulting, compared to the alternative of resources allocated to a set of production services with a high but less probable result. Such a choice is made in choosing between the production sets of corn and pasture.

[FR] includes the interrelationships between financial and human resources. An example of a decision in this area would be the replacement of family labor by hired labor, allowing a son to go off of the farm, and replacing him by an offsetting increase in the allocation to the cash expenses. A second example would be the choice between investing financial resources in a pickup truck (relevant primarily to the production processes of the firm), or in a station wagon (relevant primarily to the family consumption processes of the farm firm).

[PF] includes elements from the production and consumption decision spaces. An example

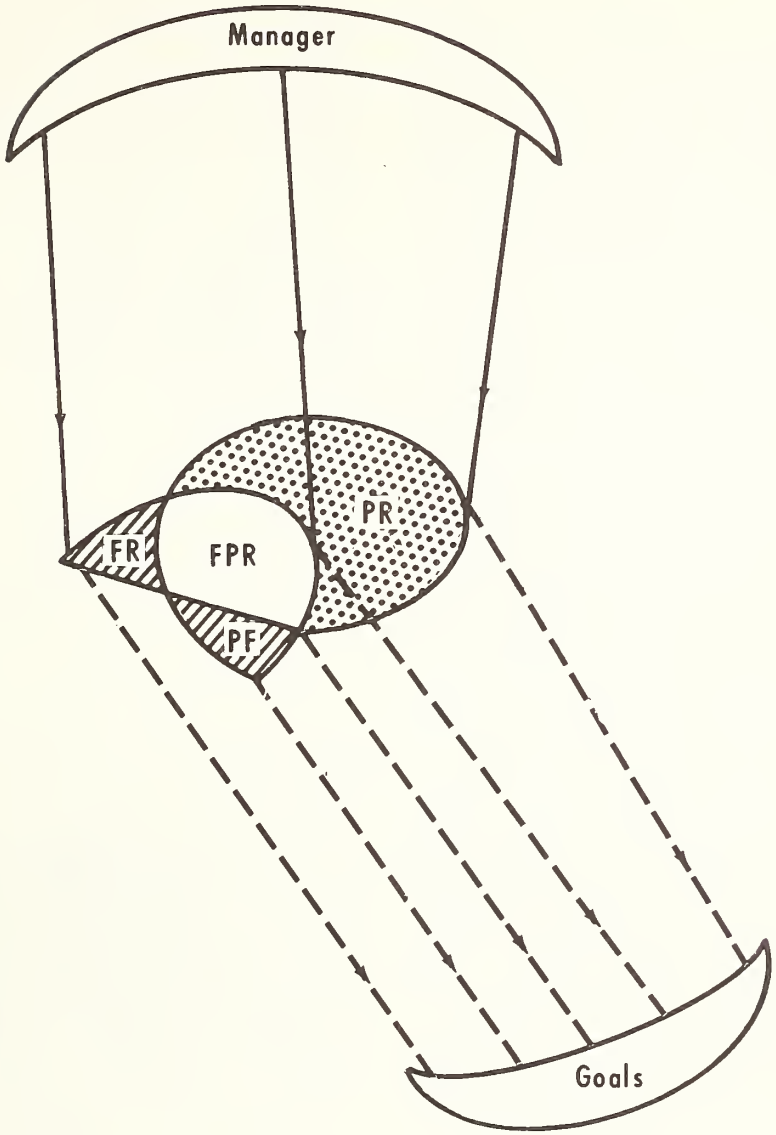

Figure 4

would be the allocation of family labor as a noncash input in certain production processes of the farm firm, freeing an equivalent quantity of cash resources for other production costs. Another example would be the decision of whether to allocate fluid milk produced by the farm firm to noncash-generating family consumption.

[FPR] is the subspace in which decision elements from all three primary spaces are involved. An example might be the decision regarding allocation of cash, as a scarce resource, to crop insurance as an investment. This would reduce the risk of an unacceptable low volume of cash flow through the farm firm, and would have relevance to both the financial

resource and family consumption goal sets. An alternative decision might be to allocate the monetary resource to a production system that would also reduce the likelihood of an unacceptable low volume of financial resource flow; for example, a supplemental irrigation system. A second example would be the decisions affecting allocations of financial resources to a stock portfolio. This might be treated as a reserve of funds which could be drawn upon as security for credit, which could then be allocated to production or family consumption or both.

The area of research in farm financial management might be restricted to problems of financial resource flow, suggested by one of the four subsets listed above, and to the relationships between these decision spaces and the spaces called "manager" and "goals." Problems falling only into one or another of the three primary decision spaces might be left as the concern of some area of research other than farm financial management. These might include farm production management, family management, or investment management. Such problems are exogenous to research in farm financial management, although the effects of such problems are frequently data that are required for a farm financial management decision. For example, the decision of whether to remain a corn-hog producer, or to specialize in either the production of corn or of hogs, is a decision in production management. But that decision, once made, will affect the financial management of the resulting firm in terms of the resource flows through the production process, the risk-uncertainty adjustments required, etc. Likewise, decisions which involve the inclusion or exclusion of certain production tools are the proper concern of production management, and the means by which the use-rights to such tools are acquired, the concern of financial management.

FUNCTIONAL APPROACH

The preceding definitions have tried to build a fence about the concept "farm financial management," and to describe the general decision processes that are involved in the concept. The following paragraphs take up a different definitional task; that of setting up some functional categories, by which the various financial management decision processes might be analyzed.

The process called "economizing" is an orderly way of identifying scarce resources, and of getting the most out of their use in the production process. Financial management economizes with respect to resource values, rather than on resources per se. More particularly, financial management is the process of economizing on the money values required to control the resources, the goods and services, called for in the production process. It is this further level of abstraction that separates financial from production management. The functional categorization includes the following members:

1. Investment
2. Ownership
3. Management
4. Labor
5. Entrepreneurship

Investment

The function of investment is to allocate money, or its equivalent forms of value, to receive a monetary return over some specified future time period. The function of ownership is to control the use-rights in a resource good in perpetuity, to receive a monetary return over an infinite time period. Investment does not imply ownership on any necessary basis. One may invest money by loaning it to a bank under the conditions of a certificate of deposit, and this certificate is in no way an ownership claim on the bank. One may invest money by loaning it to a neighbor who wishes to use it to acquire ownership of farmland. One does not thereby acquire an ownership claim on the neighbor's land, but only a promise that one's money will be returned under specified conditions.

Ownership

The functional ownership of a resource good does imply some concomitant investment of money in that good. In theory, this investment

may be arbitrarily close to zero, for example, one may receive title to property as a gift or an inheritance or a dowry. But in the general case, one must allocate money in a certain degree through investment to enjoy ownership. Since ownership and investment are analytically separated, it follows that one may not distinguish degrees of ownership: One must deal with a binary condition of ownership - nonownership.

Manager

The function of the manager is to organize the production processes, and to carry them out. This includes the translation of money resources into production goods and services, the allocation of these goods and services in production, and the retranslation of the product into money resources again. The labor service is provided only by people, while tractors and other machinery do work under the direction of people. The function of labor is to provide the human interface between management and the work mechanisms employed in production.

Entrepreneurship

The function of entrepreneurship is to bring together the resources required by management, and to stand the ultimate monetary risks of the combination of goods and services committed to the production processes.

This separation of production into functional components allows the researcher into problems of farm financial management to specify clearly, the costs, returns, and responsibilities involved in various related processes. A more lengthy study of this functional discrimination, together with an applied example, is underway.

Some Problem Areas in Farm Financial Management Research

The discussion in previous pages has concentrated on defining some terms, and on sketching a viewpoint that may be appropriate to research in farm financial management. This section discusses some of the areas in which researchable problems are apparent. The discussion of problem areas is not intended to be exhaustive, nor to suggest that there are no researchable problems other than those discussed, nor to imply a necessary priority with respect to certain problem areas that are discussed. The discussion only suggests reasonable research approaches to problems that are apparent in the general field of farm financial management.

The problem areas that are discussed include, first, that of the ingredients for a conceptual model of farm financial management. After this, there are four sections dealing with financial management from the particular viewpoints of getting started in farming, growth, disinvestment and intrafirm transfers, and management under conditions of risk and uncertainty.

TOWARD A CONCEPTUAL MODEL

Toward the beginning of this report, it was suggested that the viewpoint of research in farm financial management should be that of a gestalt. The universe of concern to financial managers in the real world appears to be a collection of people acting with both psychological and cognitive referents, constrained by past events and present possibilities, by future expectations, and by the irreversible flow of time. Financial management is a doubly dynamic process--dynamic with respect to time, and in the interplay of decision variables at any one time. We are concerned with decisions taken by managers of farm firms, and these decision makers are generally individual human beings. The decisions they make, and the actions that they take or avoid taking, have a strong flavor of the psychological imperative about them. It does no discernible good to assume that financial managerial decisions are completely "rational" by the onlookers' definitions, nor that the data available to the onlooker are necessarily available to, considered by, or even important to the person who actually makes a decision, acts, and is then responsible for the consequences.

A model that would simulate acceptably the decision processes of nonmechanistic and incompletely informed farmers greatly exceeds the technical capabilities of researchers at this time. The best that can be achieved is, therefore, to begin on such a model, and to begin again as many times as are necessary, in as many ways, and using as many logical constructs as there are seriously interested researchers. It is hoped that the social sciences will eventually progress to the point that a useful model can be built, while there are still financial managers and farm firms in business. The following

paragraphs suggest some of the ingredients that would seem to be important to the paradigms that must precede the models that simulate the decisions that people make toward managing their farm firm financial resources.

Endogenous Constraints

Management begins with a manager who is a human being. The conceptual model must include a number of things more or less unique to the manager, which could be called the endogenous constraints to management. These would be sets of goals, attitudes, values, habits, skills and abilities, learning processes, bodies of subjective experience, subjective knowledge, expectations of future events, etc. To label a decision sane or insane, logical or irrational, only puts a name to the researcher's ignorance, and does nothing toward explaining the decision. The farmer who strongly dislikes the odor of a healthy hog may not include a hog enterprise in his feasible set of decisions. The farmer who believes he can profit more from dairy cows than from hogs may also exclude a hog enterprise from his feasible set of decisions. The researcher can more readily dispute the second farmer than the first, and both must be granted rational bases for their decisions.

Endogenous constraints are data to the decision maker to whom they pertain, whether or not they are conceded some objective validity by observers of his behavior. Data are presented to the manager in written words and numbers, or in spoken or visual messages. But these data are filtered through individual perceptive mechanisms before they become real to the individual. Since perception varies among individuals, the data that are subjectively available from one individual to the next must also vary. An individual may act only with respect to the data that he has received. Therefore, there must be sets in the conceptual model called "subjective experience" and "subjective knowledge." Perhaps the best that can be expected in the near future is that researchers will gather some data indicating the range of generality that may be assumed for representative sets of managers. Until such data are available, research toward a conceptual model of farm financial management must proceed on the dubious basis of assumptions about the endogenous constraints of decision makers.

Exogenous Constraints

Management decisions are also influenced by factors that might be called exogenous constraints. Included here are sets of institutions, customs, physical environment, available technology, objective causality, second-party actions, the endogenous constraints of second parties, past events, various stochastic modifiers, etc.

These data are already included in extant conceptual models of managerial decisions, though perhaps not all of them are included in any one such model. The sets of phenomena included in this category of exogenous constraints differ from the previous category in that we agree that they may be objectively verified. We have concentrated on researching the partial effects of this institution or that stochastic element, because the results of such research may be published and defended before one's peers. We are traditionally more comfortable with statistics solidly entwined through our published results. Therefore, there is already a considerable body of available data on exogenous constraints. What is mainly needed is some integrative research on these data--some attempts to include them in the gestalt of financial management decisions.

Some of the above sets of endogenous and exogenous constraints will combine to constitute the set of feasible management decisions which a manager will evaluate, and from which he will select what he hopes are appropriate action decisions. The feasible set of decisions is therefore the residual of interactions between the two sets of constraints. In reality, this is generally a set with a surprisingly small number of elements. The research problem is to identify feasible sets of decision choices for given managerial situations, and then to establish the probable future results that might reasonably be expected to flow from them.

Feasible Action Choices

It is most critical that the conceptual model include an evaluation, necessarily probabilistic, of the interacting results of present financial management decisions over whatever future time period the present decision is likely to produce measurable impacts. Instantaneous and final results from present decisions would be

valuable to the manager, but they are necessarily a minor part of his total possibilities space. A conceptual model that allows only instantaneous solutions must be almost uselessly limited for the pragmatic farm firm manager. Time is real, however one defines it, and it must be simulated realistically in any very useful conceptual model of financial management.

A summary of the gestalt that eventually must become part of a conceptual model of farm financial management decision processes would include the following:

A. Endogenous Constraints:

Goals, attitudes, values, habits, subjective experience, subjective knowledge, skills and abilities, learning processes, expectations of future events.

B. Exogenous Constraints:

Institutions, social customs, physical environment, technology, second-party actions, second-party endogenous constraints, objective causality, past events (history), stochastic modifiers.

C. Feasible Sets of Action Choices:

Interactions between endogenous and exogenous constraints and estimates of time-related results of various managerial choices.

GETTING STARTED IN FARMING

Problems associated with getting started in farming have occupied researchers for decades. The challenge is perhaps more strong in recent years than traditionally it has been. The average value of assets used in U.S. agricultural production was about $6,200 per farm in 1940. The figure for 1966 has been estimated at about $66,000 per farm. How does a young person acquire control of this quantity of resources? Less than two generations ago, there were still areas of frontier, which could be homesteaded with very little initial capital outlay, and years of luck, work, and reinvestment of cash profits in the business. That frontier is gone. One must now buy developed land and other resources at relatively higher prices, and one has a much smaller margin between cash income and cash outlays which may be allocated to the control of needed resources. It is no longer reasonable to expect that normally competent young people will be able to work hard enough and save enough to gain ownership of the quantity of resources required in agriculture today.

Data from production economic studies can indicate the resource bundle required for a minimally viable farm firm. The question for financial management research is the means by which a nonfarmer may acquire control of this minimal bundle. The goal-value structure of the prospective farmer may provide the first hurdle, and the most critical one. Traditionally, ownership of the land has been high in the hierarchy of rural values. The supply of arable land being fixed, an individual who wishes to acquire some must buy it from someone who has it to sell. In the general case, control of the land resource may be satisfied with a downpayment and a mortgage contract held by the seller. The mortgage is a guarantee of a specified income stream to the seller, composed of the value of annual transfers of equity, plus the mortgage rate of interest. The buyer may estimate the discounted present value of the investment, and compare this figure with the asking price. Things may look good, until one compares the annual income stream that the investment is expected to generate, with that expected to cover amortization and interest payments to the seller. These may not compare favorably, because the expected life of the investment to the buyer might be on the order of 40 or more years, while the amortization period required by the seller is 30 years or less.

One alternative to this dilemma is to supplement the income stream generated by the land with income from some independent source. The young farmer may hire out his excess labor, machinery, or skills, and his wife may generate supplemental income by working off of the farm. But one could argue that the young farmer can earn more from his available labor and managerial skills on his own farm than they are worth in the marketplace. If this is not true, he is probably ill-advised to start farming in the first place.

A second alternative is for the young farmer to acquire part of the necessary resources through marriage, inheritance, gifts, poker winnings, or other fortuitous events. But this is

outside of the realm of economics, however, good the basic advice.

A third alternative might be for the young farmer to concentrate his available capital in resources with a shorter expected life--as machinery or livestock--and to acquire control of the land through short-term rent or lease. To eventually accumulate enough money to buy the land, the farmer must generate managerial income in excess of the market rate of return on land, which is about the price he must pay in rent.

A fourth alternative might be considered by beginning farmers, although it is in contrast to usual rural values. This would assume that the beginning farmer does not intend to own the land resource, and does not allocate scarce money to downpayments or amortization of mortgage contracts. Instead, he concentrates his available money in areas having the greatest short- or intermediate-run returns.

Beginning farmers have other financial management choices that are not directly related to acquiring the land resource. There is some opportunity to allocate the cash income that is in excess of cash operating cost, to further capital-formative uses. Over the short run, the beginning farmer might not maintain any fund for machinery replacement, but instead allocate such money to fertilizer or herbicide costs, or even to rental payments on additional land. Eventually he must replace old or obsolete machinery and equipment, but he might "live on his depreciation" over the short run. The beginning farmer who has minimal equity in his resources might accept the risks of stochastic yields, and reduce his cash operating costs by the amount of the crop insurance premium. If he loses the bet, he has lost only a year's operating costs and perhaps an equal amount of production credit. Later on, the farmer will have more to lose, and it might pay him to trade the insurance premium for the measure of security it provides.

The initial money requirement for a beginning farmer might be reduced considerably if he could buy used machinery rather than new equipment. He might profitably trade the opportunity cost of his labor as a spare-time or off-season mechanic, plus the uncertainty of equipment breakdowns at critical periods, for the reduced initial investment required for a line of new equipment.

Money and farming experience are probably the two most limited resources of the beginning farmer. This would indicate that he should use credit, leases, and other money-minimizing ways of controlling resources to the greatest possible degree, and such managerial advice as he can get from established farmers or outside "experts."

An outline of some of the interesting researchable problems of farm financial management, with respect to getting started in farming, might include the following:

A. Resource Acquisition and Control:

1. Values of the minimum starting requirements for economic viability, by type of farm and type of resource required.
2. Limitations and possibilities in substitutability of resource inputs.
3. Exogenous constraints on effective use of credit, by type and term of credit considered.
4. Interest rate-amortization requirements as they affect real opportunity costs of resources or earning capacity.
5. Leasing, renting, custom hire, ownership effects and possibilities.

B. Other Elements:

1. Costs and benefits of allocating "surplus" labor, management, and machinery, to supplemental income earning.
2. Risk position of beginning farmers with respect to yield-price uncertainties, quantity of resources risked, use of insurance and reserves.
3. Shortrun returns to various types of investment, and to entrepreneurial returns, substitutability of shortrun cash costs for longer run investments, and trade-offs of ownership for scale.

C. Time Considerations

1. Effects of starting situation in terms of rates of capital formation, and decision flexibility (shortrun) over initial years of firm activity.

2. Management of income and expense flows in beginning years--records and tax strategies.
3. Problems related to transfer of primary goals from establishment, to others such as growth, equity, stability, and ownership.
4. Long-term effects of starting-state characteristics of the resource bundle, and of long-term commitments, on flexibility of beginning strategies.

FARM FIRM GROWTH

The problems encountered by the apparent need for farm firms to grow include several that are of interest to researchers in farm financial management. Growth may be measured in terms of increases in equity, in acreage or livestock units, in total resources controlled, or in gross or net cash income flows, depending upon the managerial goal hierarchy assumed. Each of these criteria has some financial management content as well as that of production management. From the viewpoint of financial management, research in problems of firm growth would not concern itself with alternative resource combinations as such, but with ways of acquiring control of the requisite goods and services involved in various alternative combinations.

The market price of farmland is often higher than its apparent earning ability, taken as a separate unit. But if the value of land is averaged in with that of the basic farm unit, the marginal costs and returns generated by the additional unit may still allow its purchase. This gives a competitive advantage to farms that have already grown more than the average. Size begets size in farming, as it does in most other productive enterprises.

One of the avenues of growth for farm firms may be that of concentrating available money in allocations that promise the most rapid return flows of money or its equivalent. This would indicate leasing or renting of expensive and long-lived resources, and of those resources whose rate of return is low relative to other alternatives. An example of the latter might be specialized harvesting equipment, whose costs of ownership are higher than contract rates, because of the limited use to which the equipment may be put on any individual small farm.

Management of income and expense-flows through the firm is often critical to firm growth, to the extent that growth is generated from reinvestment of net firm returns. In this respect, it is necessary that the manager maintain close control over the relationships between production costs, credit terms, equipment replacement, financial and physical reserves, and income tax strategies. Strategies like the timing of investments in relation to the availability of reinvestible surpluses, and to the occasional high-income years (which are also potentially big tax-savings years) require considerable research effort.

Growth strategies need to be examined in terms of optimal ways of getting from given starting states, to desired states n-years hence. It has been suggested, for example, that one of the optimal strategies for expanding from a small general farm to a large specialized dairy operation, is to specialize on cash grain at first. One may then accumulate sufficient money to buy cows and specialized dairy equipment on a scale that is economically viable to begin with. This would suggest a switch to specialized cash grain farming, and some years of capital accumulation in high-earning reserves, then a second complete switch to specialized dairy production when entrance to that industry can be made on a profitable scale. The alternative of accumulating cows a few at a time, and trying gradually to grow into an economic scale, may be costly and uncertain. The net return on a small dairy herd, considering the specialized equipment required, may well be negative. So growth toward a dairy enterprise may need to be subsidized from the other parts of the firm business, and they may not be sufficiently large or specialized to allow such a subsidization. The maxim "never make an investment that will not be profitable" contains enough applicability to be worth researching, trite as it appears on the surface.

Some of the exogenous constraints to firm growth also need to be examined. One of these is the availability of the resources necessary as the basis for growth. A range livestock enterprise may be constrained by the public domain grazing permits available, and their price. Given sufficient rangeland, the growth of the firm may be constrained by the willingness of managers to underwrite or permit improvements that increase carrying capacity--such as brush removal and control, stock watering ponds,

reseeding, and controlled breeding. Likewise, water availability, as well as water cost, may constrain the expansion plans of a farmer producing irrigated crops; and the availability of land in the vicinity, as well as its market price, may constrain the cash grain farmer who is seeking growth by the addition of land resources. One cannot assume that needed additional resources are available at some price in all cases. While this may be true in the average or general case, there are local exogenous constraints that may vitally affect the growth strategies open to practicing farmers.

The risk attitudes, as well as the total effect of fortuitous events on the farm firm, may change under conditions of growth. Growth may simultaneously reduce the probability of an income so low as to endanger the shortrun liquidity of the firm (the bankruptcy threshold), and increase the absolute amount of resources lost, should the threshold be reached. The strategies appropriate to the management of cash flows, cash commitments, insurance and reserves systems, and investments, on growth-inducing resources may change in character and scale as the growth process proceeds. There may well be differences in kind as well as in degree, with respect to the protective strategies under growth situations.

Researchable problems relating to the growth goal might include the following:

A. Resource Control:

1. Costs and returns of incremental additions of various resources, by type of resource, by type of farm, and by stage of the growth process.
2. Minimum equity, downpayment, amortization restraints on additional land, equipment, and livestock.
3. Combinations of owning, leasing, and custom hiring resources and services, as growth strategies.
4. Changes in goals, attitudes, and values of managers during a growth process with respect to strategy sets for resource control.

B. Operation Strategies

1. Machinery, livestock, equipment inventory control, especially as related to production cycle cash flows--how does one maintain an optimal flexibility in the decision space under the strains of growth?
2. Effects on the rate of capital accumulation for growth of shortrun resource substitutability.
3. Resource allocation for optimal growth paths, under uncertain events of future yields, prices, and resource and service availabilities.
4. Effects of maintaining maximum shortrun decision flexibility on probable rate of growth over the intermediate or longrun planning horizon.
5. Risks and uncertainties in terms of changing the probability distribution with growth, and in terms of the absolute effects on the business, if the risky or uncertain events occur. Research is needed on expectations models, and risk acceptance-aversion, by type of farm, growth stage, equity position, managerial values and attitudes.

DISINVESTMENT AND TRANSFERS

As the average age of operating farmers and the quantity of the farm resources that they control both increase, the problems of liquidating the farm part of the firm become more important. The form in which resources are controlled has a considerable impact on the feasible set of strategies for getting uncoupled from them. Ownership, for instance, requires that the owner transfer his ownership rights to a second party, or that he retain ownership rights and lease the use-rights until it is possible to transfer the former. If, on the other hand, the manager has concentrated his investments in resources more nearly liquid than land, it may be a relatively simple matter to transfer ownership rights to some second party.

The general problem area of intergenerational transfers includes a number of subproblems that may be directly related to previously discussed problems of getting started in farming. In the case of fathers transferring resources to sons, it may be suspected that most fathers are not ready to transfer substantial resources from their own control to that of their sons, at the point of the managerial cycle when the sons most need such resources; for example, the father's farm may still be in the

growth stage when the son is ready to start farming. Partnerships normally presuppose a considerable increase in the scale of the firm to supply the consumption requirements of the additional family. This is a kind of economic quantum jump, and often results in straining both the managerial skills and the resources available, until adjustments are worked out to the new situation. If, in fact, the father does not want to expand to a two-family scale, he might still be able to use part of the equity and credit he has accumulated to underwrite a separate unit for the son. There are some problems of risk-sharing and repayment inherent in such arrangements.

As a manager approaches retirement, he may look for ways of transferring part or all of his farm equities to a second person, or of replacing them by equity in firm-nonfarm resources of various sorts or both. If the manager is able to sell the ownership rights in his various farm resources, he needs to consider investment alternatives, and the feasibility of these alternatives may be related to the income flow generated by the farm sale, and that generated (or expected) by the alternative investments. It makes a difference whether the manager is concerned about retirement income, or about passing on an estate to his heirs. Problems are presented by exogenous constraints such as estate, inheritance, and gift taxes, legal requirements affecting ownership and control of resources, and even the availability of buyers with a sufficient supply of money and credit to effect the ownership transfer.

In all of the above kinds of situations, the planning that the manager has applied in previous years has a major influence on the alternatives left to him, and on the relative economic efficiency of resource transfers that he may undertake.

It is not unreasonable to suppose that there are situations, other than death and retirement, in which managers may want to transfer resources from farm to firm, or to affect the investment balances between these two parts of the total business. There may be managers who have achieved a scale of farm operations that is relatively efficient in an input-output or an income generating sense, and who do not wish to expand to some larger scale. Assuming that they are still growth-oriented, the problem would be one of nonfarm alternatives for reinvestible surpluses. They could include investments in farmland to be rented out to other operators, or a range of investments in the nonagricultural sector. It would be desirable in such cases to investigate the effects of such diversification on the income flow, the risk position, credit availability, managerial requirements, and the lumpiness of investment opportunities.

In some cases, exogenous factors may severely limit the opportunities for farm investments, or the rate of return on capital may be more promising in firm nonfarm resources than in those of the farm. The critical relationships between the farm and nonfarm investment and resource allocation possibilities need to be explored.

Resource transfers may be desirable for managers who, for one reason or another, are not competitive in agricultural production, and who would be better off to transfer their labor, financial resources, or managerial talents to nonfarm pursuits. This would include managers of farm units with highly seasonal operations, and whose resources are therefore underemployed over parts of the year. This category could include many dryland cash-grain farmers, or the growing numbers whose main business is tourist-hunting-resort connected. Land devoted to spring wheat production in the Northern Plains, for example, is allocated to production only 5 months or so out of every 2 years. Alternate growing seasons are given over to fallowing for weed or moisture conservation, and winters are a dead loss in terms of productive employment. This works out to about 20 percent productive employment of a basic and expensive resource. Research into alternatives for added productivity for such resources should be well worthwhile.

The following outline summarizes some of the researchable problems in farm financial management, in the general areas of disinvestment and intrafirm transfers:

A. Managing for Retirement:

1. Intergenerational transfers--legal constraints, timing, effects on income, division of decision processes and net disposable incomes.
2. Transferring nonliquid resources by leasing or contract sales, as opposed to auction sales.

3. Transferring farm resources to firm-nonfarm resources for retirement income purposes--effect of prior decisions and commitments on feasible strategies, and institutional constraints on such transfers.
4. Transferring resources to heirs as living trusts, gifts, and bequests.

B. Intrafirm Transfers:

1. Firm-nonfarm growth opportunities, to be provided by allocations of reinvestible surpluses.
2. Resource transfers from farm to firm allocations--due to superior prospects for capital accumulation, or superior income generation.
3. Income flow stability over time enhanced by diversification of firm investments--volume and variation in flow.

RISK AND UNCERTAINTY

There are various problems in which financial management strategies are required to offset or minimize the effects of stochastic events on the operations of the farm firm. These events are in the general categories of uncertain yields and livestock productivity, of losses due to natural events (fire, wind, flooding), of the uncertainties and risks due to fluctuating prices paid and received, and of the changes in Government programs affecting production systems and prices.

Some events affect the shortrun liquidity of the firm, and this defines the bankruptcy threshold, if there are no readily available sources of capital that can be pumped into the financial system. It should be understood that this report is not concerned with alternative organizations or production practices that affect production risks, but only with the financial management strategies that may be associated with these types of organizations or production practices. Credit may be used to control resources or obtain services necessary to the production process. The source of credit, and repayment provisions may greatly affect the ability of the manager to withstand shortrun fortuitous events that threaten his business survival. Strategies with respect to credit may include prepayment, variable repayment, and the maintenance of credit reserves (including refinancing) that may be used on short notice.

Another group of strategies includes the scheduling of investments and the contracting of new intermediate, or longrun debts, with due consideration for the effect of these investments on the income-cost flows that are expected to obtain over an appropriate future period of years. The manager should be prepared with such emergency strategies as the conversion of short-term obligations into intermediate or even longrun debts. His ability to do this is partly a function of the asset-debt ratios by term categories, the "normal" income earning ability of the farm unit, and other endogenous considerations. His ability to convert short-term to longer-term obligations is also partly a function of the exogenous environment, including prevailing supplies of credit, demand for credit over the short run, and the attitudes of local credit suppliers toward refinancing short-term debts, at the time that the manager requires this service of them.

A related group of strategies concerns the manager's use of insurance and liquid or physical reserves. For each type of farm and environmental risk situation, there is presumed to be some optimal combination of these strategies that a given manager may use to insure survival in the face of calamitous events.

There are also strategies relating more to stability than to firm survival. Research in this area might include estimates of the financial flow characteristics for specialized versus diversified farm organizations, with respect to the contribution that farm organization might make toward offsetting cyclical price and production situations.

A well-known strategy affecting the stability of income is that of using cash rather than crop-share rents. The fact of higher risk may be accompanied by the prospect of higher incomes, to the extent that the probability distributions of prices or yields include substantial areas on both sides of the "normal" zone. Thus, while financial flows may be more stable with crop-share leases than with cash rental, there is also more opportunity to the exceptional, or lucky, or well-prepared manager, for occasional bumper years with cash leases, more or less offsetting the risks of disastrous years. Risk-taking or

risk-aversion attitudes are thus important assumptions governing selection of appropriate resource control strategies. The manager who is also a full owner of resources gets the full advantage of windfall gain situations, and takes the full risk of the counterbalancing windfall losses. He may, however, forego withdrawing ownership returns in low-income years, while the renter may not.

One category of stability strategies deals with the trading of large and long-term investments for small and shortrun operating expenses, and vice versa. Thus, a manager may choose not to invest in specialized harvesting equipment required for a crop with highly variable yields. He may allocate money to other, more stable uses, and contract for whatever harvesting is required from year to year. He may also choose to invest in the harvesting equipment, partly to ensure that he will be able to harvest the crop properly and on time, if he feels that contract harvesting is undependable, untimely, or unavailable from year to year. A middle ground requires the large-scale manager to own some harvesting equipment, and to rely on contract harvesting for whatever balance he cannot handle in a bumper crop year.

Stability may be gained through use of such devices as contract feeding, where part of the price risk is carried by the owner of the animals. Some managers may be able to reduce the price-volume-time uncertainties by producing according to contractual specifications of the processor or other immediate buyer. Future contracts may also be used as a strategy for offsetting price risks for crops and livestock.

A final category of stability strategies involves the use of physical reserves, or production in stages, to spread the income flow between years, or over an expected but uncertain peak in the price received for the product.

APPROACHES TO SPECIFIC PROBLEMS

In summary, one might examine a number of specific research project proposals that purport to pertain to farm financial management. The purpose here is to suggest the kinds of research approaches that the foregoing discussion would take for these specific problem areas. One should understand that the approach is described from this author's point of view, and that this might be worlds apart from the orientation of the author of a given research project proposal.

The format followed is first to list a topic, and then to identify that subspace of figure 4 into which the proposal seems (to this author) to fit. The main body of each discussion is a sentence or two describing the research approaches and content that are called up by the title. The purpose of this section is to use project proposals as stimuli--the sorts of stimuli that are provided in reading through a bibliography. The purpose is not to furnish a bibliography of proposed or ongoing research, to suggest any priorities on research problems, nor to criticize particular researchers nor their ideas.

Cash Flow Analysis

Research in this area would fall within the decision space [FPR]. The problem for research would be one of identifying the income, expense, and investment streams of selected farm firms, with respect to their source, direction, velocity, and volume, and the interrelationships of these characteristics. This would be a definitely dynamic analysis, with every characteristic carrying a time tag as well as a value (price) indicator. It would be the purpose of the research first to identify representative flow patterns for the more important types of farm firms, and then to establish some criteria by which these patterns might be manipulated toward optimizing the goals of management. As an example, it might be instructive to build a representative cash flow for an economic scale of Midwestern cash grain farm firm. Management strategies would then be designed, given the above flow pattern, to produce maximum income or a maximum rate of firm growth, to minimize cycle-to-cycle variation, or to provide some minimum quantity as a floor under family living. Specific modifications in allocation and control of financial resources would be the means by which the managerial goals would be more closely optimized.

Managing Financial Resources at Varying Equity Levels

This is in the space [PR]. Research in this area might concern itself with optimizing the

mix of owned and nonowned resources for various purposes (goals), such as susceptibility to risk, managerial flexibility, and growth potential.

Overcapitalization and Deficit Financing

This research would also fall into the decision space [FPR]. Overcapitalization of the owned resources presumably would tend to distort the data upon which certain financial decisions are based, including estimates of the internal rate of return to invested capital, and the base against which credit might be available.

Resource Control

These problems fall into the decision space [PR]. They involve a determination of equity ratios that are desirable for control of inputs, and for maintaining an adequate credit base. Other sorts of research in this area might include the allocation of limited available capital resources between competing investment possibilities, and of the means by which resources can be controlled within the exogenous constraints set by lenders, landlords, legal requirements, and social customs.

Corporate Form of Farm Firm Organization

This would also fall into the space of the set [PR], and might include elements from [F] as well. Research on this problem might include the detailing of the advantages and disadvantages of the corporate form of resource control, compared with the entrepreneurial and partnership forms. [F] would be included to the extent that members of the farm family, other than the manager, are bona fide decisionmaking members of the corporation, partnership, or more loosely organized entrepreneurial farm firm.

Internal Capital Rationing in Relation to the Supply of Loan Funds

This problem area is in the space [FPR]. It would include research into the attitudes of the manager and his family, with respect to the goals of liquidity preference, risk, or alternative forms of farm and firm investments. It would therefore deal explicitly with the manager-space and goal-space as well as this subset of the decision space. Research of this nature would also involve some preferential research into financial resource flows, with respect to available and desirable allocations of inflows for alternative outflows. It might also include studies of the knowledge of financial resource availability by the manager, compared with the financial resources actually available to him. It would be interesting to know whether internal capital rationing was due to ignorance or preferences, or was a reflection of real-world limitations.

Insurance

This area of research in farm financial management falls into the decision space of [FPR]. Insurance may serve the function of hedging against uncertain and undesirable reductions in the volume or quantity of income flow, against the temporary loss of family-supplied labor at a critical point of the production process, against unwanted reductions in liquidity, against casualty losses of physical resources, and as a form of annuity or savings. These possibilities play varying roles in the management of farm financial resources, and any one or all of them can be important means to managers under specified sets of financial management goals. The emphasis of research in this area would not be on the statistical estimation of various risks, but on the efficacy of various forms of insurance for various managerial purposes.

Prepayment or Variable Repayment of Mortgage Contracts

This falls into the decision space labeled [PR] again. There has been a little experimentation with these strategies by FHA and perhaps other mortgage lenders. The objective of research in this area would be to analyze the available experience in this technique, and to prognosticate its effectiveness with respect to such variables as scale of farm enterprise, type of farm, equity level, and weather and price risks.

Discontinuities in Growth or Investment Functions or Both

This type of research is in the space [PR]. Research in this area would try to isolate the critical points with respect to either time or scale, where growth is not a continuous function, along with reasons for this phenomenon. Relatively large changes in resource requirements at these critical points give opportunity for alternative ways of controlling resources, over both shortrun and longrun allocation horizons.

Tax Management

This is in the decision space [PR]. Taxes are one of the factors in the exogenous outflow of production and investment processes, and include both variable and fixed components with respect to production cycles. Real estate and personal property taxes are more or less fixed over the production cycle, while income taxes are not. The objective of research in the area of tax management would be to evaluate alternative management strategies that possibly would lead toward optimization of management flexibility, and the minimization of tax payment outflows in high-income years or over time.

Farm Family Attitudes

Problems in this area fall into the decision space [FR], and also perhaps into the two other spaces [Manager] and [Goals] in figure 4. Although attitudes are not in themselves susceptible to quantification in financial terms, they have a profound impact on the way financial resources are managed. They effect allocations from and to the financial flow over time, and the forms that these allocations take. Research in farm family attitudes would be behavioral rather than normative. Attitudes tagged with such characteristics as geographic area, type of farm, age of manager and the family members, and position in the planning horizon, should help to make normative research more appropriate.

Income Components

This research falls into the set [PR]. The financial management interest in questions of income components is restricted to the inflows of financial resources to the farm firm. An interesting component of the long-range financial resource may be the exogenous inflow deriving from increases in land value. This is not a variable resource, except to the extent that an increase in value of the land resource tends to increase equity, and therefore the borrowing base. This source of financial inflow may be a major one over the investment horizon of the firm, and should be compared to other sources or components, such as Government payments, production income, and other farm and firm investments. Studies might include the interrelational effects of varying mixes of income components over time, and of the internal efficiency of financial resources that are allocated to alternative sources.

Depreciation-Replacement

Research in this area is in the decision space labeled [PR]. Depreciation is a bookkeeping transfer of financial resources from one form to another. It is in accord with a schedule more or less fixed by institutional restraints and modified by the expected productive life of the resource. Replacement is the allocation of financial goods to the replacement of certain physical resources used up in the production process. Replacement is not limited to a certain schedule, but may be varied according to competing requirements for financial allocations. Research would therefore be aimed at establishing principles for the interrelation of depreciation-replacement, with other time-restricted financial flows. It would be interesting to consider such things as the time-scheduling of replacement, effect on tax liabilities, and effect on other aspects of the cash flow.

Financing Production Adjustments

This is again within the subset [PR]. The objective would be to investigate alternative ways of financing the investment and production allocations that are required for certain adjustments in the production process. Marginal analysis might be used to indicate the relative effect of various mixes of allocations on the production efficiency (measured presumably in terms of the relative marginal inflows that each mix might produce).

Maintaining a Balance of Investments

This fits into the subset [FPR]. The guiding assumption might be that excessive levels of investment in certain resources adversely affect rates of return, or managerial flexibility, or the risk posture of the firm. Since the firm is in most cases oriented toward both production and consumption, the investment balance must include the goals of both sectors of the farm firm.

Scheduling of Repayments, Replacements, Investments, and Other Allocations

This also falls into the set [FPR]. It is somewhat analogous to the problems of analyzing cash flows, the emphasis being on the allocations in this case. The problems would be to estimate resource requirements for various purposes over time, and to design systems of management that would optimize profit, or something else, with respect to these commitments.

The above listing of suggested research projects hopefully will clarify the approach of the researcher in farm financial management to a range of researchable problems. It might also make a little more clear the definition of the area of concern as it was presented in the previous sections.

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