PROCEEDINGS OF THE SEMINAR ON THE THEORY AND PRACTICE OF AGRICULTURAL WEALTH ACCOUNTS

R.M.A. Loyns
D. Freshwater
E.F. Hamilton
(editors)

OCCASIONAL SERIES NO. 16

Department of Agricultural Economics and Farm Management
Faculty of Agriculture
The University of Manitoba
Winnipeg, Manitoba
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June 1986

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PREFACE

In recent years an increasing number of issues have been raised concerning the system of farm financial accounts prepared by the Agriculture and Natural Resources Division of Statistics Canada. These questions have focussed on two general themes--the shortcomings in the current set of farm business accounts and the lack of information on the well-being of farmers and their families. To address these issues, Statistics Canada is presently conducting an overall review of its farm financial information system. The review, conducted with the participation of the Department of Agricultural Economics and Farm Management of the University of Manitoba, is intended to provide an independent evaluation of the concepts, methods and reporting framework for farm income statistics. An important step in the review has been the undertaking of two seminars to present ideas, identify possible changes and obtain feedback from users. The results of the first seminar were published in Occasional Series No. 14, Proceedings of the Seminar on Revisions to Farm Income and Financial Statistics for Canada. As well, George Beelen produced an M.Sc. thesis entitled, An Alternative System of Financial Accounting for the Canadian Agricultural Production Sector, 1983.

This report contains the proceedings of a workshop held in Ottawa at Statistics Canada from February 14-15, 1985. This workshop concentrated on the issue of farm family well-being under the title of The Theory and Practice of Agricultural Wealth Accounts. The workshop was jointly

sponsored by the Department of Agricultural Economics and Farm Management of the University of Manitoba and the Agriculture and Natural Resources Division of Statistics Canada.

The objective of the workshop was to provide interested individuals and organizations with the opportunity to comment on, and participate in, the process of developing additional information on the well-being of farm families. The participation of these various groups was deemed important since many of them will ultimately become the users of any new data series that are developed. Further output from the seminar will be reflected in a M.Sc. thesis by Mr. E. Hamilton, to be completed in 1986.

The papers presented at the workshop were intended to provide participants with a broad perspective on the issue of the wealth and well-being of farm families. The first two papers dealt with the theory of the economics of the household and some empirical evidence relating to wealth accumulation. Two further papers outlined the activities of both Statistics Canada and the Farm Credit Corporation in the area of wealth measurement. Papers were also presented on the valuation of land (the major farm asset), on the experience of the United States Department of Agriculture with wealth accounts and on the interest in wealth data by Agriculture Canada. A final paper proposed a set of aggregate accounts designed to provide more complete information on the economic position of farm families.

Concern about the well-being of Canada's farm families is heightened by the difficult economic conditions facing Canadian agriculture today. The Department of Agricultural Economics and Farm Management is pleased

to have had the opportunity to share in this research with Statistics Canada. We hope that readers will find this publication useful and informative.

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ABOUT THE AUTHORS

Wayne Simpson: received his early education, including his first degree, in Saskatchewan; his Ph.D. is from the London School of Economics. He spent several years in Ottawa (Bank of Canada, Labour Canada, Economic Council of Canada) prior to joining the Economics Department, University of Manitoba. He is currently Associate Professor at the University of Manitoba, with research interests in income maintenance programs, labour decision making and human capital formation.

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Bachelor degree in Agricultural Economics from the University of Guelph. Ed joined the Agriculture Division, Statistics Canada in 1981 and was granted Study Leave in 1983 to undertake a graduate study program which included the research underlying the seminar and proceedings.

FARM WEALTH AND INCOME DATA REQUIREMENTS: AN ECONOMIC PERSPECTIVE

Wayne Simpson

Introduction

The distinguishing feature of applied economic or econometric research is the emphasis placed on developing and testing models derived from economic theory. Thus, it is these theoretical considerations which guide the evaluation of data requirements for economists. Faced with the same problem, noneconomists may opt for different data requirements, statistical procedures and interpretations of the results for just this reason. Such disagreements are healthy, provided that the distinct research programs continue to produce practical insights into social behaviour, i.e., they are not degenerative.[1]

The guidance that economic theory provides to model specification varies substantially from problem to problem. In some areas, such as consumer demand theory, the guidance is relatively good and model testing and interpretation can be quite sophisticated and exact. In other areas, a high degree of uncertainty concerning the correct model specification will exist and an evaluation of the robustness of statistical results to reasonable specification modifications should be conducted.[2]

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[1] M. Blaug, "The Empirical Status of Human Capital Theory: A Slightly Jaundiced Survey," Journal of Economic Literature 14 (1976):827-855.

[2] E. Leamer, Specification Searches: Ad Hoc Inference With Non-Experimental Data, (New York: John Wiley and Sons, 1978).

In particular, there may be competing models to explain the same phenomena, each with some degree of specification uncertainty. Evaluation of these models may then be a very complex task involving as much art as science.

This paper will argue that farm wealth holding and income behaviour falls into this latter category. Such behaviour arises from the interaction of farm consumption and production decisions, and modelling such interactions is, in general, a complicated task. Furthermore, there would appear to be some unique aspects to agriculture which require special treatment. At this stage of economic research, the paper argues that there are at least two basic models to describe farm income and wealth accumulation, each with its own data requirements, research agenda and policy implications. While these models may eventually be integrated into a more general theory of farm consumption and production, little progress has been made to date. Indeed, little work has been done on this problem in comparison with many of the other aspects of farm behaviour. One obvious reason is the lack of adequate data to properly investigate the models described below. Perhaps this workshop will begin to overcome this deficiency.

In the next section, the life cycle model of wealth and income will be outlined. The third section presents what I will call the family farm model of wealth and income. The following section considers the data requirements for these two approaches. The fifth section examines the limited evidence of farm wealth and income in comparison with the predictions of these models. The final section summarizes the paper.

The Life Cycle Model

The life cycle model of consumer behaviour has a long tradition in economics, particularly with regard to the evaluation of income distribution, wealth holding and well-being.[3] Therefore, it seems reasonable to begin the discussion of the questions related to farm wealth and income by using the life cycle model.

The life cycle model concentrates on the household's attempt to maximize the present value of the satisfaction derived from lifetime consumption benefits and an estate bequest equal to expected remaining wealth at death. Wealth may be accumulated for deferred consumption and for the bequest, based upon the difference between income and consumption in any time period. Normally, income consists of earnings at some standard rate per hour plus interest paid on accumulated savings. The problem is to decide on the amount of work (and, hence, earned income) and consumption in each time period given the appropriate discount rate, or rate of impatience, and the interest rate paid on savings.

The solution to the life cycle model will typically have the following characteristics. In the early stages, consumption will be modest to generate savings and permit investment and wealth accumulation at a relatively high rate. In mid-life, the rate of consumption increases to surpass earnings, leading to a moderate, but still positive, rate of wealth accumulation due to returns on past investments. In later life,

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[3] See, for example, C.M. Beach, Distribution of Income and Wealth in Ontario: Theory and Evidence, Ontario Economic Council Research Study, (Toronto: University of Toronto Press, 1981); or A.S. Blinder, Toward an Economic Theory of Income Distribution, (Cambridge, Massachusetts: Massachusetts Institute of Technology Press, 1974).

retirement or semi-retirement causes income to decline and savings to be run down toward the desired bequest level. Wealth is expected to actually fall during later life. This pattern is depicted in Figure 1.

Applying the life cycle model to agriculture requires that some modifications be made. Earned income should consist of both returns to farming, which decline with the amount of hours worked on the farm, and off-farm work, when its returns exceed those in farming.[4] Such adaptations are not easily incorporated formally into the life cycle model (at least not for this author), although one may anticipate the results in broad terms.

The life cycle model typically predicts that consumption will grow at a constant rate. This pattern will be financed by an initially high rate of growth of income and wealth accumulation which is eventually used to finance consumption in retirement. Thus, income and wealth will follow an inverted U-shaped pattern over the life cycle. Decumulation of wealth will occur over a shorter period of time than did accumulation, leaving some bequest or inheritance. Insofar as total returns to farming rise with wealth (assuming all accumulated wealth represents investment in the farm), the off-farm component of income should decline over the life cycle. Essentially, off-farm income may be viewed as assisting the rate of saving and accumulation early in life only.

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[4] See, for example, R.D. Bollman, "Off-Farm Work by Farmers: A Study With a Kinked Demand for Labour Curve," Ph.D. Thesis, (Toronto: University of Toronto, 1978); or W. Simpson and M. Kapitany, "The Off-Farm Work Behaviour of Farm Operators," American Journal of Agricultural Economics 65 (1983):801-805.

The life cycle model describes the average pattern of household consumption, income and wealth accumulation in Canada (specifically Ontario) reasonably well,[5] but such patterns are dominated by nonfarm households. The life cycle model views the household primarily as a consuming unit with wealth accumulation as a retirement savings policy. Wealth is divisible, permitting systematic decumulation in later life. Even in nonfarm households this assumption presents a problem because a major component of accumulated wealth may be housing, which is currently indivisible financially as well as physically. This has led to arguments for reverse mortgages which would permit pensioners to use housing as collateral for retirement loans. This issue may be particularly important in agriculture where wealth, in the form of farm land, buildings and equipment, is also indivisible and may limit the usefulness of the predictions of the life cycle model.

The Family Farm Model

In terms of model development and orientation, the family farm model of income and wealth is quite different than the life cycle model. No formal model can be found in the literature although, implicitly, the family farm model draws upon the general theory of the firm. It clearly emphasizes production considerations, including those beyond the lifetime of the current operator, rather than consumption decisions over a single operator's lifetime. In addition, however, the family farm model recognizes some unique features of the agricultural household/enterprise.

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[5] C.M. Beach, Distribution of Income and Wealth in Ontario: Theory and Evidence, Ontario Economic Council Research Study, (Toronto: University of Toronto Press, 1981).

Bennett[6] traces the family farm concept over time. He argues that the unifying concept is that of the small scale operator fighting to survive under the economic pressure of economies of scale in agricultural production. Wealth accumulation is no longer viewed in terms of deferred consumption but in terms of a prerequisite to adequate returns from farming in the future. The goal is not lifetime satisfaction per se but a viable farm for one's lifetime and for future generations. Inadequate wealth accumulation does not only mean a poorer retirement but also an end to farming for the family.

The family farm model includes an element of implicit contracting designed to transfer both human and physical capital across generations. Children who would expect to inherit the farm serve an apprenticeship training period in which they provide inexpensive labour in return for a share in future ownership. This share presumably accumulates until, upon retirement of the father, the children have accumulated a major interest in the farm. Farm wealth is indivisible since land, buildings and machinery cannot be sold to finance retirement, but the father might continue to receive a share of the farm's profit as a return to his share of the operation and as a continuing, gradual sale of the farm itself. If this share is inadequate to meet retirement needs due to inadequate farm size (past wealth accumulation), bad management or bad luck, then retirement may involve a return to off-farm work.

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[6] J.W. Bennett, Of Time and the Enterprise: North American Family Farm Management in a Context of Resource Marginality, (Minneapolis: University of Minnesota Press, 1982).

The children, on the other hand, can be expected to receive excellent preparation, not only in general farm management but also in the management of a particular farm. The peculiar characteristics of the farm (local soil, weather, etc.) and their implications for production decisions can be passed on from one generation to the next as part of the inheritance process. Such accumulation of what is known as specific human capital may only arise from intergenerational transfers, i.e., the family farm. This argument would explain the higher earnings of farmer-followers than farmer-nonfollowers in the United States.[7]

Since broadly held, large corporate farms represent only a small proportion of most farms, and since such farms often involve considerable contracting out of crop production to family farms,[8] the family farm model cannot be dismissed. Its foundation in the continuity of the family farm is solidly based on evidence of rates of occupational inheritance in agriculture that are five times those in any other profession.[9] Furthermore, this result is not sensitive to controls for human capital and ability.[10] It is this exceptional rate of occupational inheritance which distinguishes farm families from other families in general and family farms from other family businesses in particular.

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[7] D.N. Laband and B.F. Lentz, "Occupational Inheritance in Agriculture," American Journal of Agricultural Economics 65 (1983):311-314.

[8] J.W. Bennett, Of Time and Enterprise: North American Family Farm Management in a Context of Resource Marginality, (Minneapolis: University of Minnesota Press, 1982).

[9] P.M. Blau and O.D. Duncan, The American Occupational Structure, (New York: John Wiley and Sons, 1967).

[10] D.N. Laband and B.F. Lentz, "Occupational Inheritance in Agriculture," American Journal of Agricultural Economics 65 (1983):311-314.

Data Requirements for Income and Wealth

The life cycle and family farm models suggest somewhat different approaches to data collection. The life cycle model would appear to have much more modest requirements. Ideally, the model requires data on consumption, net income, wealth and work effort (on-farm and off-farm) over the life cycle along with such demographic characteristics as age, education and family composition, and such production information as type of output, land size and form of ownership. In actual fact, much can be inferred from a single cross-section with such data[11] and a reasonably good life cycle model can be fitted from a small number of linked cross-sections or panels.[12]

The family farm model would appear to be a bit more demanding. Information on the behaviour of nonoperators, specifically those who will inherit the farm operation, is needed as well as that of the operator himself. This includes both on-farm and off-farm work effort and income. Thus, the unit of observation is not the senior operator alone but other actual or prospective operators sharing (formally or informally) in the management of the farm. Moreover, the process of inheritance needs to be emphasized; in particular, more importance needs to be placed on inheritance intentions and the process by which the ownership of the farm is transferred from the operator to his children. This may,

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[11] A.F. Shorrocks, "The Age-Wealth Relationship: A Cross Section and Cohort Analysis," Review of Economics and Statistics 57 (1975):155-163.

[12] MaCurdy, 1981 and 1983, for example, uses small panels to estimate life cycle models of labour supply decisions. Presumably, his approach could be extended to the analysis of farm wealth holding and income over the life cycle.

of course, be very difficult information to gather. However, overcoming these difficulties may be worthwhile if the family farm model can contribute to our understanding of farm behaviour and appropriate government tax and subsidy policy in agriculture.

Evidence of Farm Wealth and Income

As mentioned earlier, evidence on farm wealth and income is limited. Furthermore, I intend to be selective in order to reach certain tentative conclusions as directly as possible.

The life cycle model predicts that income and wealth accumulation will follow an inverted U-shaped pattern over the life cycle. This hypothesis is difficult to test directly since it would require evidence on income and wealth over time in a lifetime longitudinal data file. Shorrocks[13] argues that if the U-shaped pattern holds over the life cycle, then it will also hold for cross-sectional data on individuals of different ages under certain very general conditions. Hence, cross-sectional data, such as the Farm Credit Corporation survey, may be used to verify this prediction of the life cycle model.

The 1981 Farm Credit Corporation (FCC) survey of about 3,600 Canadian farms is a rare source of microdata on the farm wealth position and the pattern of farm wealth holding, by age, of the senior operator. Farm asset values are based on each respondent's assessment of current market values. During a period of stable fixed asset prices, such as 1981, self valuation should be reasonably accurate. When these asset prices

[13] A.F. Shorrocks, "The Age-Wealth Relationship: A Cross Section and Cohort Analysis," Review of Economics and Statistics 57 (1975):155-163.

(especially land prices) are unstable, however, systematic over or under valuation could be a problem.

Evidence from the FCC survey shows quite conclusively that wealth does not follow an inverted U-shaped pattern with increasing age. Instead, wealth increases monotonically with age for almost all types and sizes of farms, as shown in Figures 2 and 3.[14] On average, then, there are more farms characterized by steady wealth accumulation throughout the life cycle than farms involved in wealth decumulation late in the operator's lifetime. This contradicts the predictions of the life cycle model. Clearly, the bequest motive is quite strong, although it is not clear whether any hidden wealth transfers are occurring between the operator and his successors. What is clear is that investment in the farm does not decline.

The family farm model provides an explanation for continuing wealth accumulation. Physical farm wealth is indivisible and any run-down of wealth would jeopardize the viability of the farm for future generations if there are significant economies of scale in agriculture. Thus, farm wealth continues to accumulate while returns to that wealth are shared in a fashion which eventually transfers ownership from the father to the children. This transfer does not begin late in the father's life but much earlier, when the children provide inexpensive labour while learning how the farm operates. The nature of these arrangements and transfers remains somewhat of a mystery because surveys have not probed for

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[14] W. Simpson and D. Freshwater, "Wealth Accumulation, Off-Farm Income, and the Distribution of the Well-Being of Canadian Farmers: A Life Cycle Perspective," Unpublished Paper, (Winnipeg: University of Manitoba, 1984).

such information in the past.

The life cycle model also predicts that off-farm income will decline with age as increased consumption will include increased consumption of leisure and as returns from farming increase with scale. The FCC survey shows, however, that off-farm income, while declining initially, on average, actually begins to rise after 30 years in farming.[15] This result has also been found for Wisconsin farmers by Kada.[16] Again, this contradiction of the prediction of the life cycle model may be explained by appeal to the family farm model. If physical farm wealth is indivisible and if there are strong competitive pressures for continued accumulation, then off-farm work may be necessary to finance retirement if returns from farming are too small to support both parents and children comfortably. Essentially, off-farm income late in life is a reflection of inadequate returns to agricultural investment or an inadequate rate of investment earlier.

The life cycle model's prediction of an inverted U-shaped pattern for income over the lifetime could not be examined in the FCC survey because only gross farm income data were collected. Attempts to estimate net farm income from FCC loans data did not yield credible results.

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[15] Ibid.

[16] R. Kada, Part-Time Family Farming: Off-Farm Employment and Farm Adjustments in the United States and Japan, (Tokyo: Centre for Academic Publications Japan, 1980).

Concluding Remarks

Assessing the data requirements for farm income and wealth is difficult unless there is some notion of the questions to be posed. This paper has posed those questions in the form of two models--the life cycle model and the family farm model. The former model emphasizes the consumption side of the farm management question. The latter concentrates on the farm production decision but differs from the general analysis of farm businesses in comparable industries subject to economies of scale (such as the family grocery store) because of the much greater rate of occupational inheritance in agriculture. The models focus on different questions and make different data demands. In particular, questions related to farm inheritance are of the utmost importance in the family farm model but not in the life cycle model. The arrangements, if any, by which ownership of farm wealth is transferred from one generation to another over time (rather than at the point of retirement or death of the senior operator) need to be understood according to the family farm model. Since the meagre evidence we have suggests that the family farm model explains wealth accumulation and off-farm income over the life cycle better than the life cycle model, such information bears consideration in future wealth and income surveys and studies.

Many important policy issues in agriculture are involved. The role of the family farm remains a sensitive political issue in several Canadian provinces.[17] In particular, the question of the appropriate financial treatment of family farm inheritance will not go away. Better pol-

[17] J.W. Bennett, Of Time and the Enterprise: North American Family Farm Management in a Context of Resource Marginality, (Minneapolis: University of Minnesota Press, 1982).

icy formulation and assessment may be possible if intergenerational wealth transfers in farming are better understood. Answers to these and other issues can only benefit from information on farm wealth holding and the process by which it is accumulated and transferred from one generation to the next.

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Figure 1. Consumption and Wealth Accumulation Profiles Predicted by the Life Cycle Model

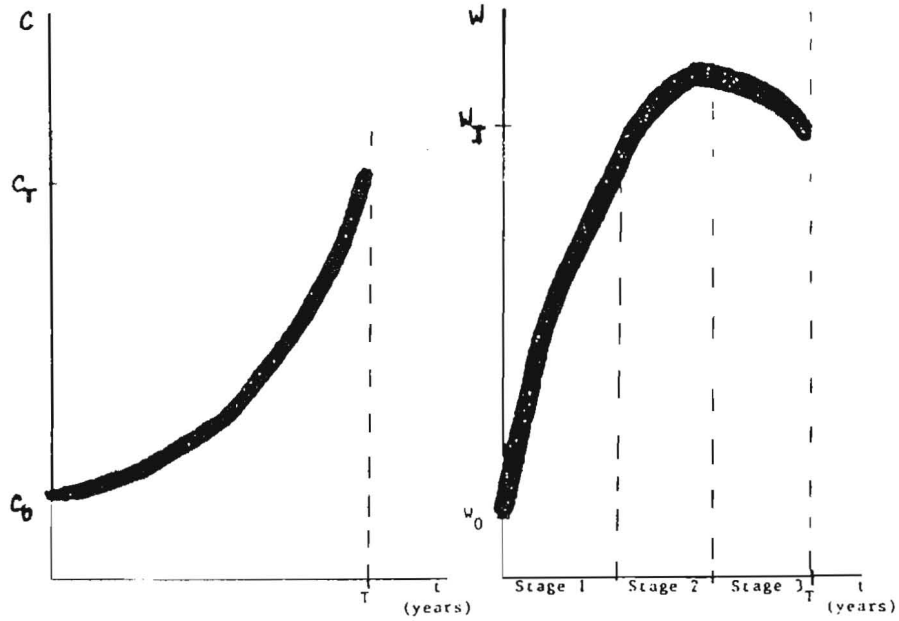
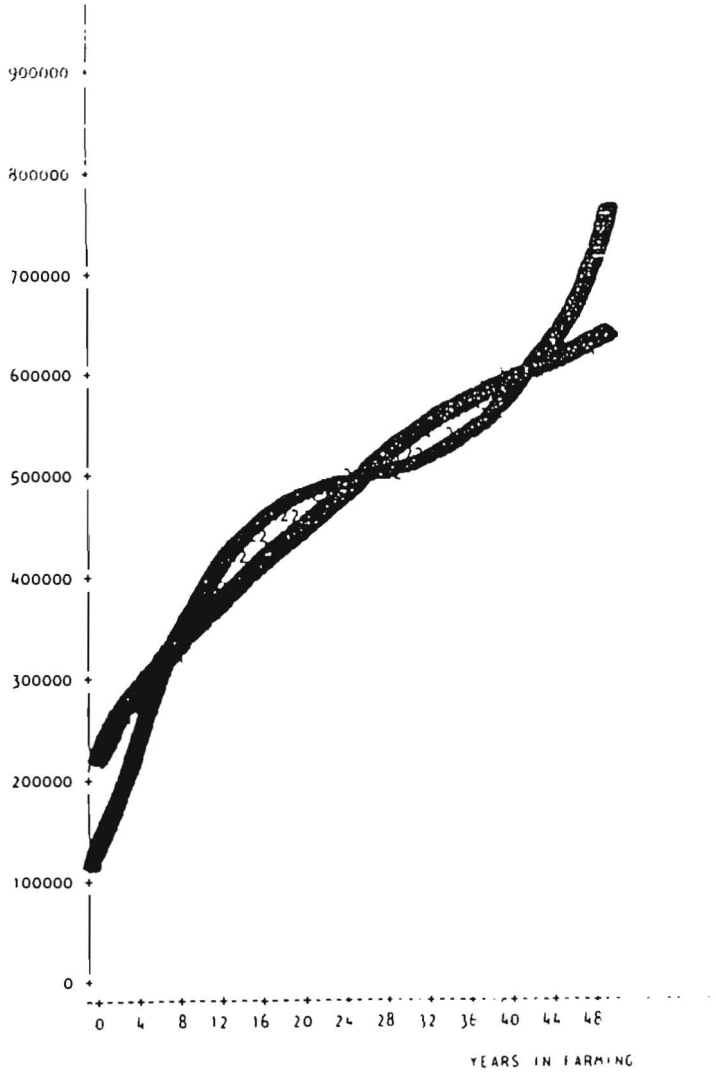
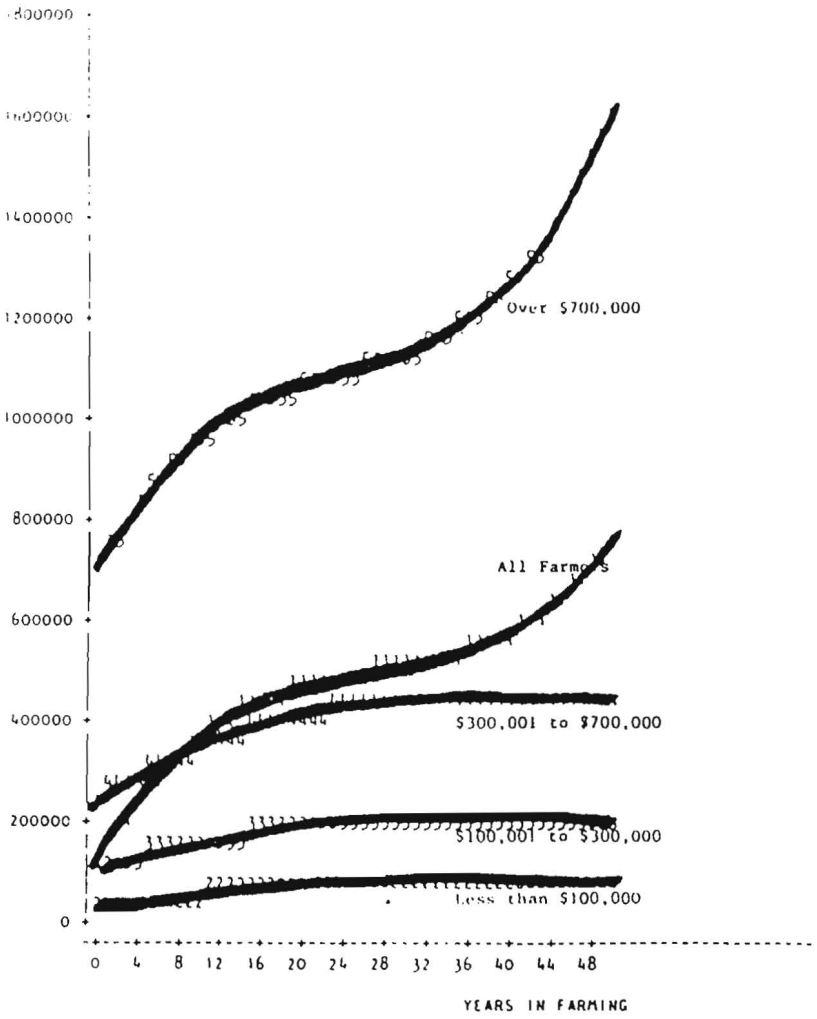


Figure 2. Estimated Wealth Accumulation Profiles, Based on Regression Estimates of Net Worth Versus Years in Farming



Source: W. Simpson and D. Freshwater, "Wealth Accumulation, Off-Farm Income, and the Distribution of the Well-Being of Canadian Farmers: A Life Cycle Perspective," Unpublished Paper, (Winnipeg: University of Manitoba, 1984).

Figure 3. Estimated Wealth Accumulation Profiles by Asset Size, Based on Regression Estimates



Source: W. Simpson and D. Freshwater. "Wealth accumulation, Off-Farm Income, and the Distribution of the Well-being of Canadian Farmers: A Life Cycle Perspective," Unpublished Paper, (Winnipeg: University of Manitoba, 1984).

THE "NEW" HOUSEHOLD ECONOMICS AND FARM INCOME

W.H. Furtan and G.C. Van Kooten

Introduction

Several papers given at the 1982 Winnipeg seminar on farm income statistics provided suggestions for revisions to the farm income and expenditure accounts. However, even if the suggested changes were to be carried out, it still would not be possible to develop a reliable indicator of the economic welfare of farm families from those data. A revised set of accounts will only be able to identify, on an economic basis, differing levels of well-being, if full family incomes are also known.

This workshop is concerned with wealth accounts. Except in the case of intergenerational wealth transfers, this concern with wealth is somewhat puzzling. The wealth of any individual is determined by the flow of income and the market rate of interest. In agriculture, the major capital good is land and land value (i.e., land price) is determined by residual income flows and expectations. What we should be concerned about is how expectations are formed and how these expectations are used by farmers, along with income measures, in the agricultural sector.

The economic organization of Canadian agriculture is not centered around land. Rather, farm families make economic decisions on how to allocate their labour among alternative enterprises, each of which

yields a return. However, not all returns are monetary. The farm household is also involved in child rearing, farm labour, leisure, health care, management and in other activities. If the data base we are attempting to develop is to give an adequate reflection of the economic health of the farm family, it must include information on all family activities (or enterprises) and not just the farm enterprise. An agricultural data base should seek to include all of the farm family's activities, as suggested by the "New" Household Economics.[1]

In this paper we will present a brief review of the "New" Household Economics (NHE) and discuss how agriculture can be accommodated within this model. As well, some suggestions will be made concerning the type of data required for this model and how it would aid our understanding of the organization of agriculture.

The "New" Household Economics and the Theory of the Firm

In his discussion of production processes in a firm, Alfred Marshall never concerned himself with the situation in which the owner was also the major supplier of labour. Subsequent economic analyses seldom made a distinction among ownership, management and labour. As a result, most agricultural economists focus only on the farm enterprise; that is, they consider only the maximization of profits from producing and marketing agricultural products.

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[1] Gary S. Becker, A Treatise on the Family, (Cambridge, Massachusetts: Harvard University Press, 1981).

The "New" Household Economics starts from the position that it is the utility of the household or family which should be maximized. The utility function can be written as:[2]

$$U = U\ (TL,\ X)$$

where,

TL = family leisure time, and

X = a vector of market goods.

This simplified model is the labour-leisure model. It is very useful for agriculture because it allows us to introduce various constraints on the family while allowing for the exercise of choice.

One of the constraints on this model is the production of farm goods and, thus, income. In addition, we include off-farm income, other asset income and leisure valued at the opportunity cost of labour. The constraints can be written as:

$$VP + A + w\ (LOF + TL) = PX*X$$

$$VP = f(LF,\ FC)$$

$$LOF + LF + TL = T$$

where,

VP = variable farm profit,

A = asset income,

w = the off-farm wage rate,

LOF = off-farm labour,

PX = a vector of prices associated with X,

f(.) = the variable profit function,

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[2] Although the question of interdependent utility functions is an important theoretical and empirical issue, it is ignored for the purposes of this paper.

LF = labour used on the farm,

FC = a vector of fixed capital inputs (including land), and

T = total time.

The comparative statics of this model can be derived in a straightforward manner, although the signs on the partial derivatives are often ambiguous. The model can also be expanded to include the demand for items that augment human capital (health care, for example), but this produces a model which is correspondingly more complex.

The reduced form equations, which are to be estimated, can be determined as in any constrained maximization problem. These equations center on how time is allocated within the household among the various family enterprises (activities). Wage rates, which are the market returns to human capital, and job opportunities are important--as the wage rate rises so does the value of leisure. If the individual does not work off the farm, then the implicit wage is the reservation wage placed on the individual's leisure time.

One of the more influential economists concerned with agriculture, T.W. Schultz, has been instrumental in the development of the NHE. Schultz has argued that the major force causing change in the agricultural economy has been the "rising value of human time."[3] As human time becomes more valuable, the allocation of resources will change to maintain some equilibrium rate of return. In agriculture, the major method of raising productivity has been through investment in research and development. In reaction to changes in factor prices, farmers have sub-

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[3] T.W. Schultz, "The Value of the Ability to Deal with Disequilibria," Journal of Economic Literature 13 (September, 1975):827-846.

stituted capital for labour, primarily in production. However, farm families have invested in higher education because there are substantial market returns to this type of investment. Consequently, an increasing number of rural people supplement their farm income with off-farm income. As a result, the farm enterprise should be considered as only one source of income to the farm family. It can supply labour to the off-farm labour market, which can be a major source of income. The family must decide how to allocate its scarce time between the farm, the off-farm labour market and the other household activities in which it is engaged. At the margin and in equilibrium, returns should be equated across all of these enterprises.

Empirical Support for the NHE

It is difficult to construct meaningful empirical tests of the hypotheses generated by the NHE model using current Canadian data. The collection of labour data on Canadian farms has always taken second place to what is considered more important data, such as number of goats, ducks and geese on the farm. In Canada, there have been only two studies which have used the NHE approach; R. Barichello[4] and Furtan; Van Kooten and Thompson.[5] Although data limitations have prevented further research in this area in Canada, there is some evidence to support the NHE model.

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[4] Richard R. Barichello, "The Schooling of Farm Youth in Canada," Ph.D. Thesis, (Chicago: University of Chicago, 1979).

[5] W.H. Furtan, G.C. Van Kooten and S.J. Thompson, "The Estimation of Off-Farm Labour Supply Functions in Saskatchewan," Journal of Agricultural Economics 36 (May, 1985):211-220.

One series of data on farm labour that we do have is the number of days worked off of the farm by the farm operator (Table 1). Using data from the 1971 and 1981 censuses, we see that more farm households are allocating labour to the off-farm market. In 1981, the number of farmers with some off-farm work ranged from 31 percent to 51 percent of the total number of operators and all provinces, except Quebec, showed an increase over the 10 year period. Similarly, the number of days worked off the farm has increased to an average of 170.9 days per year for operators reporting some off-farm work. Clearly, farm families are not bound by the farm, but, rather, make extensive use of the off-farm labour market as a source of family income.

Another piece of evidence that gives some validity to the NHE model is the changing economic organization of rural households. The average number of children per family is dropping in the rural areas of Canada. Further, more farm women are participating in the labour force and many have full-time jobs. As the value of time rises, the cost of spending time with children increases, thereby providing one explanation for the decline in family size.

Implications for Agriculture Data Collection

We can construct a simple example which reveals the difference between the NHE's full income approach and an approach based on asset values. Suppose we have two farmers, Mr. A and Mr. B. Mr. A, a grain farmer in southern Saskatchewan, owns his farm of four quarters (economic value $600,000), works 120 days a year and has a net return of $40,000. Mr. B owns his farm of six quarters and 100 cows in northern

Saskatchewan (economic value $600,000), works 340 days per year and has a net return of $40,000. Which farmer has the highest economic standard of living? The major difference between the farms is that the return to labour is higher on the farm in the southern part of the province. If we add an opportunity cost of $100 per day for the leisure time of Mr. A for 220 days, we get extra income of $22,000. Therefore, using a full income approach, Mr. A makes $62,000 and Mr. B only $40,000. This is a superior representation of the economic position of these two farmers.

The point of this example is that the key economic variable in understanding the economic organization of farms is how labour is allocated between the labour market and the consumption of leisure. The men and women who live on farms are spending an increasing amount of time earning income from sources outside agriculture. This change in labour allocation is the one economic change that Statistics Canada has largely ignored. Moreover, this lack of data limits our ability to measure the economic welfare of farm families. Simply counting the number of cattle, the number of acres, the quantity of grain produced and the value of machinery does not give one an accurate picture of the economic organization of Canadian agriculture. Fortunately, these kinds of issues are currently under consideration by Statistics Canada as part of the process of revising the farm income accounts.

Farm Wealth

In order to estimate farm wealth, we must predict the value of fixed resources, such as land, buildings and quasi-fixed machinery. Here, we enter the debate over accounting values versus economic values which is

at the centre of the discussion about capital gains or capital appreciation (as some would have us call it). However, before we can determine the economic rate of return to fixed resources, we must have a good understanding of how expectations are formed and how these enter the decision-making process. The price of land is clearly dependent upon expectations and expectations are something we have a lot to learn about in agricultural economics.

With respect to wealth in agriculture, many farmers could liquidate their assets and have a significant amount of cash. This cash could then be invested in other securities that yield more income than farming. Indeed, John Scott recently indicated that the flow of income from agriculture in Illinois accounts for only about 20 percent of the value of land.[6] This number is in line with a recent report by Richard Schoney[7] of the University of Saskatchewan. If this is correct, where does land get its remaining value? Farmers either get utility from owning land or they hold expectations which cause its value to be above the discounted stream of future income accruing to the land.

Finally, one needs to ask whether land should be valued as a unit (i.e., the entire farm) or by the last quarter added to that unit. If there are returns to size in farming, then the value of the last quarter added to the farm cannot be imputed to the first quarter section.

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[6] John T. Scott, Jr., "Factors Affecting Land Price Decline," American Journal of Agricultural Economics 65 (November, 1983):796-800.

[7] Richard A. Schoney, How Much Can You Pay for Land? Extension Bulletin, (Saskatoon: University of Saskatchewan, 1985).

In the recent past, a substantial portion of the increase in land values was simply the result of expectations, since the economic returns were, and currently are, not present. If a farm is valued at $1 million and 50 percent of this value is the result of optimistic expectations, then the true wealth of the owner is certainly not $1 million. Perhaps a measure of wealth can be determined by ability to borrow. However, financing land on the basis of security, rather than cash flow, has been a major contributor to the current debt problems in agriculture. The only meaningful measure of wealth in agriculture is the discounted flow of income and expectations should not be included in such a measure. If, in fact, the income flow increases, then capital value will increase and the owner of the resource will be wealthier.

Conclusions

It is apparent that more emphasis needs to be placed on measuring full income if we are to have some indication of the economic welfare of the farm household. Farm wealth, as measured by land values, is clearly an inappropriate indicator of family welfare, unless such values are determined from realistic notions regarding future flows of farm income and not from expectations.

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Table 1

Off-Farm Labour Participation in Canada
By Province, 1971 and 1981

Province	Percent of Farmers Working Off the Farm			Average Number of Days Worked Off the Farm by Operators Reporting Some Off-Farm Work		
	1981	1971	% Change	1981	1971	% Change
British Columbia	51.2	50.7	1.0	193.1	185.9	3.9
Alberta	41.4	33.7	22.8	168.1	149.8	12.2
Saskatchewan	31.0	25.8	20.2	146.5	127.8	14.6
Manitoba	35.3	30.8	14.6	154.3	142.5	8.3
Ontario	44.0	42.7	3.0	188.5	172.3	9.4
Quebec	32.0	33.4	-4.2	159.7	137.6	16.1
New Brunswick	44.3	42.4	4.5	180.8	162.9	11.0
Nova Scotia	47.7	45.6	4.6	186.7	167.2	11.7
P.E.I.	36.1	36.0	0.3	162.1	149.5	8.4
Newfoundland	41.6	36.2	14.9	178.0	168.2	5.8
Canada	38.6	35.3	9.3	170.9	154.2	10.8

Source: Census of Canada, 1971 and 1981.

NATIONAL ACCOUNTS CONCEPTS OF CAPITAL AND WEALTH ACCOUNTS

John Joisce[1]

Introduction

This workshop comes at a very timely moment as far as the National Accounts are concerned. Only last spring did we produce, for the first time, a national balance sheet for Canada for the 1961-82 period. In May, we shall be publishing data for the years 1961-84 on a sectored basis. However, before discussing those data in more detail, a brief explanation of the National Accounts concepts of capital and wealth should be provided. To those of us who work with the National Accounts on a daily basis, these concepts seem relatively straightforward. It is important to note, however, that the National Accounts framework only provides one perspective for examining data, a perspective that may not be qualitatively different from other ways of looking at data.

The National Accounts

The National Accounts are an integrated, macro-economic set of numbers that are based on generally accepted accounting principles and are designed to assist decision makers in macro-economic policy, whether in the federal or provincial governments, the corporate world or anywhere else. They are not intended to provide comprehensive data for micro-ec-

[1] The opinions expressed in this paper are those of the author and do not necessarily represent the views of Statistics Canada.

onomic analysis. Rather, they are designed to provide an overall, consistent and comprehensive set of accounts which bring together measures of current production and expenditure, transactions with nonresidents for both current and capital purposes and identify savings and investment decisions in conjunction with details on financial instruments and intermediation. All of this information is tied back to the stock of wealth--the assets and liabilities that are the foundation of output and economic decision making.

A broad outline of the main framework and components of the National Accounts is shown in Figure 1. Starting from the stock of assets--the productive capacity--we use an input of labour and add a mixture of other considerations, including current transactions with nonresidents, to derive current production (Gross National Product, or GNP) and expenditure (Gross National Expenditure, GNE). From these are built the income and outlay accounts. These accounts incorporate items such as the transfers that are not included in current production and represent sources and uses of funds statements for current income and expenditures. They are prepared for the four sectors of the National Accounts--persons, business, government and nonresidents.

From these accounts we move to the capital finance accounts, which provide the source and disposition of funds for the accumulation of assets--financial and nonfinancial assets and/or, in the case of governments in recent years, the covering of deficits. The financial flow accounts are next, incorporating the capital account of the rest of the world and providing for the integration of financial instruments as a lending/borrowing vehicle for the financing of capital accumulation

(and/or deficit for government). These accounts give us the capital stock, the wealth and the balance sheet components which form the base from which we move into a new period.

In the financial flow accounts, the four sectors of the National Income and Expenditure Accounts (NIEA) are disaggregated into 42 sectors and subsectors. Considerable detail is provided for financial institutions, reflecting the focus on the assembly of small amounts of savings (surplus) for relending to final borrowers whose demands are usually for large amounts. The treatment of persons, unincorporated business and nonresidents remains basically the same as in the NIEA. Government is broken down by level (federal, provincial, municipal, ...) and the Canada and Quebec Pension Plans are identified separately. Business is disaggregated into a number of subgroups, ranging from nonfinancial private corporations, through nonfinancial government enterprises (classified by level of government) to banks, near-banks and a variety of financial institutions.

Using the financial flows system--the financial asset and liability balance sheet levels that have been available for several years--we have built a complete set of sector balance sheets that include nonfinancial assets and, therefore, enable us to derive estimates of net worth or wealth.

Exclusions from the National Accounts

In preparing these balance sheets, the items that were to be included were required to display two characteristics--they had to have economic meaning and they had to be measurable. As a result, several components

that constitute an integral part of our national wealth had to be excluded on one or both of these grounds. Of these, the most important were subsoil assets, human capital and water.

Subsoil assets, whether oil and gas, coal, or other minerals, are a very substantial part of this country's economic picture. We have built up our standard of living, to a considerable extent, on the exploitation of our natural resources, of which subsoil deposits are one of the most important. Given their importance, why then are they excluded? The simple answer is that there is no accepted method of valuing them. Certainly one sees "depletable assets" on the books of resource companies, but that represents, to a large extent, the capitalization of drilling, exploration and development costs. It does not include any estimate of the value of the deposits. Moreover, even if it did include estimates of these values, what would be the basis for that valuation? Using a discounted future stream of income to the company might not be appropriate, particularly since discounting at current prices for commodities subject to sudden price changes would be of rather dubious value. Furthermore, even if we were able to arrive at a satisfactory answer to that problem, we would still need to decide how the question of ownership and revenues accruing to government would be factored in. Obviously, estimates are constructed by the National Energy Board and Energy, Mines and Resources Canada, but these are for quantities, not values. At some future point we may feel more confident about including these resources in the Accounts, but for the present they are left aside.

Human capital offers much the same conundrum. Obviously, a well educated, motivated and creative work force is more productive than an il-

literate one--that was realized some time ago. But how would one attempt to place a capital value on that? Discounting future income flows appears to be a very weak proposition at present. Capitalizing education expenditures would create the problem of portraying the salaries of teachers and administrators as an accumulation of capital. Moreover, it would be very difficult to quantify capital/output ratios for human capital, an ingredient important to our estimate construction. So, again, we have set aside the value of human capital, preferring to understate our national wealth on pragmatic grounds.

The third most important item that we have excluded is particularly relevant to agriculture. We have seen only too graphically what the lack of rain (albeit with poor management) has meant in Ethiopia and other African countries. The situation on the Prairies here in Canada last year served to remind us of the importance of rain and/or irrigation. Water, of course, is also responsible for over 50 percent of the electricity generated in this country, an enviable position for countries dependent on coal, oil or fission power. We have approximately one sixth of the world's fresh water supply, yet, in the national balance sheet, water is excluded. The reason for this is quite straightforward--water is considered a free good but even if it were not, it would be next to impossible to place a value on it. But, as the desertification of the planet proceeds, as the demand for food continues to rise and as hydro electricity becomes increasingly valuable, then, perhaps, we may begin to try to place a value on our water resources.

Other items we have left out for much the same reasons include our standing timber, fish stocks, libraries, collectors' items and national

monuments. These all present measurement problems in addition to the difficulties involved in calculating the economic benefits that flow from such items as libraries and collectors' items. On top of all this, there are a variety of components of our national well-being that remain outside the balance sheet. These could include such things as living in a democratic country, the mobility of labour and capital, and the relative security and safety of the street, to name but a few. The list could be much longer. Work is being undertaken in the United States to explore broader measures of well-being but they remain experimental and we, in Canada, have not yet ventured that far. However, what we have done in the balance sheet presentation is much more comprehensive than has been done by any other country.

Now that we know what is not in the National Accounts, perhaps we should identify what has been included. As mentioned earlier, we have endeavoured to incorporate those items that have an easily quantifiable economic meaning. These include machinery and equipment, residential and nonresidential structures, inventories, consumer durables and land.

Data Sources and Methods

At this point, a brief explanation of the methods used to derive the actual data is probably useful. For machinery and equipment, and nonresidential structures we have used a "perpetual inventory" approach. This involves the accumulation of investment expenditure by industry to obtain its capital stock in a given year. Investment data are collected, while stock data are obtained by cumulating past investment flows, deducting discards, making allowance for depreciation and allowing for

changes in replacement cost in order to adjust for current dollar valuation. As some capital has a life of 50 years or more, stock estimates for 1961 require flow data back to before the First World War. However, the relative significance of data of that age is obviously very small. The capital stock data are provided by the Construction Division of Statistics Canada. Allocation to the various sectors is based either on book value, survey data (which is then pro-rated to the perpetual inventory method) or on direct estimates.

For residential structures, data are also drawn from Construction Division's perpetual inventory information. Allocation to sectors is based on Census and Central Mortgage and Housing Corporation (CMHC) data and depends on the type of unit (single, double, row, apartment) and tenure.

The stock of consumer durables has been compiled by the Financial Flows Section, using a perpetual inventory approach based on expenditure data for 26 durables and some semi-durables such as jewellery, china and glassware. All durables are held by the personal sector.

Farm inventory data are obtained from the Agriculture Statistics Division of Statistics Canada. The data are split between unincorporated and incorporated farms using Census data with interpolations for the intercensal years.

Nonfarm inventory data are obtained from the Gross National Product Division of Statistics Canada. Starting with a benchmark year, we add the value of the physical change in inventory flows and then the inventory valuation adjustment to derive an approximate market value. Sec-

toring is based upon industry data, at book value, and is pro-rated (using the Public Accounts, for example, for nonfinancial government business enterprises).

Hopefully, this brief outline has given you some idea as to where Statistics Canada stands in the development of data for a full, 42 sector national balance sheet. While we have made some progress, we feel that there are a number of areas which need further development. Among these is a disaggregation of our persons and unincorporated business sector. We would like to break down the unincorporated business sector in order to identify the single largest component, namely, farms. Farms, however, cross two sectors--unincorporated business and nonfinancial private corporations. For the moment, however, let us examine farming as a whole and distinguish, at least in principle, between the farm and the farmer; that is, between the business and the person.

Agriculture in the National Accounts

Agriculture Statistics Division and the Census of Agriculture produce data on the value of the nonfinancial assets of farmers, including their inventories of grain and livestock, their machinery and equipment, and their land and buildings. These all constitute important aspects of farmers operations, particularly the value of land. However, we do not have comprehensive financial or wealth data, without which the nonfinancial information is of limited value. In no survey that is conducted at present for input into the National Accounts is there any breakdown of farmers deposits at banks, credit unions, etc. Nor do we have input on farmers holdings of any marketable securities except in a very aggregated form. On the other hand, we do have some data on farm debt.

Two sources of good data on farm borrowing and indebtedness are the Farm Credit Corporation (FCC) and the credit unions. FCC mortgages are made entirely to farmers. At the end of March, 1984, $4.9 billion was owed by farmers to the FCC. Credit unions also showed $1.1 billion in mortgages to farmers and a further $875 million in loans, as of the same date. These data are available in time series.

We used to have data on loans to farmers as part of the chartered banks' reporting requirements to the Inspector General of Banks and the Bank of Canada under the provisions of the 1967 Bank Act. That detail, however, was dropped with the passage of the new Bank Act in 1980. As a result, the latest date for which we have such information is October, 1981, when the new reporting regime went into effect. At that point, total bank loans to farmers were reported at $7.5 billion of which some $500 million was advanced for farm improvement loans. The new reporting system for the banks is, in fact, considerably more detailed than the old, and more soundly based on accounting principles, but in the changeover the farmers loans item was lost. However, the new reporting system has unincorporated business identified separately and we found that at the end of December, 1981, (i.e., two months after and the closest point to the last data point of the old system), the level of loans was $7.7 billion in Canadian dollars and $189 million in foreign currency. From this, it appears that a very large part of the unincorporated business component in the new reporting system is the same as the loans to farmers component of the old. However, the further we move away from that point in time, the less confidence we have that 95 percent of these loans are to farmers. The data do, however, provide some sort of benchmark.

On the face of it, a further source of data would appear to be the Canadian Wheat Board (CWB). Although we obtain quarterly data from this organization, the System of National Accounts' (SNA) treatment of these data prevents them from being as useful as they might appear. The CWB's holdings of grain are not deemed to be owned by the organization, but are considered to be held by the farmers, even though the grain has moved from the farm into commercial channels. The reason for this is that the grain in commercial channels has not been acquired by the Wheat Board--the Board is only acting as an intermediary or a conduit for the farmer. This approach is employed because an advance, rather than a payment, is made at the time of delivery. In other words, the grain is held as a sort of collateral. Accordingly, as with collateral in other financial transactions, the asset remains the property of the borrower. The matter is further complicated by the SNA's preference for accrual accounting. Rather than count farm income only when payment is actually made, the National Accounts attempts to accrue the income as it is earned. Consequently, on the income side of the accounts we may see $100 million of farm income from the sale of grain, but only $50 million will have been received by the farmers. Accordingly, an account receivable for the remaining $50 million will be recorded.

Another matter related to the balance sheet of farmers is the Crow Rate and its successor. We have made no attempt to factor these changes into our calculations as yet, but the disappearance of the Crow Rate will have an impact on farmers cash flow and on their net wealth position. This is a very complex issue and one which will have differing influences, depending, among other things, on the province and on the

distance from the elevator and the elevator terminals. However, for a thorough analysis of farmers net worth, it would be necessary to include the effects of the method of paying the Crow benefit.

At this point, what we have are estimates of a reasonably comprehensive nature for the nonfinancial assets of farmers, some portion of their debt and one item of their financial assets. The Agriculture Statistics Division does publish data on farmers borrowing from financial institutions. These data are an important source of information, but their application to the SNA's present framework is somewhat limited in that they are presented as borrowings by type of institution, rather than by instrument, which is the method by which data are assembled for the national balance sheet accounts and the financial flow accounts.

As far as the other items on the asset side of the balance sheet are concerned, we have very little detail at all. We do have, or will soon be receiving, some detail on deposits in banks for unincorporated business, but, at present, we have no means of knowing what portion of those deposits are held by farmers. Indeed, even were we to have that information, it might be of only limited value because it appears that farmers, like many other unincorporated businesses, do not always maintain separate household and business accounts. While it is debatable as to whether farmers hold much in the way of other financial assets, such as short-term paper, stocks and bonds, it is difficult to dismiss them as being insignificant until some data have been assembled. The FCC surveys of 1981 and 1984[2] placed all cash, bonds and savings into one cat-

[2] These surveys are to be distinguished from the quarterly data provided to Statistics Canada by the FCC from its balance sheet and income statements.

egory.

A brief reference to these surveys is appropriate at this point. While they obviously represent an important advance in achieving better knowledge of the balance sheet position of farmers, their application to the SNA is limited. First, as I have already mentioned, the data for the financial items are very highly aggregated. Furthermore, the National Accounts people are more concerned with change rather than absolute levels. Accordingly, time series is an essential ingredient in their analysis of data. More than two years of data would be required before we could begin to incorporate this information into the National Accounts, and, specifically, within the national balance sheet. As previously mentioned, the national balance sheet data, newcomers to the SNA, have been constructed on an annual basis back to 1961.

Earlier in the paper, the problem of farming crossing two sectors of the National Accounts was briefly mentioned. Within the Accounts, 95 percent of farm income accrues to the unincorporated business sector and the balance to the corporate sector. With the rapidly growing tendency for farmers to incorporate, as well as the increasing role of agribusiness in farming, it appears that this split may be inappropriate. Moreover, while we are applying this ratio with regard to income and the nonfinancial assets, it would be an entirely different matter to apply it to the financial assets and liabilities. This is one area that requires further research. However, within the overall scheme of things at the moment, this split is less consequential than some of the other points that have been raised.

A Balance Sheet for Agriculture

At this point, a summary of the data that we have available for an agricultural balance sheet and an estimate of net worth seem appropriate. In addition, it would also be helpful to outline the data that we still need and how they might be obtained.

Currently, we have estimates of the value of farm machinery and equipment, inventories, and land and buildings for 1961 to 1984. These are based on data collected by the Agriculture Statistics and Construction Divisons. These data are available in both current and constant dollars. In addition, we have some estimates of farmers' major liabilities, including their bank loans, mortgages from the FCC, borrowings from other financial institutions and their trade credit with the CWB. We also have an accounts receivable from the CWB. We do not have intrasectoral debt; that is, data on the amounts persons lend to, or borrow from, farmers. Indeed, we do not have this information for other unincorporated businesses, nor do we have instrument detail for much of the debt.

In order to provide a set of data that is consistent with the rest of the National Accounts, we would need information on deposits at banks and other financial institutions by type (for example, demand, savings, GIC, etc.), marketable securities (for example, short-term paper, bonds or stocks), as well as other financial assets. We would also require a figure from the banks as a means of confirming the proportion of these assets held by farmers, as well as the borrowings, by instrument, from institutions other than those already identified. Principal among these

would be loans and mortgages, but there could also be other items, such as trade credits. The full balance sheet category detail is available from the paper on the National Balance Sheet.[3] Any prospect of obtaining provincial breakdowns appears to be very unlikely, given our present inability to do that with the other aspects of the financial flows and the balance sheet.

How would we go about obtaining these data? It appears that there are two possibilities. The first would be a direct survey of farmers, using either the Agriculture Statistics Division's National Farm Survey or the Census of Agriculture. The other approach would be to develop these estimates from the information of other surveys. In terms of reliability, the second is much sounder, allowing, as it would be, for more frequent data on a more consistent basis with the rest of our numbers. Surveys of 2,000 financial institutions are likely to be much more reliable than those of 15,000 or 30,000 farmers. However, regardless of which route is chosen, both will require considerable effort in the areas of survey design and respondent input, as both of these elements are essential to the collection of the data. Whether we can expect to influence this process is largely dependent on our powers of persuasion. Clearly though, a comprehensive set of data on agriculture's balance sheet and net worth would be a welcome addition to our data base. It would give us a better idea of the viability of agriculture and its contribution to the national wealth and well-being and allow us to explore inflation accounting to discover the extent to which

[3] See Statistics Canada, Financial Flow Accounts, Fourth Quarter, 1983, Catalogue No. 13-002, (Ottawa: Statistics Canada, 1984); and Statistics Canada, National Balance Sheet Accounts, Catalogue No. 13-214, (Ottawa: Statistics Canada).

farmers have been eating their own capital to remain in operation. However, it must be recognized that the System of National Accounts is more interested in change and relativity over a time series than in an absolute figure. Continuity of concepts and data sources are, therefore, very important. Once-only surveys do not readily fit into that context. We would need a continuing resource commitment to achieve this end and that may well place this objective among those competing for a limited number of resources. An examination of that decision lies well beyond the scope of this paper.

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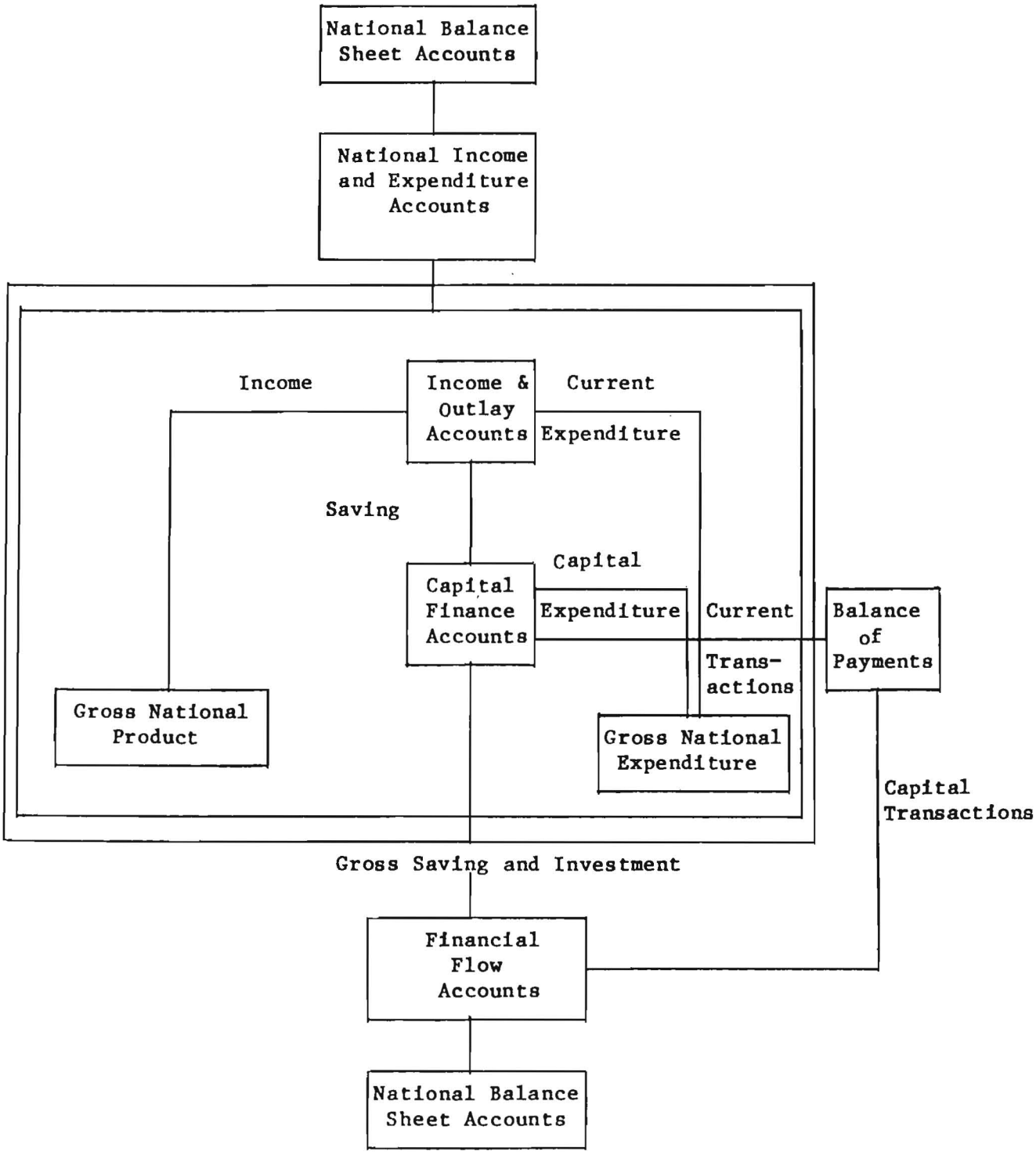
Figure 1. The Major Components and Subcomponents of the System of National Accounts



THE FARM CREDIT CORPORATION'S ACTIVITY IN WEALTH MEASUREMENT

Ralph W. Ashmead

Introduction

The Farm Credit Corporation (FCC) has undertaken two surveys, in 1981 and 1984, which have provided a base of data upon which the relative and absolute wealth levels of Canadian farmers could be evaluated. This paper will discuss the FCC's activity with respect to farm wealth data from the point of view of:

1. Why the FCC decided it needed this type of information;
2. What uses are being made of these data;
3. What the FCC has learned from the surveys and their limitations; and
4. What the FCC would like to see in the future with respect to the collection of farm wealth data.

The Need for Farm Wealth Data by the FCC

For a number of years, the FCC and others have become increasingly concerned with the availability and reliability of data which attempt to measure the wealth position of farmers. These concerns arise in the measurement of the stocks and flows of farm capital and farm debt.

Estimates of capital stock, or asset values, have generally been crude, particularly for farm real estate. Furthermore, the value of the

assets held by farmers has been understated by not including such short-term, liquid assets as cash, stocks and bonds. Data on capital flows between accounting periods, which would represent the amount of capital investment and disinvestment in agriculture, are almost nonexistent. In addition, the limited disaggregation of capital stocks and flows by major enterprise group within Canada, prevents relative and absolute wealth positions by group from being established. The farm debt data are also inadequate to meet the needs of most institutions and policy-makers in the industry. Again, there is the problem of disaggregation. Currently, farm debt data are published only at the national level. No data exist on the stocks and flows of debt at the provincial or regional levels. In addition, some of the debt data must be indirectly estimated, particularly that from nongovernment sources. For competitive reasons, some financial institutions are not anxious to provide accurate disaggregated data. Finally, the quality of the data on the flows of debt, or the debt extended over a period, is questionable. It is particularly difficult to separate extended debt, which represents an addition to the stock of debt, from that used to refund or refinance the existing stock of debt.

In light of these concerns regarding the wealth position of farmers, the FCC has now conducted two surveys. These surveys have provided relatively detailed information on the wealth position of the farm population at two time periods (January 1, 1981 and 1984) together with some limited information on the capital and debt flows for certain periods. Data were obtained on actual versus planned investment, the gross value of farm sales and the level of off-farm income.

The detail obtained on the financial structure of Canadian farming has allowed for a much greater degree of disaggregation by geographic region, farm enterprise and economic class, and has more completely represented the asset and debt structure of the industry. Certainly, not all of the questions raised in the first several paragraphs have been answered by the surveys, but the effort does represent some progress.

Uses of the FCC Survey Data

In addition to providing a more current and detailed profile of the financial structure and wealth position of farmers, several specific uses have been made of the data.

1. Estimation of Capital Requirements for Agriculture. The estimation of the capital requirements of farmers is of major interest to the FCC. Traditionally, this estimate has been prepared using statistical correlations of national debt flows (no regional debt flows are available) and relevant explanatory independent variables together with field estimates.

   The survey data have been used to improve on this procedure. Specifically, the planned investment data, which do not include the intentions of new entrants, give an indication of the total capital requirements of the industry for the coming year. Further, the historical ratio of borrowing to investment provides estimates of the debt leverage requirement. Debt requirements were estimated for geographic regions and then aggregated to give estimates of the national demand for debt capital.

2. Short-Term Program Development. Analysis of the current survey has led to the identification of an excess debt problem for a specific segment of the farm population. This analysis has resulted in current program development work to help deal with the problem. Specifically, the data allow for a more precise targeting of new programs, as well as an estimate of the costs of any particular level of government intervention.

3. Loan Portfolio Management. A unique use of the survey data by lenders is to assess the implications of changing relative wealth positions of farmers on the risk of their loan portfolios. The change in capital values and increase in debt levels between 1981 and 1984 have uniquely affected the different provinces and geographical areas of Canada. These data have been used in the assessment of loan portfolio risk, the incidence of this risk (by commodity group and province) and directly impact on the provision for losses against the loan portfolio.

4. Long-Term Policy and Program Development. Hopefully, in a longer run context, the survey will provide the basis for the discussion and resolution of farm capital and credit issues. For example, the paradox of high farm absolute wealth levels and decreasing farm economic viability remains an issue. The data do allow for an examination of the related issues of farm ownership and financing. New programs must recognize the characteristics of the absolute and relative changes in farm wealth.

Survey Limitations

The FCC surveys, while a step forward, have only begun to fill the need for farm wealth data. However, several deficiencies or concerns can be expressed about the surveys.

First, the major concern has been the measurement of asset values, particularly the value of land and buildings. In the 1984 survey, these data are subject to some suspicion. The values were subjectively estimated by the farmer and, therefore, could be significantly influenced by what was originally paid for the farm, isolated sales information and short-term economic conditions. As a result, such data are probably more useful in making conclusions about relative changes in wealth position between periods, rather than definitively predicting the absolute wealth position of farmers.

Second, in order to accurately measure relative changes in wealth position over time, the same farm population should be surveyed in each time period. Unfortunately, this was not possible. For example, analysis of the hog industry in 1984 relative to 1981 does not account for the fact that a significant number of hog producers have exited and been replaced by new farmers.

Third, changes in wealth position between periods are difficult to estimate due to inflation. Real changes in capital stock and flows must be separated from inflationary changes.

Fourth, the timeliness of the data obtained from sources such as the FCC survey is generally less than optimal. The data collection period

for this survey was longer than for most others, and when combined with the usual delays for computerization, quality testing and publication, resulted in a long lag between the taking of the survey and the availability of the results.

Future Requirements

There are many improvements that the FCC would like to see in the collection of wealth and related data on Canadian farmers. The first question one might ask is whether the FCC should continue to conduct periodic farm surveys similar to the last two. The process has worked well in the past due to the high level of cooperation between the FCC, Statistics Canada and Agriculture Canada, and due to the lack of alternative sources of such data. In the future, however, other options may be required due to cost and the need for more complete, integrated and frequent data.

There are two issues that must be resolved in the course of developing a set of wealth accounts for agriculture. These are:

1. The theoretical conceptualization and structure of farm wealth accounts (and complementary income accounts); and
2. The collection of data to support these accounts.

It is likely that (1) will be significantly easier to resolve than (2). Several suggestions can be made with regard to the first issue. Conceptually, the problem is that of designing a coordinated set of accounts which will link the balance sheet of the agricultural economy at specific points in time. Such a conceptual framework has been prepared

by George Beelen.[1] A less detailed and somewhat simplistic view is illustrated in Table 1.

In the table, the balance sheets of the farm sector, as of January 1, 1981 and 1984 are presented, based on the FCC surveys. We want to be able to explain the changes in wealth position or balance sheet position between accounting periods. Unfortunately, we don't know what changes have occurred between these two periods of time to bring about the changes observed in the balance sheets.

In particular, we cannot separate price changes (inflation) from quantity changes (real change). We also have only limited information on the capital flows that occurred between the periods.

Explaining the decline in net worth of some $4.3 billion is also difficult. If this is a significant indication of both the absolute and the relative wealth positions of farmers, it would be helpful to know what the relative contributions of deflation and declining farm incomes are in this change. The detail we are looking for could be captured in a sources and uses of funds statement (SAUF), which would account for all increases and decreases in assets, debt and net worth within an accounting period. Such a statement, however, would require supporting income and capital accounts.

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[1] George W. Beelen, "An Accounting Framework for Canada--Format and Estimation Methods," In Proceedings of the Seminar on Revisions to Farm Income and Financial Statistics for Canada, pp. 77-97, Edited by R.M.A. Loyns, D. Freshwater and G. Beelen, Occasional Series No. 14, (Winnipeg: Department of Agricultural Economics and Farm Management, Faculty of Agriculture, University of Manitoba, June, 1983).

The second issue focuses on the collection of data to support the accounts. Augmenting traditional survey data with real farm data (based on actual farm situations) would be helpful. This would entail the joint participation of various government departments and levels, as well as private organizations, in the survey and estimation process. There may also be better alternatives to subjective questions for the valuation of land, buildings, machinery and livestock.

In conclusion, the eventual development of farm wealth data will depend on the conceptualization of an appropriate set of wealth accounts and on our success in collecting the data needed to construct those accounts.

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Beelen, George W. "An Accounting Framework for Canada--Format and Estimation Methods." In Proceedings of the Seminar on Revisions to Farm Income and Financial Statistics for Canada, pp. 77-97. Edited by R.M.A. Loyns, D. Freshwater and G. Beelen. Occasional Series No. 14. Winnipeg: Department of Agricultural Economics and Farm Management, University of Manitoba. June, 1983.

Table 1

Balance Sheets of the Farm Sector

Item	FCC Survey 1981	FCC Survey 1984	Adjustments
	------$ billions------		
Assets			
Current Assets	14.6	13.9	Appreciation, Depreciation Capital Purchases and Sales, Livestock Growth, Inventory Sales and Purchases
Intermediate Assets	26.8	29.7	
Long Term Assets	76.2	72.7	
Total Assets	117.6	116.3	
Liabilities			
Current Liabilities	2.9	3.4	Principal Repaid and Borrowed, Interest Paid and Accumulated
Intermediate Liabilities	4.1	4.5	Debt Evaporation
Long Term Liabilities	10.7	12.8	Changes in Net Income, Off-Farm Contributions, Owner Withdrawals and Contributions
Total Liabilities	17.7	20.7	
Net Worth	99.9	95.6	
Total Liabilities and Net Worth	117.6	116.3	

APPRAISAL OF FARM LAND

Larry Rosevear

Introduction

For the purposes of this paper, farm land is deemed to include both farm land and buildings. This paper will address the question of how appraisers actually go about measuring the value of land and buildings when they look at a farm. As appraisers, we use the term "estimate of market value" or "providing an opinion of value" when a property is appraised or evaluated.

The question of how rural properties are appraised is quite broad and one that could be answered many different ways. However, this paper will endeavour to supply just one answer to this question, in the hope that the reader will gain some insight into the traditional three methods of valuing properties in general. Some thoughts on tabulating and analyzing trends in values will also be given, as well as some information on what is currently happening in the marketplace.

Traditional Evaluation Methods

Note that reference was made to "methods of valuing properties in general." This statement indicates that the traditional approaches to valuing properties are used in the evaluation of farm or country property, as well as urban housing, rental properties, commercial and industrial properties, etc. The three traditional approaches are:

(i) the direct sales comparison approach,

(ii) the cost approach, and

(iii) the income approach.

As in the city or town, in rural areas there are many different types of properties, varying from those with little or no acreage to others with none or many buildings. The approach to the physical inspection of the property is the same as completing an urban appraisal, in that buildings are measured, pictures are taken and detail recorded as to the type of construction, the age of the building, its condition, the interior design, etc. The interior of livestock buildings has to be accurately ascertained as there can be a very wide variation in type, style and cost of permanently installed equipment.

The land base is always inspected, requiring that the agricultural appraiser be knowledgeable about various soil types, soil classifications and the observed fertility and drainage situation of a given property. We use county soil maps to determine soil type, along with a personal observation, as well as the Canada Land Inventory Classification maps that designate soil types from 1 to 7.

Our appraisal firm usually employs two of the traditional approaches to establish a value--the direct sales comparison approach and the cost approach. The income approach was used extensively in the past by some lending agencies, but it is usually not considered relevant today and normally is not used by agricultural appraisers. In employing the direct sales comparison approach, we endeavour to locate all of the completed sales of farm properties in the area, including those with just

bare land and those with improvements. In order to arrive at a value for the subject property, these sales are adjusted for size, location, fertility, drainage, topography, building complement value, motivation for sale, if any, etc. The adjustment factors are usually determined on a per tillable acre basis and then adjusted to the subject farm. This is a necessary part of the process as the value on a per acre basis can vary widely due to the aforementioned factors. It is not unusual to see differences of up to $1,000 per acre within the same general area.

The cost approach employs the same techniques as are used in developing a value in an urban setting, in that the value of the bare land is ascertained and then the depreciated value of the buildings is added on. The buildings value is determined by first establishing the replacement cost and then a depreciated value of all the buildings and improvements on the property. We use a standard procedure for calculating the replacement cost and estimated depreciated value as outlined in Table 1.

Due to the varied nature and complexity of farm buildings, a good agricultural appraiser is required to have up-to-date cost information in order to ensure the proper replacement cost figures are being applied to subject appraisal assignments. This requires that a considerable amount of the appraiser's time is spent carrying out research, so that accurate, current data are available for the many different types of farm buildings.

Adding the depreciated value of the buildings to the value of the land provides us with a cost approach estimate which is generally considered to set the upper limit of value. In the case of farm property

valuation, this estimate usually tends to be considerably higher than the actual sales price, since historical analysis of farm sales data indicates that buyers do not pay anywhere near the depreciated value for farm buildings. The amount they actually do pay appears to range anywhere from 40 to 80 percent of the depreciated value of these buildings, depending upon many factors, such as the age and capacity of livestock buildings, the potential use to which a particular purchaser might put the buildings (especially buildings that are of older style and design), and the desirability of buildings in a given area (this does vary from area to area).

Having completed a direct sales comparison and a cost approach to estimating value, the two values must be reconciled to form one final estimate of market value. Since, as indicated, buyers do not generally pay the full depreciated value for buildings, most weight is placed on the direct sales comparison approach for a final estimate of value.

Occasionally, we appraise properties that are unique in their nature (because of their size or building complement, for example) and for which there are no comparable values available. In these instances, we rely on the cost approach to provide an estimate of value and then make a judgment decision as to the percentage of contributory value that the buildings add to the land base. If there is a large building complement on a smaller land base, the value of the buildings often has to be discounted somewhat more than usual, based on the theory that there are likely fewer purchasers for such a property and, accordingly, it would take longer to sell in a normal market situation. This is what we usually see in the southwestern Ontario area. In some parts of the prov-

ince close to major cities such as Toronto, Hamilton and Ottawa, however, the opposite is sometimes true, in that there are more smaller residential-type country properties and there is also a greater demand for properties of these types. Therefore, depending upon the nature and condition of the buildings on the property, the sale value could be higher.

A Definition of Market Value

The foregoing is, perhaps, a simplistic overview of how agricultural properties are appraised. However, it does indicate that an appraiser must have sound knowledge of many factors in order to gather all of the relevant data, analyze them and, subsequently, correlate and estimate a final market value, in dollars, for a given property. "Market value" is defined as the most probable price, expressed in monetary terms, that the property would bring if exposed for sale in the open market, neither buyer nor seller acting under compulsion, both having full knowledge of all the uses and purposes to which the property might be put and allowing for a reasonable time to find a purchaser.

This adds another dimension to the procedure of valuing properties. The appraiser is required to adhere to this definition as it is usually stated in each report. Therefore, it is necessary to be cognizant of the conditions surrounding the sales of properties which could prevent them from being true "arms length" sales, thereby affecting their individual value. These situations, if they are prevalent, can be adjusted for, but require an objective and unbiased judgement on the part of the appraiser.

The knowledge necessary to properly estimate the market value of farm land and buildings is not acquired quickly. Various appraisal courses are necessary, combined with several years of practical experience in an appraising environment, before an individual is trained and has the adequate confidence to carry out appraisal assignments.

The Market for Farm Assets

The message that should be gained from these comments is that there is more to valuing farm land than inspecting the property, costing out buildings, gathering sales data, estimating value and writing a report. The "added on" knowledge of what is happening in the agricultural community and economy is equally important in the appraisal process. Accordingly, the following discussion identifies some of the additional information that is necessary for an effective appraisal.

A technique that is used by most appraisers in determining the value of properties is to tabulate and analyze trends in values. The value of agricultural real estate peaked in approximately June of 1981 in southern Ontario after having risen dramatically throughout the late seventies. The peak period in western Canada was somewhat later than mid-1981, but, at present, both areas are in a generally comparable situation, with values having declined. Evidence of declining values was really not apparent until the fall period of 1981 and the beginning of 1982. In the spring of 1983, in western Ontario at least, there was a flurry of real estate activity that indicated to us that the decline that began in 1981 was ending. Throughout the late spring and summer months of 1983, there was very little real estate (i.e., agricultural)

sales activity, as evidenced by the relatively few sales recorded in the registry offices on M.L.S. or Teela records.

During the fall of 1983 and throughout 1984, there has been an increase in sales activity, with quite a number of sales occurring during this period. While, in general, it cannot be said that land values have increased, it now appears definite that they have stopped declining. As a result, the data in Table 2 may be considered representative of southern Ontario agricultural property values.

It follows that this is a different market than the one we were used to for several years prior to 1981. While there is some optimism, at present, that land values might increase (and, in fact, in some small, isolated areas they have increased since 1981), it would be my opinion that land values will not rise dramatically again in the foreseeable future. Through time there will no doubt be an increase, but after the high inflation of the late seventies, high floating interest rates, low commodity prices and a North American recession bordering on depression, the marketplace, as a whole, has a more cautious attitude.

During the 1970s, farm real estate values increased much faster than the rate of inflation. Farm land was a particularly good investment during this period, with the annual increase in farm real estate values averaging 15.6 percent, compared to a 9 percent compound increase in the rate of inflation. However, in the last half of 1981, and in 1982, 1983 and 1984, land values generally have not kept up with the rate of inflation. Although this is not the first time in the last two decades that the increase in land values has fallen below the rate of inflation, this

period appears to be lasting longer than in the past. My own view is that we are likely to see a continuation of fairly steady land values during the rest of this decade. In effect, we are in the process of correcting what could be termed the mistake of land values rising too rapidly in the 1970s.

The huge increase in land values from what they were, say, 10 years ago, has had a significant impact on new entrants establishing a farm business, the farm expansion activities of established farmers, the transfer of land by retiring farmers and the purchases of land by non-farmers for investment purposes. In the past, farm land was perceived to be a particularly good investment, even with 100 percent financing. However, with reduced net farm incomes, forced land sales and steady or declining land values, much of the optimism in the farm real estate market has disappeared. This lack of optimism is a result of the unstable and depressed condition of the farm economy. Because farm asset values have climbed at less than the increase in the general price level during the past two years, farmers have experienced a loss in the real purchasing power of farm assets, preventing many of them from competing in the market for farm land.

Throughout the 1970s, capital gains in farm land were greater than aggregate net farm income. Even after adjusting capital gains for inflation, the return to equity from capital gains was greater than the return from farm income during this period. However, the past two to three years of consecutive real declines in farm asset values is of major concern to both agricultural investors and lenders. An increasing equity base has been counted on as a source of reserve borrowing power during periods of low farm incomes.

While most farmers have adequate equity relative to their debts, enabling them to withstand a period of falling asset values, certain groups are more vulnerable. Those farmers who are highly leveraged with little equity to carry them through the current period of low earnings and high interest charges, have been the hardest hit. They tend to be either young and beginning farmers or those farmers who aggressively expanded their farm businesses with debt financing. Farmers who have been hit by several years of poor crops or low commodity prices have also suffered. With these farmers no longer competing in the farm land market and, in some cases, offering all or part of their land for sale, the farm land market in some areas has been relatively inactive during the past three years (as compared to the 1970's), placing downward pressure on land values. However, this is not true for all areas of Canada as local conditions vary significantly. In areas where there are large numbers of well established farmers, where crop yields and commodity prices have been average or above average, or where provincial credit and subsidy programs have been introduced, farm land values have remained steady or have increased. For example, some sections of Kent County and south Lambton County in Ontario have seen values increase during the past year.

Conclusion

This paper has, perhaps, dwelt more with trends in land values and what is happening in the marketplace than with the actual appraisal of farm properties. This emphasis is, however, based upon the belief that there is considerably more to valuing property than simply making an inspection, costing buildings, estimating age/life and depreciation, look-

ing at some comparable sales and estimating a value. An appraiser must, by nature of the work, become knowledgeable about what is happening in the area in which the appraisals are being carried out, as well as in the other areas of the province. It is also necessary to keep up-to-date with the prices and trends of the various farm produced commodities, since the strength (or lack of same) of these markets does tend to have an impact on what buyers will pay for property. Cash crop prices, in particular, have a bearing on how farmers react to buying land. The price may not change much in the short run, but if there is optimism in grains and prices are good, there will be more sales activity than if prices are in a down cycle.

The same is true of livestock enterprises. For example, the low returns in the beef industry during the past several years has resulted in ever increasing pressure on the contributory value of specialized feeder cattle facilities. Going back approximately eight years, the contributory value of the depreciated amount of these buildings would be in the range of 80 to 90 percent. However, the pressure on these facilities has developed to the extent that, at the present time, the buildings contribute only 30 to 50 percent of their depreciated value.

These examples demonstrate that the marketplace itself, through time, will provide the real value of any type of property from a market value standpoint. As long as we do not lose sight of the true definition of market value, and as long as all of the factors at play are considered when carrying out appraisal assignments, then estimated market values will be realistic. It was much easier to estimate values during the upswing cycle since it could be readily documented from the new sales data

that prices were higher and increasing. On the down side of the cycle, there is a period of time when it is very difficult to estimate value, since there are insufficient data available in given areas to determine what values appear to be. Now that we are in a fairly static situation the task becomes a little easier again as more sales are occurring and, with the direct sales comparison approach becoming the more commonly accepted method, the appraiser becomes more confident of the values being estimated. What becomes necessary in a static situation is to be on the alert for any change in the trend in market values as to whether they might be edging up, edging down or continuing to remain static.

As a closing thought, consider another influence on the value of farm land in a given area. In practice, the buyer that has to borrow the least is able to pay the most for land in the long term.

Table 1

Buildings Cost Schedule and Depreciated Value, 1984

Item	Size W x L x H (feet)	Construction	Condition	Replacement Cost	Effective Age	Remaining Economic Life	Depreciation	Depreciated Value
1. Residence & attached garage	1150 square ft., main floor, 16x28x1 storey	Vinyl sided over frame, concrete and stone foundation	Average - good	$ 57,500	35	25	$ 33,500	$ 24,000
2. Old storage building and drive shed and old silo	34x52x2 stories	Timber frame, concrete foundation	Fair	27,000	70+	10	23,000	4,000
3. Hen laying barns (2) (incl. pits and feed tanks)	Each barn 32x544x1 storey	Galvanized steel over wood stud, concrete foundation	Average - good	530,000	14	21	210,000	320,000
4. Slatted floor hog barn (incl. pits and feed tanks)	40.5x244x1 storey	Galvanized steel over wood stud, concrete foundation	Good	249,000	3	32	21,000	228,000
Totals				$863,500			$287,500	$576,000

Table 2

Range of Land Values Per Acre
Southern Ontario

Counties	Description	1980-81 $/Acre	1984 $/Acre	Approximate % Decrease In Value
Niagara Peninsula Area	Bare Land	1,000 - 1,400	800 - 1,200	15 - 20
	With Bldgs.	1,200 - 1,600	1,000 - 1,400	12 - 15
Brant/Oxford	Bare Land	2,500 - 3,000	1,800 - 2,100	25 - 30
	With Bldgs.	2,800 - 3,500	2,000 - 2,500	25 - 30
Elgin/Middlesex Lambton/S. Huron	Bare Land	2,500 - 3,000	1,700 - 2,200	25 - 30
	With Bldgs.	2,600 - 3,300	2,000 - 2,500	20 - 30
Grey/Bruce N. Huron/Perth	Bare Land	1,000 - 1,400	600 - 1,200	20 - 30
	With Bldgs.	1,400 - 2,200	1,200 - 1,600	20 - 25
Essex/Kent	Bare Land	3,000 - 4,000	1,800 - 2,500	35 - 45
	With Bldgs.	3,500 - 5,000	2,500 - 3,200	30 - 40

FINANCIAL INDICATORS ACCOUNTS OF THE U.S. DEPARTMENT OF AGRICULTURE

Linda Farmer and Roger Strickland

Introduction

The farm income accounts produced by the United States Department of Agriculture (USDA) were originally designed to provide information about the farm sector as an aggregate unit. Agriculture was treated as one all-encompassing farm firm because data were not available to do anything else. Over time, the U.S. agriculture sector has changed. Instead of the general crop and livestock farms that used to dominate the agricultural landscape, more and more farmers developed operating units which now specialize in one or two products, use more nonfarm produced inputs and capital items, use debt as a source of cash flow and have substantially revised the legal form of farm business. As the structure of agriculture departed further from homogeneity and farms became more specialized, new measures of well-being were needed. A single farm income or balance sheet statement could not provide the perspective needed to understand the financial strengths or weaknesses of the farming industry. To provide more complete information about economic conditions in the farm production sector, additional measures of income and wealth were developed.

Development of the Income Accounts

The USDA has published a comprehensive set of income and balance sheet accounts relating to agriculture for more than 50 years. These series have been revised and expanded through time. The income accounts incorporated individual state estimates in 1949 and sales class distributions in 1960. The balance sheet accounts were developed later with sales class distributions added in 1975, state estimates in 1978 and capital gains in 1976. The most important account, the returns to farm sector equity, was added in 1979.

Both the income and balance sheet series were developed at the aggregate sector level during a period in history when most of the farms were small, structurally uniform and were family operations almost entirely dependent on farming as their source of income. Changes in the agricultural production sector's structure have made such aggregate estimates less useful as an indicator of the economic well-being of the sector. But, with few exceptions, our national agricultural financial data base remained wedded to the concept of an aggregate farm sector and to the farm business rather than the farm household as the basic unit of observation. Changes in the well-being of different types of farms were handled in a separate series of accounts on farm costs and returns by type of farm. These accounts were discontinued in the early seventies. Little consideration was given to the commodities produced, inputs used, relative changes in prices and resource values, use of debt financing and other special problems, such as drought, that can affect the financial well-being of farmers. Consequently, given the heterogeneity of today's farm sector, conclusions about the well-being of various types

and sizes of farms and other distributional issues were suspect when drawn from such aggregate statistics.

Concern about the validity of the data being reported arose. Two separate reviews by the Economic Research Service (ERS)[1] and the American Agricultural Economics Association (AAEA),[2] and two internal review projects (Weeks[3] and Nicol),[4] suggested changes in the existing economic data system. These reviews and discussions among agency economists and members of the academic community led to the formulation of a revised set of economic accounts designed to increase the disaggregation and quality of the statistics and resulting analyses. Initially, the account formats were implemented to the extent possible with available data, with a long-term goal to identify and acquire the data needed to fully implement the accounts.

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[1] Eldon Weeks, et al. "Farm Income and Capital Accounting - Findings and Recommendation of a 1972 ERS Task Force," Unpublished Report, Economic Research Service, United States Department of Agriculture, July, 1972.

[2] James Hildreth, et al. "Report of Task Force on Farm Income Estimates," Unpublished Report, Economic Research Service, United States Department of Agriculture, January, 1975.

[3] Eldon Weeks, et al. Economic Accounts for the Food and Fiber Sector, Part I, II and III, Working Papers of the Economic Research Service, United States Department of Agriculture, (Washington, D.C.: USDA, 1978).

[4] Kenneth J. Nicol. Economic Information for the U.S. Farm Sector: A Revised Format, Economics, Statistics and Cooperatives Service, United States Department of Agriculture, (Washington, D.C.: USDA, August, 1980); Data Collection, Use and Improvement for the Farm Sector Economic Indicators, Economics, Statistics and Cooperatives Service, United States Department of Agriculture, (Washington, D.C.: USDA, August, 1980).

In 1980, ERS moved toward the implementation of a revised set of national accounts for the farming sector, taking advantage of the conceptual arguments advanced during the previous decade or so (Table 1). The new accounts are based on the concept of separating the measurement of the economic viability of the production units of the farm sector (a part of the business sector of the national economy) from the well-being of farm operator families (a part of the household sector of the national economy). This permits clearer distinction between the economic status of farm production establishments versus that of operator households. This separation is especially important because nonfarm income is playing a greater role in farm family income. Some small farms, for example, may not be viable units from a farm business standpoint, but the operator's household may have a satisfactory income when off-farm income is added to farm income.

In addition, a farm production transaction account was developed to measure the income from production establishments so that the value added by the farm production sector could be distributed to the institutions or individuals which control the sector's resources. In this account, residual income is the return to operators. The new accounts provide a better framework for separating the farm business from the farm household. They allow for a more thorough analysis of business conditions and provide an analytical framework to focus on the many types of farms that compose U.S. agriculture.

Disaggregations of the new aggregate sector accounts have been made to reflect size distributions based on gross farm sales and regional distributions based on state boundaries. These disaggregations better

illustrate some of the variability of the sector's economic condition. However, other aspects that are not reflected can substantially influence the true status of the performance of individual farm operations. Cyclical patterns in product prices, for example, can significantly affect farms selling or buying a product while having less effect on farms not involved in that product's market process.

The new set of income and balance sheet accounts, along with the older set of accounts, are now published in Economic Indicators of the Farm Sector. The annual national estimates are published in September for the preceding year in Income and Balance Sheet Statistics and the state estimates are published in October in State Income and Balance Sheet Statistics.

Definition of the Farm Sector

The agricultural production sector is defined as the population of all farms producing, or having the potential to produce, a minimum of $1,000 worth of agricultural products during the year. Activity associated with the movement of a product from the site of production for the purpose of transfer of ownership, or for movement through a marketing channel or processing facility, will constitute movement from the production sector. This distinction is made to separate the component parts of integrated enterprises while still allowing the farm operator to move commodities to off-farm storage with the intent of influencing market timing. Movement of the product into storage or the transportation system with the intent of altering the locational or physical attributes of the product should be associated with the marketing or processing sectors.

Where possible, the production process is being reported separately from the activity of the household or farm family. This eliminates the need to measure the other activities of the farm household and to include them as part of the farm's economic activity.

Those assets used in farming but owned by multi-product corporations represent a special situation. Conceptually, these assets should be included. Land and other capital assets are included in surveys conducted by the Bureau of the Census and the Statistical Reporting Service. The division of financial assets is probably the biggest problem, but this is consistent with the fact that financial assets tend to be the weakest set of statistics in the balance sheet accounts. Farmers do not like to report financial assets and, in all likelihood, grossly understate them when responding to surveys.

Purpose of the Balance Sheet Account

Originally, the balance sheet of the farming sector was an attempt to measure the impact of World War II on the financial structure of agriculture in the United States. The attempt was suggested by experiences during and after World War I. During and immediately after the period of the first World War, farmers in the United States experienced a boom, accompanied by considerable speculation in land and general inflation in commodity prices. After the war they encountered the collapse of prices and subsequent distress, the results of which persisted through most of the twenties and early thirties.

The main use of the balance sheet account is still the same today as it was 40 years ago--it can measure the change in the value of farm as-

sets and amount of debt from one year to the next and from one decade to another. It furnishes an opportunity for analysis of the changes in these values. The proper explanation of value change often tells more about the financial health of the farming sector than is apparent at first glance. The balance sheet can be used to measure, at a given point in time, what part of the nation's physical and financial wealth is occupied with producing food and fiber. It is a valuable guide in indicating the kinds and amounts of goods and services that are necessary for a nation to maintain its current farm output and what additions will be needed for increased farming activity. Likewise, it can indicate the volume, value and kinds of physical and financial resources that might be released for other purposes in case farming is diminished for some reason.

A balance sheet is essential in measuring the efficiency of a nation's farming sector. How else can farm output be compared with the value of assets and debt used in creating that output? It also serves as the basis for comparing the efficiency of agriculture with that of other industries. The balance sheet is the only source of the information needed to calculate the return on investment or equity and it is one of the principal indicators of the financial health of the farming sector.

The Balance Sheet Accounts

The ERS's balance sheet account uses the current market value of all assets in the farming sector. Since the account is based on market value, changes in that value reflect changes in quantity and quality, real

capital gains or losses and the effects of inflation. The balance sheet includes all assets in the farming sector regardless of who owns them.

It is important to keep in mind that the balance sheet is an annual financial statement as of a particular date and that it is an inventory or stock concept, not a flow concept. Therefore, the balance sheet presents an interesting but static picture of the financial structure of agriculture. Since its inception, the statement date has not changed and, as a result, the balance sheet is comparable over time. The major asset and debt items have also remained the same since the first statement in 1940.

Since the assets are itemized according to major type, they can be removed from the total and examined individually. For example, some economists believed that including the value of the household component was questionable. The balance sheet was set up in such a manner as to allow any asset value to be deleted or added and, if need be, the accompanying debt can be estimated and either removed or added to total debt. This is precisely what was done in 1979 when work was begun to remove the household component from the balance sheet and selected farm income accounts.

These revised accounts were developed for two important reasons; first, to separate the aggregate accounts in a manner that would permit the earnings of the farm business unit to be distinguished from farm family income; and, second, to permit better analysis of the wealth and income status of the production units and the operators of those units, by type of farm, value of sales class and type of ownership.

The basic balance sheet account is shown in Table 2, both including and excluding farm households. It consists of two main parts, assets and claims, with debt and equity making up claims.

Assets are separated into three broad types--real estate, physical assets other than real estate and financial assets. The value of real estate includes land, service structures and operator dwellings if located on the farm. Physical assets other than real estate include values for livestock, machinery and motor vehicles, all crops stored on farm and in off-farm Commodity Credit Corporation (CCC) stocks, and household equipment and furnishings. Financial assets are composed of bank deposits, currency, U.S. savings bonds and the net worth of farmer cooperatives.

Debt is shown as either real estate or nonreal estate debt including CCC loans. In the balance sheet, a debt is classified as real estate debt based on the collateral for the loan. If the loan is secured by farm real estate, then all of the loan is considered to be debt for the farm sector. The inclusion of debt for family expenses or for nonfarm business and investment may result in the overstatement of both farm sector debt and the interest paid component of farm income.

Equity, or net worth, is the residual when total debt is subtracted from the total value of assets. Equity is a measure of the wealth of the farm sector. It indicates what would be left for the owners of the farm sector's assets if all assets were sold and all debt repaid.

The new accounts differ from the original accounts because the household portion of wealth and income has been removed. In the revised bal-

ance sheet accounts, the operators' dwellings have been removed from real estate assets and debt, and the household portions of automobiles and trucks have been removed from the machinery and motor vehicles accounts. Household equipment and associated debt have also been removed from the balance sheet accounts. The financial assets retained are those considered part of the farm business, namely, currency, demand deposits and investment in cooperatives.

Sources of Data for the Balance Sheet Account

The national and state values for real estate are the values reported in "Farm Real Estate Market Developments" for April 1 (previously the values were reported for March 1 or February 1). Since these values have been consistently used in the balance sheet in lieu of January 1 values, the year-to-year trend should not be affected. The actual value-per-acre figures are based on the Census of Agriculture survey which is conducted every four or five years. Therefore, estimates represent the perceived value of farm real estate. For the intercensal years, interpolations and extrapolations are performed using indexes of farm real estate values.

Livestock on the state and national levels consists of the value of cattle and calves, hogs and pigs, sheep, turkey breeder hens and chickens (excluding broilers) on farms. Data are published by the Crop Reporting Board of the Statistical Reporting Service based on survey information.

The U.S. value of machinery and motor vehicles on farms as of January 1 is derived using data calculated for the farm income accounts. Specifically, the current value is found by adding the net capital purchases less depreciation and accidental damage to the previous year's value. The state distribution of machinery and motor vehicles is based on data from the Census of Agriculture. Stored crop values by state are furnished by the Crop Reporting Board from published and unpublished data. The value of farmer-owned CCC stocks is obtained from the Agricultural Stabilization and Conservation Service (ASCS) by special request. Estimates of the total value of equipment and furnishings of farm households are provided by the Agricultural Research Service and are distributed to the states based on the value of each state's farm operator dwellings.

Bank demand and time deposits of farmers are estimated by ERS using data from several sources, mostly the Federal Deposit Insurance Corporation and the Federal Reserve System. Currency is calculated using a benchmark ratio of currency to demand deposits collected in the 1960 and 1979 Farm Finance Surveys. The value of U.S. savings bonds owned by farmers is estimated from data furnished by the Department of the Treasury and is based, in part, on data from a sample of agricultural counties. State figures are derived from data collected in the Farm Finance Survey. The net worth of farmer cooperatives on the national and state levels is compiled from various sources, including data provided by the Farm Credit Administration, Rural Electrification Administration and Farm Cooperative Service.

Farm real estate debt is reported to ERS by the major institutional lenders--federal land banks, life insurance companies, commercial banks

and Farmers Home Administration. Debt owed to nonreporting lenders, including sellers of farmland, is estimated by ERS. Nonreal estate debt is reported to ERS by the major institutional lenders--all operating banks, Production Credit Associations, Federal Intermediate Credit Banks and Farmers Home Administration. Farm debt owed to miscellaneous nonreporting lenders, mostly merchants, dealers, and individuals, is estimated annually by using Census of Agriculture reports and data from special U.S. Department of Agriculture surveys. CCC debt owed by producers on crops stored on and off farms is reported by ASCS.

State level data on debt are available from life insurance companies, commercial banks, Farmers Home Administration and CCC. The data for the remaining lenders are distributed using either the Farm Finance Survey or state level figures that were available from the lenders on January 1, 1983.

The sales class figures are derived by using the U.S. total as the control figure and distributing that figure to the sales classes. This is done using per-farm benchmarks from the Census of Agriculture and the Farm Finance Survey, and then multiplying these per farm benchmarks by ERS's estimate of the number of farms by sales class. This way the sales class figures are adjusted annually for the movement of farms between sales classes.

Some Limitations of the Balance Sheet Account

What are some of the shortcomings of the balance sheet account? Except for the reported debt data, most of the values are estimates. Of

the estimates most are based on sound benchmarks and current updates, such as the values of real estate, livestock, machinery and crops. However, some values, such as those of bank deposits and other financial assets, are not so reliable even though the trends they show may reflect the actual situation fairly accurately. Estimates of financial assets for the past 15 years or so are probably too far removed from reality. Estimates of farmers' bank deposits are based on benchmarks that are too old. Even the current data, which we compare with the benchmarks, are not as complete as they were in the fifties and sixties.

One problem with the accounts which is currently being addressed is the double-counting of some farm machinery items due to purchases of used equipment. As a result of the rapid methods of financial depreciation that are available, some equipment is sold prior to the end of its economic or useful life. The equipment is then either transferred out of the sector and re-enters as used equipment or is sold directly to other farmers. Both transactions are recorded in the accounts as investments, thus double-counting those assets which have already been counted once when they were originally purchased. To eliminate this problem, estimates of purchases of used equipment or sales of equipment by farmers should be determined and subtracted from the account.

There are also some items left out of the balance sheet account because adequate data are not available for them. These include prepaid expenses, farm supplies on hand (such as fertilizers, fuel, mixed feed and spare parts) and office and computer equipment. Currently, the crop inventory account does not include off-farm, non-CCC stocks. There is some evidence to suggest that, if these stocks were included, the crop inventory value would increase by 30 percent.

On the debt side, we exclude all debt generated by taxes, including federal, state and personal property taxes. Some people feel that these liabilities should be included because they occur as a result of operating a farm business. On the other hand, farm debt in the balance sheet may be too high because we include all loans secured by farm land regardless of how the funds are used. This is a particularly important issue since our debt figures are used to calculate interest expenses for farm income. Comparing our interest paid figures with those from the Internal Revenue Service and the Farm Production Expenditures Survey indicates that our interest figures may be high or that farmers may simply report interest on loans secured by farm real estate but used for a non-farm purpose.

Efforts to Improve The Income and Balance Sheet Accounts

Work to improve both the income and balance sheet accounts is underway in several areas. One endeavour currently being undertaken is to disaggregate the balance sheet and farm income accounts by type of farm. This will eventually lead to the estimation of returns to equity by type of farm. These accounts, when fully developed, should help explain why farm land values are decreasing in certain regions, while still increasing in others. The balance sheet and income statements by type of farm will also serve as tools for policymakers as they estimate the impact of policy changes on the various types of farms.

A major effort over the past several years has been to improve the data base for the balance sheet and farm income accounts. Questions have been added to the Farm Costs and Returns Survey (formerly the Farm

Production Expenditures Survey and Cost of Production Survey) to develop data on farm land values, crop and livestock inventories, farm machinery, debt and interest expenses. Obtaining data on debt and financial assets is a difficult task since survey respondents are often reluctant to reveal their financial status. This is such a sensitive issue that a congressman added an amendment to a bill to ban future Farm Finance Surveys because the 1979 Census survey contained questions about farmers financial assets. This was repealed in 1984, but too late for the 1982 Agricultural Census.

Once our data base is in place, we will be able to locate discrepancies in our debt and interest expense figures. Enough data will exist to add off-farm, non CCC stocks to our value of crop inventory. We have also done some work with Federal Reserve Bank economists to improve our data on farmers bank deposits. Economists at the Federal Reserve have developed a method of estimating the change in farmers bank deposits by using regression analysis with the percentage change in deposits at commercial banks as the dependent variable, the ratio of farm loans to total loans as the independent variable and the assumption that the ratio of farm loans to total loans is indicative of the ratio of farmers' deposits to total deposits.

Returns to Equity Account

Estimating farmers returns to equity was not one of the original objectives when the balance sheet was created, but now more emphasis is given to calculating the rate of return to investment. The farming way-of-life is reward enough on many farms, such as part-time or retirement units, or farm units that are heavily supported by nonfarm income. However, to commercial farmers, an adequate return on investment is a primary consideration for continuing in farming. The bottom line is just as important in commercial farming as in any other profit-oriented business.

In the returns to equity account (Table 3), we have assumed that the return on capital is the residual claimant of farm income after the other factors of production are paid. ERS estimates a return on operator's labour and management. The return to management is estimated to be 5 percent of gross receipts. The return on operator's labour is the residual amount when hired labour expenses are subtracted from the implied cost of all labor required. This method for calculating the return to operator's labour is theoretically correct, but, for recent years, our computational procedure implies that a much greater amount of farm work is being performed by hired labour than is indicated by some other sources. This leads us to believe that the return to operator's labour could be too low, causing the return to farm assets and farm equity to be overstated. Efforts are underway to improve the data collected on farm labour. In our new survey, we will obtain the total hours the farm operator actually worked, the other unpaid labour hours and the amount paid to all hired labour. This will give us the necessary data to improve our estimate of the returns to operator's labour.

Conclusion

The balance sheet is a very useful tool to have since current income tells only part of the story of farmers' wealth. The balance sheet shows how general economic and farm policies affect both the wealth and asset values of the farm sector. Disaggregation of the data by state and sales class allows policy analysts to determine more precisely which farmers are experiencing financial stress. The returns to equity account provides a good indication of how the farm sector is doing and where it may be headed financially. If income return to equity is lower than what could be earned in other investments, then financial adjustment will occur. Either asset values will drop, with subsequent financial difficulties, or income must be increased to maintain those asset values. If the return to equity is high and expected to remain so, then farmers will experience an increase in wealth.

No one measure of income and wealth can cover the data and information needs of all individuals. It was for this reason that our new set of accounts was developed in 1980. Our accounts excluding farm households focus directly on the financial condition of the farm sector, treating the sector as a business establishment. Our older accounts include the nonfarm assets of farmers that are closely related to their farming operations, such as the value of their household dwellings and furnishings. Both accounts are widely used by the public and by policymakers. The account including farm households is most often used when policymakers look at the possible consequences of a particular policy on the rural economy. The new accounts are used when decision-makers want to focus on the agricultural production sector.

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Table 1

Definitions of the
Economic Indicators of the Farm Sector Series

Net Farm Income 1/	Net Cash Income 2/	Net Cash Flow 2/	Production Transactions 2/ 3/	Income of farm operator families 1/
-sum of-	-sum of-	-sum of-	-sum of-	-sum of-
Cash Receipts, inc. net CCC and exc. loans forfeited	Cash Receipts, exc. net CCC and inc. loans forfeited	Net Cash Income	Cash Receipts, exc. net CCC and inc. loans forfeited	Net farm income
Direct Government Payments	Direct Government Payments	Change in Loans Outstanding, inc. CCC	Direct Government Payments	Off-farm income
Other Cash Income (Machine Hire, Customwork, and Recreational)	Other Cash Income (Machine Hire, Customwork, and Recreational)	Net Rental Income to all Landlords	Other Cash Income (Machine Hire, Customwork, and Recreational)	
Nonmoney Income (Home Consumption of Farm Products, Gross Imputed Rental Value of all Dwellings)		Net Change in Farmers Currency and Demand Deposits	Nonmoney Income (Home Consumption of Farm Products, Gross Imputed Rental Value of Hired Laborers' Dwellings)	
Value of Inventory Change, exc. net CCC			Value of Inventory Change, inc. net CCC	
-less-	-less-	-less-	-less-	
Cash Expenses, inc. household	Cash Expenses, exc. household	Capital Expenditures	Nonfactor Payments:	
Intermediate product	Intermediate Product		Intermediate Product Expenses	
Taxes	Taxes		Capital Consumption	
Interest	Interest		Depreciation	
Cash wages	Cash wages		Accidental Damage	
Net Rent to Nonoperator Landlords	Net Rent to all Landlords		Taxes	
Perquisites to Hired Labor			Factor Payments:	
Capital Consumption			Interest	
Depreciation			Wages to Hired Labor, inc. perquisites	
Accidental Damage			Net Rent to All Landlords	
			-equals-	
			Returns to Operators	

1/ Including households.
2/ Excluding households.
3/ An expanded concept, total operator income from farm sources, is the sum of (1) returns to operators, (2) net rental value of operators' dwellings, and (3) net rent to operator landlords.

Table 2

Comparison of Balance Sheet Accounts
Including and Excluding Farm Households
January 1, 1984

Item	Including farm households	Excluding farm households	Percent attributed to households
	Million dollars		Percent
ASSETS	1,031,124	928,584	10
Physical assets	981,071	892,240	9
Real estate	764,539	705,248	8
Land	664,128	664,128	0
Service structures	41,120	41,120	0
Dwellings	59,291	-	100
Livestock and poultry	49,774	49,774	0
Machinery and motor vehicles	108,222	103,501	4
Automobiles	6,684	3,007	55
Trucks	10,449	9,404	10
Tractors	29,622	29,622	0
Other machinery	61,467	61,467	0
Crops	33,717	33,717	0
Household equipment	24,819	-	100
Financial assets	50,053	36,344	27
Currency	2,013	2,013	0
Demand deposits	6,061	6,061	0
Time deposits	10,124	-	100
U.S. savings bonds	3,585	-	100
Investment in cooperatives	28,270	28,270	0
CLAIMS	1,031,124	928,584	10
Liabilities	214,678	201,025	6
Real estate debt	111,635	102,821	8
Nonreal estate debt	103,043	98,204	5
Excluding CCC loan	92,242	87,403	5
CCC loans	10,801	10,801	0
Proprietors' equity	816,446	727,559	11

Table 3.

Returns to Equity Account

Calculation	Data Sources
Income returns to farm assets, operator's labour and management	Data are generated in our farm income accounts as follows: returns to operators + net rent to landlords + interest on real and nonreal estate debt
- Operator's labour	Data are from the Farm Labor Survey and hours required are from our Productivity project
- Management	Data are from our farm income accounts and are assumed to be 5% of cash receipts + net inventory change + government payments - livestock and feed purchases
=Residual income to farm assets	
- interest on real and nonreal estate debt	Data for calculating interest expenses come from FDIC, FmHA, FCS, Life Insurance Council, etc.
=Residual income to equity	
Equity	From Balance Sheet project
Income as percentage of equity	

AGRICULTURE CANADA'S INTEREST AND ACTIVITY IN FARM WEALTH ACCOUNTS

Wayne D. Jones[1]

Introduction

The idea of a workshop on farm wealth accounts is a timely one. We are currently faced with an agricultural industry experiencing severe financial difficulties and requesting assistance while, at the same time, showing evidence of substantial wealth. Governments, under strong pressure to achieve spending restraints, are looking for more efficient ways of focusing programs on the individuals who most require assistance. Also, questions have been raised, particularly in connection with the upcoming census of agriculture, as to the costs and benefits of agricultural statistics in general. These issues provide ample justification for a workshop on the conceptual and methodological problems associated with the measurement of farm industry wealth.

This paper will address the topic of Agriculture Canada's interest and activity in farm wealth accounts. My task is to identify the range of department information needs in the area of farm wealth and then briefly describe what we, as department economists and policy analysts, have been doing in recent months to obtain this information. It should be made clear that I will be referring to our development of "informa-

[1] The author thanks Dr. William McBride and Dr. Fu-Lai Tung of Agriculture Canada for their assistance in preparing this manuscript.

tion" as opposed to "data," where data require analysis and interpretation in order to become information useful to decision-makers.

This paper will centre on specific department responsibilities, associated farm wealth information needs and related department activities. For this purpose, income, balance sheet and cash flow components are included in the definition of farm wealth information. Five wealth-related areas of activity have been chosen for discussion. These include:

1. Development Programs
2. Policy Reviews
3. Farm Finance
4. Outlook Services
5. Farm Industry Structural Analysis

This list is by no means complete and is likely somewhat biased toward the activities of the Regional Development Branch. However, the range of these issues is broad enough to show the scope of application of wealth-related data. Each activity will be discussed separately under the same format--major department responsibilities related to each activity will be identified, followed by an indication of the wealth-related information we are required to generate in order to provide the kind of advice demanded by decision-makers. Finally, some specific examples of information produced in recent months will be given, not for the purpose of discussing results, but, rather, to more clearly show the Department's interest in, and need for, wealth-related data.

The paper concludes with a list of wealth-related data requirements and another of wealth-related methodological issues. The list of data

requirements is basically a "shopping list" of the data we have had to collect, impute, project or otherwise obtain in order to meet our information needs. The list of methodological issues simply indicates the type of problems we have run up against or can envisage with respect to wealth-related data development.

Wealth-Related Department Activities

Development programs. Development programs refer, essentially, to the agricultural development activities carried out under the federal-provincial Economic and Regional Development Agreements, formally called General Development Agreements. The agricultural sub-agreements generally focus on technology transfer, resource conservation and new crop development initiatives. A departmental responsibility is to provide advice on the optimum allocation of development funds.

In order to provide such advice, we must have information on sectoral performance measures and on returns to resources for alternative investments. Sectoral performance measures can be used to obtain some insight into such assessment criteria as regional comparative advantages. One example is a project we have helped fund through Dr. J.H. Clark at the University of Guelph. The project uses Ontario Farm Accounting data and a farm simulation model to examine the debt-carrying capacity of different farm types (e.g., dairy, beef feedlot, swine, farrow-to-finish, ...). Variations among average income and top-third income farmers within farm types were also measured. The study provides information on industry financial ratios, such as maximum debt per livestock unit and minimum equity levels. Similar work on the financial characteristics of

different farm types and sizes is being carried out under contract by Dr. Robert Aukes at the University of Manitoba.

Information on returns to resources can be used to evaluate alternative investments in such areas as emerging technologies. One example of this type of work is an in-house project carried out by Dr. Narayanan using the SOILEC model developed in the United States. The objective was to determine the effects of various on-farm soil conservation measures (e.g., fall plough, till planting, fall chisel, ...) on returns to land in southwestern Ontario. Net present values of operating costs, gross margins and returns to land over a 25 year period were estimated on a per acre basis. A new project is currently underway to test the applicability of the SOILEC model to western Canada for use in estimating the costs and benefits of alternative conservation-based cultivation practices.

Policy reviews. Another wealth-related area of activity is the work required in connection with policy reviews. The Department is responsible for evaluating the performance of existing policies and for providing evidence for the justification or feasibility of proposed policy changes. This responsibility relates to programs and policies indirectly affecting agriculture in such areas as taxation, transportation and monetary control, as well as agriculture-specific programs and policies. Associated with such responsibilities are information needs on the level, distribution and stability of returns in agriculture and on the direct and indirect impact of government policies on sectoral growth.

Information on the level, distribution and stability of returns is particularly important for the review of farm income programs. Recent in-house activities, for example, have examined the variation in the costs and returns of dairy producers in support of the on-going dairy policy review. Analysis, based on the Ontario Dairy Farm Accounting Project, has identified the variations in unit costs among dairy producers while separating out cash costs, imputed operator labour costs and imputed asset costs such as depreciation, interest on debt capital and the imputed cost of equity capital. Such information is essential to the dairy policy review which must address, among others, the questions of whose costs should be covered by target prices and what components should be included in determining production costs.

Policy reviews carried out with respect to the economic impacts on sectoral growth tend to predominate in the field of impact analysis. Reviews based on other sectoral objectives, such as resource sustainability or risk reduction, are, however, beginning to expand our information needs. One policy review, focused on sectoral growth, involves departmental support of the Committee of Inquiry on Crow Benefit Payments. The Department has provided the Committee with a number of studies including an analysis of the impacts of alternative payment options on net income and farm firm growth.

This particular analysis demonstrates the level of disaggregation necessary for some of the Department's wealth-related information needs. The study involved a multi-period budget generator which simulated farm level net income flows, returns to equity, factor returns, etc., over a 10 year period for farms disaggregated by physical size, enterprise

type, soil zone and province. The simulation results provided information on changes in debt structure and equity accumulation for the different income streams associated with alternative Crow benefit payment options.

Farm finance. Perhaps the Department's highest priority, with respect to wealth-related information needs and analytical activities, is presently in the area of farm finance. The Department has a responsibility to assess the "financial health" of the industry and to provide insight into the short and long-run implications for the industry of ongoing policy development and special projects, such as the federal-provincial Task Force on Agricultural Finance which was established last year. The problems and issues surrounding farm finance are of a high profile and are expected to remain so in the near future.

Specifically, information needs center on the development of better measures of the industry's financial performance and on the nature and extent of farm financial problems. The traditional measure of financial well-being, net farm income, is deficient as a performance indicator in that it represents returns to a mixture of factors (labour, management and assets), the weight and distribution of which are changing over time. Moreover, net income does not represent the total returns to farm resources. Thus, more consistent and more complete measures of financial performance must be examined.

The Department has initiated some work in this area through a study contracted to Dr. George Brinkman and Dr. Clark at the University of Guelph. Although not completed at this time, the study is attempting to

develop historical series of current returns to the productive use of farm assets and returns in the form of asset appreciation. Early results, which show very low current returns and asset depreciation since 1981, have provided useful information on the farm financial situation.

Much new information on the nature and extent of farm financial difficulties was made available from the 1984 survey carried out by the Farm Credit Corporation in cooperation with Agriculture Canada and Statistics Canada. In-house analysis of the survey results, for example, was able to classify farms with respect to their debt structure and cash flow characteristics. The analysis indicated, among other things, that a fairly significant proportion of farms with strong equity positions were experiencing cash flow problems in 1983; in other words, the financial difficulties were not restricted to low-equity farmers. Information from the survey, which essentially generates disaggregated balance sheet information for the industry, provides considerable insight into which farmers are in financial difficulty and why.

Outlook services. The Department has long had the responsibility of providing government policy-makers and the industry with outlook services. This encompasses the provision of intelligence on market forces as well as looking into the future to assess industry prospects. Wealth-related outlook services are associated more with factor markets (land, labour and assets) than commodity markets and with financial measures of industry prospects (net income, returns to assets and equity levels) rather than measures of physical output or technical efficiency.

Typical wealth-related information needs would include analysis of factor market price determination and medium-term financial prospects for the industry. Farm land price determination, for example, has received considerable attention in light of the inflated farm land values attained in the seventies and early eighties and the subsequent depreciation since 1981. The Department study under contract to Brinkman and Clark referred to earlier in this paper, is attempting to test the hypothesis that, according to asset-pricing theory, a farm economy characterized by rapid growth in real current returns to assets will tend to experience large annual real capital gains and a low rate of current returns to assets. A better understanding of the empirical relationships among current returns, capital gains and asset values may prove of greater significance than such traditional measures as net farm income, in accounting for changes in farm land prices. Study findings to date provide some historical support for the above hypothesis but the relationship degenerates after the mid 1970s. There are also large regional differences, suggesting the influence of additional market forces.

Medium-term financial prospects are prepared in-house for various purposes. It is well recognized that unfavourable conditions not only result in individual farm failures, but also have broader implications for industry investment and sectoral growth. This, in turn, affects productivity growth and long-run market competitiveness. Thus, it is necessary to monitor the industry's financial outlook. Prospects are examined under a number of different scenarios with respect to inflation, interest rates, farm prices and expenses. From estimates of gross farm income, estimates of future cash flows, returns to labour, manage-

ment and assets, asset values and other financial measures are projected. Observed relationships between these measures have provided information on the sensitivity of the economic recovery of the sector to such influences as real interest rates, industry debt restructuring and declining asset values.

Farm industry structural analysis. The final area of wealth-related activity to be discussed is farm industry structural analysis. Industry structure refers to the organization of resources for agricultural production and has important implications for what is produced, where, by whom and at what cost. As such, the Department has a responsibility to investigate the normative and positive aspects of farm industry structural change as the basic rationalization for, and coordination of, a myriad of farm programs and policies.

No clearly defined set of structural objectives currently exists for the Canadian agricultural industry. Indeed, it is arguable as to whether a consistent set of objectives could, or should, be developed given the diverse and often conflicting nature of the social and economic forces that impinge on farm industry structure. There are, however, a number of individual structural issues that require analysis and, therefore, generate information needs. Many of these issues relate to the economic characteristics of the industry. Typical wealth-related issues include the relative efficiency of large versus small farms, the increasing importance of part-time farming, the optional level of industry specialization and the capital requirements of the family farm. In order to address these issues, information is required on such distributional measures as the concentration of farm assets and output within

the industry and such comparative measures as the return to assets among farms of different economic size.

To provide information on the changing concentration of farm assets, an in-house study has been examining the farm asset transfer process. Using the agricultural census match data developed by Statistics Canada, historical and projected changes in asset ownership associated with industry entry/exit and expansion/contraction processes are being analyzed. A partial cash flow approach was used to develop data on the capital requirements for the transfer of farm real estate, nonreal estate investment and operating expenses. Estimates of the credit requirements and internal funds needed to finance these asset transfers were also developed. By studying the structural change process and the financing of asset transfers, a better understanding of future industry credit requirements and changing debt levels is achieved, while providing insight into changing asset ownership patterns.

A second phase of the same on-going, in-house structural work looked at changing output-capital ratios (capital turnover ratios) over time for farms of different economic size. The ratio itself means relatively little in terms of industry efficiency or profitability. However, capital turnover ratios become significant when combined with profitability ratios--the product of the two provides a measure of the current returns to capital. Current returns are a partial measure of the returns to investment in the industry.

Study results indicate a clear declining trend in output-capital ratios, which implies less income per dollar invested over time. This sug-

gests that, in order to maintain an adequate rate of current returns, there has been increased pressure on the industry to raise profitability. In addition, the results indicated that this trend was more predominant for larger-sized farms and that it was likely to persist through to the end of the decade. Such information has implications for the industry's investment and growth prospects as well as the structural change process.

Data Requirements

The preceding discussion was intended to provide readers with some feeling for Agriculture Canada's activities in the area of farm wealth measurement and analysis. It should be clear that our interest in farm wealth accounts stems from a very broad range of responsibilities and information needs, involving the estimation of components from income, balance sheet and cash flow statements for analytical purposes. This review of activities suggests that sectoral and/or regional disaggregations, as opposed to aggregate, industry level data, are required for most Departmental studies of this kind. This review has also demonstrated the need for more consistency in the terminology and measurement of wealth-related data.

The following list of wealth-related data requirements was drawn together from the various Department activities and reflects the type of data that went into those studies. It is presented as a possible starting point for discussion in the concurrent sessions of this workshop on the components which should be considered in the development of farm wealth accounts. For this purpose, the list is divided into four separate categories:

1. Production Costs
    a) nonfactor operating expenses and depreciation
    b) operator labour
    c) operator management
    d) capital costs
2. Balance Sheet
    a) productive assets
    b) financial assets
    c) debt associated with real estate
    d) other debt
3. Sources of Funds
    a) farm income
    b) off-farm income
    c) capital disposition
    d) credit
4. Disposition of Funds
    a) operating expenses
    b) capital acquisition
    c) debt repayment
    d) family consumption

Methodological Issues

Finally, there are some major methodological issues surrounding the development of farm wealth accounts. Again, the intent here is to provide a basis for further discussion.

The first problem is the question of farm definition. There are really two issues here--that of the household versus the enterprise concept of a productive unit, which Mr. Hamilton addresses in his paper, and the issue of commercial versus noncommercial farms. The problem here is that if all agricultural holdings are included in the aggregate data, industry averages are heavily biased by the large number of small, noncommercial farms. Consideration should be given to excluding, or at least separating out, noncommercial farms from industry averages. To emphasize this point, most industry production averages provide a more accurate picture of commercial agriculture when doubled because the smallest one-half of farmers produce virtually nothing.[2]

Another issue for discussion is the relative importance of cost versus market values for farm assets. Traditional accounting practices and intra-industry comparisons dictate the need for valuing assets at cost while the economic assessment of the industry's financial performance (primarily in terms of returns to assets) requires market values. Conceptually, it would be preferable to estimate both cost values and capital gain separately. Selection of one format over another, however, is more likely a function of our ability to collect accurate and consistent data rather than conceptual preference.

A third methodological issue is the need for wealth-related data on a distributional basis. Aggregate industry averages, without accompanying data on industry distribution, can be particularly misleading in the

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[2] Editors Note: While this form of rule-of-thumb may appear to work for some products in some regions, it cannot be depended upon for all products in all regions. That such rules exist suggests the most basic need for better data.

area of farm finance. The 1984 Farm Credit Corporation survey, for example, is a highly valuable source of wealth-related information on the industry, not because it provides an average farm equity estimate of 82 percent, but because the survey shows the distribution of farms by level of equity. The development of a farm wealth account, providing aggregate industry averages only, would be of limited value for the types of information needs and activities discussed in the presentation.

Finally, there is the issue of asset ownership versus asset control which concerns the use of equity as a measure of wealth. Assets controlled by the farmer/industry, but not owned by the farmer/industry, annually appear on balance sheets as equity since no offsetting liabilities are recorded. This phenomenon is becoming increasingly important with the increased incidence of renting or leasing of farm assets. The inclusion of assets in farm wealth accounts that are not owned would create a false measure of wealth while the exclusion of such assets would give a false measure of the economic performance of the industry (in terms of returns to assets). This problem may become even more complicated if equity financing begins to replace traditional debt financing, as some analysts are predicting.

The basic conclusion is that farm wealth information is needed and much activity to provide this information is underway. Efforts to improve the data available in this area would be highly productive.

MEASURING THE ECONOMIC WELFARE OF FARMERS: A THEORETICAL APPROACH

Edward F. Hamilton

The Problem

Much of Statistics Canada's current financial data system for the farm sector was developed in the late 1930's and early 1940's. This system was fashioned in response to the needs of users and policy-makers at that time and was based on the structure of farming as it then existed. In the past 40 to 50 years, however, both the structure of the industry and the requirements of its decision-makers have changed. The "family farms" of the depression years have become "fewer, larger, more specialized, more capital intensive, more dependent on purchased inputs, large users of borrowed capital and more integrated with [the] food processing and distribution sector."[1] The objectives of agricultural policy, which during the Depression period concentrated on the income position of farmers and their market power, have now come to include such concerns as the stability and adequacy of producer returns, reducing the disparities that exist within agriculture and ensuring the availability of adequate food supplies at stable prices.[2]

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[1] G.L. Brinkman and T.K. Warley, "Structural Change in Canadian Agriculture: A Perspective," A Report Prepared for the Development Policy Directorate, Regional Development Branch, Agriculture Canada, (Ottawa: Agriculture Canada, June, 1983), p. 6.

[2] George W. Beelen, "An Alternative System of Financial Accounting for the Canadian Agricultural Production Sector," M.Sc. Thesis, (Winnipeg: University of Manitoba, October, 1983), p. 16.

Despite these changes, however, the conceptual base of the aggregate financial accounts for farming has remained virtually unchanged. The financial information currently provided by Statistics Canada on the farm sector is largely based on the original accounting framework developed almost 50 years ago. In that 50 year period, changes in both the structure of farming and the concerns of farm policy-makers have rendered the conceptual base of this information system somewhat obsolete.

This process of "conceptual obsolescence" can be illustrated with the use of an example. The farm net income series is perhaps the single most important and, certainly, the most widely used financial statistic produced by Statistics Canada on the farm sector. In the late 1930's, when this series was originally developed, it was designed to provide information on farm business income at the provincial level.[3] It may also have been a reasonable indicator of the economic welfare of the farm family, given the prevailing economic conditions and the "one farm-one family mainly dependent on that farm" structure of the industry at that time.

Today, however, the farm net income series is often cited in discussions of the economic welfare of farm families, despite the fact that this series has become inappropriate for this type of analysis. Three arguments can be identified to illustrate the unsuitability of this measure for examining economic welfare. First, the simple organizational notion of the "one farm-one family" concept, which may have been valid during the 1930's and 1940's, is not an accurate representation of the structure of Canadian farming, as a consequence of large scale, cor-

[3] Statistics Canada, Farm Net Income, 1983, Catalogue No. 21-202, p. 14.

porate, part-time and other farm structures which have evolved. In addition, the farm net income series only includes the income generated by the farm business. Incomes earned off the farm, which, between 1980 and 1982 amounted to approximately 75 percent of the average total net income of farm families,[4] are not included. Finally, the wealth of farm families, which is certainly an important component of economic welfare, is not included in the farm net income measure.

Statistics Canada has recognized that, because of this conceptual obsolescence, some changes to the aggregate financial accounts are needed. A Concepts Review program was begun in 1981 with the objective of recommending modifications to the existing accounts. These revisions will be based on the current structure of farming and on the needs of users and policy-makers as they now exist. The needs of users in the area of farm financial statistics can be summarized in the following statement;

> . . . the two things we are looking for [are] better information on the business of farming and better information on the farmers who carry on the business.[5]

Dr. Bursa's first concern was addressed by phase one of the Concepts Review. This research concentrated on the farm business and recommended both changes to the existing accounts and the development of several new accounts, including a cash flow statement, a balance sheet and a capital flows account. The second phase of the Review deals with Dr. Bursa's other concern--better information on the people involved in farming.

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[4] Calculated using data from Statistics Canada's Survey of Consumer Finance.

[5] M. Bursa, "Analysis and Discussion of Farm Financial and Aggregate Statistics," In Summary Report of the Thirtieth Federal-Provincial Committee on Agricultural Statistics, (Ottawa: Statistics Canada, September, 1979), p. 151.

Statistics Canada has interpreted this as a desire for two things; first, better data on the socio-economic characteristics of farm operators and their families; and, second, better information on the economic welfare of those farm families. This paper will address the welfare issue and, as such, will examine the concept of economic welfare, discuss a theoretical approach to measurement and propose the concept of economic position as a proxy for economic welfare, where the economic position of a consuming unit is determined by the level of that unit's current income and net worth. Finally, a set of aggregate financial accounts will be proposed as a comprehensive measure of the economic position of farm families in order to meet the information needs of users in this area.

Economic Welfare

A.C. Pigou,[6] an economist writing in the early 1900's, described welfare as a state of consciousness. He divided total welfare into two components--economic and noneconomic welfare. Pigou restricted economic welfare to those parts of total welfare that could be related to money, such as income and wealth. Everything else, including any "psychic" returns, was classified as noneconomic welfare. Pigou also suggested that economists restrict themselves to the analysis of economic welfare, perhaps because of the difficulty in valuing the components of noneconomic welfare.

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[6] A.C. Pigou, The Economics of Welfare, Fourth Edition, (London: MacMillan and Company, Limited, 1960).

The economic welfare of an individual will be affected, among other things, by the satisfaction he derives from the quantity of goods and services that he consumes during a certain period of time. Presumably, the larger the quantity of goods and services he consumes, the greater will be his satisfaction and, therefore, his economic welfare. However, the ability of that individual to consume a certain level of goods and services will be determined, to a large extent, by the amount of income that he earns and the size of his wealth. Clearly, then, both income and wealth will be important factors (although not the only factors) in determining an individual's economic welfare. As mentioned previously, this paper will present the concept of economic position as a proxy for economic welfare. Economic position will be measured as a combination of income and wealth.

In addition, these components will be examined from two perspectives--that of the accountant and that of the economist. Statistics Canada's System of National Accounts is, essentially, an accounting approach to measuring the income and wealth of the country. Since this paper will propose a set of aggregate financial accounts as a proxy for economic welfare, some knowledge of the relevant accounting principles will be valuable. However, welfare is an economic concept, and, as such, income and wealth must also be examined from an economic perspective.

Accounting Income

Traditionally, accountants have defined income as "a surplus arising

from business activity."[7] The measurement of accounting income is done through a process of matching sales revenues during the accounting period with the relevant costs. In particular, at the end of each accounting period, unallocated costs, which represent the nonmonetary assets of the business (such items as buildings, equipment and inventories, for example) are aggregated and added to the monetary resources of the business. The liabilities of the business are then deducted from this sum to arrive at "residual equity" or "accounting capital." Accounting income for the period is the difference between residual equity at the end of the period and residual equity at the beginning. In mathematical terms:

$$Ya = ER - BR$$

where, Ya = accounting income,

ER = residual equity at the end of the period, and

BR = residual equity at the beginning of the period.

Economic Income

Not surprisingly, the economist's view of income is somewhat different than that of the accountant. Although Irving Fisher argued that saving should be excluded from the income identity (on the grounds that saving was only potential consumption and, therefore, couldn't affect current satisfaction), economists have come to regard income as consumption plus saving. More specifically, personal economic income can be defined as:

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[7] Lee, T.A., Income and Value Measurement: Theory and Practice, second edition, Baltimore: University Park Press, (1980), p. 6.

$$Ye = C + S$$

where, Ye = personal economic income,

C = consumption, and

S = saving.

However, if saving is interpreted as "the periodic change in personal economic capital,"[8] then this income identity can be redefined as:

$$Ye = C + (EK - BK)$$

where, EK = economic capital at the end of the period, and

BK = economic capital at the beginning of the period.

A further refinement of this income identity can be introduced by considering the work of John Hicks. Hicks defined an individual's income as the maximum value he could consume during a period and still be as well off at the end of the period as he was at the beginning. In other words, an individual's income is the maximum that he could consume during a period, provided that he maintains the value of his economic capital. This introduces the important concept of capital maintenance into the analysis and slightly changes the definition of economic income. Economic income in a period can now be defined as the value of consumption plus the change in the value of economic capital. The sum of these two components is the maximum that an individual has available for consumption while maintaining the value of his economic capital. This provides a rationale for the linkage between income and welfare.

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[8] Ibid, p. 7.

An example may help to illustrate this point. Assume that a person has $1,000 of personal economic capital at the beginning of the period and $1,100 of capital at the end. This person has experienced a net increase in capital of $100 and, if his cash receipts are $200, has an economic income of $300. Suppose then that this situation is reversed. Assume the individual begins the period with $1,100 of personal economic capital and ends it with only $1,000. In this case, net "dis-saving" of $100 has been experienced and, when added to cash receipts of $200, results in an economic income of only $100. In other words, this individual really has only $100 available for consumption expenditure if he intends to maintain the value of his economic capital at $1,100. Maintaining the value of his capital may be important if this individual expects to consume the same amount next period as he has in the current period. As a result, the variable "C" in the previous identity should be redefined. "C" can now be defined as the actual cash realized given that economic capital is to be maintained.

The concept of income has now been approached from two different points of view--that of the accountant and that of the economist. The accountant's concept of income has been examined because that is the concept that Statistics Canada is usually interested in. However, welfare is essentially an economic notion and it is for this reason that the concept of economic income has also been addressed. Relating these two concepts of income together will be an important step in the process of designing a set of financial accounts on the economic welfare of farmers.

Solomons has developed a relationship between the concepts of accounting and economic income. To accounting income, he:

1. adds the unrealized changes in the value of tangible assets during the period, net of depreciation and the value of inventory change,
2. deducts the amounts realized this period on changes in the value of assets that took place in previous periods, and
3. adds changes in the value of intangible assets, or "goodwill," during the period,

in order to arrive at economic income. As he states,

> The main difference between these two income concepts lies in the accountant's attachment to realization as the test...of income.'

Solomons also discusses the disadvantages of using either of these concepts as a measure of "income." The main drawback with accounting income is that it ignores unrealized changes in the value of assets. Economic income is identified as deficient in two respects. First, it requires nearly perfect knowledge of both the present and the future to correctly value the various assets. Second, the value of assets may change as a result of changes in human expectations. For example, suppose an individual buys an asset that he expects will yield a large sum of money some time in the future. Six months later, if this sum of money is now anticipated to be smaller or less certain, then the value of that asset will be reduced simply because of a change in his expectations of the future.

' Solomons, David, "Economic and Accounting Concepts of Income," The Accounting Review 35 (July 1961), p. 376.

Variable Income

Solomons examines the concept of "variable income" in order "to eliminate the effect of a change in expectations from our measure of economic income."[10] He defines variable income as the sum of three components:

1. the net receipts from assets,
2. the change in their value occurring during the period that was expected at the beginning of the period, and
3. the discounted present value of any change in future receipts occurring as a result of a change in the level of current receipts.

Solomons specifically excludes from variable income any changes in the value of an asset that occur as a result of changes in expectations during the period. However, these value changes are not excluded entirely. Instead, he proposes that these "unexpected" gains or losses be kept separate from variable income. In fact, Solomons proposes that:

economic income = variable income + unexpected gains (losses)

The concept of variable income, while important, is not the key issue here. The critical point is that economic income has been split into two components. The first component, variable income, can be thought of as an expected income and, perhaps, as analogous to realized or money income. The unexpected gains component can be considered as an "unrealized" income component, since this gain (or loss) would only be realized by the individual if he disposed of the asset. The separation of these

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[10] Ibid, p. 379.

two components of economic income is an important feature of the set of accounts that will be proposed for assessing the economic welfare of farmers. This separation is particularly important in agriculture because of the importance of land as a major asset of farmers and because of the size of the capital gains and losses farmers experience with fluctuations in land prices.

The Proposed Accounts

The set of accounts presented here is based, to some degree, on the separation of realized income and expected gains advocated by Solomons. In particular, three accounts are proposed--a realized income account, a wealth account and an additional account designed to separate out the unexpected gains on assets. It must be stressed that the sum of these three accounts can not be interpreted as the level of the economic welfare of farmers. Rather, an examination of the changes in each of these accounts from period to period should enable one to draw some conclusions about changes in the economic welfare of these people.

The first account is the realized income account (Table 1). This account is designed to represent the money income of farmers. Revenues have been divided into farm and nonfarm sources. Imputed house rent and the imputed net value of farm garden production have been included to represent the cash savings available to a family living on a farm versus a family living in an urban area.

The wealth account (Table 3) details the assets and the liabilities of the farm family. The construction of this account is straightforward except for one exception. Farm land and buildings, machinery and equipment, and quotas are all valued at purchase price in this account. The reason for this will become apparent in the discussion of the remaining account.

This account has been termed the "X" account (Table 2), mainly because of the difficulty in finding a suitable name. This account is designed to represent those unexpected gains identified by Solomons. Accounts receivable and payable are included in this account because they are essentially unrealized income and expenses. A similar argument holds for the value of inventory change. Regardless of whether this value is positive or negative, the farmer neither receives nor spends any cash. Capital appreciation and depreciation on major assets are also included in this account. These assets are valued at market price less purchase price in order that only the capital gain or loss on the asset, not its market value, is reflected in this account. The market value of an asset could be ascertained at any time by adding the capital gain or loss from this account to the purchase value contained in the wealth account. Again, the "X" account is designed to reflect only the nonmoney economic income of the farmers.

Related Issues

When developing this framework of accounts, there are several related issues that should be addressed. The first is the choice of an appro-

priate economic unit. Should these accounts attempt to measure the economic welfare of the individual farm operator, that of his family or that of some other economic unit? The farm family appears to be the logical choice because it is the relevant decision-making unit. When decisions that affect the welfare of individual family members are made, the welfare of the family as a whole is usually considered as well.

A second issue that must be addressed is the basis upon which to define families as farm or nonfarm for the purposes of the proposed accounts. Essentially, this is a question of sectoring concepts. The establishment concept has traditionally been used by Statistics Canada in the compilation of the National Accounts series. However, while this concept is suitable for classifying businesses, it doesn't appear to be acceptable in identifying farm families for welfare analysis. A more appropriate concept is the institutional concept, which defines the sector "to include all transactions of selected target groups of sector participants."[11] Choosing this sectoring concept would enable one to identify as a target group, for example, all unincorporated farm operator families.

The final issue is the problem of creating aggregate accounts from the financial data of individual families. Since these data are usually collected at the macro level, there may be problems of aggregation inherent in this approach. In particular, the transactions of individuals within the sector may not add up to the transactions of the sector as a whole, especially if these activities are taking place strictly within

[11] Penson, John B. and David A. Lins, Agricultural Finance: An Introduction to Micro and Macro Concepts, Englewood Cliffs, N.J.: Prentice-Hall Inc., (1980), p. 295.

the sector. However, this problem is common to all national accounting frameworks and, while it is important that it be recognized, it is not an issue that this research will dwell upon.

Conclusions

Despite its unsuitability, Statistics Canada's farm net income series continues to be used as an indicator of the economic welfare of farm families. In response to pressure from users, Statistics Canada has initiated research into the subject of economic welfare in order to provide more acceptable information. This paper has presented an approach to measuring economic welfare based on the concept of economic income. Hopefully, the preliminary accounting framework that has been proposed in this paper will be a step in the right direction.

Table 1

The Realized Income Account

REVENUES:	EXPENDITURES:
Returns from Agriculture	Dwelling Expenses
Unincorporated Operator Returns	
Operator-owned Corporate Profits and Wages to Operator Families	
Nonoperator-owned Corporate Wages	
Imputed Net Value of Farm Garden Production	
Imputed Rental Value of Farm Dwellings	
Rental Income from Farm Assets	
Returns from Other Sources	
Imputed Rental Value of Operator-occupied Nonfarm Dwellings	
Nonfarm Business Income	
Nonfarm Wages and Salaries	
Interest and Dividend Income	
Nonfarm Rental Income	
Transfer Payments	

Adapted from: Beelen, p. 89.

Table 2

The "X" Account

CAPITAL GAINS (LOSSES):

- Farm Real Estate
- Farm Machinery and Equipment
- Farm Quotas
- Nonfarm Assets

DEPRECIATION:

- Farm Buildings
- Farm Machinery and Equipment
- Nonfarm Assets

VALUE OF INVENTORY CHANGE:

- Crops
- Livestock
- Inputs

ACCOUNTS RECEIVABLE

ACCOUNTS PAYABLE

Table 3

The Wealth Account

ASSETS:		LIABILITIES:
Farm -	Physical	Short-term Debts
	Land and Buildings	Medium-term Debts
	Machinery and Other Equipment	Long-term Debts
	Quotas	
	Inventories	
	Crops	
	Livestock	
	Inputs	
Nonfarm -	Physical	
	Financial	
	Currency	
	Demand Deposits	
	Cooperative and other Investments	

Adapted from: Beelen, p. 99.

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REPORT OF THE WORKSHOP ON THE POLICY USES OF WEALTH ACCOUNTS

Chairman: David Freshwater

Rapporteur: Paul Murray

The chairman suggested that the session concentrate on addressing the questions of why we need wealth accounts and what users want. It was mentioned that Agriculture Canada had clearly stated its departmental requirements in the presentation of the previous day by Wayne Jones. Mr. Jones reiterated those needs and, in particular, stated that Agriculture Canada's primary interest is in the traditional types of agriculture accounts. Data requirements include production costs, balance sheet data and information on sources and disposition of funds. It was recognized that net farm income, as presently estimated, is not the only return to agriculture and that equity and returns to the factors of production are very important in establishing agricultural policy. This point was supported by several other participants during the session.

Participants stated that, due to the lack of information on farmers wealth, net farm income was currently being used incorrectly as a measure of well-being in the industry. Despite some subjectivity and measurement problems, the establishment of wealth accounts was considered essential.

The participants were asked to outline their requirements for financial agricultural data. It was concluded that, depending on the analy-

sis, information on both farm households and farm enterprises was important. Several participants stressed the need for flexibility in constructing farm accounts so that the maximum benefit could be obtained from the data.

The disaggregation needs of users were discussed at length. It was felt that provincial data were necessary due to the regional differences in agricultural production in Canada. Information classified by type of farm was considered essential for intra-industry comparisons and to properly target government programs. Classification by size of farm was also considered very important. Participants felt that information on industry averages could be misleading and was perceived to have led to the inefficient allocation of government resources.

In discussing farm wealth data, some concern was expressed regarding the use of the data to compare the well-being of farmers with nonfarmers or doing comparisons within agriculture. It was agreed that family businesses outside the agriculture sector would offer the best comparison of how well off farmers were compared to nonfarmers, but that if wealth data were not available in other sectors, only comparisons of those within agriculture could be made (for example, comparing beef farmers with hog farmers). This was felt to be valuable in any case.

The Farm Credit Corporation surveys were discussed and there was agreement that, although there were some shortcomings, this work was a major step in providing the information necessary for improving the target efficiency of programs and measuring the well-being of farmers.

It was felt that Statistics Canada must respond to the needs of users in providing a broader range of financial information or the organization would be bypassed. The need for this information was considered sufficiently important that if Statistics Canada did not provide it others would provide it with lower quality. The demand for additional financial data was not considered a short-term phenomenon resulting from the level of farm bankruptcies and interest rates.

WORKSHOP PARTICIPANTS

THE POLICY USES OF WEALTH ACCOUNTS

David Freshwater (Chairman)	United States Department of Agriculture, Washington
Tom Crozier	Ontario Ministry of Agriculture & Food, Toronto
Bill Wilson	Agriculture Canada, Winnipeg
Louise Arthur	University of Manitoba, Winnipeg
Wayne Simpson	University of Manitoba, Winnipeg
Vaclav Krabicka	Statistics Canada, Ottawa
Pierre Cloutier	Economic Council of Canada, Ottawa
Hans Adler	Statistics Canada, Ottawa
George McCaw	Finance Canada, Ottawa
Peter Lys	Statistics Canada, Ottawa
Wayne Jones	Agriculture Canada, Ottawa
Tami Reynolds	Department of Regional Industrial Expansion, Winnipeg
Gary Fisher	Farm Credit Corporation, Ottawa
Brian Hayward	United Grain Growers, Winnipeg
Danny Triandafillou	Statistics Canada, Ottawa
Paul Murray (Rapporteur)	Statistics Canada, Ottawa

REPORT OF THE WORKSHOP ON VALUING FARM LAND

Chairman: Daryl Kraft

Rapporteur: George Beelen

As a means of structuring the discussion, the chairman outlined two aspects of land valuation. The price of farm land involves the issues of appraisal approaches and building improvements, and the quantity of farm land relates to the volume of transactions and the definition of farm land.

Several general issues in land valuation were discussed. The consensus was that the value of all land and buildings should be measured in an aggregate series and not just bare land values. Also, the general opinion was that valuation should take into account any value arising from urban proximity since location characteristics affect the value of all farm land to some degree.

Several approaches to estimating the aggregate value of farm land were identified and discussed. One method would be to sample farm land transactions and impute the aggregate value of land on the basis of the changes in value from the sample. This method has a serious limitation in that it is very difficult to standardize for farm type, quality, proximity to urban areas and other factors. It was pointed out that the type of farm land being transacted at any point in time depends on many factors, including economic conditions in the various agricultural markets.

Another method would involve appraising a representative sample of benchmark farms. This method would effectively standardize the relevant

farm characteristics if the sample were well drawn. A potential problem with this method is that appraisers may have difficulty in appraising farms when there are few sales of farms comparable to the benchmark sample. Also, there was considerable discussion as to the validity of appraisals when the market was experiencing mostly stress sales.

A third method considered was to estimate farm land values by asking farmers the value of their farms. This method is, in fact, used in the Census of Agriculture. The variability of responses by farmers was a concern with this method. It was suggested that some evaluation of this method should be done by matching Census responses with appraisals carried out by professional appraisers.

It was concluded in the workshop discussion that a combination of the above methods might improve the current method of estimating the aggregate value of farm land and buildings. The Census of Agriculture could be used to obtain a base estimate. Then, the benchmark method could be applied to a sample of bare land standardized for differences such as soil type and farm use. The change in the annual value of farm land and buildings could be estimated from the change in the value of bare farm land using the benchmark method combined with data on the value of farm building construction and land improvements. Every five years, the Census of Agriculture could be used to establish a new base estimate. Despite some limitations, it was felt that such an approach had strong potential.

The volume of transactions and the definition of farm land were discussed on the quantity side of the issue. It was pointed out that the

volume of transactions is highly variable from year to year and that the relatively low percentage of total land which is transacted in any time period makes imputation to all land somewhat dubious.

Finally, it was suggested that the value of farm land should be disaggregated into three components: the farm house, other farm buildings and bare land. This classification, although somewhat artificial since they generally do not trade separately, was felt to be useful for many policy and analytical uses.

WORKSHOP PARTICIPANTS

VALUING FARM LAND

Daryl Kraft (Chairman)	University of Manitoba, Winnipeg
Jim Pietryk	Royal Bank of Canada, Winnipeg
Jacques Doran	Farm Credit Corporation, Ottawa
Denis Rheaume	Agriculture Canada, Ottawa
Bill McBride	Agriculture Canada, Ottawa
Larry Rosevear	Deloitte, Haskins and Sells, London
John Clark	United Grain Growers, Winnipeg
George Beelen (Rapporteur)	Statistics Canada, Ottawa

REPORT OF THE WORKSHOP ON DATA NEEDS AND SOURCES

Chairman: George Brinkman

Rapporteur: Stuart Pursey

The chairman set the format of the workshop to revolve around an elaboration of each of the three accounts that had been proposed. Although the workshop focused on data needs and sources, many questions and comments related to conceptual issues.

The Realized Income account was discussed first. One conceptual issue that related to this account involved income that farmers can earn from the nonagricultural exploitation of their farm assets (for example, renting the farm to others for vacation purposes). It was agreed that such earnings must be included in the account, but exactly where they would fit in was not resolved. There was general agreement that the data needed to develop the Realized Income account are currently available.

Discussion of the Wealth Account touched on several issues. It was suggested that the separation of personal assets from business assets would be preferable but was not essential. A further recommendation advocated the disaggregation of liabilities by use of funds rather than by the term of the debt. Suggested breakdowns included the purchase of real estate assets, nonreal estate assets and operating supplies.

The conceptual issues that were raised revolved around the differences between the depreciation concept used in the current farm net income series and the "market value depreciation" concept suggested as appropriate for this account. There was also some discussion of where the

value of the farm dwelling should fit in. General concern was expressed about finding and developing adequate sources of data to create the Wealth account.

Given the successful implementation of the Wealth account, it was noted that the need will arise to compare agriculture with other sectors of the economy. Ed Hamilton stated that, although this may become more important in the longer term, the current need seems to be to compare the subsectors of agriculture by type of farm, size of farm and by region.

The final account discussed was the "X" account. One conceptual point was raised concerning the tax liability that occurs when a capital gain is realized. Ed Hamilton emphasized that the proposed "X" account only relates to assets and liabilities before taxes. A similar conceptual problem will apply to accounts receivable, such as deferred grain receipts. A comment was made that the "X" account is, in fact, a valuation account.

Several general comments relating to all of the accounts were also raised. It was pointed out that the three proposed accounts would not fill data needs relating to policy issues such as investment decisions or emergency relief. It was also emphasized that the three accounts were not intended to replace business accounts. Instead, they will focus on the farm family as a whole. It was noted that the accounts could be arranged to separate out farm business income and net worth from other sources of income and net worth. It was argued that the accounts were not related to the welfare of the farmer but instead to the finan-

cial condition of farmers. The meaning of the term "welfare" in economic theory does not correspond to its use here.

Some final comments concerned data sources. There were some questions as to where and how the necessary data could be acquired, as well as some concern about getting beyond the conceptual stage to the operational stage. However, it was agreed that the data currently available should be gathered and an attempt made to fit them into the framework despite the many conceptual problems.

WORKSHOP PARTICIPANTS

DATA NEEDS AND SOURCES

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