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FARM FINANCE AND NATIONAL ECONOMIC POLICY

Some Gaps in Knowledge*

by

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Introduction

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Several years ago an AAEA committee was charged with initiating reviews of research in various fields of agricultural economics. That committee subsequently commissioned agricultural economists to review the literature since World War II in these various fields and to report on the status of knowledge to the profession. Emanuel Melichar, with the Board of Governors of the Federal Reserve System, and this paper's author are involved in a review of agricultural finance literature. This paper builds on materials that have been reviewed.

FINANCE

This paper does not fully treat the broad subject of farm finance as related to national economic policy. Omitted are issues of taxation, price stabilization, loan guarantees, business cycle relationships to agricultural credit markets, differential effects of inflation on agriculture and other sectors, and others. Although such issues merit further research and discussion, the purpose of this paper is to focus on a relatively few important

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topics, to review research on those issues, and to suggest gaps in knowledge.

The basic assertion made in this paper is that agricultural finance research is too heavily oriented toward micro economics and not sufficiently concerned with national economic policies. While micro economics is important and should receive reasonable emphasis, it is also true that national economic policies affect capital formation in agriculture, functioning of financial markets in rural areas, and the flows of funds between agriculture and other sectors. To the extent this assertion is valid, it is, perhaps, largely because of agricultural economists training in economic theory. Undoubtedly most agricultural economists have received more exposure in micro theory than in macro theory. Another possible reason for this micro orientation is that micro theory suggests more easily tested hypotheses than macro theory.

There is, perhaps, danger in overemphasizing the importance of economic theory with respect to research results. However, this position stems from the methodological importance of theory in specifying the main economic relationships of relevance in research. Economic theory provides the basis for delineating hypotheses to be tested and specifying the relationships to be measured. In many cases gaps in our knowledge of agricultural finance issues stem directly from gaps in the underlying economic theory.

The four topic areas discussed in this paper are: 1) capital formation in agriculture as affected by national economic policy;

2) the effect of national monetary and credit policies on investment and production in agriculture; 3) functioning of rural financial markets; and 4) the sources and uses of funds approach in the analysis of agricultural financing.

Capital Formation in Agriculture as Affected
by National Economic Policy

A classic study of capital formation in agriculture by Tostlebe [33] covers the 1870-1950 period. This study concluded that major amounts of farm capital came from public land grants and savings from gross income of farmers. A relatively minor part came from credit institutions. In current dollar terms, inflation added much of the farm capital value - particularly from 1910 to 1950.

Kuznets [20], in a companion study to Tostlebe's, examined capital formation and financing in the American economy. He suggested that a main determination of capital formation is to be found in factors affecting the savings process rather than exclusively in the demand for capital funds. He argued the need for theoretical work to explain the levels and trends in the proportion of capital formation to national product because his research showed a decreasing proportion of capital formation to national product over the 1869-1955 period.

In a review of the Kuznets' effort, Paul [24] pointed out the importance of the shift in capital formation toward households as private automobiles replaced public buses and as other labor and time saving devices were purchased by households.

A more recent extensive review of capital formation world-wide was undertaken by OECD [9]. A general discussion of capital formation in agriculture is presented with a review of factors which affect capital formation including brief reference to governmental efforts as well as individual incentives for capital investment. The OECD effort updates the U.S. agricultural capital situation through 1969 utilizing data from USDA situation reports [10]. In the studies mentioned to this point, emphasis has been on description of historical capital stocks and their changes with relatively little attention to the effects of national economic policies on capital formation.

Perkins and Witt [26] concluded that capital formation may take quite different forms depending on the stage of agricultural development. When agriculture is characterized by unused resources, scarce capital, and surplus labor, a major part of capital formation occurs in the form of nonpurchased capital produced with surplus labor. In a second stage of development when there exists little slack in unused natural and labor resources, social overhead capital investments become relatively more important. In a third stage of development characterized by American agriculture, they expected capital formation would occur concurrently as a substitute for labor, for resource development, and for infrastructure and social overhead.

Johnson [18] described factors affecting agricultural capital formation as follows: (1) Farm capital formation takes place rapidly when farmers are in a position to gain from reinvesting

part of their income and when they have the responsibility for the investment decision concerning farm production. (2) Rapid capital formation occurs when the public makes substantial investments in both the general and technical education of farmers, in improved technology for farming, and in extension of that technology to farmers. (3) Formation of farm capital is accelerated when the transfer of capital from farm to the non-farm sector is left to voluntary processes, including transfers in the form of inherited, monetary capital as well as training received by farm children who migrate to nonfarm occupations. (On the other hand, programs designed to force income out of agriculture make private agricultural investment unattractive.) (4) Lagging farm capital formation can be stimulated with favorable price programs and credit assistance to individual farmers. (5) both publicly and privately managed systems of direct agricultural production tend to be characterized by underinvestment in public facilities for agricultural research and extension, in general education, and in roads and other public facilities.

Some of Johnson's conclusions deserve further testing; however, they do provide a broader perspective on capital formation than is typical of most writings. In contrast to this broader view of capital formation in relation to economic policy, agricultural economists, in general have tended to use micro economics as their guide in research on capital formation. Reference to recent research is illustrative.

Baker and Hopkin [2] suggested a model for farm capitalization which related growth of the farm firm to rate of return on

assets, financial leverage and the farm family consumption function. They postulate that the incentive for a farmer to invest in his farm, to borrow for investment, or to save from consumption, stems directly from the rate of return he can obtain in his business. Similarly, Adams and Singh [1] focused on the firm-household decision making process as being vital for explaining rural capital formation. Tinnermeier [32] also reminds us that for small farmer credit programs to be successful, new technology must be profitable for the small farmer.

Johnson and Quance [19] explain agricultural capital formation in an economic framework of (1) substitution of capital inputs for labor and land in response to rising wage rates and rising land values, and (2) response on the part of farmers to expected MVP's for capital investment that were in excess of acquisition costs. Their study concluded that overcommitment of capital in agriculture resulted because ex post MVP's were lower than ex ante MVP's.

The studies of Baker and Hopkin, Adams and Singh, Tinnermeier and Johnson and Quance represent useful thoughts and research. They do, however, illustrate the tendency to rely on micro economics and neglect macro economics in the search for explanations of capital formation.

This section suggests that theoretical and problem oriented research would be useful in relating capital formation in agriculture to national economic policies and programs. Does capital formation (increased productive capacity) in agriculture take

place primarily in the context of the individual entrepreneur's adjustment to changing input and product prices? Or are there also important effects on the rate and type of capital formation due to actual or potential national economic policies (e.g., continued inflation, tax legislation, expensive credit policies)? Further, what can be said about the importance and appropriateness of infrastructure and social overhead capital formation as it relates to agriculture and to agricultural development?

It is this reviewer's conclusion that there are significant gaps to our knowledge concerning the relationships between national economic policy and capital formation in agriculture. There would also seem to be some potential for relating agricultural capital formation in the U.S. to the international economic situation. What are the implications of flexible exchange rates or shifts in balance of payments toward oil producing countries for American agriculture.

Effects of National Monetary and Credit Policies on Agricultural Investment and Production

Only limited agricultural finance literature exists which evaluates national monetary and credit policies with respect to agriculture. One early effort was by Doll [13]. His empirical analysis of the 1950's concluded that easing of monetary conditions, e.g., increasing the money supply, would not be beneficial to agriculture. He found the relationship between money supply and farm prices received to be inverse and statistically poor during the 1947-57 period. Further, the comparison of farm costs

and monetary conditions did not encourage easy money policies as a method to reduce farm costs.

Contrary to Doll's results, Gramm and Nash [14] found that agricultural incomes and investments have been responsive to changes in the money supply in the same manner as nonfarm incomes and investments. The elasticity of farm and nonfarm incomes in response to money supply changes were similar and statistically significant over the 1919-1966 period. However, while farm investments were related to changes in the money supply, the elasticities of farm and nonfarm investments relative to changes in the money supply were not equal. They suggested the difference might be due to relatively more inflexible interest rates faced by the farm sector. They concluded that farm policy "might be more effective if it were more closely coordinated with overall monetary and fiscal policy."

Sharpe [29] examined the impact of tight credit on farm mortgages during 1963-69, a period during which interest rates on farm mortgage loans rose from about 6 percent to almost 9 percent. During this period, individuals as lenders increased their share of the total real estate credit market. Federal Land Banks also expanded their share of the market. Commercial banks increased their farm mortgage loans more slowly than Federal Land Banks. Insurance companies reduced their loan commitments.

Trimble [34] looked at the effect of the stringent monetary and credit policies of 1969 and 1970 on the cattle industry. He hypothesized that these monetary and credit policies contributed

to the higher farm level beef prices of 1973 through decreased investments in productive capacity or through excess herd culling in reaction to 1969-70 conditions. His empirical results show that the beef cow herd expansion rate did relate to monetary and credit conditions. However, the estimated effect of monetary and credit policies was relatively minor. Only 5 percent of 1973 beef prices was explained by 1969-70 credit conditions.

Relatively little research has been done to examine the effects of national economic conditions and policies on the agricultural sector. The current rapid rate of inflation needs more study in terms of its effects on agriculture. Moreover, anti-inflationary economic policies need analysis concerning their impacts on the agricultural sector. Are there types of agricultural enterprises where anti-inflationary policies, such as expensive credit policies, create more difficulties than they solve? Such policies are designed to discourage the demands for goods and services, but might there be some production processes where such policies discourage investment in production capacity rather than demand for produced goods and services? In other words, are there agricultural situations where national economic policies designed for the general economy have an undesirable effect on the agricultural sector?

Research on Rural Financial Markets and Their Functions

There are substantial knowledge gaps concerning the functioning of rural financial markets. Typically, two types of studies have added to the understanding of such markets. One type has studied individual institutions. Examples are many, including Carson [11], Hopkin and Frey [17], and Hoffer, Boek and Boek [16]. Such studies have typically described how the institution operates, who it serves, and the problems it has experienced.

The second type of study has put emphasis more on description and analysis of market functions. Nisbet [23] described the rural credit market in Chile as consisting of an institutional market and an informal credit market. The well to do farmers were served by the banks in the institutional market while poor farmers utilized the informal, higher cost, credit market.

The role of financial intermediaries has received increased emphasis and increased interest from researchers. Baker, Hopkin and Brinegar [3] have called for additional research on financial intermediation. They argue that these financial institutions need to be modeled before much significant research can be done. They suggest financial intermediation can be viewed as buying funds with one set of maturities and selling funds with another set of maturities. They also have argued for the use of models to describe the functioning of financial markets.

More recently, Barry and Hopkin [4] have suggested a resource allocation model to examine the behavioral properties of financial intermediaries. Their model is basically a multiperiod LP approach including attention to liability management options, asset management options, and constraints. Particularly useful is the specification of data needs by the model. Payoffs, returns and feedback coefficients are specified in a systematic manner. Without such a model some of these important relationships would be overlooked.

Much attention has been given to financial intermediation by Federal Reserve economists. A study by Swackhamer and Doll [31] examined the distribution of bank credit flows in relation to the economic and institutional environment. Their data suggested considerable immobility in bank credit flows in rural areas both by regions and through time. They also identified considerable inflexibility in interest rates.

Geographic location was found by Swackhamer and Doll to have a statistically significant and economically important association with the structure of farm loan rates. There was evidence of rigidity in agricultural loan rates for all types of farm loans. The small banks which paid very little for funds charged rates for farm loans that were about the same as larger banks which paid maximum savings rates.

Swackhamer and Doll noted that participation loans increased by a factor of seven in the decade before 1966. They viewed this as an attempt by banks to adjust to, and keep pace with, the increasing financial requirements of agriculture. Yet, they

questioned whether the participation loan has potential for meeting future agricultural credit needs.

Baughman [5] described the basic economic function of financial intermediaries as providing a linkage between suppliers and users of funds. He described the national financial market, a variety of instruments and institutions linking the national market to local markets, and the local market for farm securities. He then concluded that adequate credit has been available to agriculture since there have been rapid increases in investment per worker and in output per worker. Also, he argued that the low rate of return on capital in agriculture suggested easy capital availability. He concluded that financial intermediaries have performed their roles reasonably well.

Sloan [30] agreed that existing financial intermediaries have performed reasonably well. At the same time, he pointed to imperfections in financial markets. He cited as examples the relative inflexibility in the price of agricultural credit compared with the price of credit in other sectors of the economy and a significant disparity in interest rates on agricultural loans among geographical areas. Further, he suggested that the rapid increase in the proportion of credit held by noninstitutional lenders may be symptomatic of shortcomings in the money markets. He also stated that legal restrictions often interfere with the free flow of capital resources. He included in this category, prohibition on certain forms of structure such as branch banking, usury laws, and restrictions on interest rates paid by banks and other thrift institutions.

Brake [7] suggested that the market for rural savers may also have inadequacies. In many rural areas the alternatives for savers are extremely limited and often provide only relatively low returns. The quality of information and access to investment information are more limited in rural areas than in urban areas.

In another work on rural financial markets, Hayenga [15] analyzed the effects of rural bank mergers on the services offered to citizens of the rural community. As a result of bank mergers, customers had access to a wider variety of services from the bank. New services were offered by merged banks that were not offered by independent banks. Both the market for loans and the market for savings became more closely tied to money market conditions. With bank merger, loan eligibility requirements became more liberalized so that a wider range of people became eligible for loans.

The literature available on financial markets and institutions is heavily oriented toward (1) specific institutions, and (2) farm loan purposes. Studies contributing to a broader understanding of rural financial markets including not only loans but savings and exchange of financial debt and equity instruments as well as noninstitutional participants are few.

Baughman's analysis is suggestive of the kind of economic logic which could be applied to studies of financial markets. Sloan's discussion points out some suspected market imperfections which merit study. Certainly the time is ripe, as suggested by Baker, Hopkin and Brinegar, to undertake some modeling of financial

markets. Such modeling will require both more descriptive information than currently available and a more macro-oriented and analytical approach to financial markets than has been applied in the past. A useful first step in this direction with respect to financial institution modeling is the Barry-Hopkin article.

Sources and Uses of Funds as an Analytical Tool

The sources and uses of funds approach to financial analysis carries great potential for improving our understanding of the financing of agriculture. This approach was pioneered by Copeland [12], but its adoption as an analytical tool by both economists and agricultural economists has been very slow. Analytically, it is an attempt to describe the money transactions between one sector and others. The approach has an appeal to a micro economist based on a direct parallel between sources and uses of funds of an individual firm and of a sector. In another sense, the approach can be viewed as simply measuring the financial transactions or flows between two balance sheets.

Several years after Copeland's initial work the Federal Reserve Bulletin began to carry flow of funds data. Yet, by 1968, Ritter [27] concluded that economists were generally not utilizing this approach for financial analysis. He called these data "indispensable" for understanding financial market inter-relationships.

Perhaps the first explicit reference to this analytical tool in the agricultural economics literature was an article by

Penson, Lins and Irwin [25]. They recognized the potential usefulness of this approach in describing the changing financial structure of agriculture. They pointed out its potential value particularly if disaggregation could reveal uses of funds by various classes of users. They suggested that this framework had the potential to provide the basis for new policy determinations and for welfare comparisons that are not otherwise possible.

In a comment on the Penson, Lins and Irwin article, Brake and Barry [8] took exception to some of their concepts and approaches. Although some of these differences are significant, Brake and Barry concurred that there exists substantial potential for analysis of the agricultural sector using the sources and uses of funds approach.

The flow of funds approach requires estimation of a matrix of numbers to quantify funds that come into the sector from various sources and the uses or payout of funds. In credit, for example, new borrowings from the various institutions represent sources of funds while debt repayment represents a use of funds.

This approach has been utilized in several models of the agricultural economy [6,21,22,28]. Melichar [22] has developed a rather extensive model to examine financial aspects of the agricultural sector. The model estimates flows used for capital purchases, savings rates, internal financing and projected external financing based on historical trends. The Penson model [21] is even more flexible in terms of utilizing the latest USDA projections to simulate changes in asset and liability items of the agricultural sector. This year the Penson model became the first sources and uses of

funds model to be used in deriving official government forecasts of the agricultural sector.

Yet, the sources and uses of funds approach is relatively untouched in agricultural finance. One need is for development of the underlying economic theory in the context of this tool. How do various uses of funds change with economic variables? How does agriculture, as a sector, make decisions on savings rates, new investments, and consumption? In the models using this approach, each estimate comes from an equation specified by the model builder. Undoubtedly these specified relationships need considerable additional discussion and analysis. Development of theory is needed for these relationships as well as for the sources and uses of funds framework to point the direction for continued research.

There is also need for additional conceptualization within the sources and uses of funds analytical framework. Some sources and uses of funds are not transactions in the usual sense. Included are gifts and inheritances. Capital appreciation and depreciation affect balance sheets but do not represent either flows of funds or transactions. Perhaps one of the most difficult conceptual problems is the change in people who are included in the agricultural sector. Each year a number of operators leave the sector and new entrants come in. Conceptualization is needed concerning the proper treatment of such changes.

This relatively new tool shows much promise, but there are substantial gaps in economic theory, analytical concepts, and data which need improvement if that promise is to be realized.

Concluding Comments

This paper has highlighted four important agricultural finance topic areas. It has asserted the need for additional macro emphasis in agricultural finance. Though the references cited do not, in and of themselves, verify the strong emphasis in the agricultural finance literature on micro as opposed to macro analysis, the AAEA literature review effort in agricultural finance does indicate that tendency.

This paper illustrates the knowledge gaps that do exist in four specific areas of agricultural finance. These are:

- 1) gaps in knowledge of agricultural capital formation as affected by national economic policy,
- 2) gaps in knowledge of effects of national monetary and credit policies on specific types of agricultural investment and production,
- 3) gaps in research on rural financial markets and their functions, and
- 4) slow adoption, and as yet little use, of sources of funds approach as an analytical tool.

Hopefully, the future will find agricultural finance researchers searching for a better grounding in macro economic theory and turning more of their attention to analyses of the effects of national economic policies on financial aspects of the agricultural sector.

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