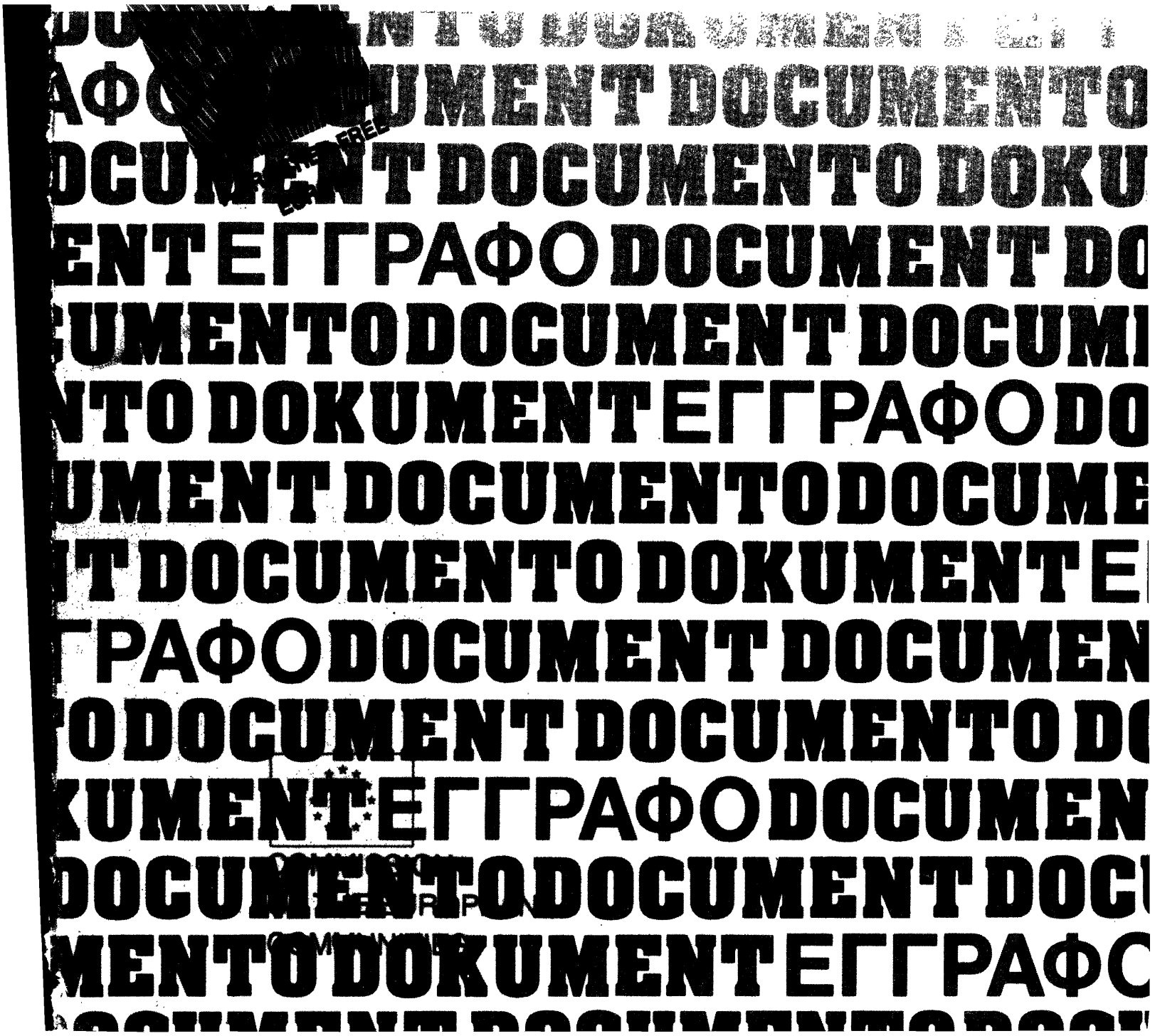
REPORT

THE CALCULATION OF ECONOMIC INDICATORS

Making use of RICA (FADN) accountancy data



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Making use of RICA (FADN) accountancy data

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PREFACE

This report was prepared over the period 1989 to early 1991 and involved the continual interchange of working papers and analyses of results between the contractor and the staff of the European Commission responsible for the Farm Accountancy Data Network (FADN, also known by its French acronym RICA). This period was a particularly dynamic one for the Common Agricultural Policy, especially with regard to new needs for income information. As part of the European Community's agricultural information system, RICA has had to respond to these developments. Some of the recommendations contained in this report have already formed part of the proposals put forward by the Commission (as in its Report from the Commission to the Council on the Farm Accountancy Data Network, COM(90) 144 final), or are reflected in discussions within the Network (such as on the implications of extending coverage among small farms and off-farm income), or in technical developments. Some recommendations reinforce changes which had already been initiated or may have been envisaged by RICA before the research started. Being overtaken by events is part and parcel of undertaking a study in a rapidly evolving environment.

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GLOSSARY OF MAIN ACRONYMS AND GROUPS OF INITIALS

A-Z: The European Farm Accountancy Data Network: An A-Z of Methodology (Commission 1989)

ALU: Annual Labour Unit

ASC: Agricultural Statistics Committee

AWU: Annual Work Unit

BLSA: breeding livestock stock appreciation

COPA: Committee of agricultural organisations in the EEC

CAP: Common Agricultural Policy

DGVI: Directorate General VI of the Commission of the European Communities (agriculture)

EAA: Economic Accounts for Agriculture (Eurostat)

EC: European Community

ECU (or ecu): European currency unit

ESA: European System of Integrated Economic Accounts

ESU: European Size Unit

EUR (EUR6, EUR9-EUR12): European Community, with number of Member States

FADN: Farm Accountancy Data Network

FBS: Family Budget Survey (or Farm Business Survey (UK))

FCRS: Farm Costs and Returns Survey (USA)

FFI: Farm Family Income

FFI/FWU: Farm Family Income per Family Work Unit

FMS: Farm Management Survey (UK)

FNVA: Farm Net Value Added

FNVA/AWU: Farm Net Value Added per Annual Work Unit

FRG: Federal Republic of Germany

FWU: Family Work Unit (or, more exactly, Unpaid Work Unit)

GNP: Gross National Product

GVA: Gross Value Added

ICP: International Comparison Project (see PPS)

LFA: Less Favoured Area

LI: Labour Income

MAFF: Ministry of Agriculture, Fisheries and Food (UK)

MII: Management and Investment Income

NFI: Net Farm Income

NVA: Net Value Added

NW: Net Worth

PPS: Purchasing Power Standard

RFS: RICA Forecasting System

RI: Rent and Interest

RICA: Reseau d'Information Comptable Agricole (see FADN)

SGM: Standard Gross Margin

SMD: Standard Man-day (UK)

TFP: Total Factor Product(ivity)

UAA: Utilised Agricultural Area

USDA: United States Department of Agriculture

EXECUTIVE SUMMARY

Introduction: the objectives of the research project (Chapter 1)

1 The Farm Accountancy Data Network (FADN), known better by its French acronym RICA, brings together annual figures from some 55000 farm businesses in the Member States of the European Community. It is an important tool for monitoring the performance of the Common Agricultural Policy (CAP) in relation to its objectives. RICA information is one input to the process by which CAP programmes are designed and implemented. A feature of data systems, of which RICA is a large example, is that they are required to adapt to changing policy environments. There is a danger of conceptual obsolescence and of continuing to measure parameters which are no longer central to policy objectives. The ways in which RICA can contribute to the emerging policy needs of the EC are not necessarily only those which were envisaged when the network was set up in 1965. It is necessary to consider what response RICA should make to fulfil its continuing role as a major source of information.

2 The broad aims of this research project were to examine:

(a) the appropriateness of the economic indicators currently in use for measuring the performance of the agricultural sector by size and type of holding etc, not only from the Commission viewpoint but also from the farmer's perception of profitability;

(b) what other indicators could be developed within the present RICA framework.

(c) what additional indicators are highly desirable in the light of the new developments within the CAP, for which RICA might be reasonably expected to provide information.

3 On the basis of a review of the policy objectives which RICA data was required to serve, the past and present practice of RICA, parallels in farm accounts surveys in the EC and elsewhere and reviews of literature, the research team was to put forward a range of economic indicators for the consideration of RICA staff. Where sufficient data were already available, an exploratory analysis using these indicators was to be made. It was intended that the outcome of this review process would be the adoption by RICA of some of these new indicators as additions to (or substitutes for) the range currently in use. It was recognised that these new indicators might require the collection of additional data from the farms surveyed by Member States.

Data requirements of the CAP (Chapter 2)

4 An important general point is that the economic indicator which is appropriate in any given policy circumstance will depend on the objective at

which the policy is aimed. Indicators cannot be judged in isolation. As a corollary, there is no single indicator which will be universally appropriate. There is also an inherent danger of using inappropriate indicators simply because they exist; this is heightened when information users are not fully aware of the concepts behind the indicators. On occasion RICA indicators have been misused in this way. Any judgement of the economic indicators to be employed by RICA must look first at the objectives of policy it is expected to serve.

5 A study of the objectives of the CAP shows that, from the beginning, two strands of policy were present, for which separate and different types of statistics need to be generated. One strand is concerned with factor use within agricultural activity; this embraces productivity and factor utilisation, rationalisation in terms of adjustment to accommodate economies of size, specialisation (including regional adjustment) and technological advance. The other is concerned with the personal welfare of the agricultural community as reflected in their living standards and earnings. While the two strands are linked, the types of economic indicator needed to explore them are distinctly different. However, many official documents display ambiguity between the two strands, and there is a tendency to assume that indicators appropriate to the former are adequate proxies for the latter. An increasing body of evidence shows this not to be the case.

6 The demand for information is one guide to its success in serving the policy needs of the EC. Results from RICA are disseminated both in the form of regular publications (mainly the annual Agricultural Situation in the Community and the annual Economic Situation of Agricultural Holdings in the EEC, sometimes called the "RICA Report") and as responses to special requests for particular sorts of analysis; the largest group of these relate to costs of production and profitability of particular enterprises. However, it is suspected that requests concerning the total income situation of farmers are not made because it is well-known in the Commission that RICA cannot provide this information.

Indicators of farming income: RICA past and present (Chapter 3)

7 The legislation setting up RICA mentions the purpose of the network as being for (a) an annual determination of incomes on agricultural holdings coming within the field of survey and (b) a business analysis of agricultural holdings. RICA data currently supports the routine calculation of some 110 variables. Of these perhaps the most important are those which relate to the income of the farm.

8 Throughout most of the life of RICA (up to the results for 1978/79 - 1981/82, which appeared in 1984) the main *income* indicator had been Labour Income expressed per unit of labour, a residual which involved deducting from the value of output costs, real or imputed, for all land (rent or rental value) and working capital but not any labour costs. The labour units (Annual Labour

Units, later Annual Work Units) included all forms of labour. The preference for Labour Income per AWU reflected a Commission interpretation of Article 39 of the Treaty of Rome as meaning that only an indicator relating to agricultural incomes of all agricultural workers (employed, self-employed and family help) could enable it to establish whether this objective had been achieved and what were the needs with regards to the support of agriculture. The Commission also took the view that such an indicator enabled comparisons to be drawn with the income of labour in other industries. The validity of the existing indicators, substantially dependent as they were on imputing, was challenged both from inside and outside the Commission, with a major review in 1982 leading to the current array of measures. These are Farm Net Value Added (FNVA) per holding and per Annual Work Unit, Farm Family Income (FFI) per holding and per unit of unpaid ("family") labour (Family Work Unit, or FWU), and Cash-flow per holding.

9 The main income indicator used by RICA in the 1980s has been Farm Net Value Added (FNVA) per holding or per AWU (output less intermediate consumption inputs purchased from outside the business, less depreciation). As a concept it is more usually found within national accounting than in microeconomic analysis. It is a hybrid of rewards (to all the labour, all the land and all the capital in agricultural production irrespective of whether or not the operator has to pay for their use) and, at the holding level, in absolute terms does not correspond with business profit or personal income of the farm operator. Expressing FNVA per AWU is even more difficult to interpret, because labour is only one of the factors whose returns collectively comprise NVA.

10 The second income indicator, but the one which has grown in importance in analyses in the later 1980s, is Farm Family Income. This deducts from FNVA the cost of hired labour, paid rent and paid interest. It is also a hybrid reward to a mix of factors, but relates only to those in the ownership of the farm family. It is easier to interpret as an income concept. However, in the form of FFI/FWU there are problems in obtaining reliable information about the amount of family labour input. The third type of indicator, Cash-flow, has been developed but as yet has not taken a significant role in the presentation of RICA results.

11 The current indicators all relate to the period of a year. Part of the variation among incomes of individual farms is due to the effect of random factors, such as weather on yields and the timing of investment. A case could be made for taking a longer view of the underlying income position of individual farm businesses. Though RICA has not used averaging over a sequence of years, evidence from other surveys suggest that most of the effect of random influences is eliminated by averaging over a three-year period.

12 One potential strength of large-scale survey data is that distributional issues can be explored. The main form this has taken in RICA has been distributions of numbers of holdings by size of FNVA/AWU or (in the most recent years)

FFI/FWU. Distributions based on "artificial" parameters pose difficulties of interpretation in a policy context. The former is particularly open to misinterpretation by those without familiarity with its conceptual base. For instance, it is sometimes taken as a proxy for the personal incomes of the agricultural population. Even FFI/FWU is no reliable guide to the total personal incomes of farmers and their households.

13 The drawing of comparisons between the levels of income in different Member States (and their aggregation into Community-wide statistics) requires the use of some conversion factors by which national currencies can be expressed in some common medium. While at present ECU exchange rates are used for this purpose within RICA, they may be considered inappropriate because the rates reflect factors beyond those relevant to the comparison of agricultural incomes. An alternative is to use Purchasing Power Standards (PPS), as employed by Eurostat in the context of the aggregate economic accounts for agriculture. Exploratory work has established that the choice of medium affects the relative income positions of the holdings in different Member States.

The development of income indicators in other agricultural information systems (Chapter 4)

14 The methodological thinking behind the current income indicators used within the national farm accounts surveys of the USA, Canada, Australia and the UK was examined, as case studies, in order to extract lessons for future developments in RICA. Each country has been concerned with the relevance of its income indicators and has made revisions in order to meet policy requirements.

15 All use a number of different income concepts, varying in their coverage of revenues and, in particular, the items which are deducted in reaching an income figure. Concepts similar to RICA's Farm Family Income were found widely, though expressed per business rather than per Work Unit. Cash flows are calculated, broadly as in RICA, but FNVA is not used as a main income indicator. Various distinctions between the farm business and the farm household are evident, and between the current and capital situation of the farm. In some indicators which were encountered, the income which farmers receive from off the farm is included, while others also cover capital gains and losses. The general consensus from these surveys is that there is no single measure which is capable of indicating the changing fortunes of farming for policy purposes. In part this stems from the multiple (yet ill-defined) objectives which indicators are required to serve and in part from the significant difficulties in measuring accurately the relevant characteristics of the farm business or farm household. It is quite possible for different indicators to show divergent, even opposite, trends.

16 *Conceptual obsolescence* has been a common experience of these farm accounts data systems. In many countries the conceptual frameworks (and

often the actual data collecting systems) were set up a half-century ago. The policy questions which the surveys are expected to serve in the 1990s are much more concerned with the incomes of agricultural households than has hitherto been the case, with the balance shifting away from issues of farm business profit and other production-orientated matters, though these are still important issues. Among the business measures, increasing interest is being shown in the *distribution* of performance. *Stability* of incomes over time is a parameter which has been neglected, though improved technical facilities make longitudinal time-series analysis of individual farms feasible.

17 Though microeconomic data banks are a potentially rich source of information, capable of analysis in many different ways and of reclassification and reinterrogation as the needs of policy change, attempts to make adjustments to meet emerging policy needs encounter *institutional rigidities* and *legal constraints*. Public choice theory can be useful in demonstrating the importance of the bureaucratic structure, conflicts of interest between parts of the bureaucracy, and costs to organisations of procedural adjustments in impeding or achieving change.

Indicators of personal income (Chapter 5)

18 Given that an assurance concerning the "fair" standard of living for the agricultural community is a central objective of the CAP, a case could be made that data on the personal or household incomes of farmers should have been an essential component in the EC statistical system from the outset. The Commission in many documents makes it clear that it is aware of the significance to farm households of income coming from sources outside agriculture. The need for such information has become even more apparent in the later 1980s, and the EC's Agricultural Statistics Committee recognises that the statistical system must adapt and, where necessary, develop new lines of data. Initiatives have already been launched by Eurostat for a macroeconomic approach to the disposable income of agricultural households. The demand for microeconomic data, especially income distributions which macroeconomic estimates cannot provide, is already apparent for use in shaping new structural policy programmes (set-asides, pre-pensions etc). The lack of information on total incomes in RICA must therefore be highlighted.

19 In addition to income studies, a case could be made that access to non-farm resources is likely to have an impact on farm management decisions, on investment, on land use, and many other business aspects. For purely agricultural reasons, data on non-farm resources might be valuable in explaining farm business behaviour.

20 The present legislation does not empower RICA to collect data which is not directly related to the holding, such as non-farm income. Nevertheless, several of the national surveys which contribute to RICA (those in Germany, Netherlands, Denmark and, from 1988/89, the UK) collect data on other sources of income and, often, on the deductions necessary to enable estimates

of disposable income to be calculated. Findings from these countries, and from other data sources in EC Member States and elsewhere, suggest some very important conclusions regarding the total income situation of farm operators.

21 The Community Farm Structure Survey shows that at least one third of EC holders or their spouses have some other form of gainful activity. Even where farming is the main activity of the operator, there are substantial amounts of other income; fragmentary evidence repeatedly indicates that only about two thirds of the total income of such households comes from farming. Off-farm income can be found at all points of the farm size spectrum. Off-farm income has been increasing in absolute and relative importance. Moreover, it is more stable from year to year than the income from farming and imparts a degree of stability to the total income situation of farm households. Lowest total incomes tend to be found not among the smallest holdings (where there is usually non-farm income) but among those which are at the bottom of that size group which justifies full-time operation. This size seems to coincide with farms which are too large to allow the operators to engage in significant off-farm activity (such as by taking off-farm employment) yet which are too small to generate a farming income adequate to allow living needs to be met and to provide for reinvestment.

22 Low (total) incomes in individual years can be a poor guide to the longer-term income situation. This suggests that a distinction must be made between farm households which are in a persistent low income situation and those who suffer occasional low incomes. There is evidence within the EC that farm families adjust their spending on consumption goods in line with their longer-term assessment of income and do not greatly reflect short-term income movements; saving and dis-saving are adjusted appropriately. This lends further weight to the suggestion that income assessments at farm level should extend over more than a single year.

23 Income measures do not usually include capital gains, though a case could be made that, whether realised or not, these form part of personal income and that they have been of substantial importance to the agricultural community. Wealth (the stock of purchasing power, as distinct from its annual flow) is also not investigated, although again it might be argued that the potential of a household to consume goods and services (its economic status) is in part influenced by the amount of net worth it holds. Much of this wealth will be in the form of agricultural real estate, but there may other assets held outside the farm which impinge on the economic situation of farmers; information on this other wealth is at present only fragmentary.

24 The issues raised by the existence of non-farm income go to the core of RICA, and call for a fundamental questioning of RICA's purpose within the EC's information system. Though it might be argued that the personal income situation of the agricultural community can be better pursued using alternative data sources, such as the Community's network of national family expenditure surveys ("Family Budget Surveys", or FBS), the fact that RICA exists using a

harmonised methodology backed by legislation, that it is conducted annually (in contrast with most of the FBSs), and that the additional information is already collected within the national farm accounts surveys of several Member States, all suggest that RICA should give careful consideration to extending its coverage so that it can play a major role in providing statistics on the personal income situation of Community farmers.

Indicators of efficiency and productivity (Chapter 6)

25 One use for RICA data envisaged in the founding legislation, and which has perhaps been neglected because of the concentration on the measurement of incomes, was for a business analysis of agricultural holdings. Chapter 6 considers how RICA can help answer questions concerning the efficiency of farms within given size, tenure or other groups, or on their productivity and factor use. On such a basis it might be possible to draw conclusions about the desirability of accelerating or impeding structural change. In this context a distinction must be drawn between technical and economic efficiency.

26 Two main approaches using RICA data might be taken. The first would be to explore a range of whole-farm and partial measures using performance ratios, many of which are already in circulation. Ratios of the value of whole farm output to the value of whole farm inputs (often called Total Factor Product(ivity)) have received much attention in the past (outside RICA), but they are subject to substantial theoretical reservations which restrict their interpretation as a guide to policymaking. Two among these are the problems of obtaining reliable valuations for some of the non-traded inputs (especially the labour of farmers and their spouses) and, perhaps the most fundamental, that ratios are average factor products and do not necessarily give any reliable guide to the outcome of marginal adjustments of farm size or factor use. Partial performance ratios (such as output per man or per hectare) have the virtue of being easily comprehended, but they too may be unreliable for indicating the relative overall performance a farm, though there are specific policy situations in which they may be of interest.

27 The second main approach would be to use the data to estimate production functions. The methodology put forward by Farrell (1957), and subsequently developed in a European agricultural context, uses the concept of a production frontier for the given level of technology; technical inefficiency can be represented by farms which lie inside the frontier. Estimates can be made of the degree to which a sample of reasonably homogeneous farms approaches the frontier. While the use of RICA data for such exercises should be supported, they seem to go beyond the simple calculation of economic indicators which is the concern of the present research project.

Indicators of profitability, business performance, financial status and viability (Chapter 7)

28 Another way of approaching the performance of farms is to examine them

primarily as businesses, as opposed to being users of national resources (which was the orientation of Chapter 6). A separate set of indicators for this purpose will be needed. Indicators were reviewed on three conceptually distinct (but related) kinds of business attributes: (a) profitability and business performance; (b) financial status; (c) viability. Two approaches are employed here, the first using *a priori* reasoning, starting from the purposes for which measurement is required and developing the appropriate indicators. The second looks at what indicators are employed in practice by farmers and some farm accounts surveys; practice does not seem usually to be underpinned by strong theoretical foundations.

29 A problem with any attempt to assess business performance is that there needs to be a definition of success or failure. No single measure is likely to give an unambiguous conclusion on whether the business is performing well or not, and the assessment will reflect the nature of the assessor. Farmers, policymakers and, for example, bankers will each have their own reasons for wanting to know about the performance of farms and therefore their own information needs and array of indicators, though there may be some overlap. In the present research context it is assumed that the Commission's needs are the most important.

30 Among the sources of economic information used by farmers in managing their businesses, fragmentary evidence suggests that to them the balance sheet is the most important, followed by profit and loss (taxation) accounts. The principle purpose appears to be to facilitate the acquisition of credit. Farmers vary widely in the extent to which they prepare and use economic indicators and links can be found with, for example, farm size and farmer age (in the USA) and dependence on hired labour and the level of education (UK). The inference of structural change and other factors in the EC is that there will be an increased demand by farmers for economic indicators as time progresses.

31 From a review of both theory and practice it is clear that the large amount of data contained in RICA could provide the Commission with a very large number of potential indicators of *profitability and business performance*. Not all outputs or inputs need to be included in the accounting systems, and different treatments are often given according to whether they are the result of actual payments or imputed within the accounting period, or whether they cross the farm family boundary (ie ownership), or (among inputs) whether they vary with the level of planned output (ie fixed or variable). Indicators for the whole farm range from cash flow concepts to residual measures (such as Farm Family Income), which can be expressed in absolute terms or as a ratio with one or more of the inputs (such as returns on capital or value of output per ha.). At the enterprise level, performance indicators can similarly take a wide variety of forms.

32 *Financial status* is interpreted here in a generic way to cover the assets and liabilities position of the business and the way in which these relate to its income-generating ability. A number of ratios can be adopted in the process of

analysis, starting from the balance sheet but also including hybrids incorporating statistics from the trading account. Examples include various gearing ratios and the value of sales as a percentage of current assets.

33 In recent times much attention has concentrated on the prediction of *viability or business failure*. RICA has financed a study on this specific issue (running in parallel with this research into alternative economic indicators), but it was necessary to cover this important subject as part of the broader review of business behaviour. "Brute empiricism" seems to be a feature of much previous work on business failure; however, this work also points to the importance of having a comprehensive knowledge of the circumstances of businesses, including the existence of off-farm gainful activities and sources of income. Theoretical research, coupled with survey fieldwork involving tracing the development of individual farms through time, led to the identification of a number of key indicators of viability, of which rent and interest as a percentage of gross output seems to be the most useful.

34 In order to reach a more satisfactory explanation of farm business decisions, one further factor which has not been touched on, up to this point, is the *taxation* situation of farmers. A case could be made (and is supported by findings in North America) that income after tax would be a more meaningful reflection of the direction in which business decisions are aimed. At present tax data is not a part of the coverage of RICA.

Inventory of national farm accounts surveys in the EC Member States (Chapter 8)

35 National farm accounts surveys are conducted in all Member States. In some cases these were set up solely to provide data for RICA, but in others they pre-dated RICA and also serve national purposes. The data collected and the size of the samples often exceed RICA requirements. One task of the present research was to construct an inventory of these farm accounts surveys in order to: (a) ascertain the types of economic indicators which are currently in use (covering both income and business performance), as a guide to the development of additional indicators by RICA; (b) show what types of data were being collected, as a guide to possible extensions of RICA's field of survey; (c) provide a reference list of surveys, a useful piece of information in its own right. A postal questionnaire was used to collect data on official aims of the surveys, sample details including the minimum size threshold and the method of selection, the categories of questions used with special attention being paid to the coverage of non-farm income, indicators calculated, and the use and publication of results. Detailed findings by Member State are contained in an Appendix to Chapter 8.

36 Each Member State publishes results on a national basis, and a range of indicators was encountered. Some countries appear to use only the indicators employed by RICA (eg Spain and Greece) whereas others adopt additional measures (eg Netherlands) or substitute alternatives as their main concepts (eg

UK). Others cover forms of non-farming income and taxation; Denmark can even provide information on consumption spending and saving. However, nothing emerged from this inventory that had not been anticipated in earlier Chapters in this Report. Information on the precise ways in which national findings were used within policymaking was difficult to obtain; work on policy objectives and the ways that farm accounts data serve them requires a more detailed and interactive approach than a postal questionnaire can provide.

37 In a separate exercise, all the institutions who together contribute to the UK's national farm accounts survey (the Farm Business Survey) were contacted and the economic indicators they use reviewed. Each carries out independent research and analysis, and a wide range of indicators was encountered; these could be grouped into whole-farm profitability measures and balance sheet analyses. Though the terminology varied between institutions, the concepts were often essentially similar. Most carried the concept of profit to at least the level of Farm Family Income, some going further and deducting the imputed value of the labour input of the farmer and spouse, thereby estimating the residual reward to capital and management.

Further analysis of RICA data using alternative economic indicators (Chapter 9)

38 Building on all the preceding Chapters, a list of potential economic indicators was assembled and a programme of analysis set out for exploring RICA's bank of data using them. Because of the very large number of variables which could in theory be calculated, the multiplicity of farm types and years and so on, some ordering of priorities was necessary. The process of selection reflected the policy requirements as perceived by RICA. It acknowledged that many indicators might be closely related to each other, and that a too large a mass of exploratory tables could present problems of interpretation within the resources of the present study.

39 Indicators fell into three groups: those which are capable of calculation within the present RICA framework; those which might be technically feasible but which are not as yet calculated (such as time-series for individual farms); and those for which additional basic data are required (such as non-farm income, though certain Member States may collect it for national purposes). The exploratory analysis could not cover the last group. The process of exploration had to tackle not only the problem of selecting economic indicators, but also of choosing the criteria to be used for grouping or ranking farms.

40 Among the range of whole-farm indicators of **income and profit**, the main differences arose from alternative treatments of non-cash items in the list of outputs and (to a lesser extent) variable inputs, of imputed costs for fixed inputs which are owned by the farmer/operator, and of changes in the balance sheet of the business, including borrowings and asset values. Some twenty indicators were proposed, ranging from cash flow (narrowly defined) to concepts including unrealised capital gains.

41 Most of the indicators of **efficiency** that were proposed took the form of ratios of whole-farm outputs to whole-farm inputs, differences among them resulting from alternative ways of selecting and valuing inputs and output. In particular, this concerned the treatment given to the labour input of the farmer and spouse. The large number of **partial productivity/performance** measures that were assembled initially had to be severely pruned to give a short list of twelve covering indicators expressed per area of land, per labour unit, and per unit of capital, with the denominators and numerators being defined in several ways. Some of the indicators of **financial status** were already emerging from other parts of the analytical framework, but another twelve were put forward, reflecting different classifications of assets (total, current, liquid etc) and of liabilities (total, long-term etc). **Viability** indicators concentrated on combinations of rent and interest as a proportion of farm output, variously defined.

42 For the analysis, the desirability of ***grouping*** by business size, type and Member State was obvious, although farm size in particular offered several possible criteria (crude or adjusted land area, work units, labour numbers, value of output, capital valuation, ESU etc). In addition, it was proposed that farms should be grouped according to income levels, efficiency ratios, viability indicators, tenure, socio-economic characteristics of farmer, and whether they were growing or contracting in business size. Perhaps of special policy relevance, it was proposed that farms should be grouped and compared on the basis of whether they were family or non-family operated, though there were various ways in which they might be classified in this respect.

43 Plans for a comparative analysis were put forward using both ECU exchange rates and PPS as means for converting national currencies into a common medium. Variables selected for this formed a restricted list. Because the aggregate agricultural accounts for the Community are now published using both bases, it was felt that farm-level indicators close in definition to those used in the macroeconomic methodology formed the most appropriate starting point for exploration.

Results of an exploratory application of new indicators to RICA data (Chapter 10)

44 The proposed indicators and forms of analysis were tested using RICA data for 1986-7 and 1987-88, with most of the emphasis falling on the latter year. The analysis was intended primarily not to describe the features of the information but rather to eliminate those indicators which add little to what others already describe. Particular policy issues will always require their own indicators. The aim here was to select those which should be considered for forming part of the regular interrogation of RICA data. The results of using the indicators are presented in graphical form. The general approach was to group together indicators which dealt with particular aspects of farm businesses, and to then examine the relationships which these showed when farms were arranged by size, type, country or other relevant parameters. Only a small

proportion of the relationships which were considered are reproduced in the body of our report; some of the others are given in an Appendix to Chapter 10.

45 Not all the proposed analyses proved to be possible within the resource constraints. Undoubtedly the most significant proposal which was not followed up was the attempt to trace the performance of individual farms over a run of years in order to obtain income averages and so on. This was for technical reasons related to the raw data, and RICA hopes that these can be overcome in the near future. However, there was no possibility that this important aspect could be covered in the time span of the present research project on alternative economic indicators.

46 Among the indicators of **cash flow**, two are recommended from the analysis for further consideration, corresponding to the definitions already developed by RICA and, separately, by Eurostat. In addition to describing different aspects of cash flow, calculating an equivalent at farm level of the Eurostat indicators invokes an important principle adopted in the process of selection; that one function of RICA should be to complement the aggregate economic accounts by providing information on the distribution of economic activity. Thus it should be possible to examine the cash flow situation by type, size, region and other characteristics, though microeconomic statistics are always likely to lag behind those from national accounting for reasons of data availability. Complementarity of this sort requires that RICA and Eurostat definitions are in line. This does not preclude the calculation of additional indicators at farm level, but a basic core of indicators should be held in common.

47 Of the farm-level indicators of **business income and profit**, the recommended indicators are: Farm Net Value Added; business income converted to "full equity", that is assuming that all land and capital is owned by the operator (FNVA less the costs of hired labour); a measure of the income to all labour (FNVA less rent and interest payments, Farm Family Income (FFI, being FNVA less the costs of rent, interest payments and hired labour); and Management and Investment Income (FFI less imputed costs for owned land and for the unpaid labour input of the farmer and his family). All but the last have equivalents in the aggregate economic accounts (NVA, Operating Surplus, Net income from agricultural activity of total labour input, and Net income from agricultural activity of family labour input).

48 Indicators which express **income magnitudes per work unit** have always received major attention within the EC agricultural information system, with results being calculated per Annual Work Unit (AWU) or, where appropriate, per Family Work Unit (FWU). Those which we recommend should form part of regular RICA analysis are FNVA/AWU; "full equity" income/FWU; income to all labour/AWU; FFI/FWU. The first, third and fourth of these, when deflated, correspond to Eurostat's main income indicators (Indicator 1, Indicator 2 and Indicator 3 respectively).

49 Measures of **efficiency and productivity** are averages and hence need careful interpretation. The recommended whole-farm indicator of total factor product is the ratio of total output to a bundle of inputs comprising intermediate consumption and the actual and imputed cost of labour. However, the relationship between performance and other parameters, such as business size, is heavily influenced by the rates at which the unpaid labour on the farm is costed. These rates should be carefully scrutinized. Other partial performance indicators which are put forward include the value of total output per ha and per AWU.

50 Only part of the problem of choosing between alternative economic indicators rests with the indicators themselves. Much of the usefulness of the data depends on the ways that farms are grouped for tabulation. Important among such grouping is the way that farms are put into different **size classes**. The analysis shows that the relationships between size and income, intensity of land use, efficiency and many other aspects of businesses are dependent on the criterion of size chosen. There is no one size criterion which is universally appropriate, because the demands of different policy problems will vary. Among the alternatives there are arguments for using Utilised Agricultural Area, the number of Annual Work Units, the value of Total output and of Total assets (excluding land) in addition to the European Size Units (ESU) measure which is currently dominant.

51 Three other ways of grouping farms have attracted the attention of the research team as worthy of more-or-less regular attention by RICA. Dividing farms into **family farms and those operated in other ways** is potentially important, given the emphasis on family farming to the stated strategy of the Common Agricultural Policy. In order to test the impact of such an analysis, farms were divided into family, intermediate and non-family groups on the basis of the balance between family and other labour input. Family farms were taken as being those on which unpaid (family) labour was responsible for all or almost all (more than 95 per cent) of the total labour input; on intermediate farms the family contributed from 95 down to 50 per cent and non-family farms it was responsible for less than 50 per cent.

52 Though family farms formed 70 per cent of the total number of holdings in the RICA field of survey in 1987-88, they contributed only just over half the aggregate total output. They were relatively most important in cereal, dairy, drystock and mixed farming types (79 to 84 per cent of numbers) and less so in pigs-and-poultry, general cropping and other permanent crops. In horticulture, non-family farms were more important than the other two types. Taking all types together, the non-family farms had higher levels of FNVA/AWU, FFI/FWU and output per AWU. Many of these (and other) differences can be explained, in part, by the greater sizes of non-family farms. However, there are also likely to be other factors involved; despite being larger and averaging over three AWUs, on non-family farms the farmer and his family on average contribute less than one unit of full-time labour. They are, therefore, in this particular sense "part-time". What the family does with the

remainder of its time and the incomes earned outside agriculture cannot yet, of course, be ascertained. Such additional information could be very instructive. The findings suggest that a division of farms along the lines explored here justifies repeated analysis by RICA.

53 Various criteria were explored by which farms could be grouped into **low and high performers.** FFI/FWU proved more instructive than FNVA/AWU. Results based on FFI (per business) were easier to interpret, showing that those with the lowest incomes were not, on average, the smallest farms. Though the level of borrowing helps explain the income level on these lowest income farms, there is also some suggestion that this group contains farms which are only temporarily in a low income position, brought about by transitory low outputs. Once again the desirability of being able to consider incomes over a run of years is highlighted.

54 The study of **farm viability** was also hampered by the lack of time series data for individual businesses. Several ratios were explored which have proved valuable in other contexts (such as the sum of rent and interest payments as a percentage of the value of total output). Ways of developing other concepts were considered, including those which include a sum for the basic living expenses of the farm family in order to leave a residual for reinvestment on which, arguably, the survival of the business depends. However at present it is not possible to test the predicting power of such concepts against changes in the farm business over time.

55 RICA data were also used to explore the implication of alternative means of **converting national currencies** into a common monetary medium (either ECU exchange rates or PPS). Member States were ranked using three income indicators (average FNVA, FFI and cash flow). Differences in ranking caused by using ECU exchange rates or PPS were marginal. A much greater influence was exerted by the choice of indicator. In particular, the position of Denmark was much lower when ranked by FFI than by FNVA, reflecting the importance of interest costs to the incomes of Danish farms.

Recommendations for the future development of indicators within RICA (Chapter 11)

56 The final chapter of this report brings together recommendations developed earlier. Important among these are the following, of which the first is perhaps the most fundamental and necessary of all:

(i) Consideration should be given by the Commission, as user of RICA, to the information which is needed to serve present and future policies, predominantly the Common Agricultural Policy but also extending to others for which farm-level data could form an input (for example, spending under regional, social or environmental policies).

(ii) Consideration should be given to the collection of additional income

information about off-farm sources (from independent activity, dependent activity, property, pensions and other transfers). This should be available for the farmer and spouse, and for other household members where possible, whether or not they work on the holding.

(iii) Consideration should be given to the collection of data on taxation and other outgoings, enabling the calculation of disposable income along the lines of family budget surveys and similar in definition to that being employed by Eurostat for its aggregate indicator of disposable income of agricultural households.

(iv) Consideration should be given to identifying and, where possible, valuing assets held by agricultural households outside the farm business.

(v) Without necessarily reducing the ability of RICA to represent the great majority of production, thought should given to expanding or modifying the RICA field of observation (though not necessarily at the level of detail of the existing survey form) so that it can be used as a means for representing the incomes of the great majority of people who are involved in agricultural production.

(vi) Support should be given to current work to establish an identical sample of farms covering a number of years, so that their economic performance over this period can be examined. For the purpose of examining income movements, RICA should average (real) incomes over periods of three years.

(vii) Family Farm Income (FFI) should become the main concept used in describing the income situation of farms. There is a preference for expressing this on a per holding basis, but the desirability of also making estimates per FWU is accepted, assuming that the labour units are reliable.

(viii) The alternative economic indicators which should be considered for regular calculation are as follows: Cash Indicator 1;Cash Indicator 3; FFI; FFI/FWU;FNVA; FNVA/AWU; Standardised Income 1 (businesses converted to "full equity"); Standardised Income 2a (Management and Investment Income); Income to Labour 1 (FNVA less rent and interest paid)/AWU; FNVA/Total output (%); FFI/Total output (%); Cash Indicator 1/FFI (%).

(ix) RICA should calculate a Total Factor Product (TFP) ratio, the preferred formulation being the value of total enterprise output divided by the cost of a bundle of inputs comprised of intermediate consumption plus depreciation plus actual labour costs and imputed charges for the labour inputs of the farmer and other unpaid workers. RICA should investigate the alternative methodologies for imputation and should review the sensitivity of the patterns of relative performance to the assumptions

built into them.

(x) The following partial productivity measures should be calculated: Total output per ha; Total output per AWU; Standardised Income 2a (Management and Investment Income) as a percentage of total assets (excluding land);Cash Indicator 1 as a percentage of Total assets (excluding land)

(xi) Of the measures of financial status, it is suggested that the following be estimated regularly: Total external liabilities as a percentage of Total assets; Current liabilities as a percentage of Current assets; Rent and Interest as a percentage of Gross Margin (and of Total Output).

(xii) RICA should consider analysing farms according to their family status, based on labour input composition, as part of its regular breakdown of results. The relative incomes and business performances of family and other types of farm should be explored within each type and within each ESU size group at Member State level.

(xiii) RICA should conduct regular analyses by level of performance, as shown by FFI/FWU and FFI per business, in order to concentrate attention on those holdings where incomes are particularly low.

(xiv) RICA should experiment with different formulations of the margin available for reinvestment, including a range of estimates of minimum living expenditures for the farmer and his family. The sizes of these margins should be compared with actual changes at the farm level over a prescribed period, including the complete disappearance of businesses.

(xv) Before any comparisons of RICA economic indicators between Member States are undertaken, attention should be given to the objective of the comparison, since this will affect the choice both of the indicator and the means of conversion to a common monetary base. Where the intention is to indicate the relative command over consumer goods and services that an income gives, the conversions from national currencies are most appropriately made using Purchasing Power Standards.

57 This study has concentrated on whole-farm data and that relating to the farmer and his family. However, in view of the strength of demand for information of profitability at the enterprise level, it is not unreasonable to think that RICA might have some role to play in providing such information. A further recommendation is therefore that:

(xvi) The feasibility of allocating variable costs between enterprises in order to estimate gross margins should be explored, at least for a subsample of holdings.

58 Perhaps the greatest impression gained from using RICA data in the course

of producing the report an alternative economic indicators is of the enormous analytical potential which it contains and which, at present, is not fully exploited in the monitoring of incomes or the business analysis of holdings. There is a balance to be struck between, on the one hand, the standard tables which RICA publishes on a regular basis with the purpose of assisting with decision-taking by the CAP, and on the other hand those analyses which are of interest to those concerned with the longer term development of the industry or which are of relevance to specific aspects of policy but which do not justify annual tabulation. Some of these issues can be satisfied by occasional examination.

(xvii) Full support is given to the plans which RICA has in hand to publish a "Periodic Report" which enables the longer-term income and other characteristics of the sample to be described, and for specific policy issues to be explored (such as the relative performance of family and non-family farms).

59 Even with the publication of a "Periodic Report", not all the possible forms of analysis which might be of interest to potential users are likely to be generated as part of publications coming from RICA. The number of people who would welcome the opportunity of working on the data using microcomputers if summary tables were issued on diskettes would be, in our judgement, substantial. Assuming suitable methodological background documents could be provided, and some indication of the statistical reliability of the results attached, the recommendation is that:

(xviii) RICA should consider giving wider access to the results of analysis by making available tabulations in electronic spreadsheet form, usable by standard commercial packages and broken down by Member State and type of farming, with size groupings based on at least two measures of size (ESU and UAA).

60 This last recommendation seems fully in line with the aims set for RICA of providing objective and relevant information on incomes in the various categories of agricultural holdings and on the business operation of holdings coming within categories which call for special attention at Community level. The utility of RICA, as an important component of the EC's agricultural information system, could be enhanced considerably.

CHAPTER 1: INTRODUCTION - THE OBJECTIVES OF THIS RESEARCH PROJECT

1.1 Background: general theory of data systems

1.1.1 RICA (Reseau d'Information Comptable Agricole, also called the Farm Accountancy Data Network, FADN) was established in 1965 "with the specific objective of obtaining data enabling income changes in the various classes of agricultural holding to be properly monitored" (Commission 1982). The justification for RICA was rooted in policy, in that "... the development of the Common Agricultural Policy requires that there should be available objective and relevant information on incomes in the various categories of agricultural holdings and on the business operation of holdings coming within categories which call for special attention at Community level." (EEC Regulation 79/65). This Regulation spelled out clearly that the purpose of setting up the Network was to collect farm accountancy data "to meet the needs of the Common Agricultural Policy". The centrality of RICA as a tool for monitoring the performance of the CAP in relation to its objectives, and as a means for formulating those objectives, is of the utmost importance to the current research.

1.1.2 The statistical needs of a policy as complex as the CAP are diverse. RICA can meet only some aspects of these needs. Other data sources at micro and macroeconomic levels attempt to meet other needs which differ in nature and timing from those for which RICA caters. In particular, RICA is seen as being complementary to the aggregate economic accounts for the branch agriculture, conceived and executed within the framework of national accounting and prepared for the Community by the Statistical Office of the European Communities (SOEC, also called Eurostat). These two kinds of statistics inter-relate, particularly with regard to the measurements of incomes in agriculture. The incomes of farms and of farmers play a central, even a dominant, part in the array of policy objectives. RICA is also capable of providing answers to many other questions about the production activities of agricultural holdings. As a rich bank of microeconomic data, it is could be used

for generating many statistics defined in alternative manners and redefined in the face of emerging policy needs.

1.1.3 The collection and analysis of data forms only part of a larger information system needed to service policy. The provision of information involves the analysis and interpretation of data to place them in a specific policymaking context. Thus an information system can be characterised as having three components (Brinkman 1983):

- a data system;
- the necessary analysis to transform data into information;
- the decisionmaker.

In parallel with the direct servicing of policy there is generally a system of scientific enquiry which is designed to test the basic assumptions of the data system and its interpretation and analysis. The way that the components fit together is shown in Fig 1.1 (from Brinkman 1983).

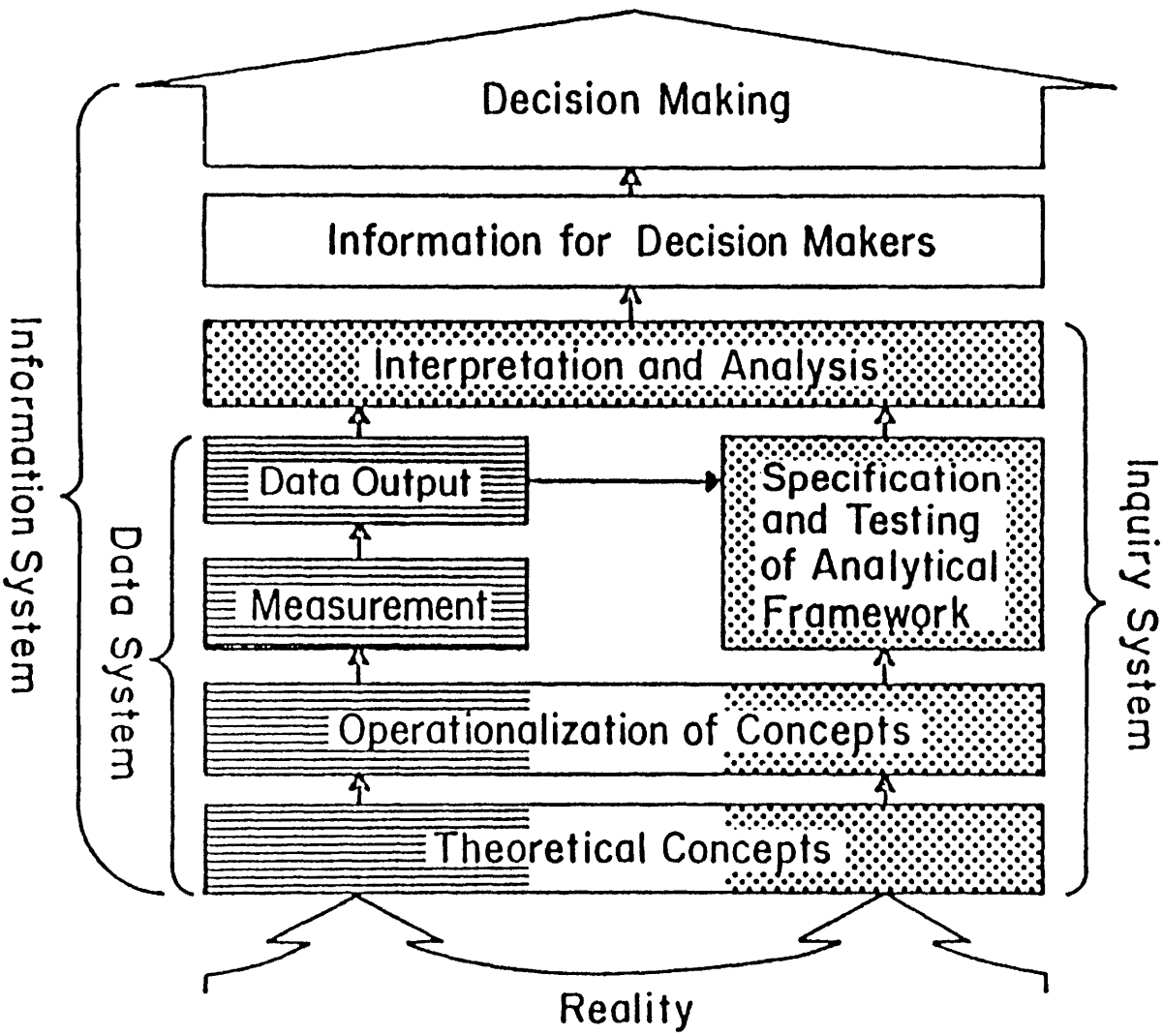
1.1.4 A property of any data system, and without which its utility is reduced, is its ability to reflect the reality to which policy relates. According to Bonnen (1975, 1977) there are three distinct steps which must be taken before data can be produced which purport to represent reality. In the (inelegant) terms used by Bonnen, these are:

(a) "conceptualisation",
(b) "operationalisation" of the concepts (definition of empirical variables), and
(c) measurement, meaning the actual collection of data.

Together these steps constitute the data system; they are compatible with the overall information framework, shown in Fig 1.1. Concepts cannot be measured directly, and for the system to be practically possible it is necessary to define measurable entities which are as highly correlated with the object of enquiry as is possible. Thus a prerequisite for a successful data system is a search for the fundamental objectives that the data system is required to serve. These will give guidance to the concepts which need to be made operational. Only then can the appropriate empirical variables be defined. Such a framework forms a useful basis for examining RICA's role in the whole information system serving the evolution of the CAP.

1.1.5 This current research project is seen to primarily consist of the second step listed in 1.1.4 above - defining appropriate empirical variables to serve policy needs. Nevertheless, such "operationalisation" will involve taking a look at the essential concepts which are part of policy, though perhaps not articulated explicitly. Also this research involves studying to some extent the process of measurement, insofar as the raw data already collected may lend itself to manipulation into new variables. The detection of gaps in the available data will carry implications for the measurement of farm businesses in Member States if such gaps are to be filled. And it is inevitable that interest is shown by this project in the interpretation and analysis of data and its presentation to

Fig 1.1 An agricultural information system (from Brinkman 1983)



decisionmakers. The evolving requirements by these policymakers for information is, indeed, an important determinant of the shape of RICA and of the economic indicators it generates. For the present research an approach which extends beyond the narrow confines of the present RICA data system seems the appropriate one to pursue.

1.2 Conceptual obsolescence

1.2.1 The data system can fail for two main reasons. One is the adequacy of the collection mechanism - the size and representative nature of samples, reliability of data entries etc. This is the aspect to which most attention has been paid by statisticians. However, perhaps the more important is the relevance of the concepts employed to the problems in hand. Here we are faced with the problems of measurability and the fact that policy is always evolving. For example, if it was decided to attempt to measure the standard of living of farmers a range of parameters might be employed. Some of these, such as consumption expenditure, might be theoretically preferred as a means of operationalising the concept but difficult to carry out. Consequently some form of income measurement may be a suitable substitute.

1.2.2 Conceptual obsolescence may occur when the nature of reality changes or the needs of policy shift. The result is that the empirical variables in use no longer represent the aspect of reality that policymakers wish to know about. Statisticians find themselves using concepts, together with their operational forms, which belong to previous circumstances. They cannot provide the new forms of information yet continue generating the old for which there is reduced demand and relevance; this represents a waste of skills and other resources. Analysis of the behaviour of bureaucracies indicate a preference for the status quo. Changes to established procedures commonly involve resource costs. Frequently changes will be opposed by groups or individuals who see their interests threatened. Countering conceptual obsolescence will have to overcome this type of institutional inertia and devise a new pattern of interest which is conducive to change. Often substantial changes are accepted only when the very existence of the bureaucracy is threatened.

1.3 The past, present and future function of RICA

1.3.1 The particular purpose for which RICA was brought into existence, as set out in Regulation 79/65/ECE, was to collect data for "an annual determination of incomes on agricultural holdings coming within a (defined) field of survey..." and for "analysis of agricultural holdings". They should serve "as the basis for drawing up of reports of the Commission on the situation of agriculture and of agricultural markets as well as on farm incomes in the Community; the reports are to be submitted annually to the Council and the European Parliament, in particular for the annual fixing of prices for agricultural produce" (cited in Lommez 1984). This means that RICA data are used for descriptive as well as analytical purposes, with results appearing both as standard presentations (in, for example, annual reports and the EC's Agricultural

Situation in the Community and by ad hoc specific analyses to meet Commission needs. An analysis of these Commission requests in recent years will be considered later (see 2.7.3).

1.3.2 The weight of attention seems to be on RICA as an income indicator on a harmonised basis for the Community. In its early years (it was set up in 1967 for the original 6 Member States) incomes of each of a range of types of farming were seen as a proxy for measuring the effects of price policies on the profitability of the main agricultural products. This is still the case. A second use was the provision of information on farm incomes in absolute terms, "so that the incomes of persons working in agriculture could be monitored, a first step towards fulfilling the objective of reasonable incomes for those working in agriculture - one of the objectives within Article 39 of the Treaty of Rome" (Brookes 1987).

1.3.3 Any data source which relies on surveys of farm accounts will involve delays between the accounting period and the publication of survey results. For RICA in practice this means a time lag of two accounting years (Schaps 1984). Though the Commission can control the system through legislation and the budget, it has only a limited possibility to accelerate the transmission of farm accounts data because data collection is in the hands of Member States. The time lag has restricted the use of RICA within the annual price fixing exercise. Though ex post analysis of the economic situation of agricultural holdings is an important task of RICA, it is not entirely satisfactory to be limited to this. To compensate, a RICA Forecasting System (RFS) has been developed, in two forms. The simpler is a matrix calculation with lists of inputs and outputs (prices and volumes) which can be applied to the latest available accounts information to produce change indicators by country, type and size of farm etc. National results are tested against the macroeconomic Sectoral Income Index. This model can also be used to predict the outcome of price proposals. The more advanced type of model, which permits substitutions within the structure of production, is not yet operational.

1.3.4 In Chapter 2 we study the pattern of requests for information which have reached RICA over the last few years. However, this pattern is in part shaped by the previous experience of users. It could well be that a greater awareness of the data bank's contents and of its analytical potential would engender a rather different pattern of requests. Similarly, new demands could be expected if perceived deficiencies of RICA can be made good; these relate both to timing and the coverage of the sample and the material collected. Thus we intend to consider not only the present usage but the potential for answering policy questions, both as RICA stands and with modest changes to its methodology.

1.3.5 The general level of importance of RICA results in price fixing seems to be less now than a few years ago, and is mainly in a background-forming role. The income indicators taken from Eurostat's macroeconomic Sectoral Income Index are usually taken as the "official" income figures because they are more

up-to-date. However, price decisions are increasingly taken on the basis of market balance and programme cost. It is clear that the nature of the CAP is changing, not only in the factors influencing the price levels under commodity support, but in its general stance. The "market management" (or "productivist") influence is waning and the "social" role of the CAP is rising. This is reflected not only in the 1985 Perspectives Green Paper and its follow-up (A Future for Community Agriculture) but also in the 1988 Community document on the Future of Rural Society. It should not be overlooked that the Commissioner responsible for agriculture is now also in charge of rural development .

1.3.6 In the future RICA would seem to have a prime role in shaping structural policy. In this capacity there are two obvious applications:

(a) income aids: RICA might be used as a way of identifying groups of holdings with income needs, so that the numbers/location/ types and sizes of holdings falling below some arbitrary thresholds could be used to plan the application and the costs of aids.

(b) set-asides: calculation of the net margins from cereals and other alternative land-using enterprises could be used to calculate payment and budgetary costs.

1.3.7 In the light of the changing policy requirement outlined above, which displays an increasing "people orientation", it is becoming apparent that the utility of RICA will be much reduced unless it responds to the evolving information requirements. The coverage currently is directed primarily at commercial holdings and therefore does not contain a strong representation of the very small farms which pose the severest "social cases". Thought should therefore be given to how best to improve the information for these small farms; this is likely to include a bigger sample at this end of the size spectrum. (In this context the Netherlands and the UK have used special small-farms surveys with simplified sets of questions.) It is also highly probable that some extension of questions to embrace non-farm incomes will be desirable; some Members States are known to collect this sort of data already (Denmark, Germany, Netherlands and UK regularly for their national farm accounts surveys, and Luxembourg on an occasional basis).

1.3.8 Eurostat is in process of developing a macroeconomic indicator of total household income for agricultural households. This raises the issue of harmonisation, as far as is practical, between macro and microeconomic methodologies.

1.4 Other farm accounts surveys

1.4.1 In order to contribute to RICA all EC Member States carry out farm accounts surveys. These use a common methodology. However, in many countries the contributing surveys pre-dated RICA and displayed a wide

diversity of systems and purposes for the collection of data (fiscal, management, analysis of the income situation, finance etc). This diversity is still evident. In many Member States the RICA sample forms a subset of a larger national sample. In addition to the common core of material required by RICA, there is additional coverage of data which varies from country to country. This increases the potential for analysis for national purposes. There are also known to be surveys of farm accounts and of the income of farm households which lie outside the RICA system. These also may contain material of interest to the development of economic indicators for RICA.

1.4.2 At the outset of this study no comprehensive list seemed to be available of the sort of data collected by the farm accounts surveys carried out in Member States and of their sample characteristics, beyond their involvements with RICA. A list of the known surveys was given in the Eurostat report on the total incomes of agricultural households (Hill 1988) and whether these collected data on total household income (as opposed to the income generated by the holding), but no details were given. Consequently, an important task was to construct such an inventory to explore not only the data collected but also the economic indicators used in their analysis and the ways that this microeconomic information was used in the policy context. The results form the content of Chapter 8.

1.4.4 Countries outside the EC also use farm accounts surveys. In particular there is a long and well-documented history in the USA. Insights into their design evolution and use of their output can also point to lessons for the present research.

1.5 Objectives of the research

1.5.1 The formal terms of reference set out in the contract between Wye College and the European Commission are given in an appendix to this Chapter. A meeting was held early in the life of the research project to clarify the objectives and to establish work tasks and a timetable. RICA staff explained that the broad aims of the research were to consist of an examination of:

(a) the appropriateness of the indicators currently in use for measuring the performance of the agricultural sector by size and types of holding etc., not only from the Commission viewpoint but also from the farmer's perception of profitability.

(b) what other indicators could be developed within the present RICA framework. The invitation to tender contained a wide variety of suggestions based on the currently available data. It was understood that RICA had not explored these, with the exception of the indicators in use (NVA and Farm family income)

(c) what additional indicators are highly desirable in the light of the new developments within the CAP, for which RICA might be

reasonably be expected to provide information. These new indicators might involve collecting additional information; some of this might already be available within the farm accounts surveys of Member States.

1.5.2 This project was one of a group of three which had been sponsored by RICA. Of the others, that concerned with the viability of agricultural holdings presented a possible area of overlap (contract with the Institut fur Landwirtschaftliche, Betriebslehre 410B, Universitat Hohenheim, D-7000 Stuttgart 70). The initial impression was that the Stuttgart project was more theoretical, looking at the income and capital structure in relation to viability, with the aim of identifying factors causing farms to cease to exist. Nevertheless, there was still a need to establish the differences in objectives and approaches between the Wye and Stuttgart projects and to integrate their developments; RICA staff were responsible for this.

1.5.3 The following work tasks were agreed as a formal work plan for the Wye College project:

(a) Construct an inventory of the farm accounts surveys to be found in EC Member States.

(b) Gather equivalent information for some non-EC states (especially USA, Canada, Sweden) for comparative purposes.

(c) Conduct a rigorous search of the literature on alternative measures of income at the microeconomic level, especially in the context of farm businesses.

(d) On the basis of the above, and in consultation with RICA, put forward income concepts which are desirable to test using real data.

(e) Explore the RICA database for the possibilities of analysis using the agreed concepts, and as a way of exposing gaps in the current coverage.

(f) To make proposals for closing gaps in the present data.

(g) Prepare a methodological handbook (or a supplement to an existing handbook) detailing the definitions of the concepts found to be of most value to a range of policy contexts.

1.6 <u>The content of this Report</u>

1.6.1 The above tasks were to be accomplished and reported in a series of Working Papers, submitted to RICA staff during the course of the research. In turn these formed the basis of this Interim Report on which RICA was required

to comment, leading to a Final Report and the conclusion of the research. The number and content of these Papers evolved during the course of the work, and their final form is listed as an appendix to this Chapter. The shape of this Report reflects these Papers.

1.6.2 Chapter 2 is an examination of the policy objectives which RICA is intended to serve. This moves on to consideration of the appropriate indicators in four broad areas: income and profit within RICA (Chapter 3) and in a selection of other countries (Chapter 4); the personal income of farmers and their households (Chapter 5); efficiency and productivity (Chapter 6); and business performance, financial status and viability (Chapter 7). In parallel, information was collated on the nature of national farm accounts surveys in Member States, including the indicators they use (Chapter 8). On the basis of these two strands, a range of indicators is proposed, some of which can be applied within the present RICA framework but some requiring extension in terms of data or sample coverage (Chapter 9). Following discussion with RICA staff, some of these proposals are explored using the existing bank of RICA data (Chapter 10). The nature of these latter stages inevitably could not be precisely known before the outcome of some of the earlier work. Chapter 11 draws conclusions of the exploratory analysis and makes proposals for the further development of RICA.

APPENDIX TO CHAPTER 1

(a) List of Working Papers
(b) Terms of Reference

List of Working Papers

Document

RICA/R-1 References

RICA/1 Notes of meeting held in Brussels, March 1989

RICA/2 Plan of research

RICA/3 The role of RICA within the EC agricultural data system

RICA/4 Data requirement of the CAP

RICA/5 Indicators of income and profit: past and present (including drawing of comparisons between Member States).

RICA/6 Indicators of personal income

RICA/7 Indicators of efficiency and productivity

RICA/8 Indicators of business performance, financial status and viability

RICA/9 Inventory of EC national farm accounts surveys and the economic indicators they use.

RICA/10 Findings from published analyses of national farm accounts surveys.

RICA/11 Proposals for further analysis of RICA data collected within the present framework using alternative economic indicators (summary).

RICA/12 Proposals for extension of data/coverage of RICA (summary).

Terms of Reference

Calculation of economic indicators

General framework:

In order to carry out a good diagnosis it is necessary to measure the patient's temperature with a thermometer that works correctly and that is perfectly calibrated. The same applies to economic studies which have political or social repercussions.

Nature and description of the study:

With regard to existing economic indicators and those to be created in the future:

- give theoretical consideration to the suitability, advantages and limitations of such indicators,
- ascertain past results (on the basis of the five most recent available FADN accounting years) thus obtained and analyse them,
- give a detailed and accurate description of a proposed method of calculation of the indicator on the basis of the Community farm return.

The subjects in the following non-exhaustive list should be dealt with in the study:

- choice of currency unit	ECU, national currency/currencies, PPS (Purchasing Power Standard parities)
- choice of time period	accounting year, calender year, average of the three most recent accounting years
- indicator of farmers' incomes	FNVA/AWU, family farm income, cash-flow, labour income, farm manager's income, available income etc...
- indicator of productivity and profitability	of labour employed in agriculture, of fixed assets, of farmland
- indicator of short- and medium-term viability of a holding	debts on net worth, the share of interest charges in the turnover, degree of over-equipment (or under-utilisation) of deadstock, the level of investments, underemployment of farm labour, farmer's age as a determining factor for cessation of agricultural activity, etc

CHAPTER 2 - DATA REQUIREMENTS OF THE CAP

2.1 What economic indicators should be calculated?

2.1.1 The requirements for farm business data in the European Community are diverse and are changing over time. The ways in which the RICA can contribute to these needs are therefore not necessarily only those which were envisaged when the network was set up. While the legislation setting up RICA charges it with providing "relevant information on incomes in the various catories of agricultural holdings and on the business operations of holdings" (79/65/ECE), it also points out that the this is to be done "to meet the needs of the Common Agricultural Policy". Though primarily geared to the CAP and its evolution, demand for farm-level data can now be found in regional and social policy, particularly as they relate to rural development.

2.1.2 Three ways can be used to discover the nature of the statistics which RICA should be generating.

- First, the objectives of policy can be studied and the indicators appropriate to these objectives can be sought. In the context of the EC, this will include not only the Treaty of Rome but also the subsequent developments of policy. This might be considered as a "first principles" approach. It does not take into account the arrangement of the current system.

- Second, the present requests for information can be analysed. This "consumer led" pattern must take into account not only the special ad hoc demands but also the regular use of information which is generally published and is therefore available throughout the Community institutions. Further, it must cover the requests which a policy-driven microeconomic data bank could be expected to meet but which are not presented to RICA because of its known (or perceived) characteristics. Consequently, an analysis must be made not only of demand from policy-makers and administrators, but also of the literature emanating

from academic and professional sources (policy analysts, farm management advisors and researchers etc).

- Third, parallels can be sought in the national policy frameworks of EC Member States and other countries. This should cover not only the present practice in terms of concepts employed and their use in helping shape agricultural policies, but also the debate within the public service and academic institutions.

This Chapter opens the examination of the first two of these approaches; later Chapters explore them in detail.

2.2 Implied policy requirements

2.2.1 The starting point for this "first principles" must be the Treaty of Rome. The Treaty states that "The objectives of the common agricultural policy shall be:

(a) to increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;

(b) thus to ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;

(c) to stabilise markets;

(d) to assure the availability of supplies;

(e) to ensure that supplies reach consumers at reasonable prices."

The Treaty in Article 39 also requires the following factors to be taken into consideration:

- the particular nature of agricultural activity, which results from the social structure of agriculture and from structural and natural disparities between the various agricultural regions;

- the need to effect any appropriate adjustment by degrees;

- the fact that in the Member States agriculture constitutes a sector closely linked with the economy as a whole.

2.2.2 Agricultural policy was developed at the 1957 Stresa Conference in accordance with Article 43. In the general resolution from that Conference two of the ten points are important in the present context (Commission (1958a) Recueil des documents de la Conference Agricole des Etats Membres de la

Communaute Economique Europeenne a Stresa du 3 au 12 juillet 1958). These are:

- An improved structure should permit the capital and labour used in European agriculture to receive remuneration comparable with that which they would obtain in other sectors of the economy (8);

- Given the importance of the family structure of European agriculture and the unanimous wish to safeguard this character, every effort should be made to raise the economic and competitive capacity of such enterprises (9) .

Following the Conference, in its First General Report on the Activities of the Community, the Commission outlined its views on the problems of agricultural policy (Commission 1958b). It considered that the central problem facing agriculture was "the disparity existing between the level of income in agriculture and that in other sectors of the economy" (p 67). The same Report also noted that attempts in the past to improve incomes through increasing production was "too one-sided" and had led to difficulties in the markets (p 70).

2.2.3 Two strands of policy emerge immediately from these CAP objectives and the Stresa points, and for which separate and different types of statistics need to be generated. One strand is concerned with factor use within agricultural productive activity; this embraces productivity and factor utilisation, rationalisation in terms of adjustment to accommodate economies of size and specialisation (including regional adjustment) and technological advance. The other is concerned with the personal welfare of the agricultural population as reflected in their living standards and earnings. While the two strands are linked, the types of economic indicators required to explore them are distinct. Both will be given a detailed treatment at a later stage, but it is worth setting out the main characteristics of each here.

2.3 The production strand

2.3.1 Implied in the first group of production based indicators would be measures of the following types (the list is not exhaustive):

production flows: output, input, margins between output and inputs defined in various ways (such as gross margin, cash flows, business profit);

stock measures: levels and changes in the stock of capital represented by the business, in its borrowings and in its net worth;

performance measures: productivity measures (output per man, per hectare etc), efficiency measures (such as total output/total input ratios and income/capital ratios), cost composition indicators, viability indicators.

These concepts and appropriate measures will be considered in detail in Chapters 3, 4, 6 and 7. A proper examination of them would require not only overall or group averages, but distributions and the ability to base more elaborate econometric studies on the raw data. Though in principle these indicators could be applied to all producing units, in practice interest is likely to be centred on those whose output is mainly for commercial sale, and within this group on those which are seen to pose the greatest relevance to the aims of policy. The group forming the centre of interest will vary according to whether output or structure is the main concern; each will have its own threshold of significance. The Community-wide nature of the CAP also implies that that there will be interest in comparisons between the farm businesses of different Member States, which necessitates consideration of distortions in national factor and product markets, and the choice of appropriate monetary conversion rates.

2.3.2 The Treaty's reference to stability of markets and the guarantee of regular supplies would also imply that a time-series approach to these business parameters would also be needed. For example, the way that farmers respond to changes in price levels can be better predicted if the past behavioural patterns of individual businesses to similar price signals can be studied. Observation of the factors associated with the growth of individual holdings and with the disappearance of others over time can give a valuable insight into the determinants of viability and can assist in both predicting the future pattern of structural change in the Community and designing programmes to influence the rate of that change.

2.3.3 The Treaty makes special mention of its concern with the optimum utilisation of labour as a factor of production. When attempting to assess the amount of labour entering into agricultural production and of measuring its productivity, there is a case for distinguishing between various forms of this input. For example, managerial and physical labour are not directly substitutable. However, the size of many EC holdings means that on many the operators perform both physical and entrepreneurial functions and it is not practical to differentiate between the two. A similar case could be made out for the other members of the family who work on the holding. Family members who do not contribute in any way to the labour input of the holding would not enter into the estimates. Under such circumstances, and where hired labour forms a small part of the labour force, it may be permissible to assume that agricultural labour is homogeneous. This lends credibility to expressing indicators of business activity per annual labour unit (or work unit) without drawing distinction between that coming from hired workers or from the independent farmer and his family. However, the assumptions behind this practice should not go unexamined.

2.3.4 The importance attached to labour input suggests that socio-economic characteristics of farm operators should be collected and used as part of the analysis. The age of the holder, the composition of the farm household and the stage of the family cycle could be expected to have an impact on the

performance of the business. In particular, the presence or absence of successors might be expected to have great impact on the investment decisions of the holder and thus on the long term viability of the holding. The presence of other gainful activities and other sources of income (not all activity-linked) also would be expected to influence the farming and investment pattern.

2.4 The personal wellbeing strand

2.4.1 The personal wellbeing strand concentrates on the living standards of the agricultural community and the earnings of those engaged in agriculture. This strand is concerned with people in farming as consumers. Income is seen essentially as a resource for consumption or saving. As such, the appropriate unit is not the amount of labour used (expressed in work units) or the production unit (the holding) but a socially meaningful concept such as the agricultural household. The main problems in this approach centre on the choice of appropriate indicators to use and the identification of those people whose incomes are to be measured. Of the two, the latter poses the greater methodological difficulty.

2.4.2 Standards of living are difficult to measure. The usual approach is to abandon attempts of direct assessments of utility (though ordinal methods might be used in pursuit of changes in living standards) in favour of measures of consumption (in physical terms or in the form of expenditure) or of income. The latter presents a more complete picture of the resources at the command of the household, as consumption data needs to be complemented by information on savings and dis-savings before much can be inferred from them about the "fairness" of the living standard. Of the various income measures which could be put forward, disposable income is the concept which is used most commonly in a welfare policy context. However, there are also arguments for including unrealised capital gains and for combining both income and wealth in a single measure of economic status. These issues will be considered in more detail in Chapter 5.

2.4.3 As both producers and consumers, the occupiers of agricultural holdings receive part of their income in kind; this may be of little importance when comparing the development of income over time between farmers of different types or sizes, but it rises to substantial relevance when attempting to set the absolute levels of farmers up against those of non-farmers and to draw meaningful conclusions.

2.4.4 A key point is that, in the process of income assessment, it is the entire income of the household that is the determining factor of living standards and which must be measured. The income from agricultural activity will only form part of this total and other sources must be counted. The incomes of persons who do no work on the farm should be included if they form part of the household. This approach does not exclude the possibility of looking separately at the income coming from farming, if this is required. When aggregating or comparing households of different composition, steps must be taken to ensure

that they are treated separately or are converted to a common base. In practice this means classifying into meaningful groupings (such as by numbers of children, and into households containing retired persons) and/or using an equivalence scale to express disparate households in consumer units.

2.4.5 There are particular problems to be faced in attempting to make comparisons between personal incomes in different Member States; even if equivalence scales and currency conversion rates can be agreed (such as Purchasing Power Parity), there may be disparities of perceived need and social values which preclude the drawing of simple conclusions about relative standards of living.

2.4.6 An important question concerns those households which are to have their income measured for the purpose of assisting the design and implementation of policy. The Treaty is not precise in what is meant by the "agricultural community" or being "engaged" in agriculture. Various possibilities exist for classifying households into agricultural or non-agricultural; these mainly involve either deriving an income from agriculture, spending some time working in agricultural production, or some combination of the income and time criteria (Hill 1989). It is evident, from the way that parts of the CAP are applied, that some households who own or operate holdings are not considered as intended beneficiaries of the CAP because their main source of livelihood comes from outside agriculture. The problems in defining an "agricultural household", and therefore what constitutes the "agricultural community", will be explored further in Chapter 5.

2.5 Ambiguity in the present information system.

2.5.1 The two approaches described in sections 2.4 and 2.5 above contain inevitable contradictions. The appropriate income concepts and data requirements are different, and the samples of cases needed to generate the data will not be of the same composition. It is not safe to assume that improvements in agricultural productivity necessarily lead to equivalent changes in the standards of living of the agricultural community, as is implied by the Treaty of Rome.

2.5.2 Even within those aspects of the CAP which can be fairly easily labelled as relating to personal situations, a flexible presentation of data may be required. For example, though living standards would seem to be more related to total household income than to that of subsets of individuals, for specific purposes (such as in relation to transitional aids to agricultural income, Regulation 768/89 OJ L84 of 29/3/89 p8) the Commission may wish to restrict the concept of households so as to include only those members who make some labour input to the agricultural holding which is associated with the household. But to take into consideration for the purpose of giving income aid the total income (including "non-agricultural resources") of these people and yet to ignore the incomes of other household members is plainly to misrepresent the overall income situation of these households.

2.5.3 In the preamble to Regulation 768/89 reference is made to the need to seek cohesion by the Community making a contribution to income aid "granted to persons practising farming as their main occupation"; what constitutes "main" in this context is not made explicit. One possible interpretation of the CAP is that it is only these people who are the intended beneficiaries of CAP support. The treatment of their immediate dependants is not made explicit. An impression from working in the area of CAP income policy is that the intended beneficiaries are by no means clear in the minds of policymakers. Therefore the data requirements are ambiguous.

2.5.4 This ambiguity is also reflected in the perception which RICA holds of its own activities. In 1983 RICA identified needs for new indicators (Examination of the different concepts of farm incomes RI/CC 828, discussed at greater length in Chapter 3). These additional needs were to show:

(a) year-to-year changes in the cash flow situation of farms, farmers and family workers in agriculture;
(b) medium-term changes in the return to primary factors in agriculture;
(c) comparison of incomes of farmers and workers in agriculture with those of persons outside agriculture or in the economy as a whole.

2.5.5 The 1987 RICA annual Report (Commission 1988e) states that the aim is to survey a sample of farms which accurately represent the universe of commercial farms in European agriculture. These are described as holdings which are "developed in such a way that they constitute the main occupation of the farmer and a potential source of income for his family." The implication of this person-orientated concept should not go unnoticed. However, when the concept is "operationalised" (see Chapter 1), the threshold does not take any direct account of the actual occupation or income structure of the operator. A commercial farm is defined as a farm over a specific size - size being measured in terms of European Size Units; the minimum size varies from 1 ESU in Portugal to 16 ESU in the Netherlands.

2.6 Present demands for information from RICA.

2.6.1 The second way of discovering the data requirements of the CAP, in as much as they relate to RICA, is to examine the recent demands by policymakers, academics and professionals for information. As was pointed out in Chapter 1, RICA's output consists both of regular reports on the economic situation of holdings and of responses to ad hoc enquiries, mainly by the Commission. The regular flow of publications is, in part, a reflection of past demands.

2.6.2 RICA results are published in the the following Commission documents (Brookes 1987):

- Agricultural Situation in the Community (annually), including part of the chapter devoted to farm incomes and in tabular form in the statistical

appendix. Two tables give, for the two most recent years, a simple division of results into output, costs and income, together with basic structural data, by type and economic size of farm and by country. In the 1988 Report (Commission 1989) the economic indicators used were:

Total output;
Intermediate consumption;
Depreciation;
Net Value Added (all the above expressed per holding in current ECU);
Farm net value-added per AWU;
Family farm income per unit of unpaid labour.

- The annual series Newsflash Agricultural Incomes in the European Community, which ran briefly from 1984 to 1986 (Green Europe Newsflash 26, 29 and 32), combined RICA and aggregate agricultural accounts results. The RICA part highlighted, for Member States and the "EUR":

(i) change in average income for each of the main types of farming as between the last and penultimate years. In 1986 results for both years came from the RICA Forecasting System (RFS).
(ii) time series of income per person (FNVA/AWU) in real terms, being a combination of observed data and RFS estimates.
(iii) a distribution of FNVA/AWU.

- the annual RICA results booklet (Economic situation of Agricultural Holdings in the EEC) containing essentially tables of the latest year of results from observed data. Level 1 results (in which, for example, inputs and outputs are broken down into individual crop and livestock enterprises) are only shown at Member State level. Other published tables are at Level 2, where inputs and outputs are more aggregated, though Level 1 information is available on request. A variety of performance indicators are generated at Level 1, including physical output per hectare and milk yield per cow, and ratios of various asset classes to laibility classes. Ratios of FFI and Cash Flow to Net Worth are also estimated. The main income indicators are:

Gross Farm Income (Gross Added Value)
Farm Net Value Added
Family Farm Income
Cash flow
FNVA/AWU
FFI/FWU

However, the national tables of the Report are at Level 2 and confine themselves to the above list, less Cash Flow.

2.6.3 Requests for additional material are received by RICA on an ad hoc basis. A list of these has been provided by RICA covering the period January 1987 to

March 1989; the total number for this period was 130. An analysis of the types of request may throw some light on the way that RICA is seen as being a useful tool in the formulation of policy. Simple numbers do not, of course, indicate relative weights of importance nor the amount of effort expended by RICA staff. Nor do they show how the requests relate to the regular statistics issued. Nevertheless, the pattern is worth noting. Of the total, on the basis of the classification system used by RICA, well over half (81 or 62 per cent) could be directly associated with particular enterprises or with a farm type which was dominated by that enterprise. The remainder covered a range of issues, including investigations of the number of potential beneficiaries of income aids, set-asides and extensification payments. An alternative subjective classification, based on interpreting the titles of the subject as recorded by RICA staff, gives the following breakdown.

Enterprise studies (costs of production and profitability of individual enterprises (milk, cereals etc)	54 cases
Farm studies	
(a) for a single type of farm, or for several types	15 cases
(b) by region (single or several)	5 cases
Experimental studies	
(a) updating or elaborating regular results	20 cases
(b) structure policy investigations	
(i) set-asides	7 cases
(ii) extensification	2 cases
(iii) direct income aids	6 cases
(iv) other	11 cases
Other and not identified	10 cases

2.6.4 These special requests thus seem to fall into four main groups, of which the third is of reduced importance for the purpose of this present study, being largely catered for by the development of the RICA Forecasting System. The groups are:

(a) those which are concerned with individual enterprise performance rather than the income of farm businesses as a whole. These seem to relate to price proposals within the evolution of the CAP and cover the likely market response of producers of these commodities to price changes.

(b) as an extension of the above, requests concerning the likely implications for the financial situation of farms which are mainly

dependent on particular enterprises or changes in commodity prices.

(c) those which explore the farm-level data but in an updated or more detailed form than is regularly produced.

(d) those which are used to help formulate structural policy.

2.6.5 Questions must be asked on the suitability of RICA in its present form to respond to these demands. For the first purpose identified, what are the appropriate indicators of enterprise performance? RICA presents accounts for complete farm businesses. Is this in a form which enables the performance of individual enterprises within the business to be disaggregated from that of the farm as a whole? For example, can revenues and variable costs be split between various enterprises on farms so that Gross Margins for commodities can be calculated? From preliminary discussion with RICA staff it appeared that enterprise Gross Margins could not at present be estimated for most Member States and that answers used the proxy of calculations on a whole farm basis for specialised farming types.

2.6.6 For the second group, what is the most appropriate indicator of profitability at the farm level? How does this change with the time period being considered? While perhaps nearest the original intentions of the founders of RICA, the system may not be operating the best economic indicators for revealing changing levels of profitability, in absolute or relative senses, or have the data by which they may be calculated.

2.6.7 For the last group of requests, RICA takes the role of an experimental instrument. In addition to the work on the number of beneficiaries and (sub)sectoral implication of direct income payments, on the level of premium for set-asides and their impact on cereals, and on extensification, other subjects to which RICA had been asked to contribute over the period covered included the threshold for cereal co-responsibility payments, income disparity, salaries of manpower and concentration of production in the EC. RICA could be expected to throw light onto some of these directly, but for others some combination with other data sources, such as the Eurostat Farm Structure Survey, would appear to be needed. Most of these demands for data imply that RICA should be capable of extrapolation to national levels and, where appropriate, to regional levels.

2.6.8 A notable absence from the list of requests for analysis are those which relate to the full income position of the farmer and spouse, or household. This is perhaps not surprising in light of the general awareness that RICA confines its coverage to the affairs of the farm business and does not contain information on personal incomes.

2.6.9 A lack of questions on the asset position of farmers and the likely impact of changing land values on the economic status of farmers, despite the

relevance of these to the economic situation of the agricultural community, can be possibly explained by the little interest shown by the Commission in such matters at aggregate level (there are no macroeconomic balance sheets to accompany the Sectoral Income Index) and the recognition that non-agricultural wealth and liabilities are not covered by RICA. To some extent the raw data seems to be already available whereby these calculation might be performed, at least for the assets and liabilities which relate to the farm business.

CHAPTER 3 - INDICATORS OF FARMING INCOME: RICA PAST AND PRESENT
(including the drawing of comparisons between Member States)

3.1 Introduction

3.1.1 This Chapter is concerned with the economic indicators which are used by RICA. Changes to the present information system in terms of the data collected and the indicators used must take account of the status quo and the factors which have led to it. Here we are concerned with whole-farm indicators of the reward from farming activity (loosely called business income). Example of the practice of farm accounts surveys elsewhere (including the USA) are given in Chapter 4. Later Chapters deal with other aspects of business performance (efficiency, viability, enterprise margins etc).

3.2 Present indicators

3.2.1 RICA data currently supports the routine calculation of a total of 110 variables. Of these perhaps the most important are those which relate to the income of the farm. The indicators currently published are:

> Farm Net Value Added (FNVA), per holding and per Annual Work Unit (FNVA/AWU);
> Farm Family Income (FFI) per holding and per unit of unpaid labour, known as per Family Work Unit (FFI/FWU);
> Cash-flow (per holding).

These are defined in RI/CC/882 rev.3 (Commission 1988c). In the latest report on The Agricultural Situation in the Community (Commission 1990, which contained a summary of the RICA results for 1986/7 and 1987/8), the variables selected for presentation were (in addition to Total Output, Intermediate consumption and Depreciation) FNVA, FNVA/AWU and FFI/FWU. Until the

1989 edition the distribution of RICA results by size of income were presented in terms of FNVA/AWU, the latest editions replacing this by FFI/FWU. However, for the aggregate (Eurostat) income indicator, NVA/AWU is retained. Cash-flow has not yet appeared in the Agricultural Situation reports; it is in the separate RICA report although given little prominence (Level 1, page 4/4).

3.2.2 The recent Commission document which describes methodology of RICA (The European Farm Accountancy Data Network: An A-Z of Methodology (Commission 1989), hereafter called the A-Z), though giving precise and exhaustive details of other aspects of the data system, is very reticent over why these variables are at the centre of RICA calculations, what they are intended to represent and how they should be interpreted in a policy context. This applies particularly to the use of FNVA/AWU, which was for long the centre of attention. It states that the Commission has defined each variable in a way which attempts to ensure a close correspondence with those of other organisations producing agricultural statistics; this presumably implies Eurostat's aggregate series. The A-Z diverts questions of definition to RI/CC/882 rev. 3 (Commission 1988c); but there only the literal definitions are given in terms of the tables of RICA standard results, calculation formulae, position on the Farm Return form and position in the calculation chain. An earlier description of the RICA system (Snowdon 1984) manages to avoid discussion of the income indicators in use, though in illustrative tables FNVA and FNVA/AWU appear.

3.2.3 Document RI/CC/882 rev 3 is more explicit about a RICA Cash-flow calculation, which it describes in an Annex. "It is not exactly an income indicator but rather an indication of the net balance of financial movements resulting from farming activity during a given period. It measures the capacity of a farm to save up money and finance itself. In fact the farmer efficiently (sic) uses this money for consumption and for savings which can later be used for investments."

3.3 Background to these indicators

3.3.1 Prior to the "1978" accounting year the type of accountancy data to be collected in a farm return and the relevant definitions and instructions were as set out in Annexes I and II of Reg. 118/66/EEC, details also being given in the RICA Handbook (2nd ed.)(Commission 1973). The data were to relate exclusively to the agricultural holding and ignore all non-farming activities of the holder and family. The main production and income results, expressed per hectare of Utilised Agricultural Area or, in some cases, per Annual Labour Unit (ALU) were as follows:

Gross Farm Income
Net Farm Income
Income of Holder and Family
Income of Family Labour
Labour Income

The schematic relationship of these variables is shown in Fig 3.1. In "Results 1977", the ninth and last of a series, the bulk of the income analysis was based on a single criterion, labour income per labour unit. Not all the data needed to calculate this complete set of indicators were available. For example, Rent and Rental Values were not published separate from other costs, interest paid was not specified and the Annual Labour Units were not subdivided into paid and unpaid (family) units. In the course of estimating some of these indicators, such as labour income, some imputation was therefore necessary; for example a rental value was charged for owner-occupied land and a notional return on capital was used (the same rate in all Member States). There are both theoretical and practical problems associated with imputation, dealt with below (see 3.3.14).

3.3.2 The "1978" accounting year saw important methodological changes (see 3rd and 4th edition of the FADN Handbook, Commission 1981 and 1984d respectively) and an expansion of the range of data collected (Bryson 1985). Movement was made towards measuring income on a current cost accounting basis. Livestock appreciation was excluded from valuation changes included in the calculation of output, but was included in the average livestock valuation for the assessment of working capital. Depreciation of machinery and equipment, and written down valuations, were calculated at replacement rather than acquisition cost, which had the effect of lowering income and raising the value of capital stocks.

3.3.3 The annual labour unit was redefined and renamed the Annual Work Unit (AWU).

3.3.4 The results following the changes in methodology were published in microfiche form using the following criteria:

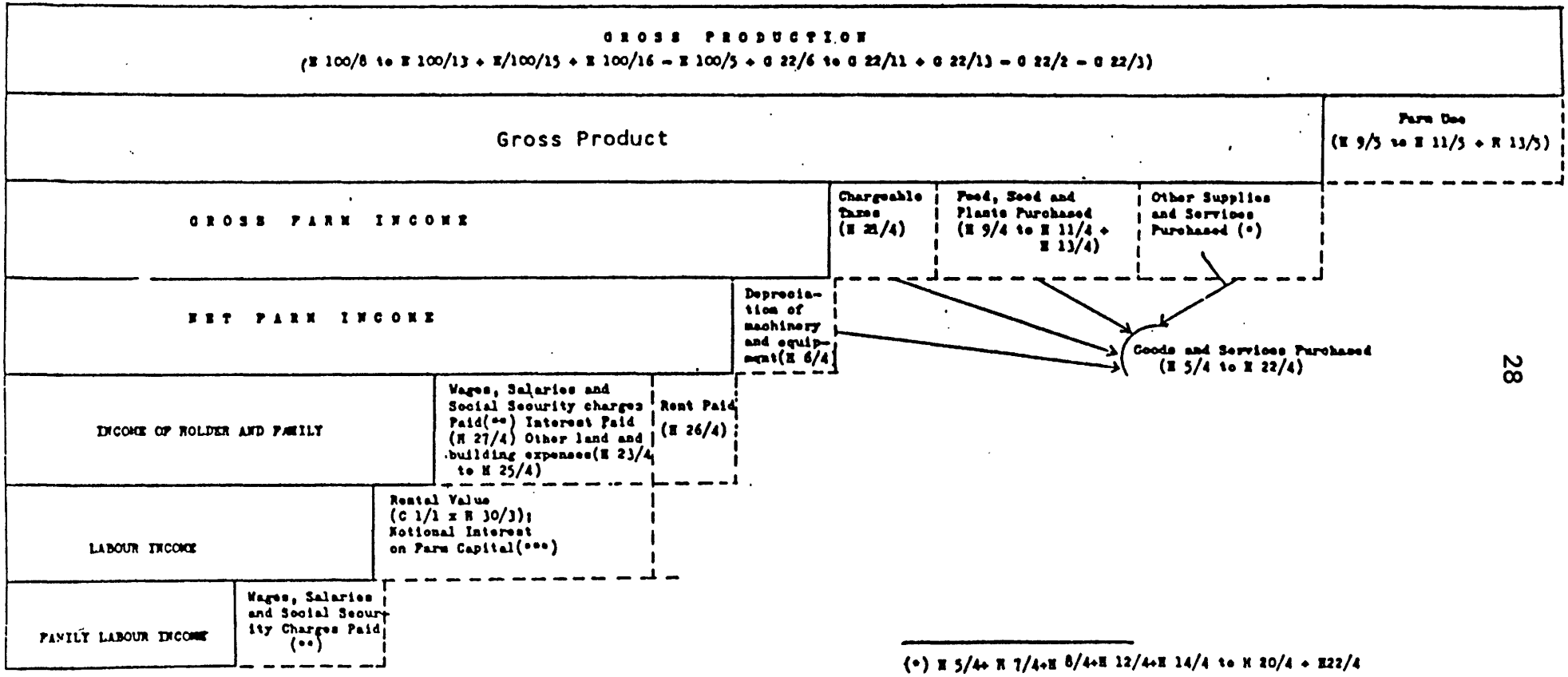
Results per holding
- Gross Farm Income - of which:
  - Balance: receipts less expenditure
- Net Farm Income
- Wages and Social Security
- Land Charges Paid

Results per AWU
- Gross Farm Income
- Net Farm Income
- Labour Income

The way that the major items relate to each other is shown in Fig 3.2. It should be noted that the main income measure - Labour Income - continued to treat all holdings as if tenanted, imputing Rental Values and excluding actual land charges for owner-occupied land. Similarly, Labour Income continued to combine both hired and unpaid (family) labour.

Fig 3.1 **Diagrammatic presentation of main farm production and farm income measures, as used up to the 1977/8 results (from FADN Results "1977")**

(Letters and figures in brackets refer to entries on the EEC Farm Return)

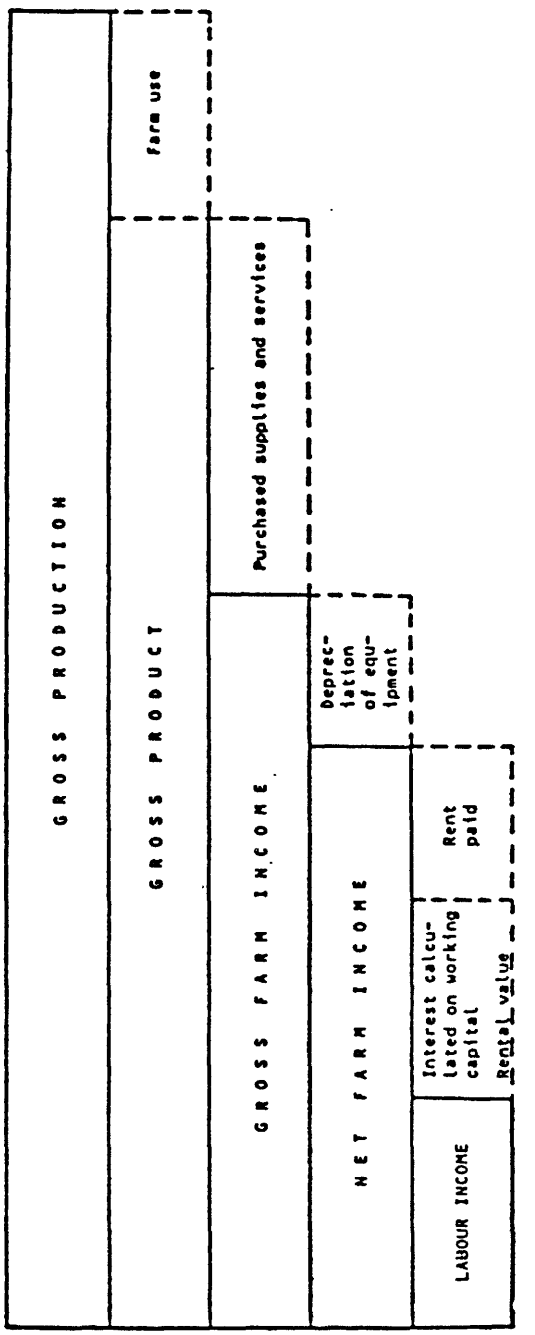


(*) R 5/4+ R 7/4+R 8/4+R 12/4+R 14/4 to R 20/4 + R22/4

(**) R 1/4+R 3/4 - D2/9 - D1/9 (excluding Operator's salary where not a member of Holder's family)

(***) 5% of $\frac{I\ 4/2 \text{ to } I\ 9/2 + I\ 4/4 \text{ to } I\ 9/4}{2}$

Fig 3.2 Diagram showing main types of production and income (measures) as used from the 1977/8 results (from FADN Results on Microfiches)



3.3.5 The 1978 revisions, while not heralding major changes in the income measures employed, seem to have been a catalyst for a more widely-ranging consideration of RICA, particularly in terms of its income concepts and definitions. This can be traced partly to a paper presented to Commission staff by the Irish delegation to the Community Committee (Attwood 1978).

3.3.6 Attwood reminded the RICA Committee of the centrality of a clear understanding of what constitutes "agricultural income" if RICA was to fulfil its role within agricultural policy, something that had concerned the Committee itself in the period 1965-69. He pointed to the current weight of emphasis then being given to Labour Income per ALU and put the following questions:

> (i) was it appropriate to use substantially different concepts of income at microeconomic and macroeconomic levels (LI/ALU as opposed to the Gross/Net Value Added of the Sectoral Income Index)? The differences not only resulted in ambiguous signals on the rates and directions of change from year to year, but also restricted RICA's role in disaggregating patterns shown by national agricultural accounts.
>
> (ii) was LI/ALU a suitable measure of income on agricultural holdings? This point is taken up below.
>
> (iii) was LI/ALU easily understood by data users? Attwood argued that those concerned with policy decisions involving consideration of changes in farm income require income measures more in accord with the actual situation on farms. LI/ALU was seen as a "non-real" measure, not helped by the level of changes experienced from year to year, sometimes in excess of 50 per cent. Attwood states that "it is difficult to accept this as the reality for regional agriculture within the Community". This scepticism has been noted in the attitude of staff in the UK, with distrust of both the numerator and denominator (Bryson 1985).

3.3.7 Special attention must be given to such criticisms of LI/ALU as an appropriate income concept. It was defined as being "equal to net farm income less rent paid and/or rental value of the land and buildings in owner occupation and interest calculated at 5% of the average value of the working capital expressed per annual labour unit" (AWU from 1978). The regulation setting up RICA (Reg 79/65/CEE), when it refers to "an annual determination of incomes on agricultural holdings..", is open to various interpretations. Attwood argued that it was realistic to assume that this implied only the income derived from agriculture (though in Chapter 2 we suggested a much wider approach). But even applying a more restricted view, Attwood felt that LI/ALU fell well short of indicating the income from agriculture. The deduction of imputed charges for interest and land, often set at arbitrary levels and which in reality formed part of the overall returns to owner-operators, produced residuals which departed significantly from what might be considered "actual" income (after allowing for capital consumption and, possibly, inventory changes).

3.3.8 There was scepticism also about the Labour Unit denominator. This not only concerned the reliability of some of the national estimates of labour input, but also there was the objection to combining hired and family labour in a single measure. This was particularly relevant to countries with a sizeable hired sector (such as the UK). Summarising, LI per holding and, especially LI/ALU was felt to be theoretically unsound and practically unhelpful. (It might be noted that the UK in its national reports tabulated LI per holding reluctantly and LI/AWU not at all).

3.3.9 In 1981 the Court of Auditors reported on RICA. There were comments and criticisms of many aspects of RICA's work, including its coverage of part-time holdings, some of which will be met in other Chapters. Rather surprisingly, the Court did not single out the income concepts then in use for major comment, other than indirectly in its comments about the desirability of a flexible approach to collation and analysis, and of the setting up of a "true" data bank including time series.

3.3.10 Subsequent to the Attwood paper, the Commission reviewed agricultural income measurement. In 1982 and 1983 it produced two important documents on the subject of income indicators and different concepts of agricultural income. These were:

> Commission (1982) Indicators of Farm Income. Working Document of the Services of the Commission, VI/308/82-EN (0082d) DG.Agriculture and SOEC.
> Commission (1983) Examination of the different concepts regarding farm incomes. RI/CC 828. Community Committee of the Farm Accountancy Data Network.

3.3.11 The former was concerned with both macroeconomic and microeconomic measurement. Rather than attempting a theoretical discussion of the most appropriate income definitions for meeting the policy objectives of the CAP, it made the point that different indicators were appropriate in different circumstances. It reviewed what was available at both levels, recognising that the national agricultural accounts related to a "branch" whereas the farm-based approach tended more towards a "sector" concept. It suggested that it would be appropriate to make greater use of RICA than was then the case, but acknowledged the need for "updated" data. Without complete accuracy, it also claimed that the NFI indicator used by RICA was already comparable to the Sectoral Income Index. Despite the disclaimer of avoiding abstract discussion of concepts, the Document goes a long way in this direction by "interpreting" the aims of policy in terms of who are the intended beneficiaries of the CAP and therefore which indicators are to be preferred.

3.3.12 Three important comments emerge in relation to the use of income indicators with regard to agricultural labour. The first results from an interpretation of the Treaty of Rome reference to "increasing the individual earnings of persons engaged in agriculture". This suggested that the use of per

caput indicators rather than totals was needed. The second relates to the denominator, consisting of all labour, both hired and non-paid (family) labour. This is justified, it is claimed, because "So far, the Commission has interpreted this article (39 of the Treaty) as meaning that only an indicator relating to the agricultural incomes of all agricultural workers (employed, self-employed and family help) can enable it to be determined whether this objective has been achieved and to establish what are the needs with regard to support of agriculture". The third was the need to draw comparisons between the income (of labour) in agriculture with that in other industries. This was possible using the macroeconomic Sectoral Income Index (an assertion which should not go unchallenged), and the authors proposed that the existing comparisons using NVA at factor cost should be retained for this purpose; any new indicators proposed would not have parallel estimates for the whole economy by which comparisons could be drawn.

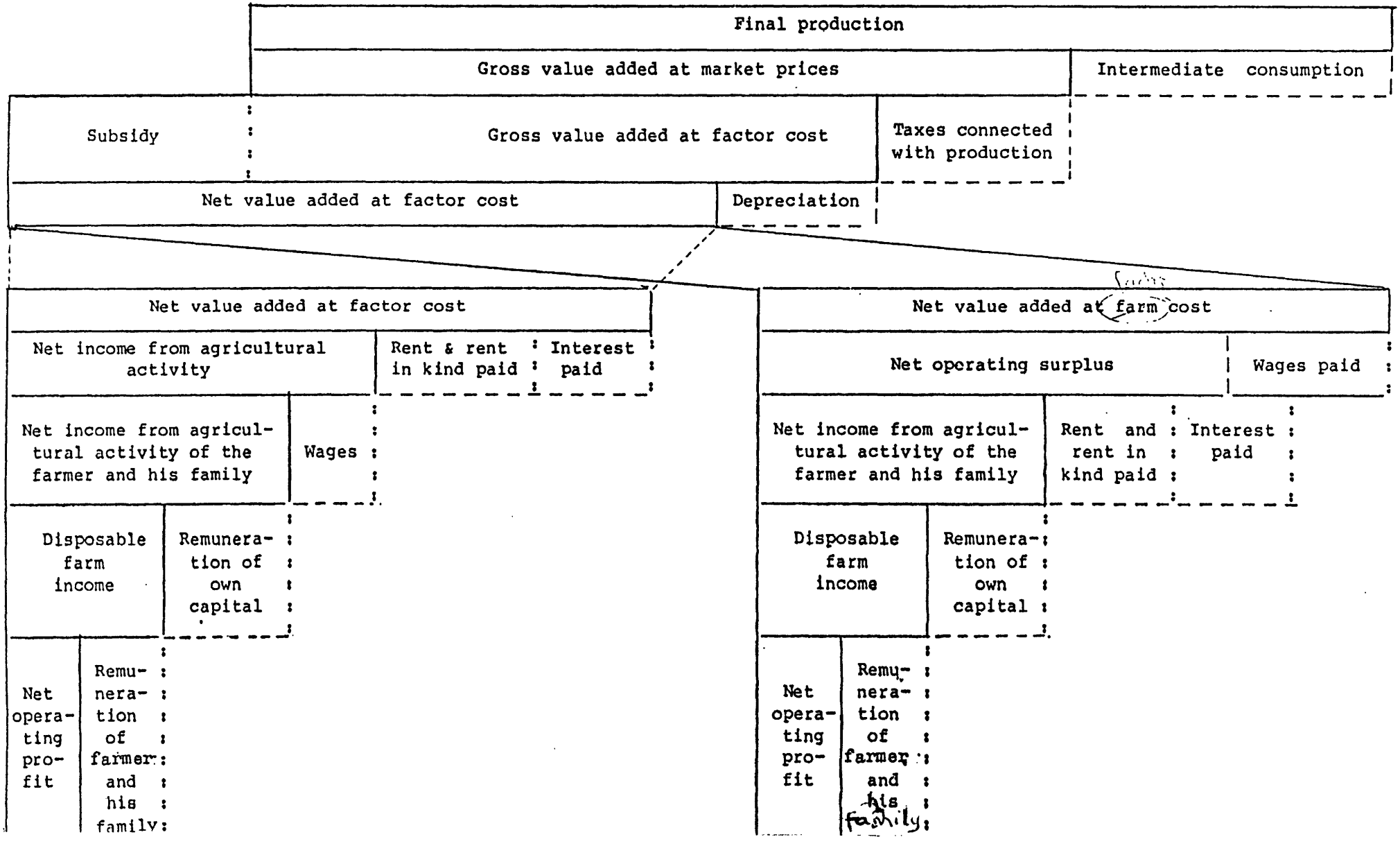
3.3.13 This 1982 document VI/308/82-EN marked the importance for future development of complementarity between macro and micro indicators. Its proposals for new indicators were couched in macroeconomic terms, with the comment that comparable ones could be prepared using RICA data. Starting from the central concept of Net Value Added at factor cost, a number of additional indicators were proposed, as follows:

> Net income from agricultural activity (total and per caput of all labour)
> Net Operating Surplus (total and per caput of self-employed workers)
> Net income from agricultural activity of the farmer and of his family
> Disposable agricultural income.
> Net operating profit.

The way that these relate to each other is shown in Fig 3.3. The special way in which the terms "disposable" and "profit" are used should be noted and treated with caution; in other contexts they have very different meanings. The document shows some less-than-clear thinking when commenting on residual rewards. It seems to strive for an indicator which can be seen as a reward for labour input (after the deduction of both actual and imputed payments to capital and land), yet recognises that in reality farmers receive rewards in several forms (especially as owners of land and capital assets). This point will be revisited. In the case of the last indicator listed, the residual could be interpreted as the reward to pure entrepreneurial input. However, a note of reality is injected by the comment that "the mere provision of a 'good' definition of income is not sufficient to ensure that the relevant indicator can in fact be constructed on the basis of existing statistics in time for decisions to be taken." In other words, practicality and timeliness must temper theoretically preferred solutions.

3.3.14 The 1983 document (RI/CC 828) contained a critical appraisal of the RICA income indicators then in use, discussed the need for new indicators and detailed the intention of the Commission Services. In considering new or modified indicators, it emphasised that the constraints of the farm return (Reg 2237/77) had to be taken into account. The way that the various indicators

Fig 3.3 Income indicators (from Indicators of Farm Income VI/308/82)



related to each other is shown in Fig 3.4. Criticism of the indicators covered the following:

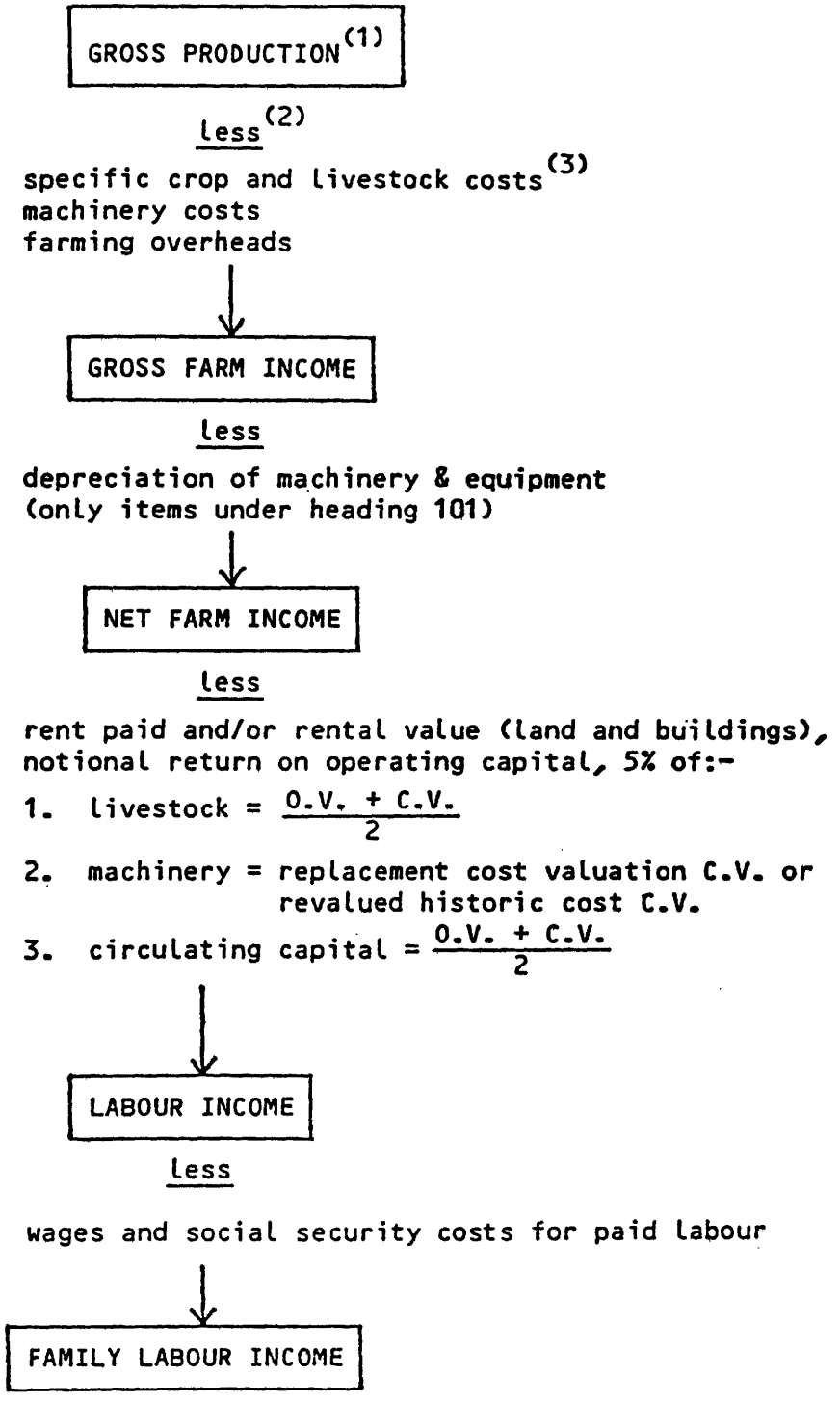
Gross Farm Income (= Gross Product less Purchased supplies and services) was considered to be too wide to reflect income from farming activity; reference back to Fig 3.2 will show that it was nearer a Gross Value Added than an income concept (which might also deduct payments for interest, rent or hired labour). Furthermore, it was gross of capital consumption; the importance of this is likely to vary between types and sizes of farm (and consequently regionally/nationally) so its omission can hide real differences in Net income.

Net Farm Income (= Gross Farm Income less depreciation of machinery and equipment) was net of capital consumption, but the calculation of this item for machinery and equipment was revealed in replies to a special questionnaire to suffer from substantial differences in methodologies between Member States (length of life, write-off method etc) and in allocation of items to various headings in the farm return. (Commission (1983) Member States replies to capital depreciation questionnaire of July 1983. RI/CC 841. Brussels: Community Committee on the RICA). Nevertheless, adequate treatment of depreciation was needed in light of the rising importance of this item.

Labour Income (= Net Farm Income less rent and rental value and notional return on operating capital) was criticised along the lines previously put forward by Attwood. The main point of concern was the deduction of the notional interest on capital. There were objections both to the rate, which was assumed to be identical in real terms in all Member States, and to the valuation of operating capital, particularly the livestock valuation where the average of the opening and closing valuations might differ significantly from the value of the average number of livestock on the farm during the accounting year. The problem was significant because notional interest was sometimes a large deduction in reaching LI. Another problem was that rents and rental values, which contained the return on (landlord) capital and depreciation of buildings etc, were liable to estimation error, especially where no market for rented land existed; this indirect treatment of depreciation on owner-occupied buildings etc also put RICA out of line with the Economic Accounts for Agriculture. The inability to compare the returns of paid and family (unpaid) labour within the Labour Income indicator was criticised, but this did not extend to the more fundamental issues of whether these two labour forms should be combined, or whether labour income bore much relevance to the objectives of the CAP. Perhaps the Commission's views of the intended beneficiaries of the CAP, made explicit in the 1982 document, were taken for granted in this 1983 review.

Family Labour Income (= Labour Income less wages paid) was open to the same objections as Labour Income, from which it was derived. This

Fig 3.4 Income indicators (from Examination of the different concepts regarding farm incomes RI/CC 828)



(1) Includes grants and subsidies on production and VAT balance if positive.

(2) VAT balance also deducted if negative.

(3) Net of grants and subsidies on purchases and farm produced inputs.

indicator was little used and seldom appeared in Commission publications.

3.3.15 The 1983 Document also announced the intended direction of methodological change by firstly identifying perceived needs for new indicators. These were mentioned in Chapter 2 as a rare example of RICA articulating its interpretation of the demands upon it for statistical information on incomes to serve the CAP. They were:

(a) to show year-on-year changes in the cash flow situation of farms, farmers and family workers in agriculture.

(b) to show medium-term changes in the return to primary factors in agriculture.

(c) to facilitate comparison of incomes of farmers and workers in agriculture with those of persons outside agriculture or in the economy as a whole. (This theme mirrors a statement in the 1982 document).

In order to meet these needs the Commission proposed four indicators:

(i) a cash flow measure, which would take into account capital purchases, interest payments and changes in indebtedness.

(ii) a net income indicator (to include return on capital and labour employed on the farm), expressed per farm and per capita.

(iii) a labour income measure (if a practical and theoretically sound one could be found). Labour income would be the return to all labour in agriculture.

(iv) an indicator of returns to hired workers in farming.

3.3.16 These proposals were not completely compatible with the actual indicators which were put forward in the same document. These were:

(a) the current Cash Flow indicator, expressed per farm and per Farmer and Family Work Unit (FWU). This flow relates to the farm business and treats hired labour as a deduction.

(b) Farm Net Value Added (FNVA), per farm and per AWU, which represents the return to all labour, management and capital used on the farm. It corresponds in principle with "Net Value Added" in the Economic Accounts for Agriculture, the basis of Eurostat's Indicator 1. It should be noted that, unlike the former Net Farm Income, depreciation on buildings and their fixed equipment is deducted.

(c) Family Farm Income (FFI), per farm and per FWU. This represents the return to the farm's own capital and the labour and management of the farmer and family labour. The costs of other capital (including land) are deducted as rent and interest paid, and wages (and other costs) of hired labour are deducted. This corresponds in principle to the "Net Income from Agricultural Activity (of family labour input)" in the aggregate Economic Accounts for Agriculture (EAA), the basis of Eurostat's Indicator 3.

(d) Hired Labour Income, the wages and social security costs per hired AWU. This is a cost item rather than a residual income indicator.

3.3.17 The choice of these indicators marked the following:

(i) a move away from measures which relied heavily on imputed values.

(ii) a move away from reliance on a single indicator (formerly labour income) in favour of a range which embraced those whose strengths were seen to lie in ease of measurement (such as cash flow) and those which were most justifiable from a theoretical point of view.

(iii) the use of indicators which were largely compatible with those use in the EAA, a desirable feature bearing in mind the greater use that these macroeconomic measures have received in policymaking largely as the result of their greater timeliness.

The document also expressed a resolve to continue to examine areas of difficulty in the accountancy system, such as the treatment of livestock appreciation, depreciation of capital goods, the impact of VAT and so on.

3.3.18 The document reveals a continuing hankering for a Labour Income indicator and a search for the improved methodology which would generate it. It was envisaged that the existing indicator would be used, though in a restricted role, until such time that this new methodology was developed. It should be noted that no equivalent to the EAA Indicator 2 (Net Income from agricultural activity of total labour input) appears within this array of measures.

3.3.19 This schema of indicators seems to have been implemented in time for the issue of the Farm Accounts Results for 1978/79-1981/2 (with detailed results for the last year) in 1984. A new series of annual printed reports was instituted, a new start in this form after a break following the published results for the 1979/80 accounting year. FNVA was the first of the new indicators used. The earliest year for which FFI could be calculated within RICA for some Member States was 1981/2, and it was not until the 1986/7 accounting year that the necessary elements became available for all countries. Therefore, descriptions of the income situation on farms have been mainly in terms of FNVA/AWU. As late as the 1987 RICA Report (Commission 1988e) textual descriptions of income developments were solely in terms of this measure,

though FFI figures for EUR 12 were given in the tables (level 1 figures were not shown for Spain for 1985/6 and for Spain and Portugal for the previous year). The Agricultural Situation in the Community Reports up to (and including) the 1987 Report (Commission 1988) used FNVA/AWU as its main income measure in the descriptive sections derived from RICA. As was noted earlier, FFI has gradually assumed a greater role in the most recent years; the distribution of farm incomes was shown for the first time in terms of FFI/FWU in the 1988 Agricultural Situation Report (Commission 1989). Cash flow has yet to appear in an Agricultural Situation Report (see 3.2.1), and though figures are shown in tables in the RICA results reports, no textual comments are made in the latest two volumes (1987, Commission 1988, and 1976/87, Commission 1990). The way that FNVA and FFI are derived is shown in Fig 3.5.

3.4 Criticism of the present indicators

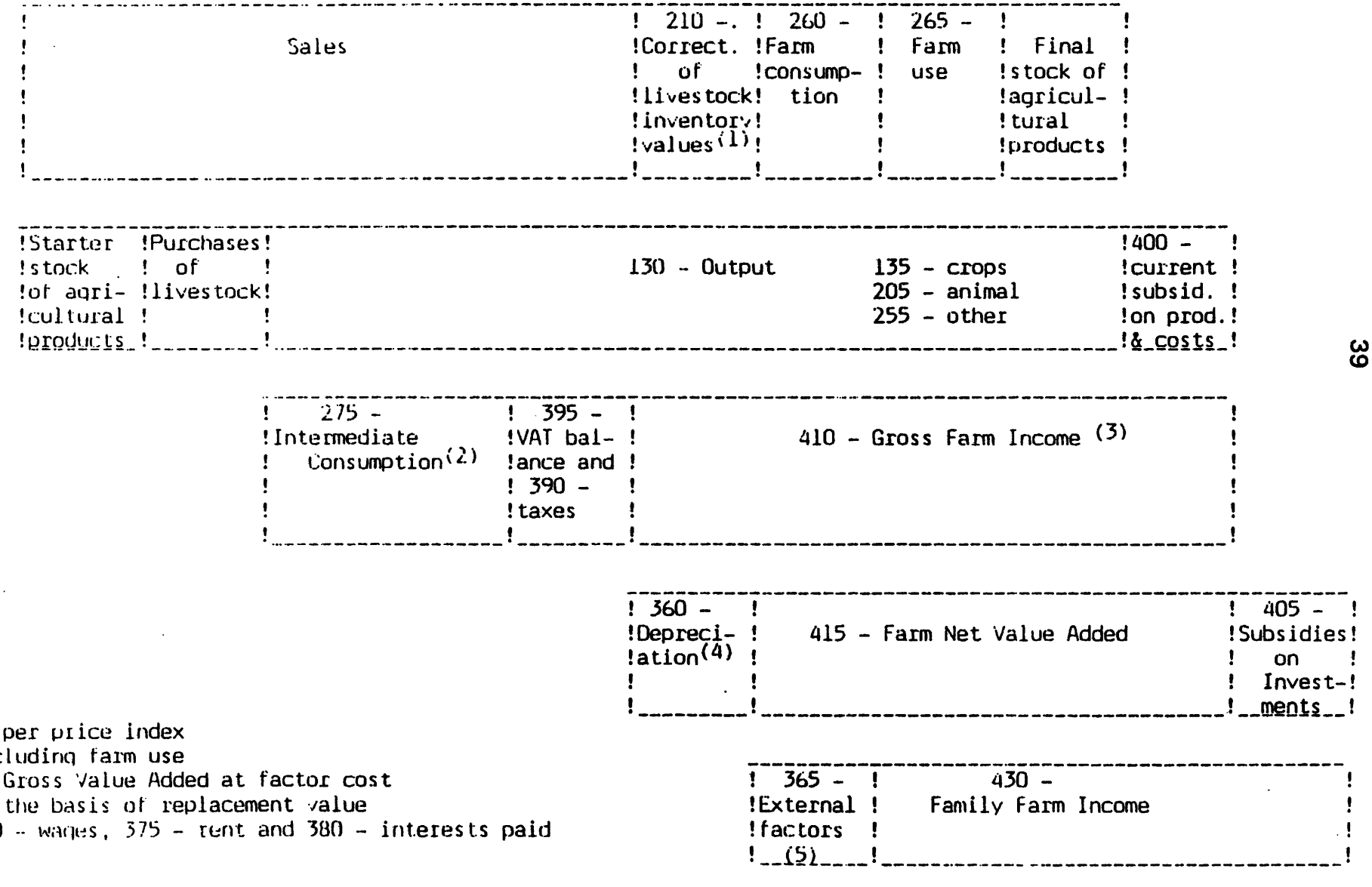
3.4.1 Criticism of the present array of indicators must be made against the background of the policy aims which RICA is expected to serve. As was pointed out in Chapter 2, these are not well defined. The main objective, relating to securing a picture of the incomes on agricultural holdings, will be considered below. However, for operational purposes, it is clearly desirable to be able to generate microeconomic measures which can be used to flesh out the main economic aggregates in the EAA and the macroeconomic indicators produced from them by Eurostat. On this basis alone RICA might be expected to produce equivalents to the following items from the EAA, a failure to do so offering a potential for criticism of RICA.

Economic Accounts for Agriculture	Current RICA equivalent
Gross (or usable) production	-
Final output	-
Gross Value Added at market prices	-
GVA at factor cost	Gross Farm Income (old terminology)
NVA at factor cost (leading to Indicator 1)	FNVA per holding/per AWU
Operating surplus	-
Net income from agricultural activity of total labour input (leading to Indicator 2)	-
Net income from agricultural activity of Family labour input (leading to Indicator 3)	FFI per holding/ per FWU
Cash flow (Eurostat definition, leading to Cash flow indicator)	Cash flow (RICA definition)
Household disposable income (under development)	-

Of these, only Household disposable income require major additional data beyond what are currently collected as part of RICA.

Fig 3.5 **Calculation of FADN indicators (I – Results) (from RI/CC 882 rev.3)**

The 3-digit numbers refer to the codes of standard variables in the documentation.



(1) as per price index
(2) including farm use
(3) or Gross Value Added at factor cost
(4) on the basis of replacement value
(5) 370 – wages, 375 – rent and 380 – interests paid

3.4.2 Final output in the EAA is net of intra-branch consumption. Hence an application of EAA rules to individual farm businesses might cause some holdings to have zero output (as when they produce only animal feed sold directly to other farms). However, at the farm level such sales are treated as both an output of farms selling them and an input of those purchasing them. Hence equivalents between macro and micro levels are better sought at the GVA and subsequent levels.

3.4.3 Three gaps in coverage by RICA relative to the EAA could be noted:

(a) Operating surplus (NVA less hired labour costs) is commonly encountered in the EAA, but seems not to have received attention at farm level.

(b) There are obvious attractions to ensuring that RICA is capable of producing estimates of Cash flow using a closely similar definition to that adopted by Eurostat.

(c) At present there does not appear to be an equivalent development within RICA which mirrors the household disposable income measure being created by Eurostat as part of the economic accounts for agriculture, involving a sector approach and the collection of data on non-agricultural income accruing to agricultural households.

3.4.4 The more fundamental criticism of RICA indicators springs from questioning how appropriate they are to the policy issues they attempt to serve. As was pointed out above, in the Legislation setting up RICA it is not explicit about which income is to be measured. Reg 79/65/EEC, Article 1, para 2, mentions as the purpose of the Network to provide data for:

(a) an annual determination of incomes on agricultural holdings coming within the field of survey (defined in Article 4); and

(b) a business analysis of agricultural holdings.

These two sections occupy separate chapters of the Regulation. Here we are concerned with the first element and the indicators used for monitoring incomes; in Chapter 7 the matter of business analysis will be tackled. It is clear that various forms of income were envisaged (Article 7 para 2). It is equally clear from the preamble in the Regulation that information on incomes and business operations is seen within the context of developing the Common Agricultural Policy. However, this poses a dilemma, since the CAP is concerned essentially with the income situation of the agricultural community, not primarily with the business incomes of holdings, though the two are obviously connected. The legislation at present confines RICA to the latter. Legislation on the form of farm return (Reg 2237/77) in its Annex II is specific on the limits of present coverage: para (b) states that;

> Data in the farm (return) concern exclusively the agricultural holding. These data refer to activities of the holding itself and if appropriate to both forestry and tourism connected with the farm. Nothing connected with any non-farming activities of the holder or of his family, or with any pension, private accounts, property extraneous to the agricultural holding, personal taxation, private insurance, etc. is to be taken into account in preparing the farm returns.

Notwithstanding the legal constraint, we can ask the questions;

> (a) to what extent do the present indicators act as good proxies for the incomes of farm businesses in terms of absolute levels and of developments from year to year?
>
> (b) to what extent do they act as good proxies for the incomes of the agricultural population, again in absolute terms or in respect of changes?
>
> (c) can the indicators be used for comparative purposes, between farmers and non-farmers, either in absolute terms or in relative movements?

3.4.5 In directing criticism of individual income indicators we must start with the main indicator used by RICA for most of the 1980s; this has been Farm Net Value Added (FNVA). The concept of net value added has been the basis of the main agricultural income indicators used at both aggregate and farm business levels. It represents the reward to all the fixed factors in production (all land, all capital and all labour and entrepreneurial input). It belongs primarily to national accounting. NVA is associated with the Production account within the European System of Integrated Economic Accounts (ESA), of which it forms the balancing item. Agriculture is treated as a separate branch of the economy within the ESA (in the form of the Economic Accounts for Agriculture (EAA)), and it is only to be expected that the NVA of agriculture has developed into an important barometer of the activity of the whole industry. Using net value added at a microeconomic level, expressing NVA on a holding basis, may be interesting in revealing information on the concentration (or structure) of production, in the sense that NVA can be seen to be generated by units of a range of value-added sizes. Its role as an indicator of anything else must be regarded with suspicion.

3.4.6 One particular problem with interpreting FNVA per holdings is that, because no charge is made for the fixed factors, holdings which use different amounts of purchased inputs, as substitutes for "fixed" farm-sourced inputs (bought-in power in place of family labour, bought fertilisers in place of land) may have identical levels of final output but differing FNVAs.

3.4.7 FNVA is a hybrid of rewards. It is capable of being broken down into the rewards to the various factors classified by function or into ownership groups.

Taking the functional approach, various attempts have been made to distribute value added into rewards to land, capital, labour and entrepreneurship, the most famous of which was the macroeconomic exercise by Bellerby (1956). The schema of indicators in the 1982 Indicators of Farm Income, referred to above, was of this sort. However, even when such exercises are successful from a statistical viewpoint, the results are nothing more than average factor rewards; these may be relevant to problems of factor allocation but are of little utility when used in the context of income support to the agricultural population.

3.4.8 Perhaps the strongest point which can be made against FNVA is that it does not correspond to the notions of "real" business profit or personal income. How these might be defined is considered later, but in general they take the form of a residual after all fixed inputs not owned by the operator have been rewarded (that is, after rent on tenanted land, interest on borrowing and wages of hired labour have been deducted from net value added). FNVA might be an adequate proxy for business profit if all or most of the land and capital were owned by the operator families, and if little or no hired labour were employed. In practice substantial differences are to be found between farming types, sizes and countries in the proportions of borrowed capital, rented land and hired labour they use, and this will militate against the validity of using FNVA as a basis for comparing developments of residual income. Holdings therefore have residual incomes which bear no constant relationship to their FNVAs.[1] Any supposed empirical relationship between the proxy FNVA and the "real" income concept should be substantiated statistically; this is one area of investigation which should be pursued by RICA.

3.4.9 For the same reasons, changes in FNVA over time can be expected to understate the changes in residual income, assuming that the main causes of the variation lie in output volumes or prices. By definition, a fall in FNVA will result in lower rewards to the fixed factors. At aggregate level this is shown in the greater variation in Indicator 3 than Indicator 1 (though changes also have to take into account differences between movements in AWUs and FWUs).

3.4.10 Expressing FNVA per AWU is even more difficult to interpret, because labour is only one of the factors whose return collectively comprise FNVA. A similar problem would arise if FNVA per hectare were used, or per unit of capital. Because FNVA does not correspond with a residual income concept, for the reasons given above, it follows that FNVA/AWU is not a reliable proxy for personal incomes. Comparisons have been published of the income development of agriculture and the general economy, using NVA/AWU and GNP/per person employed (as in Commission (1987) The Agricultural Situation

[1]For example, in 1985/86 the RICA results show that in Belgium FFI was 81 per cent of FNVA on the average farm, while in Denmark it was only 31 per cent (due to heavy interest payments) and in the UK only 33 per cent (due to large wage payments).

in the Community), but this is clearly misleading. These indicators are inappropriate for representing personal incomes. If this point is not accepted without further demonstration, it should be investigated empirically.

3.4.11 Sometimes FNVA/AWU is interpreted as a partial productivity indicator. But, as will be explained in detail in Chapter 6, this use is likely to be misleading if information is restricted to income generated by resource use in farming only and neglects resource use of the farm family (household) outside farming. The degree of error will reflect the amount of part-time farming in a country/region and the prevailing farm size structure.

3.4.12 The second income indicator used within RICA, Farm Family Income (FFI) is also a hybrid indicator, in that in part it is a residual after deducting the rewards to land, capital and labour (a distribution by factor function), but only those relating to these factors which are not in the ownership of the farm operator and which require direct remuneration in the market for inputs (Peters 1987).[2] FFI is superior to the superseded Labour Income in that it avoids the need for imputation of interest and rental values, and applies distinctly to the reward of the independent labour sector, avoiding the theoretical and practical objections incurred when combining the dependent and independent groups of labour input. There seems to be some ambiguity in the way that payment for factors owned by members of the family is treated (for example, land owned by individuals other than the nominal operator, and in situations where the legal nature of the business is separate from that of ownership of the land). In particular, the way that family members who are paid a wage, and therefore form part of the hired labour force, are treated may not be uniform between Member States. Assuming that adequate data are available on the payments to fixed factors, FFI per holding appears to be conceptually much closer to the notion of business income than FNVA, although the way that it treats balance sheet items (such as the appreciation of assets) may not be completely in line with some concepts of personal income. Distributions of FFI/holding could be an important guide to the existence and locations of holdings generating small amounts of income for their occupiers.

3.4.13 FFI/FWU gives the appearance of measuring income per caput of those engaged in agricultural production.[3] In addition to any reservations which might be held about the concept of FFI, there are problems associated with using Family Work Units as the denominator. The general question of the

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[2]In the UK the equivalent in the Farm Business Survey to FFI is Occupier's Net Income.

[3]Sometimes this measure is interpreted as indicating (average) labour productivity. The reservations expounded by Schmitt about such interpretations of FNVA/AWU (see 3.4.10 above) also apply here.

reliability of labour units has been raised before (see 3.3.8 above) but problems are at their most acute when dealing with unpaid labour of the farmer and his family. They include the following:

(i) difficulties in obtaining reliable information on the amount of time worked, and in expressing this in terms of AWUs. In addition to the problem of defining work and non-work by self-employed people, certain conventions are adopted; for example, a person who spends his entire annual working time on the holding represents one AWU even if his actual working time exceeds the normal working time in the region under consideration and on the same type of holding.

(ii) the assumption of homogeneity of labour between persons, which fails to reflect the differing capacities (and opportunity costs) among, for example, very elderly farmers and young men.

(iii) the failure to recognise that incomes of individual family members are not independent determinants of whole-family living standards. The use of a productive-factor approach in an income context may be inappropriate, as no account is taken of the socio-economic condition of the labour. For example, in interpreting FFI/AWU in a personal income context, some equivalence scale should be used related to the farm household structure.

3.4.14 In connection with the first two points, there is ample evidence from research outside RICA (summarised in Gasson 1988) that the amount of time spent by an operator on his holding is no reliable guide to the amount of income coming from agricultural activity, or to the proportion of total income derived from farming. This must throw some doubt on the suitability of a time-based criterion for use in an income context, though it might still find a place as an indicator of average factor product.

3.4.15 Criticism can be levelled at both the above indicators based on the time period over which they measure income. Each relates to the conventional accounting period of a year, but this may not be the most appropriate for income purposes. While this criticism might be levelled at other income measures, it is perhaps felt most acutely by FFI because of the closer identification between this indicator and the personal income of the farm family. Stability of incomes over time is an important issue not only in the welfare sense (it can be demonstrated that the total utility from a fluctuating income stream averaging X will be less than that derived from a constant real annual income of X) but also because snap-shots of distributions can give a misleading picture of the underlying income problems. Fragmentary evidence from a number of sources (eg. Bollman 1980, Gregory 1986, Harrison and Tranter 1989) suggests substantial movement in and out of low farm business income categories from year to year. This points to the necessity of distinguishing between farms which generate low incomes year after year from those more volatile performers which occasionally produce low incomes but which generally

enjoy more satisfactory level. Though attention is most often focused on the low income businesses, Murphy (1983) in the context of eastern England has shown that high income cereal farms had difficulty in staying in that group over a three year period.

3.4.16 There is evidence that income fluctuations are becoming a more serious problem. Year-to-year variation in farming incomes at the individual business level in the UK was greater in the 1980s than in the 1950s and 1960s (Harrison and Tranter 1989). This increased instability is supported by the experience of the EC Commission (Commission 1985c, Green Europe 208), though this judgement was made on the basis of group averages rather than longitudinal time series for individual farms.

3.4.17 There seems to be conflicting evidence on whether farming income instability is experienced more by the larger, high income farms or the smaller, low income ones. Gregory (1986) found greater instability of income among low income farms than among those with high incomes, a view which is commonly held. However, this does not to be supported by the Commission; in the Green Europe publication mentioned above the Commission expressed the view that it seemed that "farmers achieving the best incomes are also those who have to contend with the widest income fluctuations". The clarification of these issues should be the subject of analyses of RICA data for individual businesses over a run of years. The setting up of a time series for this sort of study was one of the specific recommendation of the Court of Auditors in their 1981 report on RICA, though little progress seems to have been made in this direction until very recently.

3.4.18 Perhaps the most comprehensive analysis of the incomes generated on individual farms, and evidence on which the length of period over which averaging should take place in RICA, comes from FR Germany (Cordts, Deerberg and Hanf 1984). This study used Net Profit per family labour unit as the income indicator (defined similarly to FFI/FWU) and the accounts of 1093 farms which could be traced through a series of twelve years in the sample of Test Holdings (the German farm accounts survey). It suggests that the profit of any farm in each year is partly determined by random factors, for example, the occurrence of repairs, of yields of crops and so on; these random elements would also, in the German situation, include dates of purchase of inputs and the evaluation of stocks which, in RICA, should be less a source of variation because of the treatment of stock changes. Hence the variance of profit among farms is composed of a random part which is effective only in the single year under investigation, and a systematic variance part which expresses the underlying "actual" differences in the profit situation between farms.

3.4.19 As a way of assessing the extent of random variation, Cordts et al. estimated coefficients of variation of profits at the farm level for single years (over the period 1968/9 to 1979/80), and for profits averaged over from two to twelve years. For single years the average coefficient of variation was 0.78, for two years 0.68, for three years 0.64 and for four years 0.61. Over twelve

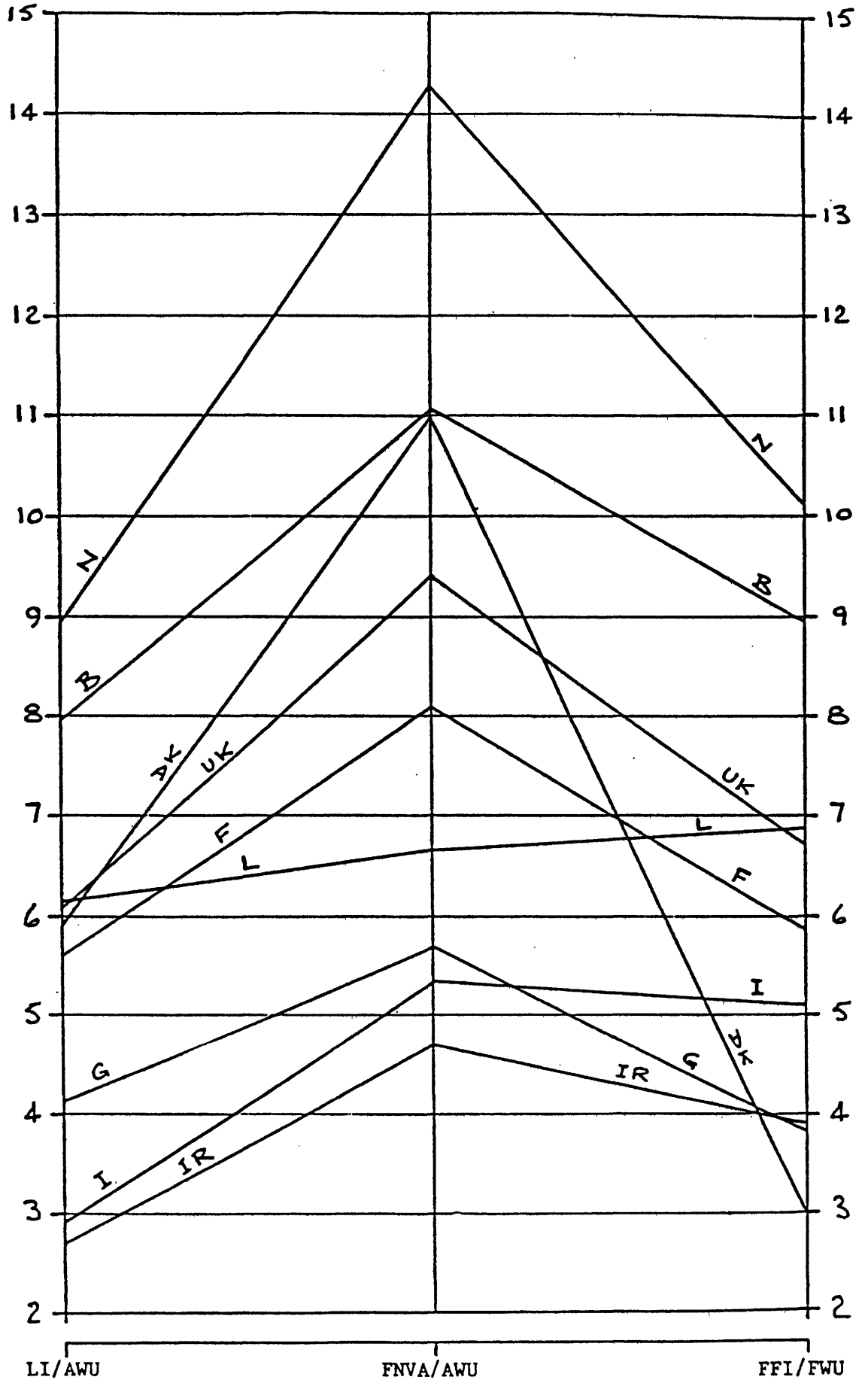
years this fell to 0.55, but such long periods start to capture differences in growth patterns of farms. These figures suggest that averaging over three years reduces substantially the effect of random factors on incomes; some 60 per cent of the total reduction in variation was achieved. More reduction (83 per cent) was achieved by averaging over five years, though growth has probably become significant by then. Though a matter of judgement, averaging over three years was seen to be the most appropriate practice for income studies in Germany.

3.4.20 Finally in this criticism of the present array of income indicators, we come to the RICA Cash-flow measure. This has yet to achieve prominence in the analysis of survey results. Alternative forms of cash-flow are conceptual possibilities, the differences mainly involving the treatment of spending on capital goods and changes in the sizes of loans. These will be reviewed later. At this stage it can be noted that the RICA version deducts capital spending and takes changes in loans into account. It is described as measuring "the capacity of a farm to save up money and finance itself" (RI/CC 882 rev.3). However, the Eurostat cash-flow, being developed within the EAA and to which the RICA measure might be expected to be complementary, neither deducts capital spending nor interest (see pp 46-50 of Eurostat (1989) Agricultural Income 1988; Sectoral Income Analysis). Eurostat describes its cash-flow measure as showing "the financial means available to the production branch "agriculture" - as a result of agricultural production - for investment, repayment of loans and withdrawals by farmers. This financial surplus resulting from current sales thus gives an indication of the liquidity situation in agriculture." The EAA indicator is expressed per family labour input in AWU, whereas the RICA measure is published per holding. Eurostat points out that the rates of change from year to year in cash flow as a rule fluctuated less than income figures (Indicators 1-3); this would be expected as income has a greater number of relatively fixed input costs deducted from a more volatile output parameter. The conclusion is that the liquidity situation in agriculture is subject to less significant changes than might be assumed from the income indicators. Depreciation can play a large role in explaining these differences.

3.5 Comparisons of income criteria.

3.5.1 Until 1984 RICA published results centred on Net Farm Income (NFI)/holding and Labour Income (LI)/AWU. These were replaced by FNVA/holding and per AWU and FFI/holding and per FWU. Special analysis run by RICA (reported in Bryson 1985) enabled comparisons to be made for LI/AWU, FNVA/AWU and FFI/FWU for the 1980/81 accounting year, given that problems were encountered with data for France and Italy. Rankings of Member States according to these three indicators were broadly similar, though the position of Denmark altered markedly from one indicator to another, and Luxembourg and Italy also saw changes. The changed ranking of Denmark in particular seems to have been influenced by the large impact caused by substituting rent and interest paid for notional rent and notional interest changes. (Fig 3.6)

Fig 3.6 Comparison of three "per capita" income criteria: FADN income results 1980/81 (from Bryson 1985)



Source: FADN Special Tabulations; Agricultural Situation 1982 Report; FADN Microfiches 1980/81.

3.5.2 Bryson (1985) also reports country rankings based on five income criteria (FNVA/holding; FNVA/AWU; FFI/FWU; FNVA-paid wages/holding; FNVA-paid wages/FWU) for 1979/80 and 1980/81. The last two removed the reward to hired labour from the measure, giving an indicator equivalent to Operating Surplus in macroeconomic terminology. While the positions of Member States were broadly similar for all these indicators, with the Netherlands consistently at the top and Germany, Italy and Ireland sharing bottom places on most criteria, Denmark's position was the most sensitive to the measure chosen. The positions of Member States reflect, to quite a large extent, the average farm business size in each country (Table 3.1).

3.6 Distribution of incomes

3.6.1 So far the discussion in this Chapter has concerned the income concepts employed by RICA rather than the way that they have been used. One potential strength of microeconomic data sources is that distributional issues can be explored. Both disparity and dispersion of incomes are essentially matters of distribution, in the statistical sense; in Commission usage "disparity" is confined to the situation within the agricultural sector, that is, as a measure of the difference in average farmer's income from group to group (for example, by economic size, by region or by country). "Dispersion" is described as the deviations of the individual figures within a given group from the average for the group. Green Europe No. 208 (Commission 1985c, Income Disparities in Agriculture in the Community) deals with both disparities and dispersions. Both seem to be of increasing concern within the policy framework, yet "dispersion" in particular has received relatively little attention.

3.6.2 Disparities of incomes are commonly presented using group averages for each farming type and Member State. Others classifications which have been used occasionally are income by:

(1) size of holding in SGM or ESU (see the 1988 Agricultural Situation in the Community report p. 59)
(2) holding area in UAA
(3) income class of farm (FNVA, FFI or other income concepts) (for example, see the distribution based on FNVA for EUR9 specially run and reported in Britton (1984), see Table 3.2)

Further obvious possibilities are to use alternative income and output measures (such as value of sales) and to classify by:

(4) size of farm labour force (total and family only - in absolute numbers, AWU, consumer units)
(5) socio-economic characteristics of operator (time spent on the holding, presence of other gainful activity, age, and so on).
(6) other characteristics, such as location in Less Favoured Area (LFA), in receipt of a structural incentive, and so on.

Table 3.1 Ranking of Member States by income (five criteria) 1979/80 – 1980/81 (from Bryson 1985)

1979/80

Ranking	FNVA/HOLDING		FNVA/AWU		FFI/FWU		FNVA-PAID WAGES/HOLDING		FNVA-PAID WAGES/FWU	
	Country	ECU	Country	ECU	Country	ECU	Country	ECU	Country	ECU
1	N	24,037	N	13,688	N	11,245	N	20,890	N	14,407
2	UK	21,936	DK	12,280	B	10,099	B	18,298	DK	12,847
3	B	18,852	B	11,946	L*	7,287	UK	13,551	B	12,199
4	F	13,615	UK	8,040	UK	6,874	L	12,326	UK	10,113
5	DK	13,541	L	7,905	F	6,009	F	12,247	F/L	7,801
6	L	12,599	F	7,662	G	5,307	DK	11,948	-	-
7	G	10,711	G	6,819	DK	5,131	G	9,715	G	6,890
8	I	7,801	IR	4,557	I	4,164	I	6,917	IR	4,590
9	IR	5,509	I	4,406	IR	3,972	IR	5,233	I	4,270
	EUR 9	11,477		6,620		5,389		9,967		6,645

1980/81

Ranking	FNVA/HOLDING		FNVA/AWU		FFI/FWU		FNVA-PAID WAGES/HOLDING		FNVA-PAID WAGES/FWU	
	Country	ECU	Country	ECU	Country	ECU	Country	ECU	Country	ECU
1	UK	25,500	N	14,420	N	10,269	N	21,605	N	15,215
2	N	24,740	B	11,284	B	9,218	B	17,034	DK	11,647
3	B	17,653	DK	11,277	L*	7,061	UK	15,642	UK	11,587
4	DK	14,714	UK	9,728	UK	6,856	F	12,844	B	11,509
5	F	14,319	F	8,121	F	6,122	DK	12,113	F	8,233
6	L	11,374	L	6,916	I	5,369	L	11,062	L	6,914
7	I	10,355	G	5,963	IR	4,146	I	9,467	G	5,916
8	G	9,118	I	5,619	G	4,004	G	8,164	I	5,536
9	IR	5,991	IR	4,945	DK	3,093	IR	5,706	IR	4,962
	EUR 9	12,600		7,182		5,614		10,959		7,163

Data Source: FADN Special Tabulations 1979/80 & 1980/81. * Interest subsidies affecting results.

Table 3.2 Percentage distribution of resources, output and income, by income groups. EUR9, 1980 (from Britton 1984)

Income of farm (ECU)	Farms	Ag. Land	Labour	Tenants Capital	Output	Income (FNVA)
	%	%	%	%	%	%
less than 4,000	31	17	25	16	10	3
4,000 to 12,000	37	27	35	28	23	22
12,000 to 20,000	16	19	16	20	19	19
20,000 to 40,000	11	21	14	21	25	25
over 40,000	5	16	10	15	23	31
Total	100	100	100	100	100	100

Table 3.3 Average farm incomes and ranking, by Member State (FNVA/AWU "1981" (from internal FADN document)

All farms	G	F	IT	N	B	L	UK	IR	DK	EUR9
	(7)	(6)	(9)	(1)	(3)	(5)	(4)	(8)	(2)	
in 1,000 ECU	7.9	8.5	5.3	16.8	13.9	9.0	12.4	6.7	15.1	8.0
	(9)	(6)	(8)	(1)	(2)	(5)	(4)	(7)	(3)	
in 1,000 PPS	7.3	8.5	7.1	16.1	14.6	10.1	12.4	7.9	13.9	8.7

Source: Internal FADN Document (unpublished),
Niveau des revenus agricoles 24th November 1983.

3.6.3 The main income indicator used to illustrate dispersion in RICA reports and Agricultural Situation Reports (including Green Europe no. 208, taken from the 1984 Report) is by size of FNVA/AWU or FFI/FWU. FNVA/AWU is particularly open to misinterpretation by those without familiarity with its conceptual base. A stronger case seems to exist for FFI/FWU, and in practice this is appearing with increasing frequency in Commission documents. The 1988 Report discussed intra-country income distributions in terms of FFI/FWU, whereas previous reports had used FNVA/AWU; percentage distributions of holding numbers were shown against levels of "income", meaning levels of FFI/FWU. As was pointed out earlier, Family Labour Units might require adjustment using an equivalence scale if the prime interest for making the analysis is in the farm family as consumers. At this stage, however, it seems reasonable to continue to generate distributions using both these measures. Distributions of incomes per holding would also have attractions, especially using those income concepts that are more closely related to production activity.

3.6.4 The conclusions from some experimental work on dispersion using Farm Business Survey data in the UK are instructive. Gregory (1986) employed three different coefficients for measuring the degree of inequality between the farms in a given sample. He found that the degree of inequality was affected by the income measure used. In general, the more "residual" the income concept, the greater the degree of inequality. "All the elements that are added into income definitions as one moves from the narrow Management and Investment Income to the broad .... definition (which includes capital gains) increase the lower-income farms' incomes proportionally more than those of the higher-income farms". And "... in welfare terms, the effect of using different income definitions is even more pronounced than just the differences in the (income) means would suggest". These findings need to be tested more widely and raise questions about how RICA should present the dispersion issue, such as the choice of income measure to employ.

3.7 Making comparisons between Member States

3.7.1 The drawing of comparisons between the levels of income in different Member States and the aggregation of their incomes require the use of some conversion factors by which national currencies can be expressed in some common medium. Such conversion is not needed when trends alone are compared. Results in RICA are given in ECU. According to the RICA A-Z (Commission 1989) the exchange rates for this purpose are calculated on a monthly basis by Eurostat. Unfortunately, these exchange rates are influenced by factors beyond those relevant to the comparison of agricultural incomes, and their use does not give a reliable picture of the relative income levels in Member States nor of changes over time. ECU exchange rates may be considered inadequate for providing a common unit of measurement.

3.7.2 As an alternative, a system based on purchasing power parity has been developed for national income and expenditure aggregate comparisons. This

has aimed to find appropriate conversion factors between national currencies and a reference unit, taking into account the real differences in price levels for a representative range of goods and services. The International Comparison Project (ICP) started in 1970 under the auspices of the United Nations Statistical Office. Eurostat has been responsible since 1980 for the exercise in the 12 Member States (including the prospective members before Spain and Portugal's accession). The "numeraire" taken for the presentation of EC results based on purchasing power parity is the Purchasing Power Standard (PPS). There is some concern over whether the representative range of goods and services used to estimate PPS is entirely appropriate for making comparisons of agricultural incomes.

3.7.3 In making comparisons between Member States of NVA/AWU the Agricultural Situation 1988 Report (Commission 1989) used PPS whereas the previous report used ECU green rates. In Eurostat's 1989 publication Agricultural Income: sectoral income index analysis a comparison is presented of the use of both ECU and PPS based systems. The impact of using PPS is to lessen the disparities in agricultural incomes (value added per AWU) between Member States. For instance, the difference between the value-added parameters for the three highest-income and the three lowest-income Member States was reduced from a factor of 3.5 to 2.5 when switched from ECU to PPS. The use of a PPS standard produced a downward shift in the relative income positions of all those countries with an above-average level of income, while the others improved. Rankings were also altered. For example, Germany's NVA/AWU was ahead of Greece, Spain and Italy on the ECU basis but behind them on PPS.

3.7.4 RICA staff have carried out a similar comparative exercise for "1981" (1980 + 1981 + 1982 average), the results of which were not published (but are given in Bryson 1985). Rankings were changed marginally but not in any clear pattern (see Table 3.3).

3.7.5 A detailed exercise comparing rankings for individual years over the period 1978-81 showed that incomes in Germany, Netherlands and Denmark (FNVA/AWU) were depressed consistently and significantly when expressed in PPS (Bryson 1985). The French incomes were reduced also, but to a lesser degree. Irish and Italian incomes improved greatly. However, rankings were little affected. On the other hand, positions were greatly changed if RICA holdings of 4 ESU and below were excluded; on this basis, Irish average incomes were the highest in the Community in 1978, and the ranking of Ireland and Italy improved relative to France, Luxembourg and Germany in all four years. Germany, already occupying one of the bottom three places when incomes were expressed in ECU, was adversely affected by a change to PPS and took the lowest place in all four years (see Tables 3.4 and 3.5).

3.7.6 The conclusion must be that the choice of monetary basis for comparing the results in Member States is of relevance to the outcome. It is likely to be especially so in times of economic instability. Though PPS may be far from

Table 3.4 Average farm incomes (FNVA/AWU) expressed in ECU and PPS, by Member State, "1978" to "1981" (from Bryson 1985)

Member State	all farms, or farms over 4 ESU	'78'		'79'		'80'		'81'	
		ECU	PPS	ECU	PPS	ECU	PPS	ECU	PPS
G	over 4	6.9	5.7	6.9	6.4	6.1	5.7	7.0	6.5
F	over 4	8.5	8.2	7.8	7.6	8.3	8.1	9.0	8.5
N	over 4	14.4	12.3	13.7	12.3	14.4	13.7	18.7	18.1
B	over 4	12.0	10.2	12.0	10.8	11.5	11.4	14.8	15.2
L	over 4	7.6	7.1	7.9	7.8	6.9	7.2	8.2	9.0
DK	over 4	12.3	9.8	12.6	10.9	11.5	10.6	15.6	14.3
I	all	4.4	6.3	4.4	6.3	4.7	6.4	5.0	6.6
	over 4	6.3	8.9	6.6	9.4	7.4	10.0	8.1	10.7
UK	all	8.0	10.7	8.1	10.0	9.8	10.2	13.2	12.7
	over 4	8.1	10.9	8.3	10.2	10.1	10.5	13.5	13.0
IR	all	7.9	10.4	4.6	5.9	4.9	6.3	7.2	8.7
	over 4	11.4	15.0	6.4	8.2	6.8	8.7	9.7	11.7
GR	all	-	-	-	-	-	-	3.4	4.7
	over 4	-	-	-	-	-	-	5.3	7.3
EUR 9[1]	all	7.1	7.7	6.7	7.3	6.8	7.5	7.5	8.0
	over 4	8.3	N/A	8.0	N/A	8.4	N/A	9.8	N/A

1 1981/82 EUR 10.

Derived from FADN Farm Accounts Results 1978/79-1981/82.

TAble 3.5 Ranking by average FNVA/AWU expressed in ECU and PPS, all farms over 4 ESU (from Bryson 1985)

	'78'		'79'		'80'		'81'	
	ECU	PPS	ECU	PPS	ECU	PPS	ECU	PPS
1	N	IR	N	N	N	N	N	N
2	DK	N	DK	DK	DK/B	B	DK	B
3	B	UK	B	B	-	DK	B	DK
4	IR	B	UK	UK	UK	UK	UK	UK
5	F	DK	L	I	F	I	IR	IR
6	UK	I	F	IR	I	IR	F	I
7	L	F	G	L	L	F	L	L
8	G	L	I	F	IR	L	I	F
9	I	G	IR	G	G	G	G	G

perfect, the size of the differences between the results obtained by it as against ECU suggests that the latter should not be considered alone.

3.8 Summary regarding whole-farm income concepts

3.8.1 From the above sections the following points emerge:

(1) the income indicator which is appropriate in any given policy circumstance will depend on the objective at which the policy is aimed. Indicators cannot be judged in isolation. As a corollary, there is no single income indicator which will be universally appropriate. Though objectives are not clearly stated, these include business profitability (and hence production levels and investment), welfare of farm operators, and the comparability of returns/incomes between agricultural and non-agricultural sectors. These imply different types of economic indicator. However, there is an inherent danger of using inappropriate indicators simply because they exist; this is heightened when information users are not fully aware of the concepts behind the indicators.

(2) measures which may be acceptable for indicating change are not necessarily suitable for use in absolute form; they should be tested against the realities they are supposed to represent when the opportunity arises.

(3) a range of possible indicators can be calculated, some of which relate to the farm business alone and others which go further and embrace the economic activity of the operators of the business. This latter group of measures necessitates the collection of data from outside the narrow confines of agricultural production activity. RICA has generally confined its concern to the holding. Nevertheless, it seems likely that the business behaviour of the farm (eg profit-seeking, productivity and investment) can only be satisfactorily explained if these external influences are taken into account. One specific example is afforded by taxation; personal taxation may be an important factor in shaping farming activity, and will relate to total rather than agricultural income (though taxation on the "forfait" system may dilute this point in some Member States). A clear distinction must be maintained between the two groups of measures relating to, on the one hand, farm businesses and, on the other, the operator and his household. (Personal income measurement will be the subject of a separate Chapter).

(4) among those economic indicators which relate to agricultural activity, there are substantial advantages in employing, at microeconomic level, concepts which are also used at macroeconomic level.

(5) indicators applied to farm businesses can reflect degrees of partiality in terms of coverage. At one end of the spectrum of partial coverage are income measures which include capital gains, while at the other would be forms of cash flow.

(6) though incomes are calculated by convention on an annual basis, they should also be considered over a run of years. Stability and level are two complementary aspects of incomes.

(7) many of the indicators relating to the farm businesses start from the value of output of the holding. Subsequent deductions can be based on;

(a) the fixed or variable nature of the inputs
(b) the function of the input (labour, land etc)
(c) the ownership of the inputs
(d) actual or imputed costs paid in the accounting period
(e) combinations of the above.

(8) in practice, imputed costs pose difficulties, especially where there are no ready market-based yardsticks. There is often a compromise between ease of measurement and economic rationale. It cannot be denied, however, that to omit imputed costs (and benefits) can give a distorted picture of the real economic situation of a farm.

(9) distributions can be expressed in many ways. Those based on rather cryptic or "artificial" parameters (eg FNVA/AWU) pose difficulties of interpretation in a policy context.

(10) the results of international comparisons (or aggregations) will be influenced by the basis used for converting national currencies into some common medium. The basis chosen should reflect the purpose for which the indicator is to be used.

CHAPTER 4: DEVELOPMENTS CONCERNING INCOME INDICATORS IN OTHER AGRICULTURAL INFORMATION SYSTEMS

4.1 Introduction

4.1.1 After having reviewed in Chapter 3 the history of the income indicators used by RICA, together with comments on their economic characteristics, it is appropriate to look at the parallel methodological developments in other farm accounts surveys, focusing attention on the indicators which are employed and the use to which they are put. This Chapter draws on experience in the national surveys of the USA, Canada, Australia and the UK; a later chapter (Chapter 8) deals with the more specific details of those surveys in EC Member States which contribute to RICA. The aim here is not to provide a world-wide review, but to draw lessons from several major examples which may be of benefit to the development of economic indicators within RICA.

4.2 The United States of America

4.2.1 In the USA concern with the relevance of income indicators seems to have come in waves during the last two decades. The early 1970s saw a flurry of interest, to which a joint committee of the American Statistical Association and the American Agricultural Economics Association made an important contribution (AAEA 1972). The notion of conceptual obsolescence in this context was promulgated by Bonnen (1975) and expanded by Riemenschneider (1983). In 1975 the USDA assembled a task force to examine its macroeconomic series (GNP Data Improvement Project). Two conferences in 1977, two staff reports in 1980, and symposia held by the AAEA in 1981 and 1985 all studied and challenged various aspects of the accounting framework. (Though the USDA documents and workshop papers are difficult to obtain in Europe, related papers often appear in the academic literature; for example the Dec. 1986 issue of the Amer. J. aric. Econ. contains several articles on economic and social indicators of the farm sector). One of the ensuing changes, which reflected among other things an increasing political interest in income developments by type and size of farm, was the setting up of the

probabilistic (sample-based) Farm Costs and Returns Survey in 1984, replacing two earlier surveys (Farm Production Expenditure Survey, and the Cost of Production Survey). This USA equivalent to RICA has a sample size of about 27,000, with usable data covering some 14,000 respondents (1988). Data are collected annually by enumerators on costs, returns, debts and assets of farm operators.

4.2.2 Referring to farm account data, Baum and Johnson (1986) state;

> "In many respects, we view the development, estimation, and analysis of microeconomic indicators of the farm sector as a critical foundation for regeneration of our current understanding of the dynamics of the farm sector, its interaction with and reaction to agricultural policy and other macroeconomic events. Consequently, we view the development, estimation, and analysis of micro/disaggregated economic indicators of the farm sector as one of the important responsibilities of the agricultural economics profession during the foreseeable future. This task will be successful depending on our use of statistically-reliable whole-farm data, such as that collected by the Farm Costs and Returns Survey, and complementary data collected by other institutions to meet the growing and perceived need to monitor accurately the heterogeneous nature of the farm sector and its well-being."

It is worth noting that the main agricultural census, which collects many income and expenditure data (especially the latter) used in constructing the economic accounts for USA agriculture, is only carried out every five years. Hence there is a need to integrate the FCRS (and other data sources) with sector accounts for purposes of updating in non-census years.

4.2.3 A four-year rotation of commodities is used, to balance response burden with information needs. The definition of a farm in the FCRS is consistent with that employed in all other USDA surveys. In addition to the normal production information, the Survey collects data on the allocation of labour resources between farm and non-farm activities, the sources of off-farm income, the size of farm households, the number of households per farm operation and the total income per farm operation and per farm household. Data are also collected on the assets and liabilities of both farm households and farm businesses, and on household consumption and expenditures. Attitudinal questions are also included in the survey from time to time (Johnson et al 1988).

4.2.4 The main income indicators currently in use are as follows (from USDA (1988) Major Statistical Series of the U.S. Department of Agriculture: Farm Income):

(i) Net farm income
(ii) Net cash income
(iii) Net business income
(iv) Total cash income of farm operator household

(v) Net cash flow
(vi) Production transactions (ie receipts and expenses)

The elements in the calculation of each are shown in Figs 4.1-4.3. These are available as national aggregates or at various stages of disaggregation - geographical (State) or by size of farm (by value of sales) or type. The main differences between the indicators arise from the treatment of:

(a) income and expenses associated with the farm dwellings occupied by farm operator households (included or excluded);
(b) noncash items (eg. depreciation and changes in inventory values);
(c) the persons whose net income is included.

4.2.5 Net farm income is the measure which forms part of US national accounting. The other concepts are the results of debate about what operators perceive as impacting on their prosperity. Net cash income excludes all non-cash income and expenses (except rent paid in kind). The value of current-year commodities entered into inventory is excluded from the income side, but sales from the inventory are included. All income and expenses associated with the farm dwellings are excluded. Net business income is conceptually consistent with the cash accounting method used by most USA farmers. It is also approximates to the calculation of taxable income, except that tax income uses historic cost depreciation rather than the replacement cost declining balance method used by the USDA. Total cash income of operator households adds off-farm cash income accruing to operators and members of their households, though the off-farm cash income of households where the farm is arranged as a nonfamily corporation is not included; this represents a deficiency in the data, but not one felt to be very important. Net cash flow measures the total cash available to the farm sector (including landlords who are not operators) after accounting for various internal and external sources and uses of funds. The USDA feels that this is a good indicator of the short-term financial position of the farm sector and its ability to meet current obligations. Net cash flow cannot in the USA be partitioned to exclude non-operator landlords because loan data are reported by type of collateral rather than by the borrower's relationship to farming.

4.2.6 The Production transactions series allocates the value of output among intermediate product expenses, capital consumption and business taxes. Hired labour, interest paid and rent paid are deducted, leaving Return to Operators as the residual reward for the factors (owned land and capital, own labour and management, including non-paid family labour). Conceptually this Return is that nearest the Farm Family Income of RICA. The exclusion of the rental value of the operator dwelling and expenses associated with it should be noted, as should the deduction of the value of perquisites to hired labour and accidental damage (in addition to depreciation).

4.2.7 The way that a farm is defined should be noted, not only for the purpose of structural studies and for inclusion in the FCRS and its indicators, but

Fig 4.1 US Department of Agriculture farm income series (from USDA 1988)

Net farm income 1/	Net cash income 2/	Net business income 2/	Total cash income of farm operator households	Net cash flow 2/	Production transactions 2/
Gross income—	Sum of—	Sum of—	Sum of—	Sum of—	Gross income—
Gross cash income Cash receipts Direct Government payments Farm-related income	Gross cash income	Gross cash income	Gross cash income	Gross cash income	Gross cash income
Noncash income Home consumption of farm products Gross imputed rental value of all dwellings					Noncash income Home consumption of farm products Gross imputed rental value of laborer dwellings
Value of net change in inventories					Value of net change in inventories
			Off-farm income	Change in loans outstanding Net rent to non-operator landlords 3/ Net change in operators' currency and demand deposits	
Less—	Less—	Less—	Less—	Less—	Dispositions—
Cash expenses 1/ Intermediate product expenses Property taxes Interest Cash wages to hired labor Contract labor Net rent to nonoperator landlords 3/	Cash expenses 2/	Cash expenses 2/	Cash expenses 2/	Cash expenses 2/	Factor payments to nonoperators 2/ Interest Cash wages to hired labor Contract labor Perquisites to hired labor Net rent to nonoperator landlords 3/
Capital consumption 1/ Depreciation Accidental damage		Capital consumption 2/ Depreciation Accidental damage		Capital expenditures 2/	Other payments 2/ Intermediate product expenses Property taxes Capital consumption Depreciation Accidental damage
Perquisites to hired labor					Returns to operators

1/Includes expenses for operator farm dwellings. 2/Excludes expenses for operator farm dwellings. 3/Includes the value of share rent paid in kind.

Fig 4.2 Components of the US Department of Agriculture farm income series (from USDA 1988)

USDA account	Net farm income	Net cash income	Net business income	Total cash income of farm operator households	Net cash flow	Production transactions
Income:						
Cash receipts	X	X	X	X	X	X
Direct Government payments	X	X	X	X	X	X
Farm-related income	X	X	X	X	X	X
Noncash income—						
Home consumption	X					X
Rental value of dwellings—						
Operator	X					
Hired laborer	X					X
Value of net change in inventories	X					X
Change in loans outstanding					X	
Net rent to nonoperator landlords					X	
Net change in operators' currency and demand deposits					X	
Off-farm income				X		
Expenses and expenditures:						
Cash expenses—						
Intermediate product expenses	X	X	X	X	X	X
Property taxes	X	X	X	X	X	X
Interest	X	X	X	X	X	X
Cash wages to hired labor	X	X	X	X	X	X
Contract labor	X	X	X	X	X	X
Net rent to nonoperator landlords 1/	X	X	X	X	X	X
Perquisites to hired labor	X					X
Capital consumption	X		X			X
Capital expenditures					X	
Expenses or expenditures for dwellings—						
Operator	X					
Hired laborer	X	X	X	X	X	X

X = account is used in series.
Blanks indicate account is not used in series.
1/Includes the value of share rent paid in kind.

Fig 4.3 Characteristics of the US Department of Agriculture farm income series (from USDA 1988)

Characteristic	Net farm income	Net cash income	Net business income	Total cash income of farm operator households	Net cash flow	Production transactions
Operator farm dwelling income and expenses:						
Included	X					
Excluded		X	X	X	X	X
Types of income:						
Cash	X	X	X	X	X	X
Noncash	X					X
Types of expenses:						
Cash 1/	X	X	X	X	X	X
Noncash	X		2/			X
Income recipients:						
Most operators and others 3/	X	X	X	X	X	X
Members of operators' households				X		
Nonoperator landlords					X	

X = account is used in series.
Blanks indicate account is not used in series.
1/Includes the value of share rent paid in kind.
2/Capital consumption only.
3/Contributors of uncompensated inputs (see text).

because it plays an integral part in defining the USA agricultural population. Since 1978 a farm is any establishment from which $1000 or more of agricultural products either were sold or would normally have been sold during a year; similar sales-based definitions predated this one. A distinction is drawn between those who live on farms and those who work on them. The farm population has been defined as all persons living on a farm (defined as above). This population, determined by place of residence and including hired labour, is different from the operator and his family; the operator is the individual generally responsible for day-to-day decisions about such things as planting, harvesting, feeding or marketing. The operator may be the owner, a member of the owner's household, a salaried manager of a corporate or institutional farm, a tenant, renter or sharecropper. There is only one operator per farm; where there are several partners, the oldest is taken as the operator (USDA 1987 and 1988).

4.2.8 The series of income estimates for the farm (resident) population, which predates the FRCS and goes back to 1934, covers both farm and non-farm sources. But residence has been seen as a decreasingly appropriate criterion with the growth of part-time farming, the use of farms for mainly residential purposes and, conversely, the choice which some operators and hired workers have made of living away from the farm; the series terminated in 1983. The later series of income for farm operators and their families has been carried back to 1960; even though farm residents who are not farm operators are excluded, this series too finds that the income from non-farm sources now exceeds that from the farm. Alternative ways of defining the agricultural community in the USA, and the implications for income measurement, are discussed in Banks, Butler and Kalbacher (1989).

4.2.9 Strickland (1982) draws attention to the importance of agriculture's preferential treatment in taxation. He claims that USA agriculture has become a highly integrated package of three activities (1) the production of agricultural commodities, (2) tax planning, and (3) real estate investment. One way of encompassing, and perhaps separating, the three is to generate several indicators. For example, series before tax and after tax can be a guide to the rewards from tax planning. Similarly, measures including and excluding capital gains would expose the third element listed above. Strickland concludes that "The difference in trend could well lead to different conclusions about changes in the financial condition of agricultural producers than would analyses based on current USDA series".

4.3 Canada

4.3.1 The debate on appropriate indicators in Canada has, in recent years, been conducted often jointly with its USA neighbour (for example Loyns et al. (1983) Proceedings of the Seminar on Farm Income Statistics, Loyns et al. (1986) Proceedings of the Seminar on the Theory and Practice of Agricultural Wealth Accounts, and Statistics Canada (1988) Summary Report of the Canada-U.S. Workshop on Financial Statistics). There are national surveys which provide

provincial level estimates on selected financial variables. These include:

(i) Census of Agriculture
(ii) National Farm Survey
(iii) Tax Filer data
(iv) Farm Credit Corporation surveys (of 1980, 1984 and 1988) which cover income as well as balance sheet items.

In addition there are farm account projects and cost of production studies, largely unrelated to the national surveys.

4.3.2 As will be seen later, Canada has an unusually rich combination of data sources by which the incomes of farmers and their families may be studied. The statistical framework is such that it is possible, and legally permitted, to link the population census with the census of agriculture. Some association has also been made between the census of agriculture and taxfiler data. The first major farm accounts survey took place in 1958 (the Farm Expenditure and Income Survey); its organisers took care to cover both farm and non-farm income in order to give a comprehensive picture of the distribution of income (Fitzpatrick and Parker 1965). There is also the Survey of Consumer Finance, which enables income to be studied using a range of definitions of farmer and farmer household (Bollman and Smith 1987).

4.3.3 In the Canadian context Brinkman (1983) (in Loyns et al. 1983) argues that farm income data requirements generally relate to:

(i) the level of income, and
(ii) rates of return.

The level of income addresses the question of whether farmers are poor and serves as the main justification for the principle of government assistance to agriculture. Rates of return, on the other hand, are used primarily to address the question whether farmers are underpaid. Comparisons of farm and nonfarm returns are used to determine if farmers are earning a "fair" return and to calculate "costs of production" product price levels for supply-managed commodities.

4.3.4 Brinkman identifies the major data requirements as:

(i) farm net operating incomes
(ii) farm income-in-kind
    (a) food produced and consumed on the farm
    (b) the net house rental value from living "rent free" on one's business property
(iii) nonfarm income
(iv) changes in capital values
(v) special taxation advantages

Of these, changes in capital values are probably the least understood. Yet Brinkman claims that they are of crucial importance in measuring changes in wealth and in providing a complete measurement of the returns to farming. It might be noted, as was explained in Chapter 3, that neither RICA nor Eurostat at present use indicators which capture changes in capital values; nor do they currently reflect items (iii) and (v) in Brinkman's list.

4.3.5 Canadians have made a particular study of the relevance of capital gains to income measurement. The argument for taking them into account can be summarised as follows:

(i) capital gains are realised in the short term, without asset sale, and affect disposable income and investment behaviour. This is done by treating gains as substitutes for savings out of current income for retirement pensions, and by borrowing against rising asset values for consumption and capital good spending. Capital gains also affect the willingness of farmers to take risks, providing a cushion in case of failure.

(ii) farmers misuse capital gains when they treat them as a opportunity cost but ignore them as an opportunity return. This happens when current income is expressed as a percentage of current asset values. Asymmetry would be avoided if, when calculating rates of return using market values, capital gains were added to income.

Both capital gains and losses should be considered. These come in the main from fixed assets, but they also arise from working capital and, sometimes significantly, from the erosion of liabilities by inflation. Of course, in any comparability exercise a parallel treatment must be given to gains and losses in the other sectors. And there are situations in which it is perfectly reasonable to take no account of any capital gains or losses; short term indicators of profitability from production could quite reasonably exclude them. However exclusion should be a positive and justified step rather than the result of custom, convenience or oversight.

4.4 Australia

4.4.1 The Australian Bureau of Statistics is responsible for national accounts, one element of which is a calculation of average income per farm using macroeconomic methodology. However, the Bureau of Agricultural Economics is responsible for industry (ie types of farming) surveys; the three conducted annually are:

(a) the Australian Agricultural and Grazing Industries Survey (covering the sheep, beef cattle and wheat growing industries)
(b) the Australian Dairy Industry Survey
(c) the Australian Horticultural Industries Survey (fruit, grapes, citrus and others)

The first two can be put together, then covering some 80 per cent of rural holdings in Australia (Campbell 1981b).

4.4.2 As part of the revision in the survey methodology which took place in the early 1980s a new range of indicators was developed. These were thought of as forming two groups, the first relating to incentives to invest or disinvest, while the second related to measures of farmer welfare.

4.4.3 The first group consisted of the following (with those of an income nature underlined):

(i) Total cash returns
(ii) Total cash costs (including rent, interest and non-family labour costs, but not family labour costs); as far as possible, costs relating to capital development and private expenditure in relation to the farm business were excluded.
(iii) Farm cash operating surplus (previously called net cash income); this equals (i) less (ii). It represents the cash surplus accruing to the farm family or business entity which is available for consumption and investment.
(iv) Buildup in trading stocks (not including any capital gains).
(v) Depreciation (replacement value)
(vi) Operator and family labour; the imputed value of physical labour.
(vii) Return to capital and management, being (iii) plus (iv) less (v) and (vi). It does not take into account capital gains.
(viii) Return adjusted to full equity, being (vii) plus rent and interest. This represents the return which would have been obtained had the farm been fully owned by the operator. "This offers and clearer impression of the actual return produced from the farm" (Campbell 1981b).
(ix) Imputed capital gain (on land, livestock and trading stocks).
(x) Full equity returns (including capital gains), (viii) plus (ix).
(xi) Rate of return (excluding capital gains); (viii)/total capital value of the property.
(xii) Rate of return (including capital gains);(x)/total capital value.

It should be noted that there is no cash flow measure which is net of spending on capital items.

4.4.4 The second group of indicators, relating to farmer welfare, are only applied to "family farms". An attempt is made to exclude both the large company farm and those which are small hobby farms. The criterion is that the farm must employ at least 48 man-weeks of operator and family labour during the year; though varying between types, about 90 per cent of all farms surveyed are classified as family farms under this definition. Some of the indicators used are the same as in 4.4.3 above: total cash returns; total cash cost, excluding family labour; farm cash operating surplus; buildup in trading stocks, depreciation. The additional indicators are Farm Income and Farm income per man-year of family labour. This is (vii) in the above list but without

deducting the imputed value of operator and family labour. "Farm income, in conjunction with the farm cash operating surplus (which measures the return actually available for disposition, although possibly at the cost of a run-down in the farm's capacity) provides useful, though by no means comprehensive, insights into farm operations".

4.4.5 Earnings from off-farm sources do not form part of this set of indicators. Before the changes mentioned in 4.4.2, off-farm income had done so. The explanation for not including them was collection difficulties; even the coverage of these had at some time been narrowed to only the operator and spouse.

4.5 The United Kingdom.

4.5.1 The indicators of income used in the UK's Farm Business Survey will be discussed in Chapter 8 which deals with all the farm accounts surveys to be found in EC Member States. Here attention is drawn to the review of the concepts of income put forward as part of a general review of official income measurement. Lund and Watson (1981) made various adjustments to the UK's aggregate Farming Income[1] figures. Parallel adjustments could be envisaged at the farm accounts level. These were as follows:

(i) the adding back in of net rent, to give a return to all land (and farmer-owned working capital and labour of farmer and spouse) and which is not affected by changes in tenure.
(ii) further adding back interest charges, so that the overall return to agriculture is not dependent on the method of financing.
(iii) adding back the imputed labour bill for unpaid family labour to give a residue which approximates to the income of the farm household.

4.5.2 Lund and Watson suggest that farmers' perceptions of profitability of farming may be more related to trends in cash flow than to summary income measures. Firstly, these perceptions may be more affected by actual capital expenditures than by depreciation allowances, and actual expenditures could be substituted in the income calculation. Secondly, increases in value of stocks and work in progress, which do not bring a cash flow, can be excluded; the degree to which farmers regard unsold harvested crops as "near cash" which perhaps should not be deducted is a moot point. A range of cash flows are also suggested in which adjustments are made for taxation, social payments and receipts and capital grants; these could apply to the farmer and spouse alone or in steps up to a group comprising farmers, their spouses, partners and directors and family workers. A logical extension of the process would be to devise cash flow series which took into account flows from non-farming

[1]The equivalent to Eurostat's "Net Income from agricultural activity of family labour input", except that interest on loans for land purchase are not deducted, and a charge is made for any family labour (other than that of the farmer and spouse), being imputed where not actually paid. Both of these departures from EAA methodology seem to percolate through to the actual UK data supplied to Eurostat, though this is not made explicit in Eurostat's published figures.

sources, though the authors do not attempt such an exercise which, in the UK context, would not be possible from available data.

4.5.3 In Britain the Farm Business Survey has used the concept of Net Farm Income since its inception in 1936. This deducts an imputed rental value for owner-occupied land, ignores all interest charges, and imputes a wage to unpaid family labour. The first two were seen at the outset as conveniences by which farms of different tenure and borrowing characteristics could be treated together; at the time farms were predominantly tenanted and information on the balance sheet was not collected. While this indicator might be satisfactory for indicating short-term changes in profitability for purposes of agricultural policy administration, it does not correspond to what individual farmers might conceive as profit (Hearn 1977). This has not prevented the misuse of NFI figures as if they were business incomes, even as personal incomes of farmers (Hill 1982). Furthermore, substantial differences have been apparent in the trends and income changes from year to year shown by the microeconomic Net Farm Income and the macroeconomic Farming Income estimates. Though Lund and Watson (1981) have shown that much of this discrepancy can be explained by the definitional disparities, commentators have at times been confused.

4.5.4 Such issues have resulted in a growth over the 1980s of the range of income indicators in official publications. In the aggregate accounts these are now as follows:

(i) Net Product (equivalent to NVA)
(ii) Farming Income (broadly equivalent to Eurostat's Net Income from family labour input)
(iii) Total Income From Farming (being Farming Income plus the imputed labour bills in respect of non-principal partners and directors (and their spouses) and family workers).
(iv) Income from agriculture of total labour input (being (iii) plus the labour bill in respect of hired workers).
(v) Farm Business Income (which seems to be NVA less hired labour and imputed labour costs of family labour other than partners and directors and their spouses; it is stated to include net rent as well as the returns to farmers and non-principal partners and directors (and their respective spouses) and interest.)
(vi) Cash flow from farming of farmers and spouses (comprising total sales, compensation payments and production grants and capital grants minus total expenditure, gross fixed capital formation, total labour costs (other than for farmer and spouse), interest (but not on loans for land purchase) and rent.
(vii) Cash flow from farming of farmer and spouses, non-principal partners and directors (and their spouses) and family workers (being (vi) plus the labour charge for family workers and partners and directors).

4.5.5 At the microeconomic (Farm Business Survey) level the indicators are:

(i) Net Farm Income (after deduction of rents or imputed rental values, all labour real or imputed except for the principal farmer and spouse, but before interest charges)
(ii) Occupiers' Net Income (deducts actual rents and actual interest, but labour as in (i) above)
(iii) Cash Income (total receipts minus total expenditure (current))
(iv) Cash Flow from the Farm Business (being (iii) minus net investment spending)
(v) Total Flow of Funds (being (iv) plus increase in borrowing and net cash flow introduced to the farm business from non-farming sources; this will include funds from investments arising out of previous years' profits, off-farm incomes and windfall income, but it does not correspond to the total income from all sources.)

4.6 Conclusions

4.6.1 There is general consensus in the literature from the USA, Canada, Australia and the UK on some important points:

(i) that no single measure is capable of indicating the changing fortunes of agriculture for policy purposes. This stems from two main sources (Campbell 1981b); firstly the multiple yet ill-defined objectives of policy for which indicators are required (including uncertainty concerning the businesses or households which are to come within the scope of the measures) and, secondly, from significant difficulties in measuring accurately the relevant characteristics of the farm businesses or farm households . It is quite possible for different indicators to show trends which are of disparate magnitudes, even of opposite directions; for example, total income may have risen, but return on capital may have fallen.

(ii) that the changing natures of both the agricultural industry and of agricultural policy endanger any statistical system with conceptual obsolescence. The statistics collected can become outdated as representations of reality, or the questions on which they were intended to throw light may be no longer relevant and new questions may arise for which the existing data is not appropriate. Hence the managers of official data systems have to be constantly aware of their changing environment and prepared to adapt to new information needs.

(iii) that the policy questions of the 1980s and 1990s are much more concerned with the incomes of agricultural households than has hitherto been the case, with the balance shifting away from issues of farm business profit, productivity and other production-orientated measures. Furthermore, while indicators for the branch agriculture possess utility, an increasing interest is being shown for policy purposes in the distribution of these aggregates between holding sizes, types and other farm characteristics, and in regional disaggregations. Stability of incomes over time is a parameter which has been neglected at the disaggregated level, though the technical

facilities now available make this sort of time-series analysis possible.

(iv) that the conceptual frameworks of the present data systems, and in the UK and USA the actual systems themselves, were set up a half-century ago. Making adjustments encounters institutional rigidities and legal constraints. Public choice theory can be useful in demonstrating the importance of the bureaucratic structure and of the interests of the bureaucracy in impeding or achieving change.

(v) that farm accounts data and national accounts data for the agricultural industry should be complementary, so that the former can be used to display distributions of the latter and provide means for verifying and analysing changes in the aggregate. A microeconomic data bank is a rich resource, capable of analysis in many different ways and of reclassification and reinterrogation as the needs of policy change and as the details of the important questions emerge over time. Such banks are, however, expensive and often dated, hence the need to link them with macroeconomic estimates which can be available to policymakers more rapidly.

4.6.2 These points find close parallels in the review of the position of RICA within the EC's agricultural information system presented in earlier Chapters. This suggests that there is some possibility of learning from shared experience in the ways that farm accounts surveys can adapt to the evolving data needs of agricultural policy, a theme that is taken up again in Chapter 8 when national surveys in Member States and the indicators they use are examined.

CHAPTER 5: INDICATORS OF PERSONAL INCOME

5.1 Introduction

5.1.1 Chapter 2 established that one of the main objectives of the CAP is that of ensuring, through increases in productivity, rational development of production and the optimum utilisation of factors, "a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture" (see 2.2.1). Many commentators believe that this "personal welfare" strand is now the dominant one within the CAP (Herrmann et al 1985, Fennell 1985, Hill 1989). This Chapter concentrates on four issues;

- what evidence is there of a need for information on the personal incomes of the agricultural community?
- what measures are available to meet policy needs?
- what is the "agricultural community" whose incomes are to be measured?
- what role can RICA play in providing information on personal incomes?

5.2 The need for personal income information

5.2.1 There is a flow of Commission documents on the CAP which give a good indication of the way that it interprets the fundamental objectives of policy. It is evident that the central aim of ensuring fair living standards for the agricultural community is seen in terms of supporting its incomes, though there is an awareness of additional factors which impinge on living standards. The

Treaty of Rome Article 39, by its reference to "increasing the individual earnings" implies money incomes. To take more recent statements, in 1980 the Commission described the CAP as "a system of support of farmers' incomes mainly through support of market prices with certain direct aids to incomes"(Commission (1980b) Reflections on the Common Agricultural Policy). In 1984, in a specialist brochure on incomes, the Commission stated that:

> "Although they are not the only factor in an assessment of the economic and social situation in agriculture, agricultural incomes are obviously of key importance. The improvement in the individual incomes of those working in agriculture is indeed, under Article 39 of the Treaty of Rome, one of the fundamental objectives of the Common Agricultural Policy" (Commission (1984b) Agricultural Incomes in the Community in 1983).

5.2.2 The Perspectives Green Paper (Commission 1985a) amply reinforced the basic concern with living standards and noted that "The objectives of the CAP are both economic and social in nature... The challenge for the Community now is to reconcile the success of the CAP in achieving its economic objectives with the need to continue to fulfil the social objective of assuring a fair standard of living for the agricultural population." Since then legislation has been introduced to enable direct income payments to be made in the form of (a) supplements to tide certain groups of potentially-viable but financially precarious farmers over the difficult period of readjustment following the reform of product prices; (b) pre-pensions (early retirement pensions) to farmers to encourage them to leave the land, and (c) a framework for controlling national aids to income, in recognition of the tendency of governments to introduce such measures in response to local political demands.

5.2.3 In 1988 the Commission published the Communication document "The Future of Rural Society" (COM (88) 601 final) in which agriculture was seen increasingly as only one of a number of activities which could be instrumental in providing income and employment. In Less Favoured Areas selective support to family farmers formed an important part of the Commission's plans. In 1989 the Commission issued more guidelines in which it stated that "As far as agriculture is concerned the aim is to support the incomes of farm families not only through the traditional instruments of market support but through non-market measures". The 1991 paper "The Development and Future of the CAP" (Commission 1991) laid emphasis on directing support more towards the small family farms because of the income problems they face, and of doing it not only through modulation of market support but also through a variety of direct payments, including for the provision of environmental services.

5.2.4 A good case could be made that data on the personal or household income of the agricultural community should have been an essential component in the statistical system from the outset of the CAP (Hill 1989). However, this did not happen. Until recently the Community income-monitoring systems at aggregate and farm levels confined themselves to income from agricultural

activity alone. It is not appropriate here to fully explore the reasons why a system for collecting and presenting such information was not set up, although the following may be borne in mind:

(a) the major concern, at the time the present system was initiated, with improving the productivity of agricultural production and of expanding output. Improving the well-being of the agricultural community was seen as a benefit which would flow from changes in agricultural performance rather than as a more direct objective.
(b) incomes have usually been seen as a background to other policy decisions, typically concerning market balance and budgetary cost, rather than the guiding light by which the level and shape of intervention was determined. Where income took a more prominent role, as during the application of the so-called "objective method" of price determination, attention was given to aggregates from the branch accounts for agriculture and not to the distribution of incomes.
(c) in some Member States collection of personal income information has been seen as politically sensitive and outside the "proper" areas of interest of government agricultural departments. NVA (per holding and per AWU) has been seen as sufficiently good an indicator of agricultural incomes for policy purposes; this seems to have been also the attitude of COPA.

5.2.5 Changes in the CAP (mainly resulting from the expansion of output) have exposed the necessity of more information on the total income situation of the agricultural community. These have included:

(a) increased concern with the distribution of support spending, with a major share being absorbed by larger producers who, it is suspected, have income levels which are relatively favourable and who, at the same time, can be associated with the production of significant quantities of commodities that are in surplus.
(b) the rising awareness that about one third of operators of holdings in the Community have another gainful activity (and therefore some earned income in addition to that coming from the holding).
(c) the wish to reorientate the CAP so that a larger proportion of its activities are of a "structural" form. Some of these new aids are targeted using income criteria[1] (for example, on the basis of the proportion from agriculture) and, in the case of transitory aids to income, involve knowing not only the total income situation of the holder but also of other members of his family (who work on the holding). The planning and operation of these aids requires such information.

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[1]For example, in relation to transitional aids to income (Regulation 768/89 OJ L84 of 29/3/89 p8) and aids for small cereal producers in the Commission proposals on the prices for agricultural products and on related measures (1990/91) (COM (89) 660).

5.2.6 The Commission is aware of the relevance of non-agricultural income implied in (b) above. In a 1985 document describing income data sources it wrote:

> "It should not be forgotten that many of the Community's eight million farmers, with their families, have other incomes: this takes the form of unearned accruals (eg social security) or remuneration for other part-time work, which may be regular or may be restricted to certain periods of the year. The disposable income of farmers can also be influenced by other factors (eg taxation) the importance of which is not easy to assess at Community level."(Commission (1985d) Agricultural Incomes in the Community in 1983. Green Newsflash 29)

Many official publications of the 1980s contain similar caveats when discussing incomes. In the 1985 Green Paper estimates of the numbers of farmers and the likely amounts of spending involved in forms of direct income aids were mentioned, though the basis of these calculations has never been published. At the time of the Green Paper, one official with responsibilities in the field of policy described the need to provide better overall income information as urgent (Avery 1985). This urgency has only increased with time.

5.2.7 The implications for the statistical system of the Green Paper were discussed by the Agricultural Statistics Committee (ASC)(Document E/ASA/140). One of the main data requirements identified by DG.VI was for information on the total income of agricultural households (E/ASA/148). As a consequence, Eurostat initiated its Total Income of Agricultural Households (TIAH) project. A positive reception to Eurostat's proposals was given at the November 1985 meeting of the ASC. The aim of this Eurostat project is to generate an aggregate income measure, using harmonised methodology, in order to:

> (a) monitor the year-to-year changes in the total income of agricultural households at aggregate level in Member States.
> (b) monitor the changing composition of income, especially income from the agricultural holding, from other gainful activities, from property and from welfare transfers.
> (c) enable comparisons to be made in the development of total incomes of agricultural households per unit (household, household member, consumer unit) with those of other socio-professional groups.
> (d) enable comparisons to be made between the absolute incomes of farmers and other socio-professional groups, on a per household and per household-member basis. (Manual on the Total Income of Agricultural Households, Eurostat 1990)

When this aggregate measure comes on stream (probably early in the 1990s) it seems highly probable that it will engender demands for equivalent information of a microeconomic nature so that, for example, distributions can be studied and particularly low-income groups identified. RICA may be

expected to have a part to play in providing this information.

5.2.8 The Commission held a high-level seminar on Agricultural Statistics for the 1990s in March/April 1987 at Maastricht. It was recognised that, in order to serve the interests of the CAP, the statistical system must adapt and, where necessary, develop new lines of data. The boundaries of agricultural statistics were changing and becoming less distinct. One of the implications for agricultural statistics of changes in the CAP was the need to keep under close scrutiny the impact of policy on various types of holding - large holdings, other "professional" holdings and marginal holdings. Among the topics covered was the income information needed about the very small farms, and the appropriate threshold for inclusion in agricultural statistics. RICA has a part to play in casting light on such issues.

5.3 Main findings of studies of total income

5.3.1 Though RICA itself is not at present capable of providing statistics on the total income situation of farmers, there is plenty of fragmentary evidence from other sources which underlines the importance of having access to such information. Even within the official data system some indications are available; the 1985 EC Farm Structure Survey found that about one third of EC holders had another gainful activity (that is, earned income), a figure likely to be increased if spouses were also taken into account. The Netherlands and Luxembourg showed the lowest figures (20 per cent and 18 per cent) and Germany the highest (43 per cent). To these sources must be added income from property (rent, interest and so on) and transfers (pensions, social receipts etc).

5.3.2 Despite national differences there is a commonality of findings among information sources. The main themes of the various studies which have examined total income or disposable income are as follows:

(a) most of the income from non-farming sources comes from off the farm, as opposed to farm-based non-agricultural activity (Gasson 1986). The terms non-farm income and off-farm income are, in practice, largely synonymous. There are difficulties in categorising income derived from those parts of the farm business which might, from an activity classification system such as NACE, be treated as non-agricultural. At a business level such divisions are often artificial.

(b) operators of agricultural holdings and their spouses (and, in a few countries where data are available, other household members) in aggregate have substantial income from non-farm sources. In the USA the total non-farm income of farm residents has exceeded that from the farm since 1966, the only exceptions being the period 1972-4 which saw unusual prosperity for US farming. In the first four years of the 1980s non-farm income of the farm population exceeded their farm income by 50 per cent. In Canada in 1986 less than one third of the

average total income of farm families (meaning all those with some income from farming) came from the farms (Bollman and Smith 1987). Even if only those Canadian households where one person claimed that farming was his or her main source of income were considered (excluding "hobby" farms), income from the farm was little more than half the total income in the mid-1980s. In the UK tax records show that, in the years 1977/8 to 1987/8, income from self-employment (mainly from farming) was only between 51 and 64 per cent of total taxable income of couples and individuals classed as agricultural or horticultural cases in tax records; again most "hobby" farmers will have been excluded (MAFF 1987, 1989). Similar sorts of findings emerge for Denmark, Germany, Ireland and the Netherlands (summarised in Hill 1989). In Ireland, for example, the 1980 Household Budget Survey found that only 52 per cent of the gross income of farmer households came from farming. Preliminary results from the Eurostat TIAH project for Italy suggest that in 1984 about two thirds of total income of agricultural households came from self-employment in agriculture.

(b) off-farm income has been increasing in absolute and relative importance. Moreover, it is more stable from year to year than the income from farming and imparts a degree of stability to the total income situation of farm households.

(c) in the American experience, off-farm income transforms the income pattern which farm income alone indicates. In absolute terms off-farm income is greatest among the smallest and largest farms (ranked by sales); off-farm income in 1981 exceeded farm income in all but the largest sales classes. In terms of total income, the operators of small farms had average incomes which were greater than those of all but the largest of farms. Data from the 1976 Current Population Survey (Banks and Kalbacher 1981) found that the highest total family incomes were on farms which generated the highest farm incomes, but at lower farm income levels the median total income was broadly similar irrespective of farm income. Even those families reporting a farming loss (about one fourth of the total farm numbers) had a total income median which was not far below the figure for all farms. Larson (1975) earlier had concluded that

> "the notion of family farm income being closely tied to size of farm business is no longer valid. The number of persons dependent on farming as a primary source of income is now a relatively small proportion of all people with farm earnings. *A significant change in the economic conditions of the farming sector may mean only a minor change in income of many people engaged in farming.*"(emphasis added).

(d) lowest total incomes tend to be found on farms which are not among the smallest (whether measured in terms of sales or, in the European context, standard labour requirements or ESU) but among those which

are at the bottom of that size which justifies full-time operation. This seems to coincide with a farm size which is too large to permit the operators to engage in significant off-farm activity (such as by taking regular off-farm employment) yet which is too small to generate a farming income adequate to allow living needs to be met and provide for reinvestment.

(e) the degree of dependence can be indicated by the ratio of family farm income to total family income. In the USA in 1975 only 30 per cent of families having some farm income (positive or negative) were dependent on farming for more than half their income, and only 20 per cent for three quarters of their income (USDA 1981).

(f) the degree of dependence on the income from the farm decreases as a broader view of the household is taken. Hence this declines as one moves from considering individuals though couples to complete households.

(g) polarisation seems to be have occurring, with households in which the farm is the main but not the sole source of income (from 50 per cent to 90 per cent in the case of Germany) diminishing in relative importance compared with those where it is a minor source and those where it is the overwhelming source (90 per cent or more of total income coming from the farm). This phenomenon has been noted in many OECD countries (OECD 1978).

(h) farmers seem to be relatively well-treated by national tax regimes. Surges in income, as revealed at farm household sector level in the USA, do not seem to be reflected in the proportion of tax take, as might be expected from a progressive income and business tax regime. This reflects the ability of farmers to plan their purchases of capital to minimise tax liability. In the UK, incomes of farmers have been observed to cluster below the threshold of increases in marginal tax rates (Hill 1987).

(i) low current incomes are often combined with substantial wealth. In part this is a reflection of the lifetime earnings profile and the age of farmers. In part it is the outcome of capital gains. Capital gains are almost universally taxed at rates which are in effect lower than those applied to current income, providing an incentive to convert current income into capital gain. In turn this has implications for structural change; there is a financial incentive for farms to expand, reinforced in many countries in the period up to the 1980s by real interest rates which were negative. As noted above, capital gains can affect levels of consumption spending. So too can high net worths. This has led to the development of methodology which combines income and wealth into a single measure - economic status - which, as will be seen later, has substantial implications for the numbers of households who qualify for

support, especially agricultural households.

5.3.3 Clearly, many of these observations are of the utmost importance if they hold anything like true for the EC, as would seem possible. Many hypotheses are thrown up which RICA might be used to test, assuming that it could be extended to included data on the total income situation of farmers and their households. In particular, if the overall income situation of small farms mirrors the findings for the USA (item (c) above), this would bring about a transformation of policy attitudes to small farms.

5.4 Measures of personal income

5.4.1 So far in this Chapter the term income has been used in a rather loose way, and some clarification of the concept is called for. The first place to look is the aspect of reality for which income is a proxy. The Treaty of Rome refers to ensuring a "fair standard of living" for the agricultural community, but in practice such standards are difficult to quantify. A common approach in empirical studies is to abandon attempts at direct assessment of utility (though ordinal methods might be used in pursuit of changes in living standards) in favour of measures of consumption. Physical consumption data (such as the of quantities of food eaten and the possession of consumer durables) are of limited application because of the heterogeneity of consumer goods. These are often reduced to a common (money) base by examining consumption expenditure, representing a flow of purchasing power away from households. However, this may not adequately reflect the potential which households have for consumption unless forms of consumption for which no direct expenditure is involved (such as the occupation of owner-occupied houses) and savings behaviour are also taken into account. Consumption can be financed from running down past savings or by borrowing, but dis-saving can only go on as long as the stock of saved resources is positive or borrowing for consumption can be obtained.

5.4.2 Another approach, appropriate in the present context, is to assess the flow of resources towards households in the form of personal income. Personal income may be defined (after Simons 1938) as the sum of (1) the market value of rights exercised in consumption and (2) the change in the store of property rights between the beginning and end of the period in question. It should be noted that this definition includes income as money and in kind, where the items have some market value, and real capital gains.

5.4.3 In practice studies of personal income use a range of narrower income concepts. While current money income is usually covered well (though there are areas of uncertainly, such as the treatment of gifts and insurance receipts), this is not the case with income in kind, which may be difficult to identify and/or value. The main non-money income item which causes problems is the imputed value attached to owner-occupied housing. Real capital gains on some categories of assets (such as breeding livestock) are treated with operating gains as part of current income in many accounting systems, but real gains (or

losses) on land and other fixed assets are usually ignored, though they help to explain why in many countries the agricultural community has become a relatively wealthy section of society and why farmers have been reluctant to quit agriculture during periods of low incomes but buoyant land prices (Hearn 1977). There is also a variety of interpretations of what deductions from personal income should be made before arriving at the residual which can be consumed or saved; compulsory payments of taxes etc are relatively straightforward deductions, but the treatments of other transfers (such as membership fees to trade unions) are less clear. The way that household income sources and consumption flows relate to each other is shown in Fig 5.1 (from Cecora 1986; capital gains are not shown).

5.4.4 The variety of interpretations referred to above results in a range of possible income indicators. These include: total income from all current sources; income minus tax; and a variety of cash flow measures which may treat depreciation as available for consumption in the short term or deduct it, or substitute actual spending on capital assets.The main income concept used in the context of assessing personal welfare is disposable income. The Eurostat definition of disposable income and its component parts, to be used in its new indicator referred to in 5.2.7 above, is shown in Fig 5.2. Disposable income is also a main income concept used in Community household budget surveys; all Member States have such surveys though the methodologies are not yet fully harmonised (Eurostat 1985a, 1986a, 1986b). There are conceptual differences between the macroeconomic disposable income and those found in these microeconomic surveys. The main differences relate to the treatment of the following:

- insurance payments and receipts
- interest on loans for consumer purchases
- payments to voluntary bodies (farmers' unions, political parties etc).

There is also some variation in the methods used for imputing the rental value of own dwellings and, for reasons of data availability, in the treatment of capital consumption. Nevertheless, as long as the treatment of the various components is precise and clear, compatible estimates can be reached between the macro and micro levels.

5.4.5 An important feature of income indicators in the welfare context is that they are typically based on the household unit rather than on the individual. This implies that steps must be taken to ensure that households of different composition are treated separately or are converted to a common base. In practice this means classifying into meaningful groupings (such as by numbers of children, and into households containing retired persons) and/or using an equivalence scale to express disparate households in consumer units. Adopting the household as the main unit of measurement also usually increases the number of income sources and, as was seen in 5.3.2(f) above, reduces the dependence on farming for a livelihood. As will be shown later, agricultural

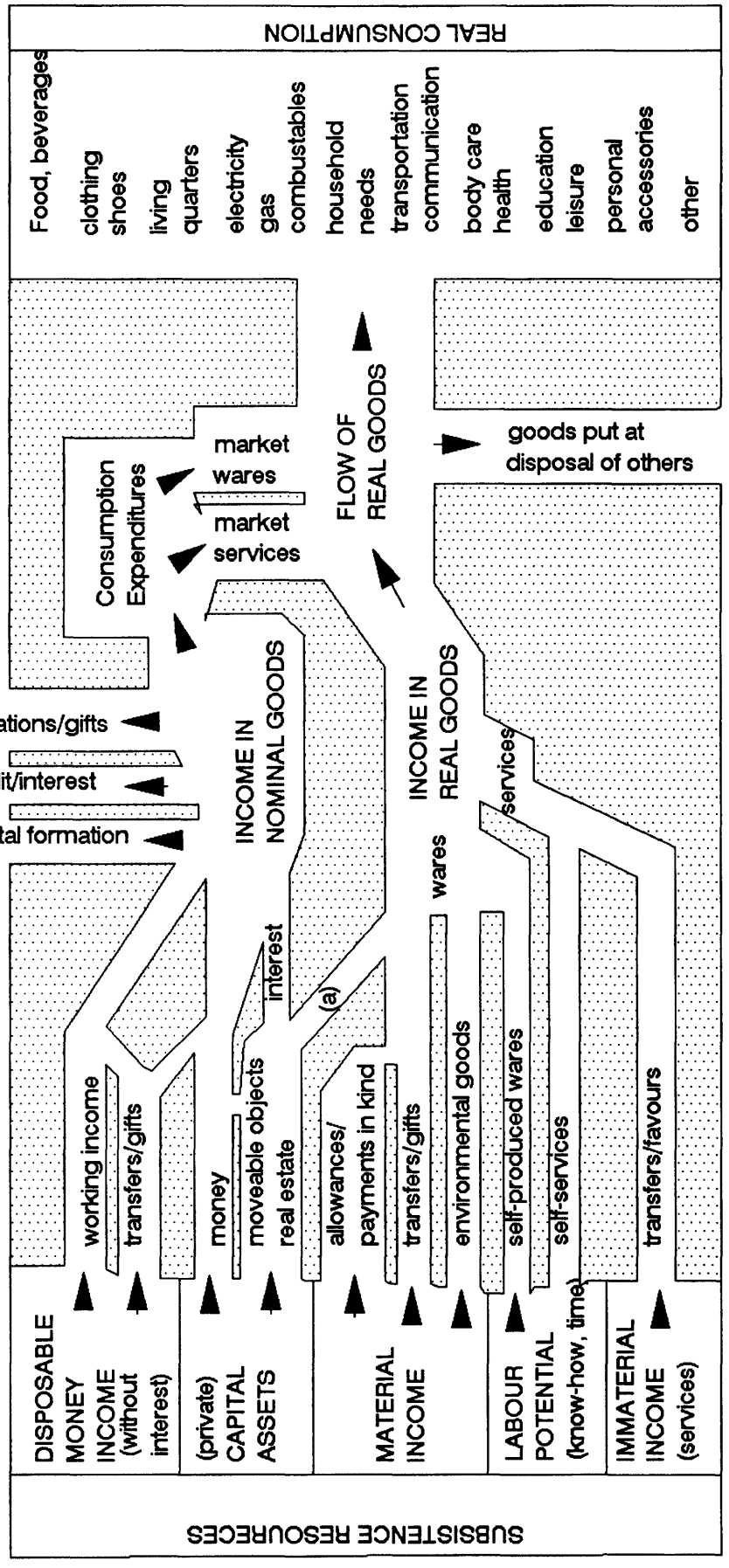

Fig 5.1 The "subsistence" of private households (after Cecora 1986)

Note: this Figure has been redrawn and modified from Cecora (1986)

Fig 5.2 Elements in the calculation of Disposable Income (from Eurostat 1990)

Note: this definition is a target for the harmonised methodology to be used by Member States in Eurostat's TIAH (Total Income of Agricultural Households) project.

1	Net operating surplus from independent activity a) from agricultural activity b) from non-agricultural activity c) from imputed rental value of owner-occupied dwellings
2	Compensation to member of agricultural households as employees, from agricultural and non-agricultural activity
3	Property and entrepreneurial income received
4	Accident insurance claims (personal and material damage)
5	Social benefits
6	Other current transfers
7	Total resources (sum of 1 - 6)
8	Property and entrepreneurial income paid
9	Net accident insurance premiums
10	Current taxes on income and wealth
11	Social contributions
12	Other outgoing current transfers
13	Net disposable income (7 minus 8 - 12)

households may well contain individuals who do not work in farming yet whose incomes would be counted in any measurement exercise.

5.4.6 Despite the general acceptance of disposable income as an appropriate income concept for use as a proxy for living standards in household budget surveys and in the new Eurostat series, reservations must be borne in mind. These relate to three main issues - the choice of period over which to make measurements, the problems resulting from the measure failing to capture all aspects of income, especially that part coming in kind, and its exclusion of wealth. These form the subjects of the next sections of this Chapter.

5.5 Stability of incomes over time, and its implications

5.5.1 One important finding about the total personal incomes of farmers additional to those listed in 5.3.2 above needs special attention. This is that low incomes in individual years can be a poor guide to the longer-term income situation. This mirrors the observation of the stability of farming income (profit) noted in Chapter 3 (3.4.15 et seq). Findings from Australia showed that low incomes are transitory for a large majority of farm households. Over the period 1968/9 to 1972/3 almost half the cases studied in the Henderson Poverty Inquiry had fallen below the poverty line at least once in the five years, but only nine per cent had been below it in four or five of the years (Vincent 1976). Put another way, on a single year basis between 17 and 23 per cent of the farm households were in poverty, but taking the period as a whole only 4 per cent were in poverty. This suggests that a distinction must be made between the core of farm households which are in a persistent low income situation and those who suffer temporary low incomes.

5.5.2 Continuing the same theme, there is evidence that farm families seem to adjust their spending on consumption goods in line with their longer-term assessment of income and do not greatly reflect short-term income movements. This is in line with Friedman's permanent income hypothesis (Friedman 1957). Evidence from Denmark, where the farm accounts survey covers personal as well as holding finances, shows that the consumption spending of farmers is more stable than disposable income.[2] In three years out of the six shown in Table 5.1 consumption was less than disposable income, and saving took place.

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[2]It also might be thought that disposable income would be more stable than the income from farming, but this is not necessarily the case. Unless fluctuations in farming income and in income from other sources are strongly positively correlated, *total income* (farming and other income together) will be more stable than farming income alone. If deductions made in reaching disposable income (mainly taxes and social contributions) are stable, then disposable income will be less stable than total income; the higher the share of total income these deductions represent, the less stable the residual disposable income. Disposable income might be more or less stable than income from farming. If taxation is only levied after a lag, so taxes on a high income year are actually paid in a subsequent year when incomes are low, disposable income could suffer large variations over time. Thus no simple generalisation about the relationship is possible. Table 5.1 shows that, over the period 1984/5 to 1989/90, farming income (after interest payments) in Denmark was marginally less stable than disposable income.

Table 5.1 Denmark: Current income and savings on full-time farms (a)

DKK 1000 per farm

Year	84/85	85/86	86/87	87/88	88/89	89/90 (b)	90/91 (c)
1 Net farm income	323	289	271	229	288	427	390
index "1985/6" = 100	*110*	*98*	*92*	*78*	*98*	*145*	*133*
(net of interest (*)	*162*	*121*	*104*	*38*	*85*	*214)*	
(index "1985/6" = 100	*125*	*94*	*81*	*29*	*66*	*166)*	
2 Profit from other business	24	25	29	32	34	36	
3 Off-farm salary	29	33	35	42	49	50	
4 Total salary and net income (1 + 2 + 3)	376	347	335	303	371	513	480
5 Net interest payments	161	168	177	191	203	213	
6 Pensions and supplem -entary benefit	7	9	9	12	15	17	
7 Current income (4-5 + 6)	222	188	167	124	183	317	285
index "1985/6" = 100	*115*	*98*	*87*	*64*	*95*	*165*	*148*
8 Family allowances	3	3	2	5	5	5	
9 Personal taxes	48	60	60	52	41	46	
10 Disposable income (7 + 8-9)	177	131	109	77	147	276	
Index "1985/6" = 100	*127*	*94*	*78*	*55*	*106*	*199*	
11 Private consumption	131	147	146	143	145	156	
index "1985/6" = 100	*93*	*104*	*103*	*101*	*103*	110	
12 Current savings (7 + 8-9-11)	46	-16	-37	-66	2	120	

Notes: (*) asssumes all interest is for farming purposes
"1985/86" = average of 1984/5 - 1986/7
(a) the table includes only farms with at least 1755 hours of labour per year (1800 hours before 1987/88)
(b) figures for 1989/90 are preliminary
(c) figures for 1990/91 are forecasts

Source: English summary of The Danish Agricultural Economy - autumn 1990, Table 4. Copenhagen: Danish Institute of Agricultural Economics

But in the other three years consumption exceeded disposable income, and dis-saving occurred. The main point is that fluctuation in farm or disposable income are not reflected in the short term in the amounts that farm households spend on consumption; this consumption spending is arguably an important criterion of whether farmers are disadvantaged in comparison with other socio-professional groups.

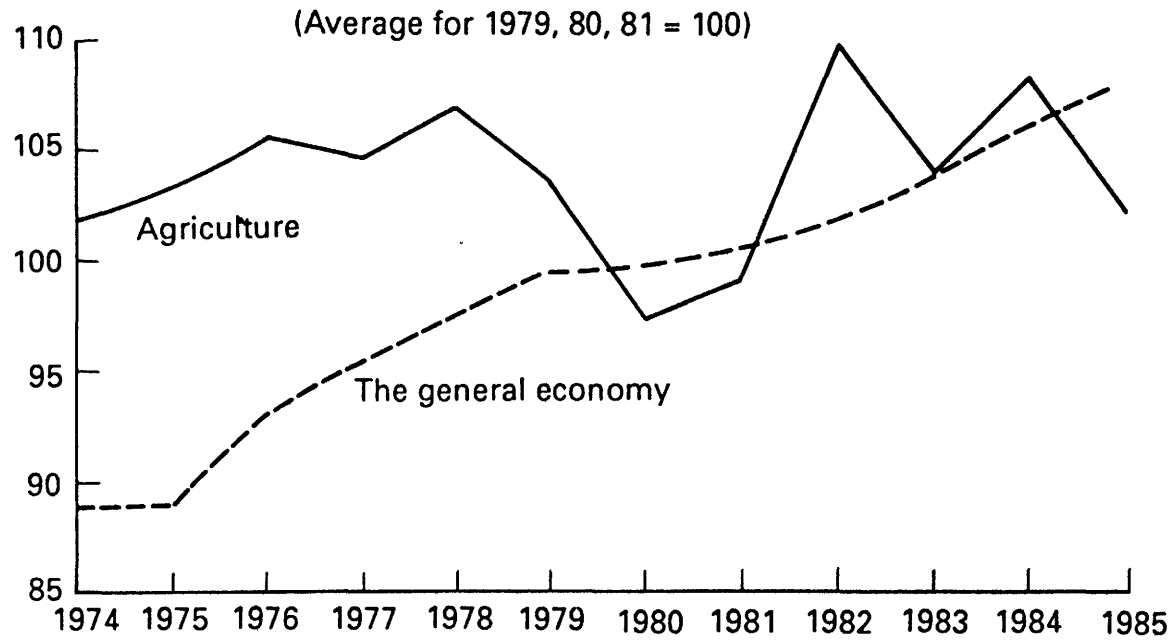
5.5.3 The implication of these findings is that personal income measurement for individual cases (farm households) needs to take place over more than one year, and that some mechanism should be used which allow the year-to-year variation to be taken into account. Averaging over, say, three years might be one advisable step, a practice supported by empirical findings in Chapter 3. If, as will be recommended later, RICA is to have a role in collecting data on the complete income situation of holdings and their operators, the necessity of calculating multi-year statistics would have to be borne in mind when organising data collection and processing.

5.6 Comparisons of personal incomes: farmers and non-farmers

5.6.1 One theme common to the Commission's reviews of its agricultural economic indicators at both aggregate and disaggregated levels, discussed in Chapter 3, has been the wish to draw comparisons between the situation of the agricultural community and that of other socio-professional groups, or at least with the entire population or the non-agricultural population. Comparisons between the living standards could be made on a variety of bases. Ideally this should reflect the entire flow of resources to and away from households, as indicated in Fig 5.1. Comparisons using physical consumption data are of limited utility, and would probably be outside the capacity of any enlarged RICA system. Consumption spending usefully summarises all goods and services, but is inadequate without also knowing the level of savings (and borrowings). Ireland, through its Household Budget Survey, showed that in 1973 consumption by farm households was only 80 per cent of that of urban households. However, differences in living costs must also be considered; in the USA the poverty line for farm families is put at 85 per cent of the general level to reflect these differences, and in Australia the Henderson Poverty Enquiry took 80 per cent (Vincent 1976).

5.6.2 In practice such comparisons seem not to have been given high priority within the statistical system. Where comparisons have been attempted, they have been made using inappropriate income parameters. For example, the Agricultural Situation in the Community 1986 Report (Commission 1987) graph entitled "Incomes in agriculture and in the general economy", covering the period 1974-85, compared real NVA/AWU for agriculture with real Net Domestic Product per person employed for the wider economy. It is reproduced here as Fig 5.3. The reader of the Agricultural Situation Report is invited to draw conclusions about the personal income situation of those in agriculture from these indicators. Though they might be used to compare average labour productivities, a comparison of personal incomes is not justified; even less could

Fig 5.3 "Incomes in agriculture and the general economy EUR10" from Agricultural Situation in the Community 1986 Report



Agriculture: Real net value-added (at factor cost) per work unit.
The general economy: Real net domestic product (at factor cost) per person employed.

Source: Commission (1987) The Agricultural Situation in the Community.

living standards be compared on this basis.

5.6.3 Similarly, the basis on which "comparable income" statistics were generated (under Directive 72/159/EEC on the modernisation of farms) does not lend itself to interpretation as an indicator of relative personal incomes; under this part of structural policy the income concept applied to agriculture was LI/AWU and for the non-agricultural group "the average gross wage for a non-agricultural worker". Such a comparison can be criticised both for its income concept as applied to agriculture and for the group with which comparison is attempted.

5.6.4 The theme of comparison between agriculture and non-agriculture is continued in the Eurostat development of indicators of aggregate disposable income for the agricultural population mentioned in 5.4.4 above (see Manual on the Total Income of Agricultural Households, Eurostat 1990). Provision is made for comparisons within Member States on the basis of disposable income per household and per household member, adjusted by equivalence scales, between agricultural households and those of other socio-professional groups. This sort of exercise is already carried out and published on a regular basis by France and Germany. Detailed comments on the findings are contained in Hill 1988. Here it is sufficient to point out that, in both countries, households headed by a farmer have average household disposable incomes which are higher than the all-household average and substantially higher than those of wage-earners. However, this favourable position is eroded if income per household member is examined (though equivalence scales are not yet in use to take account of the larger size and different composition of farmer-households).

5.6.5 There is a substantial literature on the problems of making comparisons using personal or household income measures, mainly from North America. Most of the arguments are rehearsed in Kulshreshtha (1966, 1967). The main problems seem to be in making allowances for the following points;

(a) the main source of income to agricultural households is in the form of farm net operating income from independent activity, whereas the income of most other groups is from dependent activity. Risk and other elements would need to be considered, though this possible source of non-comparability could be minimised by making comparisons with similar entrepreneurial groups, such as the operators of non-agricultural small businesses. However, data for these are rarely available.

(b) income-in-kind may be disproportionally large in agriculture. These items include the consumption of own production (milk, firewood etc) and the services of the domestic buildings of the farm. There are also possibilities for obtaining other consumption goods at costs which are substantially different from those of other socio-professional groups, such as the ability to keep horses for recreation purposes. If income is to act as a satisfactory proxy for living standards (or potential consumption levels) then these non-monetary elements must be both

identified and satisfactorily valued. Some of these items are of little importance when comparing the development of income over time between farmers of different types or sizes, but rise to substantial relevance when attempting to set the absolute levels of farmers up against those of non-farmers and to draw meaningful conclusions.

(c) similarly, differences in the prices of purchased consumption items between agricultural-rural and non-agricultural-urban areas, which are probably not advantageous for the agricultural community, must also be taken into account.

(d) secondary income (non-farm net operating incomes, wages, property income, transfers and welfare payments) may be more important than with other groups, so its adequate coverage is particularly important.

(d) changes in capital values, especially of land and buildings, may be of special importance in agriculture.

(e) special taxation advantages are often extended to agriculture and in effect constitute a form of income which must be taken into account. To some extent the use of post-tax income figures gets over the problem of differences in treatment by income taxes, but in practice there are larger, more significant differences in capital taxation (such as in the treatment of land for capital gains or inheritance taxation) which act in the favour of farmer-landowners.

(f) the nature of the social units may be different, so it will be necessary to gather information on the sizes of households, their composition (age, sex, relationships and so on) so that comparisons may be put on the same basis.

5.6.6 There are further problems to be faced in attempting to make comparisons between personal incomes in different Member States. There can be differences between the amount of consumption provided in kind by the state (such as health care) financed from general taxation; the same level of private consumption spending can imply substantially different standards of living. These forms of income in kind are not likely to be covered in surveys of income or family budget surveys; this might constitute a case for making comparisons using pre-tax income. In addition, there may be disparities of perceived need and social values between Member States. Consequently, even if equivalence scales and currency conversion rates can be agreed (such as Purchasing Power Parity), strong reservations preclude the drawing of simple conclusions about relative standards of living from income data.

5.6.7 Notwithstanding the difficulties of comparison, if the intention is to use income levels as a proxy for standards of living, these are made more satisfactorily using total or disposable incomes (though some categories of income, such as capital gains, may be excluded) than by using average factor

rewards. And the unit for assessment should be the household rather than the individual or the work unit engaged in agriculture.

5.7 Economic status of farmers and their spouses

5.7.1 In many industrialised countries, including the EC Member States, farmers who complain of low farm incomes are frequently holders of wealth which is substantial and typically above that of non-farmers. In Australia one study (Stoeckel, Cuthebertson, Curran 1974) found a ratio of wealth to income some four to five times higher for farmers than for non-farmer families. Explanations for this include the non-planned effect on land prices of product price support (Sexton and Duffus 1977, Harrison 1975), the need to finance retirement, the desire to pass assets to the next generation, narrow awareness of investment opportunities off the farm, the pattern of lifetime earnings and the age profile of farmers.

5.7.2 Both income and wealth represent potential spending power and, except for short-term consideration of poverty, it is desirable to bring the two into a common measure. Elderly farmers with large net worths have the potential to consume at high rates; they are in a different position from farmers with similar incomes but little or no net worths.

5.7.3 In order to express income and net worth in a common measure the usual approach is to calculate the annuity value of the net worth, that is an income stream of equivalent present value to the lump sum. This is added to conventional income (from all sources) to give a parameter of the total flow of economic services at the command of the consumer unit over the remainder of the unit's expected life. The combined measure is termed "economic status" or "economic wellbeing". This method was expounded in the USA by Weisbrod and Hansen (1968) and later applied with telling results in agricultural contexts. The determinants of the income-equivalent are the amount of net worth (NW), the expected future life of the recipient (n) and the rate of interest (r). They are linked by the formula:

$$\text{Annuity value} = NW \times \frac{r}{1 - (1 - r)^{-n}}$$

Normally the expected life is that of the farmer, but with couples it is not unreasonable to take the longer of the two life expectancies. The argument that net worth represented by business assets could not be turned into an actual annuity can be countered by annuitising the value assuming that the assets are retained for the lifetime of the present occupier (or, in the case of land, valuing the land as if sold with the occupier as sitting tenant), selling on forward contract, deducting the value of expected farm income flows and annuitising the residue, and others.

5.7.4 Calculations of economic status have been made for the USA (Carlin and

Reinsel 1973, Gardner 1972), for Australia (Vincent, Watson and Barton 1975, Sexton and Duffus 1977), for Canada (Chase 1980, Chase and Lerohl 1981) and for the UK (Hill 1982, Gregory 1986). As would be expected, the net effect is to raise the average level of income (in Canada in 1977 by 47 per cent) and to reduce substantially the numbers of farmers regarded as falling below the poverty line. In Australia the proportion of farmers "earning" less than $4000 in 1974 fell from 19 per cent to 5 per cent. The largest effect was seen among farm households with a head aged 60 years and over. For the UK the impact of annuitising the value of farm land (at tenanted land prices) in the 1977/78 Farm Management Survey was to halve the number of farms below an arbitrary £2000 poverty line. The relative inequality associated with the measure of economic status in the UK was lower than that associated with current income or income including capital gains. Such findings are of obvious interest to a Common Agricultural Policy concerned with low incomes, and they suggest that plans to assist low income farmers might usefully consider means by which their assets might be drawn on to relieve current income problems.

5.7.5 While this economic status indicator is useful conceptually, its full application would need data on both the income (farm and non-farm) and wealth (farm and non-farm) of members of the agricultural community. Comparisons with non-farmers would require similar information for them. At present official statistical systems do not provide such information.

5.8 Definitions of agricultural households

5.8.1 A further major issue encountered when attempting to assemble personal income information in agriculture is the choice of definition of those households which should have their incomes measured. In its 1981 review of the workings of RICA, the Court of Auditors raised the issue of the coverage of RICA (Court of Auditors 1981). The Court pointed out that the field of observation excluded a large part of agriculture (in terms of holdings and therefore people), notably part-time holdings, and that the focus of RICA no longer corresponded to the orientation of the CAP. It stated that people were beginning to recognise, for example in the less-favoured areas, that all types of holdings had special value for society, the economy and environment. The Court saw that a new definition of the field of observation seemed necessary, which would take account of the new CAP perspectives. Since the Court reported, these arguments have become even stronger.

5.8.2 Any move for RICA to reorientate its coverage more towards agricultural households and away from its present coverage of production, will involve critical consideration of the present field of survey. The present sample may contain businesses which are operated by families which, according to criteria explored below, could not be classed as agricultural households; these might be found throughout the farm size spectrum. Conversely, some holdings which at present fall outside the field of survey, especially the very small ones, might qualify for inclusion if the rules were to be altered so that RICA was more representative of agricultural households.

5.8.3 The history of RICA shows some ambiguity in terms of its coverage. It was never the intention of the Commission that RICA should cover all agricultural holdings in the Community. The establishing regulation (Reg 79/65/EEC) clearly set out a restricted field of survey within which RICA was set to operate. This was defined in Article 4. Up to 1982 the coverage was of agricultural holdings which:

(a) were run as market orientated holdings; an agricultural holding was defined as a farm business situated within a limited geographical area, operated as a single unit and under a single management. It was considered "market orientated" if at least half of its output was marketed.
(b) provided the "main" occupation of the operator; "main" meant that the occupier devoted at least three quarters of his annual working time to the holding, and
(c) ensured the employment per year of at least one worker (one man-work unit); the threshold however could be reduced in the case of a Member State to 0.75 man-work units.

This coverage implies a concern with the incomes of people who were solely or mainly engaged in agricultural production and with holdings that, on a time criterion, might be considered full-time or almost so. In 1975 the RICA theoretical field of survey covered about 59 per cent of the total 5.8m holdings in the EC (EUR9).

5.8.4 In 1981 Reg 2143/81/EEC modified the original Article 4. The coverage then became "agricultural holdings having an economic size equal to or greater than a threshold expressed in European Size Units (ESU)". (The size thresholds applying 1982/3 to 1985/6 were set by Reg 1859/82 and increased for years starting 1986/7 by Reg 3548/85). The intention seems not to have changed, but the criterion for coverage was shifted from an actual involvement in agricultural activity to an estimated one. The RICA A-Z (Commission 1989) refers to the intention of RICA to cover commercial farms, defining these as farms large enough to provide a main activity for the farmer and a level of income sufficient to support his or her family. In order to be classed as commercial, a farm must exceed a minimum economic size. This use of an ESU threshold seems to mark a departure by RICA from an orientation based on people who were engaged in agriculture to one based more on the production of the holding, or, more precisely, on its estimated value added at prices of a stated period.

5.8.5 Any move towards generating income estimates relating to the people engaged in agriculture rather than, or in addition to, estimates for significant commercial farming businesses, will need to confront the essential issue of what constitutes the agricultural community. This will parallel that already encountered by Eurostat in the development of its macroeconomic indicator (see Hill 1988 and the paper prepared for the December 1989 meeting of the Working Party on the Economic Accounts for Agriculture). To simplify the

situation and possibilities, it seems that the agricultural community can best be defined in terms of households (which usually implies families) rather than individuals. A range of criteria can be applied to determine the nature of the agricultural community; residence, occupancy of land, ownership of output, labour input, income dependency are some of the possibilities to be used singly or in combination. In the European context these can be reduced to two main levels of definition of agricultural households:

(a) to consist of all those households which operate an agricultural holding which qualifies for inclusion in the Farm Structure Survey[3]. In most cases the operator would be the head of the household. This definition would include all part-time holdings as well as those which formed the sole occupation of the household.
(b) those households where household income from self-employment (on the holding) was the main source of total income.

5.8.6 Though some forms of agricultural support benefit all producers (suggesting that the CAP is directed at all households who operate an agricultural holding), a more selective approach seems the intention of others (such as structural aids, which apply qualification tests). The more recent policy documents emerging from the Commission (for example, The Future of Rural Society of 1988) suggest that policy is being increasingly targeted at those in greatest need, particularly the farm families which are dependent on the holding for their livelihood and especially those in disadvantaged areas. The second of the above alternatives then seems to be the more appropriate. This narrower definition of the agricultural household is the one that Eurostat is to adopt in its sector measure of disposable income; it is also compatible with the general disaggregation of the household sector of national accounts into socio-professional groups, a long-term ambition of the ESA.

5.8.7 In the absence of adequate income data to apply the latter criterion, some interim systems of classification are to be allowed by Eurostat. Principal among these is the use of a reference person, usually the head of the household, by which to categorise the entire household and its income. A household could be thus classed as agricultural if either the reference person's main income source was from independent activity in agriculture, or if his main occupation (judged according to time spent, or by a mixture of time spent and income dependency) was in agriculture. In EC Member States various systems using income and/or time are already in operation, especially in family budget surveys. France and Germany regularly publish estimates of per household disposable income for agricultural households and other groups using this type of classification.

5.8.8 Two particularly contentious issues arise. Firstly, as touched on above, households which operate holdings which produce significant amounts of

[3]This varies between Member States.

agricultural produce will be excluded if these households also have even larger incomes from non-agricultural sources. Secondly, in some households there may be individuals who take no part in the agricultural production of the holding, or in agricultural production elsewhere. Often these will have full-time off-farm jobs. While these individuals may find themselves in agricultural households, it is a moot point whether they form part of the agricultural community for the purposes of support under the CAP. Clearly the living standard of the household is in part dependent on their earnings (although the degree of income and expenditure pooling should be the subject of specific research). Germany and France, in the national exercises referred to above, include them. In Canada it was found that the gap between farmers and non-farmers was less when broader definitions of what constituted a farm family were adopted; this implied that secondary family members contributed relatively more to family income among farm families than among non-farm families; one factor explaining this might be the larger size of farm families (Bollman and Smith 1987).

5.8.9 The use of a criterion of what constitutes an agricultural household for the purpose of income measurement does not necessarily preclude the use of other criteria for individual support programmes. For example, for qualification tests for direct income aids it might be preferable to take into account only the incomes of members of the household who work on the farm.

5.9 Implication for RICA

5.9.1 The present legislation does not empower RICA to collect data which is not directly related to the holding. Annex II of Reg (EEC) 2237/77 states that "Nothing connected with any non-farming activities of the holder or of his family, or with any person, private accounts, property extraneous to the agricultural holding, personal taxation, private insurance, etc, is to be taken into account in preparing the farm returns." Hence any extension of the array of information to be collected by RICA would need a change in legislation; presumably this does not preclude the collection of such information on an informal basis.

5.9.2 Up to the mid-1980s RICA's Head of Service held the view that the network should not attempt to expand its activities into measuring non-farm income. In 1978 RICA relaxed its position a little by collecting information about certain on-farm activities which do not belong strictly to agricultural production (tourism and forestry). But this relaxation has not subsequently extended to data on income from off-farm income sources.

5.9.3 The national surveys which contribute to RICA do not all adopt the narrow approach; Chapter 8 will consider the methodology of these in detail. Here it is sufficient to point out that in several Member States the surveys attempt to capture all the personal incomes of the operators and spouses and their outgoings (mainly taxation and social contributions), leading to estimates of disposable income. Fig 5.4 (from Hill 1988) summarises the position. In

Fig 5.4 Farm accounts surveys: disposable income information (from Hill 1988)

Country	Disposable income information

Belgium

Not a suitable source. The survey does not cover non-farm income

Denmark

At present the major source for disposable income. There are three accounts surveys, the third drawing its cases from the first two.

a) Farmers' Association (19,000, weighted to be representative). Excludes horticulture and fruit growing. Covers non-farm income, taxes and insurance data. No data on social benefits and payments or damage payments received.

b)Smallholders Association (4,600 cases) Also covers horticulture and fruit growing. Information collected as in a) above.

c)Institute of Agricultural Economics (2,000 cases, selected from a) and b) above) which contributes to RICA. Disposable income calculated close to Eurostat definition. Gaps in insurance data and social security contributions. Other household members are covered if they are declared as members of the household, but these are not numerous. Disposable income figures published.

Federal Republic of Germany

Agricultural Report Test Holdings (some 11,000). Collects information on holding related income, other income, certain details of taxes and social contributions paid. Farmer and spouse is taken as the unit; income earned off the farm by other family members is not collected. Classification into full-time farms, part-time main income farms and supplementary income farms is on the basis of estimated standard income rather than actual income. Grossed up estimates are possible using agricultural statistics.

Greece

Not a suitable information source. Covers about 7,200 holdings but does not ask questions on non-farm income. These have been tried in the past with poor response.

Spain

Not a suitable information source.

France

Not a regular information source. There was a one-off 1978 survey (CERC, 3,000 household-holdings) which covered agricultural and para-agricultural income, most non-agricultural income and investment, sale of capital, changes in real estate capital and debt.

Ireland

Not a suitable information source at present. National Farm Survey covers about 1,500 holdings but only farm business income information collected. Agricultural cases in the periodic Household Budget Survey are now drawn from this survey.

Italy

Not a suitable information source. RICA only covers about 10 per cent of holdings, deemed to be the commercial sector.

Luxembourg

Not a suitable source. Accounts relate only to full-time farms. Information on non-farm income is obtainable only for those who do not maintain other personal bank accounts. Non-farm income of other household members is not covered. There has been a special one year voluntary analysis of disposable income along Eurostat lines.

Netherlands

At present there are two surveys, soon to be amalgamated:

a)Central Bureau voor de Statistiek (CBS) Production Account survey with 3,000 cases drawn from the 35,000 holdings which use accountants. Data is provided by these accountants. Sample omits the small (below about 14 ESU) and very large, but raisable within these constraints. Components available which lead to disposable income close to Eurostat definition. Only farmer and spouse covered.

b)Institute for Agricultural Economics (IAE, 1,600 cases directly surveyed, part of RICA). Higher lower size limit than CBS survey (17 ESU) and split made between agriculture and horticulture. Non-farm income and tax data missing for 10% of sample, and restricted to household members who work on the farm. Components are available by which disposable income close to the Eurostat definition can be calculated.

Portugal

Not a suitable source. RICA is still in an establishment phase, rising from 171 holdings in 1981 to about 3000 in 1990. At present no information is gathered on non-farm income.

United Kingdom

Not a suitable information source at present. The regular Farm Business Survey does not collect data on income arising from outside the holding, although a special survey of small farms is now underway which covers these sources. (Questions in regular survey from 1988/89)

Denmark and FR Germany non-farm income is collected regularly and disposable income is published. This also seems to be the situation in the Netherlands. In Ireland the latest Household Budget Survey has selected its agricultural household cases from farm households in the National Farm Survey. In the UK the Farm Business Survey already collects some data on non-farming use of farm resources and is commencing to collect further information on the non-farm income of its co-operators as one way of fulfilling its commitment to Eurostat to provide estimates of aggregate disposable income. The UK has also mounted a special survey of the total income situation of very small farms (less than 4 BSU), which started in 1986.

5.9.4 A common feature of these surveys is that they experience difficulty in collecting information about the off-farm income of the other household members (ie in addition to the farmer and spouse and dependent children). In Denmark and Germany the coverage is partial, and in the Netherlands it is only collected for household members who work on the farm. In Luxembourg special analyses have been carried out on total income for isolated years - though not all the non-farm income has been captured.

5.9.5 Information coming from sources other than farm accounts surveys can help throw light on the sorts of findings that a more comprehensive RICA might produce. Statistics on total incomes from other sources is available for Denmark (income register, mainly based on tax statistics); Germany (household income and expenditure survey, and an annual microcensus); Ireland (Household Budget Survey); Netherlands (tax data) and the UK (tax data, though not covering households operating farms arranged as companies)(Hill 1989). Other Member States (especially the southern ones) are likely to generate information over the next five years as they explore data sources, particularly their household expenditure surveys which often contain substantial numbers of agricultural households. In France and Germany macroeconomic methods are used to estimate the total income (and its components) of agricultural households; these however depend on the use of microeconomic data to distribute economic aggregates. In France tax data are used and in Germany several sources, including taxation, the household income and expenditure survey, and the farm accounts survey.

5.9.6 Outside the EC, details on off-farm income are collected in the USA as part of its Farm Costs and Returns Survey. Canada has its taxfiler data and its Survey of Consumer Finance. Australia has used tax data and a special income study involving the survey of farm families (the Henderson Poverty Enquiry)(see Chapter 4). Norway and Austria also have this sort of data.

5.10 Conclusion

5.10.1 The issues touched on in this Chapter are of central significance to the future development of RICA. The basic question is whether RICA is to remain as a system for monitoring the performance of farm businesses, or whether it is to evolve a capability to assess the income situation of the agricultural

community. If it is to go even partly along the latter road it will need to collect data currently outside its legally-defined field of interest. We feel that it is important for RICA to consider its role as a provider of statistics on the incomes of farmers and farm families, because agricultural policy seems increasingly to be aimed at the farm family as a social unit rather than at the holding as a production unit. Furthermore, an adequate understanding of the economic behaviour of farm businesses cannot ignore the other gainful activities that many of their operators engage in, nor the non-farming resources that they command.

5.10.2 Specific recommendations are reserved until Chapter 11. However it is clear that consideration should be given to the collection of additional income information from off-farm sources and for analysis incorporating this additional data, including the identification of those farm sizes, farm types and regions with the lowest total incomes should be identified. To be compatible with disposable income estimates emerging from Eurostat and family budget surveys it would be necessary to collect data on taxation and other compulsory outgoings. More socio-economic details are desirable, such as the years of birth of all members of the labour force (those of the holder(s) and/or manager(s) are already collected) and the identification of household members who do not work on the farm. The issue of income stability is of major importance, and facilities to enable income to be studied for a run of years on individual farms must be developed. The separate impact of wealth on economic status should also be explored, though in the absence of data on non-farm assets this might be based on the information already available on farm income, farm net worth, the age of the holder and additional information (such as interest rates) which may be readily to hand. And, not least, the nature of the sample should be considered. Without necessarily reducing the ability of RICA to represent the great majority of production, thought might be given to expanding or modifying the sample so that it can be used as a means for representing the incomes of people who are involved in agricultural production. These, and other, recommendations are developed in more detail in Chapter 11.

CHAPTER 6: INDICATORS OF EFFICIENCY AND PRODUCTIVITY

6.1 Introduction

6.1.1 The basic legislation setting up RICA (Reg 79/65/EEC) cited two specific purposes for which the data collected by the network was to be used; these were not seen as the only possible uses. The first was for the annual determination of incomes of agricultural holdings (falling within a defined field of survey). The second, which was not given any less emphasis, was for "a business analysis of agricultural holdings".

6.1.2 One of the criticisms offered by the Court of Auditors in 1981 was that, after 13 years of operation, in the opinion of the Court RICA had not yet been used for the second objective. Chapter III of Reg 79/65/EEC had not been used; this allowed the collection of additional information, using a special farm return, via the relevant authority in Member States, for the purpose of business analysis. The Court found this surprising in view of the Council Directive 72/159/CEE which referred to RICA as an instrument of information and scientific study on the development of holdings which benefit from help in promoting their modernisation. This sort of problem seemed, to the Court, to fit exactly with the second objective. The Court found it strange ("astonishing" was used in the non-official translation) that the Commission should create an instrument to treat certain questions and then not make use of it when these questions were actually posed. Some of these questions require longitudinal time series data for individual holdings; the Court reiterates at several points in its report the desirability of this type of information (Court of Auditors 1981).

6.1.3 The Court recognised that a wide range of Community and national institutions might wish to have access to the RICA data bank so that they could analyse it according to their own requirements. Independent researchers might

be expected to wish to engage their special expertise with the statistical resource of the RICA data.

6.1.4 The RICA annual reports are mainly concerned with the analysis of income indicators and balance sheets. Chapter 2 showed that RICA receives a large number of requests for more specific information, over half of which relate to individual enterprises or types of farming (costs of production, profitability and so on). One aspect of business activity that could well form an additional use for RICA data is the study of efficiency and productivity; the improvement of productivity was central to the original thinking of the Treaty of Rome's Article 39. Though longitudinal time-series might be particularly useful in the study of productivity improvements, especially on those holdings which have received Community aid for modernisation or other forms of structural change, here we are concerned more with the use of cross-sectional analysis.

6.1.5 As far as we are aware, RICA staff have not carried out major studies of an analytical nature of the concepts which might be applied to study agricultural efficiency nor have they used RICA data to establish patterns which might be important for policy purposes.

6.2 Approaches to efficiency and productivity

6.2.1 Questions relating to efficiency and productivity which RICA might reasonably be expected to answer in its role of supporting policy fall into two broad groups; those which relate to the performance of the whole farm and those which relate to individual factors of production. The first group includes the following:

- are small farms less efficient than large ones in their use of resources? If they are, do economies of size run out at any particular level?

- in view of the EC attachment to the family farm, is there any evidence that it is more efficient than the non-family farm?

- are farms in Less Favoured Areas less efficient than those elsewhere, and what economic cost is borne by the Community by maintaining them for social or environmental reasons?

- does holding tenure affect the performance of the farm?

- are holdings run by elderly farmers less efficient than the others?

- are dairy farmers in one Member State more or less efficient than in some other Member State?

6.2.3 The questions related to individual factors include:

- are small or large farms the less intensive users of land, and therefore to be preferred for environmental reasons?

- do part-time or full-time farmers make the better use of additional capital, and should the rules for investment aids discriminate against one or other group?

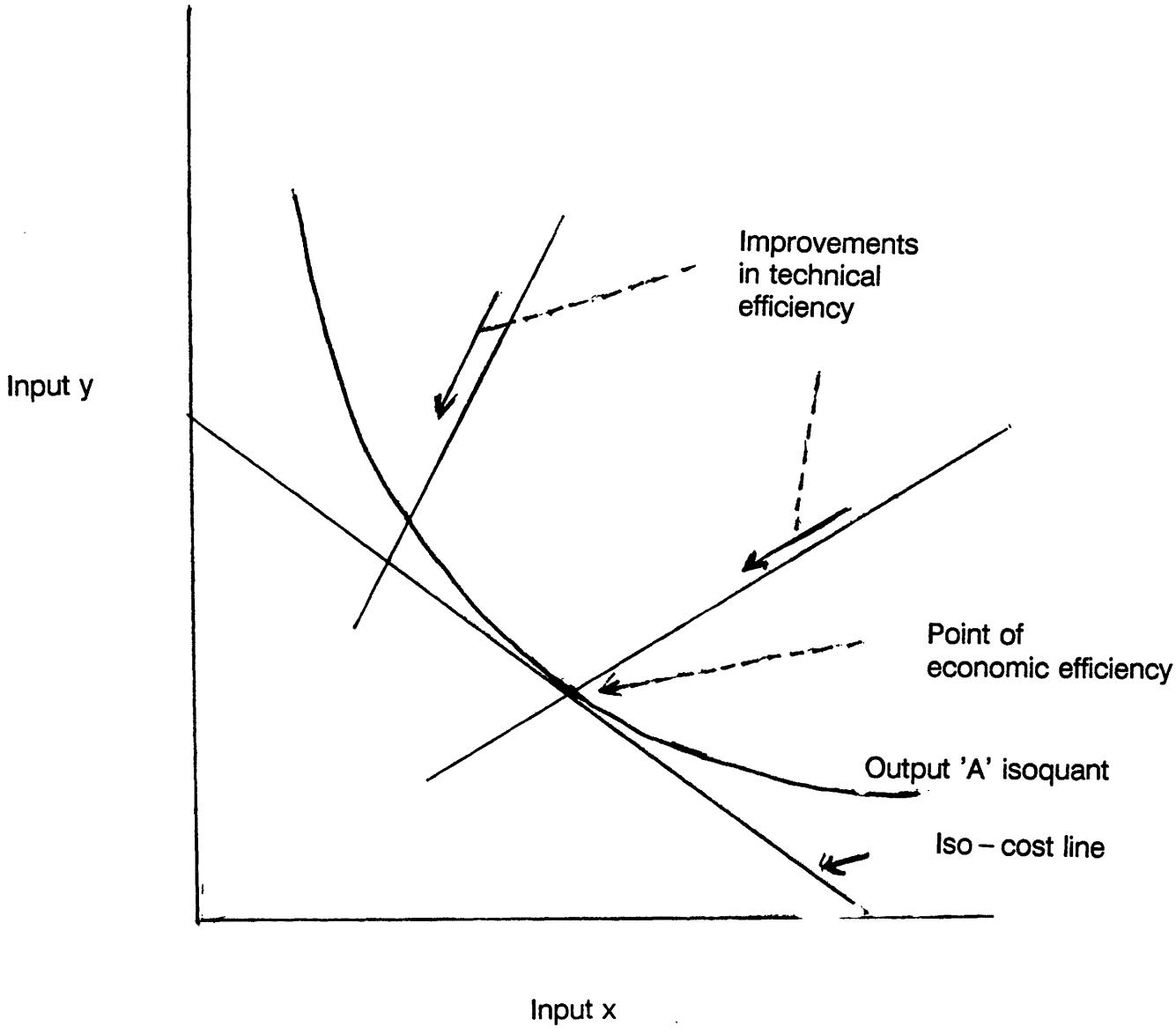
- is output per man a reasonable guide to overall productivity?

6.2.4 There are many ways of measuring efficiency, and different results are likely to emerge in terms of ranking of individuals or groups when different measures are used. Behind each measurement device lies a theoretical definition of efficiency which makes fundamental assumptions about (a) certain properties or characteristics of the transformation process of inputs into outputs, and (b) the purposes for which it is desired to measure efficiency and the kind of interpretations that will be made of the efficiency measure (Burrell 1980). In designing, applying and interpreting indicators of efficiency it is essential to be clear about why a particular concept is being used, and what it measures. Studies of efficiency have in the past been devalued by confused methodology involving inappropriate indicators and the misinterpretation of results because of a lack of appreciation of what was being measured.

6.2.5 Economists traditionally view the concept of efficiency in at least two ways (Lingard 1978). Technical efficiency is concerned with whether production at any one point in time is taking place on the production frontier; that is, for any combination of inputs is output being maximised subject to the prevailing state of the technical arts? Leibenstein refers to the absence of slack in this sense as "X-efficiency". Economic efficiency (or allocative efficiency) describes the necessary conditions for factors and products to be allocated so as to achieve equality between various marginal rates of substitution. In a market economy this is sought by profit (or utility) maximising agents equating the relevant marginal rates of transformation to the respective price ratios. These two concepts can be illustrated by Fig 6.1, in which a movement towards any point on the isoquant from any point on the right of it is an improvement in technical efficiency since fewer resources are employed to generate a given level of output, yet there is only one point which is economically efficient. This is the point of tangency between the isoquant curve and the isocost line.

6.2.6 The term efficiency is also used in a less exact sense to relate measures of the performance of farms, such as average costs of production, to some farm characteristic, especially size. This size-and-efficiency relationship is not strictly one of economies of scale since it is not measured with all inputs changing in the same proportions. Sometimes the term "economies of size" is used in this context. And while "productivity" has a technical meaning in the context of measuring increases in output stemming from technological change, it too is used in a more generic way to link performances to business

Figure 6.1 An illustration of technical and economic efficiency



Note: The isoquant shows the minimum alternative combinations of inputs which will produce a given level of output. Combinations which lie to the right are less technically efficient and movements towards the isoquant represent improvements in technical efficiency. All points on the isoquant can be regarded as technically efficient. Economic efficiency has to consider also the costs of the inputs and there is only one point on the isoquant at which the condition for economic efficiency is met.

characteristics, including the personal characteristics of the farmer and his family.

6.3 Partial measures

6.3.1 A partial measure of efficiency/productivity is one which measures output in terms of the use of one particular input, or group of inputs, and ignores all other resources which have contributed to producing the output. Examples are output per man or per hectare. Except in specific situations, comparisons between individual farms or groups of farms on the basis of partial measures will be unreliable for indicating the overall performance of the farm. For example, a high level of output per man may be the result of high uses of variable inputs or of large capital stocks, neither of which are taken into account in the partial indicator.

6.3.2 Where a range of partial measures of efficiency produce the same ranking, there may be some justification for cautious confidence in overall ranking. But this is not the case when, as is far more likely, rankings are not the same on all criteria. Even when a farm business is superior on all partial measures, it is not necessarily superior in terms of some other criterion, such as profit maximisation, as will be shown later.

6.3.3 Burrell (1980) states that there are two extreme situations in which a partial efficiency measure might be thought useful. One is where all inputs are used in the production process in fixed proportions and where all firms face common prices. In this case a ranking according to the partial measure is the same as would result from measuring all inputs. The other is where only one of the inputs is economically scarce, so that all the others have zero shadow prices. (In the situation where they at the same time have non-zero market prices there will be a divergence between the position which the individual farmer and society will wish to adopt). A variant of this latter situation is where society explicitly chooses to use a weighting system other than prices, and when all weights other than one equal zero. For example, an over-riding, totally inelastic priority may be given to, say, labour productivity, perhaps in war-time.

6.3.4 A similar case for caution could be made regarding changes in partial measures. An increase in output per man in one sector does not necessarily imply an improvement in overall efficiency.

6.3.5 Within the context of the CAP special emphasis has been given to the estimates of Net Value Added per Annual Work Unit (NVA/AWU), not only as an income indicator (see Chapter 3) but also as a partial productivity measure. Estimates of NVA/AWU emerging both from RICA and from the aggregate economic accounts (Eurostat) have been viewed in this way. However, there are objections to NVA/AWU being used as an indicator of efficiency or productivity for the following reasons:

(a) it is an average product figure, and is not necessarily a guide to marginal efficiency. As Schmitt (1988) shows, where allocation of family labour between farm and non-farm uses is concerned, average factor performance in agriculture alone is not a satisfactory indicator of efficient factor use.
(b) changes in FNVA/AWU attribute all the increase to the factor labour, whereas there may be both quantitative and qualitative changes in the other fixed factors which should be taken into account.

6.3.6 Schmitt points out that, though labour productivity in agriculture might be expected, using neo-classical economic reasoning, to be more or less in line with labour productivity in the non-farm sector, reflecting the state of economic development, in reality there are large differences in agricultural productivity between countries of very similar levels of overall labour productivity. These differences can be explained in terms of farm families exercising rational choices in the marginal allocation of their labour time among competing farm and non-farm activities, the choices being made in the context of a given farm size structure. The finding that average labour productivity on part-time farms is lower than on full-time ones is entirely consistent with rational choice by farm families on the basis of marginalities which produces an economically efficient allocation. An additional factor is that there are grounds for thinking that the opportunity costs of labour (leisure) used in farming are rather low compared to industrial wage rates; this may result in longer working times in agriculture. However, labour is still being used efficiently although (marginal) productivity might be rather low. Schmitt concludes that statistical data regarding the income and productivity of farms (he uses NVA/AWU for agriculture) are misleading if that information is restricted to income generated by resource use in farming only and neglects resource use of the farm family (household) outside farming. The degree of error will reflect the amount of part-time farming in a country/region and the prevailing farm size structure.

6.3.7 Despite the caution which theoretical considerations encourage, there are circumstances in which partial measures can be of service to the CAP. The developments in recent years suggest that those relating to intensity of land use in particular could be important. Output per hectare could be a useful proxy for environmental purposes. The relationship between farmer age and this parameter could assist in predicting the likely effect of earlier retirement and the changing age profiles of the agricultural population. One possible indicator of the performance of Community programmes to assist both in the reorientation of the CAP in terms of reducing surplus output and in achieving environmental goals might be output per hectare or changes in output per hectare.

6.4 Total business efficiency

6.4.1 There is a history of studies of the efficiency of farm businesses which adopt a whole-farm approach. Many are concerned with the relationship of farm size and efficiency. They almost exclusively belong to the period when there was general concern with improving the performance of the agricultural

industry. They tended to focus on the diseconomy of the small farm and to speculate on the implications of the existence of these farms for the performance of the entire industry, though it was recognised that some farms could be too big. Interest in the performance of the large farms, weaker than that in that of small farms, was engendered by concern with attempts to limit the size of farms in some countries and the feeling that the creation of very large units might have carried implications for employment and village life which were undesirable.

6.4.2 The overall thinking for this sort of study can be summarised in the following quotation;

> "..there are theoretical reasons, often supported by practical experience, to suppose that below a certain (but undetermined) size, farms or firms are 'too small' to give the lowest possible cost per unit, while above another ... point on the size scale farms are 'too large' and use resources less economically than they would if they were smaller.
>
> If these simple propositions are true of British agriculture, it would seem worth trying to identify the critical points in question and to ask how many farms are of an 'uneconomic' size; what proportion of total production they embrace; whether the numbers of farms operating below the 'economic' range is increasing or diminishing; and what might be the effects on the economic efficiency of agriculture if the size structure were to change, with or without the stimulus of government action". (Britton and Hill 1975).

It should be kept in mind that the relative efficiency of farms was here measured by reference to their output per unit of all resources used.

6.4.3 The inefficiency of small farms, where established, acted as a reinforcement for policies which treated them as social problems rather than agricultural ones. Their relatively small contribution to total output already meant that they were largely ignored in many major policy decisions relating to the level of aggregate agricultural output. Schemes to encourage the disappearance of small farms, or their major enlargement in business size, were designed to essentially to solve the welfare problem they represented (OECD 1964); if this also removed pockets of inefficiency, so much the better. However it must be borne in mind that efficiency is quite separate conceptually from income, and farms could be found in which inefficiency was combined with high incomes, and others where high efficiency was accompanied by low incomes. The former could be found among large farms, the latter among small ones. Income can be envisaged as the <u>difference</u> between a farm's outputs and its inputs, whereas efficiency is essentially concerned with the relationship between them, often taken as the ratio of outputs to inputs.

6.4.4 For the UK, studies of relative efficiency have often drawn on data from the Farm Management Survey (FMS). These include Zuckerman (1961) <u>Scale</u>

of Enterprise in Farming and Britton and Hill (1975) Size and Efficiency in Farming. The latter gave rise to a number of articles from other authors in an attempt to develop the methodology, including Dellaquaglia (1978) 'Size and efficiency in Scottish agriculture' and Lund and Hill (1979) 'Farm size, efficiency and economies of size' which also used FMS data. These fall into two groups, first those which question the details of the measures used and, second, those which challenge the whole approach.

6.4.5 Both Zuckerman (1961) and Britton and Hill (1975) use as their indicators of efficiency Total Factor Productivity (TFP), or more exactly, average total factor product. Both used the ratio of gross output per £100 of all inputs (including an imputed charge for farmer and wife's labour). The FMS accounting conventions are adopted; charges are made for all variable inputs, labour and capital in the form of depreciation. As a variant on this, Lund and Hill (1979) used total enterprise output per £100 inputs, including farmer and wife's labour but excluding stock appreciation for breeding livestock. Total enterprise output is gross output excluding any profit or loss on the sale of previous year's crops plus the market value of home produced feed (excluding forage) and seed. In a variant of this Power and Watson (1983), in an exploration of the alternative measures of size on the size/efficiency relationship using FMS data, include in output the stock appreciation for breeding livestock (unlike Lund and Hill 1979 but like Britton and Hill 1975); this was for practical rather than theoretical reasons. It should be noted that the output parameter also reflects any differences in market prices between those obtained by large or small farms; assessments relate therefore not strictly to efficiency of production but to something looser, which might be called "performance".

6.4.6 Surprisingly, relatively little attention has been paid to the input side of the calculation. Though imperfections in the measurement of inputs is acknowledged, there are few calculations which attempt to correct for them. Not all inputs are included in the bundle whose costs form the divisor and there does not seem to be much discussion over the appropriate treatment of the "fixed" factors of production. In the UK work charges were made for land but not for other forms of capital. All farms were treated as tenanted, rental values being imputed for owner-occupied land; land charges, particularly depreciation of buildings, may not be properly represented on owned farms where there is some evidence in the UK that these are more heavily provided with buildings than their tenanted equivalents. No charges (other than depreciation) were made for non-real estate capital. For practical reasons rather than from economic principles, no interest charges were made, either for borrowed capital or for an opportunity cost of owned capital. The cost of unpaid labour (mainly the farmer and spouse) was imputed using the rates for hired labour, questionable in view of the age profile of farmers and their education/experience histories.

6.4.7 In a study of efficiency which is looking at the national use of resources, inputs should be valued at their opportunity costs. On many, perhaps most, holdings the operator might well be both unable and unwilling to gain

employment at the imputed wage rate. Furthermore, some of the time they spend on their farms could be considered as of little productive worth; it is unlikely that the operators would be willing to pay hired labour for undertaking these tasks. Most of the derived size/efficiency relationship, described later, can be attributed to the relatively high labour costs shown on small farms; if the charges made for farmer and spouse labour are too high, this radically alters the apparent inefficiency of the small farms.

6.4.8 No charge was made for the managerial input of the farmer and spouse, or for other non-agricultural skills (secretarial or clerical inputs). Among the larger farms in particular these may be substantial, and calculations of output/input ratios which tried to capture all economic costs should not ignore them. On farms using a hired manager this managerial input will in part be deducted as a cost, but this will not be the case on farms managed by the operator. A case could be made for imputing a management charge for all farms, related in some way to farm size if, as seems likely, larger businesses demand higher quality management ability; this point was developed in Britton 1970.

6.4.9 The imperfection in measuring labour input is, on balance, likely to lead to the overstatement of costs on small farms and their understatement on larger ones, though this may in part be offset among the very largest by the presence of hired managers. These measurement errors alone might be expected to result in an apparent poor performance in terms of output/input ratios of small farms, and improvement to the medium sized farms and some drop in ratio as the largest farms are reached. "One should not exclude the possibility that persistent differences in the performance measures between individual farms simply reflect differences in the opportunity cost earnings of their entrepreneurs. The idea that observed efficiencies would tend towards equality if perfect measurement could be attained is not easily discredited." (Lund and Hill 1979).

6.4.10 Lund and Hill (1979) also point out that, even if the total outputs/total inputs ratio was constant across all output, the use of an actual input as a measure of farm size will in general tend to indicate a decline in performance with increasing output where none exists. This is because of the variations of performance within groups. High performance farms will be shifted to the left while those with poor performance will be shifted to the right. Conversely, bias in the opposite direction results from the use of an actual output measure of size. The use of hypothetical inputs for a given level of output avoids this particularly problem. But, according to Lund and Hill, using a measure based on hypothetical inputs "for a single input, ignores the differing normal input requirements of different types or combinations of inputs". The implication seems to be that, where the prime policy interest is in farm as occupiers of area, an area size measure should be used.

6.4.11 The measures of size used by the earlier studies were confined to physical farm area (actual or adjusted for rough grazing in a rather arbitrary

way)(Zuckerman 1961) and estimated labour input (Standard Man-days, SMDs (Britton and Hill 1975, 1978)[1]. Lund and Hill (1979) used only SMDs but had the advantage of a using a run of years (1968/69 to 1976/77). The theoretical SMD measure was found to offer a fairly consistent picture across farming types. The main findings were as follows:

(a) a rapid rise in the output/inputs "efficiency" ratio as business size increased up to the 2-4 man size (600-1200 SMDs), a suggestion of some further rise as size increased to 1800 SMDs, with perhaps some decline in the largest farms of over 4200 SMD. However, the numbers of very large farms were too small for much confidence to be ascribed to observations at this end of the spectrum. In essence, the evidence was for an inverted "L" shaped size/efficiency relationship with the output/input ratio, corresponding to an "L" for average total costs per unit of output. Within this overall pattern there were variations of detail between farming types and between years. (For further evidence relating to dairy farms, see Mukhtar and Dawson 1990).

(b) the main reason for the poorer performance of the small farms lay in their labour costs, particularly the high costs associated with the farmer and spouse labour. They seemed too small to allow this fixed input to be spread over a sufficient volume of output. The turning point in economies of size (about 800-850 SMD) seems to correspond with the size of business at which total wages earned by the paid labour begins to exceed the estimated value of unpaid labour. Charging farmer and spouse labour at zero opportunity cost effectively eliminates the apparent diseconomy of the small farm; this might be justified if the transfer earnings of an elderly and immobile workforce were very low or non-existent.

(c) large farms seemed to use neither more nor less of the variable inputs per unit of output than smaller businesses. There is evidence from the FMS data for small economies and diseconomies in the use of machinery and land in the different farming types, but these are not large in relation to the dramatic reduction in labour costs when moving from the smallest businesses.

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[1] In the UK the size of a farm business in Standard Man-days was derived by applying coefficients of labour requirement for units of cropping and stocking, derived from surveys of actual labour usage and revised periodically, to the cropping and stocking pattern found on the farm in question and summing. It was intended to show the annual requirements of manual labour (in units of eight hours of manual work for an adult male under average conditions) needed for production, with an addition for essential maintenance and other necessary tasks. This "standard" labour requirement did not necessarily correspond to the actual labour used, which would be affected by factors such as the amount capital equipment available, management skills, degree of underemployment of labour and so on.

6.4.12 The analysis established the importance of the parameter of size to some of the findings. When analysing the intensity with which large and small businesses use their land, care must be taken to distinguish the findings based on alternative measures of size. For example, the evidence is that small farms measured in area terms use their land more intensively than larger farms of the same type. However small businesses measured in SMD tend to use their land less intensively. This sensitivity was claimed to extend to the general pattern of size and efficiency, with Sutherland (1983) claiming that "for the same data from any given sample of farms, efficiency will indeed appear to increase more rapidly with size measured in SMD than with size measured in acres". This did not, however, amount to a challenge to the underlying relationship.

6.4.13 In an attempt to explore the impact of the measure of size on the relationship, Power and Watson analysed the FMS using a range of size criteria. The twelve measures tried were:

Input based
- total area
- annual labour units
- tenants' capital
- total inputs (including farmer and spouse labour)
- total livestock units
- number of dairy cows
- cereal area

Output based
- total enterprise output
- turnover

Hybrid
- Standard Man-days (1968 based)
- Standard Man-days (1976 based)
- European Size Units

Rather than adopt externally-determined size classes for the analysis, farms were ranked and the results broken down into deciles; the boundaries of size groupings were defined according to this ranking. Four farming types were examined separately: specialist cereals; general cropping; specialist dairy, mainly dairy.

6.4.14 The main findings from this analysis, which should be treated with caution as it relied on data from only one year, were as follows:

(a) economies of size were observable for each farm type when moving from the smallest size groups under all size measures except annual labour units (ALU) (where the performance of the smallest farms was not as depressed).

(b) the patterns were not identical among types, with for example the mainly dairy group showing a greater tendency towards diseconomies after the initial rise in the ratio than the other groups. Cereal farms tended to show a more consistent rise beyond the initial steep improvement in the ratio.

6.4.15 The above discussion has been entirely in terms of data from the UK's Farm Management (Business) Survey. Poppe (1986) has used a closely similar technique to explore the relative efficiency of the regions of the EC through RICA data; he looks not only at ratios between the value of total outputs and total inputs, but also at relationship between the remuneration claim of family labour and capital and Farm Family Income (which Poppe terms the "remuneration indicator"). One difference in the methodology for calculating the total output/total input ratio from that employed in the UK studies is that a charge for own-capital is imputed. Although the measurement errors of imputing a labour charge for the unpaid labour element is acknowledged, along the lines already set out above, the solution is no more satisfactory. The volume of labour is accepted from RICA data on the number of hours worked by the farm family as the best available Community-wide source, although evidence of discrepancies with other labour input information is presented. The price of labour was taken as the gross hourly earnings, as found by RICA, though it was agreed that the farmer would need to pay more to hire labour (per day) and that there were some large regional variations. This exercise had to face not only the problem of different labour costs between Member States, but also different interest rates (real rates based on fixed interest government securities, but with a minimum of 2.5%). Imputation used labour costs and interest for complete Member States rather than regions. The published analysis relates only to regional averages for all sizes and types of holding. Results for the efficiency ratio varied widely but only one region had a ratio greater than 100 (ie a value of output greater than the value of inputs used); perhaps this explains why the analysis has received little attention. Presumably breakdowns should be possible by size group and type of farming, though subject to the same sort of caveats as apply in the UK and with additional ones for international or interregional comparisons.

6.5 Other uses of the total performance ratio

6.5.1 The total output/total input ratio has been used to probe the relative efficiency of owner-occupied, tenanted and mixed tenure farms in the UK (Britton and Hill 1978, Gasson and Hill 1984, Hill and Gasson 1985). The former, which looked at farms which were wholly or very largely owner-occupied or tenanted) found that there were significant differences between small farms in their ratios; in the period 1968-73 the performance of small rented farms was higher than that of owner-occupiers, with pronounced differences occurring in the 50-100 acre group, the most consistent differences being among specialist dairy farms. These rented dairy farms operated at a higher level of intensity, with significantly higher amounts of tenant capital per acre and output per acre. The work by Gasson and Hill, which drew on special

surveys as well as FMS data, showed a more complex picture and incorporated mixed-tenure groups. It was these mixed-tenure farms which seemed to be the better performers, though the line of causality seemed to not to run from tenure to performance. Rather, the explanation seemed to be that these farms were managed by dynamic operators and which had experienced the most rapid growth in area; this growth had often been achieved by mixing tenure forms.

6.6 Objections to total output/total input ratio

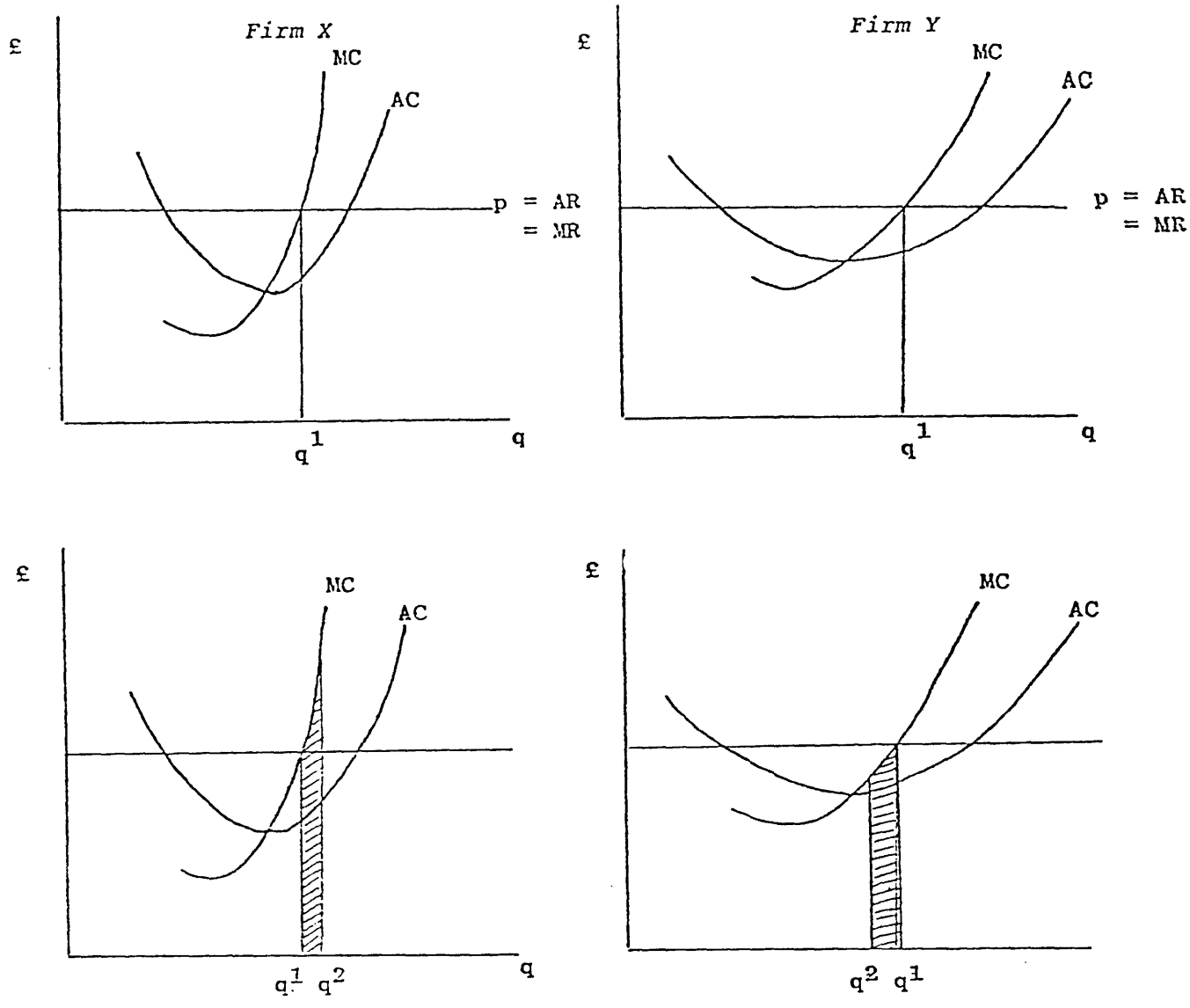
6.6.1 In addition to the matter of measurement error and bias associated with choice of size criterion, there are more fundamental challenges to the use of the total output/total input ratio (see Lingard 1978, Lund and Hill 1979, Burrell 1980). The first of these is that the ratio is based on private costs and revenues, so that it is incapable of reflecting either the full costs or the full benefits which an efficient allocation of society's resources would wish to take into account. Both the prices of inputs and outputs may be distorted by government intervention or imperfections of competition.

6.6.2 Second, economic efficiency is concerned with marginal relationships, whereas the total output/total input ratio at farm level is an average concept. Except in conditions where prices of outputs force firms to operate at the lowest points of their average cost curves. average and marginal costs differ. Given that some inputs are fixed (such as land) in the short term, it is quite possible for farms to be organising themselves in ways which equate the various marginal relationships and yet exhibit different average performance ratios. Conversely, identical ratios do not imply that cases are equally near to achieving economic efficiency, if this is taken to mean optimum resource allocation in their respective situations. It is quite possible for the transfer of resources from a farm with a low average performance ratio to one with a higher ratio, which might superficially be expected to lead to a net improvement, to result in lower output and a fall in measured "efficiency" (see Fig 6.2).

6.6.3 When the ratio is used at a more aggregate level, for example between farming types or between the agricultural industries of different Member States, another kind of averaging occurs (Burrell 1980). Here there will be averaging over many different farms. The overall group averages may be the same but the distributions of farms could be different. Firstly this involves problems in making comparisons of overall efficiency; is the group with the wide spread and including some very poor performers to be viewed in the same light as a much more homogeneous set of cases? Secondly, the distribution and range of the performance ratios will have a bearing on the number of holdings which will be affected by any policy to remove the poor performers. In an industry dominated by a few, large, high performance farms attempts to improve overall performance will have an impact on a large proportion of holding numbers or people engaged in production. In any study of agricultural performance it is therefore necessary to know not only group averages but the distributions. The

Fig 6.2 Illustration of relationships between marginal and average costs

AC = average cost AR = average revenue
MC = marginal cost MR = marginal revenue
p = price of output
q = quantity of output



Note: Firm X and Firm Y are both acting in an economically efficient way as they are equating MC with MR. However, X has the higher ratio of value of output £ of input (or the lower average cost per £ of output). Expanding output of Firm X by 1 unit and reducing output of Firm Y by 1 unit results in greater combined costs; more resources are used and total output is less efficiently produced. This is evident from the diagram in which the shaded area of Firm X (additional resources used by expanding from output q1 to output q2) is greater than that of Firm Y (showing the resources released).

Source: Burrell (1980)

weight given to distributions will reflect the purpose for which efficiency is being measured.

6.6.4 A distinction must be drawn between long-run and short-run (something stressed in the efficiency context by Madden (1967)). Which costs are variable (and hence are capable of entering into the marginal cost/marginal revenue equation) will depend on the time period chosen. A farm may be acting in an economically efficient way in the short-term even if its overall output/input ratio is poor. It needs time to make the appropriate adjustments to its fixed costs - and may in fact be in the process of doing just that. Technical advance is occuring all the time, which is probably pushing the lowest point of the long-run average cost curve to the right. "However, just as it is economically inefficient for a farm continuously to adjust its more durable inputs to those optimum for its current level of output, so it is economically inefficient for it to be continuously pursuing the ever shifting long-run cost curve without regard to the costs of adjustment" (Lund and Hill 1979). These authors also point out that there is a difference between the ex ante view of costs on which farmers base their production decisions (reflected in the ratios) and the costs which they actually incur, which are those picked up in the RICA.

6.6.5 It is evident that little can be inferred about income from a farm's output/input ratio. As Fig. 6.3 makes clear, when profit is maximised the ratio is not also maximised, except in particular circumstances. So both profit-maximising firms and those far from this profit can have identical ratios. The maximum ratio corresponds to an output which does not maximise profit. In other words, there is no simple relationship between the ratio and profit.

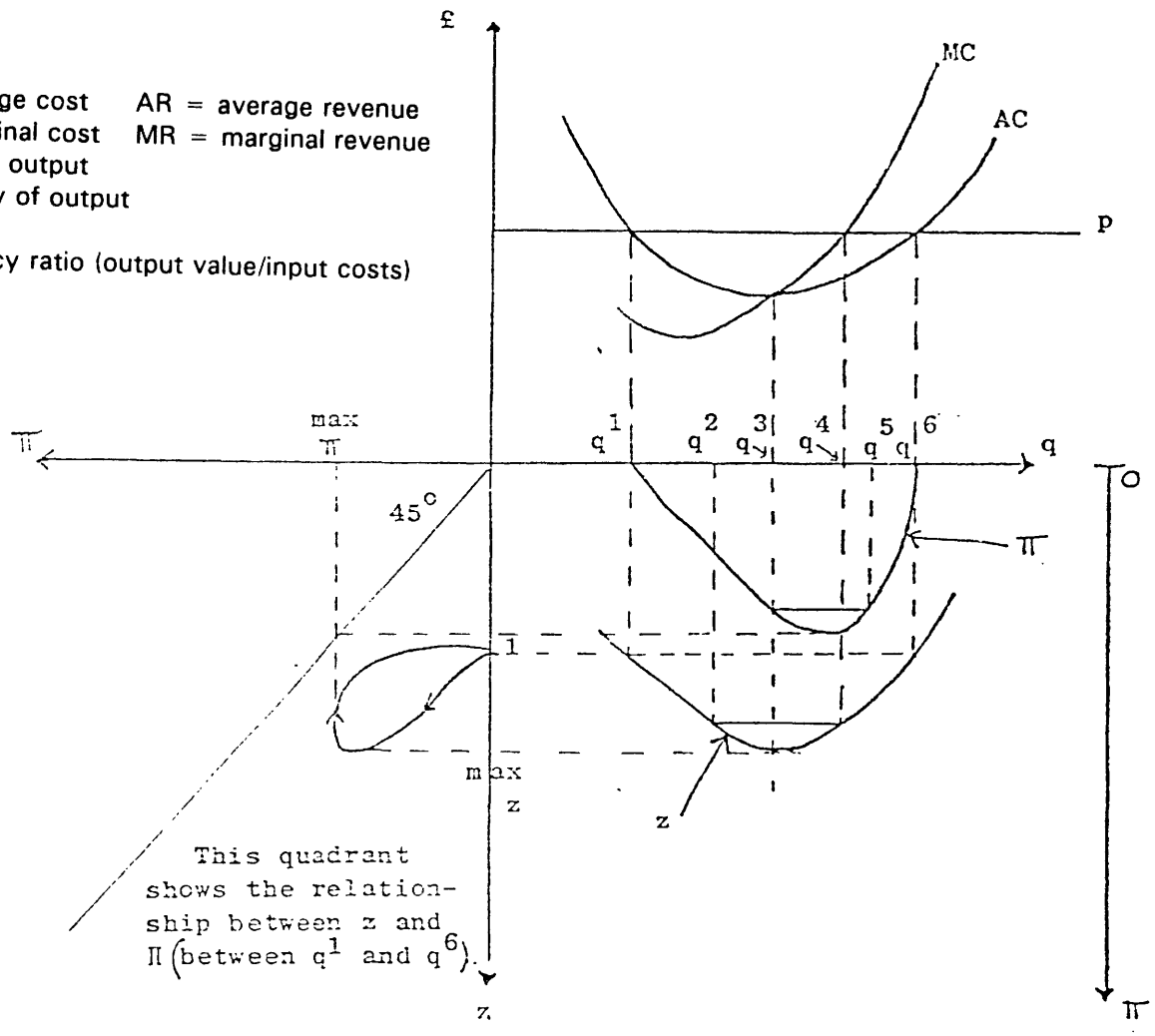
6.6.6 A further complication is that simple comparisons involving the total input/total output ratio do not take account of the fact that the farm groups may face different factor and/or output prices. In a Community context this can be a major source of difficulty if any attempts are made to compare the efficiency of, say, dairy farms in different Member States. Identical physical inputs and outputs could give rise to different value ratios. And one would expect farms to adjust their input mixes and outputs in accordance with the prices they face, so that differences in the ratio might be expected even if all the marginal relationships were being optimised. These problems are not all solved if calculations are undertaken at different sets of prices, chosen from the countries to be compared (see Burrell 1980).

6.7 Interpretation of total output/total input ratios

6.7.1 The above points, which are not an exhaustive list of the theoretical problems to be faced, should engender caution in the use and interpretation of total output/total input ratios. Alternative approaches to the study of farm efficiency should be explored, some of which are touched on below. Nevertheless, these ratios have assumed a role in analyses of the structure of agriculture and would appear to continue to do so. One view might be that the theoretical objections are too carping and, despite them, the ratio has

Fig 6.3 Relationship between profit (π) and efficiency ratio (z)

AC = average cost AR = average revenue
MC = marginal cost MR = marginal revenue
p = price of output
q = quantity of output
π = profit
z = efficiency ratio (output value/input costs)



Source: Burrell (1980)

Note: in this example of a typical firm's relationship between costs and output, the profit-maximising output (q4) is different from the output at which the efficiency ratio (output/input) is maximised (q3). The ratio can take the same value at the maximum profit position and at another output far from this position (q5 and q2). The profit at the best efficiency level can also be achieved at an output which results in another efficiency ratio (q3 and q5). Only when product price corresponds with the lowest point of the AC curve will the output optima for profit and efficiency ratio coincide. In an unreal world in which firms were homogeneous in their technologies and the cost functions they faced, and were in a state of in perfect competition, it might be expected that, at equilibrium, competitive forces would force all firms to operate at the lowest points of their AC curves. However, where these conditions do not occur, ranking firms by their efficiency ratios cannot be taken as a reliable guide to their relative profit levels.

something to offer for judging the desirability of changes in the agricultural structure. No measure is likely to be perfect, and when the main interest is the performance of the industry rather than efficiency, the ratios have much to commend them. When dealing with the disappearance of complete farms, as often happens when small businesses at the margin of viability are sold and their operators retire or leave farming, the whole farm becomes the marginal unit. Its average ratio represent the output from the bundle of marginal resources which then become available for other operators to use (less, of course, the labour of the retired farmer and spouse). Under such circumstances the total output/total input ratio could be a useful tool in steering resources away from some groups of farms and towards others. The ratios are relatively easy to measure and are capable of being grasped conceptually by non-technical policymakers. However, users should be aware of the assumptions they are accepting.

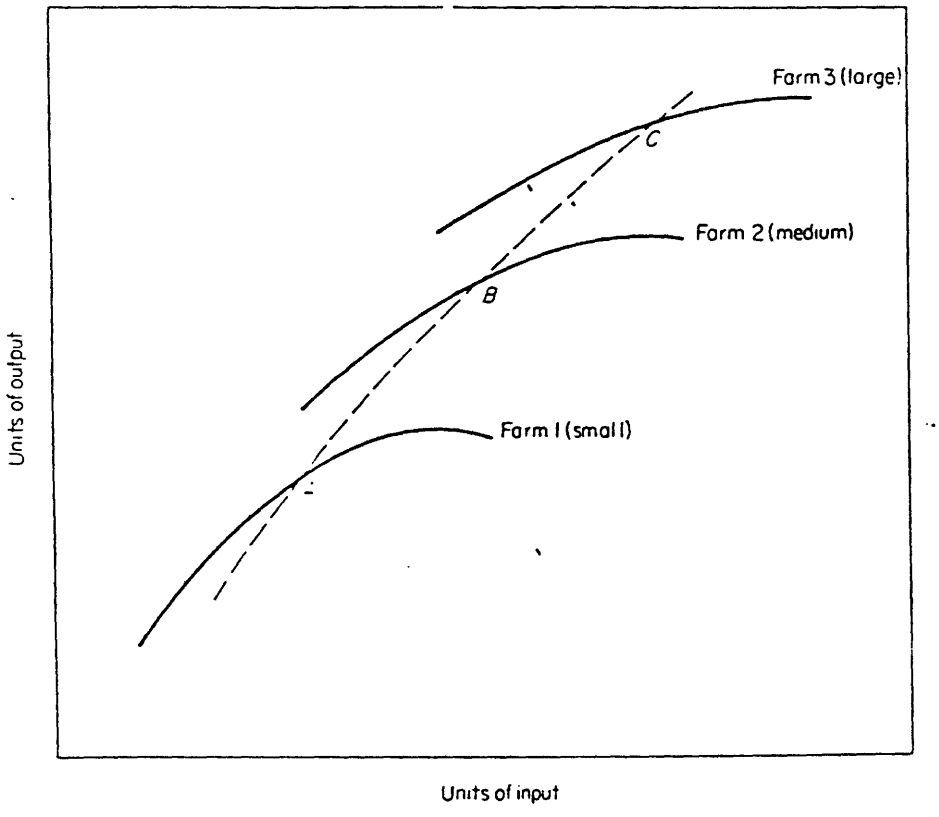
6.7.2 Perhaps the most important conclusion which flows from the above discussion is that it is wrong to assume that an increase in the size of farms will enable them to assume the production characteristics of those farms which are already larger. There may not be a single production function with farms of various sizes at different positions on it, but rather a range of different functions. This was set out simply by Britton and Hill (Fig 6.4). There may be good reason, not least the restricted management ability of the occupiers of small farms, which constrain the performance of these farms even if they were able to acquire more fixed resources. There is some evidence that increases in farm size is associated with greater fragmentation (Edwards 1978). The net improvement in industry performance may therefore be less than was anticipated. This is also reflected in the common experience among non-farm firms that economies of size that are anticipated when growth occurs, perhaps being the reason why growth policy is pursued, often fail to materialise. This is one more area where a time series of RICA data on individual farms could be very valuable.

6.8 Alternative approaches to measuring efficiency

6.8.1 In view of the various theoretical difficulties associated with the total output/total inputs ratio, alternative methodologies need to be investigated. These involve econometric techniques which go beyond the calculation of economic indicators as envisaged in this present study. Nevertheless, RICA would seem to provide the sort of data which these techniques need. Without going into details, it seems that there are two broad approaches such studies could take.

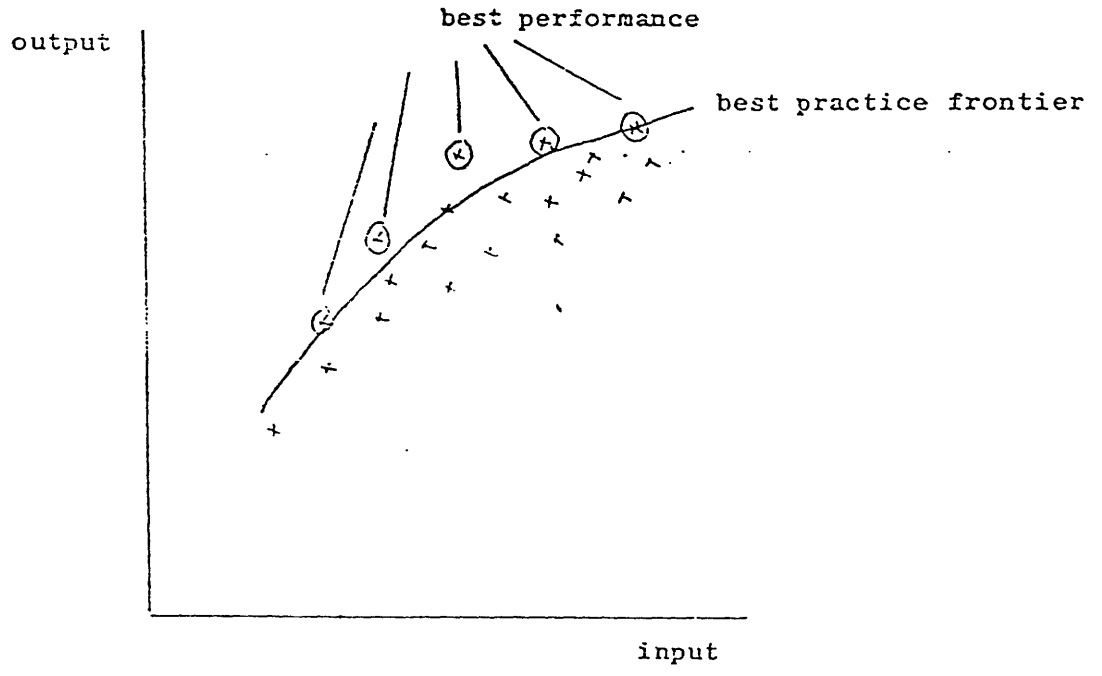
6.8.2 The first is to estimate a production function. The assumption is generally made that a population group of firms has a common technology which can be described using a single production function. From a random sample of farms, inputs and outputs are measured and this information is used in a regression analysis to estimate the parameters of the production function. In turn the sample's "average" marginal value product is calculated for each

Fig 6.4 Derivation of a false production function from inter-farm comparisons



Source: Britton and Hill (1975)

Fig 6.5 The "best-practice" frontier



Source: Burrell (1980)

input. "If these marginal value products are not significantly different from the corresponding representative marginal factor costs, then it is concluded that the sample is allocatively efficient, and this conclusion is then extended to the population from which the sample was randomly drawn"(Burrell 1980). This technique can be used to test the allocative efficiency of two or more sub-samples of individual cases separately, given adequate numbers. More sophisticated approaches allow the comparison between two groups of firms of their technical efficiency separately from their allocative efficiency.

6.8.3 There are general problems to be faced when using non-experimental data for the estimation of production functions, and particular problems when using farm accounts data, such as the UK's Farm Business Survey (Lingard 1978). These include the lagging of rents resulting from the legislative frameworks and the well-known problems with the imputed labour costs for the farmer and spouse and the omission of managerial charges. Such techniques have, however, been used (for example, Anderson and Powell 1973, Hoch 1976, Rasmussen and Sandilands 1962).

6.8.4 The second approach is to estimate a production function which represents the maximum output obtainable from these inputs using current technology (after the concept put forward by Farrell (1957)). This frontier can be corrected for unusually favourable conditions beyond the control of the operators (see Fig 6.5). Technical inefficiency is represented by farms lying inside the frontier. Estimates of the degree to which a sample of reasonably homogeneous farms (say, specialist dairy types with similar types of inputs) approach the frontier can be made. In principle this technique could be used to make comparisons across national boundaries. A recent example of using this technique, in the context of Phillipine rice farms, is given in Dawson and Lingard (1989).

6.9 Implications for RICA

6.9.1 Two avenues of research seem to present themselves. Both are dependent on a clarification of the policy needs of the CAP. The first, which follows the well-established methodology described in sections 6.3 to 6.7 above, is to explore a range of whole-farm and partial efficiency measures using the ratios of performance already in common circulation (total output/total inputs and various output/ single input indicators). Lund and Hill (1979) suggest that an appropriate starting point is the ratio between the values of total-outputs and total-inputs, though then one may wish to move on to examine how these measures vary between farms classified according to their use of a specific input, say land or labour.

6.9.2 In calculating the total output/total input indicator there is a necessity to discuss with RICA staff their preferred treatment of items such as increases in the value of stocks. On the input side the problems of imputation, particularly concerning labour, also require careful consideration. It could well be that the most satisfactory solution is to use for purposes of exploration a range of

measures of outputs and inputs, some taking a broad view and others excluding those elements which are likely to incur serious measurement error. It could well be that the measure would prove not to be very sensitive to adjustments in the statistical defintion of parameters involved.

6.9.3 The groupings by which analysis should take place, as with so many aspects of this present study, are dependent on the policy objectives for which the analysis is required. Size of business is one obvious possibility, though the use of ESU may present problems of interpretation if a policy is conceived primarily in area terms. Whichever groupings are chosen, the evidence points to the importance of considering the distribution of performances around the means. Sturgess (1984b) suggests that this might be done more effectively in terms of means and quartiles than by standard deviations, since the former are more readily comprehended by non-statistician policymakers. An extension to deciles might be considered; from time to time, commentators on the agricultural situation like to focus upon the "top 10 per cent" and/or the "bottom 10 per cent". Comparisons of ratios of farms in Less Favoured Areas and other areas, and across national boundaries, are subject to heavy caveats, as outlined above.

6.9.4 The other line of investigation is to encourage the use of RICA data for econometric analysis. This may mean making available to institutions outside the network banks of anonymous but harmonised data.

CHAPTER 7: INDICATORS OF PROFITABILITY, BUSINESS PERFORMANCE, FINANCIAL STATUS AND VIABILITY[1]

7.1 Outline of the Chapter's structure

7.1.1 One of the objectives cited in the basic legislation (Reg 79/65/EEC) setting up RICA was to use the data collected for a business analysis of

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[1]The contribution of Nigel Williams, Farm Business Unit, Department of Agricultural Economics, Wye College, to parts of this Chapter is gratefully acknowledged.

agricultural holdings. The aims of this section of the research project on the calculation of economic indicators are as follows:

- to examine the measures of profitability, business performance, financial status and viability that are currently in use;
- to assess their validity;
- to identify any gaps in the data currently being collected; and
- to make proposals for further research on the selection of relevant predictive indicators of profitability, business performance, financial status and viability.

7.1.2 This Chapter is comprised of two parts. The first considers from a conceptual viewpoint the indicators which are appropriate for examining a range of facets of business behaviour. The second looks at those which are currently in use in farm accounts surveys. There is inevitably some overlap with the review of the past and present income indicators used by RICA (Chapter 3); in that context farming income was seen primarily as a source of personal income for its operating family. But the same magnitudes can be viewed from different perspectives. Here we are concerned with the farm essentially as a business, and the performance parameters are principally those which could be those which might be applied to production irrespective of the type of product. For example, there is nothing uniquely agricultural about return on capital. Nevertheless, there are some indicators of business performance which may have particular uses in an industry which is characterised by the use of one factor - land. These are of special utility which analysing the differences of performance found among farms of the same type.

7.1.3 There is some commonality with the measures of efficiency and average factor productivity, discussed in Chapter 6, but there the focus was the performance of the agricultural industry as a user of resources. Here, in contrast, we look at the use of these and other measures in the context of the performance of individual businesses. In this farm-orientated context, it may well be that partial productivity measures are a useful tool for monitoring business performance.

7.1.4 For convenience this Chapter deals with the subject in three sections:

- profitability and business performance;
- financial status;
- viability.

This subdivision is essentially artificial; in practice the notion of business performance in the short-run merges with business growth and, its opposite, business contraction and viability. The financial status of the business is only one of the characteristics which can effect both its performance and its ability to survive. But this status has been identified as a particularly important factor in viability and merits special attention. Nevertheless, for the present purpose it is helpful to present the material in three sections.

Part I Conceptual issues.

7.2 Introduction

7.2.1 A problem with any attempt to assess business performance is that there needs to be a definition of success or failure. No single measure is likely to give an unambiguous assessment of whether the business is performing well or not. To take two examples, a high rate of return on capital may be achieved as a result of very low investment in capital, to the long term detriment of the business. A level of operating surplus per ha may be achieved, but it may be insufficient to meet the loan servicing costs of a heavily indebted business. Harrison and Longworth (1977) use the dual objective of maximising business net worth while minimising the risk of firm failure in their study of the growth of farm businesses. Charlton (1971) simply measured the change in net worth. Upton and Haworth (1987) used four parameters of growth in size - farm gross output, area, labour and machinery depreciation. But each of these were studies by outside observers of farm businesses; the farmers themselves might not necessarily concur with any of the chosen criteria of success. However, they illustrate that the assessment of business performance may involve a range of possible criteria and, in the face of contradictory indicators, may devolve to a value judgement.

7.2.2 The assessment of business performance is not neutral and reflects the nature of the assessor. Performance can be viewed from three main perspectives - the farm, the public policymaker, and the other sectors of the economy which are closely related to agriculture (especially banks and other lending institutions). Each group will have its own reasons for wanting to know about the performance of farming and therefore its own information needs in terms of indicators of that performance. While the indicators may overlap, they are unlikely to be identical. Fulfilment of personal goals will lead a farmer to perceive himself as successful ("subjective success"). Fulfilment of goals that external actors (the European Commission, national governments, banks, associations etc) consider important leads to the farmer being judged as successful by his surroundings ("normative success"). Olsson (1988) points out that an individual can be successful on both counts simultaneously, but different criteria of success are involved because the objectives are likely to be different. In reviewing the economic indicators of farm performance which RICA currently calculates, and the alternatives which might be explored, it is necessary to bear in mind whether these are for the information of the Community's farmers, the Commission, bankers or whoever. For present purposes it is assumed, though by no means certain, that the Commission's needs are the dominant element.

7.2.3 Viewed from the farm level, the judgement of success or failure of the farm business will depend on the objectives of the farmer and the extent to which he achieves them. Only when objectives have been clarified can the indicators which are appropriate to these objectives be chosen; without specified objectives it is difficult, if not impossible, to detect success or failure.

There will be interpersonal differences in the assessment process: it is by no means certain that what is deemed successful by any single farmer will be seen as success by other farmers. For any individual the objectives of his farming activity, and thus his perception of success, will change over time (Olsson 1988). There may be conflicts of forms of success; Olsson found in Sweden examples of farmers who were working towards achieving certain personal objectives, unaware that their "success" in that direction was weakening the ability of the farm firm to survive in the longer run. Conversely, there were farmers who regarded their farming as "failing" because they were experiencing liquidity problems, even though on other criteria of business performance they were doing well.

7.2.4 Little research seems to have been conducted into what farmers perceive as the best indicators of farm performance in the short, medium and longer terms. Rather dated work (Black 1965, 1966, 1967 and Gasson 1973) suggests that, in general, farmers attach high importance to the physical performance and appearance of their farms, with being technically up-to-date a major motive underlying investment. Among the four main groups of motives and goals held by farmers in Gasson's survey (intrinsic, expressional, instrumental and social), the income generating ability of the farm was not among the highest placed, even among the larger farms which are often assumed to have a more commercial attitude. Others, notably the reward from undertaking the physical tasks of farming and the independence that the job entails, featured strongly. Such findings help explain, for the UK at least, the ready response by farmers to grant aid schemes that enable them to re-equip their farms with buildings and machinery and, on the other hand, the slow takeup of pensions which may compensate for monetary profit foregone but does nothing to replace the other rewards which are associated with the activity of farming. Farmers, it is claimed (Poole 1989), have a complex mix of goals and objectives and these change over time; whereas in a new business the prime objective may be financial stability, twenty years later it may be to pass the business to an heir. This is supported by work in Sweden (Olsson 1988) which showed that farmers had a variety of personal goals they seek to achieve, most of them non-economic. Survival of the business and the possibility of the next generation carrying on the farm were mentioned. Again this finds echoes in empirical studies in the UK where the presence or absence of a successor has been identified as an important determinant in farmers' investment strategies (Harrison 1975). More research in this area of farmer goals would seem to be justified.

7.2.5 There seems to be little information on the economic data needs of farmers and the information which they look for in pursuit of the objectives. Gasson (1989) in reviewing the literature in this area concludes that it is long on theory and prescriptions but short on descriptions of how farmers actually manage their businesses, including the financial information they use. Reference is still made to a detailed study for the USA in the 1950s (Johnson et al 1961), since when the economic and management environments have undergone substantial change. Some idea can be gained of the needs and use

of economic data from more recent work in the USA which studied the financial accounting practices of commercial farms and the reasons why accounts were prepared and how they were used (Jones, Sonka and Mazzocco 1982). In a random sample more farmers prepared balance sheets than "cash flow" (income and expenditure) accounts (69 per cent against 48 per cent). Two thirds of those preparing balance sheets cited credit acquisition as the major reason for doing so, and a similar proportion gave this reason for preparing the income account. Business analysis was given as an additional reason for 58 per cent of farmers who prepared balance sheets. Other reasons for the income account included the analysis of investment alternatives, formulating market strategies and tax planning. Though 24 per cent of farms managed without either type of account, there were clear links with the characteristics of the respondents. Higher levels of borrowing were positively associated with the preparation of financial statements, the proportion preparing income accounts rising the more rapidly. Bigger farms were more likely to prepare these statements, perhaps because they needed higher degrees of management. And younger farmers were more likely to prepare them than older farmers.

7.2.6 Broadly similar findings emerged from a (non-random) sample of farms in the UK as part of a study for the Agricultural Training Board of the way that farmers manage and control the financial sides of their businesses (Gasson 1989). The bank statement was the source of information most quoted by farmers (55 times by the sample of 92 farmers), about twice the frequency of any other. Management accounts were quoted less frequently than profit and loss (tax) accounts (18 as opposed to 25 cases), even though half the sample were members of some farm accounting scheme (Farm Business Survey or others). This suggests that historic balance sheet data and taxable profit (together perhaps with the main elements of revenue and costs) are the items in greatest demand. However, a typology emerged from the sample, with a "low-control" group relying mostly on bank statements and accountants' (tax account) figures. The "medium-control" group were the most likely to use enterprise costings which, while they may provide some financial indicators and inter-farm comparisons, are essentially historical rather than forward looking. The "high-control" group relied most on forward budgets and mentioned the widest array of information sources. The best of these farmers using these budgets were tending to make their farms perform in line with the budgeted figures rather than have the figures simply reflect what the farm had achieved. Among the factors associated with higher degrees of business control, a greater dependence on hired labour was more closely associated than farm size, farmers relying wholly on family labour tending to be only low or medium controllers. Among personal characteristics, while the age of the respondent (or senior farmer) was not significant, an important association was found with the presence or absence of full-time agricultural college education; exposure to this sort of education was the important influence rather than specialist management training.

7.2.7 Though these studies may not be directly applicable to an EC-wide situation, and while they do not reveal in detail how data might be used to

measure success at the farm level, they suggest that the structural changes which are occurring in Community agriculture will lead to increased demand for farm-level financial information. It should be noted that the 1979/80 Farm Structure Survey found that only 22 per cent of Community holdings kept accounts (though this had risen from the findings of the Surveys in 1966/67 and 1970/71), and book-keeping was the norm only in the Netherlands, Denmark and the UK.

7.2.8 The view of success and failure of farms and farmers as seen from the EC Commission may differ from that of individual farmers, or of farmers collectively. Indeed, within the Commission's perspective there are likely to be a range of business performance criteria which relate to different policy objectives (production, employment, income generation, competition and so on). Within the present RICA data system a myriad of economic indicators could be calculated, based on different breakdowns and combinations of the outputs and inputs to the farming businesses. The choice of which should be estimated should flow from the objectives of policy to the choice of economic indicator. While some objectives of farm businesses can be hypothesised, and indicators of performance in relation to these suggested, these should not be considered as substitutes for a critical examination by RICA of what is considered success of farm businesses from the point of view of agricultural policy. It should also be stressed that the information needed for the management of individual farms, which might show the relative performance of individual enterprises and factor uses within the business, is not necessary the same as is required for CAP purposes.

7.2.9 In the absence of empirical evidence on farmer-preferred financial indicators of farm performance, it is necessary to observe the practice of the analysts of farm accounts. Hayton (1988) identifies three targets for a farm business:

a) provision for the livelihood of the owner;
b) maintenance of business assets; and
c) sufficient business growth to ensure long term survival.

The personal goals and circumstances of the owner (eg amount of leisure time, provision for family education and the stage of his career) will influence the level of provision in (a). Cash income cannot be gained at the expense of (b) in the long term if the farmer wishes to maintain net worth and the earning potential of his assets. The farmer must also set aside sufficient resources to finance business growth. However, the farmer may use credit to finance capital acquisitions in anticipation of future profits. Hayton suggests that if the average medium and short term capital of a business is £1500 per ha, then upwards of £30 per ha of profit will be needed over and above personal consumption and asset maintenance to support an annual 3% growth in the business.

7.2.10 The business itself is dynamic and Hayton identifies three phases in the life of a business:

a) establishment;
b) expansion; and
c) consolidation.

The three business objectives given above will remain the same, but their relative weightings will alter as the business moves from one stage to the next, eg as the operator approaches retirement he may invest in non-farm assets to maintain retirement income.

7.2.11 Even such an apparently simple objective as maintaining the productive capacity of the business may be fraught with problems of specification. Is the productive capacity measured in physical or value terms? If the former, how is technological advance to be handled? Productive capacity is often seen as being related to the stock of capital available to farming. This suggests that the maintenance of the capital value of the business can be taken as a measure of success. But more productive replacement capital could maintain physical output using a smaller capital stock, which would be compatible with a view that the business was shrinking because the resource base of the business was in decline. If the latter, with productive capacity maintained in terms of value, then the business needs to expand in a physical sense in order to maintain revenue in the face of the cost-price squeeze which characterises agriculture. Consideration also needs to be given to whether agriculture is to be considered in isolation from other industries, or whether allowances should be made for changes in relative success between industries.

7.2.12 One of the major problems associated with the financial analysis of businesses is that there is a lack of a sound theoretical base for many of the indicators that are employed in such work. Frequently the measures that are used are little more than 'rules of thumb' that have been derived from informal empirical observation over a period of time. The critical values of the indicators are frequently imprecise or couched in broad terms so that they may be applicable across several industries and over several time periods. The cost of this wide applicability is a loss of precision within specific industries and periods. As noted above, the indicator chosen can have considerable implications for the analysis, and different indicators can give conflicting pictures. For example, in the UK context Lowland cattle and sheep farms are notoriously unsuccessful when Management and Investment Income (which includes a charge for the opportunity cost of the land) is used as the measure of business performance, with negative values being recorded for several subsequent years (Williams, 1989). However, the use of Occupier's Income (which is not net of such notional charges) indicates that the farms generally produce a surplus.

7.2.13 Recent research work on measuring the performance of businesses in its broadest sense has mainly concentrated on the prediction of financial failure,

although some work has been done on farm capital change (Harrison 1975) and increasing farm gross output (Upton and Haworth 1987). Frequently these studies of financial failure consist of little more than 'brute empiricism' (Shailer 1986), with a multitude of financial ratios being studied and discarded until a relatively few remain which are found to be the best 'predictors' of failure in the businesses under study. Unfortunately the scarcity of data available to such researchers means that they usually only have sufficient observations to enable them to identify the measures that are common to the failed businesses, usually in comparison with a control group of non-failed businesses. They are rarely in a position to test these predictors of failure on other businesses that failed at the same time (a 'hold out' group) or failed businesses in other time periods.

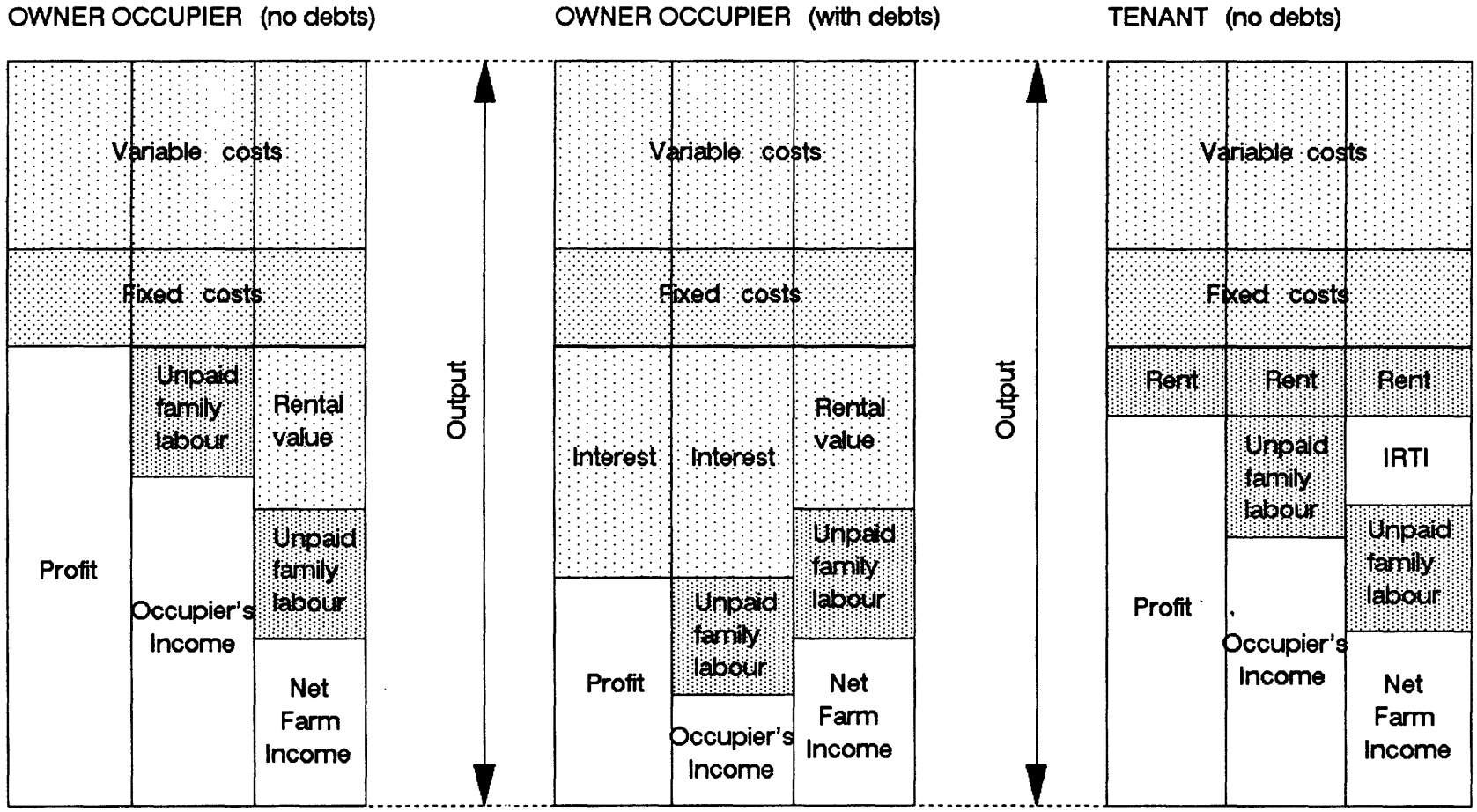
7.3 Indicators of whole farm business profitability and performance.

7.3.1 The usual starting point for assessing business performance is the trading profit and loss account. A trading profit and loss account, to which the RICA return approximates, gives little direct information on the health of a business beyond indicating the level of operating surplus for the year. There are also several different measures of operating surplus. The least reliable is taxable profit since this is a surplus calculated with the objective of minimising tax liability (mainly on personal incomes) rather than indicating business performance. As such it will be dependent on conventions governing stock valuations and capital depreciation that have little or no relationship to economic values. Similarly, the value of family labour may be under or overstated to minimise tax liability. The level of taxable profit recorded will vary considerably between farms with similar outputs and costs due to differences in tenure type and levels of indebtedness. This is illustrated in Fig 7.1. Obviously, this wide variation in profit does not accurately reflect the technical or financial performance of the farm as a production unit.

7.3.2 The Handbook of Legislation governing the RICA Farm Return is explicit that, in the important matter of depreciation of machinery and equipment, the aim is to keep as closely as possible to the actual depreciation in value of the machinery (p III/50). To this end accountancy offices are allowed to chose rates appropriate to the region or holding, implying that different rates apply between (and possibly within) Member States. The treatment of depreciation of buildings and works is not specified in the Handbook, though it seems likely that similar conditions apply. The aim is clearly to achieve a uniformity of result (ie a realistic estimate of capital consumption) rather than uniformity of rates of depreciation. The use of taxation rules, such as where they allow accelerated depreciation or are based on historic costs, is inappropriate.

7.3.3 Substantial differences in taxation regimes, as applied to agriculture, are found between Member States (Reid and Girling 1982, Hill 1988). Taxation based on accounted incomes seems to be levied in only a minority of States (Denmark, Netherlands, Germany, UK) with farmers in the others being taxed either on the "forfait" flat rate system or in effect falling outside the tax net. Consequently the same nominal pre-tax income may imply very different levels

Fig 7.1 The impact of tenure and indebtedness on residual (taxable) profit



(a) Fixed costs include regular labour and depreciation

(b) Occupier's Income and Net Farm Income are concepts used in the UK

(c) Tenants with debts would have lower profits (and Occupier's Income) by the extent of interest payments

IRTI = imputed rent on tenants improvements

of post-tax income in different Member States. Comparisons of the profitability of farming between Member States cannot be made satisfactorily without taking into account the various tax regimes. Before inter-country comparisons of post-tax purchasing power could be properly made, information on the differing costs of the consumer goods purchased by farm households would be needed. But even the first step of this comparison is difficult since no up-to-date inventory of the taxes on farming seems to be readily available. Nevertheless, it is clear that, at least in some countries, the success of the farm business is perceived as a post-tax phenomenon. There is plenty of evidence that decisions concerning investments in new and replacement machinery are influenced by short-term variation in the level of taxable income, with tax minimisation a business goal (CAS 1978). Though less firm evidence is available, this is thought also to affect investments in buildings and works. Such investment will have an impact on the level of farming income in the short term via depreciation, and in the longer term through greater volumes of production and/or labour substitution.

7.3.4 In North America the rewards from farming in the 1970s was seen as arising from three sources: current productive activity; real estate; and financial planning, including tax planning. At present information on the personal incomes of farm operators is not gathered within the RICA framework, though national farm accounts surveys in some countries collect the data (Denmark, Netherlands, Germany). There seem to be sufficient grounds for a detailed study of how taxation in Member States impinges on farm production and investment decisions, and for a consideration of the practicality of collecting data on tax payments within the RICA. Because of tax-minimising procedures and the carrying-over of losses, it is desirable to examine tax payments and post-tax incomes over a run of years, further reinforcing the need for longitudinal time series for individual farms which has been indicated on a number of occasions in this Report.

7.3.5 Within the accounting conventions adopted by RICA, and national farm accounts surveys in Member States, a wide range of indicators can be calculated which could be termed as "operating surplus". Essentially these measure the difference between the value of output from the farm business and the value of the inputs used to generate it. However, not all outputs and inputs need to be included in the accounting system and therefore in the estimation of business parameters. Different treatments may be given according to whether outputs or the use of inputs result in cash payments within the accounting period or whether they are imputed. Another distinction is whether they cross the farm family boundary (ie ownership). Among inputs, those which do not directly vary with the level of planned output may be excluded. Such classifications have been developed for purposes of farm management advice, the history of which is traced by Lloyd (1968) and Giles (1986).

7.3.6 The measures of operating surplus that have been used as measures of income for the purpose of assessing business performance include the following:

Cash Flow: among the financial parameters, there is a feeling among commentators that various form of cash flow are closer to farmers' perceptions of profitability, at least in the short-run, than accounting profit or the income measures commonly used in farm accounts surveys (Lund and Watson 1981). As pointed out in Chapter 3, Cash Flow can take a variety of forms and can either relate solely to the business or encompass the other flows to and from the farm household.

Farm net value added; This measure, used by RICA, is defined as output less specific costs, overheads and depreciation plus the balance of taxes and subsidies. It represents the return to all labour, land and capital. (see Fig 7.2).

Family farm income (or Farm Family Income in RICA terminology); this is farm net value added less wages, rent and interest, but plus investment grants and subsidies. As such it represents the return to the farm family for their labour and own capital. The larger the family, the larger the value, other things being equal.

Operator's income; this as similar to Farm family income, except that the value of unpaid family labour (excluding farmer and spouse) is deducted in arriving at the surplus. It represents the surplus available to compensate the farmer and spouse for their labour and own capital invested in the business. It is close to what might be interpreted by farmers as profit. The level of operator's income will vary considerably with the level of indebtedness of the business and the tenure type.

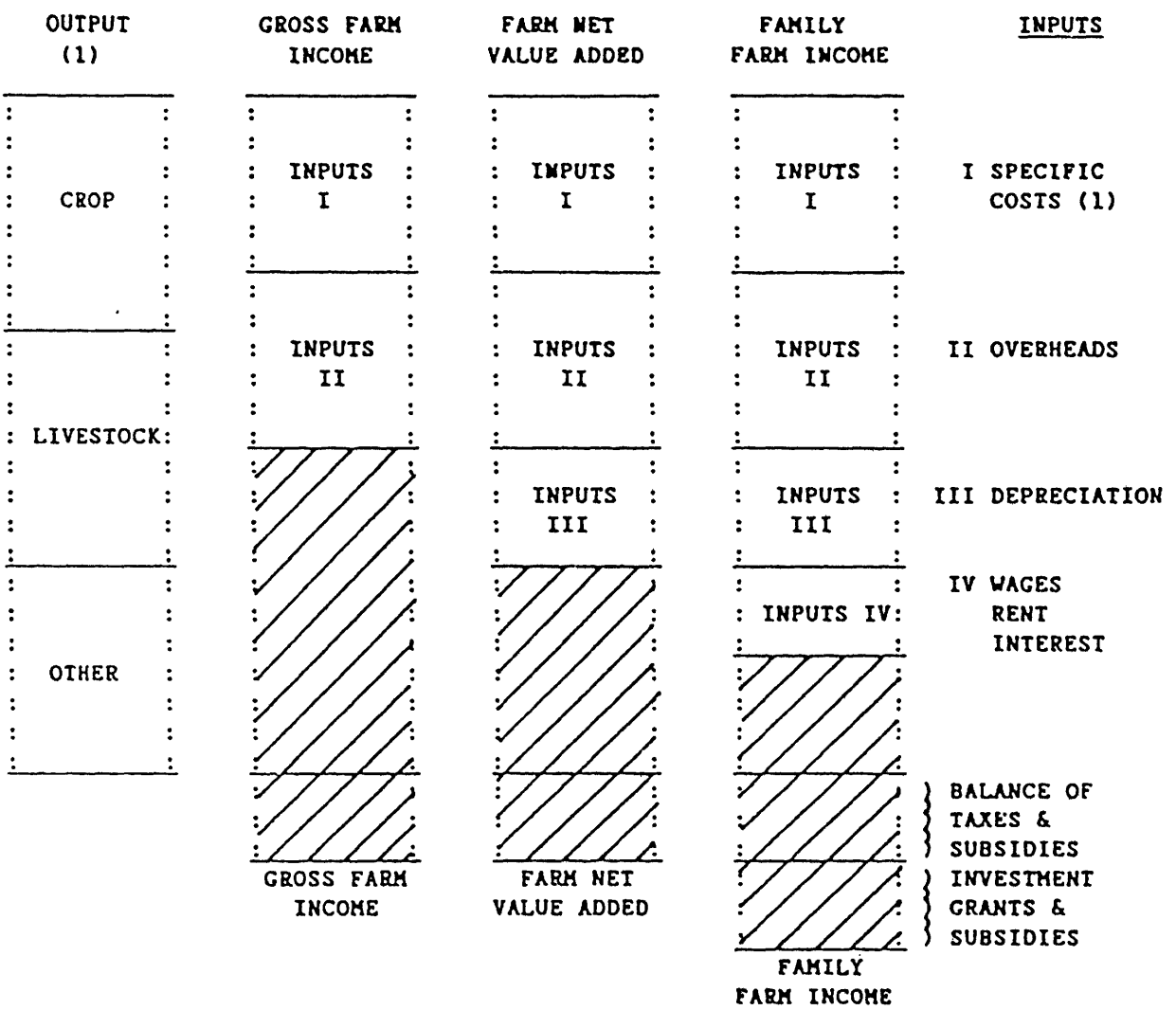
Various forms of "standardised" measures are encountered, designed to put businesses operated under different capital, tenure or labour structures onto a common basis. Among these are:

Net farm income; as used in the UK, this imputes a cost for owned land and ignores all interest payments. As such, NFI represents the return to the farmer and spouse for their labour and to the medium and short term capital invested in the business. As can be seen from Fig 7.1, this measure is consistent between farms of different tenure type and levels of indebtedness. It is therefore a very useful comparative measure of technical and financial performance between years and across farms.

Management and investment income; again as used in the UK, this is net farm income less the value of the manual labour of the farmer and spouse. It therefore represents the residual return to the short and medium term capital of the business. This is a superior measure to NFI in that it is unaffected by the level of labour provided by the farmer and spouse.

Return adjusted to full equity; as used in Australia, this is management and investment income plus rent plus interest. This represents the return

Fig 7.2 Diagram of input, output and income as used in FADN results



(1) Farm Use (value of home-grown feed and seed) is included in both Output and Inputs I.

which would have been obtained had the farm been fully owned by the operator. In the opinion of Campbell (1981) it offers a clearer impression of the actual return being obtained from the farm. In a functional sense it is the return to land and capital; in Eurostat terminology it is operating surplus minus the imputed labour cost of the operator and his family.

7.3.7 In that the business of farming represents one possible use of scarce capital, it is reasonable to consider the return achieved. Before proceeding, however, it is important to identify the different types of capital that are in use in agriculture. Farm capital is commonly divided into:

- long term; this is the land and associated infrastructure that makes it possible to farm the land (the farmhouse, the roads, the drainage etc).

- medium term: this includes plant and machinery and breeding livestock.

- short term; this is the working or circulating capital (seed, fertilizer, pesticides, feedstuffs, fuel, fattening livestock etc.).

Because long term capital on rented land is the property of the landlord, in the UK it is often referred to as 'landlord's capital' even on owner-occupied farms. In the USA literature it is called 'real estate' capital. Similarly, the medium and short term capital is frequently referred to as 'tenant's capital or 'non-real estate' capital.

7.3.8 Common capital-related measures of business performance include the following:

Non-real estate (working or tenant's capital) per ha; though not by itself an indicator of performance, the level of capital may reflect past performance and be the key to explaining the level of outputs and labour input. It is highly dependent on the enterprise mix on the farm.

Return on non-real estate capital; This can be calculated in various ways. Within the UK the most common calculation uses Management & Investment Income (that is, after deducting from income a charge for the physical labour of the farmer and spouse) as a per cent of tenant's capital. A high MII is usually associated with a high return, but it is not always positively correlated.

Return including holding gains on working capital; The effect of inflation is to increase the money value of business assets, although the rates of change will vary between assets. As such the level of operator's capital is increased in money terms. These gains are termed holding gains. While this will increase his net worth and may also improve his per cent equity, it does not represent an increase in disposable income (or profit).

The increase in value of breeding livestock (breeding livestock stock appreciation, or BLSA) cannot be consumed by selling some of the stock to liquidate the gain without depleting the productive capacity of the business. The increase in value of machinery or glasshouses means that a greater element of cash inflow has to be set aside via the depreciation provision to maintain that capital stock. Thus inflation has the dual effect of reducing 'income' and increasing 'wealth' in money terms. To give a more informed picture of the return to capital, holding gains may be added to 'income' before expressing the combined figure as a return on average capital (which has also been adjusted for inflation).

7.3.9 Campbell (1981) suggests a series of measures of 'incentive to invest'. Among the rates of return postulated in this context are the following:

- Full equity return (see 7.3.6) (excluding capital gains) over the total capital value of the property

- Full equity return including capital gains over the total capital value of the property.

7.3.10 Whatever the measure used, the surplus itself is the result of various factors (eg intensity, prices, yields etc) and interdependencies between those factors. Lloyd (1968) proposed Fig 7.3 to illustrate these interrelationships. Thus output on a milk producing farm is affected by the yield (eg litres of milk per cow), the intensity (eg number of cows per hectare) and product price level (ECU per litre of milk). The yield will depend on the level of variable or specific costs (eg purchased feed) as will the intensity. The latter will also be linked to fixed or overhead costs (eg labour and power costs). In recognition of the importance of these relationships, a number of ratios have been derived over time which are used in accounts analysis to try to identify the strengths and weaknesses of a business. They are frequently used for comparisons between financial years on the same farm to identify trends, and between the farm and average figures for farms of similar size and type for comparative purposes. They fall into three main groups;

- measures of operating surplus per farm, per hectare and as a percentage return on capital invested in the business. These have already been discussed.
- measures of intensity of production and resource use per farm and per hectare.
- ratios between inputs and outputs.

7.3.11 The main measures of intensity are often expressed both in absolute terms and per hectare. In the latter form they become partial productivity measures. They include the following :

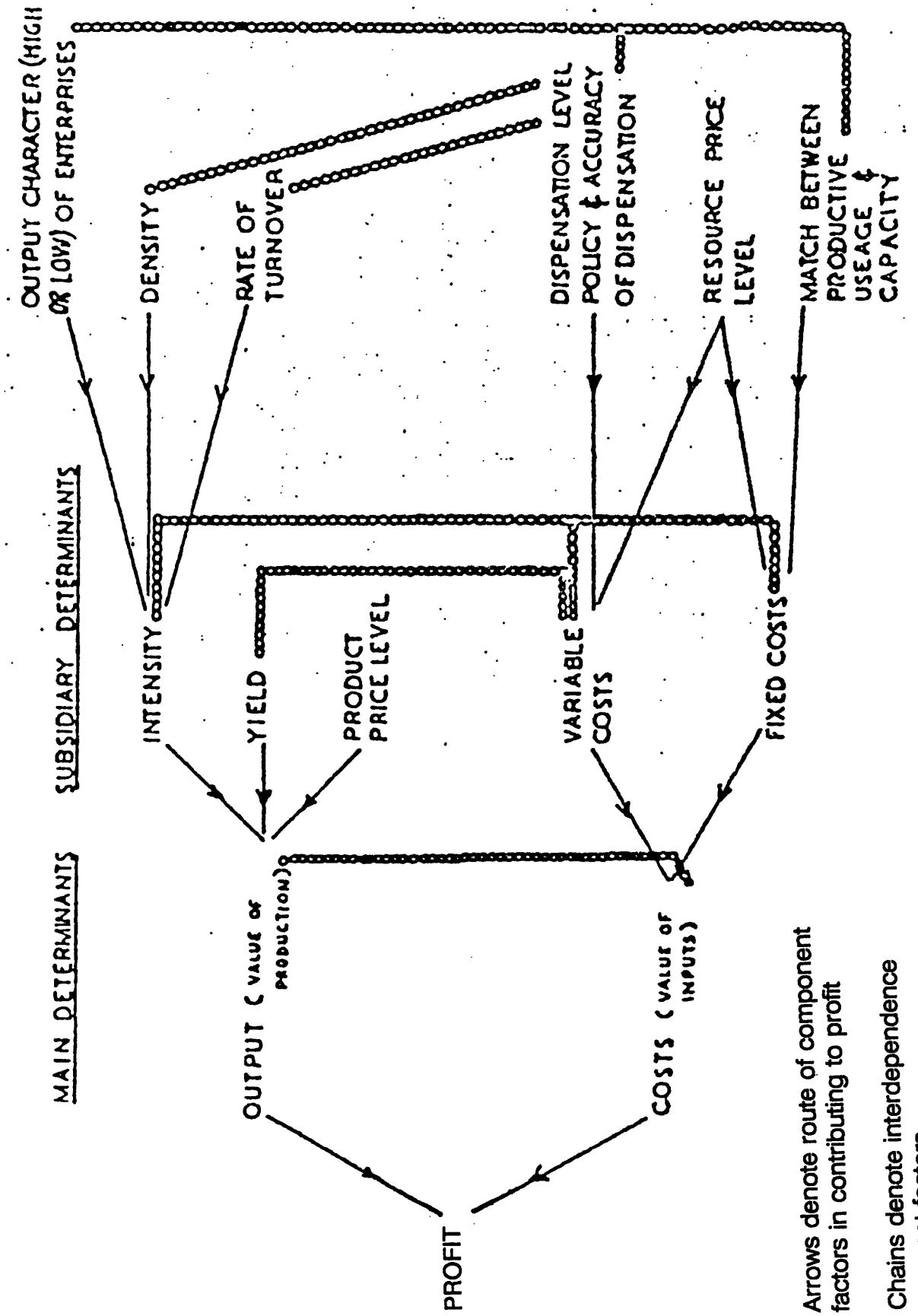


Fig 7.3 Factors and interrelationships promoting farm business profit

Total output, total input; these are of little use in assessing performance etc directly as it they are related to size of business and enterprise mix rather than performance as such.

Total output per ha., total input per ha.; these are reasonable measures of intensity of land use, but problems in inter-farm comparisons of performance are caused by differences in land quality and also in the selection of enterprises. This latter point can be minimised by grouping farms of similar type.

Enterprise output per ha.; There are two definitions - either enterprise output divided by total farm area (which only describes the balance of enterprises on the farm, not their relative performance), or enterprise output divided by enterprise area (which indicates the productivity of the enterprise per ha). Neither takes account of the costs incurred in the production process.

Farm gross margin per ha. This is a measure of intensity of use of land, but allows for the direct costs of production. Some problems arise in that the definition may or may not include casual labour and contract charges as variable costs, which may be direct substitutes for fixed costs. Also this measure does not allow for the allocation of specific overhead costs such as specialist machinery. It may not be a good indicator of profit as high fixed costs may be associated with high gross margin enterprises.

7.3.12 There are some whole-farm measures of performance which are made in physical terms, reflecting the level of yields and intensity of land use. These include the following:

Standard output This applies standard figures to crop areas and stock numbers to show what output would be if performance of all enterprises was at an average level. If above the actual output, then the farm is achieving above average yields or prices, but this may be due to high use of variable inputs.

System index, which is the ratio of farm standard output to group standard output. It provides a measure of the general intensity level of the farm compared with similar farms. It excludes the effect of higher, or lower, yields and prices that the individual farmer may be achieving.

Yield index, which is the ratio of gross output to standard output. It provides a measure of the extent to which farmer's yields and prices exceed (or fall short of) the norm.

7.4 Performance indicators of parts of the business

7.4.1 Enterprise gross margin. This is the contribution that each enterprise makes towards the fixed costs of the business. It gives a better measure of enterprise performance than enterprise output as the direct costs of production are deducted in the calculation. Note that the problems itemised above also apply. The approach also ignores complementary and supplementary relationships between enterprises. It is not possible to calculate enterprise gross margin from the data in the RICA return except on single enterprise farms because the variable cost data is not recorded on an enterprise basis.

7.4.2 Cost accounting or net margin. In its most extreme form, in full cost accounting, all costs, including overheads, are allocated between enterprises according to their use of them, leading to calculations of full costs of production. This requires very detailed recording of labour and machinery use, so is very time consuming. Many of the allocations are arbitrary, eg office expenses. Nevertheless there are advocates for using a margin net of the cost of capital. Hume and Smith (1974) proposed such an approach for farm planning purposes, pointing out that, with increasing amounts of capital tied up in livestock enterprises and the tendency for the expansion of cattle to be financed on borrowed funds, it was important to allocate the cost of capital involved in livestock and building expenditure. More recently Giles (1986) has given as reasons for adopting a net approach the following:

- the growing magnitude of fixed costs
- the need to know how they are used
- the need to understand how farm profit has accrued
- the need to assess the effect of introducing "alternative" enterprises, or of eliminating enterprises.

However, as with gross margins, the approach takes no account of complementary or supplementary relationships between enterprises in their use of fixed resources. Inputs are not valued at their opportunity costs. Although it purports to show the full contribution of each enterprise to overall farm surplus, the deletion of an enterprise is most unlikely to change the overall surplus by that enterprise's net margin because of resource fixities.

7.4.3 There are specific indicators used for measuring the performance of livestock enterprises and the associated forage production. They are expressed per unit of land and can therefore be interpreted as partial productivity measures. These are as follows:

Grazing Livestock Units per forage ha. and adjusted forage ha.; these are essentially measures of stocking density. The former is distorted by purchases of forage. Both are increased by the use of purchased concentrates.

Grazing Livestock output per forage ha. and per adjusted forage ha.; these are measures of output of grazing enterprises. They are directly comparable to crop enterprise output (see below).

7.4.4 As a complement to the land-based partial productivity measures given above, there are parallel indicators based on labour and machinery utilisation. These are as follows:

Gross Margin per unit value (eg per £100) of labour, of machinery, and labour & machinery: These attempt to allow for the effects of fixed costs on the performance of the business. They will give an indication of excessive use of one or both of these inputs relative to output level.

Labour, Machinery, Labour & Machinery costs per ha. These are useful for drawing comparisons between similar farms. They are greatly dependent on enterprise mix.

Labour costs per 100 standard man-day, tractor costs per 1000 tractor hours: These indicate how much the farm is paying for a standardised quantity of the fixed inputs. The labour and machinery requirements of the farm are calculated using standard data. The actual expenditure is then divided by the requirements to show how much these inputs are 'costing'.

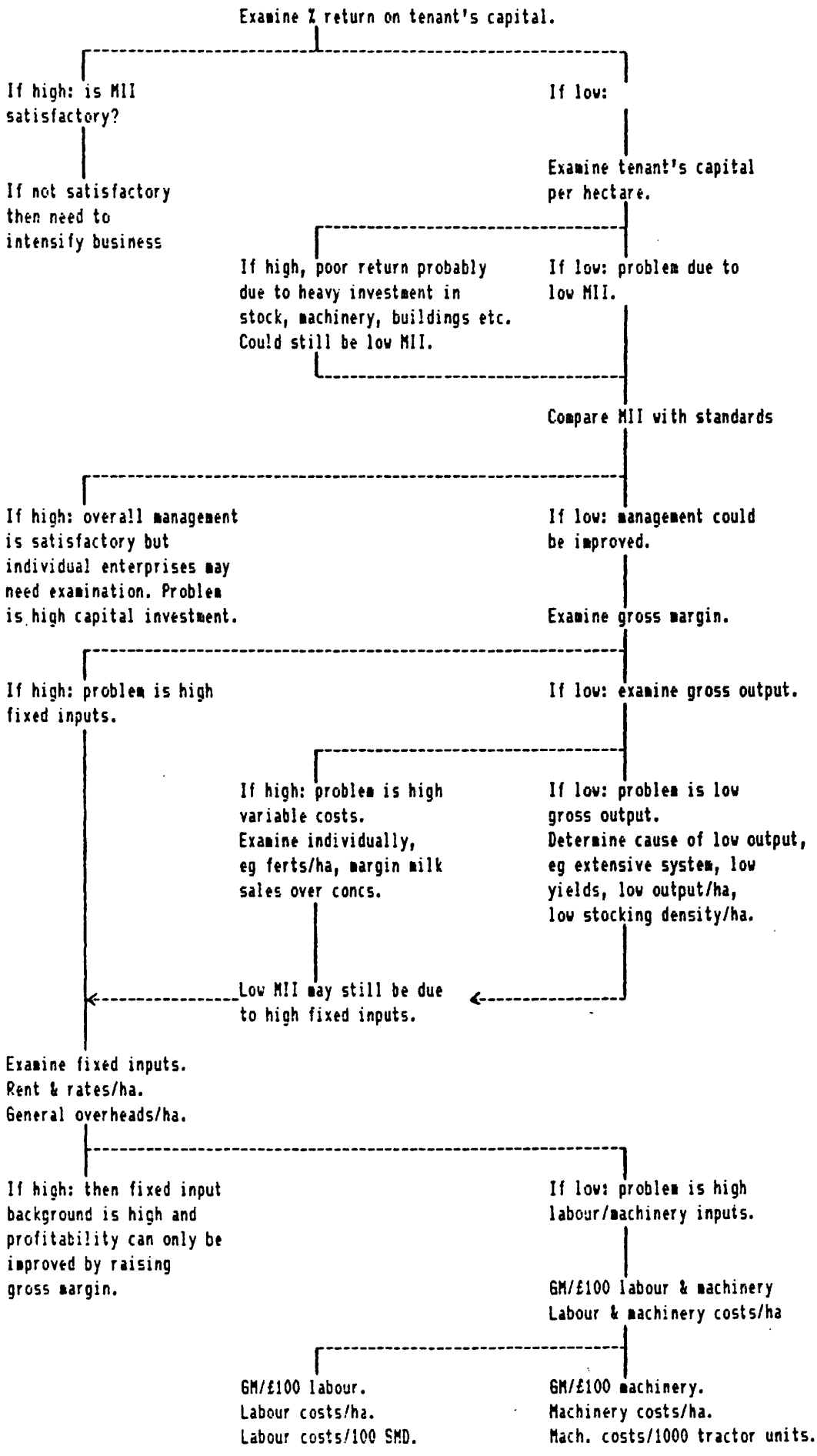
7.5 The validity of performance measures in whole farm business analysis.

7.5.1 An important problem with the above performance ratios is that almost all are average rather than marginal values. As such they do not indicate how the productivity of resources will change if the size of the business is increased or decreased. This can only be determined by detailed analysis using partial budgets, etc, for an individual farm.

7.5.2 Many of the economists who have criticised performance ratios have concentrated on their theoretical shortcomings while failing to present workable alternatives. Individually the ratios may be misleading, but if used together they can help to identify strengths and weaknesses in farm businesses. RICA is not primarily concerned with the problems of management of the individual farm business, and these ratios may well be sufficient for indicating sectors of the agricultural industry where policy problems are developing and for monitoring the progress of groups of farms which may be the subject of special attention by policymakers.

7.5.3 Fig 7.4 shows a flow chart that illustrates the relationship between the various indicators and how they can be used in concert to provide an analysis of business performance.

Fig 7.4 Comparative analysis: systematic interpretation of efficiency measures



7.6 Measures of financial status.

7.6.1 Financial status in this context is a generic term used to cover how the assets and liabilities of the business relate to each other and to the income generating ability of the business. The balance sheet is also a usual starting point for measures of business viability. This is logical since the firm will cease to be a viable enterprise when total liabilities equal or exceed total assets. A number of accounting ratios have been adopted over the years for the analysis of balance sheet data. In addition certain other measures derived from the trading profit and loss account have also been employed. Finally, cash flow data has been used for this purpose as well.

7.6.2 Among the balance sheet ratios the following are commonly estimated:

Per cent equity (Ratio of proprietor's capital (or net worth) to total assets.) Empirical evidence has shown this to be an important determinant of a business's ability to survive in the medium and long term. The higher the per cent equity the less vulnerable the business is to a drop in the value of its assets or occasional trading losses. The lower the per cent equity, the less willing will be a potential lender to put money into the business.

Net capital ratio (Total assets divided by total liabilities). This gives indications of business viability similar to per cent equity.

Gearing ratio (The ratio of loan capital (debt) to own capital (equity)). The higher the gearing the greater the return that will be earned on equity capital for a given level of business income - provided that income is sufficient to at least cover all outgoings. If income is insufficient, then a high gearing increases the prospects of bankruptcy.

Current ratio (Ratio of current assets to current liabilities). This gives an indication of the ability of the firm to survive in the short run. The higher the figure, the better able the business will be to meet unexpected demands for payment from creditors or lenders of short term debt (eg bank overdraft).

Liquidity ratio (Ratio of quick current assets (cash at bank and in hand, debtors, crops in store etc) to current liabilities). This indicates whether current assets (eg growing crops) will need to be liquified (possibly at a loss) in order to meet demands for repayment of short term liabilities. Thus the business may have serious difficulty meeting short term commitments even if the business is perfectly solvent in the longer term.

7.6.3 Numerous other ratios have been proposed, many of them hybrids of the trading profit and loss account and the balance sheet. This is the case with those currently calculated by RICA (reviewed in Part 2 of this Chapter) which include, for example, not only the ratio of current liabilities to net worth but also

the ratio of sales to current assets. Some thirteen ratios appeared in the RICA study of the financial analysis of RICA farms by Hulot and Loyat (1990).

7.6.4 Net cash flow has also been used as an indicator of financial status. This is the cash surplus or deficit in the year after allowing for private drawings and capital investment/disinvestment. A surplus indicates that the net worth of the business is increasing. A deficit over several consecutive years is an indication that the business is not generating sufficient cash to maintain drawings, or capital investment or debt repayment at the current levels.

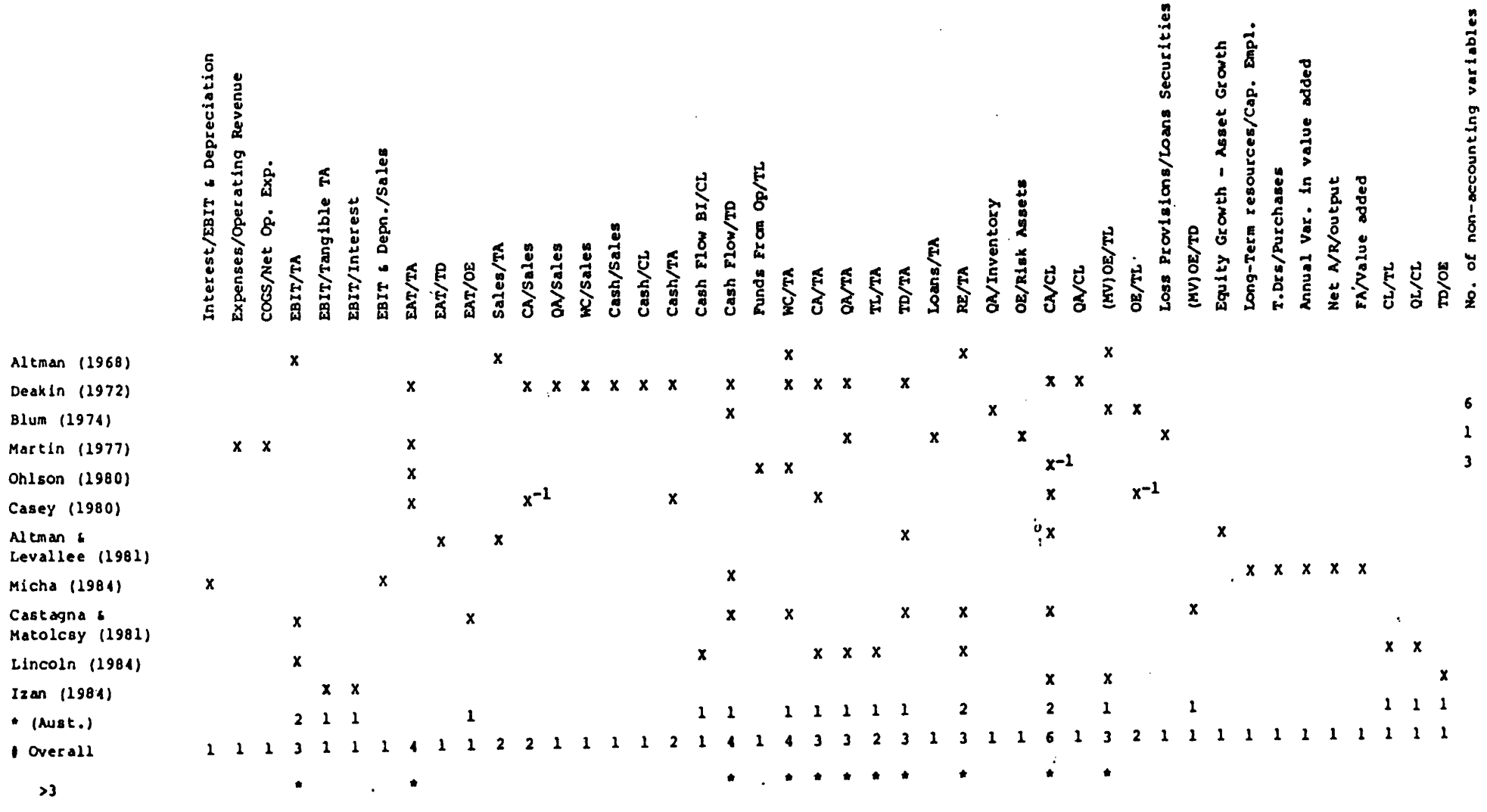
7.7 Prediction of business failure.

7.7.1 There has been considerable empirical work on the use of financial ratios as predictors of business failure. This has mostly been in corporate businesses, but some work has been done on small businesses. Relatively little attention has been paid in the general business literature to business failure in agriculture. This lack of interest may be in part due to the high ratio of capital to turnover in agriculture, effectively precluding those with minimal capital from entering the industry. The availability of capital from off-farm sources may also play a part. This section of Chapter 7 is written as part of a general consideration of business performance and with an awareness that RICA has commissioned a separate study on that subject.

7.7.2 Looking first at work in other industries for some insights into this apparent anomaly, Scott (1981) takes the view that none of the empirical research on predicting financial failure was based on explicit theory. When searching for the best set of financial variables to predict bankruptcy, researchers are neither guided nor restricted by theory. They face an almost unlimited number of possible variables. Since many financial variables are highly correlated the choice of variables is often made on the basis on the slight differences in predictive power. All empirical measures rely on accounting data. Earnings or cash flow variables appear in all models, while debt appears in several. Scott notes that there is a high correlation between many financial ratios so that the statistics tend to be 'over-fitted'. An example of the profusion of measures used in this type of study is given in Shailer (1986)(see Fig 7.5). Scott also argues that business failure needs to be more carefully defined. In many studies it is only bankruptcy, whereas in reality businesses may fail to meet their financial obligations to an extent which does not always lead to bankruptcy, as creditors may 'forgive' small debts to avoid the greater potential losses in bankruptcy.

7.7.3 Among non-corporate businesses the personal characteristics of the proprietor and family may loom large. Analysis cannot take place meaningfully if large elements of the financial situation of the family are ignored. Thus in the context of farm businesses it is necessary to acknowledge that many operators and family members have other economic activities - both income flows and demands on these flows - which can impinge on the viability of the farming business. More specifically, a farm may be kept going as an independent unit

Fig 7.5 Variables used in the reported models of selected major studies



-1 denotes the reciprocal of the listed equation was used.

Legend to Fig 7.5

A full legend is not provided in Shailer (1986). From the text it appears that the following are meant:

CA	Current assets
Cap. Empl.	Capital employed
CL	Current liabilities
COGS	Current operating gross surplus
EAT	Earnings after tax
EBIT	Earnings before tax and extraordinary and abnormal items
FA	Fixed assets
MV	Narket Value
OE	Total proprietary equity
Op. Exp.	Operating expences
QA	Quick assets
QL	Quick liabilities
RE	Gross value of freehold land and buildings
TA	Non-current tangible assets plus investments
TD	Total debt
T. Drs.	
TL	Total liabilities
WC	Working capital

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primarily because the operator has an additional source of income for current consumption or for investment on the farm; as an independent business it may not be viable. Conversely and perhaps less commonly, farm businesses may close because the non-agricultural activities of their operators fail. Because of the close relations between the personal circumstances of the operator' household and the farm business, it is quite likely that a number of otherwise viable farm businesses will cease to exist each year because the owner-operator retires or dies. Studies of viability somehow have to cope with the this, for example by studying only those farming households whose intention is to continue in farming for, say, five years or more. Even allowing for "natural" business cessations, not all failures of businesses to survive are of equal significance. Hughes, Richardson and Rister (1985) point out that farm failures can be the result of everything from poor management to weather conditions in other countries. The elimination of poor managers might bring about net social benefits by reducing the cost of food. However, if good managers are being forced out because of public policies, the effects may be substantially different.

7.7.4 One approach pertinent to family businesses is to identify a margin, after the deduction of immediate business costs and the basic household expenditure, which is available for reinvestment in the continuation of the business. This has been used in France to identify farms which can be considered to be "at risk" (for example, Ministere de l'Agriculture et de la Foret 1990). The more difficult part of such an approach is to test the indicator against the actual outcome over a run of years. To some extent this problem can be circumvented by collecting data on farmer intentions, as was undertaken for three areas in the USA by Smale, Saupe and Salant (1986). A viability index was constructed, representing the ratio of farm and non-farm cash income to necessary consumption expenses (taken from poverty-level income criteria), capital replacement costs and principal (loan) payments. In more exact terms the ratio was as follows:

$$\frac{\text{net cash income from farming + off-farm employment + unearned income}}{\text{estimated minimum consumption spending + estimated capital replacement cost + estimated loan principal payments}}$$

Among the households planning to continue in farming, households with a ration greater or equal to 1 would be able to maintain their (base year) operation. Those with a lower ratio would be unable to meet all their obligations without making adjustments.

7.7.5 A similar presentation can be used for households which were intending to leave farming. These were assumed to expunge all outstanding debt by liquidating assets; thus they were no longer obliged to make principal repayments. They also had no obligation to replace capital. The viability for these "exit" households is thus:

$$\frac{\text{estimated annual income from value of net worth + estimated wage income + estimated Social Security payments (receipts) + transfer payments (receipts)}}{\text{estimated minimum consumption}}$$

A ratio greater or equal to 1 implies that the household would be able to satisfy its minimum consumption requirements on cessation of farming, and a lower ratio means that it would have difficulty in meeting them.

7.7.6 Concentrating here on the households which intended to continue in farming, Smale et al (1986) constructed a regression model, with the viability ratio as the dependent variable and parameters of the farm business and the farm family as independent variables. Farms were analysed separately in the following groups:

- households where the operator was planning to leave
- farms where the operator was part-time
- small farms with a full-time operator
- larger farms with a full-time operator
- dairy farms (one test area only)

It may be noted that multiple activity on the part of the operator was assumed to be so important an influence on viability that it was treated as part of the basic analytical framework and not as a dependent variable for which tests were to be applied. Within the farm types, regression used the following independent variables:

An index of farm size (sales, crop area, total assets).
Debt-to-asset ratio
Farm productivity index (only on dairy farms)
Operator education
Operator experience (years in farming)
Non-operator off-farm employment
Non-operator on-farm labour
Number of children under 16 years of age

Factors associated with viability differed between the household groups. For the farms planning to continue, however, the expected relationships between the independent variables and viability held broadly. Farm size was not as strongly positively associated with viability as might be expected, growth possibly carrying with it extra debt-servicing requirements and production inefficiency. High debt ratios were for most groups negatively associated with viability. For five of the household groups, off-farm work by other household members was positively associated with greater viability, whereas an additional hour worked on the farm had no observable effect for any of the groups.

7.7.7 These findings underline the importance of knowing more than the narrow farm business characteristics when attempting to assess the viability of

farm households, and therefore the desirability of RICA collecting additional data on the household composition of its sample, including the farm and off-farm activities of the farmer and the other members of the farm household. However, in the absence of such information within the present accounting framework, the remainder of this discussion must confine itself to existing business parameters, narrowly defined.

7.7.8 A number of 'rule of thumb' measures for assessing agricultural business viability have been suggested. Clery (1975) and Checkley (1982) put forward rent and finance charges as a per cent of gross output, with 15-20% as the critical level. The use of finance as opposed to interest charges can be criticised as it includes an element of capital repayment. Checkley also suggested rent and finance charges per ha, but the critical level will vary as inflation erodes the purchasing power of money. Warren (1982) suggested that the ratio of net worth to total assets (ie per cent equity) should not fall below 66% to ensure business survival.

7.7.9 Whyte (1983) used two criteria. The first was that net profit should exceed personal drawings and hence maintain net worth. This was not a clear measure as increasing asset values could mask the problem of personal drawings exceeding net profit, at least in the short run. Furthermore the initial per cent equity was important, as a high value would enable the business to survive over a long period of deficit. Because of these points Whyte used a complementary measure, maintenance of percentage owned.

7.7.10 Crabtree (1984a,b) looked at a sample of 62 North of Scotland farms over a four year period. In following Whyte's criteria, he pointed out that if net worth could only be maintained through asset appreciation, then there were long term problems associated with gearing and loss of liquidity. He suggested two criteria for viability: 'cautious', in which net profit should exceed personal drawings; and 'optimistic', in which net profit and capital appreciation should exceed personal drawings.

7.7.11 Crabtree looked at a range of measures to asses the performance of the farms. The key to his assessment of viability was rent and interest as a percentage of gross output (RI%). He found that this RI% figure varied considerably in the sample, from 0% to 63%. Using regression analysis he found that net profit before capital appreciation was insufficient to cover personal drawings beyond 14% rent and interest, although there were considerable variations around this. When capital appreciation was included in the analysis, Crabtree found that RI% could rise to 38% for owner occupiers and 21% for tenants. (It should be emphasised that these data only refer to the particular four year period under study.)

7.7.12 Crabtree also looked at gross margin, machinery costs and hired labour costs as percentages of gross output. He found that gross margin reflected net profit but not as well as rent and interest. There was little discernible relationship between the other two measures and adjusted net profit. Gross

margin and rent and interest were related, each 1% increase in RI% being associated with a 0.25% fall in gross margin as a percentage of gross output.

7.7.13 Looking at percentage equity, Crabtree concluded that the lower limit for owner occupiers to maintain their net worth solely from trading was 80%. The equivalent figure for tenants was 70%. He also emphasised the importance of the level of personal drawings on the maintenance of net worth.

7.7.14 Crabtree also looked at the implications for time on the analysis. He modelled an owner-occupied farm with a RI% of 15% over a number of years. Interest was charged at a real rate of 8% and 12%. The business showed a slow increase in borrowing at first, but once RI% rose above the range 20-25% it accelerated, with the higher interest rate causing the greater problem. When RI% reached 38% net worth began to fall, but the position of the business was probably irredeemable long before this. Crabtree suggests that the critical level is 20-25% RI%.

7.7.15 In a later piece of work, Crabtree (1986) investigated five ratios when assessing business viability on a sample of 57 livestock and 27 arable farms in Scotland from 1979-1983.
These were:

- Rent & interest as a % of gross output.
- Rent & interest as a % of gross margin.
- Rent & interest in £ per ha.
- Gross margin as a % of gross output.
- Per cent equity (net worth/total assets).

It is worth noting that four of these measures relate to trading data while only one refers to the balance sheet. Crabtree again found that the most useful was rent and interest charges as a per cent of gross output. The critical value of RI% was 15%, but this varied with farm type and tenure, and he emphasised that it should only be regarded as a crude 'rule of thumb' first indicator where other data are limited. On the issue of maintaining net worth and per cent owned, he found that a lower RI% was required for the latter than the former, although the fit was poor.

7.7.16 Griffis (1988) used six measures in his checklist for assessing business health. These were:

- Profit;
- cash flow (trading and capital);
- rent equivalent;
- rent plus interest as a per cent of output;
- total debt; and
- per cent owner/operator equity.

It is interesting to note that again only one balance sheet ratio is used for a procedure that is explicitly about business health rather than performance. Griffis chose not to use measures of output or gross margin as he had not found these to be consistent predictors.

7.7.17 Griffis also introduced a subjective element into his appraisal. When refining his classification of farms Griffis attempted to make allowance for potential changes to the farming system on the subject farm. Thus if some restructuring of the business is feasible, either in the form of changes in enterprise mix or cost structure, then the classification will allow for this. Such a system relies on first hand knowledge of the farm, information which is not available to the central RICA analyst, though it may well be available to the individual enumerator. We shall return to this last point later.

7.7.18 Net cash flow has been proposed as a measure of business health. Helmers, Watts and Attwood (1976) dismissed cash flow as an efficiency measure because of the effect of uneven expenditure on capital. There will also be problems if there is a change in the level of creditors/debtors between the start and end of the year. Despite these criticisms, some authors have used the measure. Griffis used trading and capital net cash flow in his appraisal of business health. Adelaja and Rose (1988) used a simultaneous equation net cash flow model and argued that cash flow is a better indicator of short run economic viability than 'viability ratio' (ratio of net household income to financial obligations ie operating costs, principal & interest payments, family consumption, taxes, capital replacement) and that this is better in turn than debt to asset ratio.

7.7.19 It is evident from the above discussion that while there has been little in depth analysis of business failure in agriculture, the choice of measures used has been rather wide. Somewhat surprisingly, the majority of the measures rely on flow variables from the trading profit and loss account, rather than stock values from the balance sheet.

7.7.20 Sight should not be lost of the fact that failure is very much dependent on exogenous variables, which are not constant over time. The conditions that will be fatal for one business may prove to be superable for another. Thus, one business may fail in one period because of low inflation associated with high real interest rates, whereas a similar business with similar ratios may survive because of high inflation associated with negative real interest rates in another time period.

7.7.21 Exogenous factors are difficult to incorporate into a realistic analytical model since they change over time. Failure to incorporate them in the model may mean that although the model explains why some businesses succeed and others fail in one time period, it may be less accurate in predicting which businesses will be successful or otherwise in future periods. Musser et al (1984) ran a simulation of a representative farm with different ownership and tenure patterns and different growth strategies. Using historical data from the

period 1974-1981, which was characterised by adverse financial conditions towards the end of that period, they found that the timing of decisions such as land purchase within the period under study had a significant impact on final equity levels. Their results emphasised how important the temporal aspect of decision making (and the initial equity position) was.

7.7.22 Endogenous factors are also important. Harrison and Longworth (1977) point out that differences in starting net worth will make the difference between success and failure between two identical businesses. Perry et al (1985) looked at the relationship between initial equity positions and bank credit policies and probability of survival of a farm under different assumptions about changing land values and tenure types. They found that the initial equity level was the most critical, with a high equity giving a good probability of survival in all cases while a low equity gave a high probability of failure. The credit policy of lenders only affected survival in the 'intermediate-equity' group of farms. They also found that while a tenant was more likely to lose all his equity capital than a part-owner, he was also more likely to increase his equity value than a part owner. The relative performance of the farms was found to be highly dependent on the assumption made about capital gains on land.

7.7.23 Differences in attitudes to personal consumption will also be important as these can confound predictions based on the ratios. Eisgruber and Lee (1971) argue that the owner/manager of a growing firm will derive infinite utility from subsistence drawings and zero utility from further (luxury) consumption. All spare funds will be reinvested in the business. Other farmers may place a lower utility on growth and therefore withdraw funds from the business, sometimes to its long term detriment. The running down of the business may be perfectly rational if the operator is nearing retirement or is aware of other productive uses for the land in the future, eg gravel extraction or sale for house building.

7.7.24 The particular situation in agriculture where the operator is frequently the sole proprietor may have implications for business viability. Personal decisions about the level of drawings and transfers into or out of the business may be made which have no rationale in economic terms. Such transfers of equity funds will render predictions based on financial ratios irrelevant.

7.7.25 Charlton (1972) noted that physical performance is important in the growth of heavily indebted businesses. A good technical performance that produces margins that are sufficient to cover interest and taxation charges will lead to increased growth despite a high leverage. A poor technical performance where margins are insufficient to cover interest and taxation charges will lead to increased risk of failure. He also emphasises that relatively small improvements in performance of a business that is only marginally profitable will have a disproportionate effect on its subsequent growth and development compared to a business that is already in a prosperous state. To the former, a modest improvement may be critical to survival; to the latter it is not so, as the necessary conditions for continuation are already met.

7.7.26 Charlton's results also showed that a marginally profitable business achieving a high rate of physical growth would achieve only limited financial growth where that expansion was financed via heavy use of borrowed capital. A greater rate of growth could be achieved in these circumstances by a much lower physical growth financed through the use of internally generated funds. In contrast, a very profitable business easily able to fund interest and taxation charges out of earnings could achieve the greatest expansion by making extensive use of loan capital.

7.7.27 The model should also incorporate as many endogenous variables as possible, including non-financial ones. An obvious example would be the farmer's age and the existence or otherwise of potential successors. Factors such as these are likely to have significant impacts on business performance and viability. Other factors that will be likely to be relevant include the operator's degree of business confidence, his capability as a manager, the extent to which he has alternative business opportunities open to him etc.. Upton and Howarth (1987) studied the relationship between farm and farmer characteristics and the growth of the business on a sample of farms in the south of England. Their results are set out in Table 7.1. Unfortunately, it may not be possible to obtain cardinal measures of all the relevant endogenous variables, but it should be possible for the enumerator to give ordinal measures to potentially important explanatory variables such as those listed above.

7.8 Implications for RICA data collection and analysis

7.8.1 While the RICA data includes detailed physical measures of output, there is little or no information on physical levels of input. It would obviously be difficult to measure all inputs in this way because of the great degree of heterogeneity within many of the input categories, eg pesticides. However such data might be useful in attempting to identify the technically efficient farmers so that this can be related to financial performance. Scope may also exist for collecting gross margin data, ie allocation of variable costs, so that more light may be shed on the links between these measures and overall performance. The problem of the allocation of fixed costs is not one that lends itself to solution via the survey. The great degree of detail that would be required would make visits prohibitively expensive in staff time and would alienate the cooperators.

7.8.2 Given that many of the fixed cost allocations are arbitrary, consideration could be given to the possibility of carrying out regression analysis on the whole farm data that is available to obtain estimates of the level of fixed inputs for the different crop and livestock enterprises on different size and types of farm. Errington (1987) has used regression analysis techniques to estimate the labour use associated with different enterprises from annual farm census data. Tyler (1966) has shown how the allocation of labour to horticultural crops can be estimated in financial terms using regression analysis on whole farm survey data. Further work is being carried out by Errington (1989) on the estimation of a number of different inputs associated with various agricultural products

Table 7.1 Correlations between measures of farm growth and farmer characteristics

	Growth of Area	Growth of Labour	Growth of Machinery Depreciation	Managerial Ability	Propensity to Invest in Farm	Intended Expansion of Farm	Number of Dependents	Extent of Off-farm Income
Growth of gross output	.43*	.58*	.68*	.35*	.55*	.32*	.25*	-.30*
Growth of area		.47*	.40*	.38*	.32*	.34*	.27*	-.18
Growth of labour			.43*	.34*	.30*	.31*	.23*	-.09
Growth of machinery depreciation				.45*	.49*	.41*	.20	-.39*

* Significant at 5% level at least.

using FBS data. The results are reported to be consistent with those derived from full cost surveys of individual enterprises. This would seem to indicate that the Commission should be able to use cross section RICA data to make estimates of the average costs of production of many of the agricultural commodities currently being produced in the EC. We understand that this approach is being undertaken by INRA (France) as part of a study parallel to the present one, and so further discussion of the techniques is unnecessary.

7.8.3 The estimation of measures of business performance etc from RICA data should ideally be repeated for a series of years to ensure that the measures adopted are reasonably stable over time. Data on businesses that fail should also be examined over a sequence of years to see how long before eventual failure it was possible to predict the ultimate fate of the business. This is the sort of investigation that the other parallel study on holding viability might be considering.

7.8.4 Time series data for single businesses as opposed to aggregate data places a considerable burden on enumerators. Nevertheless, there are grounds for thinking that such additional effort might be well spent when seeking indicators for farm profitability, business performance, financial return and viability, adding to the call for such longitudinal information made in the contexts of measuring business income (Chapter 3), personal income (Chapter 5) and efficiency (Chapter 6). Relatively minor errors in estimation of stocks valuations can have significant impact on the operating surplus of the business in a particular year since it is by definition a residual. An underestimate of a valuation at the end of one year may, erroneously, show that the business in question has not performed well. However, the very fact that the erroneous valuation is carried forward to open the following year's accounts will mean that the surplus in that year is overstated. Thus farms will appear to switch from above average performance groups to below average for no other reason than a measurement error. Such problems could be reduced by examining performance for more than one year, though there would be a danger of ignoring trends, and of understating the importance to viability of critical periods, such as when a short-term liquidity crisis may cause a business to close. Bearing in mind the need to have access to data for single years which is reliable, the type of problem illustrated by stock valuation suggests the desirability of using skilled staff to carry out full audits on farm accounts rather than summary surveys, which tend to increase measurement error as they are highly dependent on farmer recall.

PART 2 Indicators of performance in use

7.9 Introduction

7.9.1 Part 2 examines the indicators of various aspects of performance which are currently published by RICA or, for the purpose of illustration, British University and College farm accounting departments. The main concepts employed by the farm accounts surveys of other Member States will be described in Chapter 8, and the indicators used by the UK's Ministry of Agriculture will be recounted in that context. Here we are concerned with the activities of the independent academic institutions which, hopefully, might be expected to adopt a more exploratory attitude to the use of data. Other examples of academic literature could have been used; for example Cordts, Deerberg and Hanf (1984) for FR Germany cite forty-three farm level economic indicators in their study of income among the Test Holdings (the German farm accounts survey). However, their overall list bears a close similarity to that which emerges here for the UK.

7.10 Business performance measures used by RICA

7.10.1 The 1987 RICA Report (Commission 1988) contains three types of indicators:

- the array of income indicators (Gross Farm Income, FNVA, FFI and Cash flow)
- the capital position of holdings (liabilities, assets and investments)
- at the Level 1 results, a range of performance indicators (see page 45); these are:
  - FNVA/AWU
  - FFI/FWU
  - changes in Net Worth
  - Net Investment
  - FFI as % of Net Worth
  - Cash flow as % of Net Worth

The text of the Report is concerned with FNVA (and FNVA/AWU). There is no commentary which interprets the tabulated results for the other indicators of performance.

7.10.2 The Report also refers to an analysis of "specialisation" and "concentration". The former is considered as the degree of specialisation of a farm on a single product or group of associated products; the latter is considered as the degree of concentration of the production of a single product or group of associated products on specialist farms. There is a danger in such exercises of merely discovering the classification of farming types that has been employed. However, the Report draws conclusions about the relative performance of specialist farms. For example, better economic results are claimed for the horticulture and wine specialists, which together accounted for

9.6 per cent of the total EC10 agricultural output but 12.6 per cent of the total FNVA. In contrast, the mixed farm type, which accounted for 13 per cent of total EC10 output, achieved only 10.7 per cent of the FNVA. Perhaps the conclusions should be treated with caution because the results relate to a single year and in view of the reservation concerning the meaning of indicators which only cover part of the economic activities of the operators of agricultural holdings.

7.10.3 Findings based on the indicators listed above, and others which may have been calculated but not published, may have appeared in the replies to specific questions to RICA, an analysis of which was presented in Chapter 2. A detailed search of these has not been conducted, but a superficial examination of their titles and brief description suggests that any additional indicators would appear to have been largely related to costs of production of various commodities.

7.11 Farm accounts analysis in practice: the UK as a case study.

7.11.1 As a guide to the range of indicators relating to agricultural business profitability, business performance, and financial status which are used in practice (viability being thought of more as the subject of research activity rather than routine monitoring) it was thought desirable to look in some detail at a number of institutions which are involved in regular monitoring of farm accounts. The UK formed a good subject for a case study since a many different academic institutions are simultaneously involved in the collection and analysis of farm accounts; though employing the same basic framework each can take an independent line in the sorts of analysis it undertakes and the economic indicators it calculates. It was hoped that the multiplicity of approaches might throw up both a consensus of what were found by long experience to be the most useful indicators and diversity in the potential for alternative indicators that the basic data provide. This UK case study was seen as complementary to the inventory of farm accounts found in all Member States, including a description of the economic indicators in use, which is to be the subject of Chapter 8. There the UK's FBS will also be encountered, but not in the disaggregated form (by collecting institution) in which it appears here.

7.11.2 Contact was made with the UK government departments responsible for conducting the Farm Business Survey (FBS) in England and Wales, Northern Ireland and Scotland (Farm Accounts Scheme, FAS). This in turn led to direct communications with the Universities and Colleges which carry out the survey work in Britain; in Northern Ireland it is undertaken direct by the Department of Agriculture for Northern Ireland (DANI). In addition to contributing cases to the FBS, local analysis is usually carried out for research and/or advisory purposes, leading to separate publications. Information was sought on what economic indicators were calculated for local analysis and on any research which may have considered the nature of these indicators or which may have used the FBS as a data bank. Replies, and publications giving local analyses, were received from 11 out of the 12 contracting institutions in Britain, from the Department

of Agriculture for Northern Ireland (DANI), and from the Department of Agriculture and Fisheries for Scotland (DAFS).

7.11.3 At national (UK) level, it has already been reported that the changing performance of farm businesses is assessed in the latest Farm Incomes in the United Kingdom report (MAFF 1989) in terms of the following indicators, with farms divided into farming types and by size (in British Size Units):

- Net Farm Income; (a standardised income, which assumes that all land is rented, that no borrowing occurs and that all labour other than that of the farmer and spouse is paid). This is the longest-established indicator, starting in 1936.
- Occupier's net income; is based on actual tenure and indebtedness and represents the return to the principal farmer and spouse for their manual and managerial labour and investment in the farm business.
- Cash income; the difference between total (cash) receipts and total expenditure.
- Cash flow from the farm business; cash income minus net investment spending
- Total flow of funds; cash flow from the farm business plus net cash flow from non-farming sources plus increase in borrowing.

7.11.4 The balance sheet ratios, calculated for owner-occupied, tenanted and mixed farms separately, are:

- external liabilities as a percentage of total assets
- current assets (physical working assets and liquid assets) as a percentage of current liabilities (claims on the business which have to be met within a short period of time, usually less than 12 months).
- liquid assets (cash and sundry debtors) as a percentage of current liabilities.

Tables of supplementary analysis show long and medium term loans as a percentage of net worth.

7.11.5 In addition to its generally-published indicators, MAFF has made available on special request tabulations for the UK of the following ratios, again dividing holdings into tenure groups and (in this instance) into ESU size bands:

- net income (excluding blsa[2]) to net worth
- net income (excluding blsa) to value added
- net income (excluding blsa) to total assets
- sales to total assets

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[2]blsa = breeding livestock stock appreciation (change in value)

- sales to fixed assets
- sales to current assets
- value added to sales
- value added to total assets
- liquid assets to total assets
- current liabilities to net worth
- long & medium term loans to total assets
- net worth to total assets

These ratios came to this research project in terms of analysis for a single year (1980/81). It is not clear whether they are calculated annually. Explanation of why these particular ratios were chosen does not seem to have been made explicit in an external document. They form a mixture of trading account and balance sheet items.

7.11.6 Ratios of the value of total output to total inputs (with an imputed cost for unpaid family labour, including that of the farmer and spouse, and land) have been calculated by the MAFF both as a regular feature of analysis of farm performance in the past (though not currently used) and as part of more experimental work (see Chapter 6). Though real estate capital was covered by a rent or rental value figure, no charge was imputed for other capital (except depreciation).

7.11.7 Among the contributing universities and colleges there is universal application of the standardised Net Farm Income as a main indicator in their analyses of local farm accounts. The other main standardised income measurement, Management and Investment Income, is also estimated, though prominence is not given to it by all institutions. There is a variety of approaches to cash flow, though here the terminological differences often hide what are common approaches.

7.12 Whole-farm profitability measures

7.12.1 Perhaps the clearest exposition of its schema of whole-farm profitability measures is given by the University of Exeter (Fig 7.5). The starting point is Net Farm Income, and a series of measures are derived involving ultimately the increase or decrease of off-farm ("private") funds. It should be stressed that, in practice, the "Private Drawings" shown in this scheme does not necessarily cover all the personal consumption spending of the farmer and his household. There may be other sources of income and personal bank accounts which do not enter into the farm business accounting system. Rather, this item shows how much has been withdrawn from the farm for private spending.

7.12.2 Concepts which relate to the whole-farm profitability, gleaned from these University and College sources, and which would appear to justify examination in pursuit of the calculation of economic indicators using RICA data, include the following:

Net profit before interest charges (Edinburgh: East of Scotland College of Agriculture, with a similar approach by Aberdeen: North of Scotland College): this is defined as Net Farm Income plus imputed rental value on owned land and improvements plus ownership income minus depreciation on tenants improvements minus ownership expenses.
In the formulation used by Exeter University it is Net Farm Income plus imputed charges which have previously been deducted (rental value plus unpaid family labour) minus landlord expenses.
Net profit after interest charges: as above but less interest charges. Another way of deriving this would be farm gross margin less actual fixed costs (and an imputed cost for unpaid family labour other than that of the farmer and spouse.

Farmers' return (Edinburgh): Net Farm Income minus imputed interest on tenant capital, estimated at 10% or 15%. This residual represents the return to the farmer and spouse's physical labour and managerial inputs

Private drawings (Exeter and some others): the reservations noted above should be borne in mind.

7.12.3 Terminology becomes confusing among the various cash flow indicators. For example, Trading Surplus (Aberdeen) and Trading Net Cash Flow (Reading) appear to be different terms for "Cash income" in the national presentation. However, there seems to be general agreement that it is desirable to measure cash flow at several different levels:

(a) that coming from production
(b) item (a) adjusted for net capital spending
(c) items (a) or (b) adjusted for cash introduced from outside and from additional borrowings and (possibly: DAFS) withdraws of capital.
(d) items (b) and/or (c) adjusted for private drawings.

7.12.4 Profitability is also measured as returns on capital. The most frequently encountered rate is Return on Tenant Capital (Management and Investment Income over average Tenant Capital). Nowhere was there encountered an attempt to remove the physical and managerial labour input of the farmer and spouse, to leave a return solely to the capital element. Other returns appearing in local reports were:

- Return on total capital (Aberdeen): profit + interest/ total assets. In the formulation used by Manchester this becomes MII + rental value and imputed rent on improvements/ total assets.
- Return on owned capital (Aberdeen): profit/ Net Worth.
- Return on net worth (Exeter): Management and Investment Profit (Profit after deducting unpaid wages and farmer and wife's labour)/ Net Worth
- Return to land (Manchester)

7.12.5 In the local reports from FBS accounting centres business performance is usually assessed on the basis of a range of monetary and physical indicators. Analysis may take the form of comparing the results for groups of farms (by type or size or both) between years (usually adjacent years) or within groups between the overall group average and some premium performers. The judgement of what constituted "premium" is not uniform between centres: the University of Newcastle interpreted this as the top third of farms ranked according to Management and Investment Income per hectare. The University of Reading uses (total) MII. London (Wye College) uses an algorithm of MII and return on tenant capital, but treats the 50 per cent of best performers as its premium group. There is a preference for expressing indicators per unit area; this seems to be better understood by farmer clients. The problem posed by rough grazing is overcome by expressing the total areas of the farms in terms of adjusted area, in which there is a conversion to pasture equivalence. Aberdeen uses Effective Hectares, which is the total areas less roads, woods and so on, suitably adjusted for rough grazing. The justification for the size of the conversion factors does not seem to be explicitly stated.

7.12.6 Perhaps the most straightforward presentation of performance indicators appears in the report from Newcastle University. The indicators used, and by which comparisons are made between the all-farm average and the premium group, are given below. Many other FBS centres use most of these. Where additional indicators are gleaned from other Universities and Colleges but do not appear in the Newcastle list, they are labelled accordingly:

Output
- Total Output per adjusted ha.
- Grazing livestock output per adjusted forage ha.
- Cash crop output per cash crop ha.
- Gross margin (total) per adjusted ha.
- Crops and livestock Gross margin per ha. (Cambridge)
- Value Added per farm and per ha. (Cambridge)
- Gross output per £100 total inputs (Manchester)

Stocking density
- Grazing Livestock Units per adjusted forage ha.
- Forage area (ha.) per livestock unit (Reading)

Labour and machinery and land

Gross margin (Gross output: Manchester) per £100 of:
- labour costs (paid and unpaid)
- machinery costs
- labour and machinery costs

Gross margin per £100 fixed costs
Gross output per £100 land (Manchester)
Standard man-day requirement (Aberdeen and Aberystwyth)
Standard man-day availability (Aberdeen and Aberystwyth)

Farmer and spouse labour (imputed) per ha. (Aberdeen splits the per farm figures into the manual labour and management components)
Working capital requirements per £100 gross output (Cambridge)
Accumulated investment in machinery per £100 gross output per annum (Cambridge).

Return on tenant's capital (as an indicator of farm performance)
Management and Investment Income per adjusted ha.
Net Farm Income per adjusted ha. (Edinburgh)
Tenant's capital per adjusted ha.
Return on tenant's capital (replacement cost: also at historic cost (Cambridge))

Other data (depending on type of farming)
Average price per finished animal or per animal sold (beef, lambs etc)
Wool value per fleece
Milk production per cow (volume and value) and per forage acre
Lambs reared per 100 ewes
Crop yields (wheat, barley (tonnes per ha.)
Average herd/flock size

Revenues and costs (depending on type of farming)
Enterprise (or gross) output for each enterprise separately per ha or per adjusted ha. or, where appropriate, per animal
Variable costs (separately by group, eg concentrate feed, fertilizers) per ha.
Fixed costs (separately by group eg labour, machinery, rent and rates) per ha.
Breeding livestock appreciation
Less Favoured Areas (LFA) compensatory allowances per ha.
Subsidies per farm (Aberdeen)
Short-term loan interest charges per ha. (Cambridge)
Total interest charges per ha (Manchester)

7.13 Balance sheet position

7.13.1 Many, though not all, of the local reports cover the balance sheet position of farms as well as the profit and loss account. This information has relevance both to the profitability of the business and its longer-term viability. Particular attention is shown to the changes which have occurred between the beginning and end of the accounting years. The expected categories of assets and liabilities are usually encountered. The Report from Manchester is typical:

Fixed assets:
Land and buildings
Machinery and equipment

Breeding livestock

Current assets
- Trading livestock
- Crops and consumable stores
- Debtors
- Bank, cash, short term deposits

Liabilities
- Long and medium term (by type of institution, and private loans)
- Short term loans (by type of loan)

Net worth

Changes in the composition of assets and liabilities are interpreted in the context of the development of the farm business. Of particular interest are the changing level and composition of loans, and the changes in net worth (see for example the Exeter report).

7.13.2 Several of the reports feature the ability of the business to reinvest for the future. This is part of a general analysis of the sources and disposal of funds. Exeter measures Farm business reinvestment: though not a direct indicator of profitability or viability, the ability of the business to reinvest can be considered a measure of its longer-term profitability.

7.14 Enterprises and margins

7.14.1 To some extent the performance of single enterprises on farms has been covered by the section above; for example, output per cow in physical or value terms will give some idea of relative positions. However there is a general agreement that, for purposes of farm planning, enterprise gross margins form a useful concept. In some instances it is possible to allocate some of the farm's fixed costs, when a form of net margin results. The estimation of margins from systems of farm accounting requires information on the use of variable inputs; on farms with more than one enterprise this involves an allocation between enterprises. Such an allocation is not an essential feature of the FBS, where the emphasis is on the farm-level data.

7.14.2 It should be noted that, outside the regular FBS framework, there are separate MAFF-commissioned surveys concerned with different types of enterprise and designed to collect costs related solely with it, but these are occasional in nature. Previously these were called Agricultural Enterprise Studies (in England and Wales), now renamed Special Studies in Agricultural Economics, in part because the nature of the work has broadened. Typically these use the same University and College departments and staff as undertake the FBS; the reasons for the distinction between the two is largely a historical one and involves contractual arrangements. A recent example is the study of profits and losses from lowland beef production (Farrar, Colman and Richardson

1989). This measured the various costs and revenues associated with the beef enterprise and made use of three marginal concepts; gross margin, net margin (gross margin less the total allocated fixed costs, including the farmer and spouse and other unpaid family labour) and enterprise margin (net margin plus the value attributed to the labour costs of the farmer and spouse). In a discussion of the results, which showed an average loss of £4074 (net margin), the authors suggest that farmers do not perceive many of the non-cash costs as real costs in deciding whether to continue in beef production. About one third of the variable costs were imputed (home-grown feed, bedding etc). Among the fixed costs, there is the added problem that not only are many imputed at the farm level (family labour, rental value etc), but even the use of cash-paid inputs may overstate the opportunity cost; if beef rearing is a minor enterprise on the farm, hired labour used for feeding might otherwise simply not be utilised. By adding back into the net margin the imputed costs of production, the substantial loss is converted into a surplus. This is even the case after deducting interest charges associated with the enterprise which, the authors argue, are perceived as attributable costs. Thus there is a conflict between what might be called the "economic" and "financial" approaches. If the farmer's decision to stay in beef production is more closely related to the latter, the conventional emphasis within accounting analysis is perhaps misplaced if the intention is to predict farmers' responses to changing cost-price conditions. On the other hand, if the intention is to estimate the average costs of production viewed from an economic (resource use) standpoint, net margins are perhaps more appropriate (though the problem of underutilisation at the farm level remains). These contrasting approaches illustrate the need to be clear about the objectives of the data-gathering exercise; the indicator chosen will depend on the objective in hand.

7.14.3 Within the regular FBS framework, the local reports of Universities and Colleges which contribute to the FBS (and DANI) indicate that enterprise average Gross Margins are prepared from farm FBS accounts in at least five centres (Aberystwyth, Cambridge, Edinburgh, Manchester, and DANI). For example, the Manchester report gives outputs, variable costs and gross margins for the following:

> spring barley, winter barley, winter wheat, winter oats, winter oilseed rape, dried peas, potatoes, sugar beet, dairy cows, dairy followers, dairy followers with beef production, hill and upland suckler cows, hill sheep, upland sheep, lowland sheep.

Reading goes partly down this road by calculating, for cattle and sheep output, the value less the cost of concentrate feed, giving the result in £/ha..

7.14.4 The report from Cambridge uses, in addition to Gross Margin, the concepts of Value Added and Net Margin for individual enterprises. The allocation of fixed costs also enables an estimate of total costs of production to be made. Other FBS centres do not seem to have the same degree of confidence in allocating these fixed costs.

7.14.5 How variable (and fixed) costs are allocated in practice is not made clear from the published reports. (In some cases the glossaries of definitions do not fully cover the terms used). Clearly the structure of the individual data-collecting processes has to be capable of such allocations. The reply from DANI pointed out that Gross Margin analysis was developed and is still in use extensively in Northern Ireland. The individual farm accounts there are all prepared in this way. The senior civil servant responsible for the system suggested that consideration might be given to the reconstruction of RICA data to enable this type of analysis to take place.

7.15 The next stages

7.15.1 From the above discussion, in both parts, it is possible to draw up a scheme of indicators relating to those various aspects of farm businesses which have been touched on (profitability, performance, financial structure, viability). These, and the indicators already suggested as part of the review of income measures in earlier Chapters, form the subject of Chapter 9. However, before proceeding to a list it is necessary to consider the inventory of farm accounts surveys in EC Member States and their use of economic indicators for national purposes.

CHAPTER 8: INVENTORY OF NATIONAL FARM ACCOUNTS SURVEYS IN THE EC MEMBER STATES[1]

8.1 Introduction

8.1.1 One of the work tasks of the present research project (Chapter 1) was the construction of an inventory of the farm accounts surveys which take place in Member States of the European Community. The reasons for undertaking such a task were:

(a) to ascertain the types of economic indicators which were currently in use, as a guide to the development of additional indicators for RICA;
(b) to show what types of data were being collected, as a guide to the possible extension of the field of study for RICA;
(c) to provide a reference list of the surveys currently taking place.

8.1.2 This Chapter outlines the main characteristics of national Member State surveys and the areas of difference between them and the requirements of RICA. It is based on the results of a questionnaire sent to the appropriate authorities in each EC country[2]. The main areas of investigation were:

(a) general details, including a description of the sample and official aims of the surveys;
(b) an account of the data collected;

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[1]The first draft of this Chapter was prepared by CEAS Consultants (Wye) Ltd.

[2]A copy of the questionnaire and its accompanying letter are detailed in the Appendix to Chapter 8. The collection of information was undertaken by CEAS Consultants (Wye) Ltd.

(c) the indicators of the economic performance of farms, farmers and farm households which were calculated;

(d) the uses to which these indicators were put and the way that the results were published.

The questionnaire was distributed early in June 1989, with the request that replies were to be made by July 14th, 1989. In practice, several Member States were only able to provide information even by the end of September, and it was not until December, much later than had been anticipated, that a reasonably complete inventory could be assembled. This delay limited its use in the design of the analysis of RICA data. Nevertheless, it proved to be a worthwhile exercise and provided confirmatory information for findings emerging from the review of literature and other sources.

8.1.3 Under EC Regulation No. 79/65, every EC Member State is obliged to undertake annual surveys of farm accounts and to submit the results to the European Commission (the RICA survey). However, primarily for historical and policy reasons, there is considerable variation in the coverage and detail of surveys at national level. For domestic purposes the sample may be larger or the information cover a broader range of aspects of business or personal details than is required to meet commitments to RICA. In addition, occasional national 'one off' studies relating to farm accounts and economic indicators are encountered, conducted to extract specific information, such as the French Centre d'Etude des Revenus et des Couts (CERC) survey of agricultural/household income in 1978.

8.1.4 The first part of this Chapter discusses the principal differences between national data and the information supplied to the Commission under RICA. The large Appendix systematically details the nature of each national farm account survey[3].

8.2 Sample details

8.2.1 *Sample coverage:* National surveys differ considerably in the field of observation they attempt to cover. For example, in Germany, Denmark, Belgium and the Netherlands part-time holdings above a minimum threshold are included whilst in the United Kingdom the survey collects data from 'full-time holdings' only (although an additional 'Survey of Very Small Farm Businesses' has also taken place). A similar survey of part-time farms is also currently being undertaken in France. Greece, Italy, Portugal and Ireland do not make a

[3]It should be noted that differences in the quantity of information relating to each National Member State presented in this report reflect both differences in the nature of each survey and on the response to the survey questionnaire. As such, the authors wish to thank the appropriate people in each Member State who completed the questionnaire and forwarded relevant information.

distinction between full and part time businesses in their surveys whilst Luxembourg only surveys full-time farms.

8.2.2 *Sample size:* The size of samples varies between Member States from approximately 1.5 to 13 per cent of the total population of farms, although the normal proportion surveyed for RICA requirements varies between 1.5 and 2.5 per cent. In some countries the number of farm records is substantially larger than the commitment to RICA. For example, in Germany the national survey encompasses 11,100 agricultural and horticultural holdings compared with its RICA requirement of approximately 5,500; in Luxembourg 800 farms are surveyed of which details from 350 are forwarded to RICA. In the UK, France, Belgium, Ireland, Italy and Denmark, the number of farms surveyed is slightly larger than required by RICA whilst, Greece, Spain and Portugal survey the minimum required.

8.2.3 *Farm size threshold:* The UK, Spain, Portugal, Italy France and Greece indicated that their minimum farm sizes (in European Size Units) for inclusion in their samples were equivalent to that specified for RICA. In the other Member States the following thresholds are used:

- Germany: uses a Standard Gross Margin (SGM) threshold of 5000 DM;

- Belgium: uses a slightly smaller SGM threshold of 12,414 ECU (compared to the RICA minimum of 13,200 ECU);

- Ireland: covers all farms over 2 hectares;

- The Netherlands uses a minimum size of 20 European Size Units (ESU) compared to the RICA threshold of 16 ESU (1982 values);

- Denmark: splits its categories into agricultural and horticultural records. Agriculture includes all holdings above 4 ESU (1980 values) plus any holding over 5 ha. Horticultural holdings have no minimum area threshold, although must exceed 4 ESU (1980 values).

8.2.4 *Selection of participants:* Participation by farmers in the RICA surveys is voluntary throughout the Community. Nevertheless, once a farmer has agreed to participate, they are encouraged to remain in the survey sample for a number of years in order to build up a continuous picture of the economic position of agriculture. For example, in Denmark approximately 80 per cent of sample participants remain from one year to the next, whilst in the Netherlands a continuous data panel is obtained in which farms participate for six years. However, in the UK, a proportion of the sample is replaced annually from information obtained in the June Agricultural Census, although farmers may stay in the sample for up to 15 years.

8.2.5 *Stratification of the sample:* In most Member States samples are stratified according to the standard RICA classifications of:

- economic size;
- region;
- farming type.

In addition, the Netherlands stratifies by age of farmer and Denmark includes the extra categories of area, farmer age and whether employment is full or part-time.

8.3 Data collected

8.3.1 In order to comply with the requirements of RICA, each Member State must collect information on the following:

- farm characteristics (tenure and area);
- manpower;
- crops (previous and current);
- forage;
- livestock and livestock products;
- variable costs;
- fixed assets and depreciation;
- liabilities;
- VAT;
- grants and subsidies;
- on-farm consumption of products (both physical and financial information is collected where appropriate).

8.3.2 In some Member States the range of information collected is considerably wider and/or more detailed than the RICA requirements. For example, in the Netherlands information about non-agricultural income, tax payments, private consumption, product quality and cropping plans is collected, with the data split into physical quantities or given an implicit price where appropriate. In both Denmark and West Germany information about 'off farm' income (but not non-farm assets) is collected. In the UK, for some years a limited amount of data has been obtained about non-agricultural income earned from farm resources; from 1988/89 information relating to 'off-farm' income of farmers (and their spouse) has been collected.

8.4 Economic indicators

8.4.1 The main reason for contacting Member States to enquire about their national farm accounts surveys was, in the present context, to gain information on the economic indicators that were employed. These fell into two main groups, outlined below.

8.4.2 *Farm economic performance:* In each Member State, a number of indicators of farm economic performance are estimated (see Appendix to this Chapter). Some of these conform to standard RICA economic indicators (eg farm net value added) and therefore facilitate direct comparisons between

Member States. However, many indicators are country-specific. Although these indicators frequently measure 'similar' performance factors (eg net farm income, occupier's net farm income, cash income), their use for accurate country by country comparisons is limited because of the nature of the differences in definition/calculation. Examples of the different national performance indicators used are:

- Belgium: calculates a wide range of indicators, including one called 'revenue de travail' which comprises gross production (less state aid) less all charges except wages and salaries. This appears to conform to the former Labour-income concept used by RICA. The 'revenue de travail' is then expressed per hectare or per labour unit. A labour income for family labour alone (RTF) is also calculated. Belgium also calculates Gross margins, Revenue/cost ratios, returns on capital, and various investment indicators;

- Netherlands: the survey which contributes to RICA (from the LEI) calculates a wide range of performance indicators such as enterprise gross margins, output, net farm operating result, labour income, total output/ total input ratios, balance sheet and net worth;

- West Germany: uses profit (defined similarly as RICA's FFI) as its main indicator of farm performance and analyses this both by unit of family labour and per enterprise (farm business);

- Denmark: calculates gross output, total cash income, gross profit, total and net investment, net interest payment, current income, assets and liabilities and non agricultural or non horticultural income on a per holding basis;

- Ireland: calculates gross income, family income, average gross output, expenses, income and resources on a per farm basis.

- United Kingdom: calculates Net farm income, Occupier's net income, Cash income, Cash flow from farm business, and Total flow of funds. It also calculates balance sheet data.

8.4.3 *Indicators of the economic position of farmer or farm household*: Data collected in most Member States (including RICA requirements) is primarily concerned with providing information for calculating the income and economic position of the farm business. In terms of the **personal** economic position of farmers or the farm household, most Member States do not make such calculations. Examples of the additional indicators calculated in those countries where the relevant data are collected are as follows (see Appendix to this Chapter for definitions):

- Denmark calculates current income, which includes non-farm income sources, but this is published on a holding (rather than household) basis - though the two are likely to be closely related;

- Germany calculates disposable income (farm profit plus non-agricultural income, less direct taxes, social taxes and insurance);

- the Netherlands assesses the farm income of the farmer based on activities undertaken on the farm only (excludes income earned from activities undertaken 'off-farm', though data on this are collected);

8.5 Use and publication of indicators

8.5.1 Each Member State publishes the data from their national farm surveys on an annual basis. In addition, Belgium, Ireland and the Netherlands produce interim results prior to the final publication. The Netherlands also produces a study every five years of the long term position of each type of farming, with structural and market changes.

8.5.2 Where the appropriate national authorities stated reasons for undertaking the surveys and calculating economic indicators, the primary reason cited was to assist in policy formulation. Both Germany and the UK indicated that the data is used for evaluating past policies. Other important uses cited for undertaking the surveys were research, forecasting and making comparisons with other economic sectors.

8.5.3 Comparisons of performance with non-agricultural sectors is not generally performed by the agricultural statistics collecting authorities in the majority of Member States. However, Belgium publishes a comparison of the 'Revenue de Travail' per labour unit between agriculture and the rest of the economy and Spain compares the 'profit from family labour' indicator with the national minimum wage.

8.6 Other characteristics

8.6.1 *Relationship to aggregate economic accounts*: The only country to make specific reference to aggregate data sources was Denmark where the national farm survey data is combined with other data to create a micro-economic policy model. In Germany, the aggregate agricultural accounts are presented in the same report as the national farm survey (the "Agrarbericht").

8.6.2 *Additional studies*: In most Member States the regular collection of farm business data is limited to a single annual survey. However, in the Netherlands, in addition to the survey conducted by the LEI, a second annual survey of 3,000 farms is conducted by the Centraal Bureau voor de Statistiek (see Appendix for details). In addition, a number of research papers and one-off studies are compiled in some Member States. Examples include the UK's survey of Very Small Farm Businesses (below the minimum threshold for the

annual Farm Business Survey) and the French Centre d'Etude des Revenus et des Couts (CERC) survey of agricultural/household income in 1978.

8.7 Conclusion

8.7.1 In retrospect the attempt to assemble an inventory of farm accounts surveys did not contribute more than marginally to the array of economic indicators which this research project puts before RICA for consideration and exploration. Member States were not found to be engaging in the use of indicators beyond those already touched upon in previous Chapters of this Report. Knowledge of the sorts of data which each collected was not advanced greatly from that reported as part of the Eurostat study of the total incomes of agricultural households (Hill 1988). The uses to which the indicators are put were not articulated with sufficient precision to throw much light on the potential demand for additional RICA-level indicators; clearly a more in-depth direct approach was required. Nevertheless, this inventory enabled some confirmation to be lent to the indicators brought forward in earlier Chapters. It also showed that the official data system in at least some of the EC Member States is capable of generating a much broader range of information on the economic behaviour of farms and farm households than is currently undertaken within the RICA framework. As such, these suggest that some increase in the utility of RICA may be feasible.

APPENDIX TO CHAPTER 8

(i) The questionnaire and accompanying letter

(ii) Returns by Member State

Belgium

Denmark

Germany

Greece

Spain

France

Ireland

Italy

Luxembourg

Netherlands

Portugal

United Kingdom

Details of surveys

(1) Please include details of all official farm account surveys and censuses on separate forms.
(2) If the data forwarded to the Commission as part of RICA is drawn from a national survey which has a larger number of cases and which, for national purposes, collects a wider range of data (such as income from non-agricultural sources, taxation etc), please provide details of the full survey.
(3) Where semi-official or independent surveys are known to exist which carry out analysis of the economic performance of holdings please include details as far as possible.

A. General details:

(1) Member State and name of the survey?

(2) What are its official aims?

For example, legislation may require the regular monitoring of the economic situation of agriculture to make comparisons between the financial position of farms and other groups etc.

(3) What is its frequency?

Eg annual, every two years, three years etc.

(4) What is the method of data collection?

Eg postal, personal interview, accounting associations etc.

(5) Sample details:

(a) Coverage?
(b) The sample size?
(c) How does the sample differ from the RICA sample?
(d) How are participants selected?
(e) The stratification of the sample?

Details of target population

Eg lower farm size threshold, treatment of part-time farmers

B. Data collected

(1) The broad range of data collected?

If possible, could you send us a copy of the questionnaire and any additional information for interviewers / enumerators or informants.

C. Details on indicators of the economic performance of farms:

(1) What indicators are developed from the data collected in the survey to identify the performance of the farm as a business?

Please show the full range of these including those which draw on balance sheet information. For example, is value added or profit the main indicator and are indicators expressed per holding, per labour unit, or both, or by some other unit? Please give an indication of the concepts which are involved and, if possible, why these have been chosen in preference to other indicators.

(2) How are these indicators defined?

For example, for labour units are actual or standard values used

D. Details on indicators of the economic performance of farmers and farm households:

(1) What indicators are developed from the data collected in the survey to identify the economic position of the farmer or the farm household?

Please indicate the full range of these and give an indication of the concepts involved and also why these have been chosen in preference to other indicators.

(2) How are these indicators defined?

*For example, are farm households defined as including only those who live **and** work on a holding.*

(3) To what extent is non-farm income taken into account when devising indicators of income and non-agricultural assets and liabilities when considering indicators of wealth?

(4) Are regular comparisons of the economic position of farm households made with other sections of society?

We would be interested to see the extent to which such comparisons are feasible in different Member States.

E. Use and publication of indicators:

(1) Where are the data on incomes or other economic indicators published and in what form?

Perhaps you could send to us a specimen publication.

(2) For what purposes are these indicators used?

In which ways are they used to meet national policy requirements? What is their relative importance in policy formulation compared with the aggregate economic account results?

(3) How are these indicators combined with others to assess the economic performance and position of farms and farmers.

How do they relate to, or integrate with aggregate economic accounts, taxation statistics and other data sources?

(4) What studies have been officially sponsored in recent years on the economic performance and position of farms and farmers?

Please provide references or a brief description of the work.

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June 6th 1989

FADN study contract: Calculation of economic indicators (of the economic position of farmers and farm businesses)

You will be aware that Dr Berkeley Hill of Wye College, University of London, has been awarded a study contract by the European Commission (DGVI, RICA) with the above project title. The primary aim of the study is to explore the methodologies for assessing farm performance and the economic position of the farmer in the EC as a basis for further development of RICA. In particular, the analysis will be directed at:

- examining the indicators currently in use in each Member State for measuring the performance of the agricultural sector by different size and types of holdings etc;

- identifying which other indicators could be developed within the present RICA framework;

- identifying which additional indicators are desirable in the light of recent developments in the Community policy for rural areas (especially the Common Agricultural Policy), for which RICA might reasonably be expected to provide data.

To assist with these tasks, I am writing to request certain information on the activities of Member States in this area. One important component of the research is to develop an inventory of the details of all Member State surveys and censuses which collect data on the economic position of farm holdings. We are taking as our starting point those farm account surveys which contribute to RICA. We are aware that in some Member States these surveys are analysed independently for national purposes and may have a larger sample with a different coverage. Additionally, there may be other surveys which do not form part of RICA.

In broad terms we seek the following:

- the methodologies used and characteristics of survey samples (ie number of farms, sampling methods, coverage of farms by type and size, the extent to which the smallest farms are included and methods of weighting used);

- the concepts used in the compilation of economic indicators of farm performance and the economic position of farmers (for example, do these include total farmer/spouse and household income, do the indicators relate to productivity, profitability and the viability of farms etc);

- the extent to which these issues have been subject to special investigation in recent years by other officially funded *ad hoc* studies (for example on non-farm income sources or on the 'wealth' of farmers).

- how economic indicators at the holding level are used for policy purposes, and the changing pattern of demand for information coming from policy-makers.

To provide a systematic guide to the information required I would appreciate it if your replies could follow the headings suggested on the attached sheet. We would welcome copies of any relevant reports or manuals on methodology. It would help us if your replies were in English or French, although where this is not possible please provide the information in your own language.

Should you consider that this letter would be more appropriately dealt with by another official in your organisation, I would be grateful if you could forward it to the appropriate person and inform me of the person with whom we should make contact.

If you have any queries relating to the above request, please contact either me, Dr Berkeley Hill or Nick Young at the telephone or telefax numbers given at the end of this letter). The nominated officer at the European Commission (DGVI, RICA) is Mr B Brookes.

We would be grateful if you could return your replies to us by **July 14th** if possible.

Yours sincerely

Graham Brookes

Contact telephone and telefax numbers:

Graham Brookes	*tel: UK (233) 812181*	*fax (233) 813309*
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Nick Young	*tel: UK (233) 812181*	*fax (233) 813309*

Section A:

1. Country: Belgium

Name: Institut Economique Agricole Farm Accounts Scheme

2. Aims:
1) Supply objective data and descriptive analysis of economic results and the financial position of holdings
2) To provide useful indicators and analysis of the economic position of farms to those responsible for policy and to others, senior people in the industry
3) To contribute to the study of agricultural structures, particularly at the regional level

3. Frequency: Annual

4. Method: Personal visits by 'book keepers' and returns made by farmer

5. Sample:

a. Coverage: Full and part-time holdings with standard gross margin > 500,000 Belgian francs (1980) (12,414 ECU, 1980)

b. Sample Size: 1,415 out of 44,360 farms in 1988

c. Comparison with RICA: Very similar to RICA - RICA sample takes farms of slightly larger economic size of 13,200 ECU compared with the Belgian minimum size threshold of 12,414 ECU/500,000 Bfrs. This size threshold is based on 1980 exchange rates and is maintained in order to retain a constant sample and thereby facilitate examination of changes over time

d. Selection of participants: Non-random. Farms are selected which are representative of the region, (having normal production and marketing conditions for the region). Farmers participate voluntarily

e. Sample stratification: Stratification by:
1) Economic size (SGM '000 Bfrs)
500 - 1,000
1,000 - 1,500
1,500 - 2,000
2,000 +
2) Farming system - Orientation technico-economique (OTE) of the European Community legislation
3) Regional - 10 agricultural regions of Belgium

Section B:

1. Data collected: (Not all specified, but includes...)
- receipts and expenses
- stocks, sales and purchases of livestock (cattle, pigs, sheep, poultry)
- use of inputs
- labour use
- machinery use
- crop rotations, and areas and yields
- on farm consumption of produce

Section C:

1.Indicators of farm business performance:

Many farm and enterprise indicators calculated. The general business indicators are shown below. The RT/UT is used most widely and analysis by size of farm, region and type of farm regularly collected.

Gross margin
Gross margin / work unit
Gross margin / area (various)
Gross margin from livestock / area of forage crop
Gross margin, pigs / Pig

(C1 continued)

Revenue de Travail (RT) = Gross production (less state aids) less all charges except salaries/wages.
Revenue de Travail Familial (RTF): unit of family labour (UT)
RT / unit of labour
RT / ha (utilised for agriculture)
RT as percentage of gross production
RTF / unit of family labour (including state aids)
Revenue agricole 'approche' = Revenue plus interest on advanced payments
Return on capital as a function of Net Profit, RTF and RT
Revenue (product)/1,000 Bfrs of costs and charges
Various capital and investment indicators used eg, investments in the business

2. Indicator definition: A wide range of indicators used (see section C1).
Standard values are used for labour units.

Section D:

1. Indicators of farm household economic position

These all appear to represent economic position from the revenue of the head of the farm and of his family.
Obtained by adding the net result of the enterprise plus the salary of the head of the farm. This is referred to as **Revenue du travail du chef d'exploitation.** However, the **Revenue du chef d'exploitation** is this figure **plus** free products **plus** interest on capital (animals and rent) **minus** interest on loans. Also, the **Revenue du chef d'exploitation et de sa famille** includes the wages of the family members (as this is a study of farm enterprises and profitability it is suspected that no account is taken of non-farm revenue other than imputed interest)

2. Indicator definition: See section D1

3. Non farm 1) income and 2) assets included: Not included

4. Comparison with non farm groups: The main indication of this is the comparison of the RT/work unit with the equivalent for the entire economy. This is published in index form to identify changes in the relative position of agriculture and the rest of the economy

Section E:

1. Publications of data:
1) 'Evolutionale l'Economie Agricole et Horticole' (November) provisional results
2) 'La Rentabilite de 'exploitation agricole en (year)' (January) definitive results

2. a.Purposes and use of indicators: To allow those interested to follow the evolution of the agricultural sector

b. Importance for policy cf aggregate sources
a) At the macro level to assess the use of capital and labour in agriculture
b) At the micro level to identify the diversity of conditions of agricultural production (however, it is limited insofar as smaller farms are excluded)

3. Relation to other data sources: There does not appear to be any integration with data from other sources

4. Studies on farmer performance: Survey data provides background information for research papers (list supplied of 19 papers specifically based on survey data). All of these produced by IEA.

Section A:

1. Country: Denmark

Name: Economic results in Danish agriculture and horticulture

2. Aims: To produce information on economic conditions for agriculture and horticulture in general and for farm/firm types in particular

3. Frequency:
Agriculture: annual
Horticulture: annual

4. Method:
Agriculture: majority through Accounting Associations (electronic conversion); 15% manually
Horticulture: all manual collection

5. Sample:

a. Coverage:
Agriculture:
1) Any holding where SGM from agriculture > 50% of total SGM from agriculture and horticulture combined
2) and > 5 hectares
3) but if < 5 ha, if economic size > 4 ESU

Horticulture:
1) If SGM from horticulture > 50% of SGM from agriculture and horticulture combined
2) and > 4 ESUs

b. Sample Size:
Agriculture: 1925 from 83707 population (2.3%)
Horticulture: 307 from 3073 population (10%)

c. Comparison with RICA:
Agriculture and Horticulture:
- Sample based on 1983/5 values, where 1200 ECUs = 1 ESU
- Should be comparable with RICA as economic size groups are defined on same basis

d. Selection of participants:
Agriculture:
1) 7 farm types used
2) Aim at including as many farm types as possible
3) Try to keep farms in survey (82% continued in survey year to year)

Horticulture: Not available

e. Sample stratification:
Agriculture:
1) Employment (full or part-time)
2) Economic size (European standard)
3) Type of farming (European standard)
4) Area
5) Farmers' age
6) Location

Horticulture:
1) Employment (full or part-time)
2) Economic size (European standard)
3) Type of farming (European standard)
4) Area
5) Farmers' age
6) Location
N.B Full-time = > 1755 hrs p.a

Section B:

1. Data collected:
Agriculture and horticulture:
1) General data (area of farms etc)
2) Livestock composition
3) Change in value of livestock
4) Workforce
5) Fixed assets (+ change in value)

6) Off farm assets
7) Liabilities
8) Crop production
9) Small stock and other income sources
10) Grants and subsidies for sales and purchases
11) Grant and subsidies for farm alteration, repair, reorganisation
12) Farm costs
13) Profit and loss and capital account

Section C:
1.Indicators of farm business performance:

1) Gross output/holding
2) Total cash/holding
3) Gross profit/holding
4) Total and net investments/holding
5) Net interest payment/holding
6) Current income/holding
7) Assets and liabilities/holding
8) Non agricultural or non horticultural (depending which classification) income/holding

2. Indicator definition: Per holding basis

Section D:
1. Indicators of farm household economic position:

Not specifically defined except:
current income - though this is defined on a per holding basis

2. Indicator definition: Not specifically defined

3. Non farm 1) income and 2) assets included:

1) Off farm and other income is included in gross profit from agriculture
2) Non-farm assets do not appear to be included

4. Comparison with non farm groups: NO

Section E:
1. Publications of data:

1) Economic results in Danish agriculture
2) Economic results in Danish horticulture

2. a.Purposes and use of indicators:

1a) Used by committees preparing legislation
1b) Annual report by Ministry of Agriculture of economic trends in agriculture
1c) Other studies use data

b. Importance for policy cf aggregate sources

2) n/a

3. Relation to other data sources: This data combined with others to create a micro based policy model

4. Studies on farmer performance: A large number of publications

Section A:

1. Country: Germany

Name: Agricultural Test Book Keeping of the Federal Ministry for Food, Agriculture and Forests (BML)

2. Aims: Assessment of the income position of agriculture by enterprise type, enterprise size, region, employment type (main or secondary income)

3. Frequency: Annual

4. Method: The Agricultural Book Keeping Agency draws up the years sales/transactions for participating enterprises using standard criteria

5. Sample:

a. Coverage: 1) Enterprises with SGM above 5,000DM
2) Main and secondary agricultural enterprises, plus horticultural, forestry and small open seas and coastal fishing enterprises

b. Sample Size: 9,000 agricultural main employment enterprises
1,500 agricultural secondary employment enterprises
600 horticultural employment enterprises

c. Comparison with RICA: For RICA the data from approximately 5,000 agricultural main employment enterprises are supplied from the national sample. The RICA minimum threshold is 8 ESU (approximately 20,000 DM of SGM). Further differences between RICA and the national survey exist in the delimitation and weighting of enterprise types and income definition

d. Selection of participants: State level committees choose the sample based on structural surveys (agricultural reports) carried out at intervals of several years

e. Sample stratification: as (d) above

Section B:

1. Data collected: Income from the farm business, other holding related income, taxes and social security payments. The holdings are broken down into three categories according to the basis of the relative importance of off-farm income (full-time holdings, part-time main income holdings and supplementary income holdings)

Section C:

1.Indicators of farm business performance: Profit is the main indicator detailed for each enterprise and each unit of family labour. Profit is defined as the annual remuneration for family labour, own land and own capital; this is similar to RICA's FFI. Enterprise expenditure is also analyzed

2. Indicator definition: as C1 above

Section D:

1. Indicators of farm household economic position: Disposable income (comprises farm profit plus non-agricultural income, less direct taxes, social taxes and insurance)

2. Indicator definition: In the Test Book Keeping only the non-farm income of the farmer and spouse are collected. However, the Federal Statistical Authorities also gives an estimate of the disposable incomes of other persons living in agricultural households but not employed on the farm (from a separate household income and expenditure survey)

3. Non farm 1) income and 2) assets included: Non-farm income includes:
- income from self employed and employed work
- income from capital

- rents from farm land let out
- social benefits and various current transfers

4. Comparison with non farm groups:

The household incomes calculated by the Federal Statistics Office covers a wide range of other groups in society, and comparisons can be made with agriculture

Section E:

1. Publications of data:

Annual publication of the Agricultural Report of the Federal Ministry is submitted to parliament in mid-February. Contains analysis of income position of agriculture

2. a.Purposes and use of indicators:

1) Indicators give picture of state of incomes in agriculture compared to rest of society
2) Data useful for policy decisions
3) Data used to analyze effects of previous policy decisions

b. Importance for policy of aggregate sources

The greater disaggregation of the Test Book Keeping accounts allow more useful calculation than aggregate accounts. For example they offer better reference points for targeted measures

3. Relation to other data sources:

The Agricultural Aggregate Accounts are presented in the Agricultural report (see E1) to complement the accounts data. The main indicator is net value added per labour unit; this represents enterprise income, not profit

4. Studies on farmer performance:

Various analyses of the income situation of agricultural enterprises have been carried out with financial help from BML

Section A:

1. Country: Greece

Name: RICA data only

2. Aims: Enquire into, and establish farming incomes as provided by Regulation No 79/65/EEC of the Council of 17 July 1965

3. Frequency: Annual (since 1981)

4. Method: Specially trained personnel working personally with the heads of farm holdings

5. Sample:

a. Coverage: All holdings covered by 10 yearly general census (Holding - not defined)

b. Sample Size: 7,200 farms (1.4% of population)

c. Comparison with RICA: RICA sample

d. Selection of participants: as RICA

e. Sample stratification: as RICA

Section B:

1. Data collected: as RICA

Section C:

1.Indicators of farm business performance: Presented in form laid down by RICA document RI/CC 882 Rev 2

2. Indicator definition: as RICA

Section D:

1. Indicators of farm household economic position: as RICA

2. Indicator definition:

3. Non farm 1) income and 2) assets included: No

4. Comparison with non farm groups: No

Section E:

1. Publications of data: annually

2. a.Purposes and use of indicators: Used by Ministry of Agriculture to compose tables to help formulate credit and agricultural policy

b. Importance for policy cf aggregate sources Used by universities, cooperative organisations

3. Relation to other data sources: Not specified

4. Studies on farmer performance: Not specified

Section A:

1. Country: Spain

Name: National Agricultural Accounts Network

2. Aims: RICA objectives (only RICA data collected)

3. Frequency: Annual

4. Method: Mixed, according to circumstances of the farmer. It may be personal, postal or by management groups

5. Sample:

a. Coverage: Minimum threshold = 2 ESU

b. Sample Size: Sample size of 7175 based on 1982 census data however, actual sample achieved was in 6407 (1985). Population greater than 2 ESU = 919,166 holdings

c. Comparison with RICA: RICA sample

d. Selection of participants: Voluntary participation. Accepted if characteristics accord with planned target

e. Sample stratification: RICA (Region, farm type and economic size)

Section B:

1. Data collected: RICA data

Section C:

1.Indicators of farm business performance:
Added value per hectare of utilizable agricultural area by:
1) farm type and
2) enterprise type (RICA definition)

2. Indicator definition: Per farm basis

Section D:

1. Indicators of farm household economic position: as RICA

2. Indicator definition: Per farm basis

3. Non farm 1) income and 2) assets included: Not collected

4. Comparison with non farm groups: Comparison made between 'profit from family labour' (RICA defined) and national minimum wage

Section E:

1. Publications of data: 1) Red Contable Agraria Nacional Vol I and II

2. a.Purposes and use of indicators:

b. Importance for policy cf aggregate sources

3. Relation to other data sources:

4. Studies on farmer performance: Red Contable Agraria Nacional 1983, 84, 85, 86

Section A:	
1. Country:	France
Name:	collected and compiled by the Ministry of Agriculture, Service Central des Enquetes et Etude Statistiques (SCEES)
2. Aims:	Not specified other than RICA
3. Frequency:	Annually
4. Method:	Farm visits
5. Sample:	
a. Coverage:	Full time farms only over 1 standard man year (or a standard gross margin of over 4,000 ECU) and over 10 hectares of wheat equivalent
b. Sample Size:	5,500 farms from a total population of approximately 634,000 farms
c. Comparison with RICA:	RICA data only collected
d. Selection of participants:	Randomly from the agricultural census (conducted every two years). Drawn from farms that have their accounts independently assessed and farms that are in receipt of assistance for 'development plans'. In order to receive financial assistance, primarily targeted at younger farmers, farms must maintain accounts.
e. Sample stratification:	as RICA
Section B:	
1. Data collected:	as RICA including: area, farmer age, output, use of inputs, gross margin, net income, interest payments, capital charges, working capital, land and other fixed assets
Section C:	
1.Indicators of farm business performance:	see sub-section B
2. Indicator definition:	as RICA
Section D:	
1. Indicators of farm household economic position:	Whole farm data only
2. Indicator definition:	as RICA
3. Non farm 1) income and 2) assets included:	1. Farm income only 2. n/a
4. Comparison with non farm groups:	Not specified
Section E:	
1. Publications of data:	Annually in Resultats economiques des exploitations agricoles

2. a.Purposes and use of indicators:	Not specified
b. Importance for policy cf aggregate sources	Not specified
3. Relation to other data sources:	Other sources of data cover only parts of the agricultural population or apply to only parts of income, making comparisons difficult
4. Studies on farmer performance:	Occasional studies. For example, 1978 Centre d'Etude des Revenus et des Couts (CERC) study of income sources of 3,000 agricultural households. This study both on and off farm income, all household members and the purchase/sale of assets

Section A:

1. Country: Ireland

Name: National farm survey (NB Method of sample selection and classification changed in 1984; new survey follows EC typology)

2. Aims:
1) To determine level of farm output, costs and incomes arising in agriculture, and variations between different regions, sizes and farming systems
2) To determine structure of farm output and expenses for similar classifications
3) Standards of farm performance for various farm types and sizes which will provide aid to farm planning

3. Frequency: Annually

4. Method: Personal interview

5. Sample:

a. Coverage: all farms within EC farming system classification

b. Sample Size: 1,311 from 188,000 population (1988)

c. Comparison with RICA: Uses same farming systems classification

d. Selection of participants: Random start with systematic selection

e. Sample stratification:
1) Farming system (8 types: eg dairying, cattle, mainly sheep))
2) Size - 6 groups (Family farm income:IR£)
0- 2,500
2,500 - 5,000
5,000 - 10,000
10,000 - 15,000
15,000 - 30,000
> 30,000

Section B:

1. Data collected:
1) General data and tenure
2) Crop particulars
3) Crop expenses
4) Dairy and cattle details of inputs and outputs
5) Other livestock - sheep, pigs and poultry
6) Machinery, land and buildings costs
7) Labour, hours and costs
8) Hours
9) Machinery and buildings - purchases, sales and grants, depreciation
10) Improvements
11) Land value
12) Machinery, buildings, improvements inventories

Section C:

1.Indicators of farm business performance:
1a) Gross output per farm
1b) Family farm income per farm
1c) Family farm income per family labour unit
1d) Average gross output, expenses, income and resources per farm
Above subdivided by a) farming system; b) farm size
1e) Above subdivided additionally by income group

ALSO
2) Report presents distribution of farms by
a) Standard Labour Units and Actual Labour Units
b) Standard Labour Unit and Economic Size
c) Family farm income group by farming system and size
3) Further division of all in (1) into disadvantaged areas and non-disadvantaged areas

2. Indicator definition:	As Section C1
Section D:	
1. Indicators of farm household economic position:	Not recorded
2. Indicator definition:	n/a
3. Non farm 1) income and 2) assets included:	Not covered
4. Comparison with non farm groups:	Not made
Section E:	
1. Publications of data:	1) Provisional estimates of the results of the national farm survey in June of year following survey 2) final results of survey published in second year following survey
2. a.Purposes and use of indicators:	1) National policy analysis
b. Importance for policy cf aggregate sources	2) Traditionally NFS data used less than aggregate accounts, although use is increasing
3. Relation to other data sources:	No relationship
4. Studies on farmer performance:	Number of publications on sectors and general subjects (eg markets, environment)

Section A:

1. Country: Italy

Name: Instituto Nationale di Economica Agraria (INEA)

2. Aims: as RICA

3. Frequency: Annual

4. Method: Data is collected by postal questionnaire

5. Sample:

a. Coverage: Full time farmers only but by reference to the legal form of the institution running the holding (eg farmer, company, partnership)

b. Sample Size: as required by RICA
18,000 farms drawn from:
- holdings over 5 hectares except for specialised horticulture and viticulture
- minimum economic size of 2 ESU

c. Comparison with RICA: as RICA

d. Selection of participants: voluntary

e. Sample stratification: as RICA (region, farm type and economic size)

Section B:

1. Data collected: as required by RICA and include;
annual production, intermediate consumption, direct and indirect taxes, social security payments, employee compensation, interest received and paid, rent received and paid, insurance premiums and claims

Section C:

1.Indicators of farm business performance: as RICA

2. Indicator definition: per farm basis

Section D:

1. Indicators of farm household economic position: as RICA

2. Indicator definition: per farm basis

3. Non farm 1) income and 2) assets included: Not collected

4. Comparison with non farm groups:

Section E:

1. Publications of data: Published annually by region in RICA-Italia

2. a.Purposes and use of indicators: Not specified

b. Importance for policy cf aggregate sources: Not specified

3. Relation to other data sources: Not specified

4. Studies on farmer performance:

Section A:

1. Country: Luxembourg

Name: Agricultural Economics collected by the Rural Economy Department (SER) and the Luxembourg Office for Productivity.
RICA survey, but in 1984/85 a more comprehensive one off survey was also conducted (see below)

2. Aims: RICA

3. Frequency: Annual

4. Method: Data is collected only from those farms which keep accounts. Of the 4500 holdings in Luxembourg about 800 keep accounts and it from this population that information is obtained for the RICA submission.

5. Sample: see sub-section A4 above

a. Coverage: Sample is not representative of all holdings in country as only full time holdings are in the sample which are larger than the national average and more intensively managed. Small and part time holdings are not included.

b. Sample Size: see sub-section A4

c. Comparison with RICA:

d. Selection of participants: see sub-section A4

e. Sample stratification: None

Section B:

1. Data collected: as RICA

Section C:

1.Indicators of farm business performance: as RICA

2. Indicator definition: as RICA

Section D:

1. Indicators of farm household economic position: as RICA

2. Indicator definition: as RICA

3. Non farm 1) income and 2) assets included Accounts are kept according to the need of the holding and not according to a standard national format. Therefore not all returns include non agricultural incomes; it depends on whether this information is put through the farmer's bank account. The sample will be inconsistent.

4. Comparison with non farm groups: No

Section E:

1. Publications of data: Annually

2. a.Purposes and use of indicators:/b. Importance for policy cf aggregate sources/ 3. Relation to other data sources:

4. Studies on farmer performance:
1984/85 Special study carried out on all the holdings with accounts available (688 holdings). This analyzed the information and obtained a rough picture of distribution of total income classified according to source.

Section A:

1. Country: The Netherlands

Name: Farm account network of the Landbouw - Economisch Instituut (LEI)

2. Aims: To monitor economic situation of agricultural holdings and provide data for research

3. Frequency: Annually

4. Method: Accounting Dept. of LEI. Keep the farmers accounts and extract data

5. Sample:

a. Coverage: 20 ESUs minimum (part-time farmers included) (1980' values)

b. Sample Size: 1,100 from 70,000 population (1986)

c. Comparison with RICA: Much more data gathered than required under RICA

d. Selection of participants:
- Continuous panel in which farms take part for 6 years
- Selected from annual May census of agricultural and horticultural holdings above 10 SFUs

e. Sample stratification:
1) Size (SFU and ha)
2) Age of farmer
3) Type of farm
4) Region

Section B:

1. Data collected: RICA data plus much more eg:
1) Non agricultural income, taxes, private consumption
2) For most costs and outputs monetary data is split into quantity and implicit price so productivity comparisons can be made
3) Quality of product data
4) Gross margin data
5) Cropping plan

Section C:

1.Indicators of farm business performance:

1) Enterprises
- yields
- gross margins
- cost prices

2) Farm value
- output/100 guider costs
- net value added
- labour income of the farm
- net farm operating result

3) Balance sheet
- net worth

4) Annual charges
- product prices
- input prices
- terms of trade
- productivity
- profitability

2. Indicator definition:
1) RICA definitions of family farm income
2) Labour units:
age > 19 years = 1 unit
age > 18 years = 0.9 units
age > 17 years = 0.8 units
age > 16 years = 0.65 units
part-time corrected accordingly

Section D:

1. Indicators of farm household economic position:

Farm income of the farmer = Net profit or loss including:
Income - imputed costs of family labour;
- interest on farm investments;
- imputed rent for farmer owned land;

less - interest paid on borrowed capital;
- costs of farmer owned land and buildings including depreciation, maintenance, real estate taxes

plus - subsidies or other farm revenue not in farm business accounts
less - savings;
- net cash flow can be computed for farm family

2. Indicator definition:

Farm Household
Excludes members who do not work on farm or do not depend on income of family

3. Non farm 1) income and 2) assets included:

1) Non farm income included
2) n/a

4. Comparison with non farm groups:

Not specifically made because of lack of data comparability

Section E:

1. Publications of data:

1) Halfway through year 'forecast' published
2) 6 months after year end interim results
3) Statistical reports on economic performance of agriculture and on income and wealth in agriculture
4) Textual study on changes in agriculture and comparison with policy
5) Every 5 years long term analysis made on each type of farming to review structural change and market conditions

2. a.Purposes and use of indicators:

1) Used by Ministry of Agriculture, Marketing Boards, Agricultural Banks, Extension Services, Unions

b. Importance for policy of aggregate sources

2) Aggregate accounts not used because the Netherlands is so specialised in agricultural sectors

3. Relation to other data sources:

None

4. Studies on farmer performance:

Occasional extra studies on specialised topics not covered in statistics and an effects of proposed policies

Section A:

1. Country: The Netherlands

Name: Production account survey of the Centraal Bureau voor de Statistiek (CBS)

2. Aims: To monitor economic situation of agricultural holdings and provide data for research

3. Frequency: Annually

4. Method: Compiled from farms that keep independently assessed accounts

5. Sample:

a. Coverage: Between 14 ESU minimum and a maximum of 430 ESU

b. Sample Size: 3,000 farms from the 35,000 farms that keep independently assessed accounts

c. Comparison with RICA: Covers both similar and different data to RICA

d. Selection of participants: - random sample from the annual May census of agricultural and horticultural holdings

e. Sample stratification:
1) Area (ha)
2) Business type
3) Size class by SFU

Section B:

1. Data collected: Accountancy type data including:
1) Farm income, expenditure, assets, liabilities
2) Investments (including energy saving investments), capital flow, output
3) Transfers, social security payments and taxes paid

Section C:

1.Indicators of farm business performance:
See section B

2. Indicator definition: 1) Accounting definitions

Section D:

1. Indicators of farm household economic position: Farm income of the farmer = **NET PROFIT OR LOSS** including:
Income - imputed costs of family labour;
- interest on farm investments;
- imputed rent for farmer owned land;
less - interest paid on borrowed capital;
- costs of farmer owned land and buildings including depreciation, maintenance, real estate taxes
plus - subsidies or other farm revenue not in farm business accounts
less - savings;
- net cash flow can be computed for farm family

2. Indicator definition: Farm Household
Excludes members who do not work on farm or do not depend on income of family. Does not include earnings of other family members earned off farm

3. Non farm 1) income and 2) assets included:
1) Non farm income not included
2) n/a

4. Comparison with non farm groups: Not specifically made because of lack of data comparability

Section E:

1. Publications of data:	1) Annually
2. a.Purposes and use of indicators:	1) Used by Ministry of Agriculture, Marketing Boards, Agricultural Banks, Extension Services, Unions
b. Importance for policy cf aggregate sources	2) Aggregate accounts not used because the Netherlands is so specialised in agricultural sectors
3. Relation to other data sources:	None
4. Studies on farmer performance:	

Section A:

1. Country:	Portugal
Name:	RICA survey only (in establishment phase)
2. Aims:	RICA
3. Frequency:	Annual
4. Method:	as RICA
5. Sample:	as RICA
a. Coverage:	as RICA
b. Sample Size:	3,000 by 1990
c. Comparison with RICA:	
d. Selection of participants:	as RICA
e. Sample stratification:	as RICA

Section B:

1. Data collected:	as RICA

Section C:

1.Indicators of farm business performance:	as RICA
2. Indicator definition:	as RICA

Section D:

1. Indicators of farm household economic position:	as RICA
2. Indicator definition:	as RICA
3. Non farm 1) income and 2) assets included:	
4. Comparison with non farm groups:	

Section E:

1. Publications of data:	Annually
2. a.Purposes and use of indicators:	Not specified
b. Importance for policy cf aggregate sources	Not specified
3. Relation to other data sources:	Not specified
4. Studies on farmer performance:	

Section A

1. Country: United Kingdom (Separate surveys are conducted for England, Wales, Northern Ireland and Scotland)

Name: Farm Business Survey

2. Aims: Provision of economic information for:
1) Policy formation
2) Further research

3. Frequency: Annual

4. Method: Farm visit by university and college investigation officers and Department of Agriculture in Northern Ireland (manual collection of data; return made to Ministry

5. Sample:

a. Coverage: 'Full time farm businesses: holdings greater than 4 British Standard Units (1 BSU = 2000 SGM at 1980 values)

b. Sample Size: England: 2,200 from 156,000 population
Wales: 500 from 30,200 population
Northern Ireland: 450 from 42,400 population
Scotland: 650 from 26,200 population

c. Comparison with RICA: Minimum threshold = 8 ESU (RICA standard)
Some farms unavailable for RICA if farmer unwilling, accounting year outside RICA range or data not available which RICA need
(NB in Scotland minimum size group is 8-16 BSU and maximum threshold for non-cropping farms is 100 BSU;
Holdings in largest size group not sampled in Northern Ireland)
In Wales maximum threshold of 100 BSU)

d. Selection of participants: 1) Participants may stay in sample for 15 years
2) A proportion of farms replaced annually from random recruitment based on June Agricultural Census.

e. Sample stratification: By: 1) Main farm type (standard EC classification)
2) BSU size group (4-16 BSU, 16-40 BSU, above 40 BSU)
3) Region (8)

Section B:

1. Data collected:
1) Farm characteristics: area, tenure
2) Manpower
3) Previous crops
4) Current crops
5) Forage
6) Miscellaneous output
7) Cattle and products
8) Other livestock
9) Machinery and equipment
10) Permanent crops
11) Hot and cold houses
12) Variable and fixed costs
13) Investment
14) Tax
15) Livestock subsidies
16) Farm vehicles
17) Net farm income
17)Liabilities and assets

Section C:

1.Indicators of farm business performance:

1) Net farm income
2) Occupier's net income
3) Cash income
4) Cash flow from farm business
5) Total flow of funds

2. Indicator definition: Per farm basis

Section D:

1. Indicators of farm household economic position:

- from 1988/89 data collected on off farm income of farmer and spouse
- limited data collected on non agricultural, on-farm income

2. Indicator definition: see sub-section D1

3. Non farm 1) income and 2) assets included:

1) see sub-section D1
2) personal assets and liabilities excluded

4. Comparison with non farm groups: Not made

Section E:

1. Publications of data:

1) 'Farm incomes in the United Kingdom'
2) 'Agriculture in the United Kingdom'
3) Each regional data collection centre published its own results

2. a.Purposes and use of indicators:

For policy formulation:
1) in assessing economic condition of industry at individual farm level
2) as a base for short term income forecasts
3) in evaluation of policy options

b.Importance for policy of aggregate figures: Complements aggregate data by providing impartial micro level data source

3. Relation to other data sources: Not integrated as accounting assumptions of Farm Business Survey are different

4. Studies on farmer performance:

1) One off studies on individual enterprises or specific features
2) 'Survey of Very Small Farm Businesses is ongoing (ie farms below the minimum threshold for FBS)

CHAPTER 9: THE PROPOSED FURTHER ANALYSIS OF RICA DATA USING ALTERNATIVE ECONOMIC INDICATORS

9.1 Introduction

9.1.1 The preceding Chapters considered various aspects of the performance of farm businesses and the incomes of farmers, and proposals for further work were made in general terms. The purpose of this Chapter is to show all those economic indicators that were considered for application within the proposed programme of analysis using RICA data, and to list those which, after discussion with RICA staff, were selected to form part of the analysis. The reasons for suggesting the various concepts and measures are not repeated here. The results of the analysis are presented later, in Chapter 10.

9.1.2 As a guiding principle, agreed with RICA staff, the analysis of RICA data using the proposed indicators was to be exploratory rather than definitive. Consequently, it was not necessary to pursue all levels of disaggregation, for example down to Member State level or for all countries, where this added little to the overall understanding. It was agreed that the main analysis should use data from the 1987/8 year, but in view of the concern with changes in indicators from year to year, it seems desirable in many cases to estimate the economic indicators for two consecutive years (1986/7 and 1987/8) or, in some cases, for each of the years 1983/4 to 1987/8 or, in some cases, for each of the years 1983/4 to 1987/8.

9.1.3 The agreed main form of analysis was to be a review of group averages, based on tables similar to those which appear in the annual RICA publication

Economic Situation of Agricultural Holdings in the EEC. It was also proposed that the relationship between indicators should be explored though a form of correlation matrix, at least for the main indicators, but this would depend on the programming facilities available within RICA. In light of the concern with year-to-year changes, it was suggested that this correlation exercise should include not only measurements of associations between the absolute levels of the alternative indicators in a single year but (and perhaps more importantly) between changes from one year to the next. In addition, at several places in the study it has been made apparent that other ways of treating the data could be rewarding, such as multiple regressions, factor analysis and more econometric techniques in pursuit of marginal products and measures of efficiency. These possibilities did not form part of the analysis to be explored here. However, the research team believes that these approaches, which represent an interrogation of the data bank, should be investigated as part of other research activities.

9.1.4 Because of the very large number of variables which could in theory be used, the multiplicity of farm types and years and so on, some ordering of priorities was necessary. The process of selection of economic indicators and the ways in which they are used in the analysis:

- reflected the policy requirements as perceived by RICA and the team working on the present research project;
- acknowledged that some of the proposed economic indicators bore close relationships to each other, so that an element of overlapping would result;
- recognised that exploring all the many possibilities would have created a mass of tables, to interpret each of which would have been difficult within the space of the present research.

9.1.5 Based on the material contained in the earlier Chapters of this Report, three categories of economic indicator were identified:

(a) those which were capable of calculation within the present RICA framework;

(b) those which might be technically feasible but which are not yet calculated (such as indicators based on time-series for individual farms);

(c) those for which additional basic data is required (for example, the other income accruing to agricultural households), though for some Member States this may be available outside RICA in national surveys.

For the purpose of this proposed analysis, only those variables listed in the FADN Handbook of legislation instructions: notes for guidance, Section III, The farm return (January 1988 version) and Key to variables used in FADN standard outputs (level 1 and 2), RI/CC 882 rev.3, were considered. Possibilities for the enlargement of RICA in terms of the data collected, or changes to the sample

to reflect emerging policy needs (such as the greater representation of very small farms) will be examined in Chapter 11.

9.1.6 The proposed analysis depended on two elements. One was the selection of variables for each farm business - the economic indicators which are the central concern of the present study. The other was the choice of criteria which were to be used to rank or group farms (size, output, performance etc) and the way that the variables were to be presented (group averages, distributions etc). Both of these elements depend on the purpose for which analysis is required. From an observation of legislation, Commission policy statements and the present pattern of use of RICA data it seems that indicators are required to serve two particular aspects of farms; incomes (comprised of personal income and business income) and the economic performance of farm businesses.

9.1.7 Personal income indicators were not considered for inclusion in the proposed exploratory analysis because information on non-farm incomes is not gathered in the present RICA. Among the indicators relating to the business five categories were proposed, comprising the following:

(a) Indicators of whole-farm income and profit
(b) Indicators of efficiency
(c) Partial productivity/performance measures
(d) Financial status: Balance sheet indicators
(e) Viability and other indicators

PART 1 Selection of variables

9.2 Indicators of whole-farm income and profit

9.2.1 A range of whole-farm income indicators can be envisaged. The main differences arise because of the ways that treatment is given to:

(a) the non-cash items in the list of outputs and (to a lesser extent) variable inputs.
(b) the treatment of imputed costs for the fixed inputs which are owned by the farmer/operator.
(c) changes in the balance sheet position of the business, including in the borrowings and assets values.

9.2.2 The rewards to the fixed factors are capable, given suitable data, of being allocated by economic function (property income, labour income, managerial reward), by ownership or by a combination of function and ownership. Though such a breakdown may be appropriate to the economic analysis of the performance of farm businesses, at the farm level farmers may be far more interested in the financial outcome of their agricultural activities (Chapter 7). The treatment of business outputs and inputs will be more cash-orientated and should take into account the relevant taxation regimes.

9.2.3 A case could be made that income concepts which form the reward to a group of income recipients, such as the farmer and spouse or the household or the entire labour force, should be expressed per labour unit. There is sufficient evidence on the multiple income sources accruing to farm households in Member States to demonstrate that the income from farming, divided by the number of labour units, is no satisfactory guide to the level of personal income. Dividing agricultural income by the number of Annual Work Units (in full-time equivalents) may have a place in indicating labour productivity and factor rewards (though there are reservations about both its economic rationale and the reliability of the basic data); it will be put forward as a potential economic indicator later. In consequence, most of the measures of income in this section have been considered primarily on a per-holding basis.

9.2.4 It was proposed that the following set of whole-farm income/profit indicators should be calculated, those finally selected after consultation with RICA staff being marked *. Unless labelled otherwise, the indicators are on a per-holding basis. The ways in which the indicators in the first group (cash indicators) and in the second group (income indicators) relate to each other are shown in Figures 9.1 and 9.2:

Cash Indicator 1*:
Current cash receipts - total current cash expenditure.
(This is essentially the approach used by Eurostat's Cash flow of family labour input, with the modification that own consumption is treated as a cash receipt, as is also "processing by producers")

Cash Indicator 1a*:
Cash Indicator 1 - depreciation.

Cash Indicator 2*:
Cash Indicator 1 - net investment spending.
(A distinction could be drawn between spending on land and spending on other forms of assets which might be thought of as more directly linked to the ability of the holding to maintain its level of production.)

Cash Indicator 3*:
Cash indicator 2 + increase in borrowing + net cash flow introduced to the farm business from non-farming sources.
(This is essentially the form used as the RICA Cash-flow. Funds introduced are combined with the increase in borrowing. Investment in land is deducted.)

Cash Indicator 3a
Cash Indicator 3 + net sales of real estate.

Value added (gross)

Total output (sales + farm use + farmhouse consumption + change in valuation for each item) - intermediate consumption + current grants and taxes. (This is the same definition as the current Gross farm Income)

FNVA (per holding and per AWU)*

As at present defined. This is the reward to all the fixed factors after the deduction of depreciation.

Standardised Income 1 (per holding and per FWU)*

Businesses converted to "full-equity"; FNVA - hired labour. This represents the return to all the capital and land in the business, and the labour and management of the farmer and family. It also corresponds to Operating Surplus in the aggregate economic accounts.

Standardised Income 1a

As above, but deducting all labour (hired and imputed) except that of the farmer and spouse.

Standardised Income 1b*

As above, but deducting all labour including the imputed cost of the farmer and spouse labour. The residual is the reward to all capital and land, and to managerial input.

Standardised Income 1c

As Ib, but also deducting a charge for the managerial input of the farmer and spouse. The residual is the return to land and capital.

Standardised Income 1d* to 1g

As Standardised Incomes 1 to 1c, but + unrealised capital gains.

Standardised Income 2

NVA - (rent and/or imputed rental value) - (hired labour and imputed non-hired labour (except farmer and spouse)). This represents the return to capital and to the physical and managerial input of the farmer and spouse. (This measure may not be practical in Member States in which there is no effective rented land sector.)

Standardised Income 2a*:

As Standardised Income 2, but minus imputed cost for the physical labour of the farmer and spouse. This corresponds with Management and Investment Income.

Income to Labour 1 (per holding and per AWU)*:

FNVA - rent (actual) - interest (actual, for farming loans and land purchase). This represents the residual available to all the labour of the farm business arising from the land, capital and labour input (physical and managerial) it controls. This is equivalent to "Net income from agricultural activity of total labour input" as used in the aggregate accounts.

Income to Labour 2:

FNVA - rent - imputed rental value - interest on working capital (calculated at the effective borrowing rate on short and medium term loans).

Farm Family Income 1 (per holding and per FWU)*:

As currently defined (FNVA - wages paid - rent paid - interest paid (including on loans for land purchase) after subsidies + capital subsidies).

Farm Family Income 1a

FFI1 + unrealised capital gains.

Farmer and Spouse Income 1*:

As FFI1, but also deducting imputed wage for family and other unpaid labour, except for farmer and spouse.

Farmer and Spouse Income 1a:

As FSI1 + unrealised capital gains.

Fig 9.1 Relationship between proposed cash flow indicators

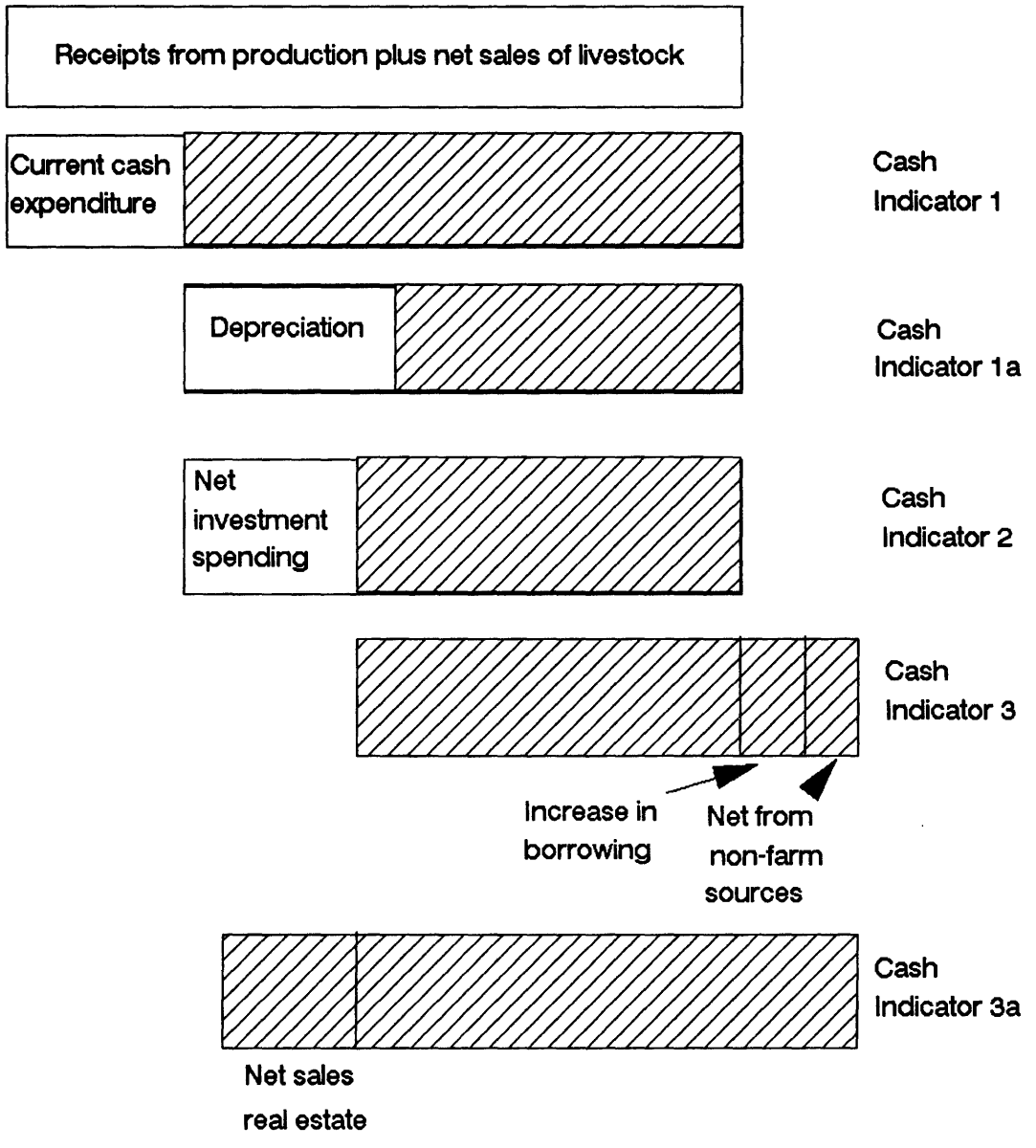
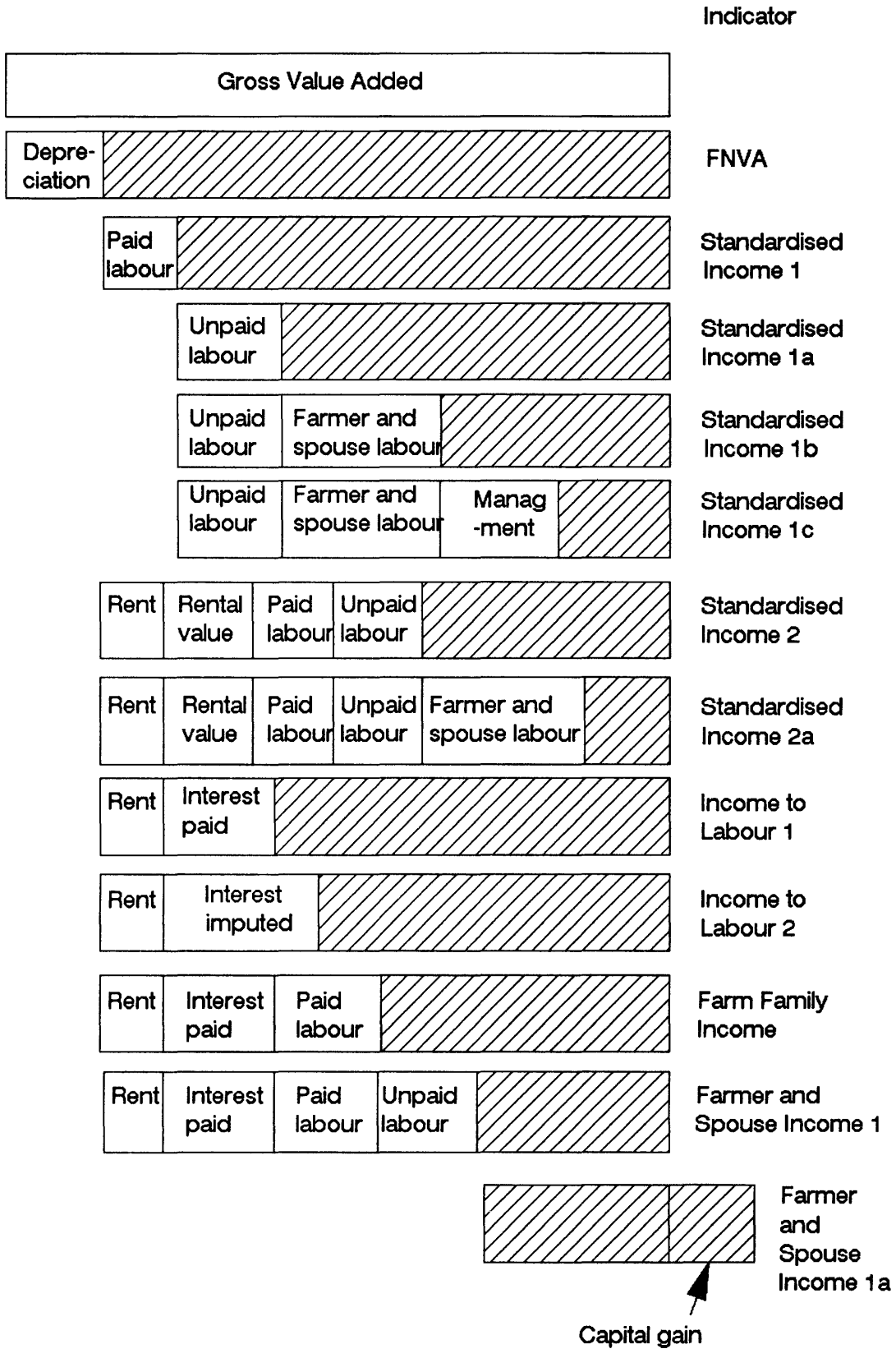


Fig 9.2 Relationship between proposed income indicators



9.3 Longitudinal sample analysis

9.3.1 The income indicators listed above are normally calculated for the period of one year. However, a recurrent theme of the literature on incomes and profits is the necessity of observing the behaviour of businesses over some longer period. This applies to all the indicators, with the possible exception of the cash-flow series. At the outset of the analysis, when the framework was proposed, the technical feasibility of following individual businesses within RICA for, say, three or five years had not been established but the situation looked promising. The research team felt strongly that statistics using data for more than one year should be developed; for example, inter-year variations would need to be studied and the best way of presenting the information explored.

9.3.2 During the course of discussion it was agreed that:

- longitudinal analysis should be based on a sample of businesses which had been within the RICA system for 3 consecutive years (1985, 1986, 1987).

- analysis would be in the form of a count of holdings which fell into pre-selected income bands, with incomes measured in four time periods in each of the three years and the farm-level average for the three year period.

- the reduced list of economic indicators for this exploratory exercise should be:
  - Cash Indicator 2
  - FNVA
  - FFI
  - Labour Income 1
  - Standardised Income 2a

- the count of holdings should be carried out for:
  EUR10 or 11, according to availability, and by farming type

9.4 Other income ratios

9.4.1 Some ratios between the main income variables can be useful in showing the (declining) share of output value remaining to farmers and their fixed resources, and as short-term indicators of the liquid resources position. The researchers proposed a few key ratios, such as the following, of which those marked * were finally selected:

- FNVA as a percentage of Total output (not included as an income indicator above)*
- FFI as a percentage of Total output*
- FFI as a percentage of FNVA
- Cash indicators (1*, 2*, 3 above) as percentage of;
  - Total output*
  - FNVA
  - FFI*

9.5 Indicators of efficiency and productivity

9.5.1 Whole-farm measures: At the whole farm level Chapter 6 indicated some support for the estimation of average Total Factor Product (TFP). This could be in several forms, depending on the components which were selected to form the output or, in particular, the inputs. The following were put forward, of which the last was selected by RICA for reasons of data availability:

> Gross output/ total inputs (including imputed costs for owned land and the labour of the farmer and spouse, valued at the average market price of rented land and of hired labour).
>
> as above, but valuing the imputed items at their real opportunity costs: in many cases the transfer earnings of the farmer and wife labour might well be lower than the costs of hired labour.
>
> as above, but outputs valued at common prices to eliminate differences in market prices between farms of different sizes, types and so on.
>
> * Total enterprise output (gross output - profit or loss on the sales of previous year's crops plus the market value of home produced feed (excluding forage) and seed)/ total inputs (including the value of farmer and spouse labour but excluding stock appreciation for breeding livestock).

As will become evident from Chapter 10, a revision of the formulation was made during the process of the analysis, so that the cost of land (actual or imputed) and interest were excluded from the bundle of inputs, which thus included intermediate consumption, depreciation and labour costs (actual or imputed).

9.5.2 Chapter 7 described the use of a standard output as a way of comparing the performance of individual farms. This applies standard figures to crop areas and stock numbers to show what output would be if the performance of all enterprises was at an average level, estimated by observation of the universe of farms in a group or by sampling. This approach gives rise to the following indices:

> System index: the ratio of farm standard output to group standard output. It provides a measure of the general intensity (of factor use) compared with similar farms.
>
> Yield index: the ratio of the farm's actual gross output to the estimated standard output. This incorporates both yield and price differences achieved by the farm from the norms.

9.5.3 In principle similar indices could be constructed for many other business parameters for which "standards" are available. For example, in the UK some FBS centres calculate standard man-day requirements for individual farms and the actual man-day availability; these can be expressed as an index. For RICA the most obvious contender for this sort of treatment is Standard Gross Margin, the index being:

Actual farm gross margin
Farm Standard Gross Margin

If the standards are not calculated from the sample from which the actual farm is drawn, then the group average may not correspond to 100 (or unity). The index would be interpreted as demonstrating the relative performance of farms in generating gross margins from their endowments of fixed factors. However, on the advice of RICA staff this form of analysis was not given high priority within the present examination of economic indicators, and it was not pursued.

9.5.4 Partial productivity/performance measures Some of the indicators which relate business parameters to single factors (or, in a few cases, bundles of different factors) are simple arithmetic expressions (for example, output per AWU). Others attempt to isolate the contribution of a single type of input (eg the reward to capital) by deducting estimates of the reward to the other inputs, leaving a residual. Returns to labour, to capital, to management and, at least in principle, returns to land could each be derived, assuming that satisfactory ways of arriving at the rewards to each of the others could be estimated. In practice, this procedure involves much imputation and is open to challenge for the values so ascribed. Consequently the indicators calculated tend to reflect the combined rewards to a mixture of inputs.

9.5.5 Many partial performance indicators with respect to land were encountered in drawing up this Report. Often all the main components of output and input are expressed per hectare, and the income indicators listed above can all be presented divided by the physical area of the business. In some cases this is seen as an alternative to using ESUs as the main criterion of size, and area is sometimes converted to "adjusted ha" to take account of the variation in production potential of land of different quality. Among the more commonly encountered indicators were the following:

Output (gross/total) per ha (actual/ adjusted)
Gross margin per ha (actual/adjusted)
Value added (gross/net) per ha (actual/adjusted)

Crops and livestock gross margin per ha
Grazing livestock output per adjusted forage ha
Grazing livestock units per adjusted forage ha
Cash crop output per cash crop ha

Physical crop yields (tonnes per ha)
Physical animal output per ha (litres of milk per forage ha etc)

9.5.6 Labour productivity measures relate to the total labour input, including as a cost the imputed value of the unpaid family labour (farmer and spouse and other family labour). It was suggested that the following were the indicators to be calculated:

Total output per AWU and per unit labour cost
Gross Farm Income (GVA) per ALU and per unit labour cost

Gross margin per AWU and per unit labour cost
FNVA per AWU and per unit labour cost
FFI per FWU and per unit cost of family labour

Related measures:
Ratio of FWU to AWU
Ratio of cost of family labour to total labour

Total assets per AWU
Total assets (excluding land and buildings) per AWU
Machinery, breeding livestock and current assets per AWU
Gross investment per AWU

9.5.7 Partial productivity measures with respect to capital should encompass all capital, irrespective of ownership. However, in practice it is difficult to draw a line between these indicators and those used to assess the financial status of the business, in which the division by ownership is critical. Those put forward for exploration in the present context were:

NVA as a percentage of total assets
NVA as a percentage of net worth
Standardised Incomes 1 to 1c ("full equity and no unpaid labour, with various treatments of unpaid family labour and labour of farmer and spouse) as a percentage of total assets
Standardised Incomes 1d to 1g (+ unrealised capital gains) as a percentage of total assets
FFI as a percentage of net worth
FFI 1a (FFI + unrealised capital gains) as a percentage of total assets
FFI 1a as a percentage of net worth
Management and Investment Income (Standardised Income 2a) as a percentage of total non-real estate capital.

Sales as a percentage of:
fixed assets
current assets
total assets
Cash flow (from output sales) as a percentage of
total assets
net worth
current assets

9.5.8 Of this large list the following were selected for tabulation, using group averages:

Total output per ha*
Total inputs per ha*
Grazing livestock units per ha*
Total output per AWU*
Total output per unit labour cost*
Total assets per AWU*
Total assets (less land) per AWU*
FNVA as a percentage of Total Assets*
FFI as a percentage of Net Worth*
Standardised Income 2a (Management and Investment Income) as a percentage of total assets (less land)*
Cash flow 1 as a percentage of total assets*

Cash flow 1 as a percentage of current assets*

Grouping: EUR, by size group, by type group

It was assumed that FNVA/AWU and FFI/FWU, both of which can be interpreted as productivity measures, would be generated elsewhere in the analysis.

9.6 Financial status

9.6.1 Some of the above indicators can also be interpreted as reflecting the financial status of the farm business. Others, derived mainly from the balance sheet, are the following, of which those marked * were selected for furthar exploration:

external liabilities to total assets*
current liabilities to current assets*
liquid assets to current liabilities
liquid assets to total assets
current liabilities to net worth*
long and medium term liabilities to total assets
net worth to total assets

changes in asset valuation
changes in liabilities
changes in net worth

non-real estate capital per ha and per adjusted ha
buildings valuation per ha and per adjusted ha

9.7 Viability

9.7.1 Work on the viability of holdings suggests that the following additional ratios would be useful, of which those marked * were selected for further exploration:

Rent and interest to gross output
Rent and interest to gross margin*
Rent and interest per ha*
Gross margin to gross output

PART 2 Selection of ranking or grouping criteria

9.8 Size, types, geographical and other criteria

9.8.1 It has been established that the size parameter chosen will depend on the particular policy problem in hand. In an analysis which is seen primarily as a tool for the better management of policy, it may be important to concentrate on those parameters which are most easily understood by policymakers and readily available to the implementers of policy. Various criteria were proposed

by the research team, based on either inputs, outputs or hybrid parameters (Chapter 6), listed below. Those selected for exploration are marked *:

land area *(crude Utilised Agricultural Area or adjusted to pasture equivalence)
Annual Work Units*
Family Work Units*
Labour numbers (capita) in total* or family members only
Value of total inputs (including farmer and spouse labour, with annual equivalents for durable assets)*
Total working capital (total less real estate)
Total assets (including real estate)*
Enterprise parameters (Livestock units, crop areas or other appropriate measures)

Total output (or total enterprise output)*
Sales, actual or estimated*
Turnover

European Size Units (Standard gross margin)*
Standard labour requirements
Standard income

9.8.2 Though the traditional way of presenting size groupings has been in terms of pre-determined but arbitrary size boundaries which are consistent from year to year (though modified periodically), economic analysis can often benefit from the use of quantiles (normally deciles, quintiles or quartiles).

9.8.3 The research did not propose to test alternative ways of classifying holdings in farming types; the present methodology was accepted. Similarly, the existing regional and national boundaries were adopted for purposes of analysis.

9.8.4 Among the other myriad possible bases of analysis, the following were put forward to RICA staff as candidates:

(a) according to the levels of cash flow, income or profit - total or per AWU

(b) according to efficiency levels and partial productivity measures, such as into high and low performers in terms of the total output/total input ratio, or SGM per AWU, or the ratio of actual labour to standard labour requirement (or similar ratios applying to capital stocks).

(c) according to the critical viability ratios (such as on the ratio of rent and interest to gross output) and the degree of financial stress as revealed by balance sheets, where appropriate combined with current account information (for example debts to net worth, or interest charges to net worth).

(d) according to the family or non-family operation, as indicated by the ratio of FWU to AWU.

(e) according to the tenure composition of the holding, with the main groupings consisting of owner-occupied, mixed (mainly owned), mixed (mainly rented), and rented. This grouping might be particularly important for some of the income indicators which reflect actually income flows rather than economic concepts which utilise imputed values.

(f) according to the socio-economic characteristics of the operator, for example the age of the holder, the presence or absence of other gainful activities, the stage in the family cycle (in as far as there is information on the ages of children, the presence of family members working on holding etc).

(g) according to the dynamic characteristics of the holding, for example whether it was changing over time in terms of area, of working capital, AWUs, gross output and so on. Farm businesses could be classified into growing, static or declining groups. This assumed, of course, that some longitudinal information was available. Though some start could be made by using information for two consecutive years (at present contained within the RICA framework for some business variables), ideally some longer perspective would be desirable.

9.8.5 In view of the present and emerging policy requirements, from the list above it was decided to concentrate on the relative performance of:

- family and non-family farms
- low and high performers
- viable and less viable businesses

9.9 Combining and comparing indicators across Member State boundaries

9.9.1 A required part of this study was an exploration of the influence of alternative methods of currency conversion (ECU rates or PPS). Where economic indicators take the form of ratios between items in the RICA form, the choice of conversion method is of no direct relevance. It becomes important only where comparisons are made between Member States using indicators which are in absolute money values. Superficially, the PPS would appear to be the more appropriate to apply to income concepts which purport to reflect the consumption possibilities of farm operators.

9.9.2 A report of some exploratory work using both ECU rates and PPS was given in Chapter 3. As Eurostat now uses both, and has published a comparison of the results for NVA/AWU, it was thought instructive to carry out parallel comparisons using RICA microeconomic indicators. The first candidates were those closest to the aggregate indicators, FNVA/AWU, Income to labour 1 (as given above), and FFI/AWU; the first and third were chosen for further exploration.

CHAPTER 10: RESULTS OF AN EXPLORATORY APPLICATION OF NEW INDICATORS TO RICA DATA

10.1 Introduction

10.1.1 This Chapter reports the outcome of the exploratory analysis of RICA data using the economic indicators and forms of presentation developed in preceding Chapters. The basic extraction of data from RICA tapes for the years 1986/7 and 1987/8 was undertaken by RICA staff in Brussels, the results being passed to the research team at Wye College in the form of electronic spreadsheets for further exploration and processing on microcomputers.

10.1.2 An important need which had been identified was the analysis of time series data for individual farms. Regrettably, within the life of the project it did not prove possible for RICA staff to link the data for individual farms over a run of years. In the early stages this seemed feasible, but RICA encountered problems which, though technically solvable, could not be resolved in time to be included in this analysis. The desirability of undertaking such a longitudinal study remains undiminished. However, this report can only underline the reasons why this should take place; this is done in the conclusions from the project (Chapter 11). Here the analysis must be restricted to what was

manageable within the existing time period and resource constraints.[1]

10.1.3 This Chapter follows the exploratory analysis in the sequence set out in Chapter 9. First the whole-farm income and profits measures are described, starting with various cash flow indicators and then broadening to include the fixed factors and the other related ratios. Then indicators of efficiency are explored, both whole-farm and partial measures. Financial status and viability are followed by the use of alternative measures of size. Special policy applications are explored, including the relative performances of family and non-family farm businesses and the characteristics of low and high performers. Finally some assessment of the impact of using ECU exchange rates or PPS as a means of making comparisons across national boundaries is developed.

10.1.4 The overall aim is to narrow down the list of potential economic indicators and forms of analysis set out in Chapter 9 to those which, on the one hand, are helpful in revealing the major economic characteristics of farms in the EC, as captured in the large amount of data from RICA holdings and, on the other, are within technical bounds of the existing data network and the resources which are available for interrogation and interpretation. Thus the analysis is intended not so much to describe the features of the information but rather to eliminate those indicators which add little to what others already describe. In recommending that RICA considers economic indicators additional to those already in use, the approach is necessarily selective, and the choice of which elements to concentrate upon and which to discard is to some degree subjective. In line with the general approach of this project, the guiding light in making such judgements is the priorities seen in the objectives of the CAP by the research team. Particular indicators will always be needed to assist in the analysis of individual policy issues. The aim here, however, is to select those indicators which should be generated as part of the regular interrogation of the RICA data and which might form part of the published reports on income emanating from the Commission. When the time comes to implement recommendations of which to retain, RICA staff will need to evaluate the benefit gained from the additional information against the marginal administrative costs of data handling and (perhaps more significantly) its interpretation and dissemination.

10.1.5 The analysis is presented here largely in graphical form. The large volume of data provided by RICA to the present project meant that there was a danger of generating so many Figures that a concise account of what they contained became difficult. To ease communication, many of those which deal with analysis by type of farming are relegated to an Appendix to Chapter 10, though their contents are referred to in the text. Results are given for only one

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[1]The estimation of the correlation between the movements of alternative indicators over time was automatically ruled out. Correlations between indicators within the same year using farm-level data, as proposed in Chapter 9, also could not be handled by RICA within the time and other resource constraints of this project.

of the two years available (1987/88), though the analysis has also been run for the preceding year, with a very similar outcome.

10.1.6 The basic RICA sample and the farms which they represent is shown in Table 10.1. In analyses by type of farming there will be a concentration on those of greater numerical importance. The first part of the analysis is based on a breakdown of farms into six standard economic size groups. One drawback of this standard grouping is that the first few contain farms that are very small; for example, in the UK those holdings in the first three size groups (that is, less than 16 ESU) would not be generally regarded as capable of generating an income for a full-time farmer. Later, different ways of presenting ESUs and alternative measures of size are used and the impact assessed.

10.2 Cash flow indicators

10.2.1 The four cash flow indicators considered in Chapter 9 share as their basis the difference between current cash receipts and current cash expenditure, but vary in their treatment of depreciation, net investment spending, changes in borrowings and of funds introduced from outside the business. Each are expressed on a per farm basis. Not surprisingly, the measure which does not take into account capital items (Cash-Indicator 1, which corresponds to the Eurostat definition) gives substantially higher figures per farm than the others (Table 10.2). For the RICA survey as a whole Cash-Indicator 1a (which deducts depreciation) is a little lower than Cash-Indicator 2 (which deducts actual investment spending), showing that for 1987 at least depreciation overstated capital expenditure. Adjustment to take into account additional borrowing and the net flow of funds introduced to the farm business from non-farming sources (Cash-Indicator 3, which is essentially the definition of the existing RICA Cash-flow) raises the cash flow position marginally. However, the overall impression is one of a wide gap between Cash-Indicator 1 and the other three, which share a similar level.

10.2.2 Figure 10.1 shows that the relationship between cash flow indicators holds broadly across the ESU size spectrum, but with the differences becoming more marked as larger farm businesses are encountered. This is the first example of what becomes a common feature in the analysis described in this Chapter: that the largest (open-ended) group of farm businesses have results disparate from those of the other size groups. In effect, they form a special case. Often the smallest size group also proves to be atypical, so that statements of generality do not apply at either ends of the spectrum, though that is not always the case, as here. From Figure 10.2, which expresses the various cash-flows as a percentage of Cash-Indicator 1, it is evident that:

(a) the gap between Cash-Indicator 1 and the others, resulting from taking capital items into account, is relatively greater among larger businesses;
(b) the differing levels between Cash-Indictors 1a and 2 imply that smaller businesses spent less than their depreciation allowance on

Table 10.1 Numbers of holdings by size and type

EUR12, 1987 FSS 1985, SGM "1982"(a)

	SIZE GROUP (ESU)						
TYPE	All	0-4	4-8	8-16	16-40	40-100	>100
ALL TYPES							
Farms represented	3926717	891699	800221	812444	944925	404837	72591
Sample farms	54743	4785	9154	12317	16125	9671	2691
CEREALS							
Farms represented	271277	66657	62211	53446	52929	28539	7495
Sample farms	3417	517	645	783	725	503	244
FIELDCROPS							
Farms represented	1061265	298748	266457	206063	179961	88456	21580
Sample farms	14776	1446	3076	3773	3748	1994	739
HORTICULTURE							
Farms represented	138350	20895	23641	25786	32854	23499	11675
Sample farms	2890	138	311	436	643	843	519
VINES							
Farms represented	211878	52626	52959	35714	47613	20820	2146
Sample farms	2308	277	480	554	661	307	29
PERMA. CROPS							
Farms represented	523050	202720	152888	87539	57129	19854	2920
Sample farms	6134	1120	1553	1518	1305	529	109
DAIRY							
Farms represented	580448	38674	54419	139640	242688	95929	9098
Sample farms	8871	302	891	1714	3556	2093	315
DRYSTOCK							
Farms represented	485666	87104	98783	135289	130863	29281	4346
Sample farms	6456	478	1092	1788	2030	863	205
PIGS-POULTRY							
Farms represented	61663	6812	3566	5886	21513	19785	4101
Sample farms	1001	57	63	100	304	356	121
MIXED							
Farms represented	593120	117463	85297	123081	179375	78674	9230
Sample farms	8890	450	1043	1651	3153	2183	410

(a) Weighted using the 1985 Farm Structure Survey (Eurostat) and classified according to "1982" standard gross margins

Table 10.2 Cash flow indicators by size group (ESU) and farming type

EUR12, 1987 FSS 1985, SGM "1982"(a)

	SIZE GROUP (ESU)						
TYPE	All	0-4	4-8	8-16	16-40	40-100	>100
ALL TYPES							
Cash Indicator 1	14874	4192	6567	10641	20596	38108	80959
Cash Indicator 1a	10169	3367	5211	7643	13810	24465	49539
Cash Indicator 2	10396	3649	6031	8228	13960	22777	50201
Cash-Flow	11155	3606	6016	8442	15109	25861	57422
CEREALS							
Cash Indicator 1	13993	4283	6233	10089	19044	36636	70693
Cash Indicator 1a	8852	3231	4511	6836	12650	20782	37021
Cash Indicator 2	10183	4158	5477	7830	14394	21615	46334
Cash-Flow	10995	3923	5705	8080	15737	24521	53610
FIELDCROPS							
Cash Indicator 1	12066	4320	6405	10265	18717	33069	64861
Cash Indicator 1a	8173	3495	5082	7713	12843	19901	28474
Cash Indicator 2	9002	4144	6283	8889	13660	18998	31067
Cash-Flow	9524	4084	6219	9101	14302	22788	35475
HORTICULTURE							
Cash Indicator 1	27748	4782	9106	16254	23459	44010	111328
Cash Indicator 1a	19476	3808	7432	13052	16535	29503	74189
Cash Indicator 2	19837	3713	8089	13146	17962	29115	73859
Cash-Flow	21020	3507	8309	14020	18374	29150	84646
VINES							
Cash Indicator 1	14527	5007	8145	12330	21836	35167	79583
Cash Indicator 1a	10195	3812	6293	8794	15073	22515	58562
Cash Indicator 2	10294	5052	7760	8827	14048	19010	57994
Cash-Flow	12416	4801	7713	9852	16627	28743	106025
PERMA. CROPS							
Cash Indicator 1	8936	4148	6215	10052	19398	35343	66057
Cash Indicator 1a	6920	3430	4979	7845	15000	24758	43777
Cash Indicator 2	6962	2979	5540	8332	15184	23682	42242
Cash-Flow	7256	3027	5474	8219	16125	27453	54358
DAIRY							
Cash Indicator 1	23815	4251	6920	11408	24858	49290	102045
Cash Indicator 1a	16698	3420	5632	7741	17098	34800	75251
Cash Indicator 2	15295	3573	5911	7304	16444	29164	67043
Cash-Flow	15776	3539	5912	7582	16937	30497	66380
DRYSTOCK							
Cash Indicator 1	12701	3693	6032	10153	18606	36570	85511
Cash Indicator 1a	9049	2968	5054	7415	12354	25269	63842
Cash Indicator 2	9250	3050	5178	7618	12720	24140	72085
Cash-Flow	9748	3119	5187	7870	13713	26995	69101
PIGS-POULTRY							
Cash Indicator 1	20675	1586	3748	10900	14810	28967	71904
Cash Indicator 1a	12356	1065	2762	8026	8153	15812	51048
Cash Indicator 2	12625	1498	3253	9995	7830	17305	45608
Cash-Flow	16336	1603	2949	8241	14007	19747	59834
MIXED							
Cash Indicator 1	15082	3924	6772	9915	18846	33260	74652
Cash Indicator 1a	9330	3149	5270	6387	11199	19146	44752
Cash Indicator 2	9761	3214	6066	7649	11263	19402	43994
Cash-Flow	10925	3187	6041	7692	13090	23118	51663

(a) Weighted using the 1985 Farm Structure Survey (Eurostat) and classified according to "1982" standard gross margins

Fig 10.1 Cash flow indicators by ESU size group: absolute level (ecu) per business

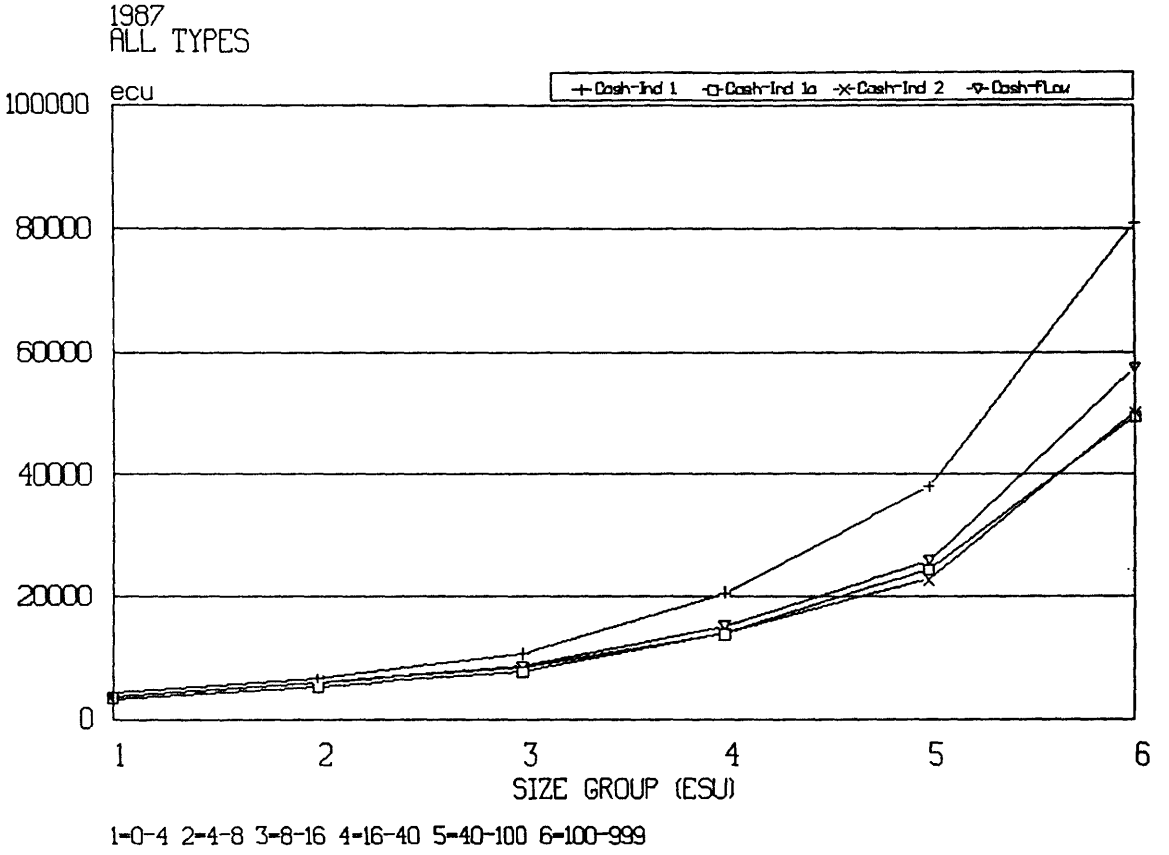
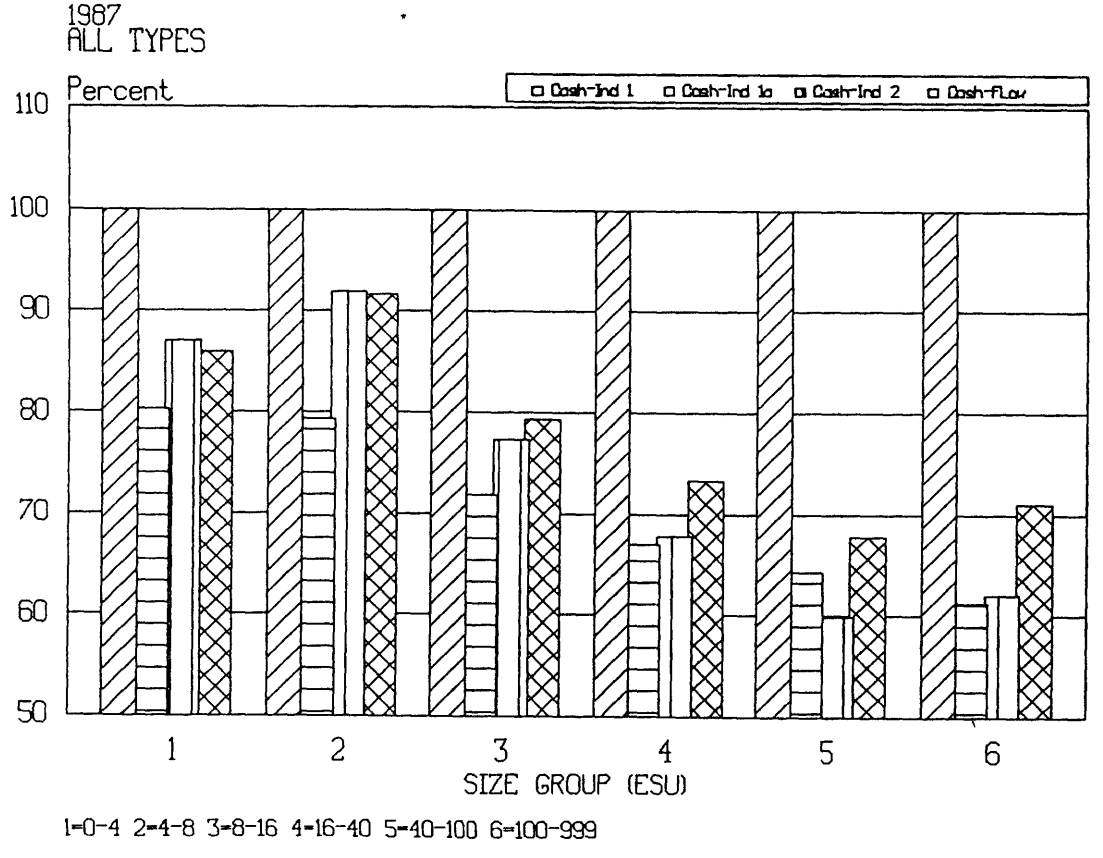


Fig 10.2 Cash flow indicators by ESU size group: percentage of Cash Indicator 1



investment, but this was less evident or reversed higher in the size spectrum;

(c) borrowing and other sources of cash flow were more important among larger businesses than among smaller ones.

10.2.3 The pattern was also repeated across types of farming, though at various levels of income per farm. Minor variations were seen in the relative importance of borrowings etc as a means of supporting cash flow in Pigs-Poultry and Vines, and on Dairy farms where investment was greater than depreciation (Figure 10.3). Analysing individual farming types by economic size (see the Appendix, Figure A10.3) shows that the largest size class (> 100ESU) frequently displayed atypical or extreme characteristics; for example, among the largest Vine holdings, borrowing was a major source of cash-flow, with the RICA Cash-flow higher than any of the other indicators of this group. However, it is also clear that the relatively high investment spending on Dairy farms was not just confined to the larger farms in 1987.

10.2.4 Consequent on these differences, it must be concluded that the cash flow experienced by holdings of different sizes and types will not be adequately represented by a single indicator. One indicator might suffice if a constant relationship existed between the alternative measures, but this clearly is not the real situation. Though a case might be made out that all four cash flow indicators should be calculated, it seems fairly clear that priority should be given to two - Cash Indicator 1 and Cash-flow, corresponding respectively to the Eurostat definition and that already in use within RICA. These two describe contrasting aspects of the cash flow situation and, conveniently, have definitions which already form part of official methodologies.

10.3 Indicators of profit and income per farm business

10.3.1 The array of indicators of profit and income produce a wide range of estimates, as is evident from Figure 10.4 which charts the all-size/all-type average position. The highest per farm results come from FNVA and the lowest, a negative quantity, from Standardised Income 2a (Management and Investment Income - the residual after charging for all land and labour, including that of the farmer and spouse).

10.3.2 It is worth reviewing the impact of deducting various cost components from FNVA. The first approach is to pursue the reward to capital by progressively charging for labour components and for land. Removing the cost of hired labour (to give Standardised Income 1, which converts businesses to a "full equity" position and forms the reward to all land and capital and the farm family's own labour) leads to a relatively small reduction in the size of the income indicator (86 per cent of the FNVA figure, as illustrated in Figure 10.4). Standardised Income 1 is also equivalent to Net Operating Surplus in the aggregate economic accounts for agriculture. But deducting the costs of all labour (including the imputed cost of the farmer and spouse) leaves only 16 per cent of FNVA as the reward to all capital and land and managerial input

Fig 10.3 Cash flow indicators by type of farming

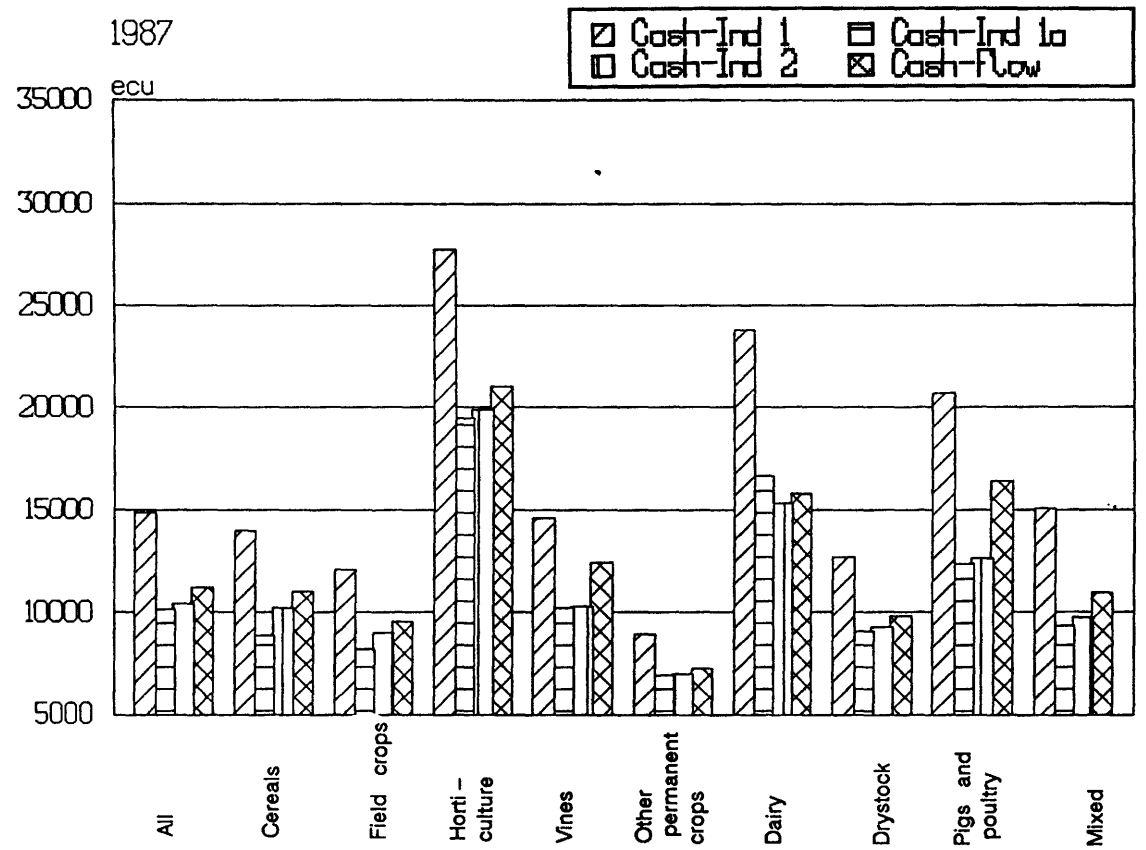
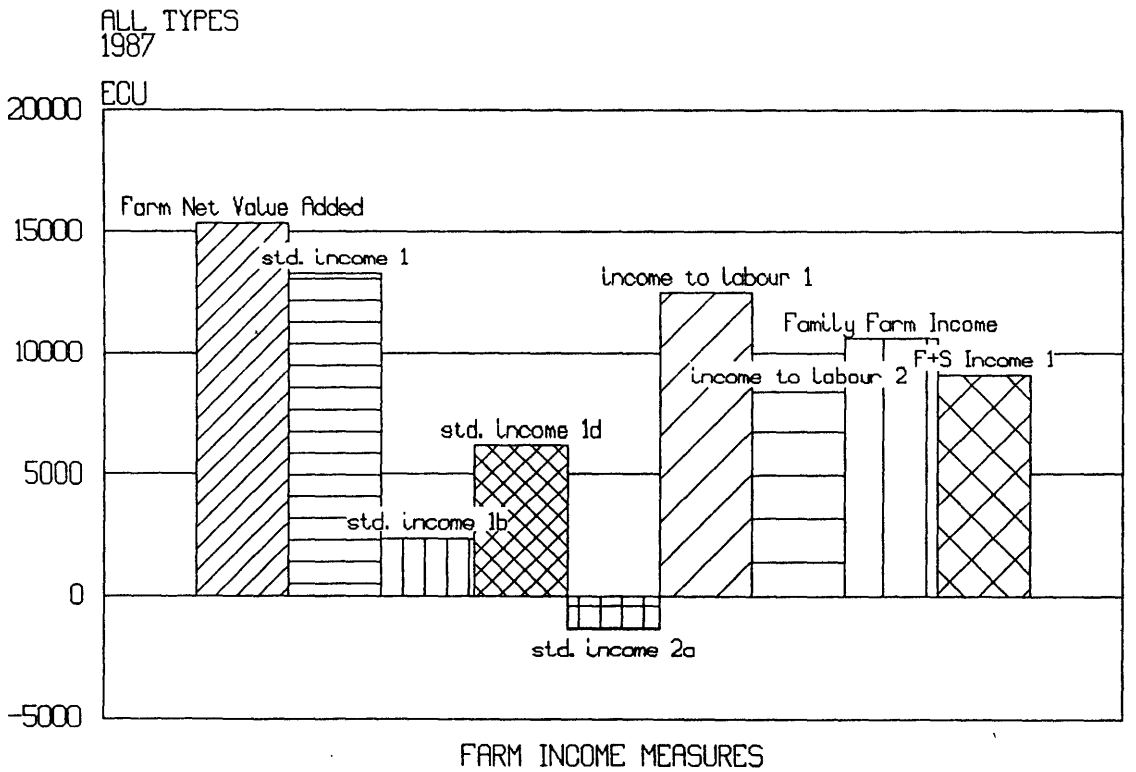


Fig 10.4 Farm income measure: absolute level (ecu) per business



Standardised Income 1b). This emphasises the importance of the farmer-and-spouse labour as a resource on RICA farms. As noted above, if in addition land costs are removed (Standardised Income 2a) the residual reward for capital and management is negative.

10.3.3 The second approach is to pursue the reward to labour by progressively charging for land and capital. Deducting actual rent and interest (Income to Labour 1) lowers the income estimate to 81 per cent of FNVA; this is the residual reward to all the labour in the farm business (hired and family) and to the land and capital it controls. It is also equivalent to "Net income from agricultural activity of total labour input" in the aggregate accounts. Further deducting actual labour costs of hired workers (to give Family Farm Income) lowers the residual income to 69 per cent of FNVA; this avoids the hybrid of mixing of independent and dependent activity and is the reward to the family for all the resources it owns and uses in the farm business. Imputing the value of the labour of family members (in addition to the farmer and spouse) lowers the residual (Farmer and Spouse Income) to 59 per cent of FNVA.

10.3.4 In an attempt to isolate the return to the factor labour, Income to Labour 2 makes deductions for all land (rent or imputed rental value) and also imputes a cost for the working capital based on effective borrowing rates. The result is a residual which is lower than all the others found in this second approach, only a little over half of FNVA (55 per cent).

10.3.5 Table 10.3 contains the all-type averages for both groups of indicators. Figure 10.5 shows their relationships to FNVA across the range of ESU size groups. For this purpose the per farm average figure for each of the indicators is expressed as a percentage of FNVA, taken to be the reference because of its present use as the major indicator. The aim is to reveal any substantial disparities between the patterns shown by FNVA and the other measures, which will emerge as differing percentages. Standardised Income 1 drops away in the two highest size groups, reflecting the greater importance of hired workers there. Standardised Income 1b (the reward to all land, all capital and management) rises progressively across the size groups, again as would be expected; larger ESU businesses use more land and capital. Similarly Standardised Income 2a (the reward to capital and management, land costs having been deducted separately) rises over the size spectrum.

10.3.6 Among the second group of indicators (Figure 10.6), Income to Labour 1 declines over the first three size groups, implying that actual rent and actual interest take a larger share of FNVA on larger farms. Both Family Farm Income and Farmer and Spouse Income decline progressively throughout the size spectrum and show a similar pattern, though the gap narrows a little. Income to Labour 2 shows a very stable relationship with FNVA across the size groups.

10.3.7 The pattern is repeated broadly in each of the types of farming, with the caveat that Horticulture and Pigs-and-poultry tend to be exceptions (Appendix, Figure A10.5). As percentages of FNVA, Standardised Income 1

Table 10.3 Indicators of income and profit by size group (ESU)

EUR12, all types, 1987

	SIZE GROUP (ESU)						
INDICATOR	All	0-4	4-8	8-16	16-40	40-100	>100
Farm Net Value Added	15352	3924	6215	9790	19847	41563	114002
standardised income 1	13271	3578	5722	9050	18099	35438	76296
standardised income 1b	2395	825	1657	3181	8691	22028	58690
standardised income 1d	6226	-218	1136	1214	9467	25353	48756
standardised income 2a	-1385	-149	198	965	4145	10945	28035
income to labour 1	12497	3778	5872	8516	15847	31325	88566
income to labour 2	8401	2048	3320	5215	10997	22606	65136
Farm Family Income	10587	3546	5437	7937	14327	25544	51391
Farmer and Spouse Income 1	9070	3236	4963	7343	13134	23850	48439

Fig 10.5 Selected farm income measures (group 1) by ESU size group: percentage of FNVA

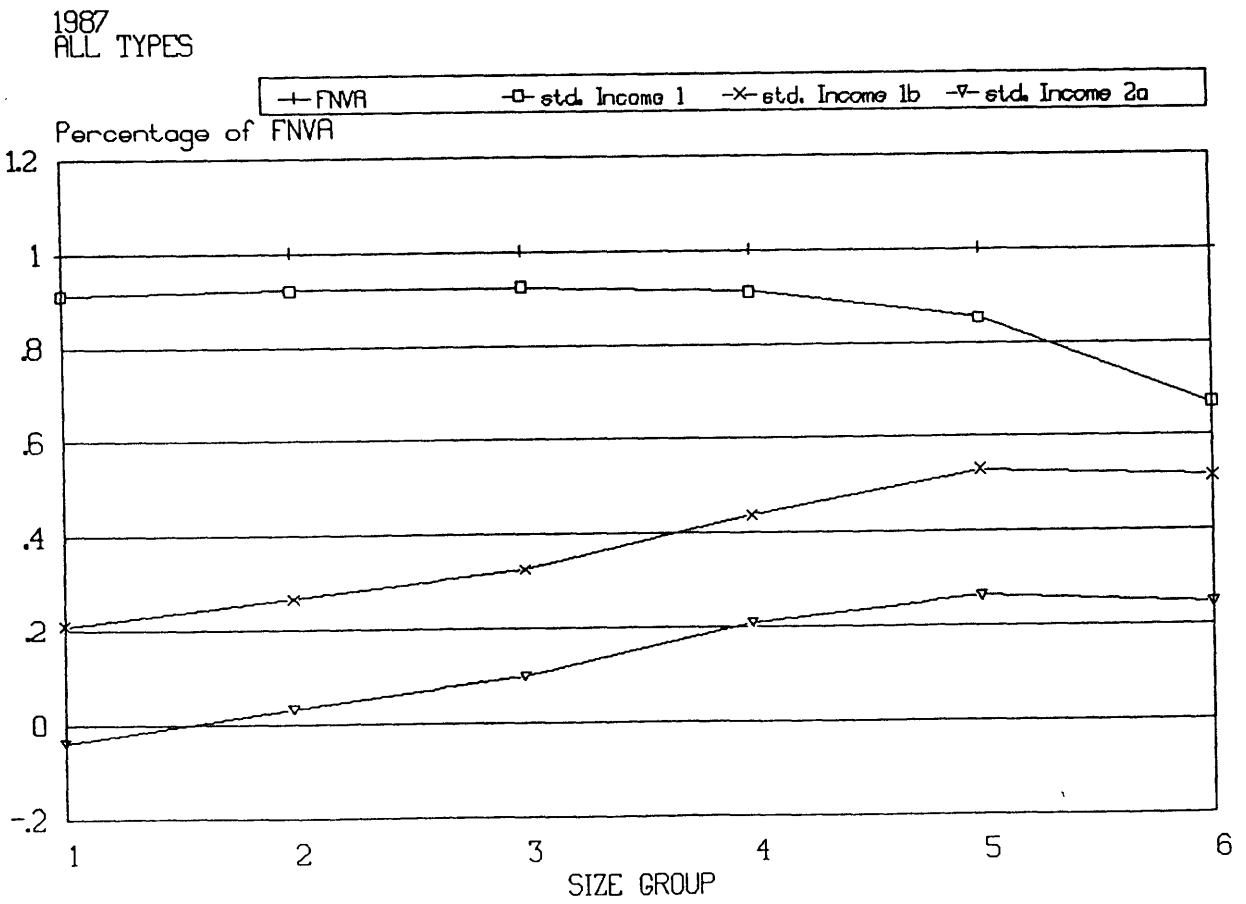


Fig 10.6 Selected farm income measures (group 2) by ESU size group: percentage of FNVA

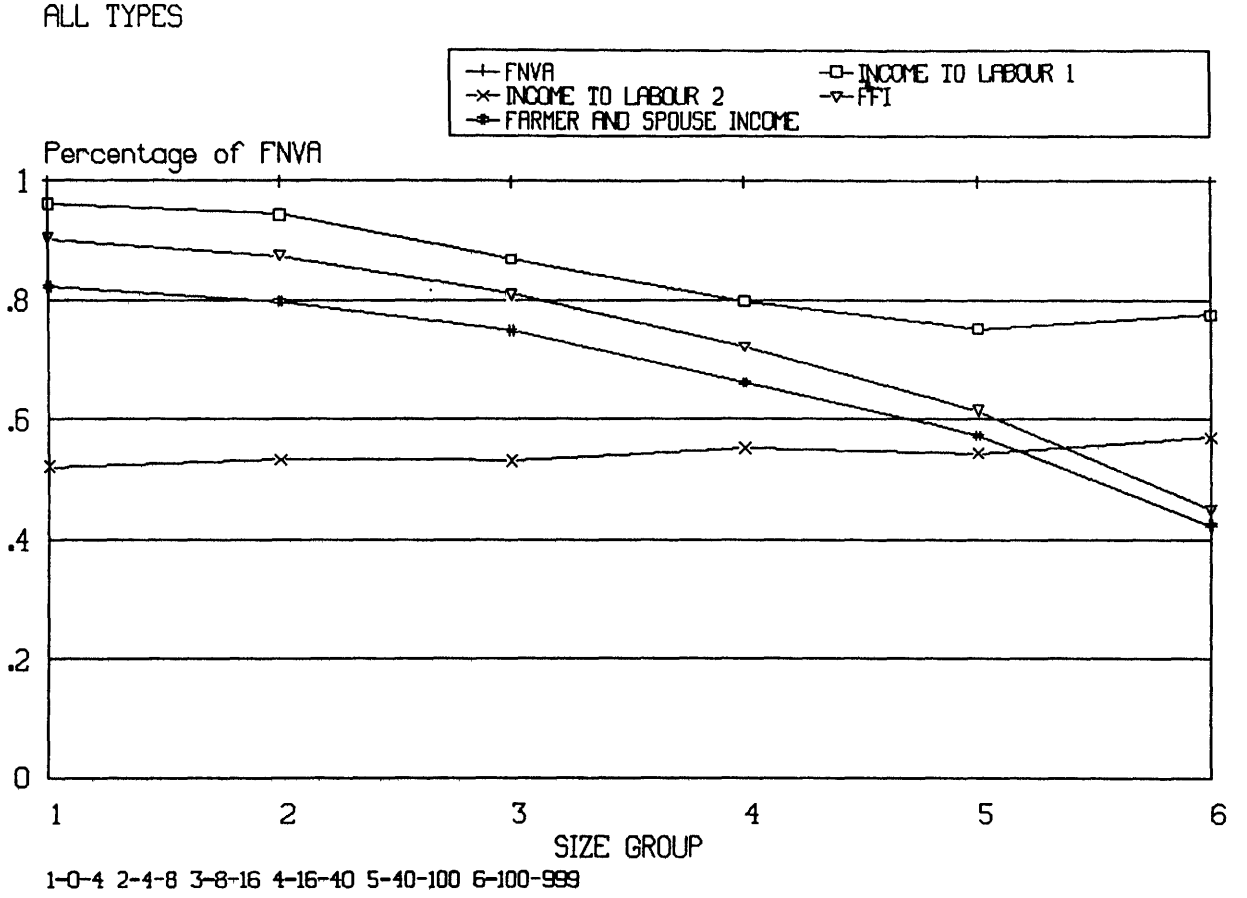
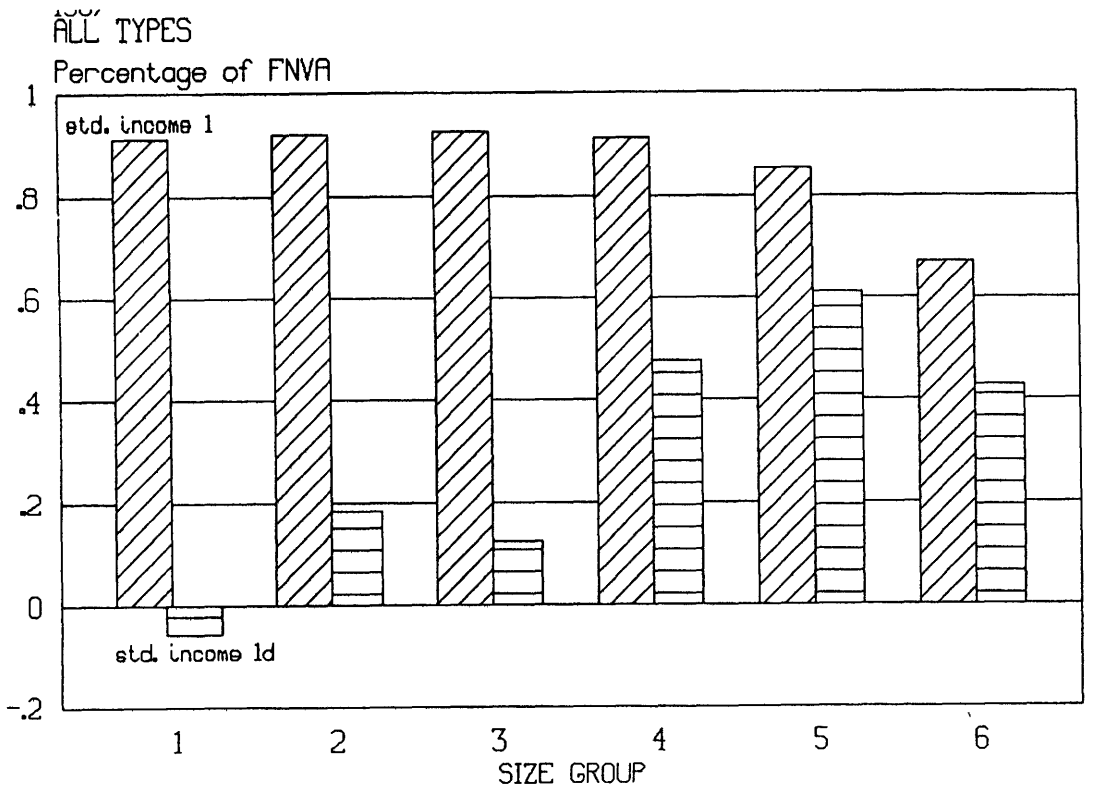


Fig 10.7 **Impact of including unrealised capital gain by ESU size group: percent of FNVA**



drops away in the two largest size groups, but less obviously in these two types. Standardised Income 1b rises with increasing business size in some types (General cropping, Vines, Other permanent crops, Mixed), in others no clear trend is apparent (Drystock, Horticulture) and in yet others some size groups show particularly low percentages (Cereals, Dairy, Pigs-and-poultry). This pattern is shadowed at a lower level by Standardised Income 2a in all types except Cereal farms, where there are substantial disparities among the lowest three size groups. Family Farm Income and Farmer and Spouse Income are closely similar in pattern and level in all farming types. Income to Labour 2 represents a broadly stable relationship to FNVA across the size groups in most types, but a modest but persistently rising trend can be seen in Horticulture, Other permanent crops, and in the Dairy type.

10.3.8 Summarising and taking a view across all the farming types, of the indicators considered here, the relationships with economic size suggest that a choice between Standardised Incomes 1b and 2a should be made; both are not required. In that the latter already corresponds with a concept in use in some Member States (Management and Investment Income) this would seem to be the preferred alternative. Similarly, Farmer and Spouse Income gives little information beyond that coming from Family Farm Income, so the former could be dropped. The generally stable relationship between Income to Labour 2 and FNVA also implies that this labour reward would not be particularly helpful. The remaining indicators are therefore:

FNVA	
Standardised Income 1	(businesses converted to "full-equity", equivalent to Operating Surplus)
Standardised Income 2a	(Management and Investment Income)
Income to Labour 1	(equivalent to "Net income from agricultural activity of total labour input")
Family Farm Income	

10.3.9 One further definitional exploration was made using income per farm business. Unrealised capital gains were added to Standardised Income 1 (to form Standardised Income 1d). On a per farm basis the effect of the capital losses which were occurring at the time was to reduce the net income (as a percentage of FNVA) in all size groups (Figure 10.7). Among the smallest farms the impact of the losses was to completely absorb FNVA. While not wishing to deny the importance of capital gains as a form of reward over the longer term, the findings for 1987 lead to the conclusion that simple aggregation with current income can easily overwhelm the latter. Consequently such gains or losses are better considered within the context of periods greater than the single year of conventional income and expenditure accounting.

10.4 Income measures per work unit

10.4.1 Major attention has always focused by the EC on income measures

expressed per annual work unit, being the annual labour input on holdings expressed in full-time worker equivalents. Of the concepts considered in this exploratory analysis the following are capable of being expressed in this way, either per Annual Work Unit (AWU) or per Family Work Unit (FWU).

FNVA/AWU
Income to Labour 1/AWU
Income to Labour 2/AWU
Standardised Income 1/FWU
FFI/FWU

Both FNVA/AWU and FFI/FWU form part of the existing RICA range of indicators, and there are equivalent macroeconomic indicators (which when deflated become Eurostat's Indicators 1 and 3). Income to Labour 1/AWU also has an equivalent in national accounting (forming the basis of Eurostat Indicator 2) though this concept is not yet used by RICA. Standardised Income 1 also has a macroeconomic equivalent (Operating Surplus), though not usually expressed per work unit.

10.4.2 Figure 10.8 shows this range of measures per work unit for each standard ESU size group (all types together). It is evident that there is a general progression of higher incomes per work unit as larger size groups are reached. However, for two of the measures (FFI/FWU and Standardised Income 1/FWU) there is a disproportionately large improvement seen when moving from the next-but-largest farm size group to the largest size. This is most clearly evident from the Figure 10.8a, in which the various income measures are plotted against FNVA/AWU. It should be recalled, however, that this largest size group is open-ended and contains a few very large businesses whose performances may be dependent on particular combinations of talent and resources which are not necessarily capable of replication.

10.4.3 Patterns are similar in each of the farming types though, where exceptions are found, they occur in Horticulture and Pigs-and-poultry (Appendix, Figure A10.8). In each type Income to Labour 2/AWU forms the lowest indicator in absolute terms, shadowing the pattern of FNVA/AWU. The gap between FNVA/AWU and Income to Labour 1/AWU varies between types, being smallest in Horticulture, but they are otherwise broadly in parallel between size groups. The two indicators which are expressed per FWU (Standardised Income 1/FWU and FFI/FWU) again show similar patterns across types but vary in their proximities to each other, being closest in Horticulture.

10.4.4 On this evidence there would not seem to be much to be gained from pursuing all five measures, the most obvious one which might be dropped first being Income to Labour 2/AWU. Though Standardised Income 1/FWU is perhaps not likely to be carried far in future analysis, at present we consider that it should be retained. Thus the indicators recommended for further consideration are:

Fig 10.8 Income measures per annual work unit by ESU size group: absolute level (ecu)

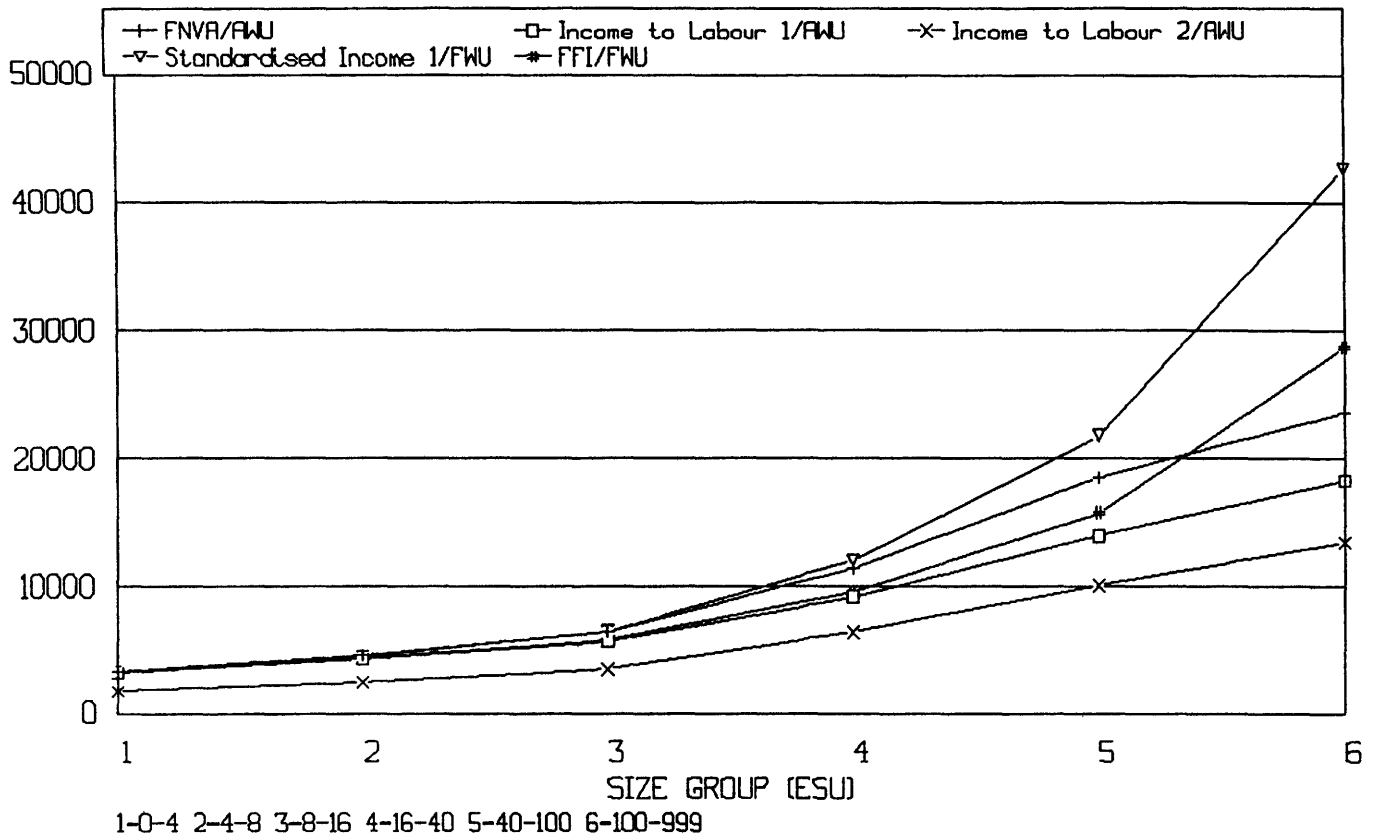
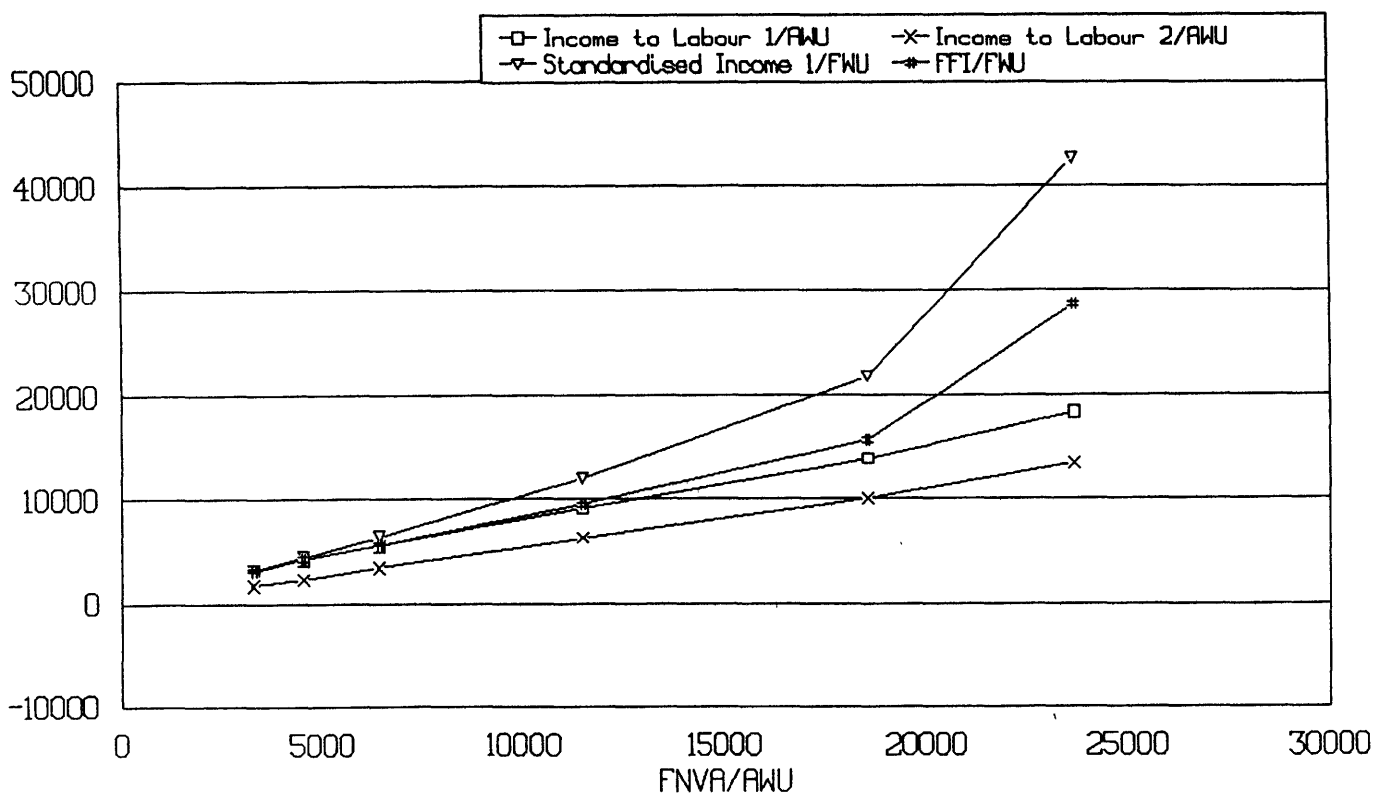


Fig 10.8a Income measures per annual work unit by level of FNVA/AWU within ESU size groups



FNVA/AWU, Income to Labour 1/AWU, Standardised Income 1/FWU, FFI/FWU

10.5 Other income ratios

10.5.1 In Chapter 9 the calculation of a small range of other income ratios was proposed; two cash flow measure, FNVA and FFI expressed as a percentage of output, and two cash flow measures expressed as a percentage of FFI. After consideration of the evidence on the alternative definitions of cash flow, Cash Indicator 1 and Cash-flow were preferred (rather than Cash Indicator 2 which had initially been proposed). The resulting ratios by economic size groups are presented in Figure 10.9 and Table 10.4. There is a tendency for each of the ratios which are expressed as a percentage of Total Output to decline with increasing size. The share of Total Output remaining as Family Farm Income falls progressively, from 48 per cent in the smallest size group to 17 per cent in the largest. Similar falls are seen in the ratios involving cash flow. However, the share of Total Output remaining as FNVA has reached a plateau by the 16-40 ESU size group.

10.5.2 In contrast, Cash Indicator 1 rises as a percentage of FFI with increasing economic size; in all groups it is larger than FFI. From being about one fifth greater in the two smallest sizes it rises to more than fifty per cent greater in the >100 ESU group. RICA's Cash-flow measure maintains at about the same level as FFI across the size spectrum.

10.5.3 The substantially different patterns seen among these ratios implies that the following are likely to be of particular interest:

FNVA/Total Output %
FFI/Total Output %
Cash Indicator 1/FFI %

10.6 Indicators of efficiency

10.6.1 In studying the indicators of efficiency it is possible to draw on both the tables supplied by the research team which grouped holdings by farming type into six economic size groups, and also those which presented data by ESU in deciles. The former contained a large number of variables which allowed a wider range of partial efficiency indicators to be explored for each of the farming types, but were more limited in their potential for the exploration of the relationship with business size. The latter contained only a subset of data and were broken down by Member State (but not by farming type).

10.6.2 It was apparent from Chapter 6 that farm performance can be explored using a variety of ratios of outputs to inputs. The choice of which outputs and, in particular, of which inputs to include is dependent on the problem for which the indicator is required. Figure 10.10a shows the ratio of Total output to Total purchased inputs (including hired labour and depreciation, but not the imputed

Table 10.4 Other income ratios by holding size group (ESU)

EUR12, all types, 1987

	SIZE GROUP (ESU)						
RATIO	ALL	0-4	4-8	8-16	16-40	40-100	<100
FNVA/Total Output %	38	53	51	42	36	34	38
FFI/Total Output %	26	48	45	34	26	21	17
Cash Indicator 1/Total Output %	37	57	54	46	37	31	27
Cash-flow/Total Output %	28	49	50	36	27	21	19
Cash Indicator 1/FFI %	140	118	121	134	144	149	158
Cash-flow/FFI %	105	102	111	106	105	101	112

Fig 10.9 Other income ratios by ESU size group

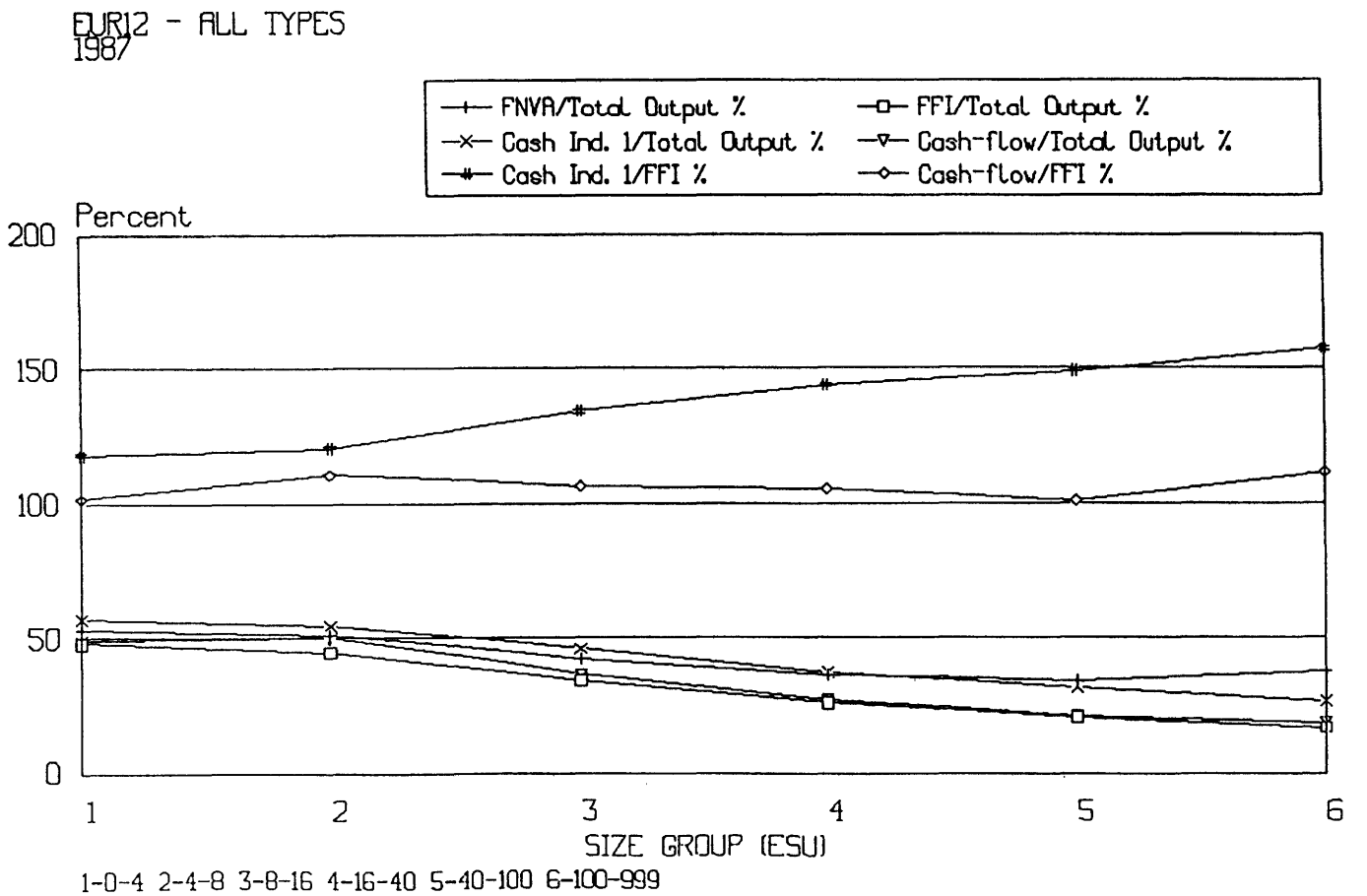


Fig 10.10(a) Whole – business indicators: Ratio of Total output to Total purchased inputs by ESU decile

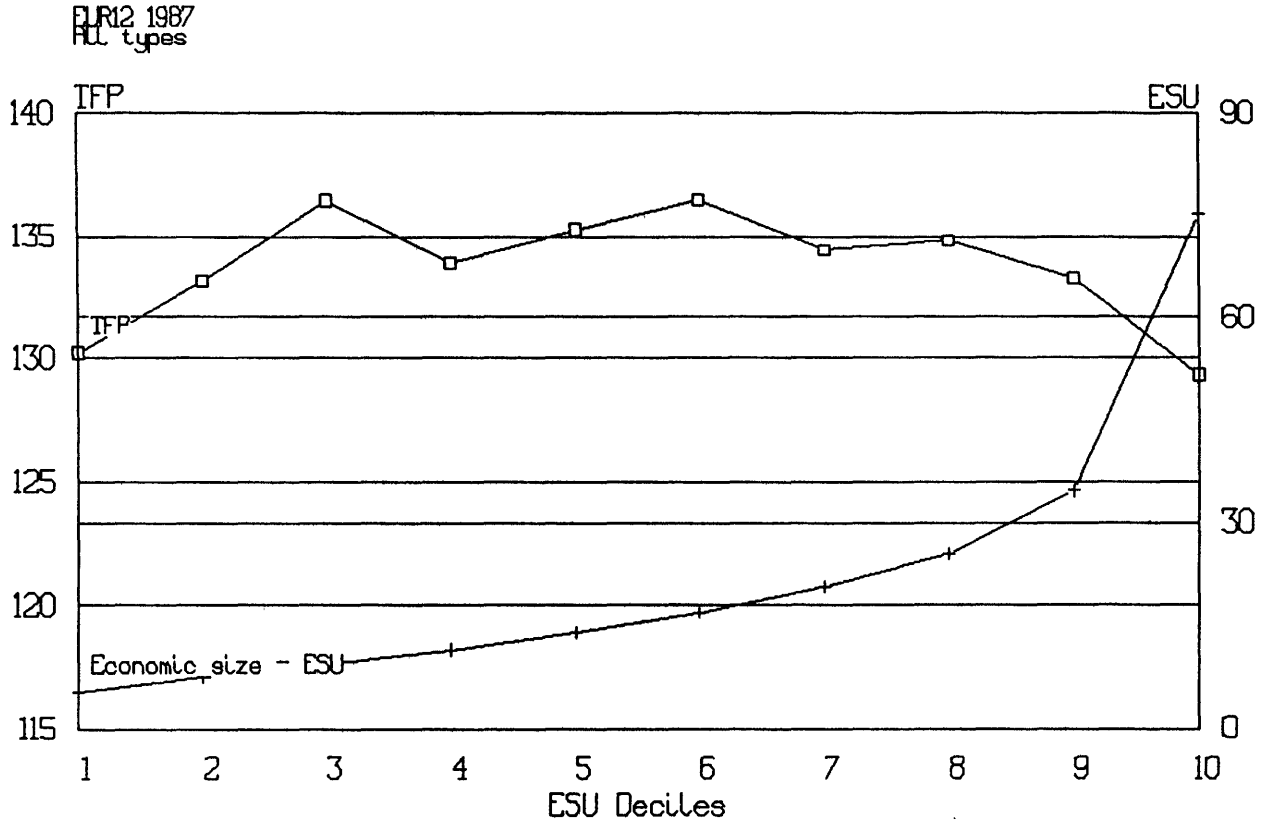
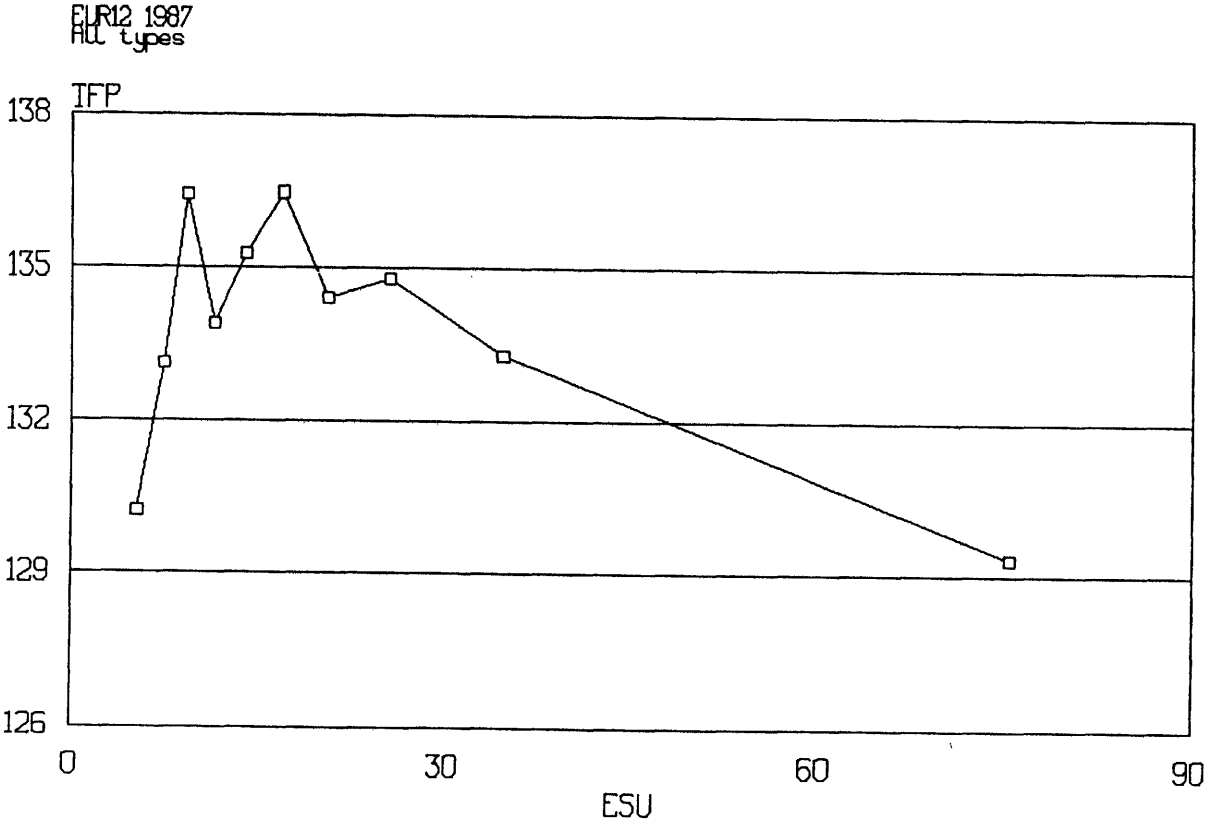


Fig 10.10(b) Whole – business indicators: Ratio of Total output to Total purchased inputs by ESU per business



value of the labour of the farmer and his family) by ESU decile, together with the corresponding average ESU size in each decile. This ratio is labelled Total Factor Product (TFP) but it does not represent a complete coverage of all factors, since only the purchased inputs are included. In particular, the labour of the farmer and his family (unpaid) is treated as having zero value; in reality it is a very significant input, as will be shown below. This ratio resulting from taking the value of only the purchased inputs rises from the smallest farm businesses (mean sizes 5, 7 and 9 ESU respectively), followed by a plateau and a falling off of the ratio beyond the eighth decile (26 ESU). The pattern is also evident from Figure 10.10b which plots the ratio against ESU for each decile. The implication is that the smallest economic sizes are relatively poor users of purchased inputs, in the sense that on average they generate less output from each unit of input. So too are the largest sizes.

10.6.3 This size/output-input ratio does not mean, of course, that efficiency in the use of all inputs (together) or other bundles of inputs follows this pattern. One view of efficiency might relate to the average output achieved by the farmer from all the resources which he can assemble and vary on his holding; this might include only the intermediate inputs bought from other sectors and labour (both hired and family), but not charges for capital or land, whether actual or imputed. Figure 10.10c (which is based on ESU size groups rather than deciles) shows not only the ratio of output to purchased inputs (labelled TFP1) but also those ratios resulting from including in the bundle of inputs an imputed value for the unpaid labour of the farmer and other family; this labour has been costed at rates equivalent to hired labour (for the present purpose valued at the average hired rates found in each cell formed by a cross-tabulation of ESU size and farming type within each Member States). Two lines are shown, one for the average performance ratio in which inputs are taken to include intermediate inputs (plus depreciation) and labour and a charge for land (rent or rental value)(TFP2), and a higher one from which the land charge is excluded (TFP3). These show clearly that the larger farms (ESU sizes) are the better performers; the general level is changed by excluding the land charge, but not the general pattern. The relationship is brought into sharper focus by plotting the ratios against the average labour input (in AWU) in each ESU size group (Figure 10.10d). Here is it very clear that the performance increases sharply up to about the size of business which occupies two AWU, with little further improvement as larger farms are approached. There would seem to be little to be gained from the regular calculation of both ratios, and the one excluding land charges appears to be the preferable because of the smaller extent of imputation involved. The size/average performance relationship (excluding the land charge) was investigated for each main type of farming, with closely similar results for most types. In each there was a fairly clear common point beyond which further improvement was not noticable (about 2 AWU), though in Horticulture the improvement in performance seemed to continue beyond this size.

10.6.4 The contrasting patterns in the relationship between farm size and the average output/input ratios resulting from including or excluding the imputed

Fig 10.10(c) Whole – business indicators: Three efficiency ratios by ESU size group

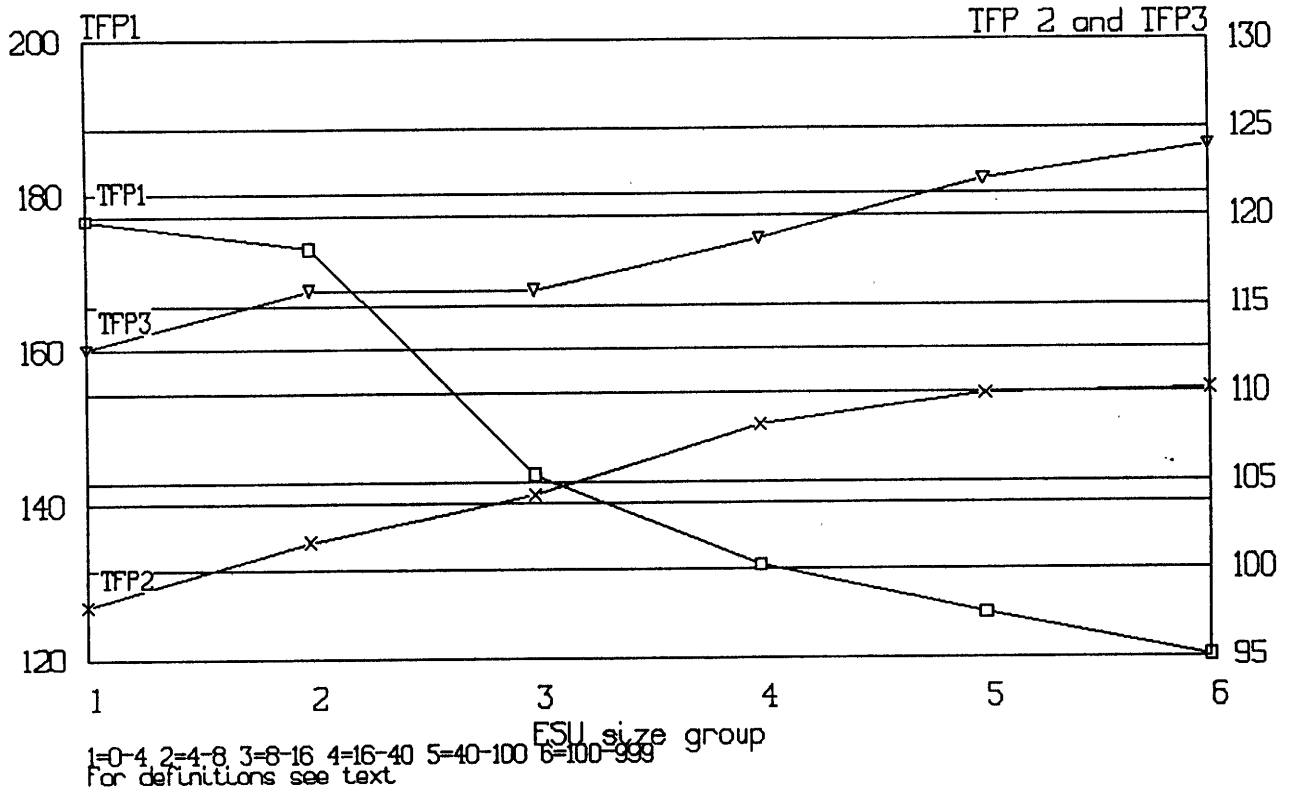
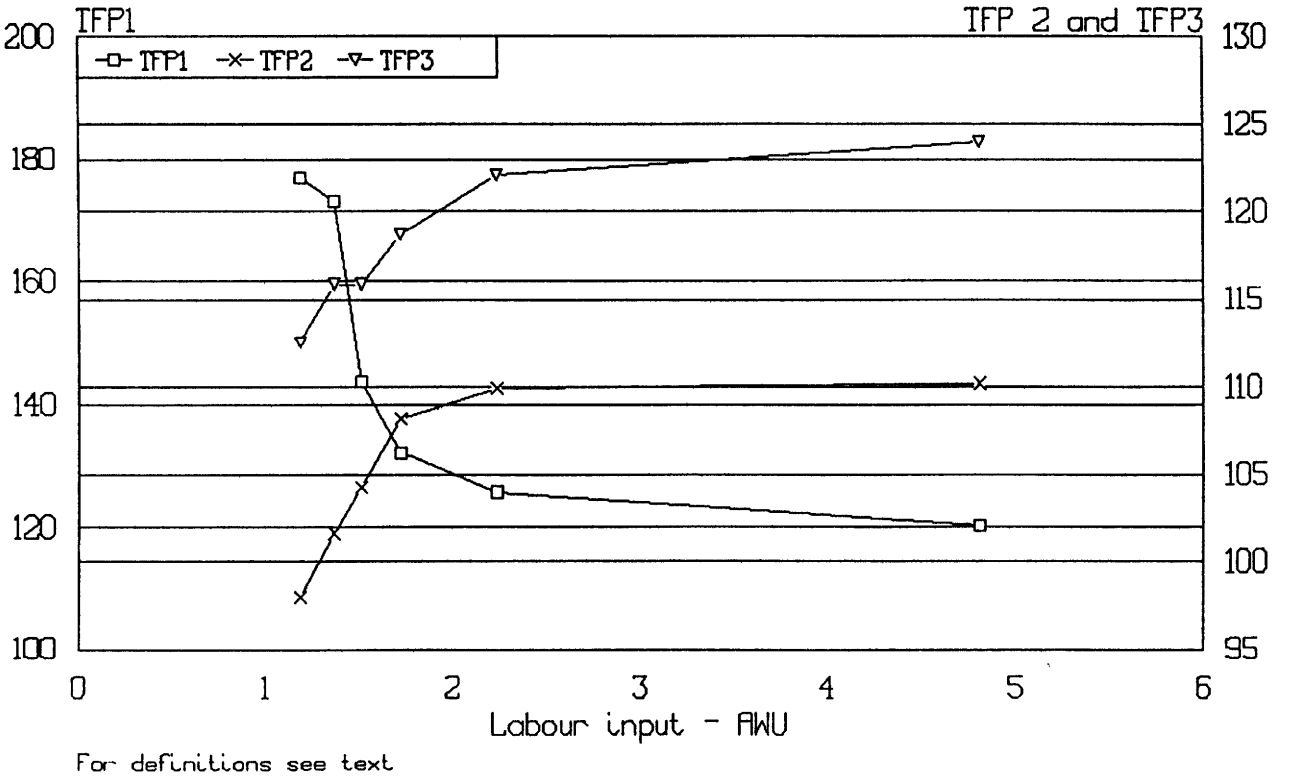


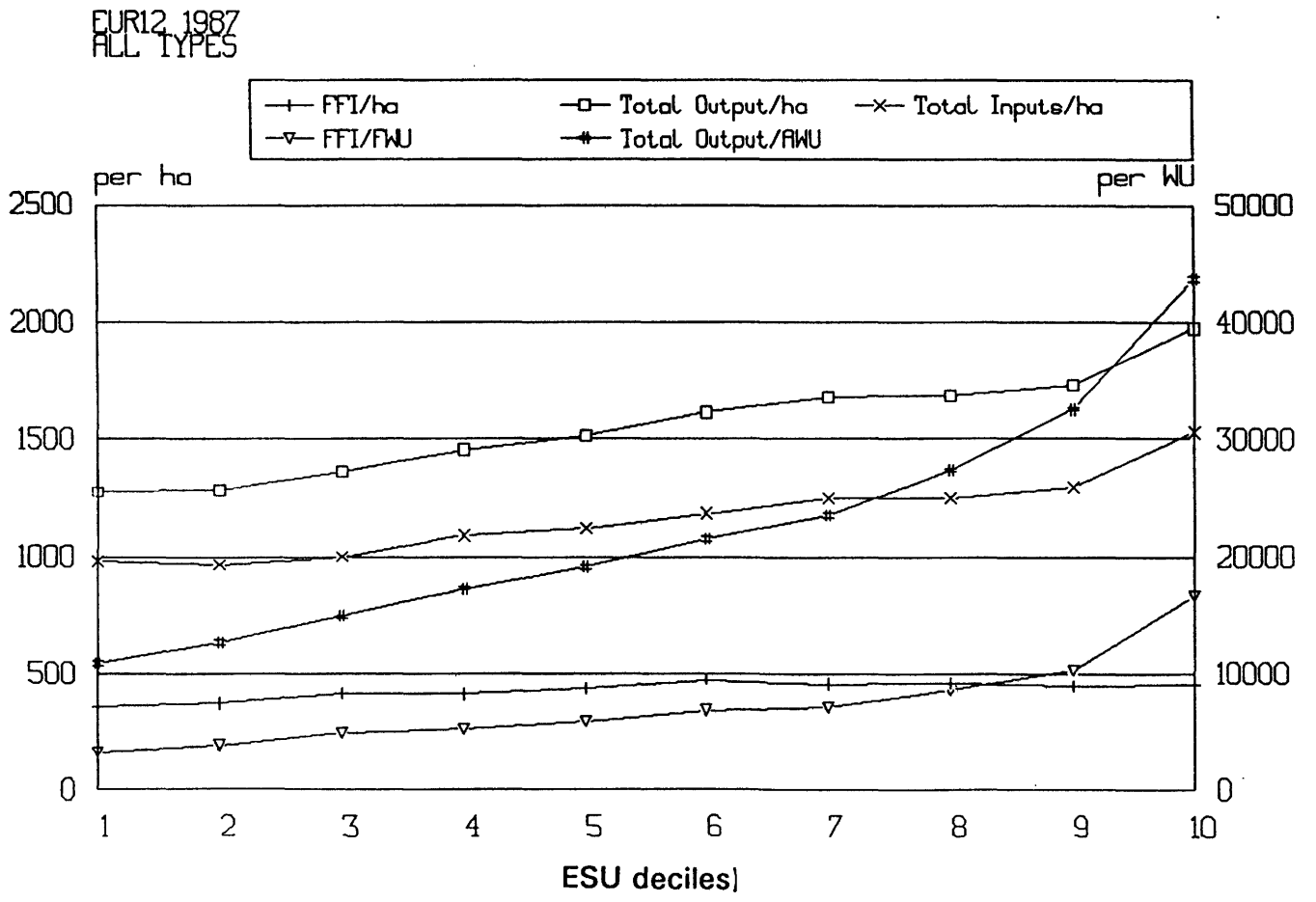
Fig 10.10(d) Whole – business indicators: Three efficiency ratios by AWU within ESU size groups



value of unpaid labour points to the importance of how this item is valued. Where imputation has been undertaken on the basis of rates equivalent to hired labour, the research team has identified some interesting differences between the rates applied to the family labour on farms of different sizes, with the smaller farms using substantially lower valuations. Though the cause is not yet fully established, it is likely to be the product of the very small numbers of actual hired workers found in some type/size/country cells (used for imputation process) and the nature of the hired labour found there. A case could be made for applying the average manual industrial wage in the same region, rather than the actual agricultural wage rates, though it also might be argued that the likelihood of many farmers being employable outside the agricultural industry is slim, given their age structure. Clearly, this question of the appropriate method of imputing a charge for unpaid labour must be investigated further.

10.6.5 A selection of partial indicators of efficiency are shown in Figure 10.11. Larger businesses are more intensive users of their land, and both output per ha and input per ha increase across the deciles. However FFI per ha (interpreted in an efficiency context) does not seem to show much increase among the larger businesses. The clearest difference between the size deciles is exhibited by Total output per AWU; bigger businesses achieve much greater outputs from each full-time equivalent of their workforce. The income generated per Work Unit is also greater.

Fig 10.11 Partial efficiency indicators by business size (ESU deciles)



10.6.6 The relationship between economic size and the partial efficiency measures displays some marked differences between farming types (see Figures A10.11 (a to k) in the Appendix). There does not seem to be any marked relationship between size and Output per ha on Cereal, General cropping and Drystock farms, whereas on Vines and Other permanent crops the relationship is strong, and in the Dairy group there is some evidence for a weaker one. The same general pattern is found in Inputs per ha and FFI per ha. This evidence implies that perhaps only one of these three partial efficiency measures is worth regular calculation, in which case Output per ha is the most appropriate candidate. Horticulture and Pig-and-poultry have not been considered in these area-related indicators.

10.6.7 Output per AWU rises across the six size groups on all farming types. The Pigs-and-poultry type shows a similar trend to the remaining types, but is excluded from Figure A10.11(e) because the absolute figures are about double the next highest type (Dairy).

10.6.8 The amount of capital per AWU has been sometimes interpreted as a proxy for labour productivity, the assumption being that under competitive conditions and adequate factor mobility this will be associated with higher output per worker. The RICA data show that there is a tendency for the larger farm businesses to have a greater intensity of capital per worker. This is the situation whether the value of owned land is excluded or included. However, the relationship with business size is again not uniform across farming types. In Horticulture and in the Other permanent crops group the relationship is weak while in others (such as Pigs-and-poultry and Drystock) it is stronger (Figures A10.11f and 10.11g).

10.6.9 Several forms of return to capital were in the list of partial productivity measures listed in Chapter 9 to be tried in the analysis. FNVA as a percentage of the value of Total assets (the value added from the entire capital base) was marked by the higher levels achieved at all sizes by Horticulture, with a doubling of the percentage over the size spectrum. The percentage achieved by Vines and Other permanent crops was noticeably improved in the higher size groups (Figure A10.11h). Other types did not exhibit a marked pattern with size. Cash Indicator 1 as a percentage of Total Assets produced a tightly bunched set of returns with no obvious association with size, but with Horticulture again well above the others and increasing across the spectrum. However, excluding the value of land produced a much more varied set of percentages among the farming types, both in terms of levels and size-related patterns (Figure A10.11i). FFI as a percentage of Net Worth, representing the return to the farm family for its labour and owned capital resources, again demonstrated the atypicality of Horticulture and (in the largest size group) Vines, with the returns for other types closely bunched and varying little over the size groups (Figure A10.11j). A common feature of these rates of return is the sharp movement between the two largest size groups (40-100 ESU and >100 ESU), suggesting that the very large businesses are special cases and deserve separate investigation.

10.6.10 Standardised Income 2a (Management and Investment Income) as a percentage of Total Assets (excluding land) for the all-type average rose progressively from -2 per cent in the smallest size group (0-4 ESU) to 15 per cent in the largest (>100 ESU)(Figure 10.11(k)). However, there was no such smooth movement across the size bands in individual farming types. Horticulture saw particular instability. Some saw slightly higher rates of return at the size extremities than in the centre (for example, Cereals) and others the reverse (Pigs-and-poultry).

10.6.11 Summing up, while all the efficiency ratios could have application in certain circumstances, the greatest potential for regular calculation when looking at farm businesses grouped by economic size and type of farming would seem to lie with the following:

Ratio of total output to intermediate inputs (including depreciation) and labour costs (actual and imputed). The method by which family labour is valued, and the implications of using alternative methods of valuation, should be explored further
Total output per ha
Total output per AWU
Standardised Income 2a (Management and Investment Income) as a percentage of total assets (excluding land)
Cash Indicator 1 as percentage of total assets (excluding land)

10.7 Financial status

10.7.1 Chapter 9 described five selected indicators which have been used in other contexts for examining financial status and viability. Three are ratios between categories of liabilities and assets and two relate to the load imposed on the business by payments for rent and interest (Rent and Interest/Gross Margin, Rent and Interest/ha). Obviously it is not possible to test for the validity of these as predictors of the fate of farm businesses when data for only one or two years are available. Also some indicators may play a useful role when examining businesses within a type of farming which are not appropriate for more general use; interest charges per livestock unit or per ha are examples. Nevertheless there is some merit in examining how these more general indicators vary between types and sizes of farms in order to eliminate those which are unlikely to yield much of interest in the regular cross-sectional analysis of RICA data. It should be noted that the basic tables used for this exploratory process were provided to the research team at an earlier stage of this project than most of the others; they therefore took somewhat different forms and allow different types of analysis.

10.7.2 The five indicators were estimated using group averages for each of the six standard economic size groups and (separately) the nine types of farming. In addition, the all-type-all-size situation for each Member State was examined. Larger businesses tend to have higher ratios of liabilities-to-assets (percentages) whether total or current categories are taken, as is evident from Figure 10.12.

Of the three ratios of liabilities to assets, two show that the largest size group (>100 ESU) has lower ratios than the next largest, though this is not the case with Current Liabilities to Current Assets. Of the three, Current liabilities as a percentage of Net Worth is consistently the lowest across the size groups whereas the relative positions of the other two are reversed as progress is made from the smaller to the larger businesses. Rent and Interest as a proportion of Gross Margin also increases with size, except for the largest category.

10.7.3 There are substantial differences between the farming types in the levels of ratios of liabilities to assets, with Horticulture and Pigs-and-poultry atypically high and Other permanent crops low. In some types the highest ratios result from the use of total liabilities and assets, in others from using current liabilities and assets only (Figure 10.13). Again, the ratio involving Net worth appears to add little information. Rent and Interest as a percentage of Gross margin displays what appears to be a more independent pattern. These charges per ha are obviously an inappropriate indicator in this situation; they are high in the intensive land-using types.

10.7.4 Finally, when classed by Member State, all indicators are atypically high in Denmark and at low levels in Spain, Italy and Portugal (Figure 10.14). While each indicator seems to describe broadly similar inter-country differences, the relative positions of the ratios of total and current liabilities and assets is not consistent and there are some occasional oddities (such as the very high current

Fig 10.12 Indicators of financial status by ESU size group

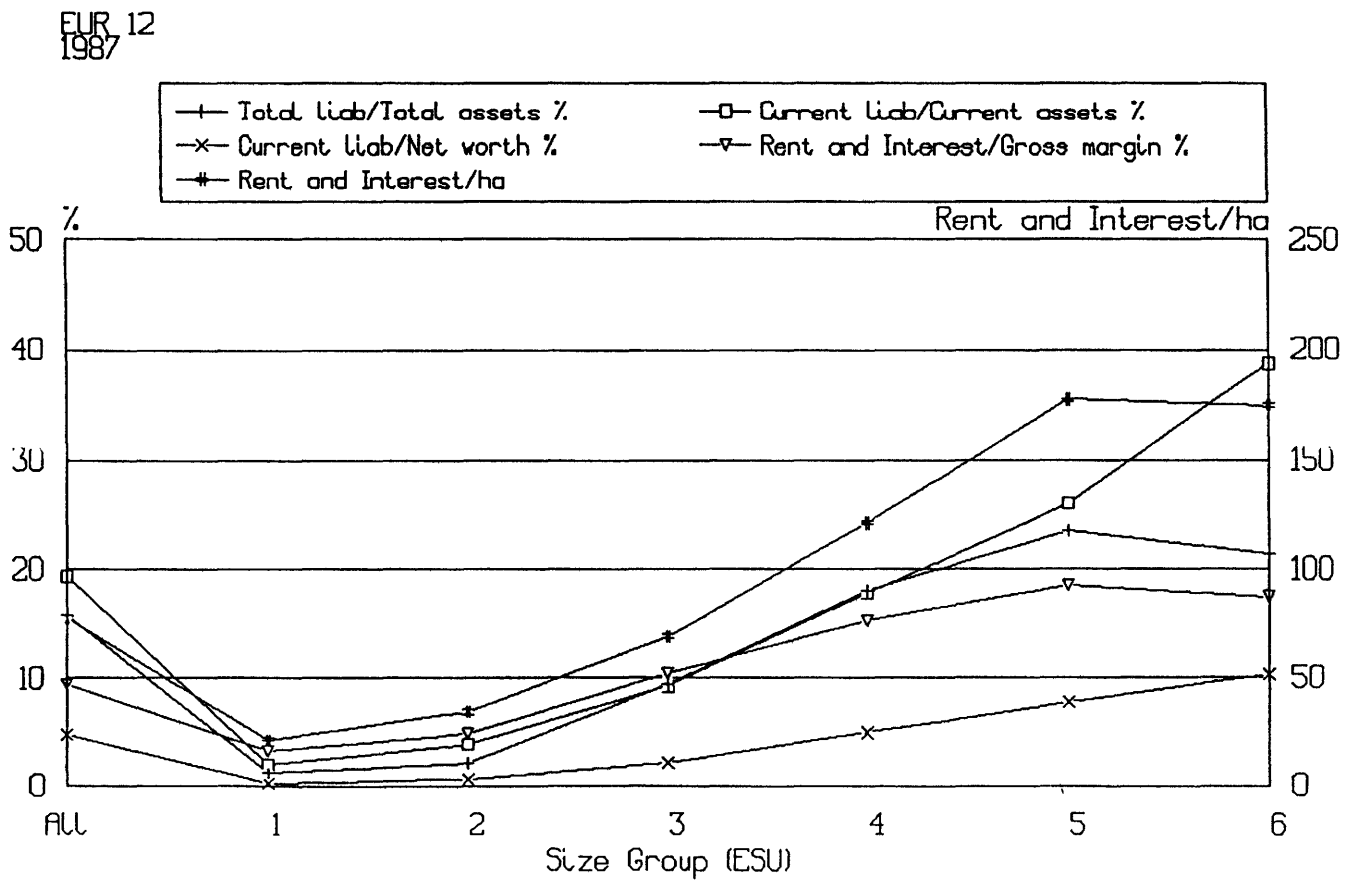


Fig 10.13 Indicators of financial status by type of farming

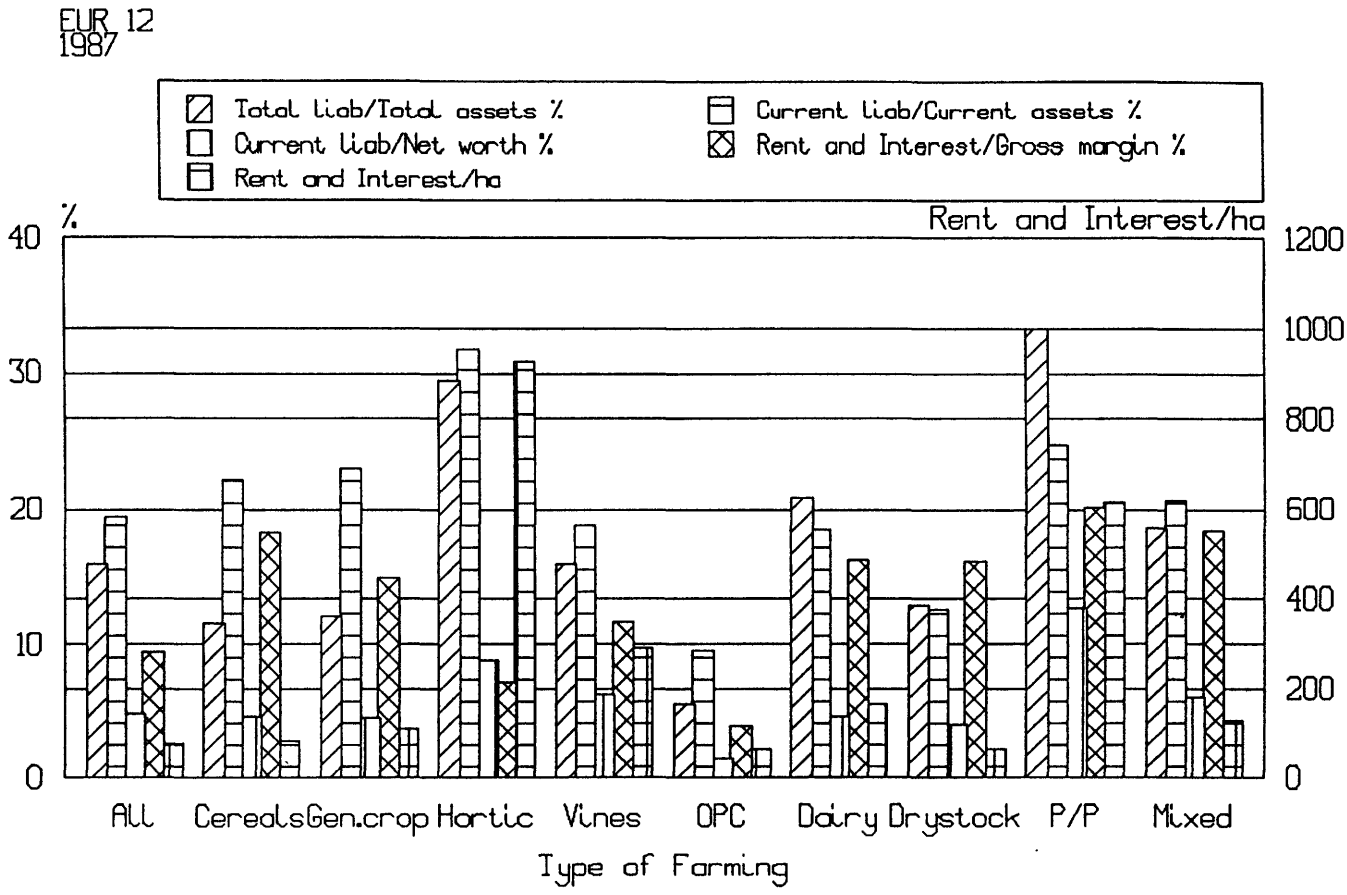
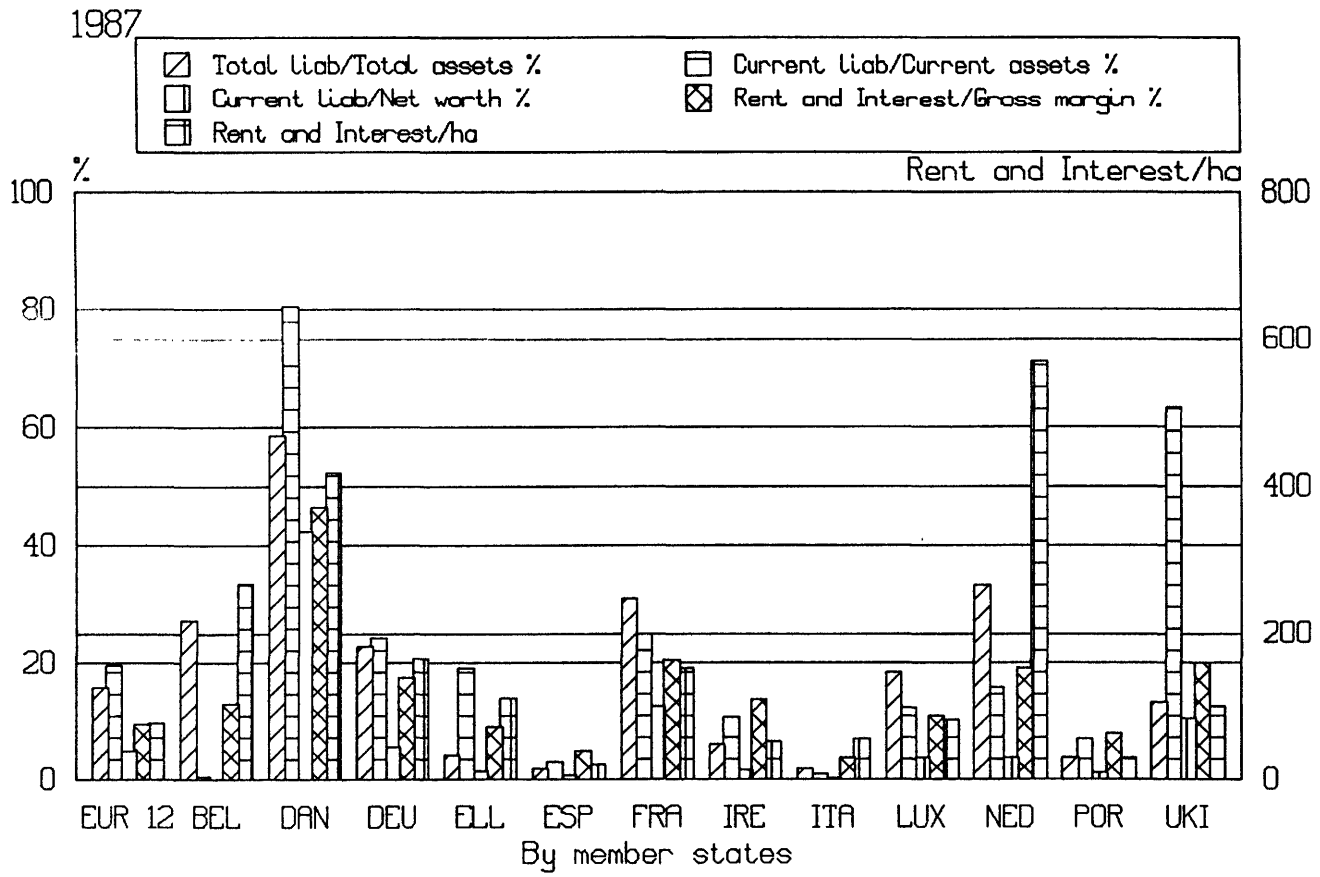


Fig 10.14 Indicators of financial status by country



ratio in the UK). The Rent and Interest burden (as a percentage of Gross margin) is particularly high (in relation to the other ratios) in Ireland, Italy and Spain. The high per ha burden in the Netherlands is probably a reflection of the importance of Horticulture there.

10.7.5 Summing up, the following general indicators would seem to display such differences across farm sizes to warrant routine calculation:

Total liabilities as a percentage of Total assets
Current liabilities as a percentage of Current assets
Rent and Interest as a percentage of Gross Margin.

As will be seen later, some methodological questions were thrown up when using the third of these indicators for other parts of this analysis (some very atypical figures in a few Member States) and in practice it may be necessary to substitute Rent and Interest as a percentage of Gross Output, already proposed as part of the investigation of viability. These indicators will be re-examined in in that context (section 10.11 below).

10.8 Alternative measures of size

10.8.1 Chapter 9 listed eleven parameters of farm business size which were to be explored for use with economic indicators. Of these two were concerned with physical area (UAA and Adjusted UAA), three with labour input (AWU, FWU and the number of persons working on the holding), two with the capital base (total assets including and excluding land), and three with the levels of productive activity (total output, total inputs, and standard gross margin in the form of ESU). In an attempt to reduce this number, farms were arranged in deciles according to each of the size parameters, and group averages of two of the main income indicators (FFI and FFI/FWU) were plotted. This showed that there was very little difference between the patterns resulting from using either land area or the capital measure, and that AWU was very similar to the number of persons in the outcome. The patterns from using deciles based on Total output and sales were also very close, except in the smallest decile where the 10 per cent of farms with the lowest sales had FFI levels substantially lower than that of the 10 per cent with the lowest Total output. Consequently the list of size parameters used for further exploration was as follows:

UAA
AWU, FWU
total inputs, total output
total assets (excluding land)
ESU

10.8.2 Using these seven size parameters, the relationship between size and five income and performance indicators was examined (FFI, FFI/FWU, Total output per ha, Total output per AWU, and Total Factor Product). Firstly, deciles were used. Figure 10.15 shows that, not surprisingly, higher deciles in each

Fig 10.15 Alternative measures of size: Family Farm Income by size decile

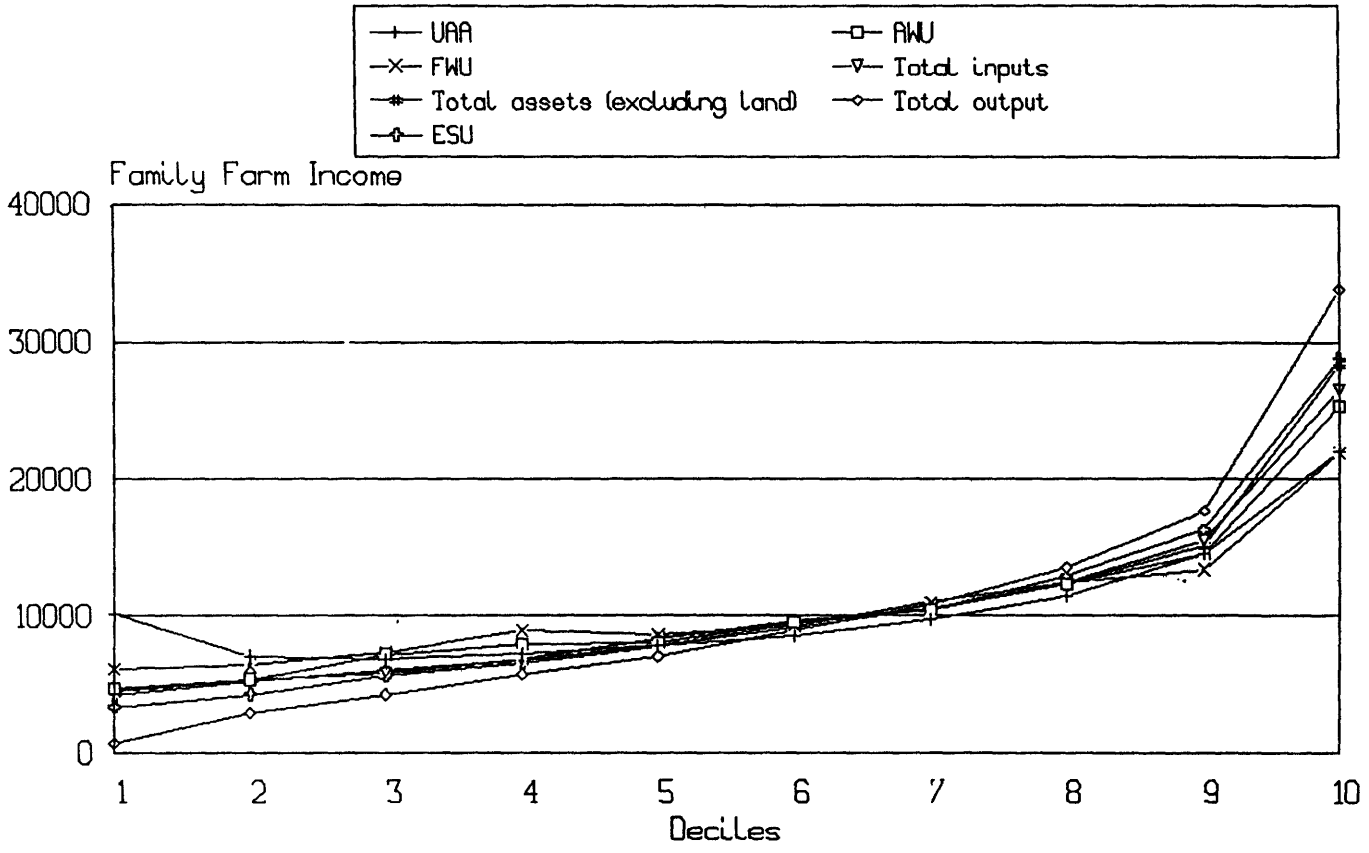
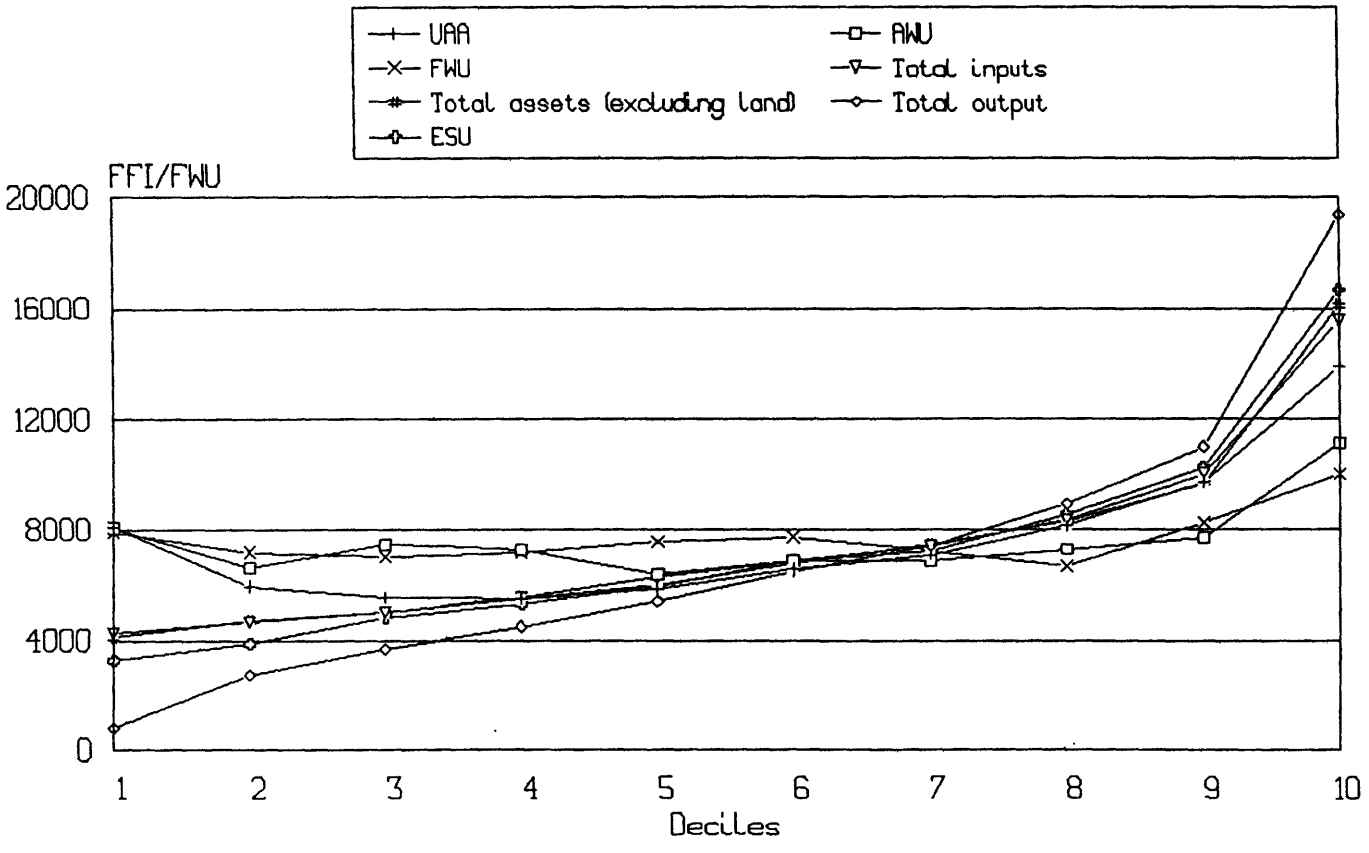


Fig 10.16 Alternative measures of size: FFI/FWU by size decile



size measure are associated with higher FFI. However, the smallest decile farms on a UAA basis have higher incomes than the next smallest; this is likely to reflect the influence of Horticultural holdings. Deciles based on output gives the widest range of incomes and on UAA the narrowest.

10.8.3 Turning to FFI/FWU, the income level is fairly stable across the deciles when size is measured in AWU (and FWU) up to the largest size group, when it rises (Figure 10.16). Income levels fall across the first four UAA deciles and then rise. The other size parameters produce a consistently rising pattern, with the widest ranges emerging from Total output and ESUs. Even if the highest and lowest deciles are treated as exceptional cases and ignored, the differences are large; FFI/AWU in the ninth output decile is over four times that of the second, whereas for the same area deciles it is only about one and a half times. Arranging farm businesses on an output basis will therefore give a greater income disparity across the size deciles than will the other measures.

10.8.4 Conflicting statements are often made about whether small farms are more or less intensive users of their land than larger farms. Figure 10.17 demonstrates the reason for this confusion. Even if the very small area farms are left out of consideration (which removes some of the intensive Horticulture holdings), there is a progressive relationship between area size and output per ha; smaller area farms use their land the most intensively, and the larger farms the less is the level of output per ha. In contrast, all the other size measures tried show that larger businesses use their land more intensively, output deciles giving the strongest relationship. Of course, the general size/intensity relationship hides the differing balance of types and countries, and at some stage this will need further investigation.

10.8.5 Total output per AWU appears to be fairly stable across the size deciles when size is measured in AWU (or FWU), with the smallest two and largest deciles having somewhat higher levels (Figure 10.18). In contrast, the other measures show rising output per AWU as higher deciles are reached, although this pattern is not initially apparent for UAA.

10.8.6 The ratio of Total output to Total purchased inputs (including labour, interest and rent but not including imputed inputs) displays marked sensitivity to the size parameter chosen (Figure 10.19). On an output size criterion, there is a substantial improvement in the ratio when moving up from the smallest deciles whereas when using Total inputs there is a substantial deterioration. The other size measures give a more neutral pattern. Beyond about the fifth decile all the measures show a similar pattern, with a small fall off in the highest two deciles. This analysis lends support to the point made earlier that the apparent efficiency pattern is dependent to some degree on the size parameter chosen, emphasising the need for caution when interpreting results in a policy context.

10.8.7 FFI was plotted against absolute levels of the seven selected size criteria, values of the independent variable being taken from the deciles. In all

Fig 10.17 Alternative measures of size: Total output per ha by size decile

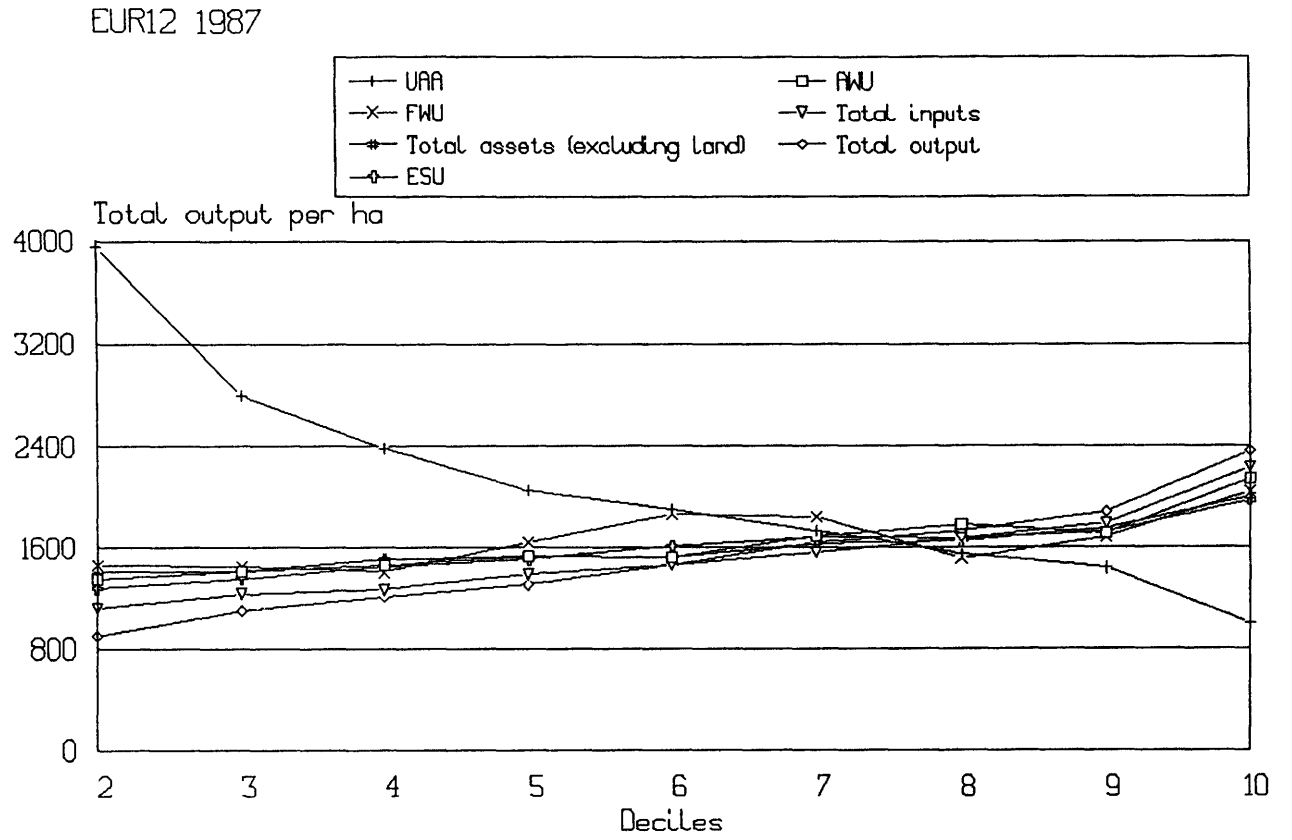


Fig 10.18 Alternative measures of size: Total output per Annual Work Unit by size decile

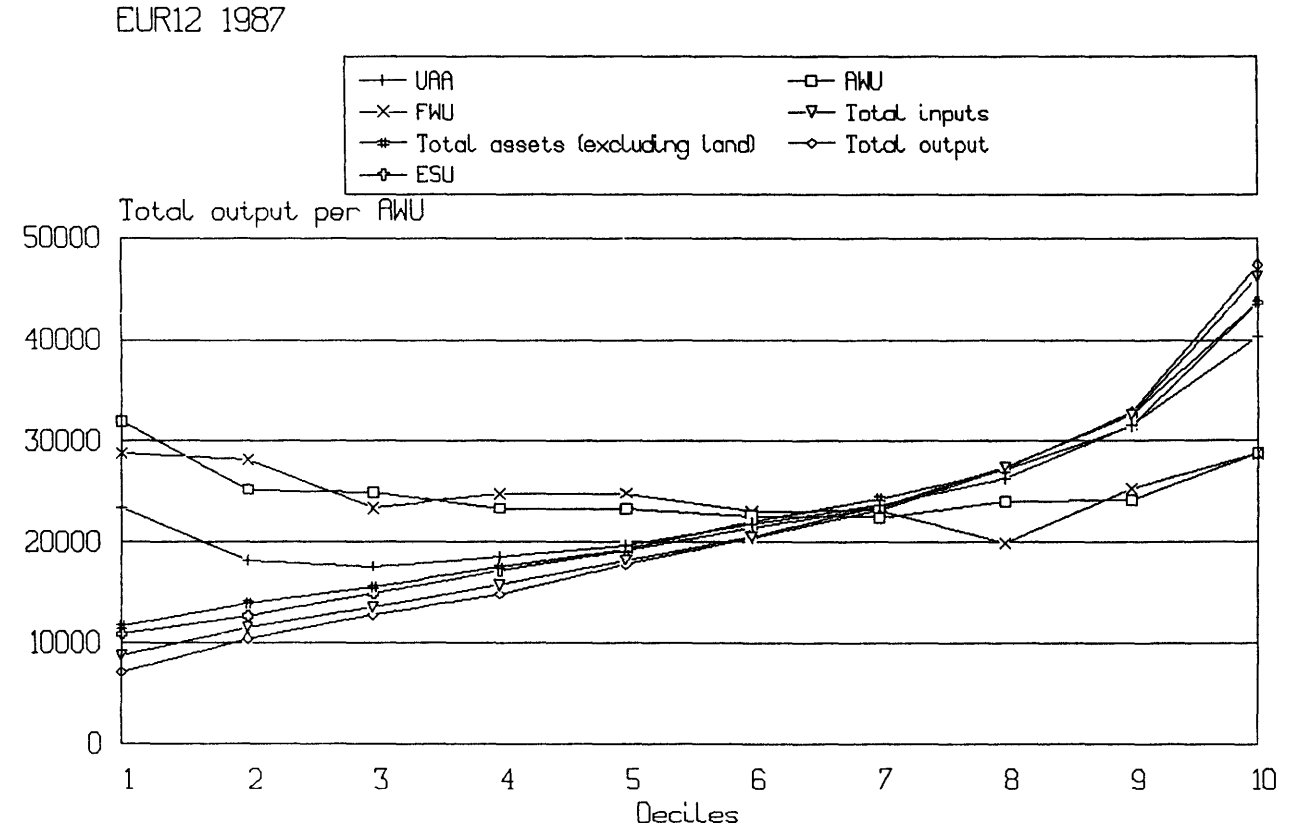


Fig 10.19 Alternative measures of size: Ratio of total output to total purchased inputs by size decile

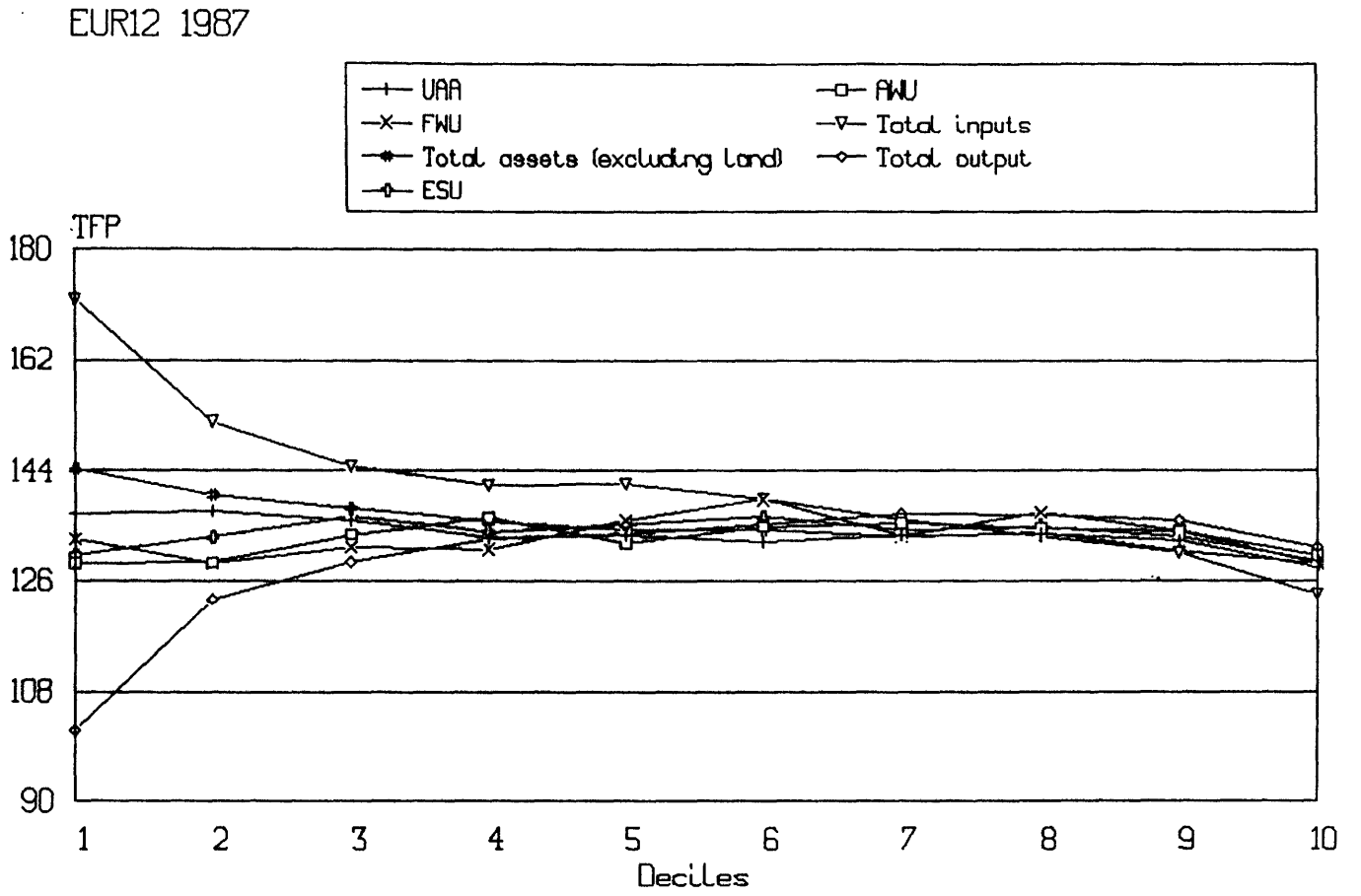
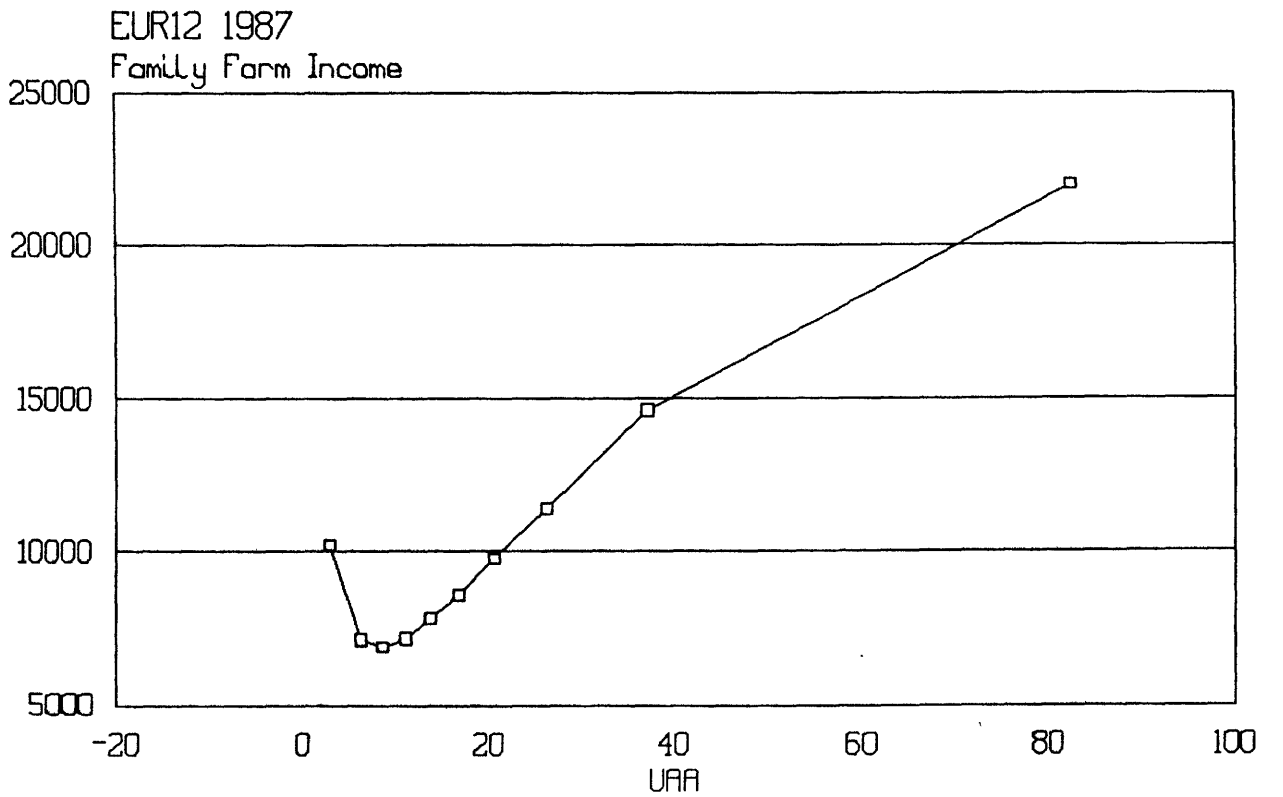


Fig 10.20 Family Farm Income by farm UAA within UAA deciles



but one case the relationship between size criterion and FFI was close to being linear over the ten observations. The only exception occurred with UAA, where income declined with increasing size below about 10 ha, only then increasing (Figure 10.20); the disproportionate importance of Horticulture businesses in these size groups is likely to form part of the explanation for the pattern. This feature of small size was not seen in the relationship between FFI and Total assets (including land). To illustrate the size-income relationship, Figures A10.20a to A10.20c (in the Appendix) show the situations for FFI plotted against Total assets (excluding land), Total inputs, Total output and ESU.

10.8.8 Finally in this section, size in ESU has been plotted against the other size criteria for the deciles based on ESU (being the most frequently used size measure in RICA at present). Figures 10.21 and 10.22 show the almost linear relationships with ESU and the value of inputs, output and assets (excluding land). Values from the tenth ESU decile have been omitted from the graphs as they are often far to the right of those from the ninth decile, but they too lie on a linear projection. The relationship with UAA is also close to linear. With AWU non-linearity sets in beyond about 20 ESU (1.6 AWU). FWU is clearly not linear, and this is supported by the values in the tenth decile.

10.8.9 Summing up, it is apparent that the relationship between size and indicators of income, intensity or efficiency are dependent on the criterion of size chosen. For income and intensity purposes, there are arguments for using UAA, AWU, Total output and Total assets (excluding land) as additional criteria to the ESU measure which is currently dominant. Total inputs seem to display patterns very similar to those of Total output in most circumstances and therefore could be dropped, though the marked difference when assessing the output/input average performance relationship means that for this particular purpose it should be retained. FWU has not emerged as a very useful general measure of size because the share of unpaid labour within the total declines on farm businesses with larger outputs or areas. However, again this measure will find a place in the examination of policy issues which relate directly to the farm family.

10.9 Special policy applications (1): the family farm

10.9.1 Chapter 9 described three specific policy issues which were to be explored using RICA economic indicators. The aim was both to cast light on the issues themselves and, in line with the general nature of the present research project, to find the indicators which were of greatest utility as a guide to future RICA analysis.

10.9.2 Of the three issues selected for further investigation in this report, perhaps the most novel is the differing economic characteristics of family farm businesses and non-family farms. This classification is based on the share of the total labour input (FWU/AWU) coming from family (unpaid) labour. Three classes were identified: farms totally (or almost totally) operated with family (unpaid) labour (ie where the ratio of FWU/AWU is above 0.95), those mainly

Fig 10.21 Relationship of alternative measures of size (group 1) to ESU

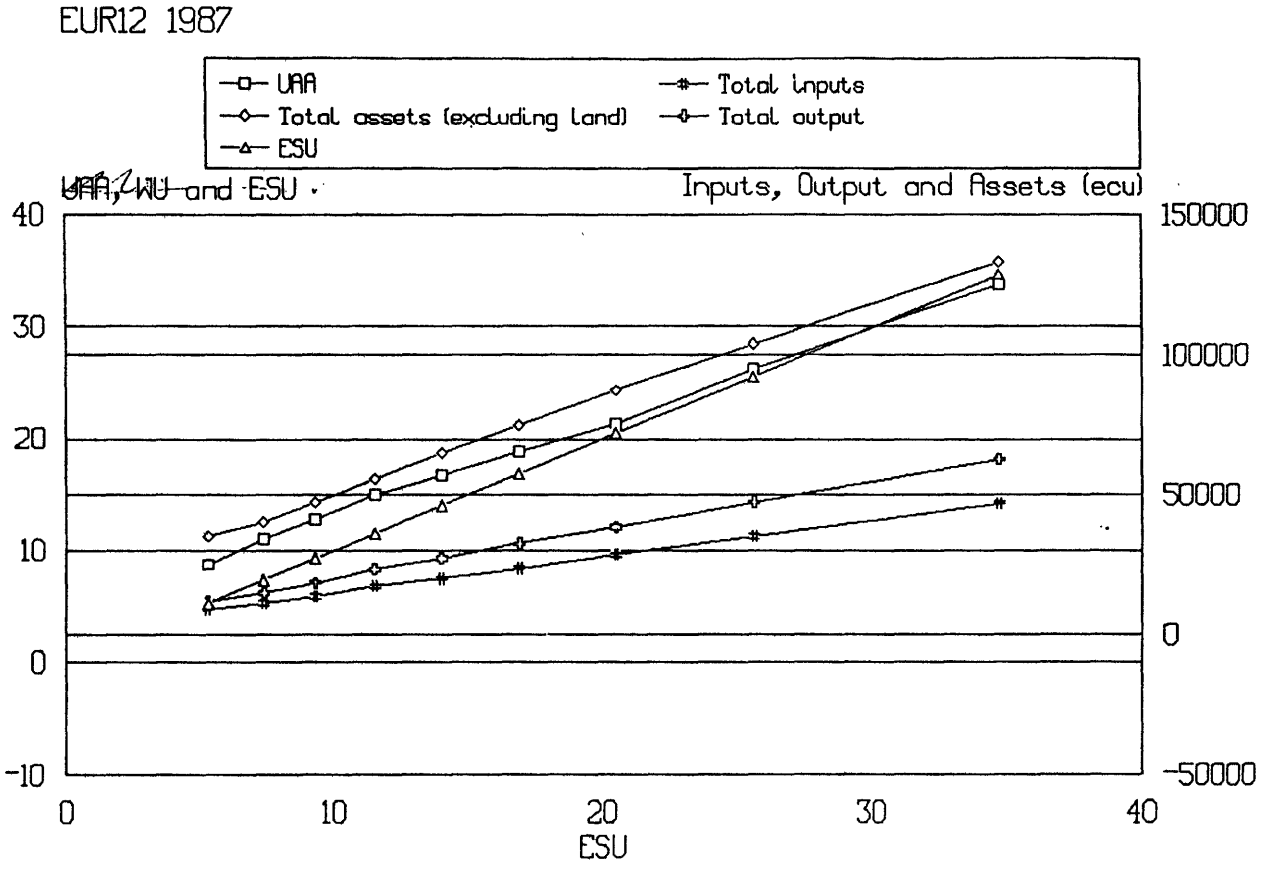
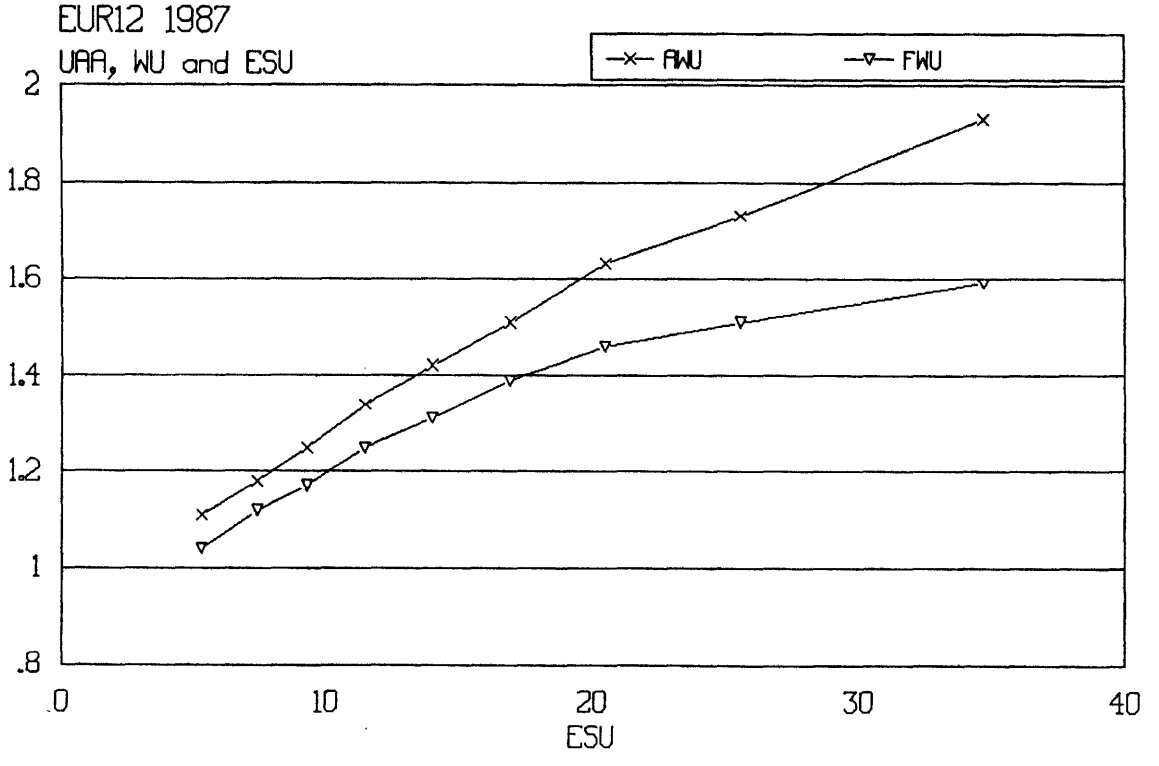


Fig 10.22 Relationship of alternative measures of size (group 2) to ESU



operated this way (ratio 0.5 to 0.95), and those where family labour is in the minority (below 0.5). For ease of reporting these are termed family farms, intermediate farms, and non-family farms. However, this is only one interpretation which can be put on "family farm" and the other possibilities (other proportions, or other bases such as ownership, or combinations of criteria) should not be left out of sight. These might include the proportion of household income coming from independent agricultural activity, or the main occupation of the head of the farm household.

10.9.3 Classified according to the FWU/AWU ratio, family farms dominate the picture in terms of numbers of farm businesses but are far less important in terms of agricultural activity. Though family farms form 70 per cent by number, they contribute only just over half the aggregate Total output and occupy a similar share of UAA. Non-family farms constitute 7 per cent of the total represented by RICA, and intermediate farms 23 per cent (1986 figures). The non-family group are responsible for 18 per cent of output and of UAA and 19 per cent of FNVA. The explanation lies in the fact that, in all farming types, non-family farms are on average much larger than intermediate farms in terms of output per business, AWU, area or Net Worth. Intermediate farms, in turn, are larger than family farms.

10.9.4 One parameter in which non-family farms are <u>not</u> larger than the other groups is in their number of Family Work Units (FWU). Though the average total AWUs on non-family farms was greater than on family farms (3.07 in contrast to 1.44 for RICA as a whole), the average FWU per farm on non-family farms was substantially smaller than that on family farms (0.76 FWUs in contrast with 1.44 FWUs). Intermediate farms fell between the other two groups in each respect. It is interesting to note that in the non-family group there was an average of less than 1 FWU, implying that the businesses were part-time (at least in this one sense). Intermediate farms had on average more than a single FWU (average 1.3 FWU). This pattern of work units was repeated in all farming types, except that in two (Horticulture and Dairy) there was marginally more than 1 FWU on the non-family farms. How these findings should be interpreted will be considered in more detail later, but the statistics suggest that the non-family farms substitute hired labour for family labour, even for that of the farmer. In examining the data it should be borne in mind that, in some countries (such as the UK) family members who are paid a regular wage may be classed as hired workers and therefore not appear in the FWU figures.

10.9.5 There are differences between farming types in the importance of family and other forms of farming. In terms of numbers of holdings, family farms prevail in Cereals, Dairy, Drystock and Mixed types, with 79-84 percent of numbers (1986 figures). In Pigs-and-poultry, General cropping and Other permanent crops the percentages are 66, 63 and 53 respectively, and in two groups (Horticulture and Vines) less than half the total are family farms. Because of their greater size, the non-family and intermediate groups are disproportionately important in terms of productive activity and use of

resources. For example, in the Cereals type the 6 per cent which are non-family farms account for nearly a quarter of the total area in cereal farms. Only in two farming types (Dairy and Drystock) are family farms responsible for more than two-thirds of the total output or two thirds of the UAA, the remainder coming from intermediate or non-family farms. In General Cropping non-family farms account for about one third of the output and the land. In Horticulture, non-family farms are more important than in any other type of farming group analysed. They account for more than half of the total output, for 61 per cent of total inputs, and use 42 per cent of all the labour engaged in this type of production. Intermediate class farms seem particularly important among the Vines group, but the balance between intermediate and non-family farms seems to favour the former when the share taken by family farms is high. The situation is summarised in Table 10.5.

Table 10.5 Percentage of holding numbers, output, UAA and AWU accounted for by non-family, intermediate and family farms (respectively) - 1986

Percent	All	Cer'ls	Gen. crop -ping	Horti -culture	Vines	Other perm. crops	Dairy	Dry-stock	Pigs-poultry	Mixed
Holdings										
non-family	7	6	10	19	11	12	3	5	11	4
intermed.	23	14	28	35	47	34	15	12	23	17
family	70	80	63	46	42	53	82	84	66	79
Output										
non-family	19	21	29	55	21	32	9	9	24	13
intermed.	27	22	31	29	51	37	24	17	25	25
family	54	57	39	16	28	31	66	74	50	62
UAA										
non-family	20	24	36	25	23	34	8	12	14	20
intermed.	24	19	27	44	47	32	22	22	33	21
family	56	57	37	31	30	34	70	66	53	59
AWU										
non-family	14	15	20	40	17	22	6	7	23	10
intermed.	23	16	27	29	46	33	18	13	26	19
family	63	69	53	31	36	45	76	80	51	71

10.9.6 Often questions about the family nature of farming turn on the economic behaviour of these businesses. Analysis was undertaken using group averages on a number of parameters; FNVA/AWU, FFI/FWU, Total output per ha and per AWU, Total Factor Product, FFI as a percentage of Net worth, and Rent-and-Interest as a percentage of farm Gross Margin and per ha. Taking all farming types together, the level of FNVA/AWU was greatest on non-family farms and least on family farms, with intermediate farms taking a middle position (Figure 10.23a). This was repeated in each separate farming type (see Figure A10.23a in the Appendix). On this criterion, then, non-family farms are the better performers and might be preferred to family farms. In part this reflects the larger size of non-family farms and the link between size and FNVA/AWU described earlier; breakdowns were not undertaken within size groups as part of the RICA analysis so it is not possible at this stage to isolate

Fig 10.23a Family and non – family farms: indicators of income by family status

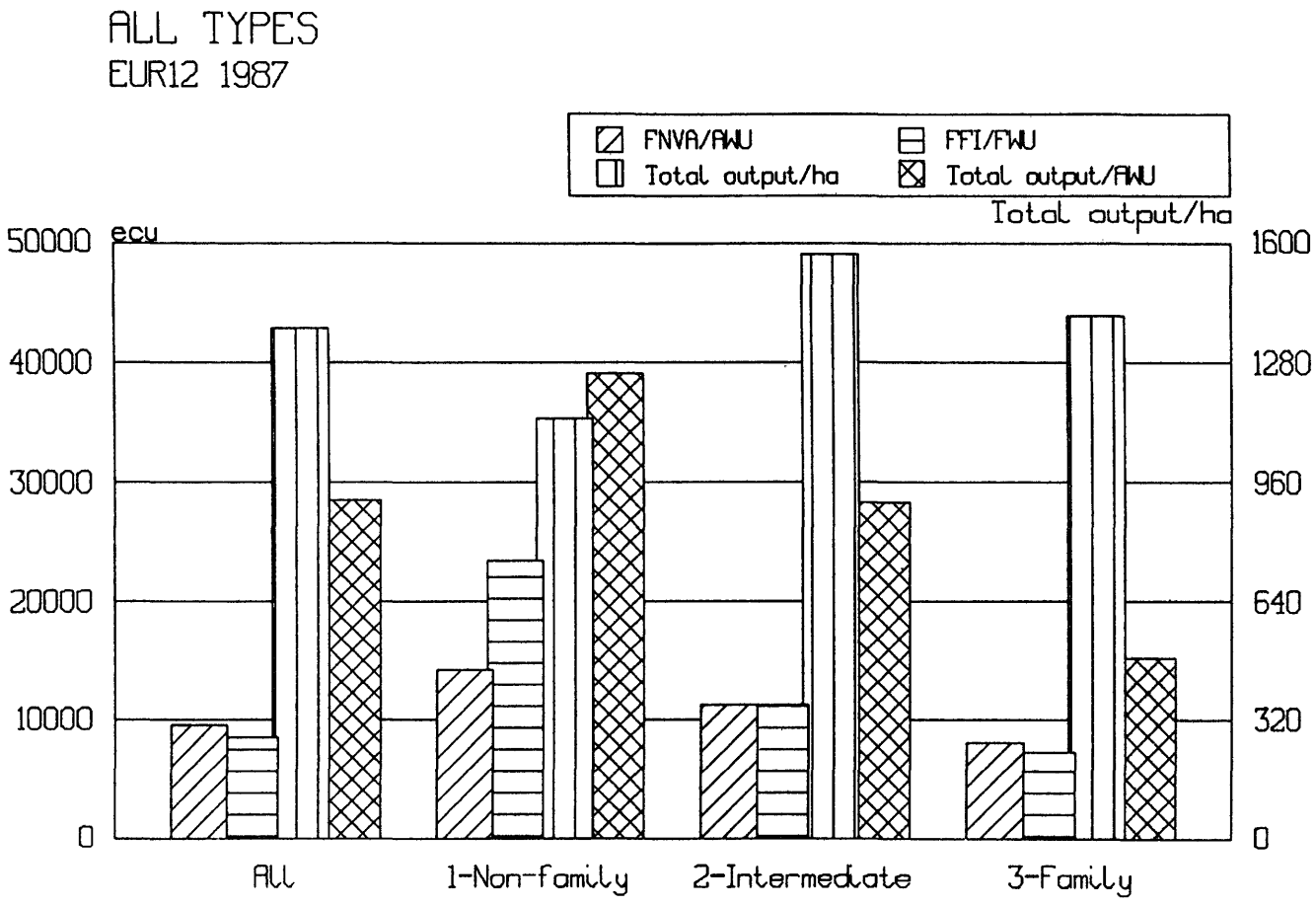
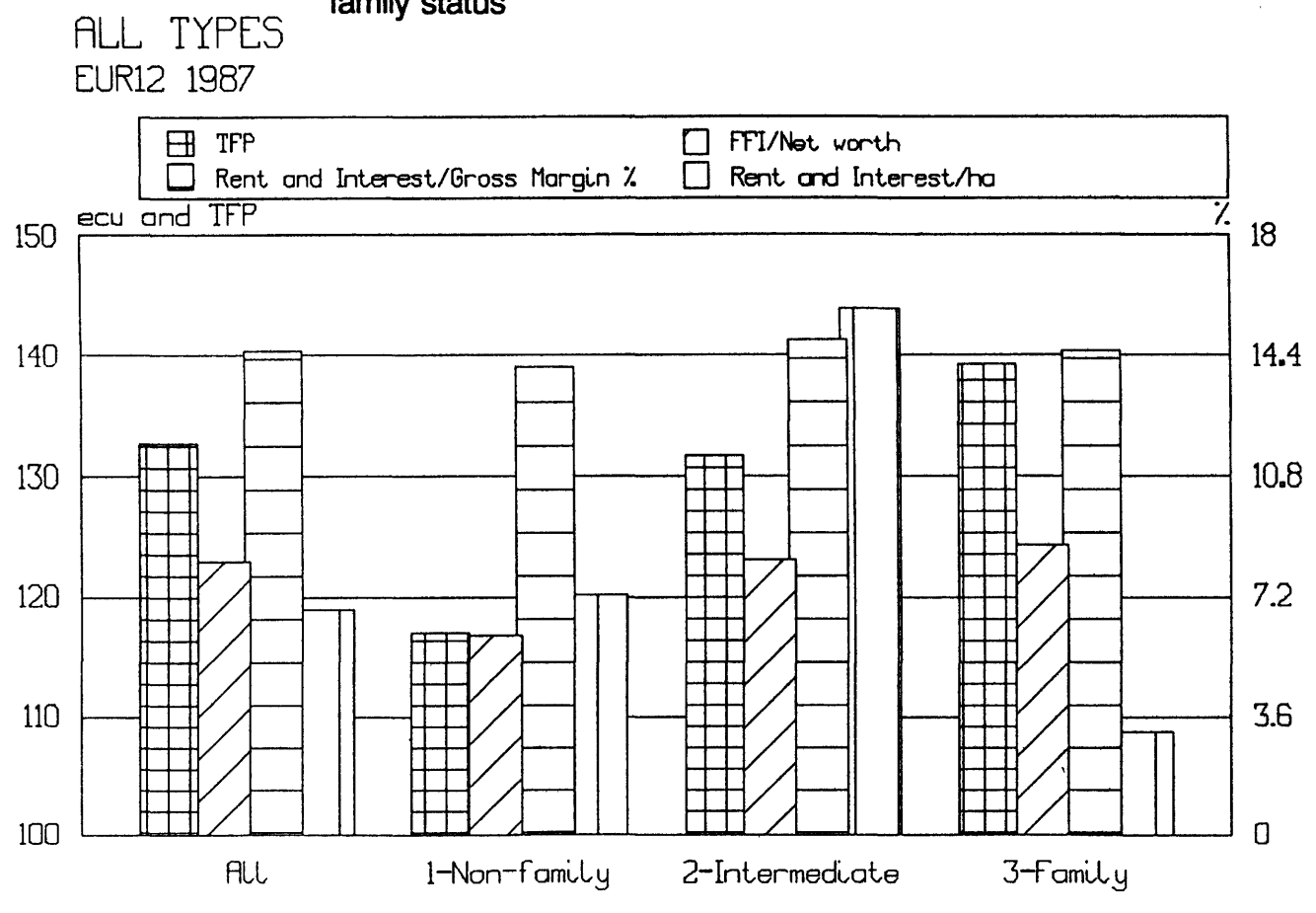


Fig 10.23b Family and non – family farms: indicators of business performance by family status



any independent affect associated with the family nature of the farm by size decile. This should clearly be a future priority.

10.9.7 FFI/FWU also was greatest on non-family farms for all types together and in each type separately, and least on family farms, but here there was a very marked difference between the levels seen on the non-family farms and on the intermediate farms, with a smaller step down to the family farms (Figure A10.23b). Total output/AWU was also greatest on non-family farms and least on family farms; though most farming types followed the general pattern, this was not the case for Drystock and Pigs-and-poultry, intermediate farms being the best performers (Figure A10.23c).

10.9.8 On an all-types basis Output per ha was highest among intermediate farms, but within farming types showed no clear association with family operation. On some types non-family farms were less intensive land users (for example, Drystock and Cereals) whereas in others family farms were the less intensive (Dairy, Vines, Other permanent crops)(Figure A10.23d).

10.9.9 In the relationship with the ratio between output and (purchased) inputs, family farms were the best performers overall (Figure 10.23b), though in some types there was a strong linkage with family status (Horticulture, Vines, Other permanent crops) whereas in others it was non-existent or weak (Pig-and-poultry, Mixed)(Figure A10.23e in the Appendix). FFI/Net worth was lowest in each farming type on non-family farms and highest on family farms; this was to be expected because no charge is deducted for family labour, which by definition is of greater importance on family farms. This measure has therefore not been pursued. Finally, Rent-and-Interest as a percentage of Gross margin shows a mixed situation; in all types the load on the business from these two items is marginally less on family farms than on intermediate farms, though in some types (General cropping, Pigs-and-poultry, Drystock) the intermediate group has the highest percentages whereas in others there is a progressive fall in the figure from non-family to family farms (Figure A10.23f). Diversity between types is also a feature of Rent-and-Interest per ha, with some family farms having lower amounts per ha than non-family farms (such as Dairy) and others higher figures (Drystock)(Figure 10.24). Taking these two viability measures together, the family farms appear to be in a more favourable position than the other classes, though the differences are small.

10.9.10 Summing up, results coming from this part of the analysis suggest that the division of farms into non-family, intermediate and family classes provides interesting and valuable information. There is an association between the family or non-family nature of farms and their business size, and many of the differences observed can be explained, at least in part, by size. However, there is likely to be more to it than that alone. At some stage a breakdown within size groups in each type should be explored. A provisional interpretation of the data on the number of FWUs suggests that the non-family farms are not just family farms grown large and operated by families with substantial accretions of hired labour. Rather, they contain businesses which, though

employing substantial amounts of hired labour, do not engage the farmer or any member of the family full-time. What these people do with the rest of their time must be the subject of conjecture in the present context, but the pattern taken together with the size and other characteristics of non-family businesses again points to the need to know more about the off-farm activities of farm families if their farming behaviour is to be adequately explained. In the meantime, there does not seem to be firm evidence for preferring family farms as a business form, and on some criteria (FNVA/AWU and FFI/FWU) non-family farms appear to be substantially better performers.

10.10 Special policy applications (2): levels of performance

10.10.1 Three parameters of performance were selected as the basis of investigating the characteristics of farm businesses which did poorly or well. One (Total Factor Product (TFP)) has not been followed up at this stage because of uncertainty over its precise formulation. The two remaining parameters are FNVA/AWU and FFI/FWU, which are usually seen as income measure but which can also be interpreted as performance indicators. The analysis thus becomes one of looking at the characteristics of high and low "income" businesses. This section thus probes the question of whether an analysis on this basis would prove to be a useful extension of the current RICA practice. Tables were provided by RICA for EUR12 and by country; a breakdown by farming type was proposed by the research team but not explored. As an adjunct to these performance indicators an analysis by level of FFI (per business) was undertaken, in which a breakdown both by country and by farming type was given by RICA.

Fig 10.24a High and low performance farms: area and total assets by FNVA/AWU quintile

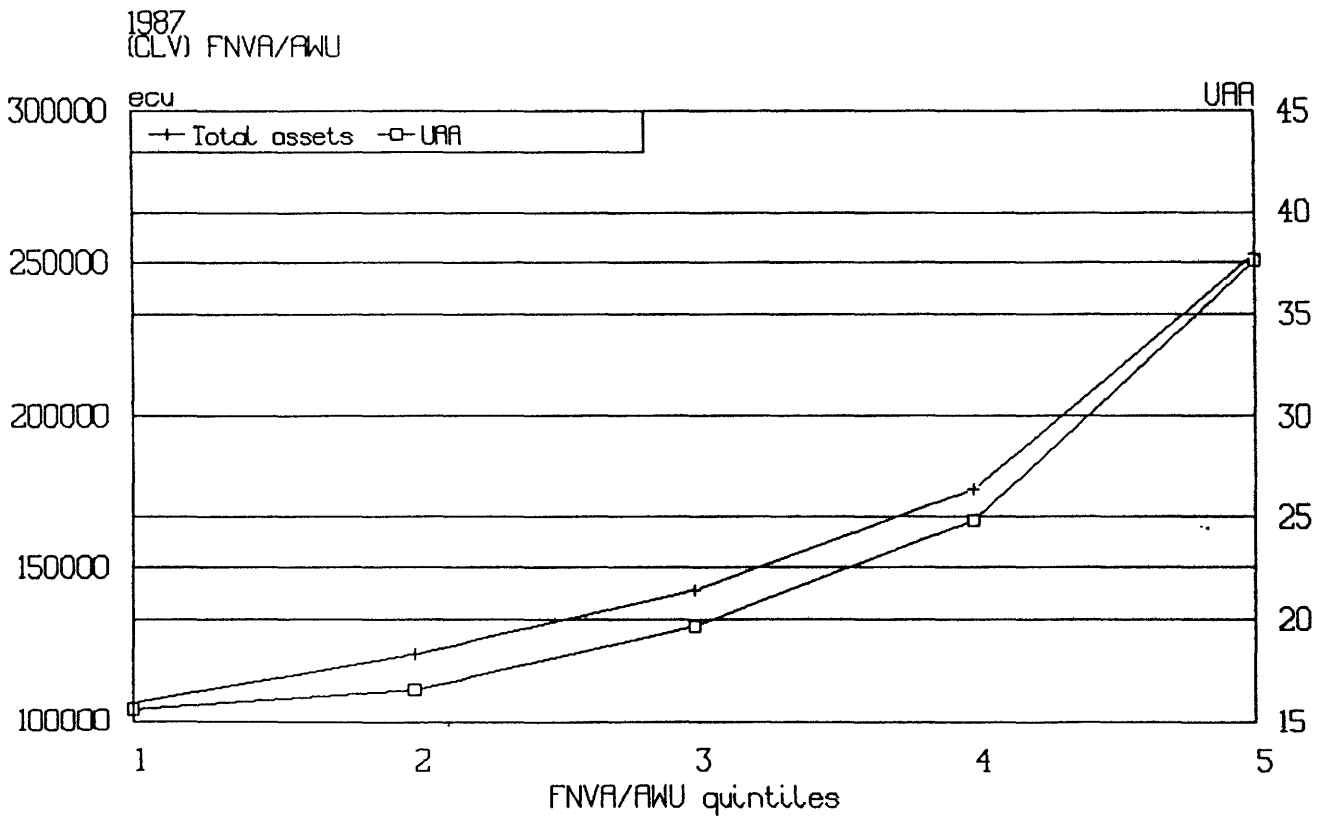


Fig 10.24b High and low performance farms: income indicators by FNVA/AWU quintile

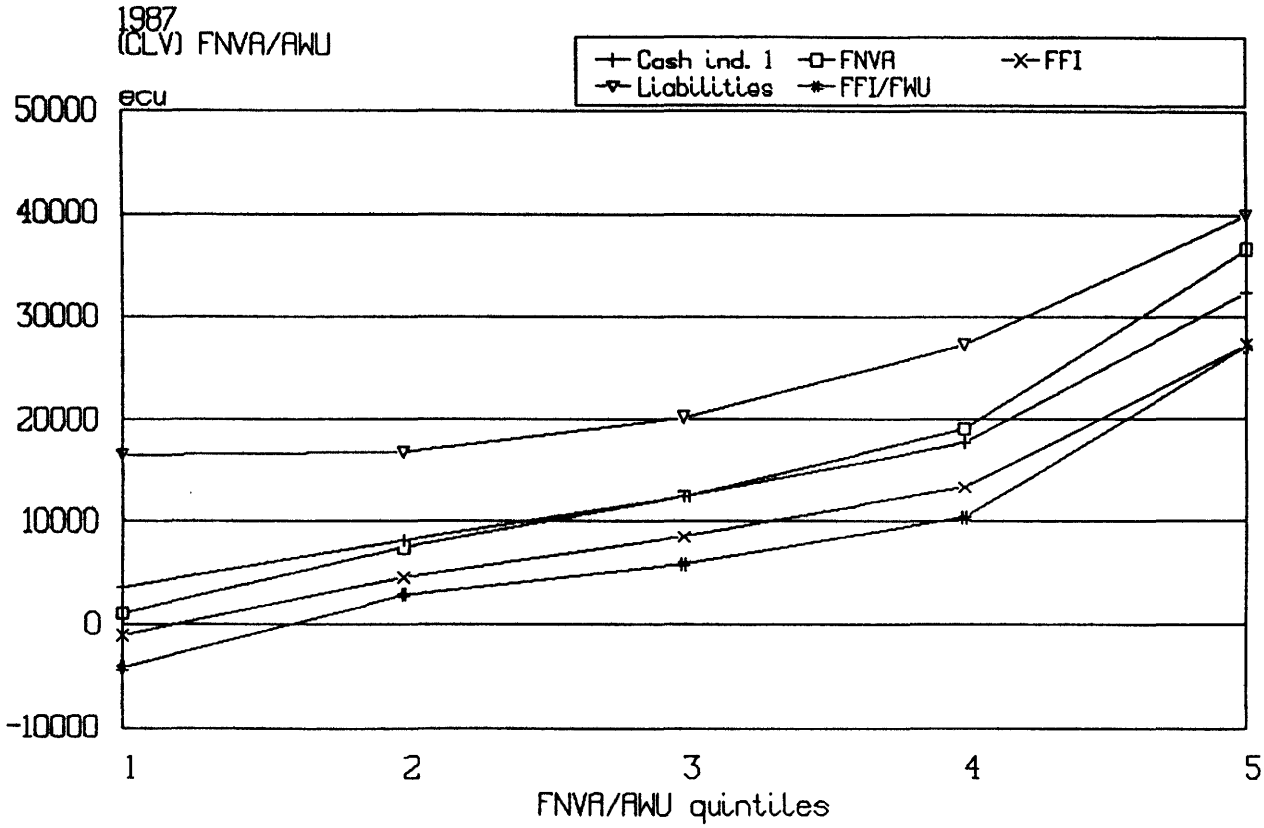
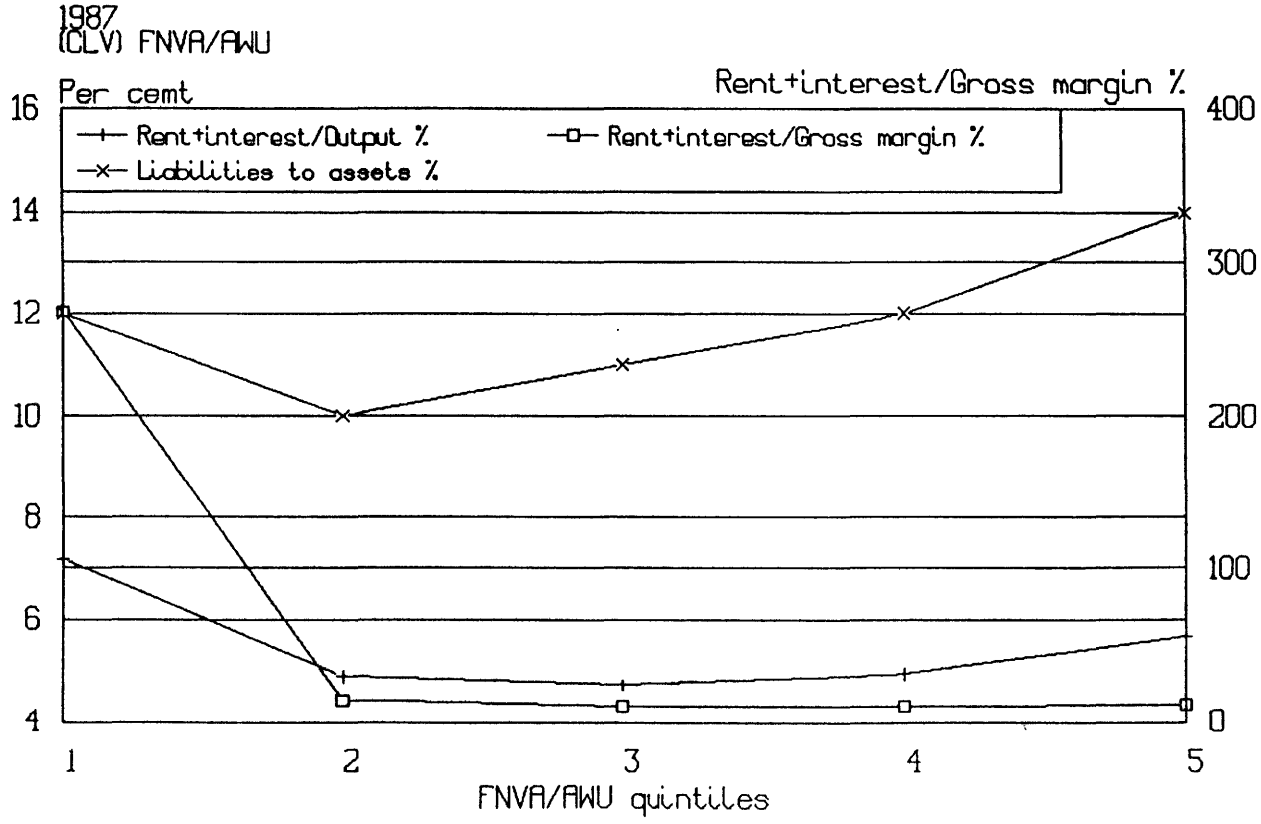


Fig 10.24c High and low performance farms: financial status by FNVA/AWU quintile



10.10.2 On the basis of the level of FNVA/AWU, farms were divided into performance quintiles and ten economic indicators examined (Cash indicator 1, FNVA, FFI, FFI/FWU, liabilities, assets (including land), UAA, liabilities-to-assets ratio, and rent plus interest as a percentage of Total output and of Gross margin). This list was extended from that initially considered following the results from earlier analysis. Higher performance is associated, on average, with larger size, whether measured in UAA or by the value of assets (including land)(Figure 10.24a). Figure 10.24b shows that Cash indicator 1, FNVA and FFI per business (and FFI/FWU) all rise with increasing performance, with the highest performers having particularly large levels. Average FFI is negative in the lowest quintile. However, liabilities only rise substantially beyond the second quintile, suggesting that the lowest performance group, as well as generating small outputs, have disproportionately large amounts of borrowing. The ratio of liabilities to (total) assets falls from the smallest performance quintile, but then rises (Figure 10.24c). Among the poorest performers rent and interest (together) represent a much higher share of Total output and of Gross margin than in other groups, the former rising marginally once more towards the larger businesses. In the case of the latter the initial fall is spectacular but, as will become evident, this is mainly due to one country (Netherlands) and is therefore to be regarded with caution.

10.10.3 Arguably greater emphasis should be placed on FFI/FWU as an indicator of performance, since this nearer central objective of agricultural policy. The latest (1990) version of the published RICA results (for 1986/7) gives group average results (Level 2) on this basis for each Member State; farms are classified into seven performance groups (absolute FFI/FWU) and into quintiles. These quintiles are calculate at Community level, so the national tables show those farms which happen to fall into each Community quintile. For the purpose of the present analysis, quintiles were estimated within each Member State separately. In some ways the analysis produces more interesting results than those above. Higher levels of FFI/FWU are associated with larger farms (UAA or Total assets) though the poorest performers are not, on average, the smallest in terms of area or assets (Figure 10.25a). Higher performances are also associated with higher amounts of Cash indicator 1, FNVA and FFI, and on the poorest performer quintile FFI is negative (Figure 10.25b). However, the absolute level of liabilities is high in the group of poorest performers, only being exceeded by the best performers (which are much larger in size). The share of Total output which interest (and rent) takes is greatest among the poorest performers, and this burden declines progressively across the quintiles. Bringing the elements together, the poorest performers are not necessarily the smallest farms, but they are heavily indebted ones. The best performers are the biggest, and their borrowings, though greater, do not impose such a drain on the output of the business.

10.10.4 The range of absolute levels of FFI/AWU represented by the quintiles was noticeably greater in the UK and Denmark among the other countries examined (see Figures A10.25a). The UK was marked by very low (and negative) FFI/FWUs in the lowest quintile, far below the level of other countries,

Fig 10.25a High and low performance farms: area and total assets by FFI/FWU quintile

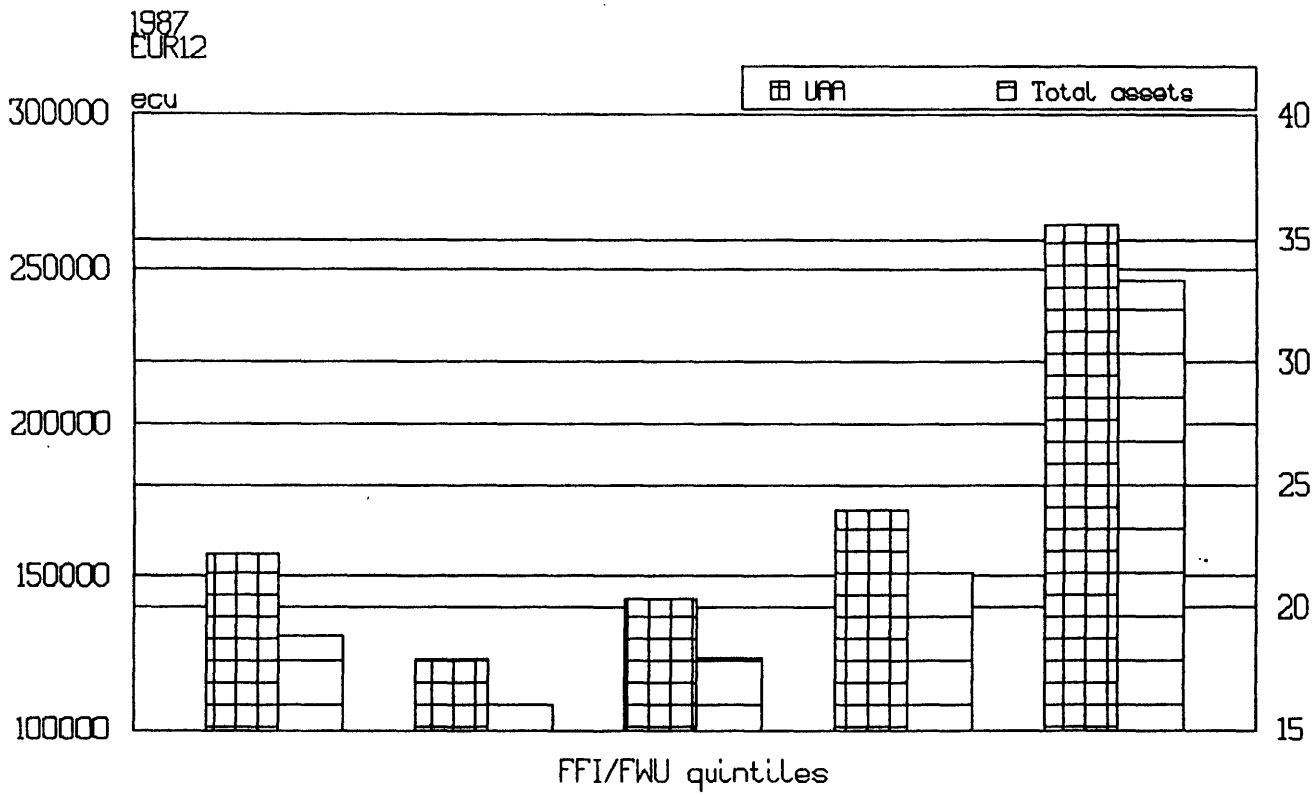
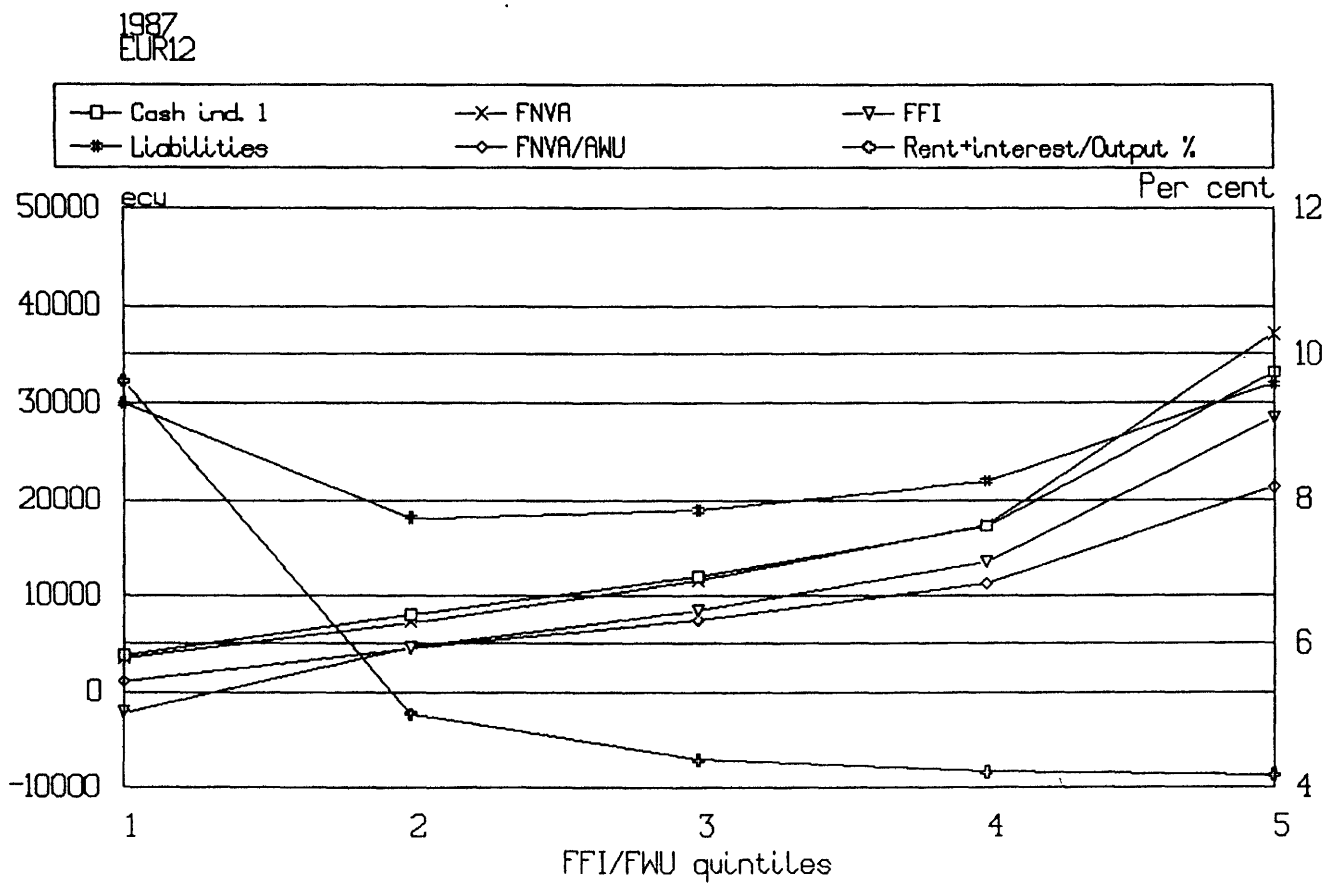


Fig 10.25b High and low performance farms: income indicators by FFI/FWU decile



and very high ones in the fifth quintile, far above the others. In Denmark very low incomes were encountered, but not very high ones. When these two countries were excluded the widest income range was seen in the Netherlands and the narrowest in Greece. (The spreadsheet package used for analysis could only cope with ten countries simultaneously, so Luxembourg and Portugal were not considered in this exploration.)

10.10.4 Across the performance quintiles Cash-Indicator 1 rose in all countries, most in the Netherlands and UK and least in Greece and Spain (Figure A10.25b). A similar pattern emerged with FNVA, except that in the UK the lowest FFI/FWU quintile was associated with a greater FNVA than the second (Figure A10.25c). On balance, the Cash indicator 1 did not seem to add much information beyond that coming from the better-established FNVA. As expected, higher FFI/FWU were associated in all countries with higher FFIs (Figure A10.25d). Over the quintiles as a whole there was a tendency for higher performance farms to have larger areas (UAA) and total assets (including land), particularly when moving from the fourth to the fifth quintiles, although in at least two countries (Greece and Denmark) the relationship seemed small (Figures A10.25e and A10.25f). The patterns shown using UAA and Total assets were quite similar. However, in almost all countries the lowest performing farms were slightly larger than the next lowest; the UK was exceptional in that the difference was much larger, and the average size of farms belonging to the lowest FFI/FWU quintile was about double that of the second performance quintile.

10.10.5 Liabilities show an interesting and relevant pattern. At EUR12 level liabilities per farm were greatest among the lowest performers and among the highest performers, giving a "U" shaped pattern. There were wide differences between countries in the levels of liabilities per farm, but the "U" pattern was repeated in each (Figure A10.25h). The ratio of liabilities to assets among the lowest performers was higher than the next quintile, though beyond the third quintile a diversity of pattern were observed. Denmark formed a special case because of its unusually high level of indebtedness, but the declining liabilities to assets ratio with higher levels of performance was again in evidence (Figure A10.25i).

10.10.6 A marked feature at EUR12 level was the declining share of output taken by interest and rent. In each country the lowest decile of FFI/FWU had the highest percentage taken by these two elements, with a substantial decline to the second decile, a further small decline to the third but little if any fall thereafter (Figure A10.25j). Expressing interest and rent as a percentage of Gross margin gave extremely high figures for the lowest quintile in the Netherlands (over 7000 per cent) and for Germany and Denmark (350-450) but with other countries below 100 per cent. This implies that this indicator should be treated with caution if applied on a EUR12 basis (Figure A10.25k).

10.10.7 Analysing performance by level of FFI per business (as opposed to per FWU) gives a very similar picture, but as a breakdown into deciles was provided

by RICA to the research team, rather than the quintiles in the above analysis, some further light can be shed on the characteristics of the extremities of performance level, particularly of the poorest performers. Only the lowest decile of performers had negative FFI; these farms were substantially larger than the second decile according to a range of parameters (ESU, UAA, Assets including land, AWU, Total output). There was evidence that farms in the second decile were marginally larger than those in the third according to some measures. The lowest (negative) income farms possessed slightly more family Work Units but a clearly greater amount of hired labour (Figure 10.26a). The lowest decile had higher levels of output, but also faced larger costs for intermediate consumption (plus depreciation), higher wages, higher rent and higher interest charges (because they also had greater liabilities, about double those of farms in the second decile). Together these higher costs more than absorbed the higher output (Figure 10.26b, in which the height of the columns represent output but in which the negative FFI of the first decile is not shown). It was found their average FNVA was also lowest (estimated before interest has been deducted)(Figure 10.26c), suggesting that, while the level of borrowings and the cost of servicing them is important, the explanation for low incomes must allow for relatively poor outputs in relation to the size of business. Some of this may result from permanent low productivity from the available inputs, but the characteristics of low income farms are also consistent with those of large businesses which have temporarily suffered a low level of output. This underlines the desirability of being able to view performance over more than one year, a point made many times in this report.

Fig 10.26a High and low performance farms: area (UAA), business size (ESU) and labour input (AWU) by FFI decile.

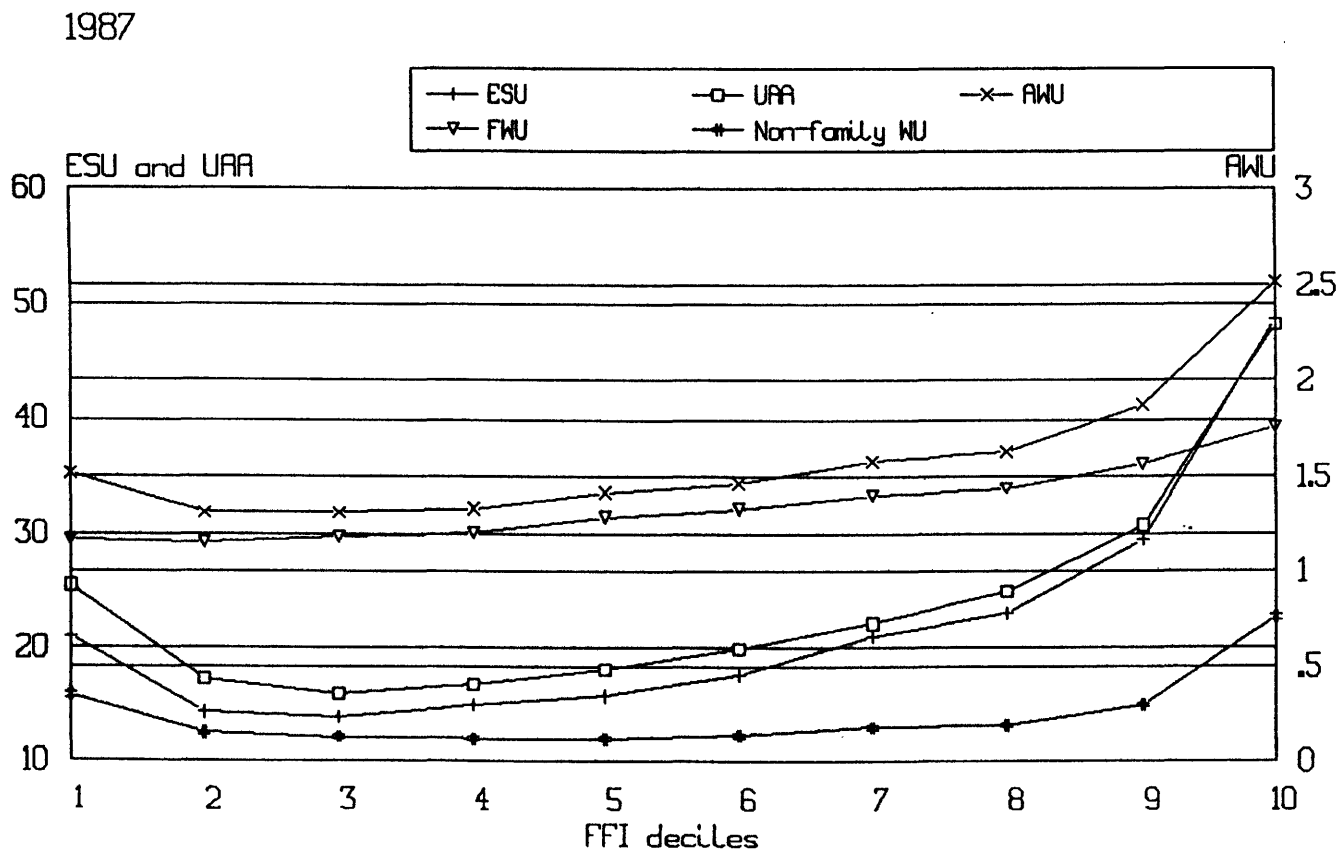


Fig 10.26b High and low performance farms: major costs per business by FFI decile

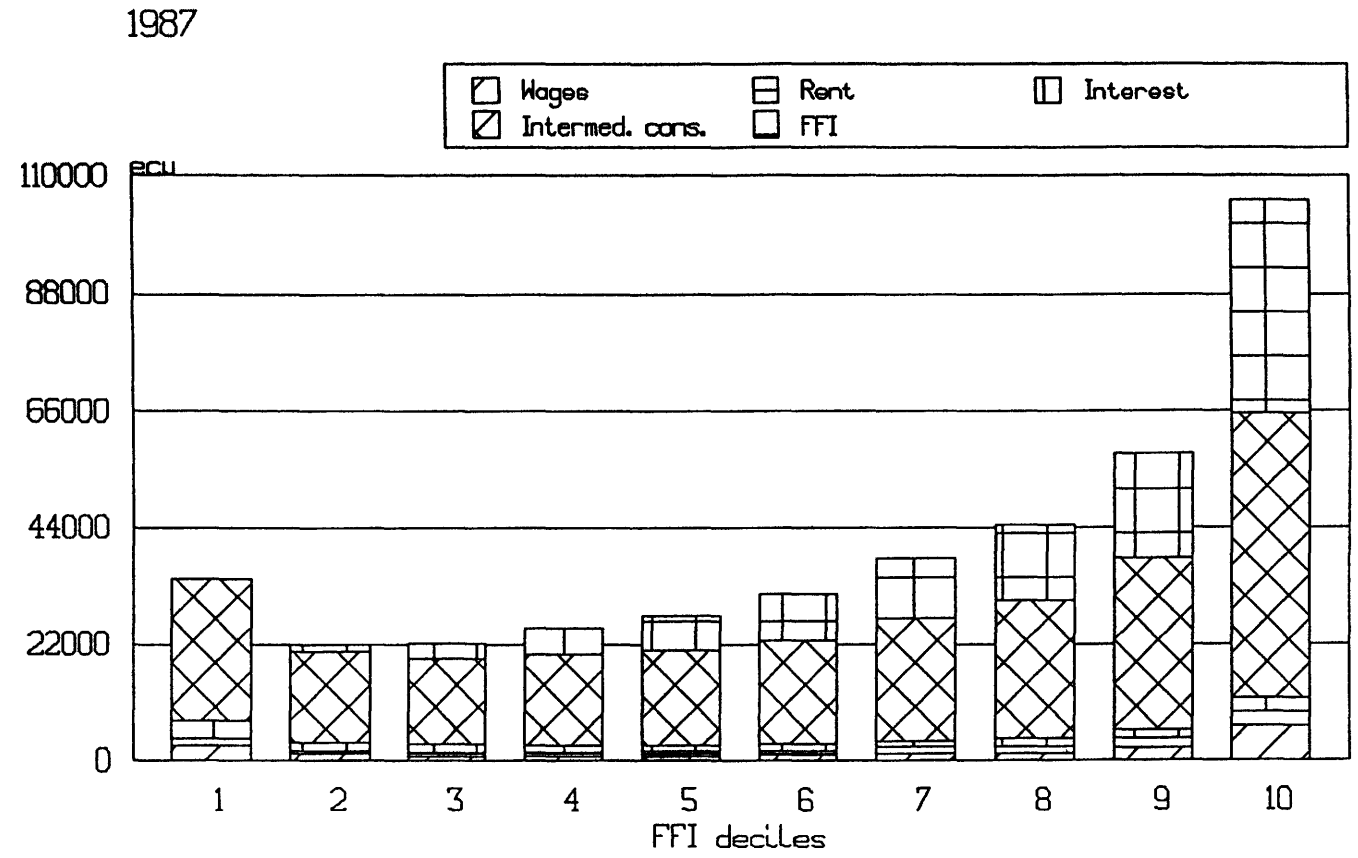
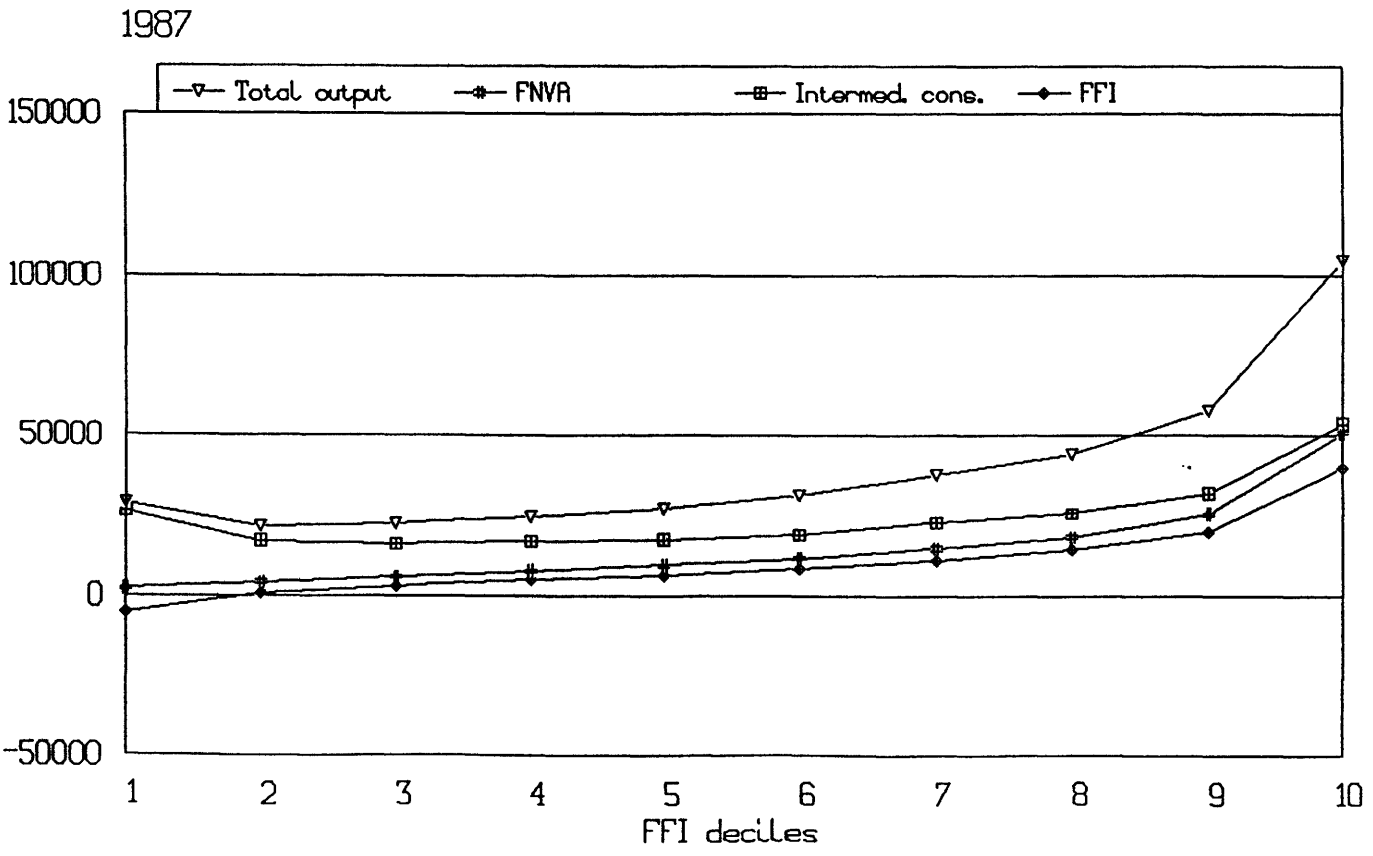


Fig 10.26c High and low performance farms: output and income measures by FFI decile



10.10.8 Summing up, performance level has proved to be an interesting basis on which to rank farms. Analysing by FFI/FWU performance provides more insights into the factors associated with high and low performance than does FNVA/AWU. High performance (FFI/FWU) is associated with greater size, but the lowest performers are not generally the smallest. Rather, they seem to be relatively highly indebted. Liabilities tend to be greater among the highest performing groups (they are larger businesses) and among the lowest performers. The share of Total Output which is taken by interest (and rent) seems to be more consistently related to performance than the same items expressed with respect to Gross margin, where the influence of atypical figures from a few countries disguises the more general relationship. Analysis of FFI per business suggests, however, that low incomes may also result from transitional poor outputs on farms which would normally have higher FFI and hence higher FFI/FWU, something that could be clarified by longitudinal data.

10.10.9 Thus the recommendation is that an analysis based on FFI/FWU should be developed. Among the indicators which should be pursued are FNVA, FNVA/AWU, UAA, Liabilities, ratio of Liabilities to Total assets, and Interest and Rent as a percentage of Total output. FFI per business has a virtue of easier interpretation, and a further recommendation is that analysis on this basis should also be considered, especially if the level of performance can be averaged over several years.

10.11 Special policy applications (3): viable and less viable businesses

10.11.1 Following the empirical work described in earlier chapters, three criteria were used to classify businesses into quintiles according to the stress which borrowing was placing on their ability to carry their borrowings. These were:

- the ratio (or percentage) of total liabilities to total assets
- interest-plus-rent as a proportion of Total output and of Gross margin.

Of course, the validity of these indicators as explanatory or predictive factors cannot be tested without time-series data, so attention here is focused on the characteristics which are under the various degrees of financial stress. Though subdivision into farming types was proposed by the research team, this was not followed up.

10.11.2 Starting with the ratio of liabilities to assets, at EUR12 level the most indebted quintile of farms tended to be larger, whether measured in UAA or by Total assets (Figure 10.27a). The least indebted were the smallest in terms of area though not in value. There did not seem to be any clear relationship between the ratio and the measures of income (Cash indicator 1, FNVA, FFI,), though the absolute level of liabilities was reflected in the ratio. FNVA/AWU rose progressively across the quintiles, but this was not the case for FFI/FWU. Presumably part of the explanation for this difference is the interest cost which

Fig 10.27a Financial status and viability: area and total assets by liabilities to assets ratio quintile

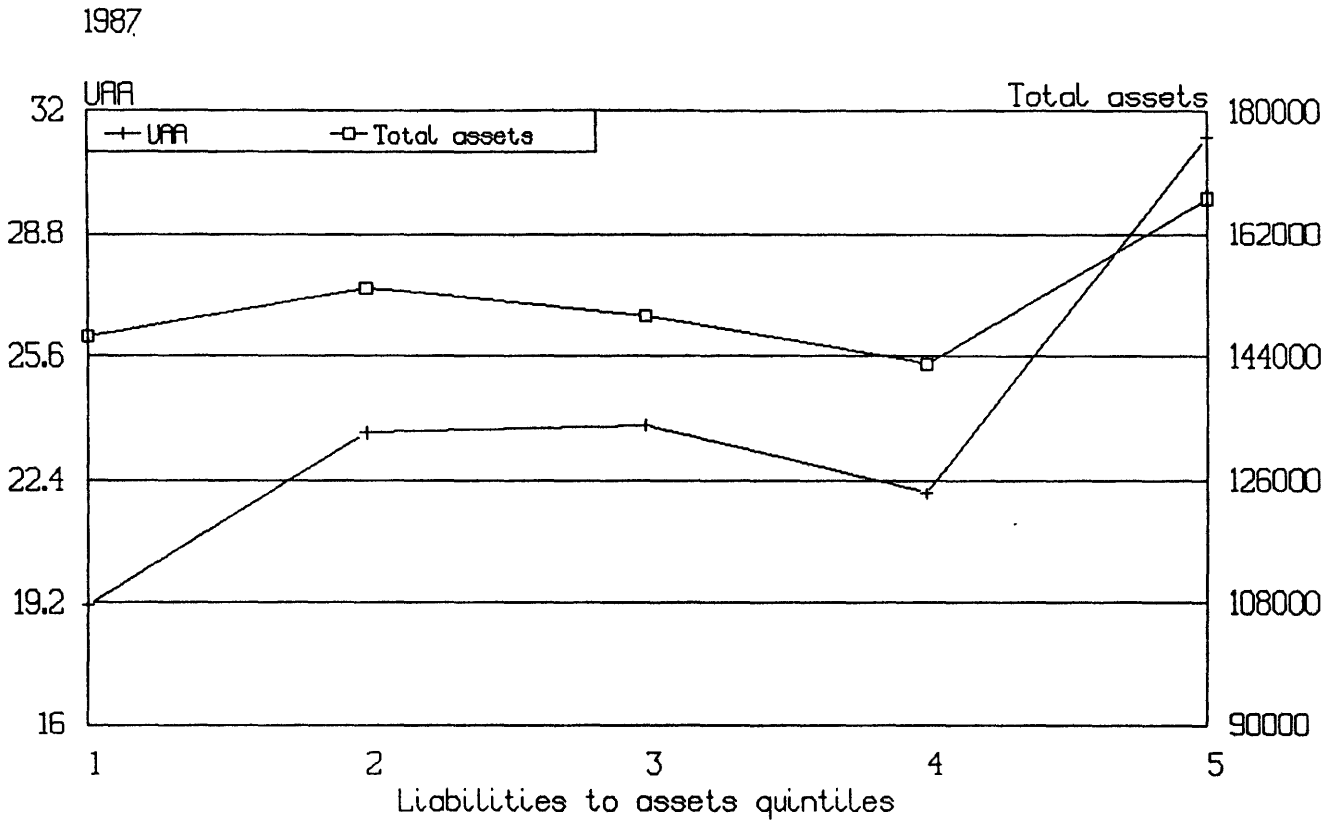


Fig 10.27b Financial status and viability: income measures and total liabilities by liabilities to assets ratio quintile

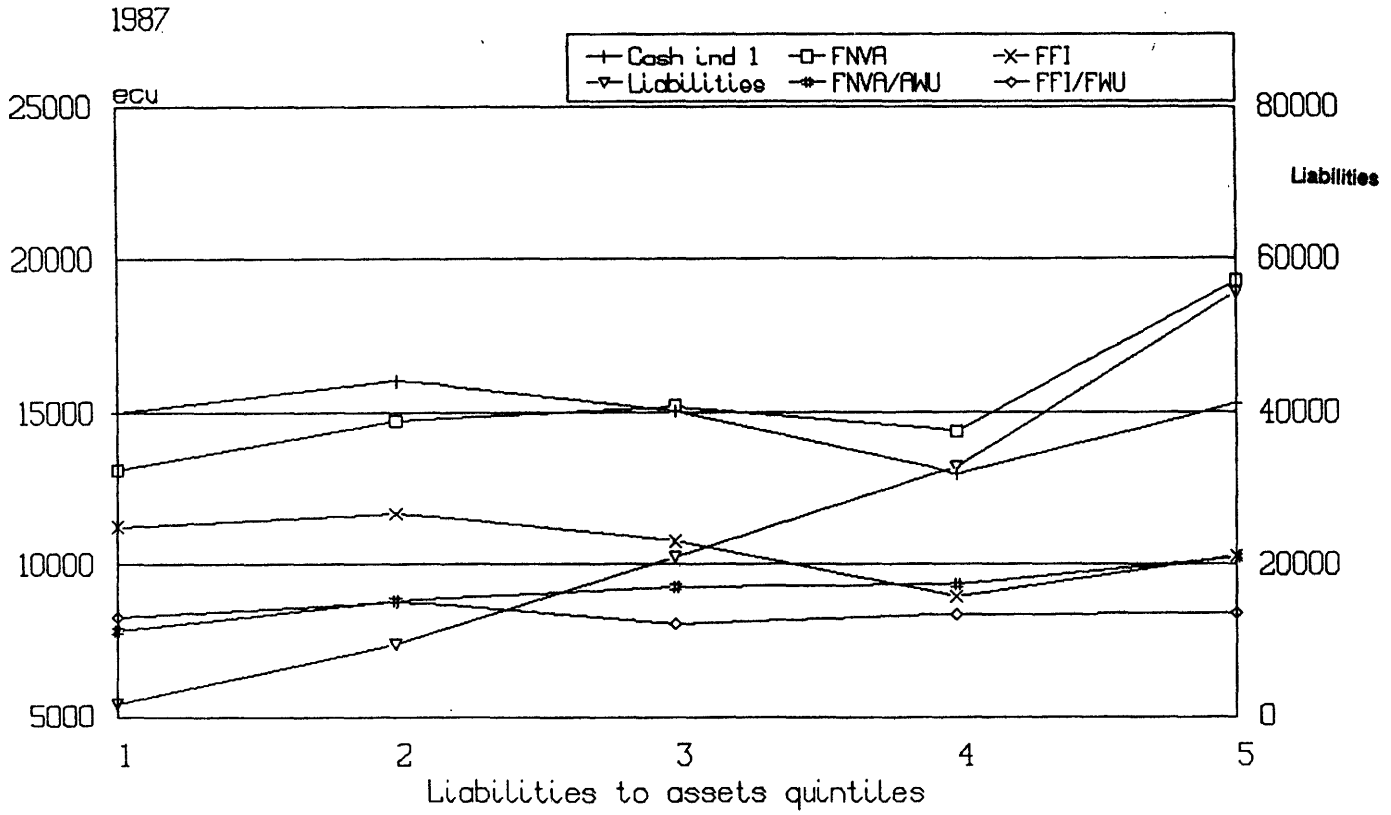
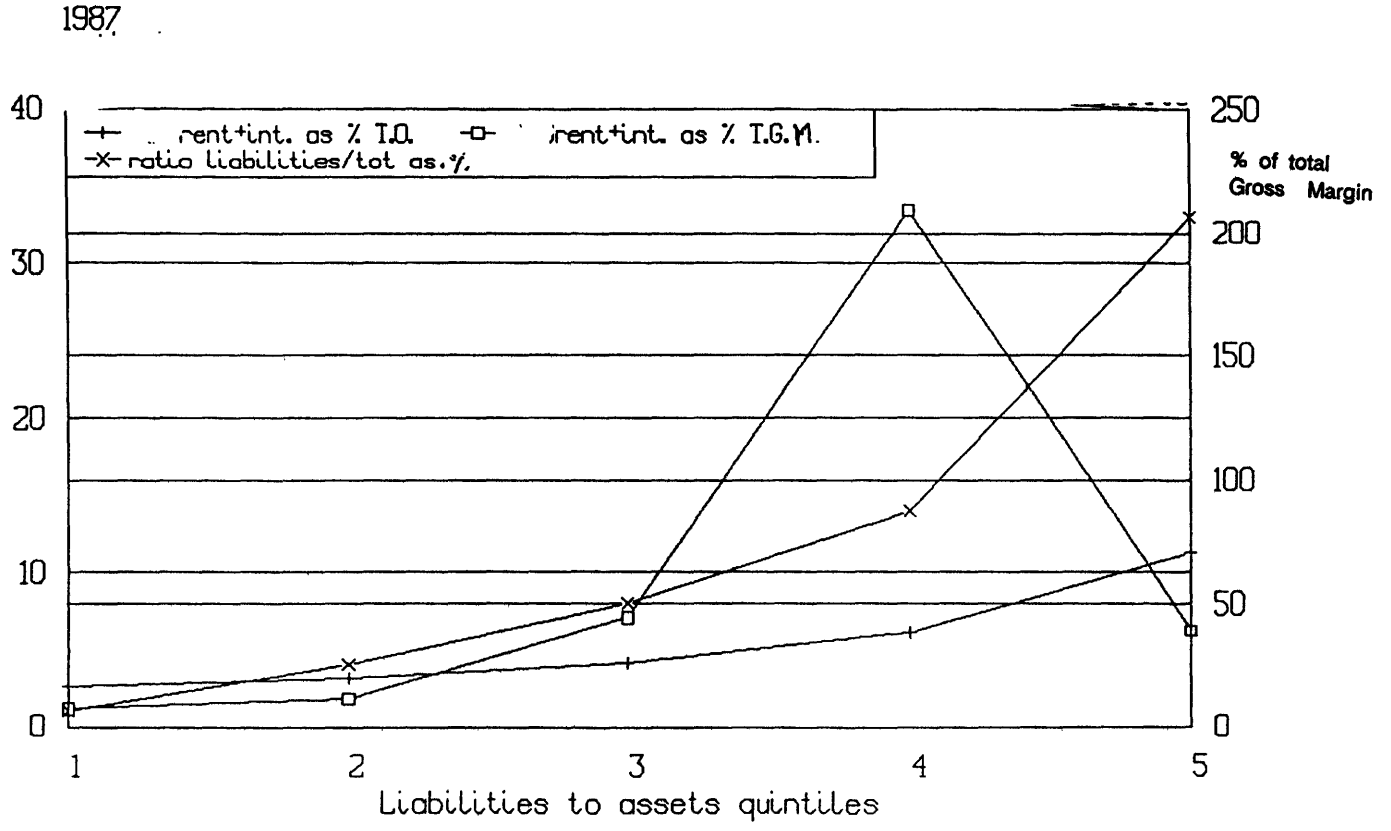


Fig 10.27c Financial status and viability: financial status indicators by liabilities to assets ratio quintile



rises with greater amounts of borrowing. Though the ratio of liabilities to assets and the percentage of Total output taken by interest and rent moved consistently across the quintiles, that of interest and rent as a percentage of Gross margin was not so, especially in the two most indebted groups (Figure 10.27c).

10.11.3 Taking next Interest and rent as a percentage of Total output as the indicator of financial stress, there was a progression with size in UAA, the more stressed being the larger farms. This was not true when size was measured in total asset value (Figure 10.28a). The businesses which are the most stressed using this indicator all have lower levels of income (totals and per Work Unit) than the fourth quintiles (Figure 10.28b). This contrasts with the pattern shown using the liabilities to assets ratio above (Figure 10.27b). The most stressed farms again had the greatest liabilities, with a gap opening up between FNVA/AWU and FFI/FWU. A very similar pattern emerged when analysis was based on Interest and rent as a percentage of Gross margin (given in the Appendix as Figure A10.28).

10.11.4 There is a suggestion in several of the Figures using the percentage taken by Interest and rent (both series) that the fourth quintile farms are bigger businesses than those in the fifth (though they are smaller in area). This is consistent with the view that those farms in financial stress are those which have borrowed particularly heavily. Larger businesses can support greater volumes of liabilities, but this does not hold for smaller ones.

Fig 10.28a Financial status and viability: area and total assets by interest and rent as a percentage of total output (quintiles)

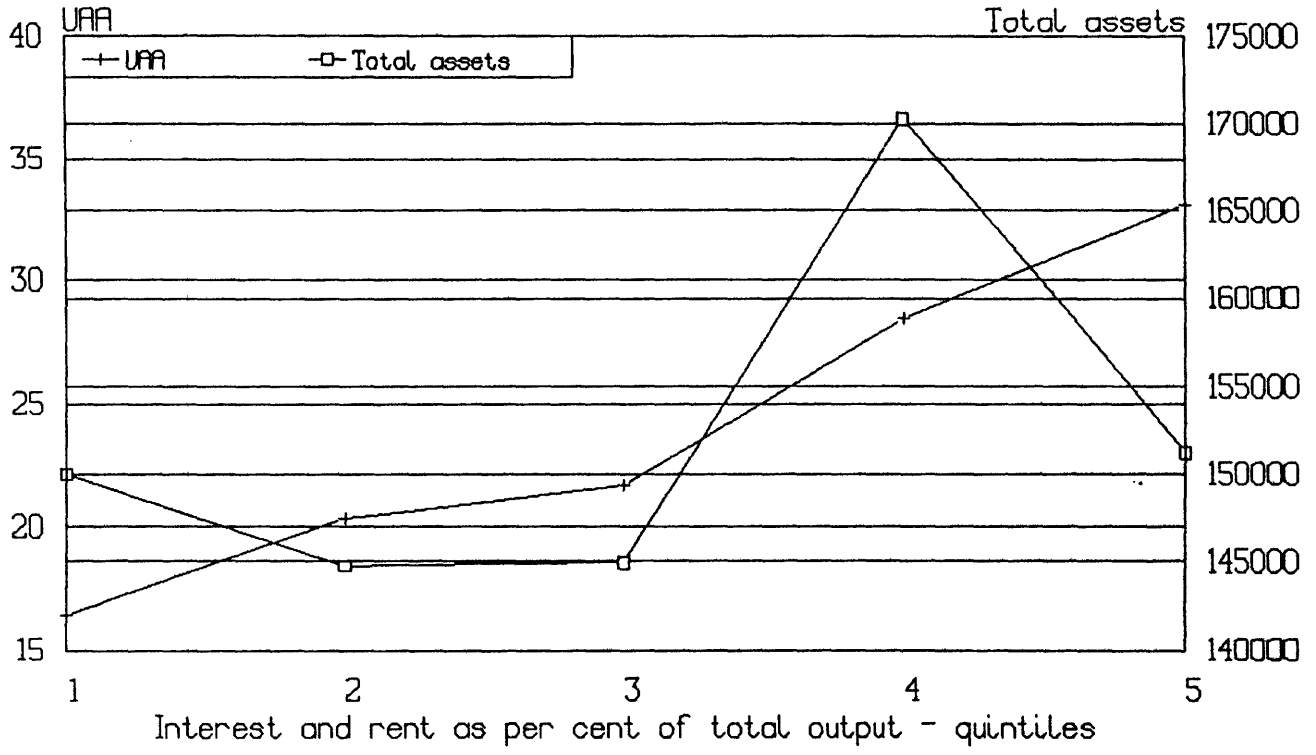


Fig 10.28b Financial status and viability: income measures and total liabilities by interest and rent as a percentage of total output (quintiles)

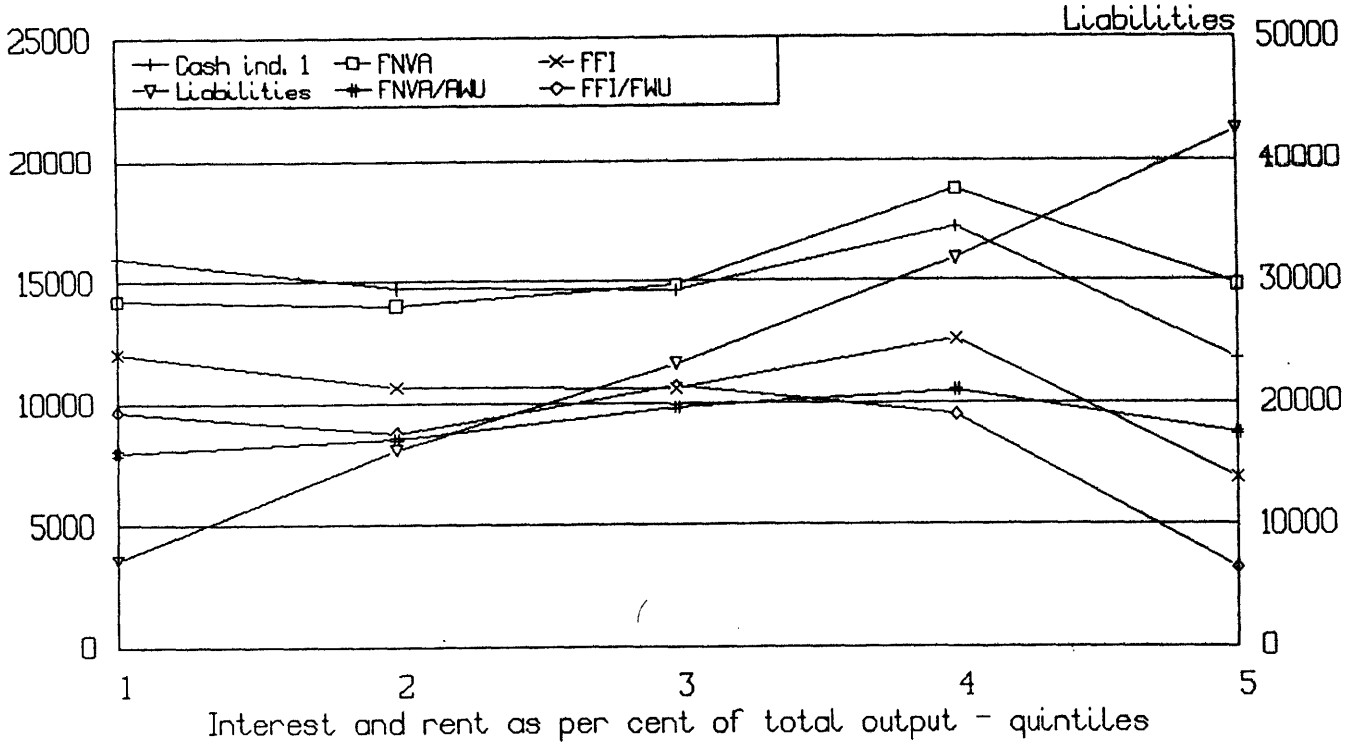
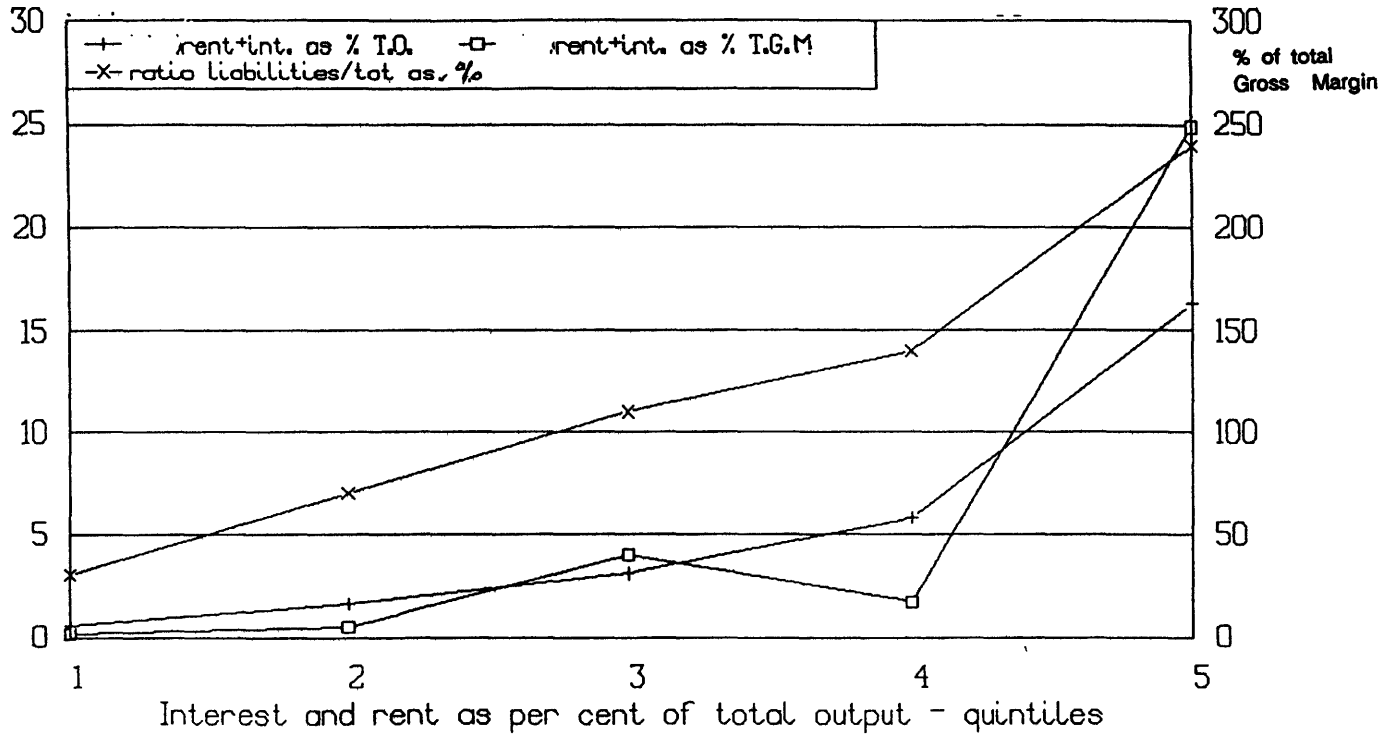


Fig 10.28c Financial status and viability: financial status indicators by interest and rent as a percentage of total output (quintiles)



10.11.5 As a very tentative recommendation, it seems that Interest and rent as a percentage of Total output forms a particularly interesting base for analysis, and therefore should be pursued. There are some problems when interpreting the same elements expressed with respect to Gross margin because the influence of some very atypical figures in a few countries.

10.12 Comparisons using ECU exchange rates and PPS

10.12.1 Chapter 3 (section 7) reported the results of an exploratory comparison by RICA of income levels between Member States using ECU exchange rates and PPS rates. For the average over 1980 to 1982 rankings were changed marginally but not with any clear pattern. A year-by-year comparison for the period 1978-81 showed that using PPS depressed FNVA/AWU in Germany, Netherlands and Denmark. In contrast, Irish and Italian incomes improved greatly. More recently, comparisons of aggregate NVA/AWU by Eurostat found that PPS lessened income disparities between Member States, shifting down the relative income positions of all those countries with an above-average income while improving the others. As part of this present research, comparisons using RICA data for some more recent years were to be made.

10.12.2 Figure 10.29 and 10.30 show FNVA and FFI (per business) expressed in ECU exchange rates and PPS for ten countries averaged over the years 1983/4 to 1987/8. Spain and Portugal are not covered because data were not available for all the years in the series. The Appendix (Figure A10.29) shows the calculations for each year separately. In numerical terms the average FNVA

Fig 10.29 Comparisons between Member States of FNVA using ECU exchange rates and PPS

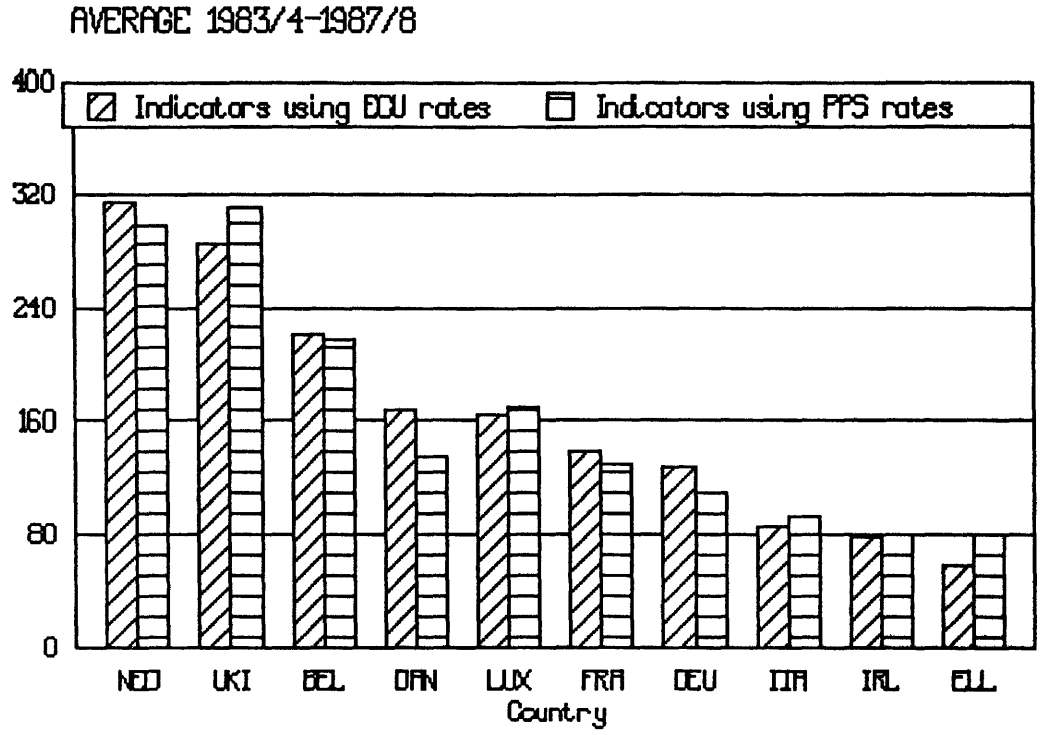
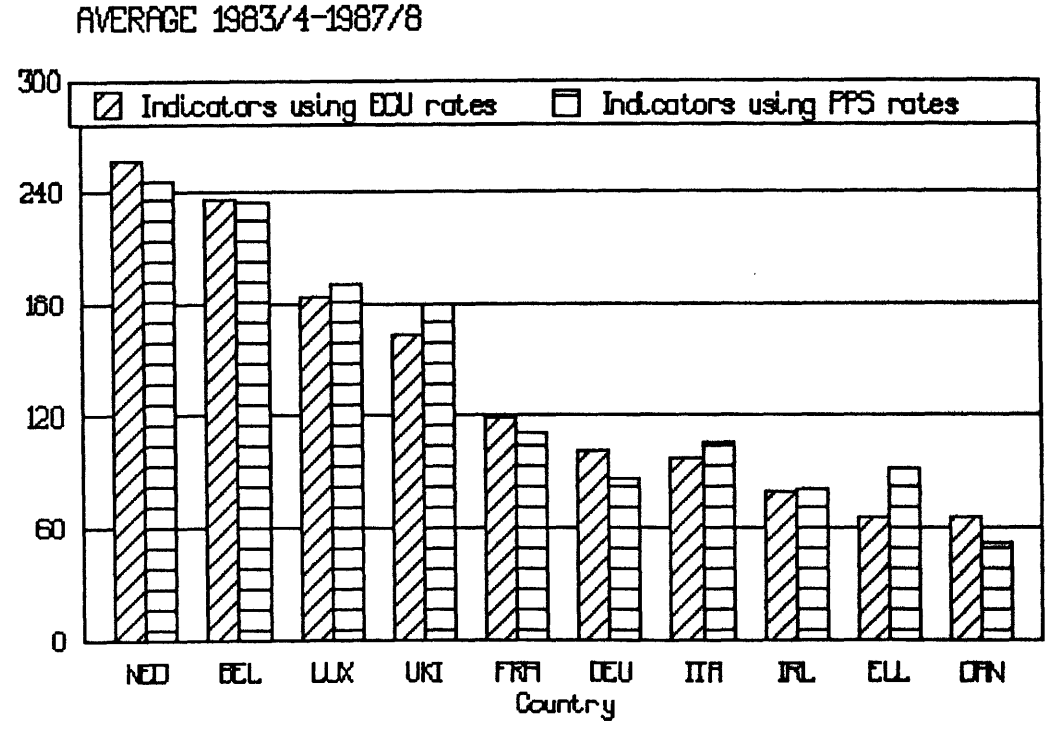


Fig 10.30 Comparisons between Member States of FFI using ECU exchange rates and PPS



in each country is raised by using PPS, except in Denmark, so Figures 10.29 and 10.30 have been converted to EUR=100 to make the relative impact clearer[2]. The tendency is for the countries with levels of FNVA per business lower than the EUR average to show an improved relative position using PPS. For countries above the average the pattern is not consistent; while five of the seven show a reduced relative position, the UK and Luxembourg show improvements. Hence, while the general impact of using PPS rather than ECU exchange rates is to reduce disparities, the pattern was not simple. However, the ranking for the period as a whole is only changed marginally and is limited to adjacent countries changing places.

10.12.3 Comparison of FFIs produces a more marked change in ranking, but confined to the lower levels of FFI. Of the ten countries in the Figures, Greece is moved up two places by using PPS and Germany down two. While there is some tendency for the FFI position of low income countries to be raised by using PPS, this does not apply to Denmark. In FFI terms Denmark is a special case; principally because of the unusually large share of NVA taken by interest payments, it lies bottom of the ten countries shown, compared with fourth on a FNVA (ECU) basis. Ranking was also tried using Cash indicator 3 (the definition already in use by RICA); the order of the top four countries remained unchanged (Netherlands, Belgium, UK, Luxembourg), the next four which have closely similar absolute levels saw some changing of places (France, Denmark, FR Germany, Italy), with Italy improving its position by three places. The bottom two, with smaller absolute amounts, also changed order. The following table shows the impact on ranking position; it also serves as a reminder that, for some countries, ranking by average FNVA is not necessarily a good guide to ranking by FFI or Cash indicator.

Table 10.6 **Rank position of Member States according to selected income criteria and means of conversion (ECU exchange rates and PPS): average for the period 1983/4 to 1987/8**

Country	FNVA (ECU)	FNVA (PPS)	FFI (ECU)	FFI (PPS)	CI-3 (ECU)	CI-3 (PPS)
Netherlands	1	2	1	1	1	1
United Kingdom	2	1	4	4	3	3
Belgium	3	3	2	2	2	2
Denmark	4	5	10	10	6	7
Luxembourg	5	4	3	3	4	4
France	6	6	5	5	5	6
FR Germany	7	7	6	8	7	8
Italy	8	8	7	6	8	5
Ireland	9	10	8	9	9	10
Greece	10	9	9	7	10	9

[2]The EUR average covered EUR10 for 1983/4 and 1984/5, EUR11 for 1986/6 (Spain is not included) and EUR12 for 1986/7 and 1987/8. These differences did not affect the issue of ranking, but the relatively high index numbers of most of the countries reflect the inclusion of Spain and Portugal in the latter years.

10.12.4 Comparing the time series for FNVA using ECU exchange rates and PPS (in the Appendix) finds only small differences in the patterns appearing. Among the countries with the highest FNVA, the use of PPS shows the UK at the end of the period to be at a similar level to the Netherlands, whereas the ECU exchange rate shows it to be lower; in both series there was a relative decline in the UK's position relative to the Netherlands. Greece holds the lowest position in all years on the ECU basis, but, using PPS, Ireland takes this position for three of the five years. As noted above in the whole-period averages, the relative position of Greece is increased by using PPS, and this improvement is seen in each year.

10.12.5 The time-series patterns described for FFI over the period are essentially the same on either basis; both show the dip in income felt by the UK in 1985/6 and the sustained decline seen in Denmark from 1984/5. Greece again increases its relative position with PPS conversion. Two further possibilities remain; that the use of PPS in place of ECU exchange rates could affect the distribution of incomes within years, and the choice might have some impact on the development of incomes over time for farms at different positions in the income spectrum. These issues have not been explored.

10.12.6 Summing up, the use of ECU exchange rates or PPS to permit national results to be placed on a common base does not seem to be critical in affecting the broad patterns shown in the results. As might be expected, where there are substantial differences between ECU exchange rates and PPS, there is some impact on the relative position of Member States. Thus the position of Greece is enhanced using PPS. However, in most instances the order of ranking is only changed marginally.

APPENDIX TO CHAPTER 10

This appendix contains Figures referred to in the main text. Each Figure consists of a number of graphs relating to different farming types, or other breakdown.

Figure A10.3	Cash-flow indicators by type of farming (selected) by ESU size group
Figure A10.5	Farm level indicators by type of farming and ESU size group
Figure A10.8	Income measures per Work Unit by type of farming by ESU size group
Figure A10.11	Efficiency indicators (various) by ESU size group and type of farming
Figure A10.20	FFI by three measures of business size
Figure A10.23	Income measures by family and other status by type of farming
Figure A10.25	Income measures by level of performance and country
Figure A10.28	Business parameters by level of rent and interest as a percentage of Gross Margin
Figure A10.29	Comparison of FNVA and FFI between Member States in each year 1983/4 to 1987/8 using ECU exchange rates and PPS

Fig A10.3a

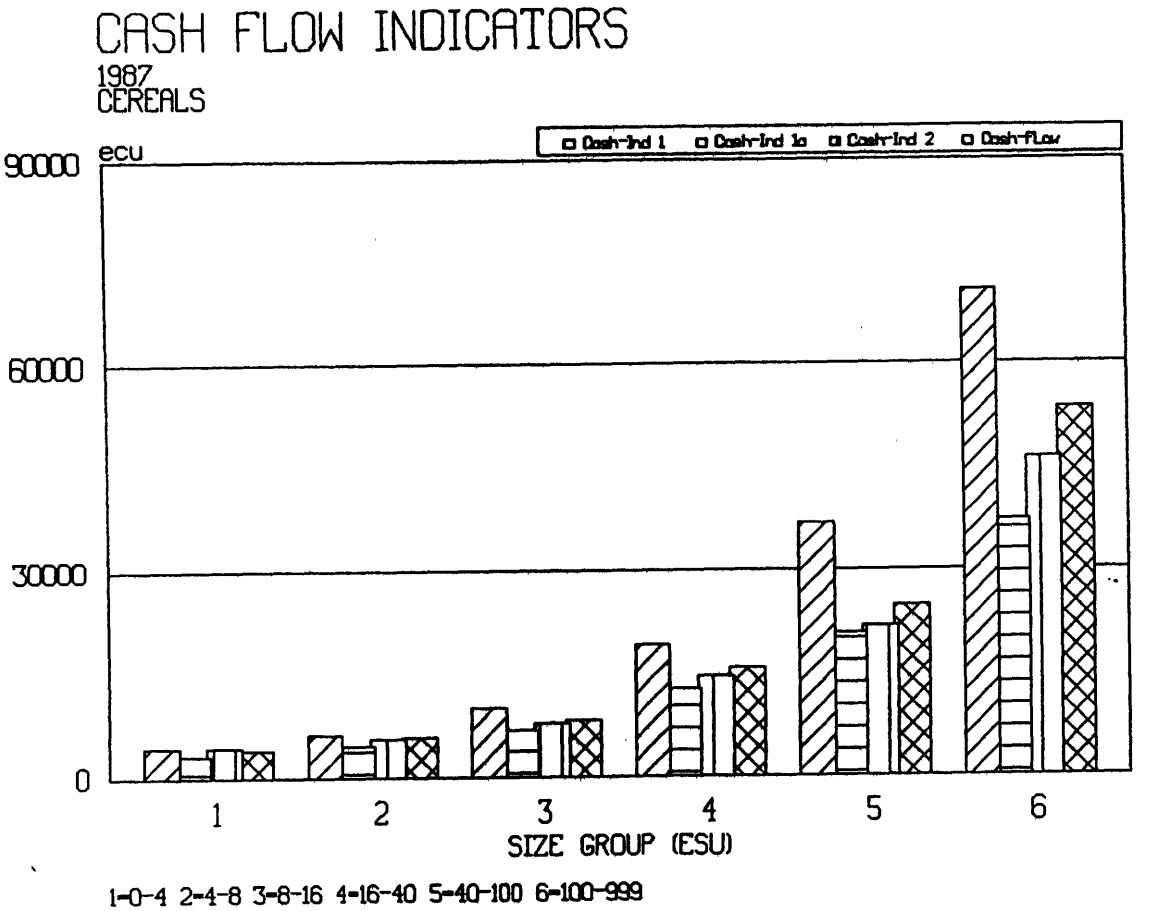


Fig A10.3b

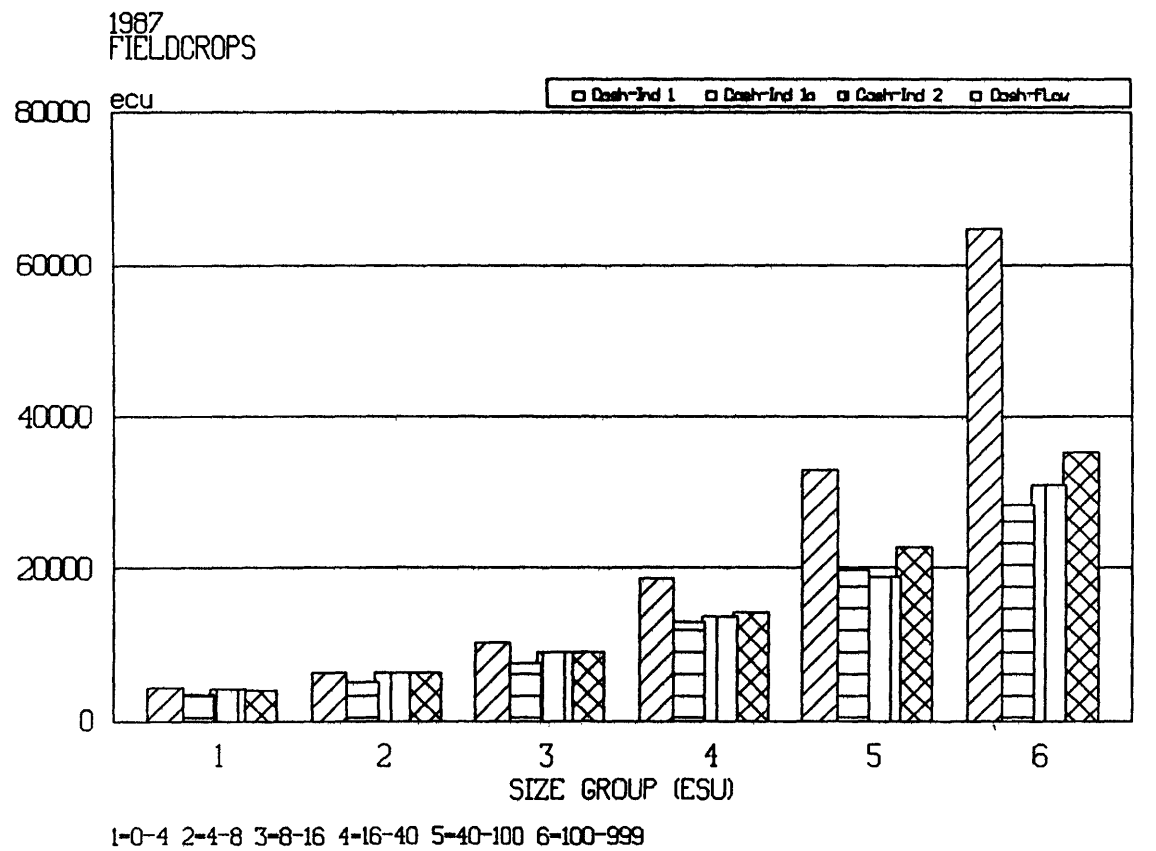


Fig A10.3c

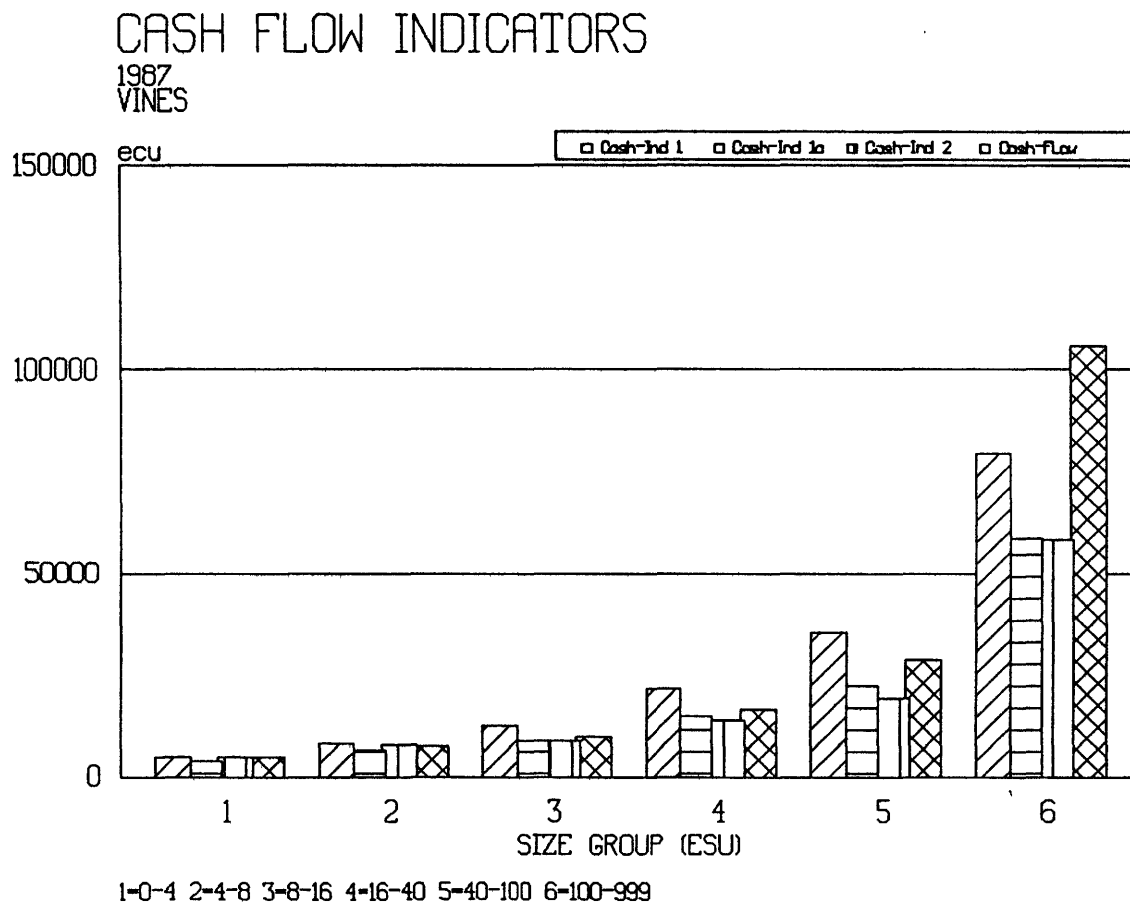

CASH FLOW INDICATORS
1987
VINES
ecu
Cash-Ind 1
Cash-Ind 1a
Cash-Ind 2
Cash-Flow
150000
100000
50000
0
1
2
3
4
5
6
SIZE GROUP (ESU)
1=0-4 2=4-8 3=8-16 4=16-40 5=40-100 6=100-999

Fig A10.3d

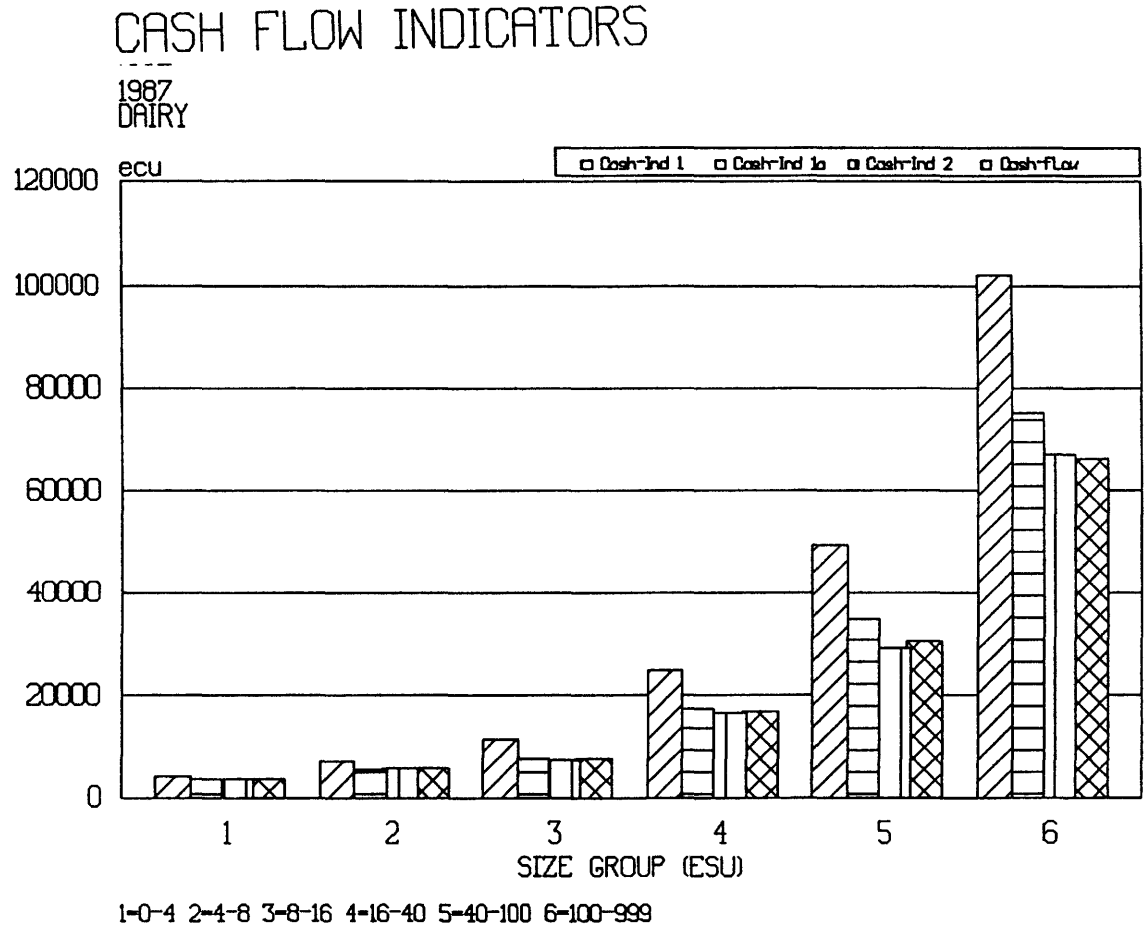


Fig A10.3e

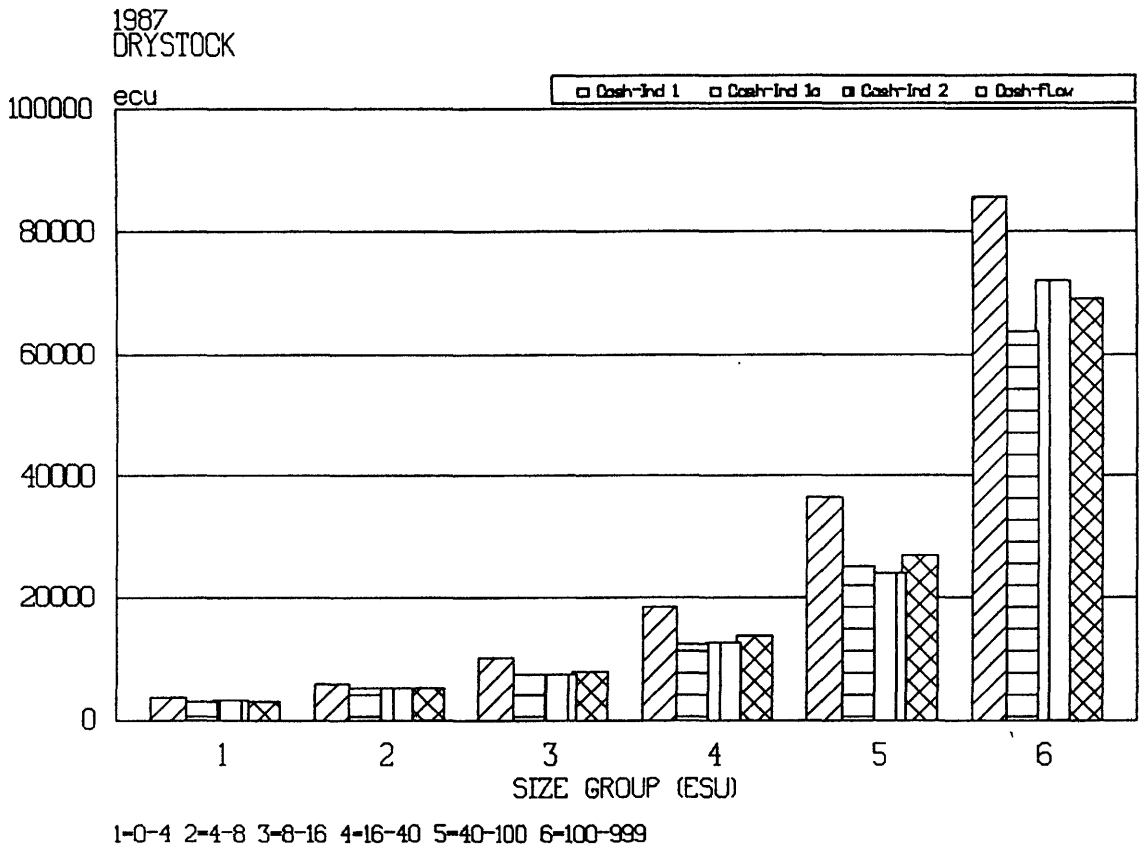


Fig A10.5a

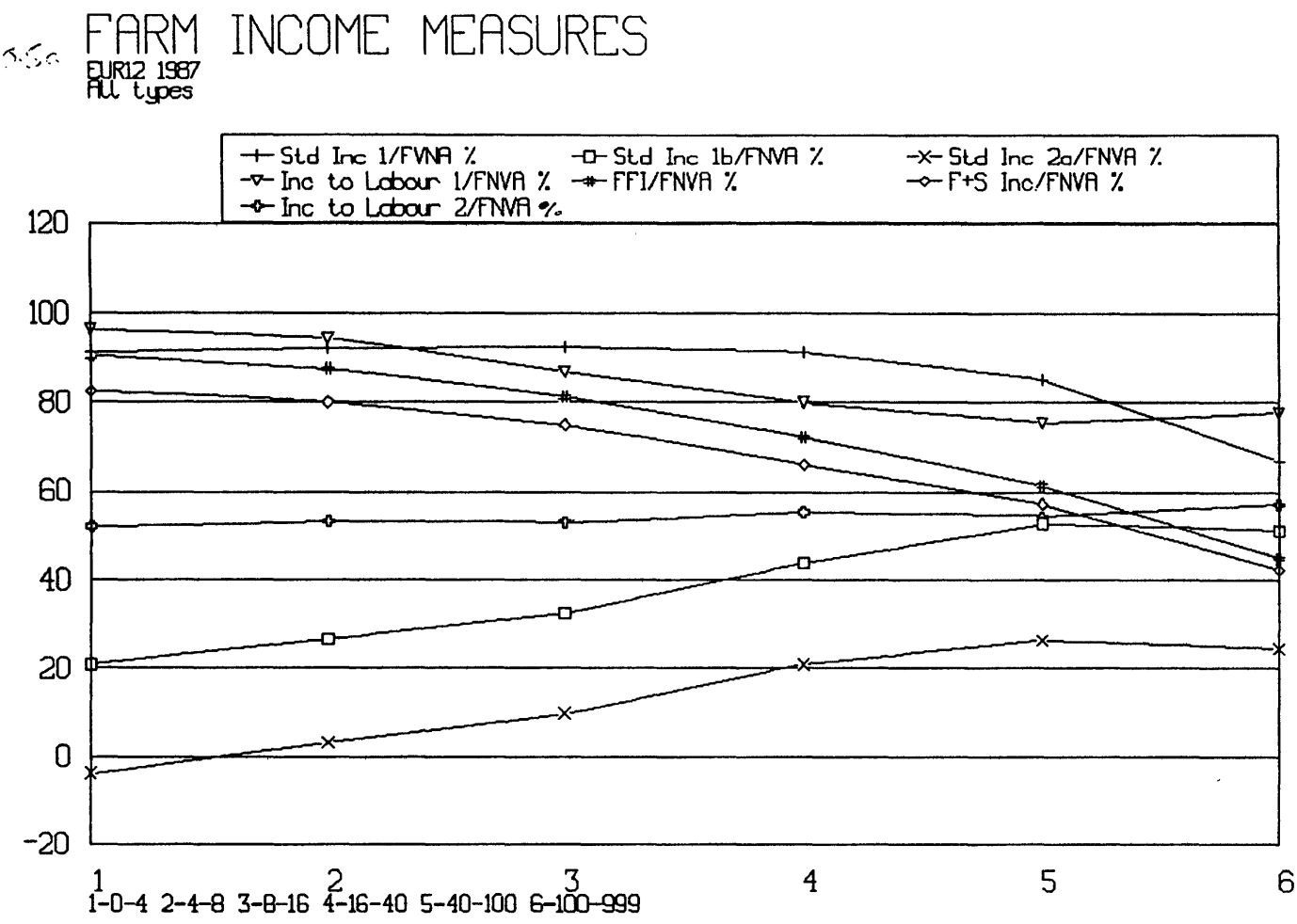


Fig A10.5b

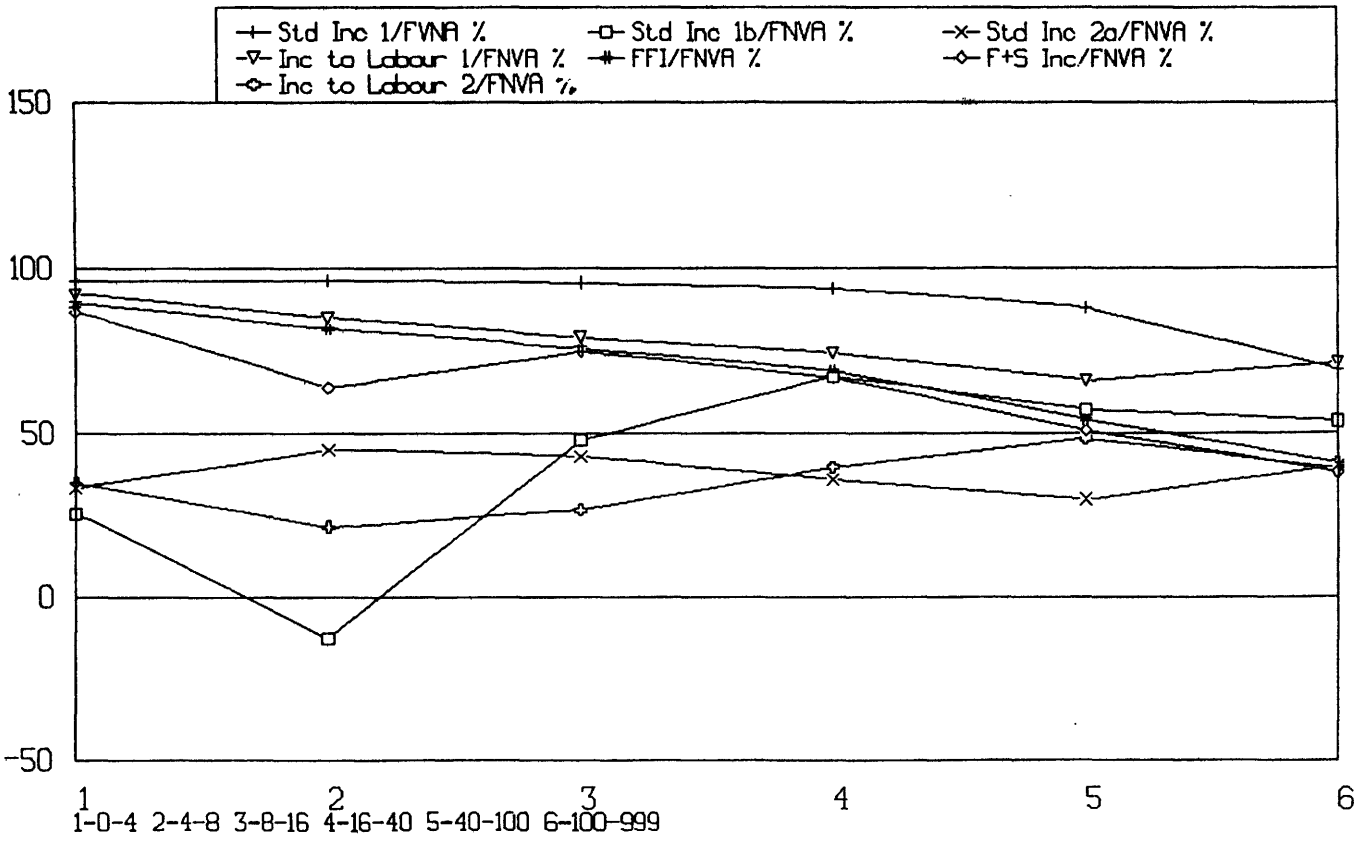


Fig A10.5c

FARM INCOME MEASURES

EUR12 1987
General cropping

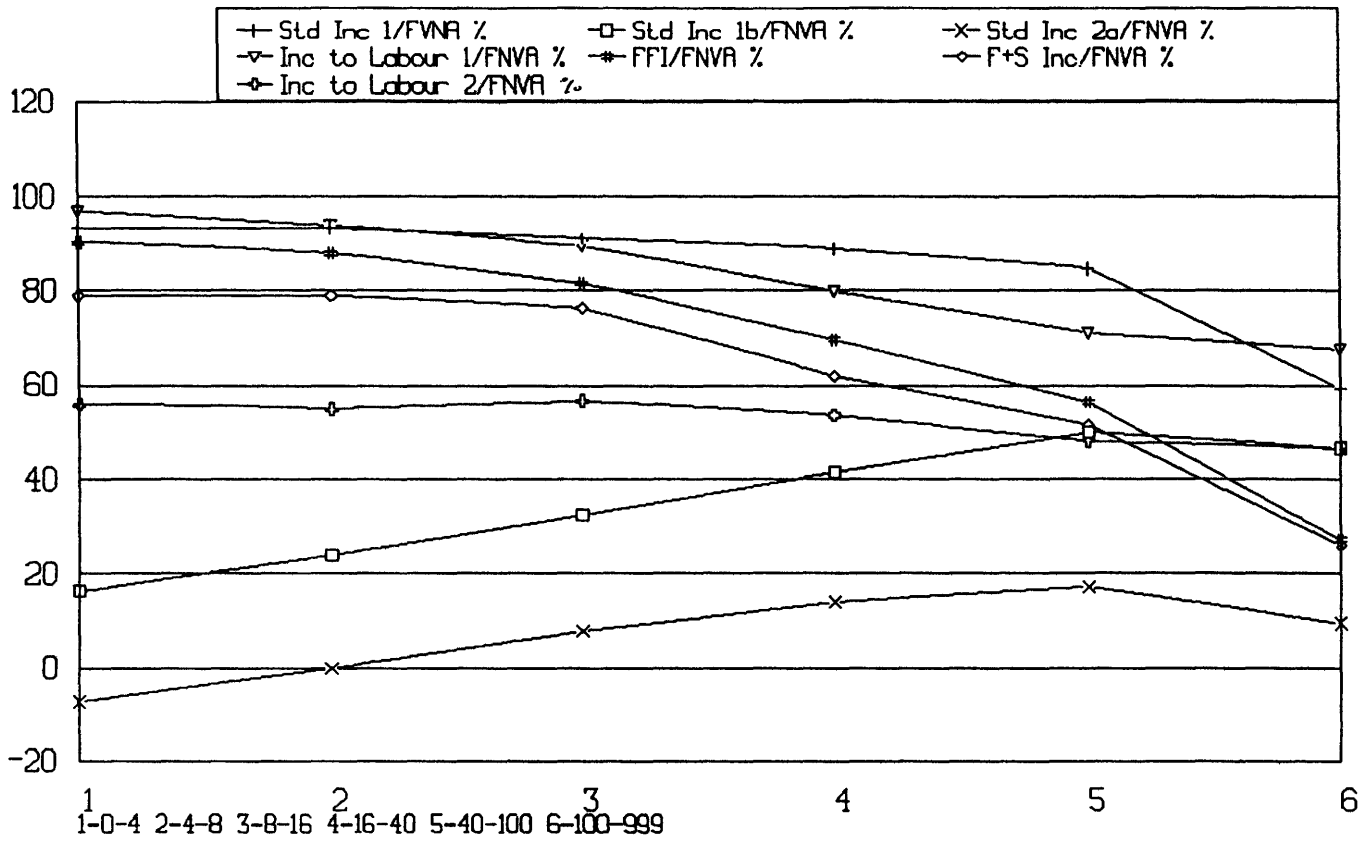


Fig A10.5d

EUR12 1987
Horticulture

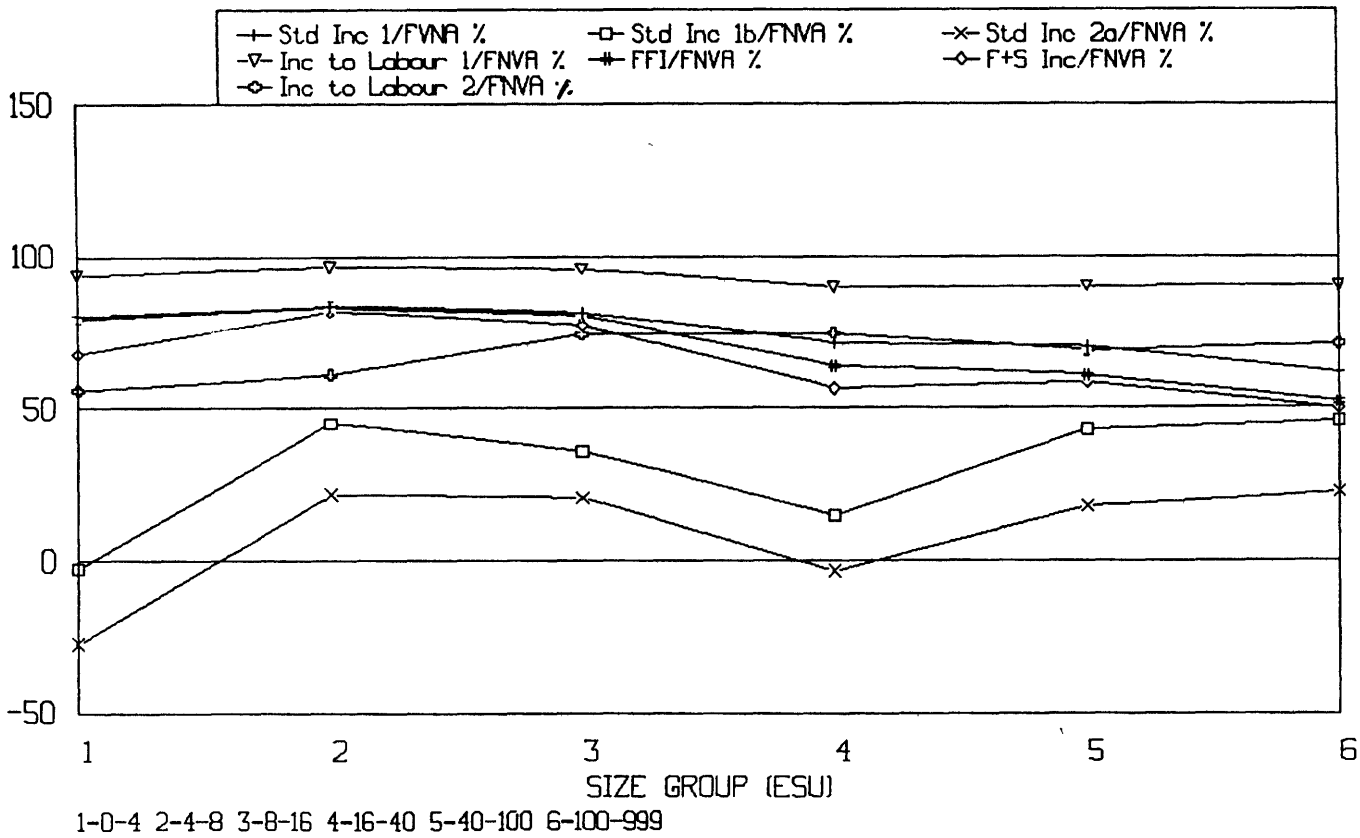


Fig A10.5e

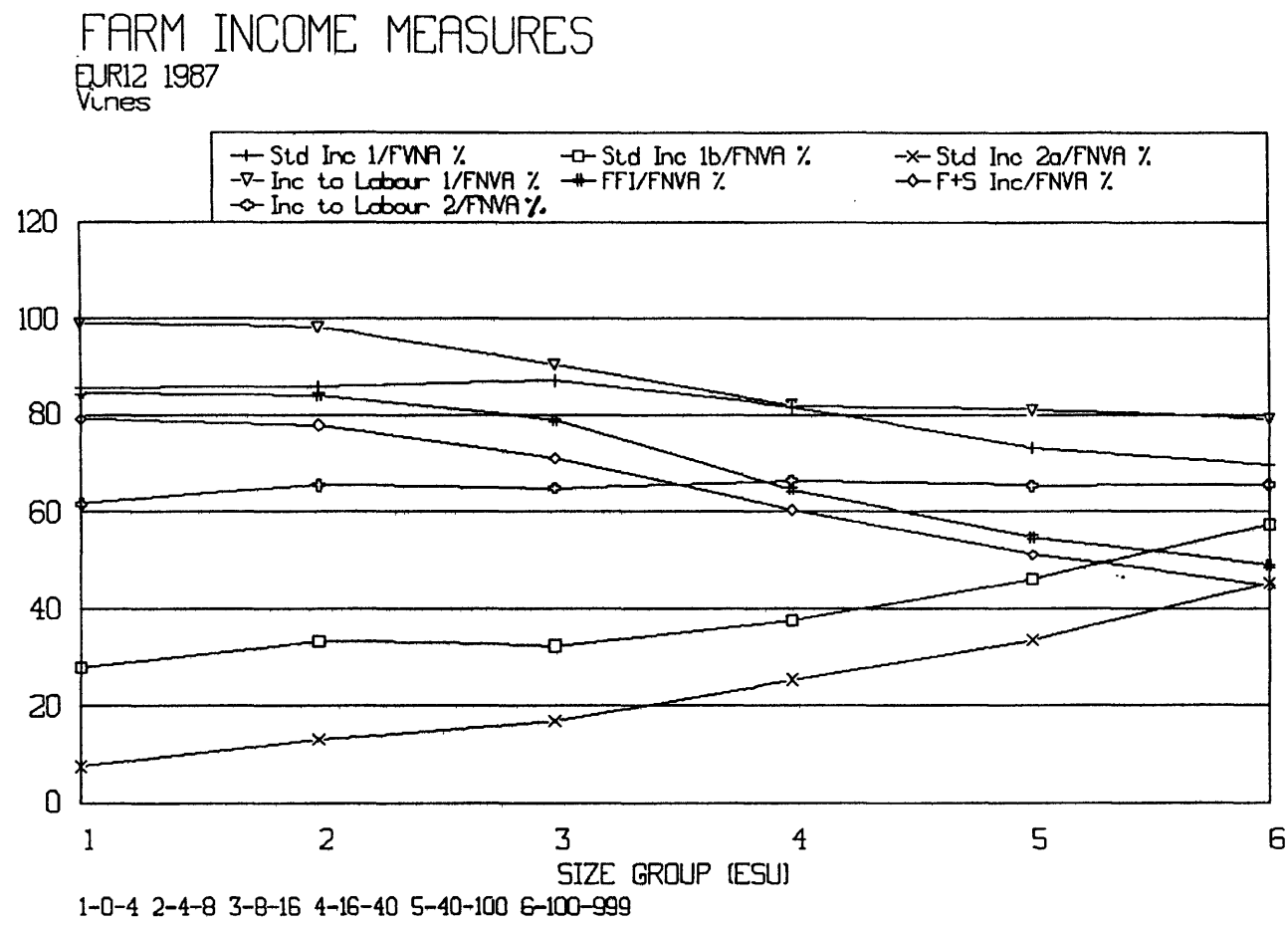


Fig A10.5f

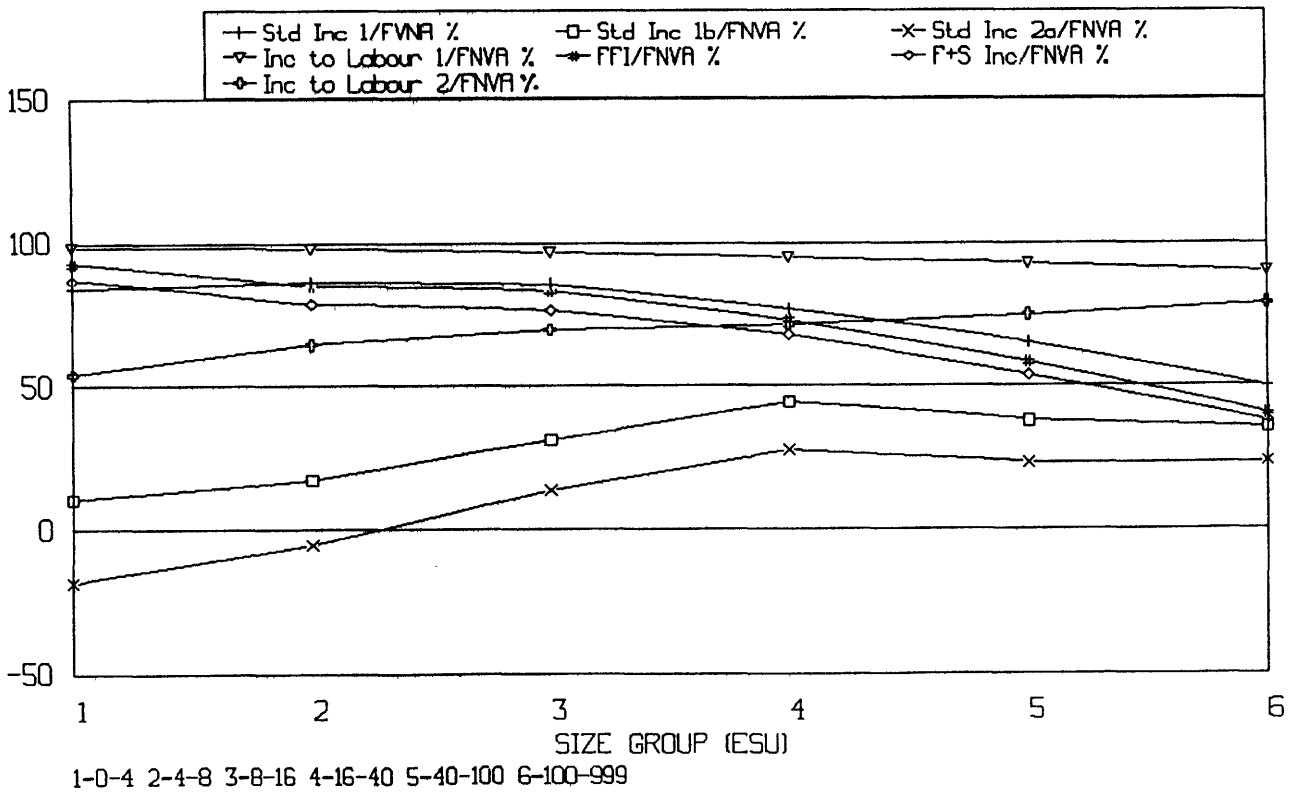


Fig A10.5g

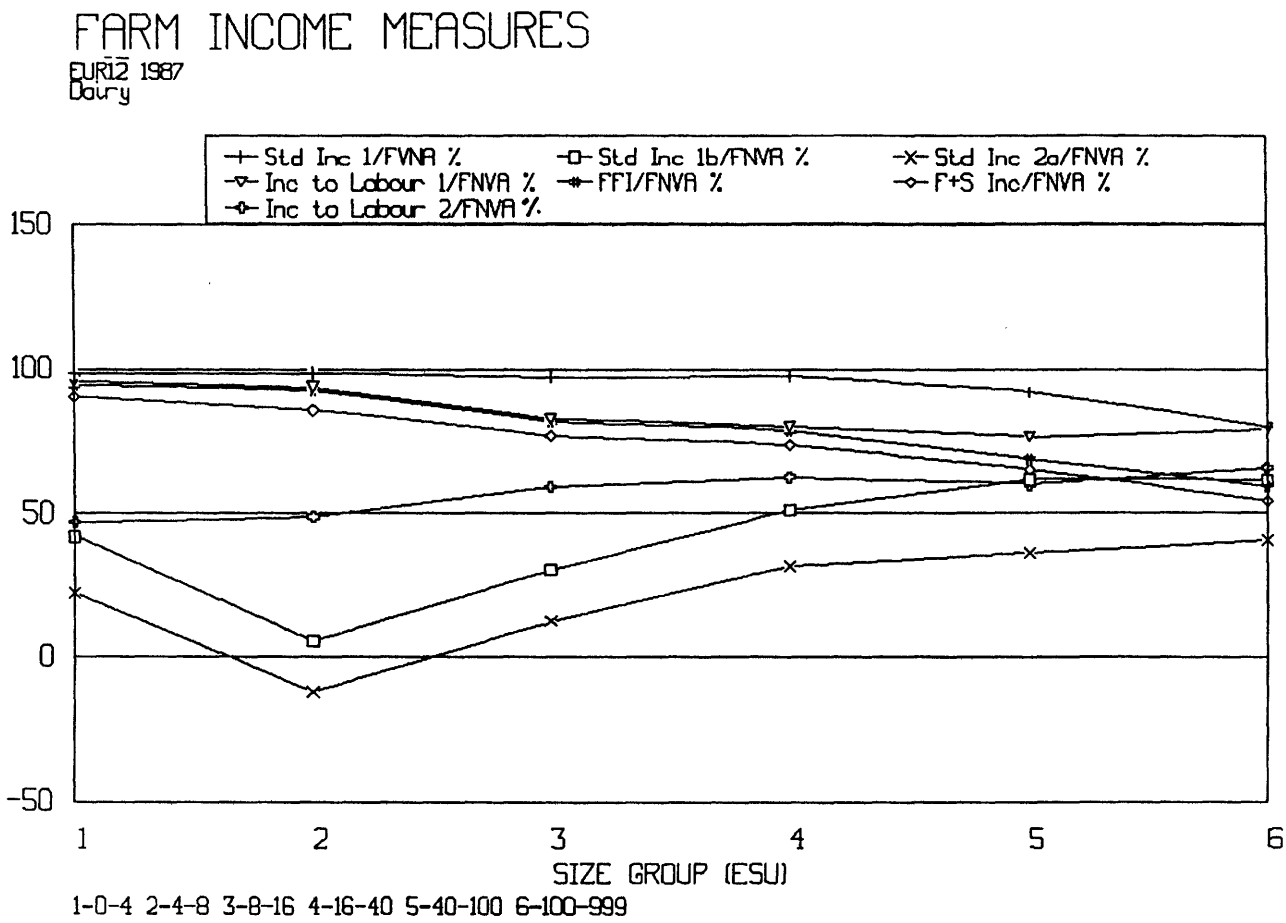


Fig A10.5h

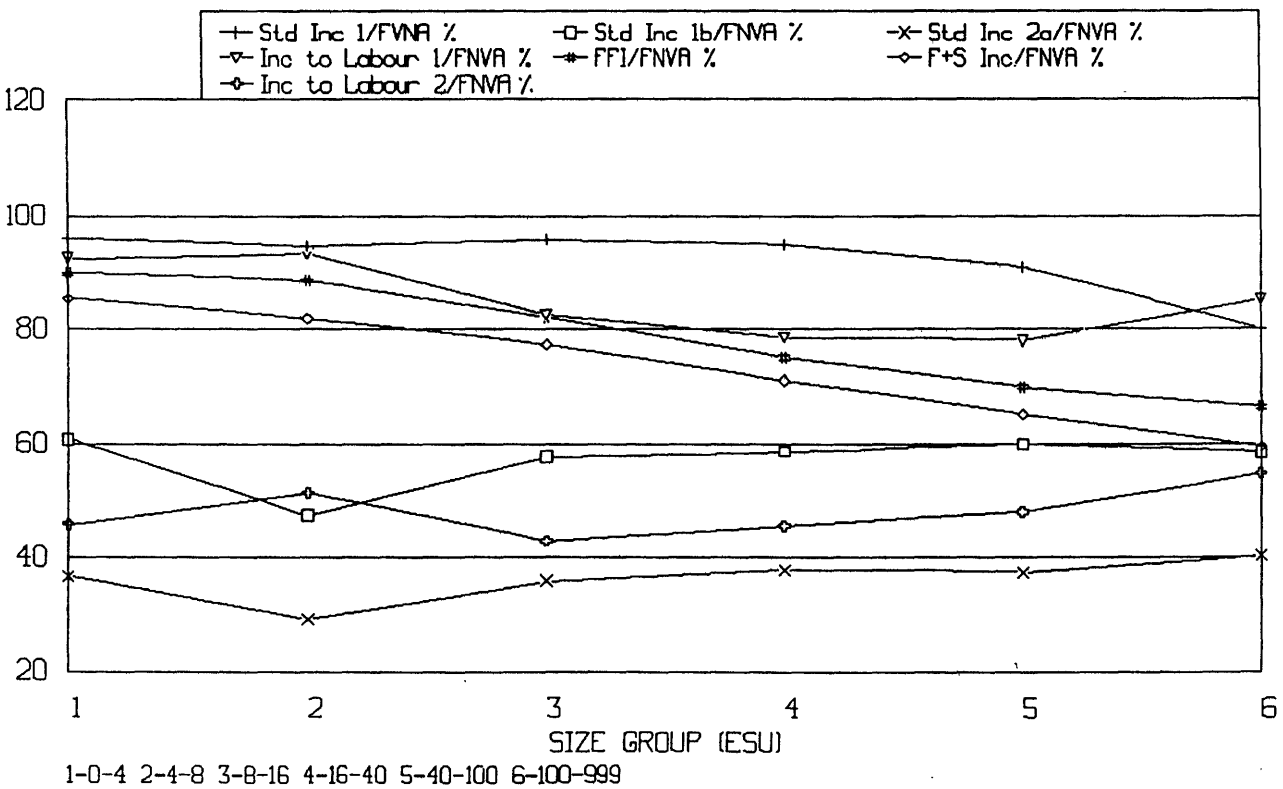


Fig A10.5i

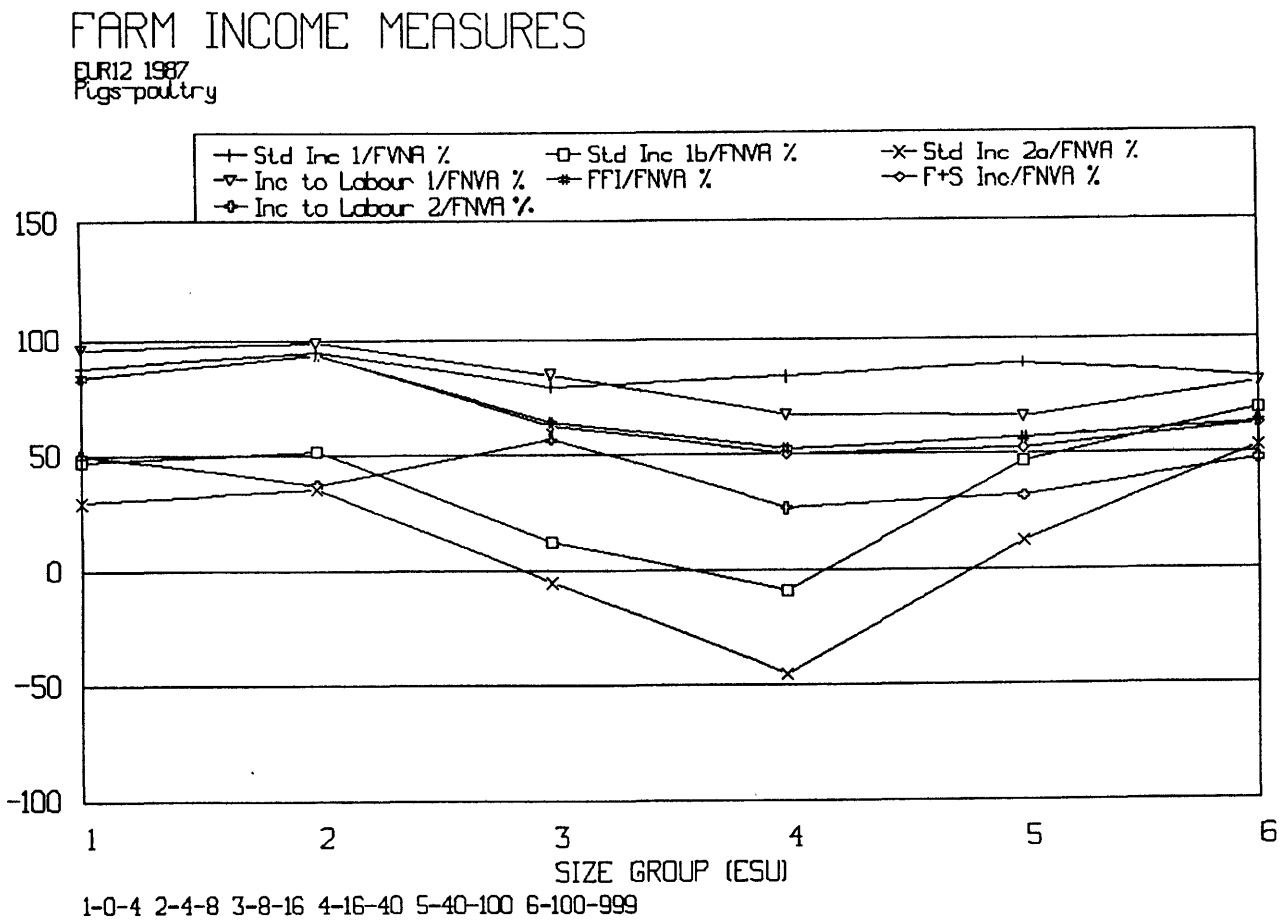


Fig A10.5j

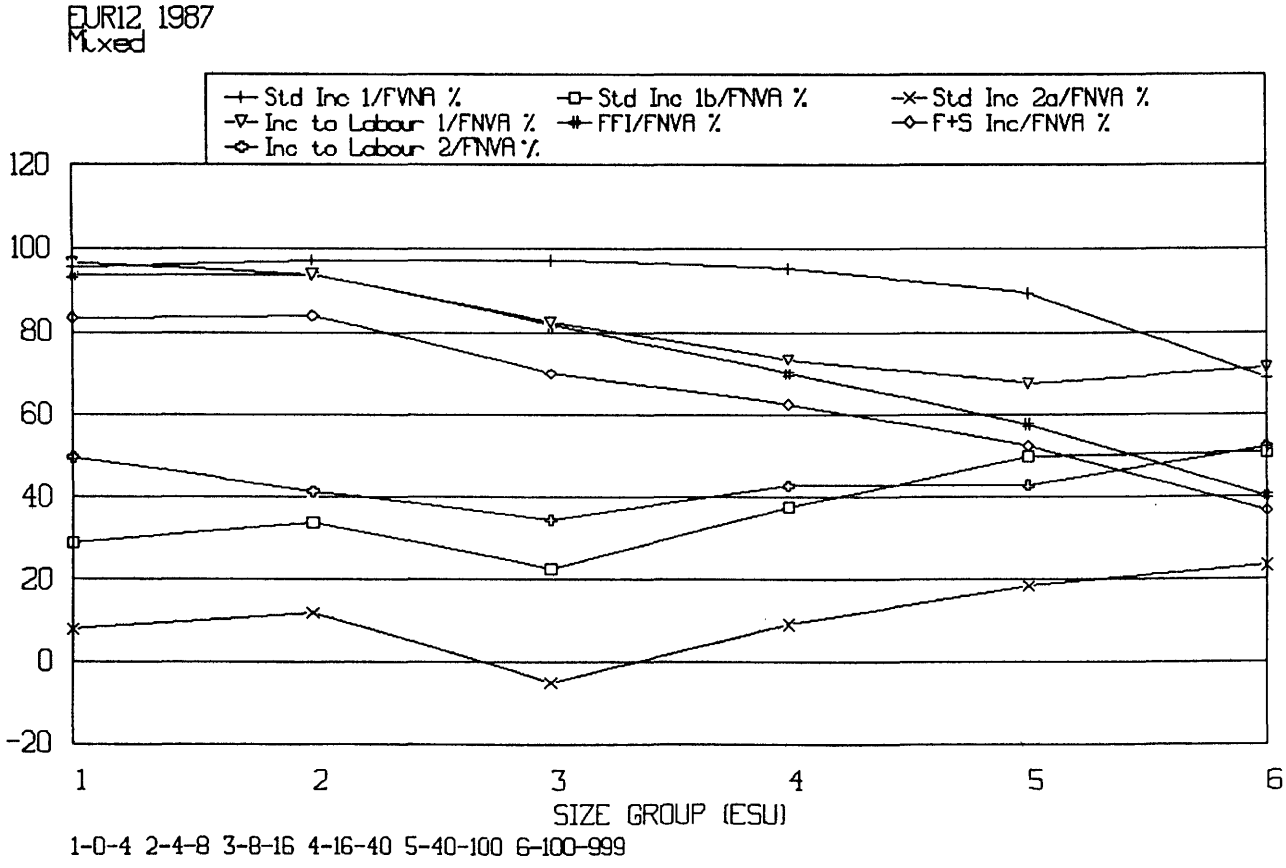


Fig A10.8a

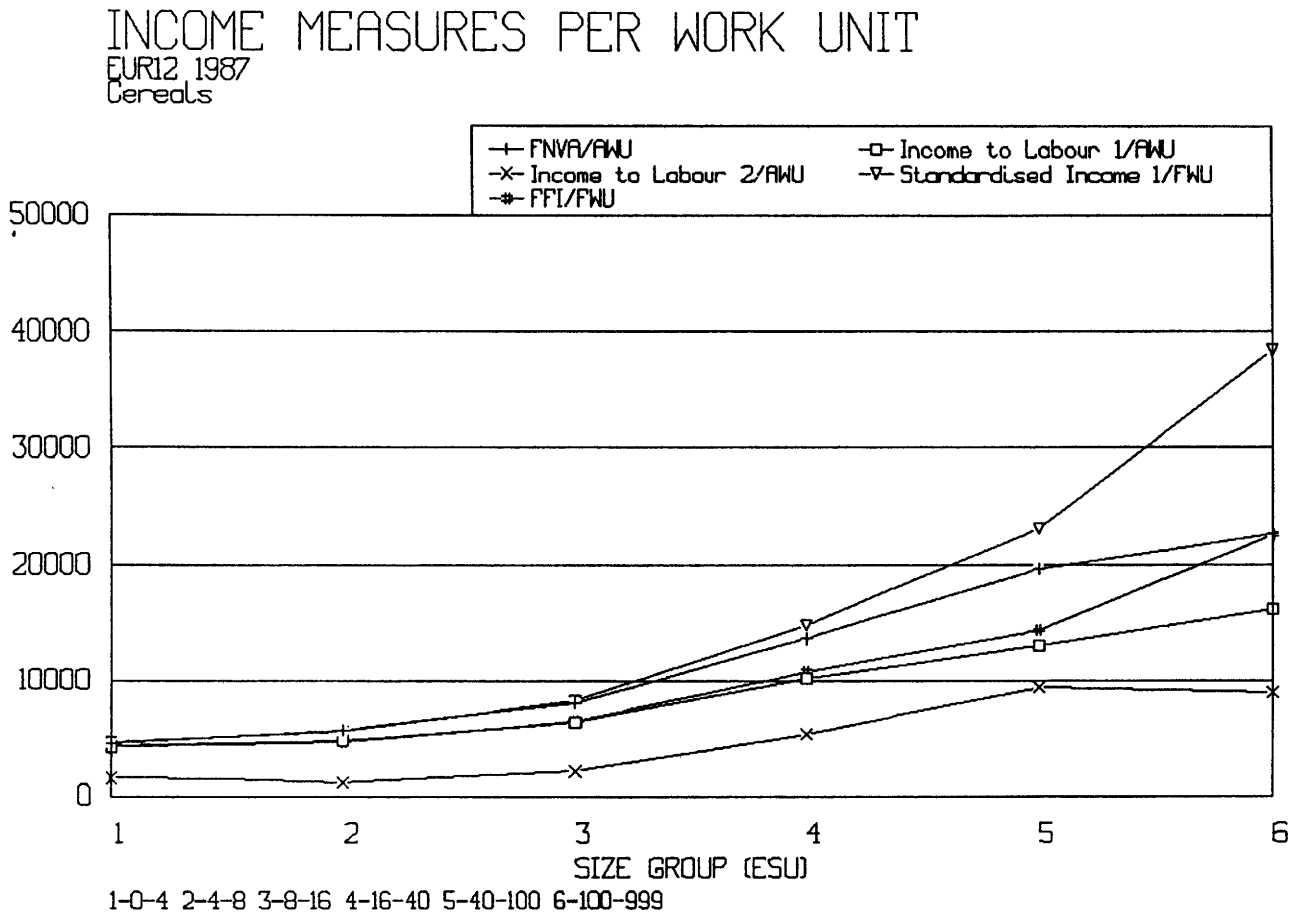


Fig A10.8b

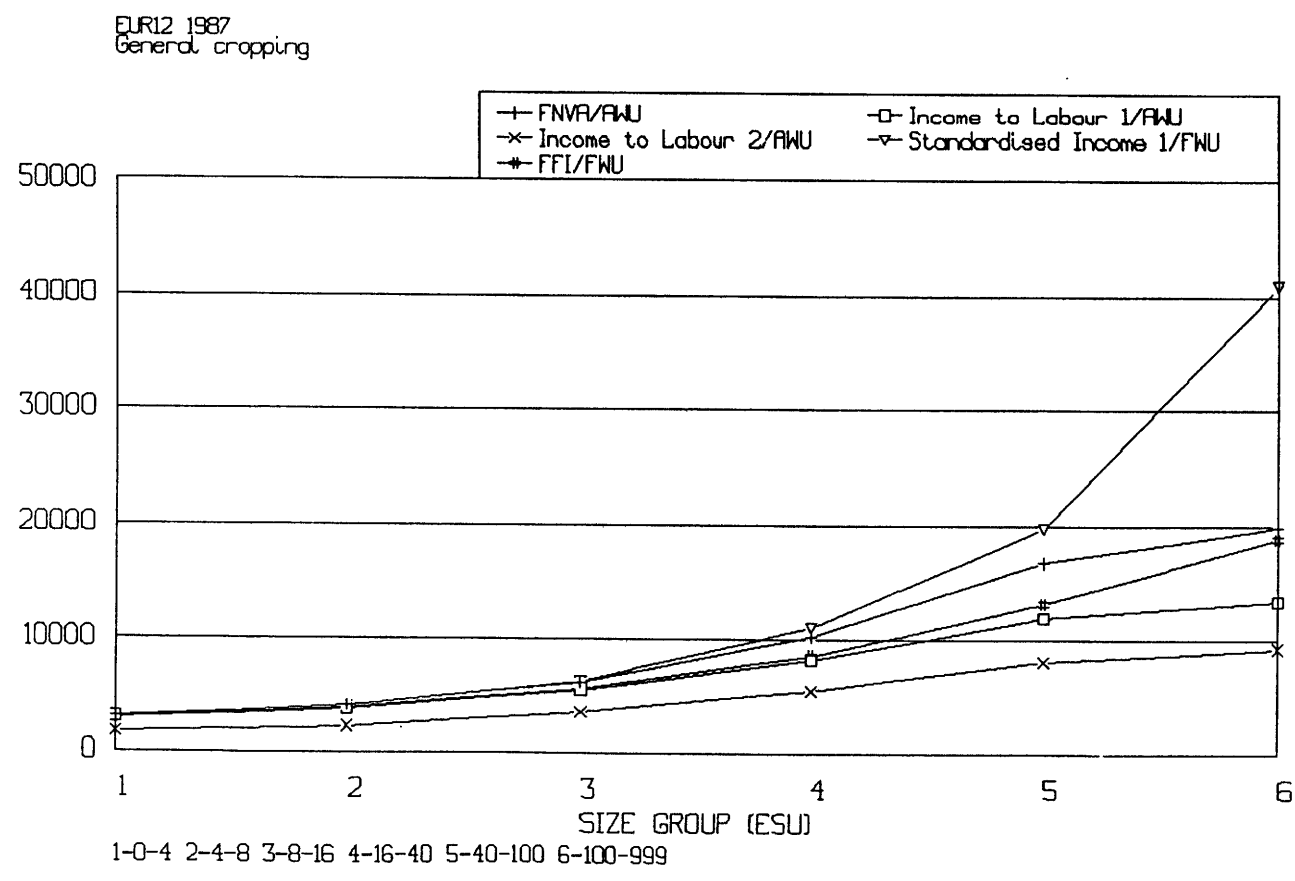


Fig A10.8c

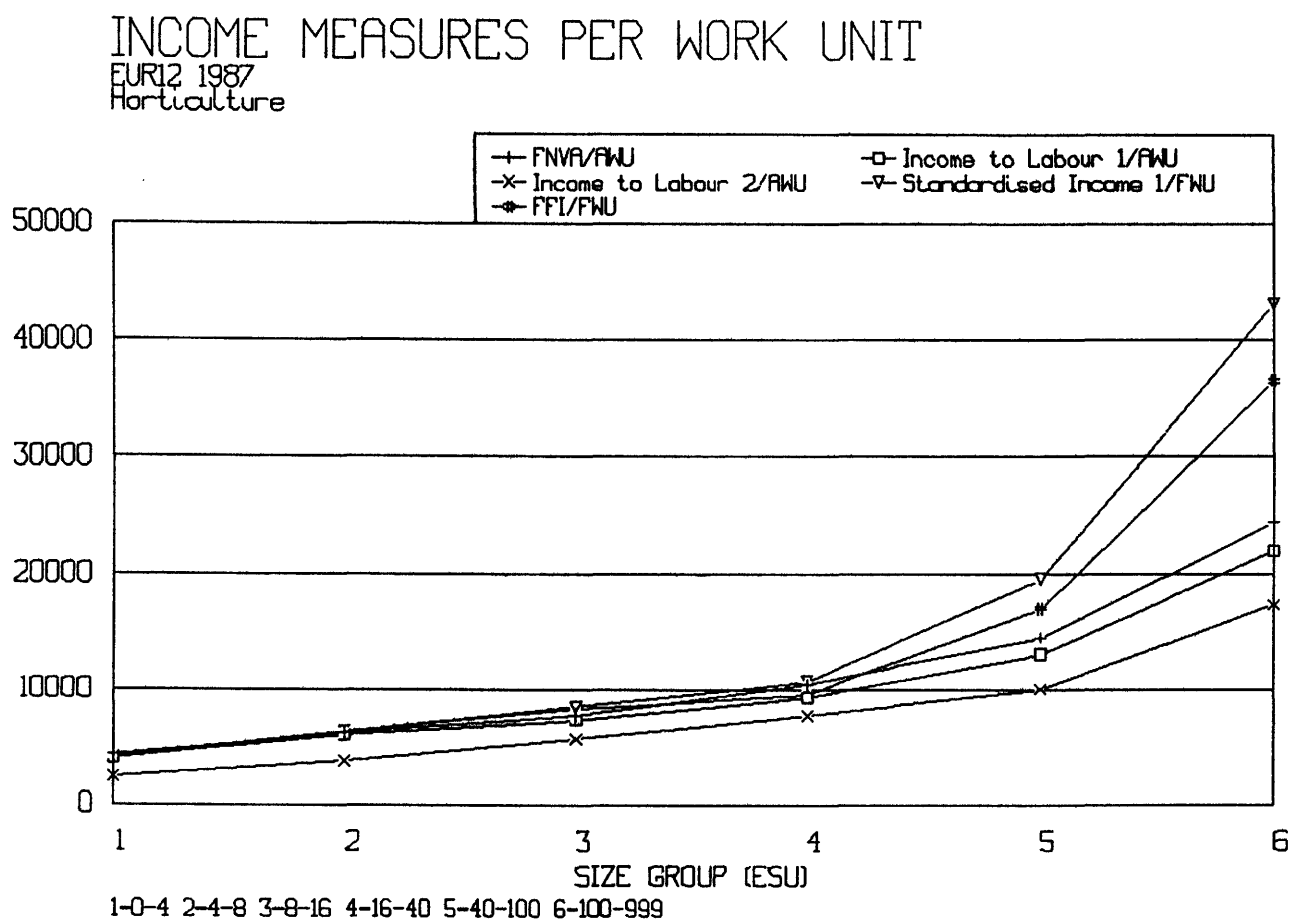


Fig A10.8d

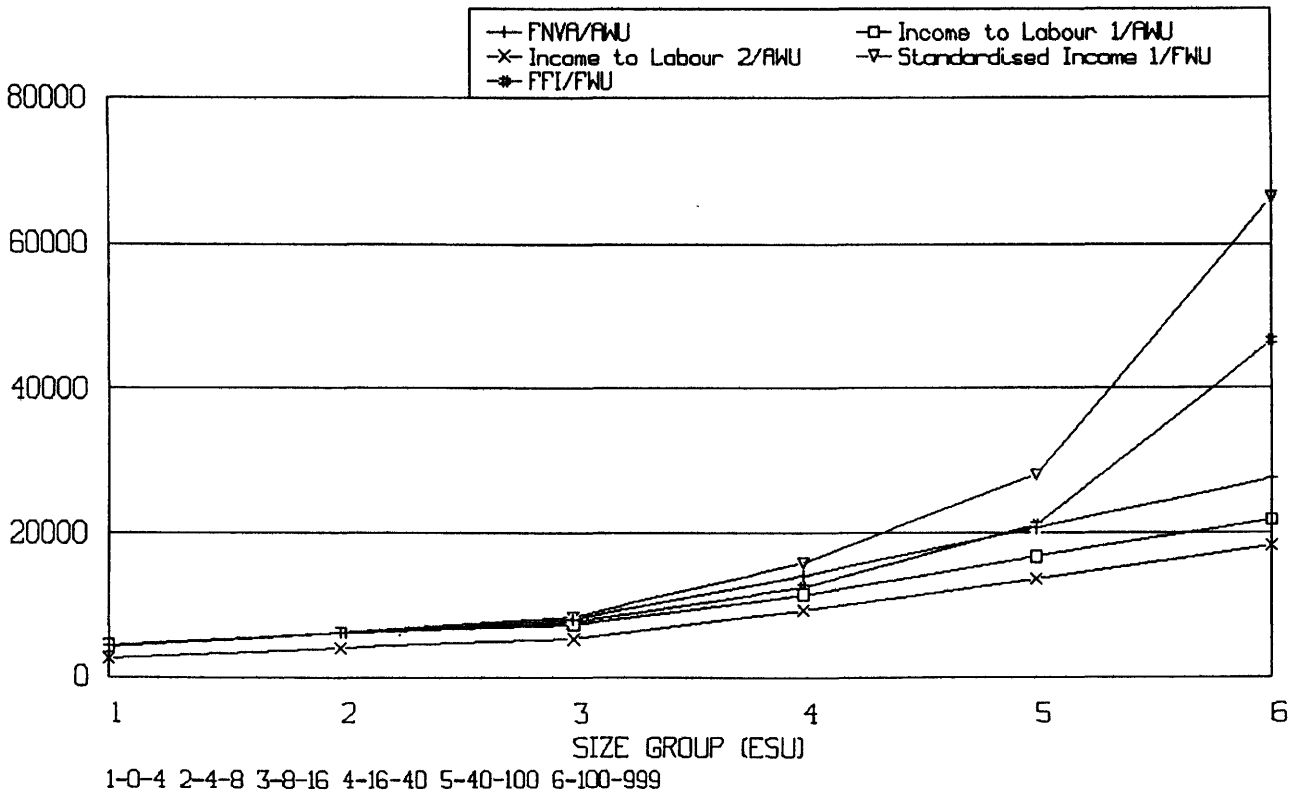


Fig A10.8e

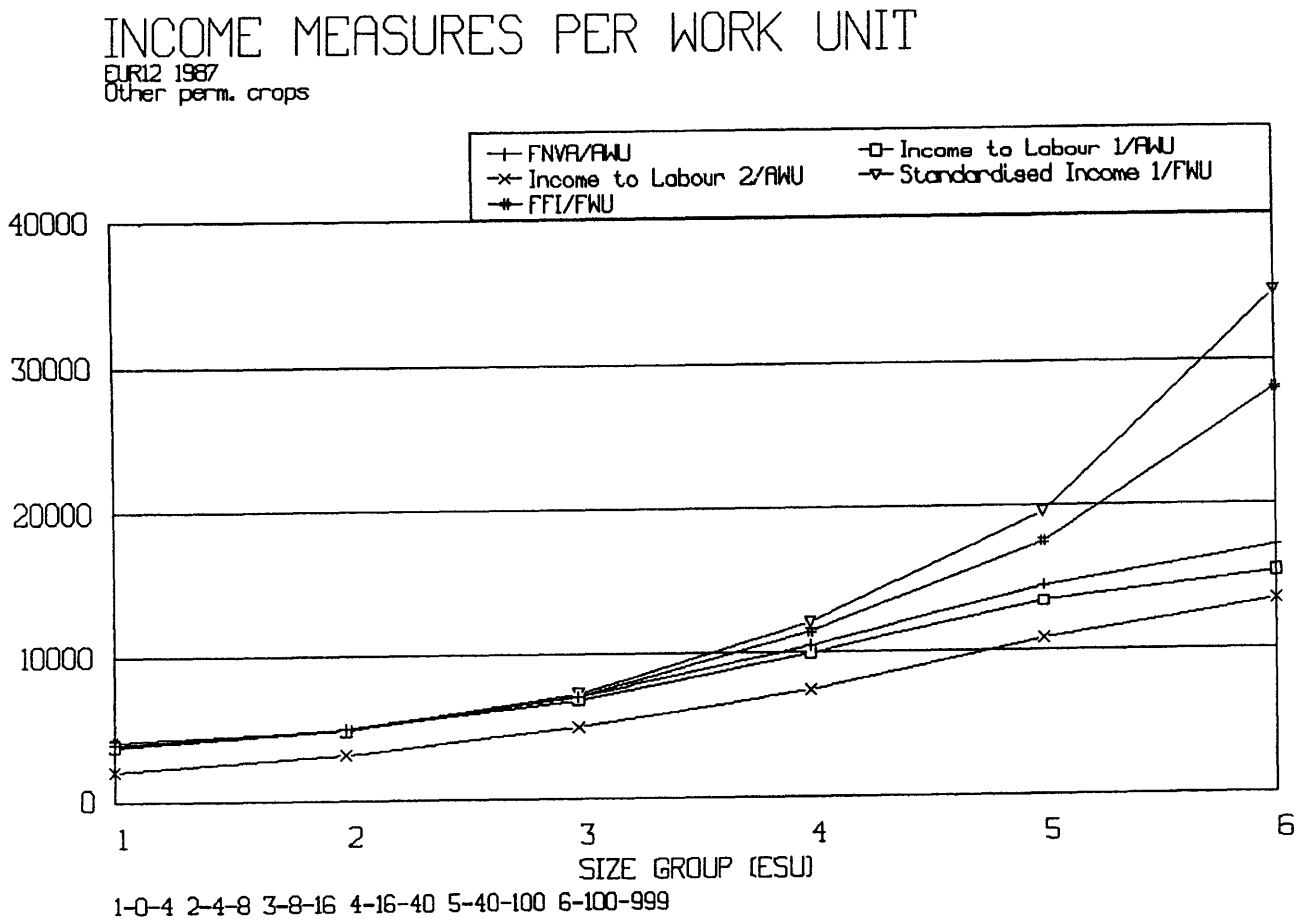


Fig A10.8f

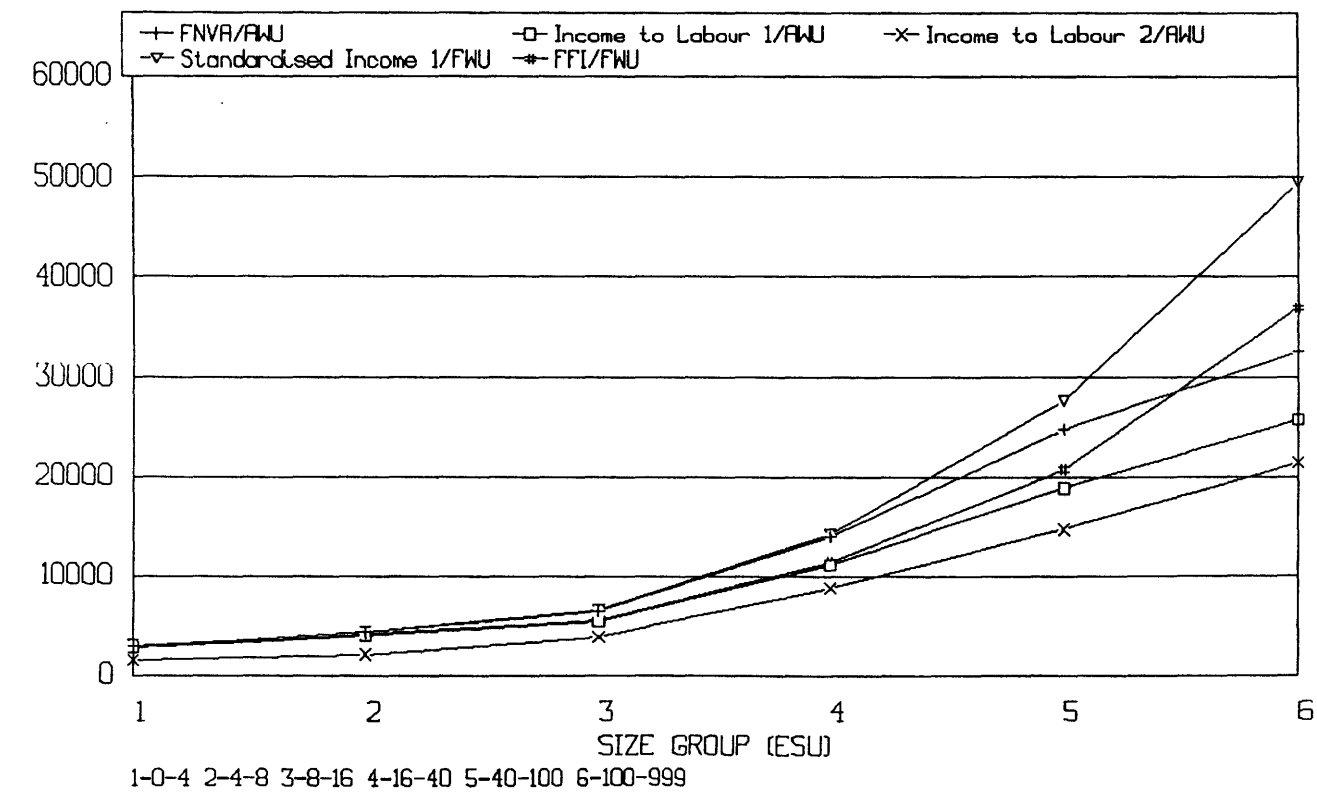


Fig A10.8g

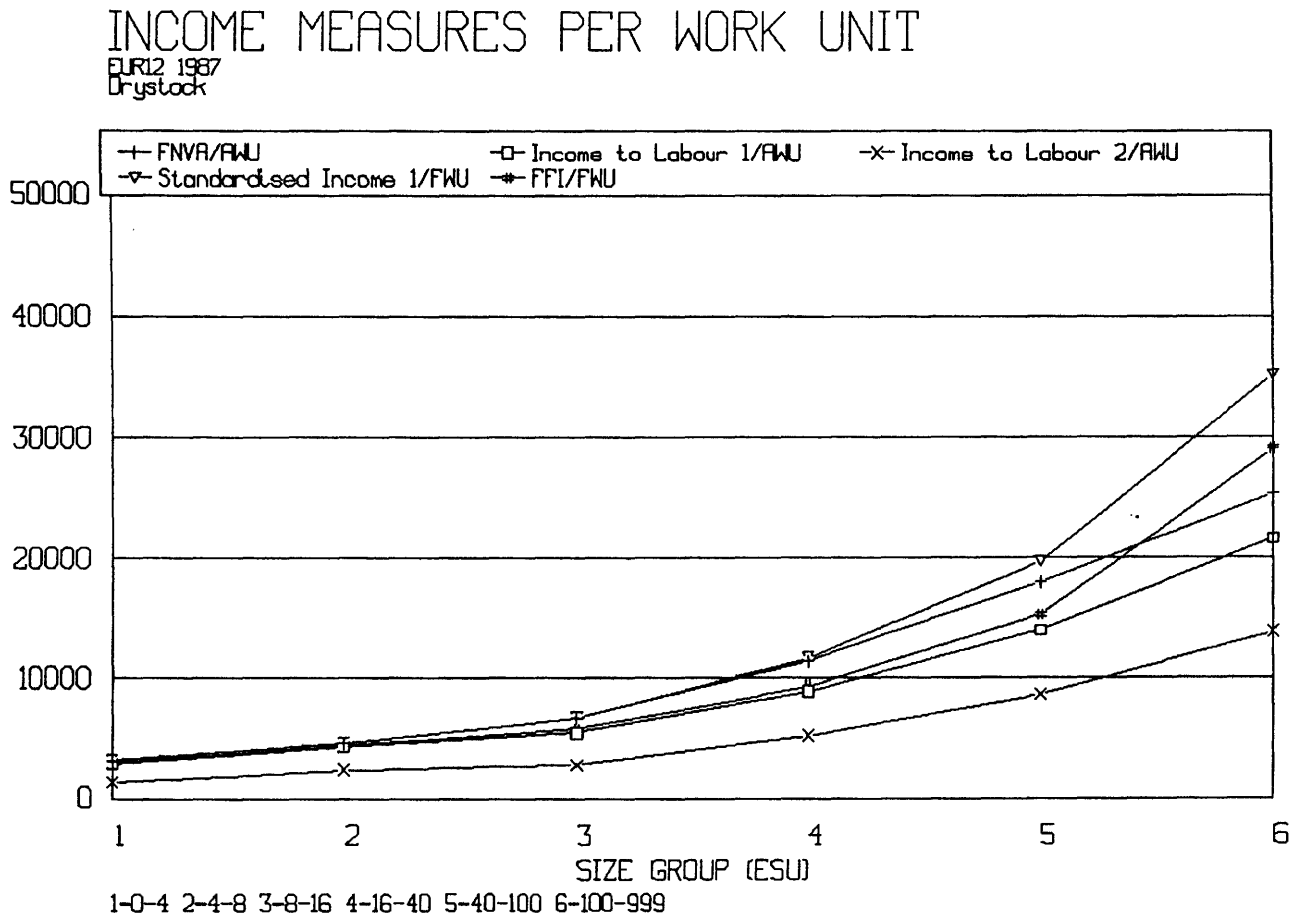


Fig A10.8h

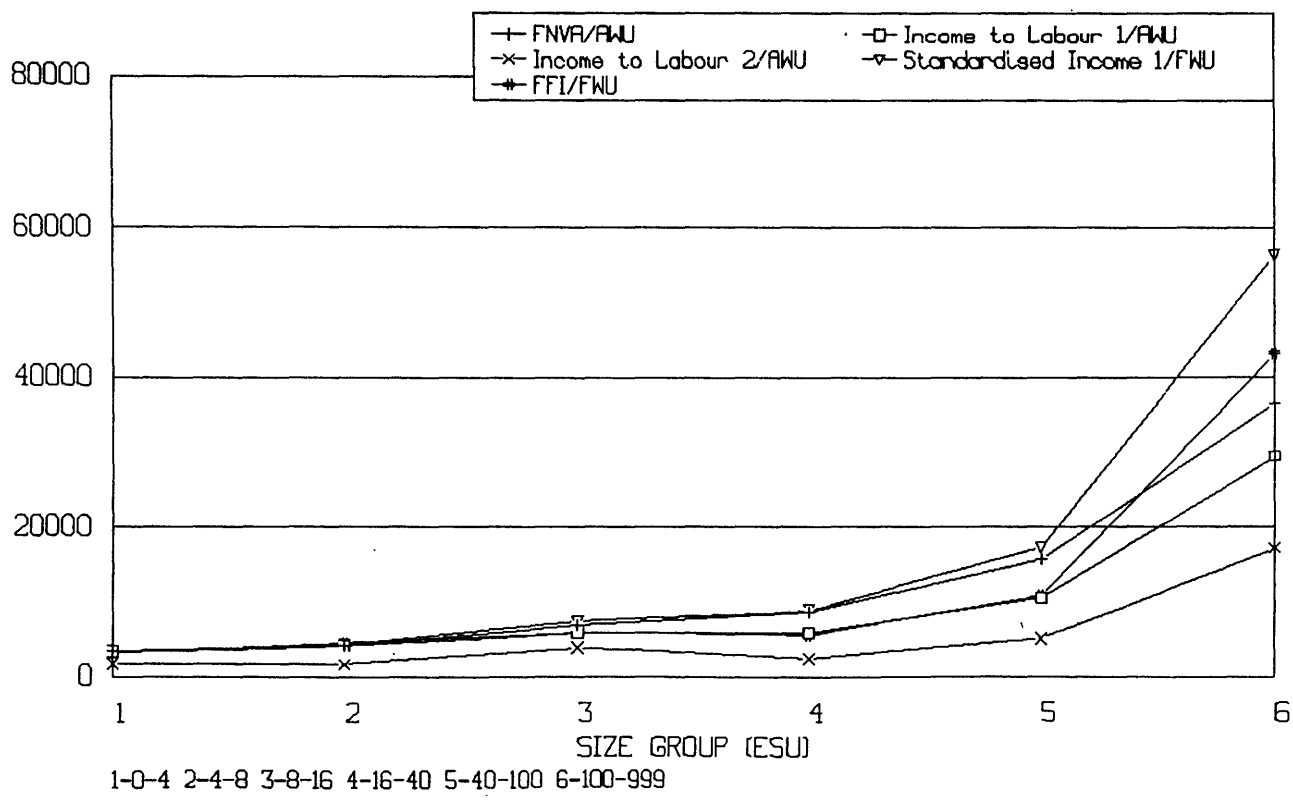


Fig A10.8i

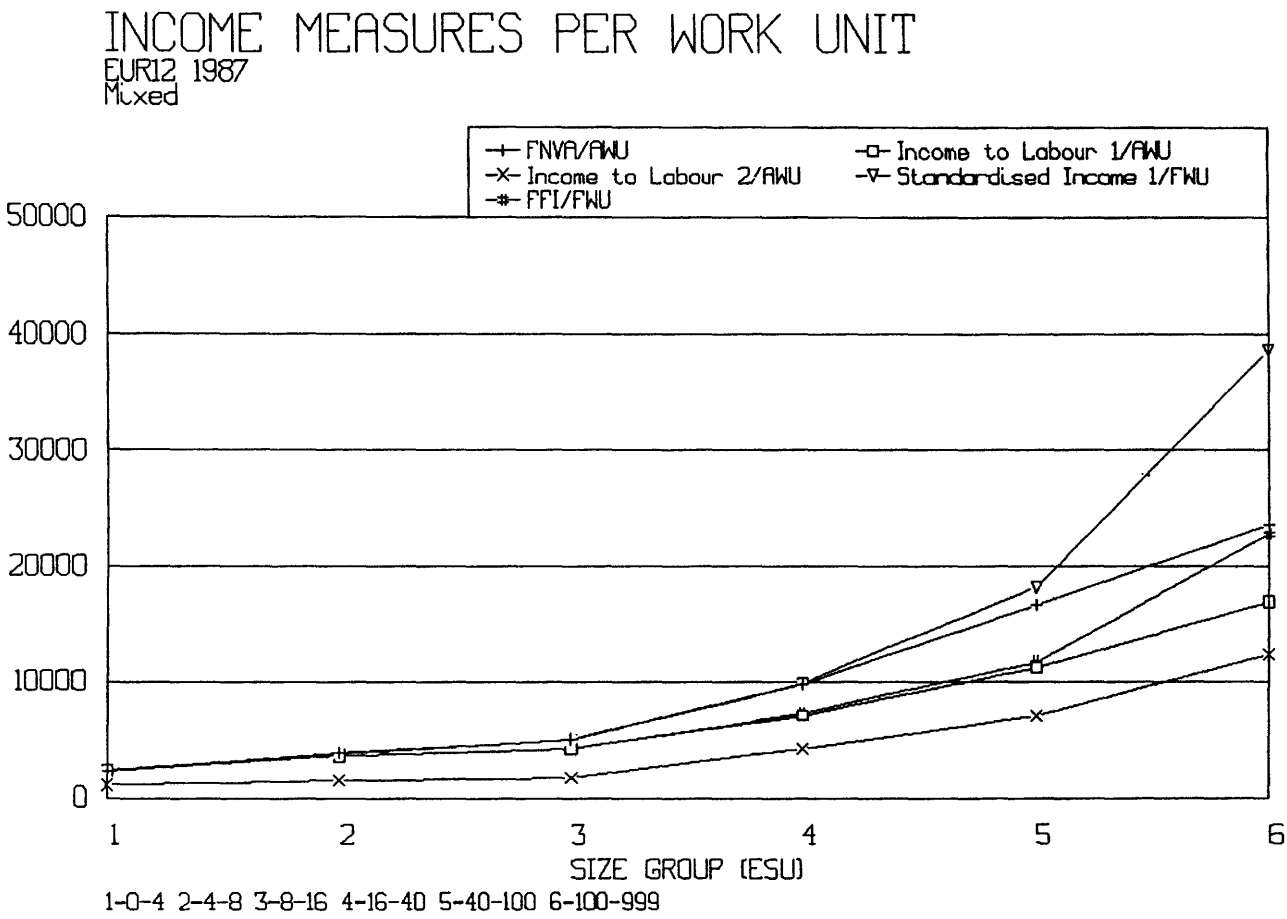
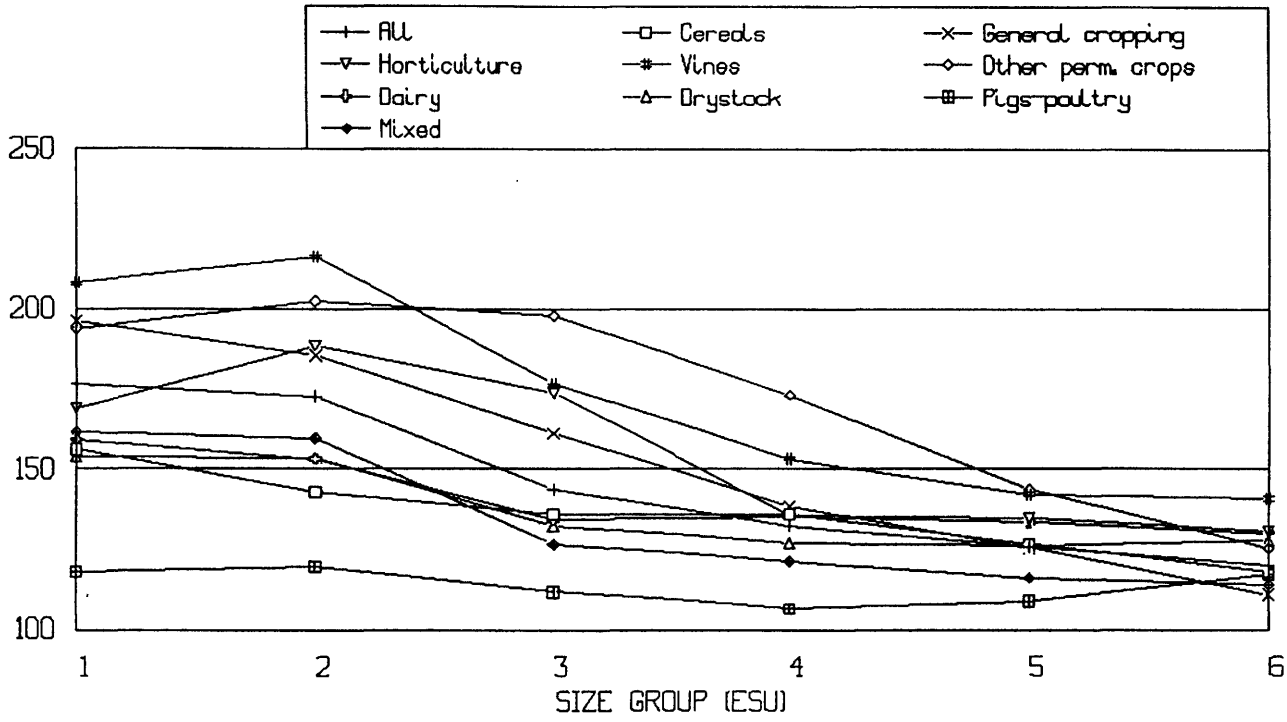

INCOME MEASURES PER WORK UNIT
EUR12 1987
Mixed
FNVA/AWU
Income to Labour 1/AWU
Income to Labour 2/AWU
Standardised Income 1/FWU
FFI/FWU
50000
40000
30000
20000
10000
0
1
2
3
4
5
6
SIZE GROUP (ESU)
1-0-4 2-4-8 3-8-16 4-16-40 5-40-100 6-100-999

Fig A10.11a

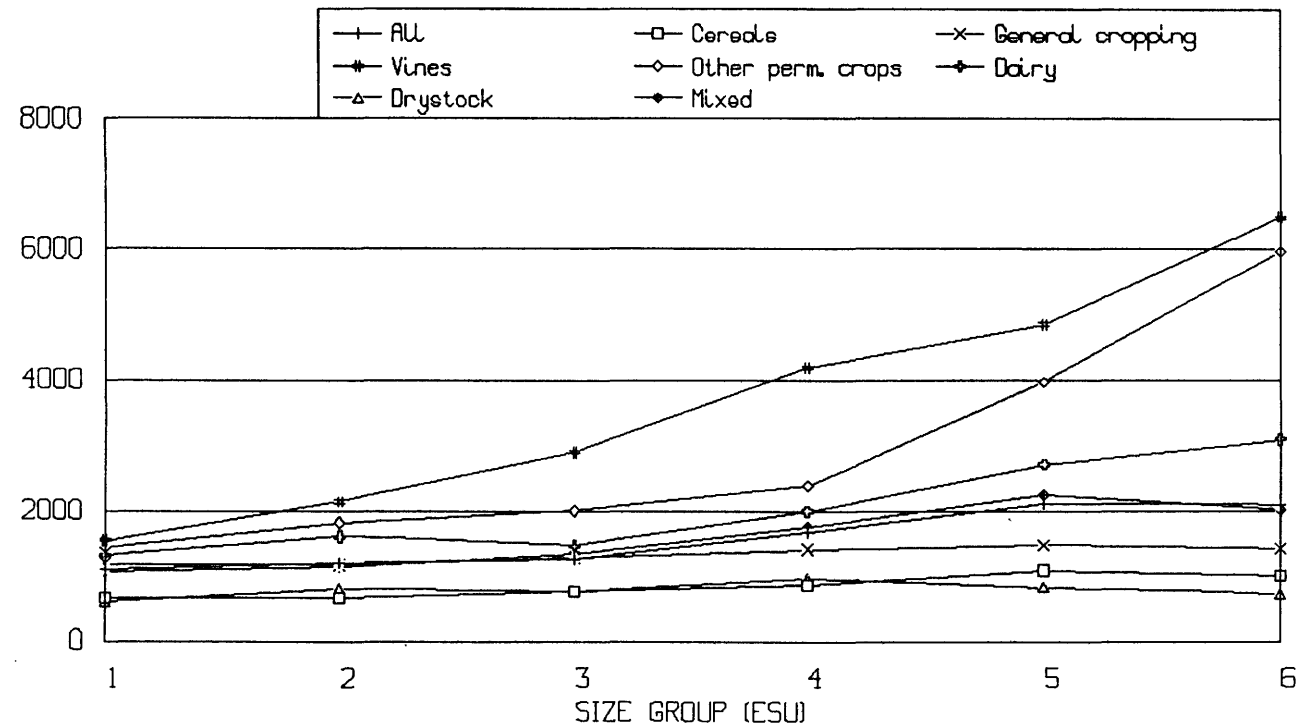
EFFICIENCY INDICATORS
TFP
EUR12 1987



1-0-4 2-4-8 3-8-16 4-16-40 5-40-100 6-100-999

Fig A10.11b

Total output/ha
EUR12 1987



1-0-4 2-4-8 3-8-16 4-16-40 5-40-100 6-100-999

Fig A10.11c

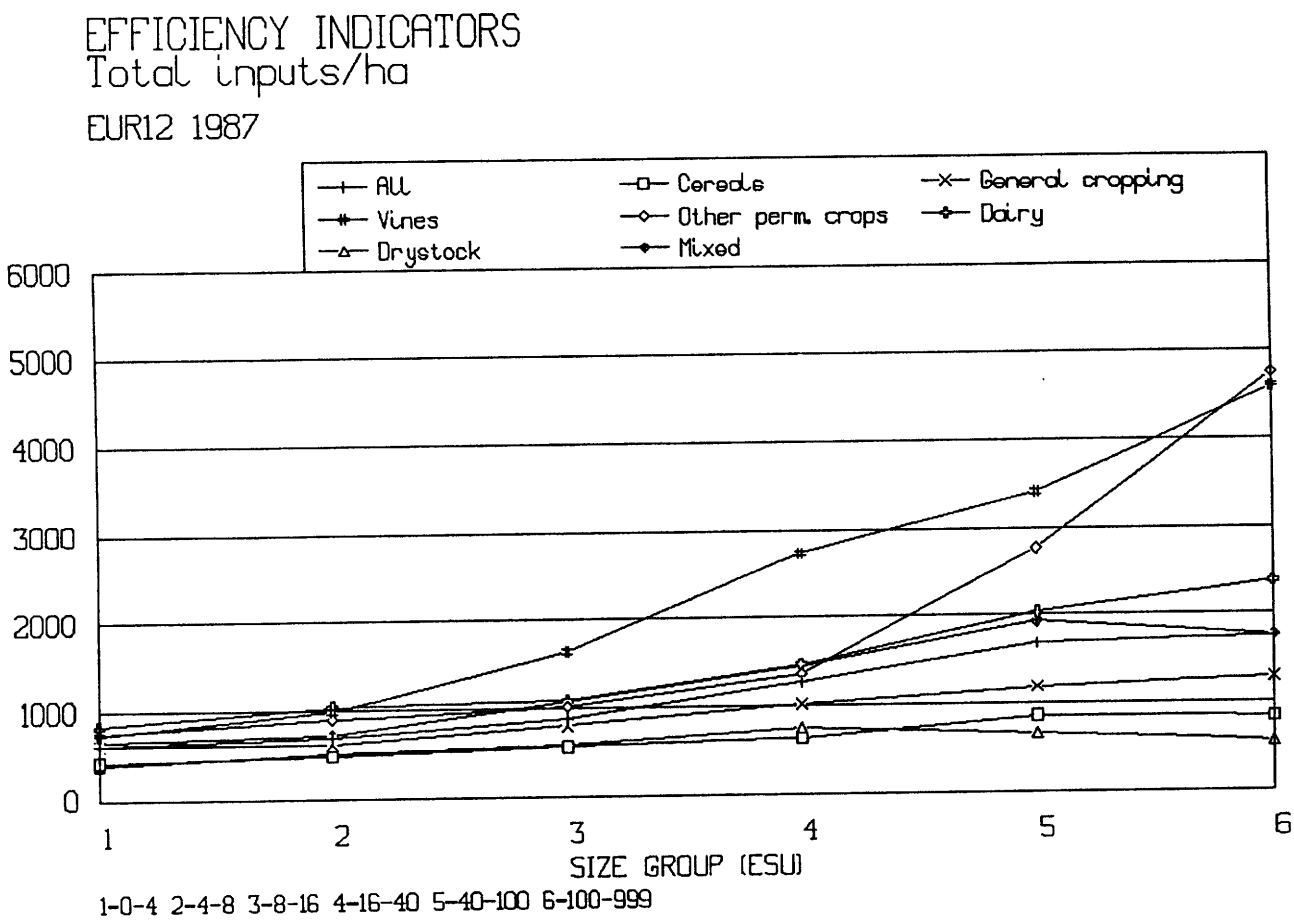


Fig A10.11d

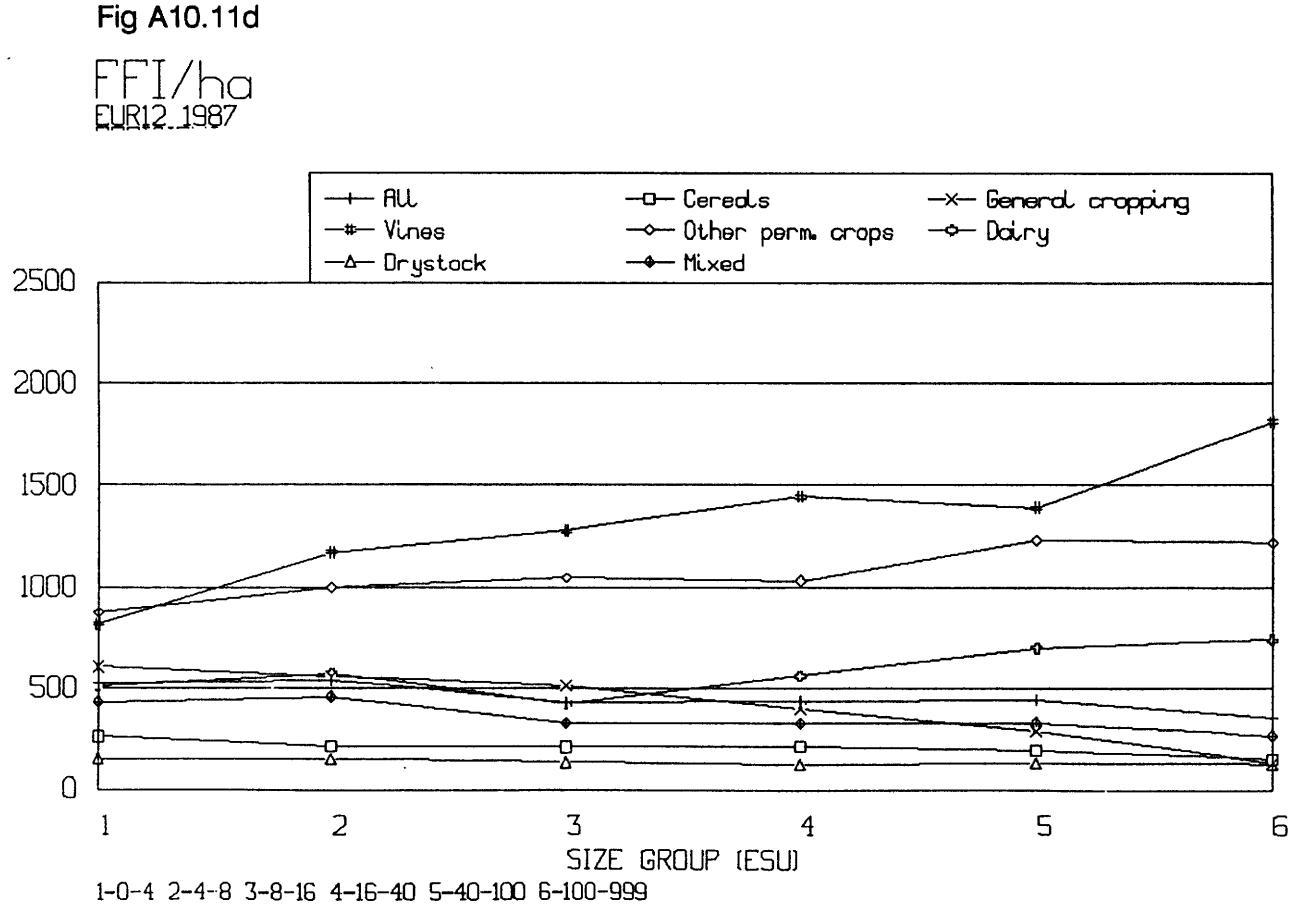


Fig A10.11e

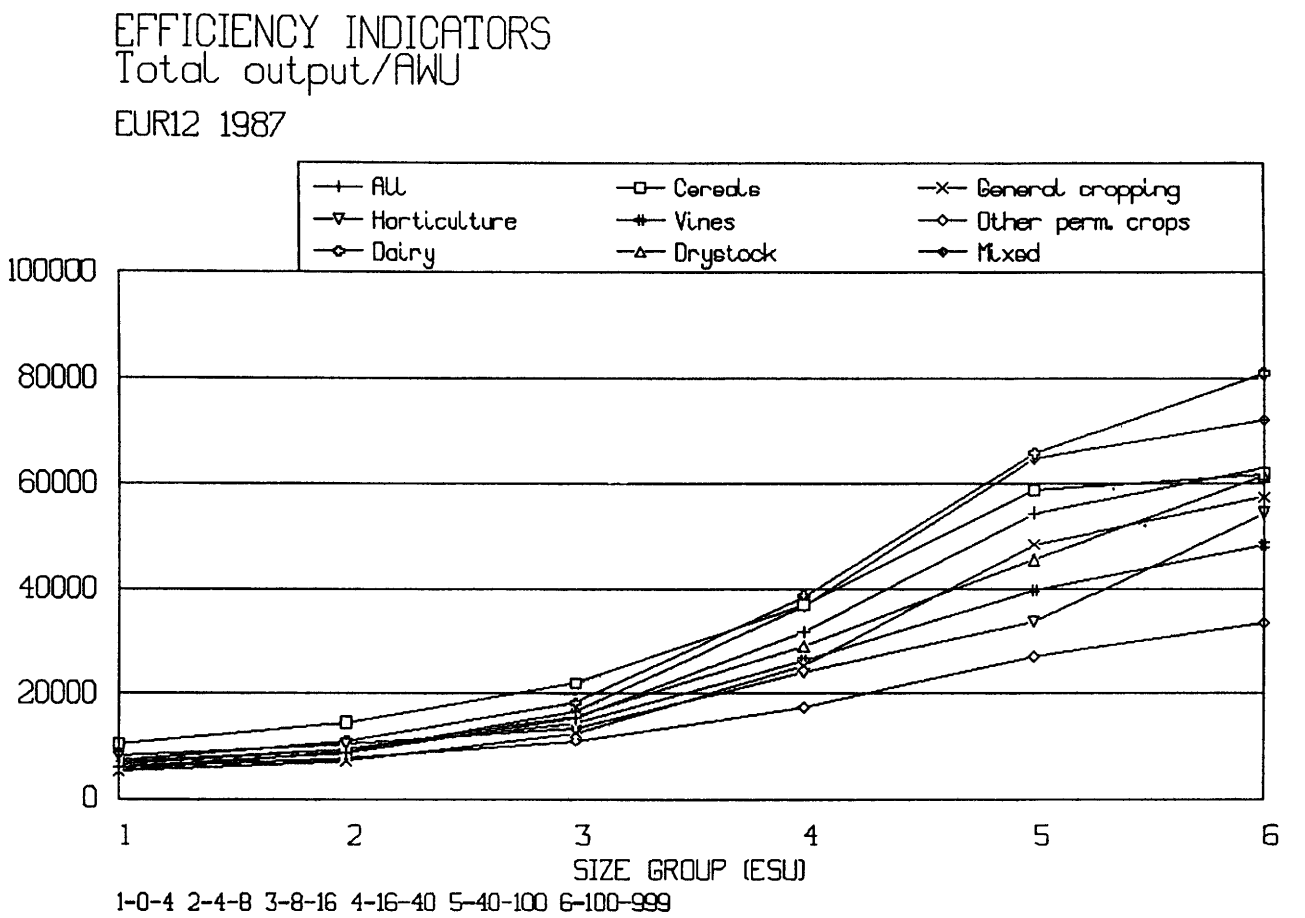


Fig A10.11f

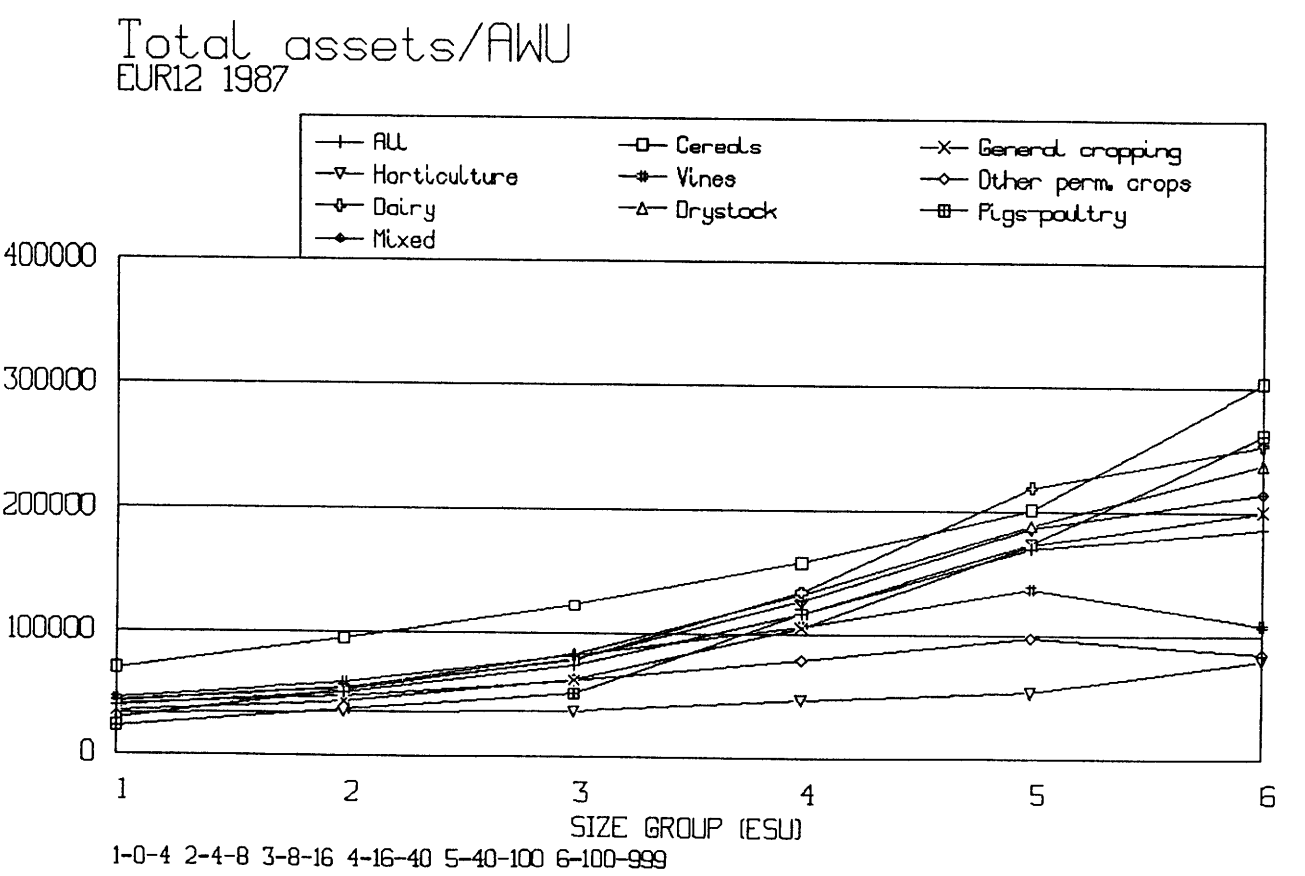


Fig A10.11g

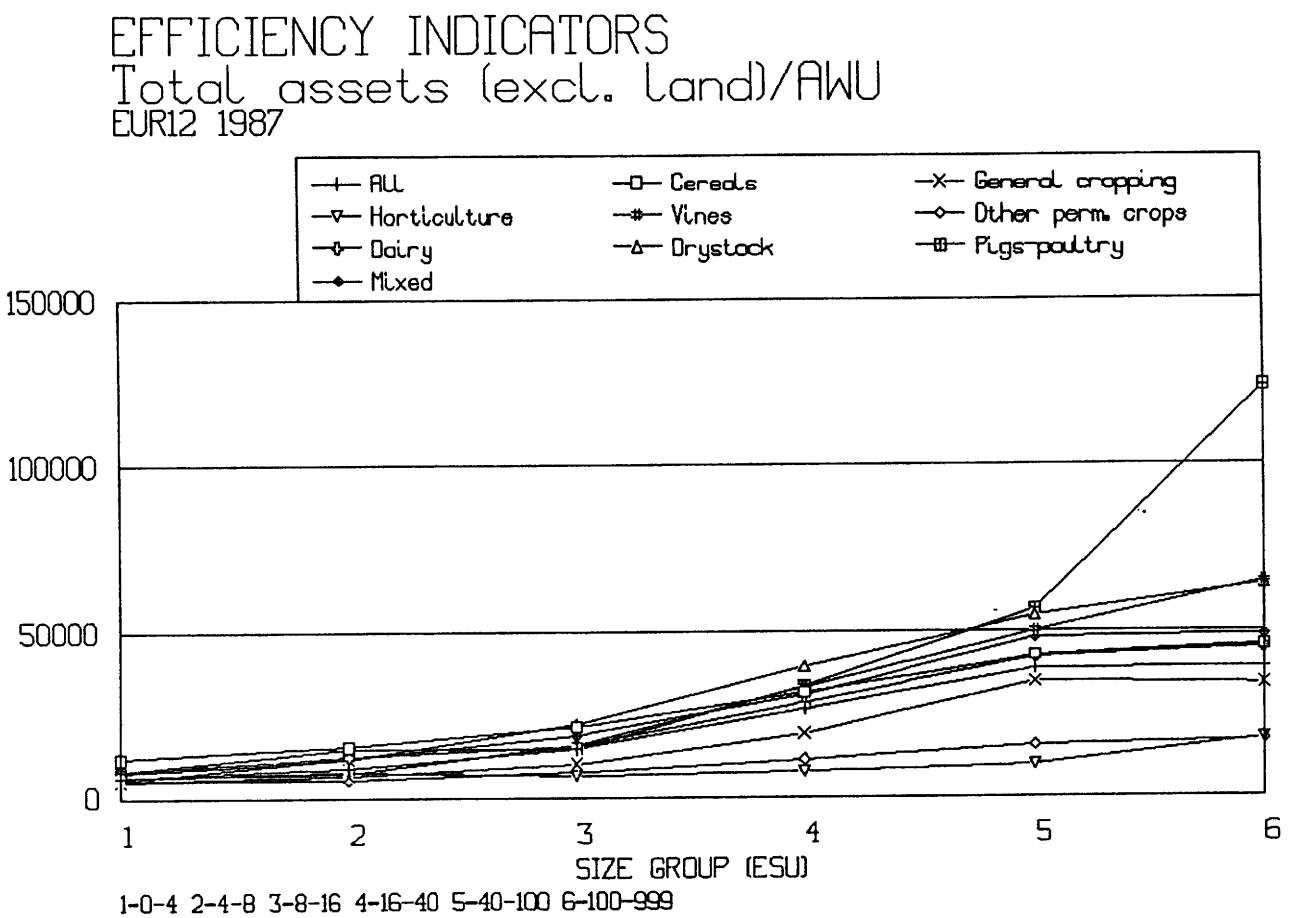


Fig A10.11h

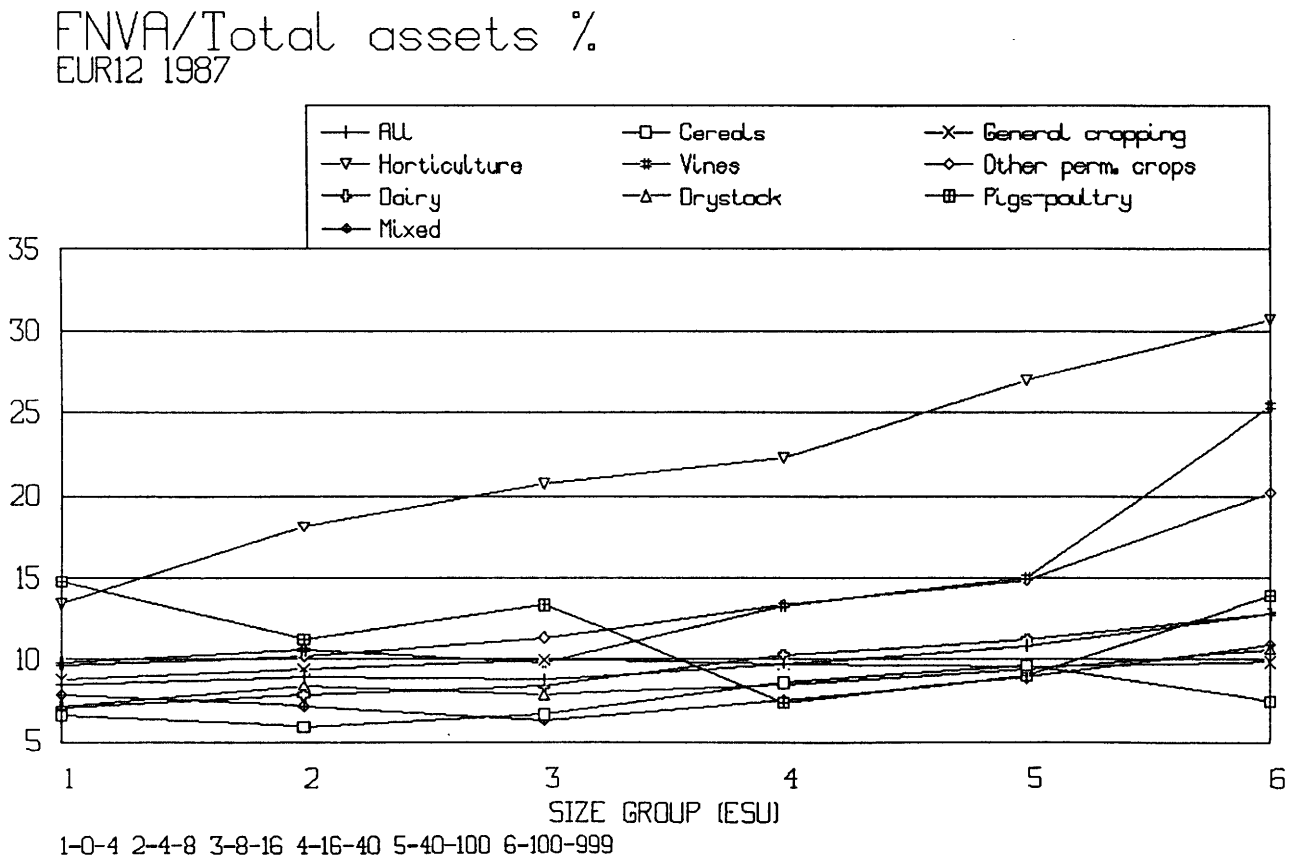


Fig A10.11i

EFFICIENCY INDICATORS
FFI/Net Worth %
EUR12 1987

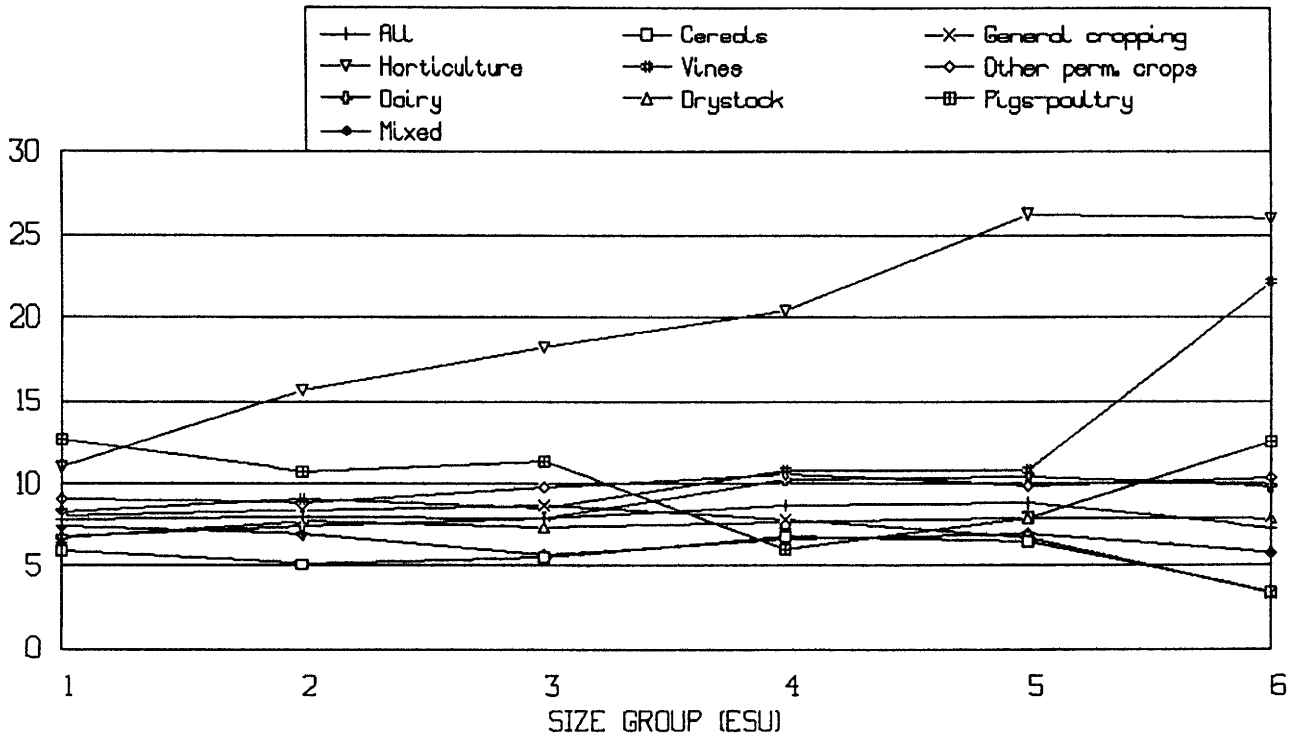


Fig A10.11j

Cash ind. 1/Total assets (excl. land) %
EUR12 1987

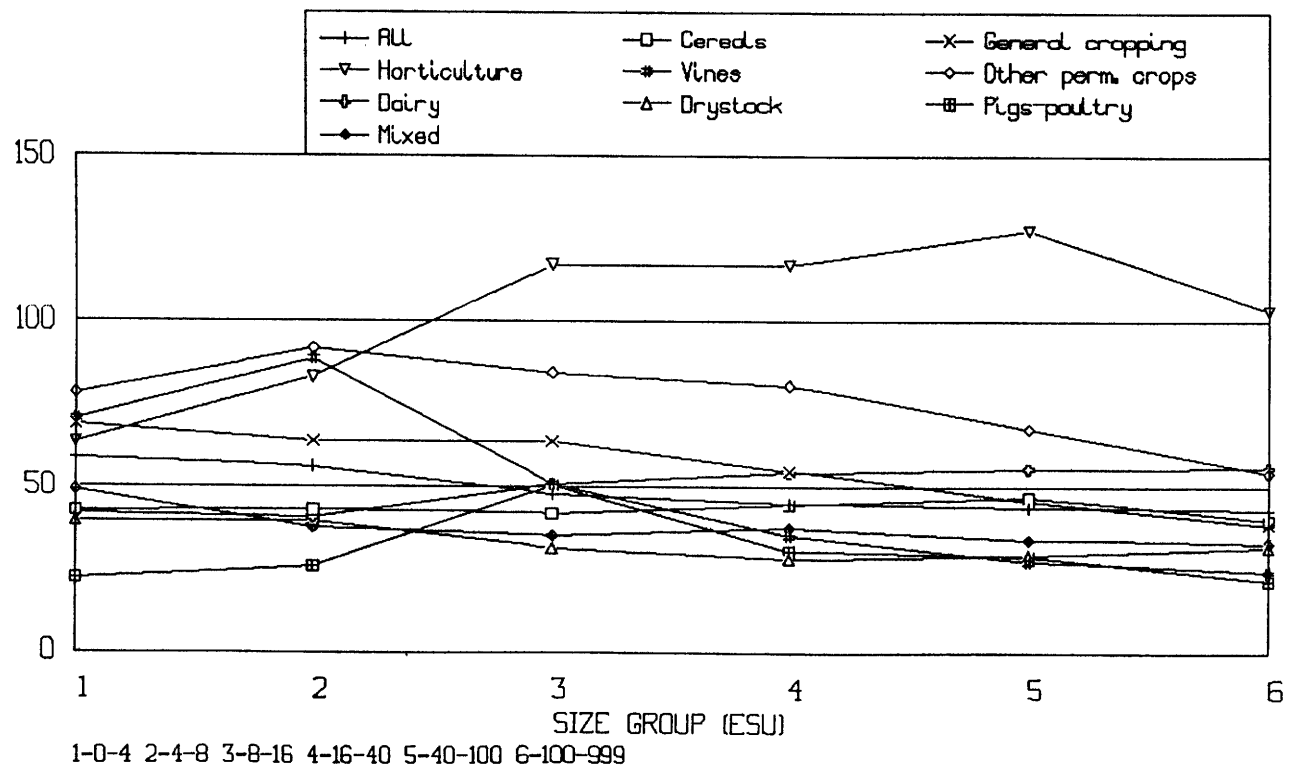


Fig A10.11k

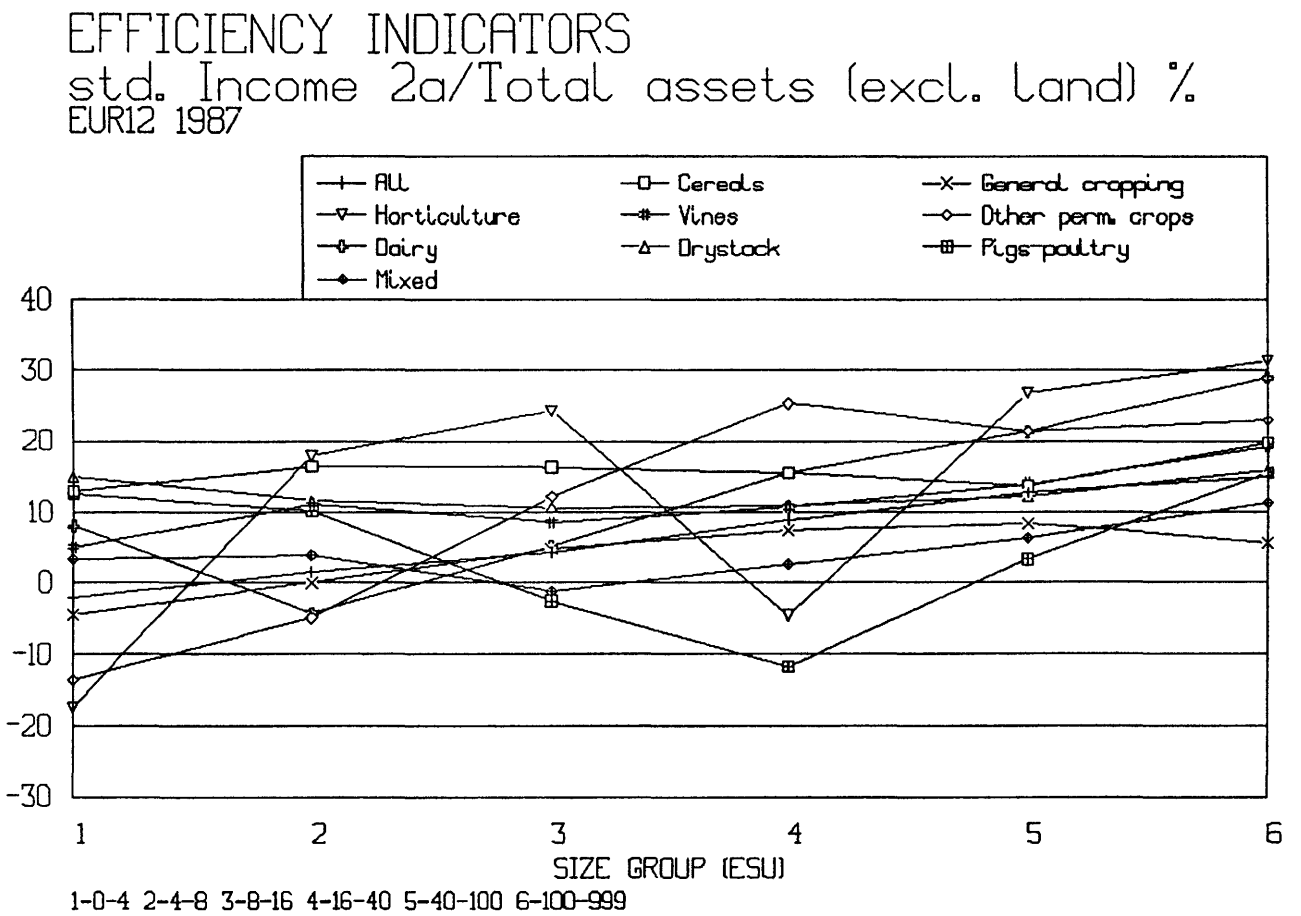

EFFICIENCY INDICATORS
std. Income 2a/Total assets (excl. land) %
EUR12 1987
All
Cereals
General cropping
Horticulture
Vines
Other perm. crops
Dairy
Orystock
Pigs-poultry
Mixed
40
30
20
10
0
-10
-20
-30
1
2
3
4
5
6
SIZE GROUP (ESU)
1-0-4 2-4-8 3-8-16 4-16-40 5-40-100 6-100-999

Fig A10.20a

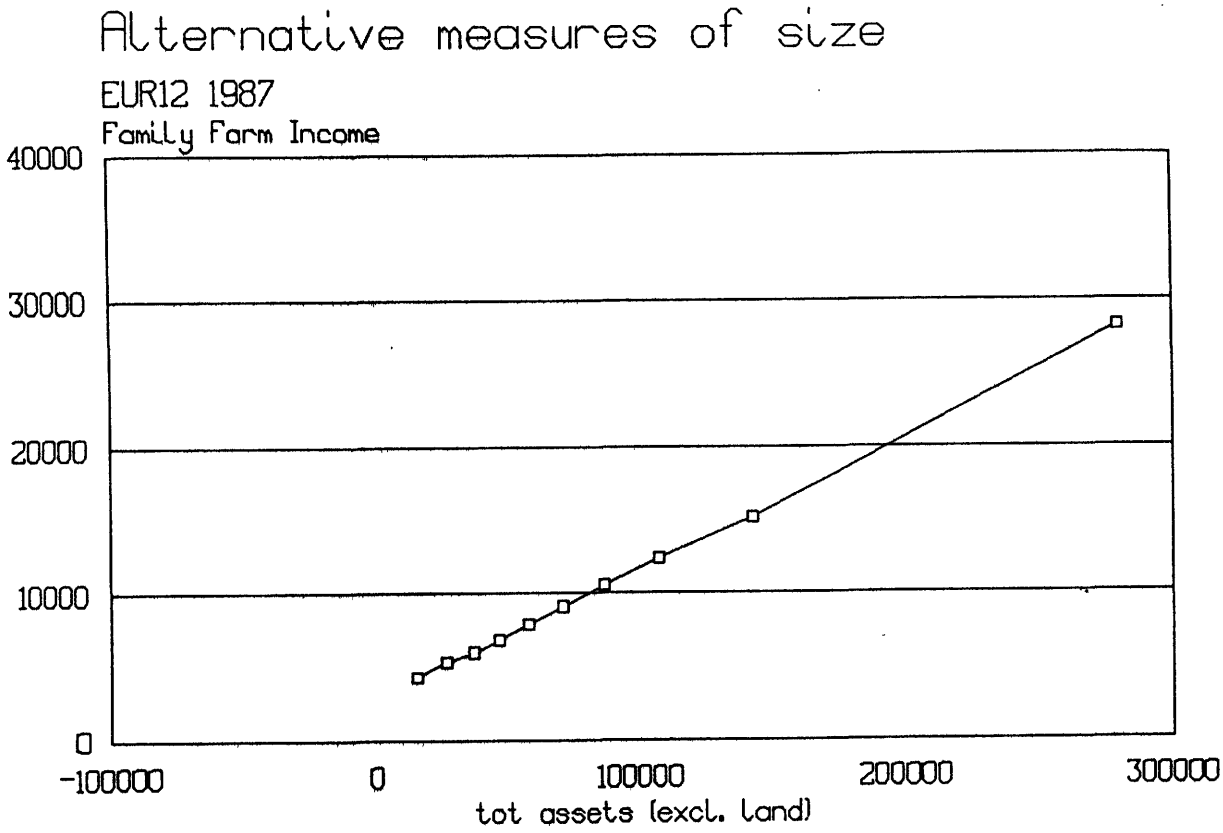


Fig A10.20b

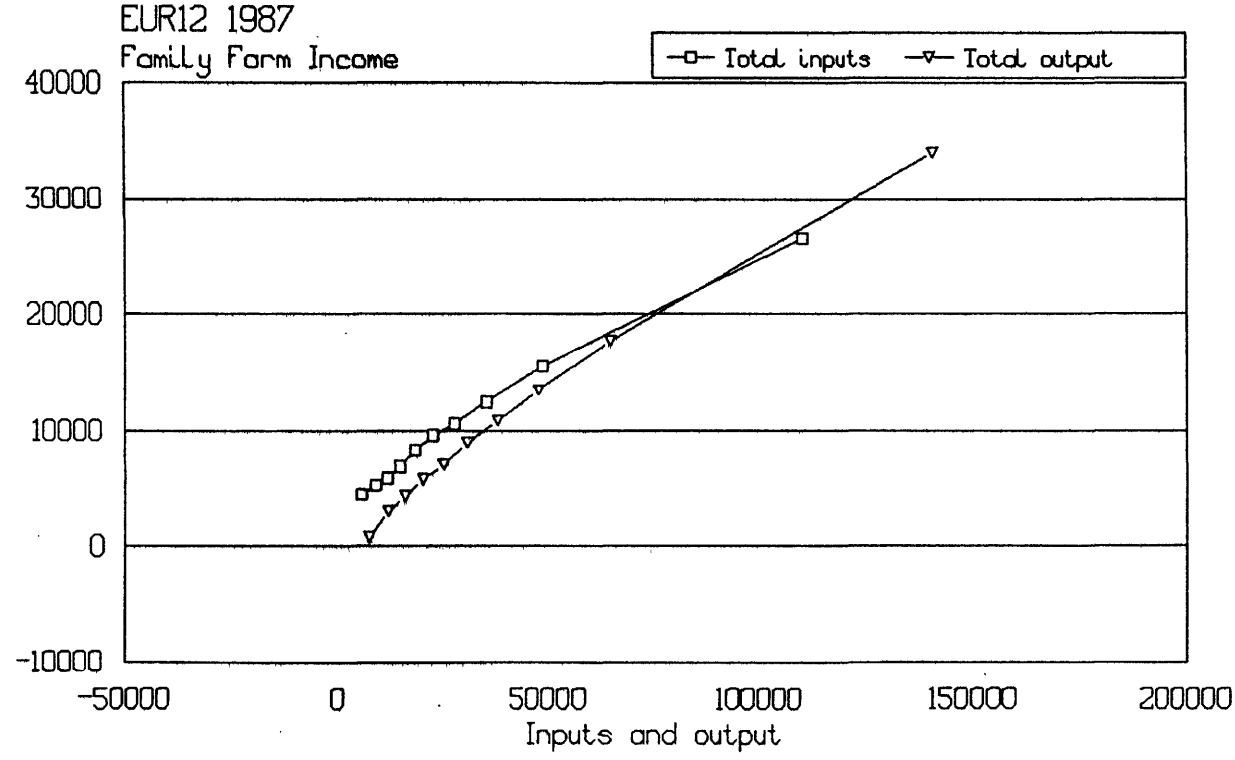


Fig A10.20c

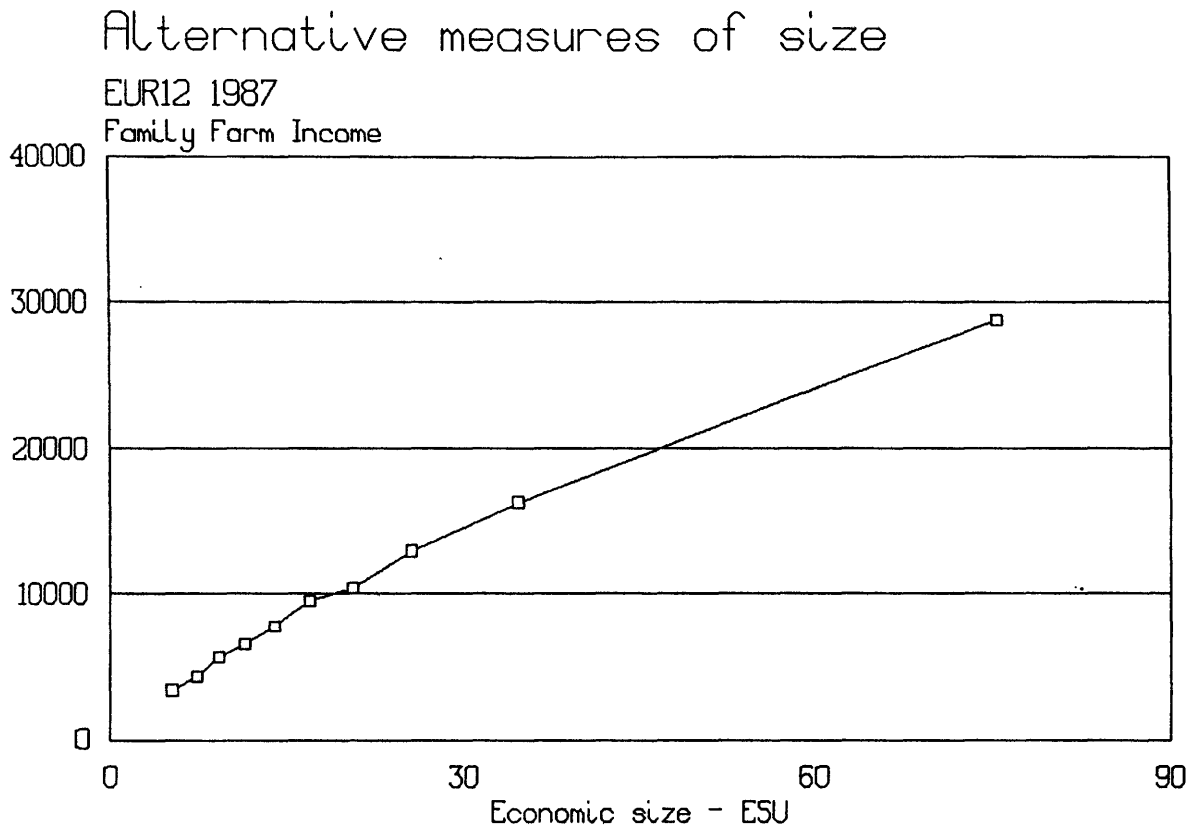
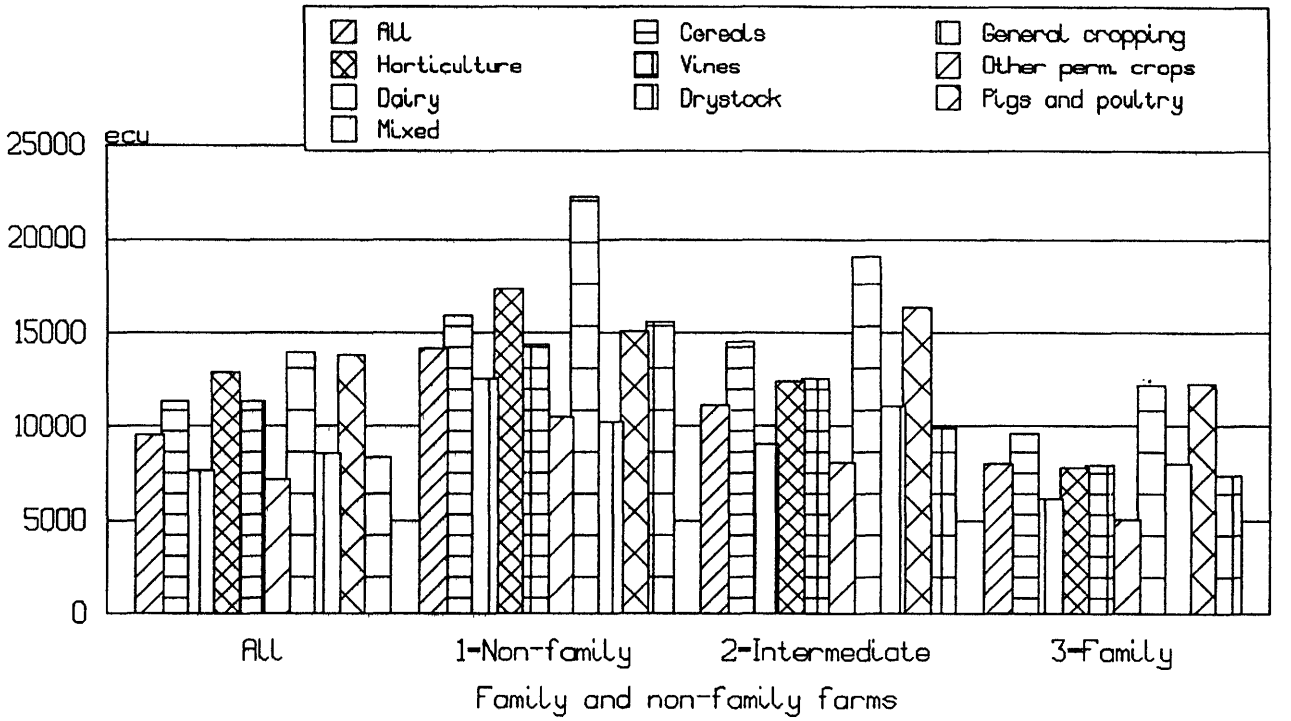

Alternative measures of size
EUR12 1987
Family Farm Income
40000
30000
20000
10000
0
0
30
60
90
Economic size - ESU

Fig A10.23a

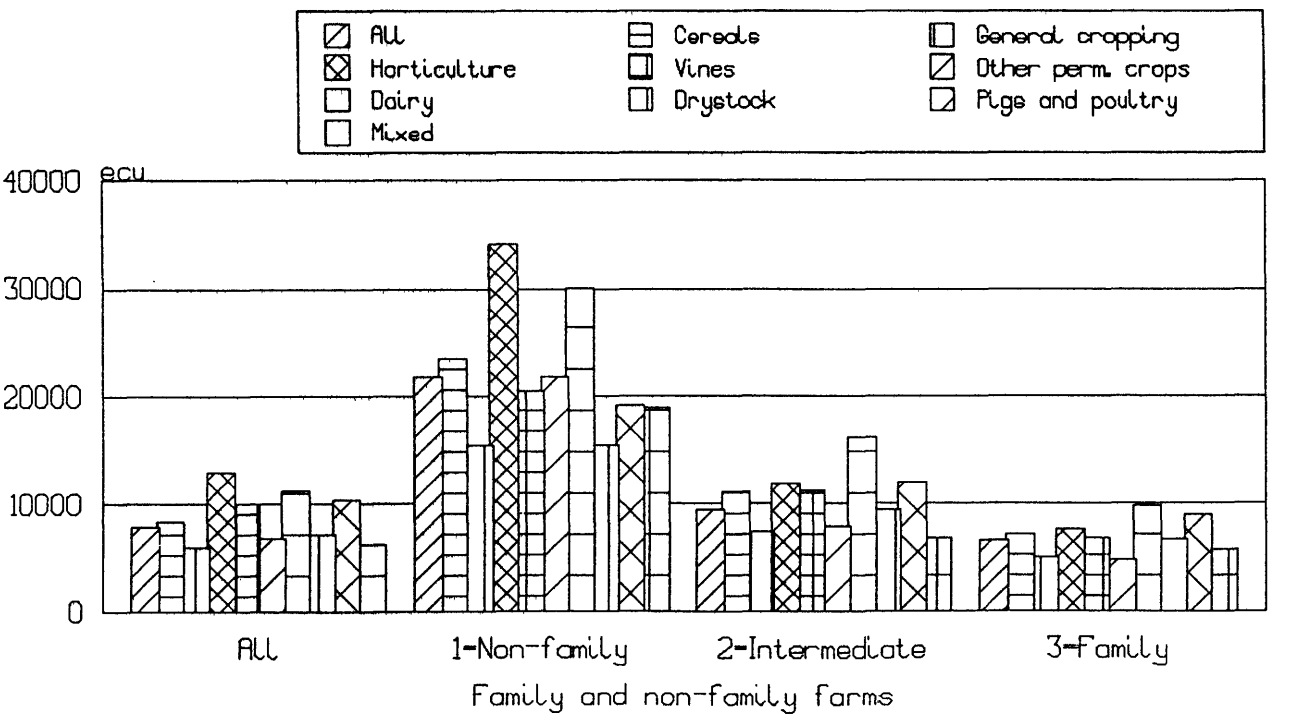
Family and non-family farms
FNVA/AWU



99=All, 1=<50% 2=50-95%
3=>=95%

Fig A10.23b

FFI/FWU
EUR12 1987



99=All, 1=<50% 2=50-95%
3=>=95%

Fig A10.23c

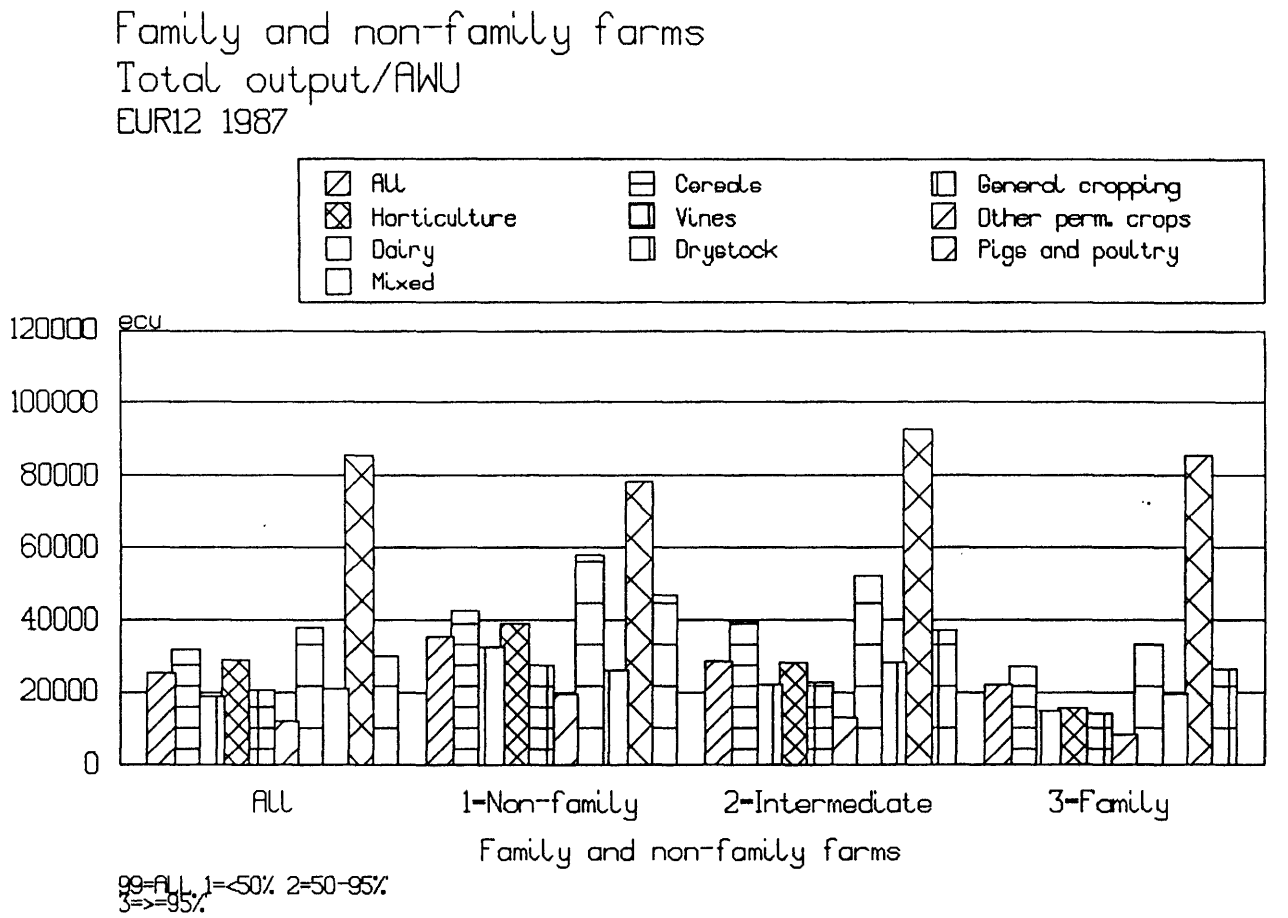


Fig A10.23d

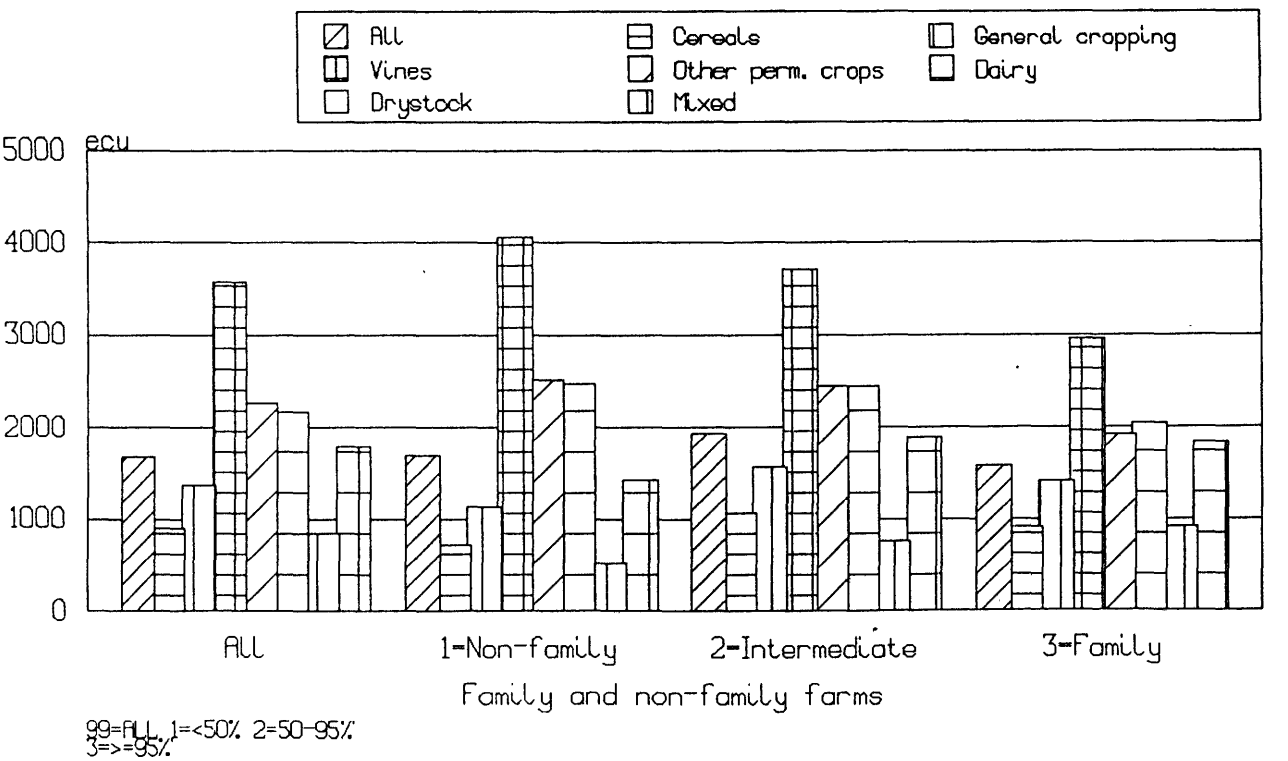


Fig A10.23e

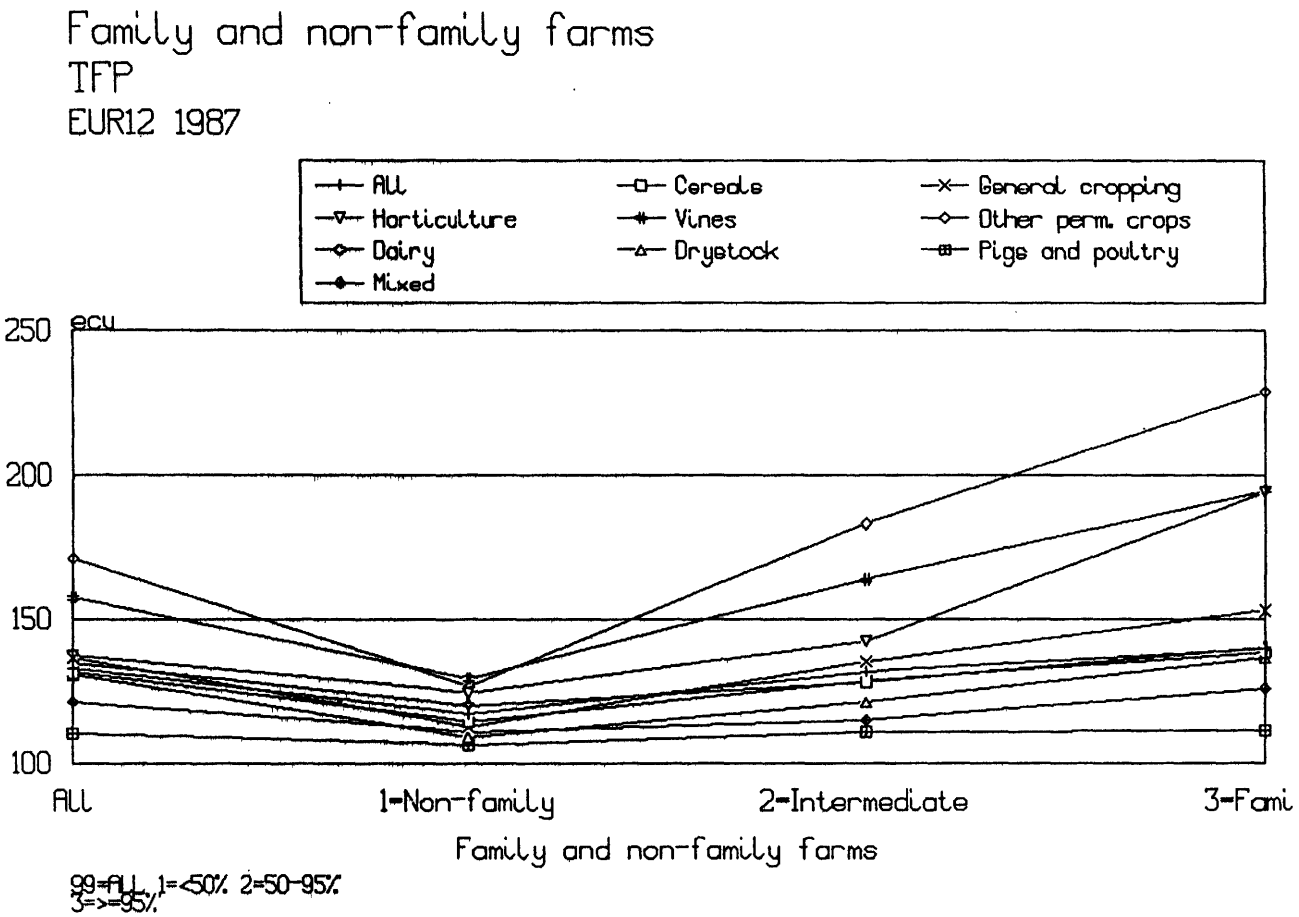
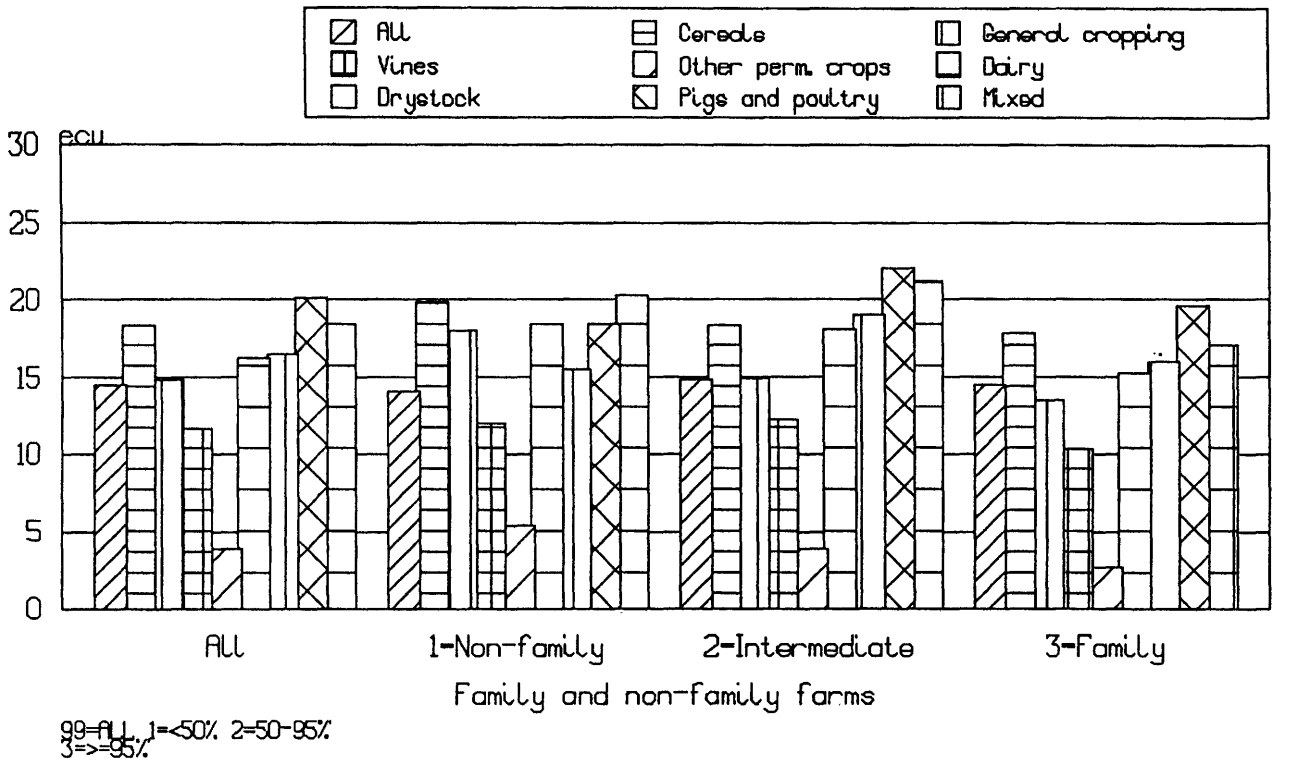

Family and non-family farms
TFP
EUR12 1987
All
Cereals
General cropping
Horticulture
Vines
Other perm. crops
Dairy
Drystock
Pigs and poultry
Mixed
ecu
250
200
150
100
All
1-Non-family
2-Intermediate
3-Fami
Family and non-family farms
99=All, 1=<50% 2=50-95%
3=>=95%

Fig A10.23f

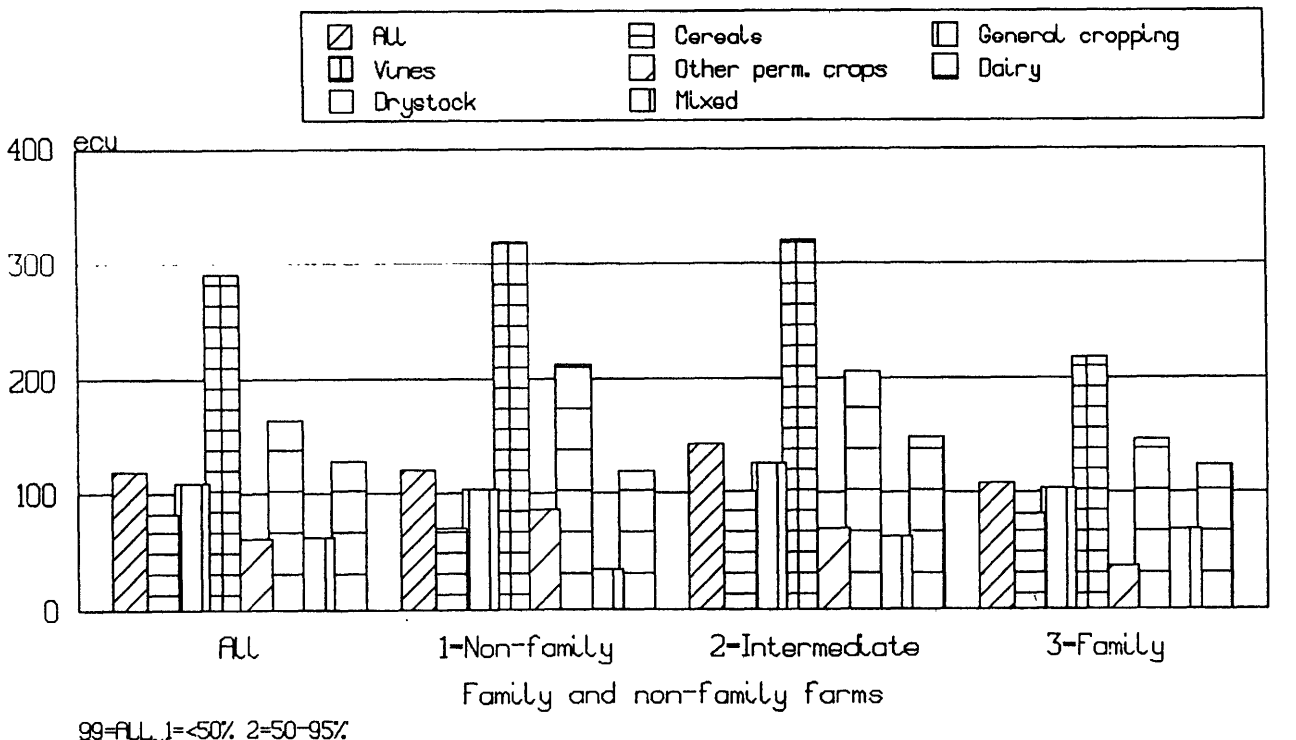
Family and non-family farms
Rent and Interest/Gross Margin %
EUR12 1987



99=ALL, 1=<50% 2=50-95%
3=>=95%

Fig A10.23g

Rent and Interest/ha
EUR12 1987



99=ALL, 1=<50% 2=50-95%
3=>=95%

Fig A10.25a

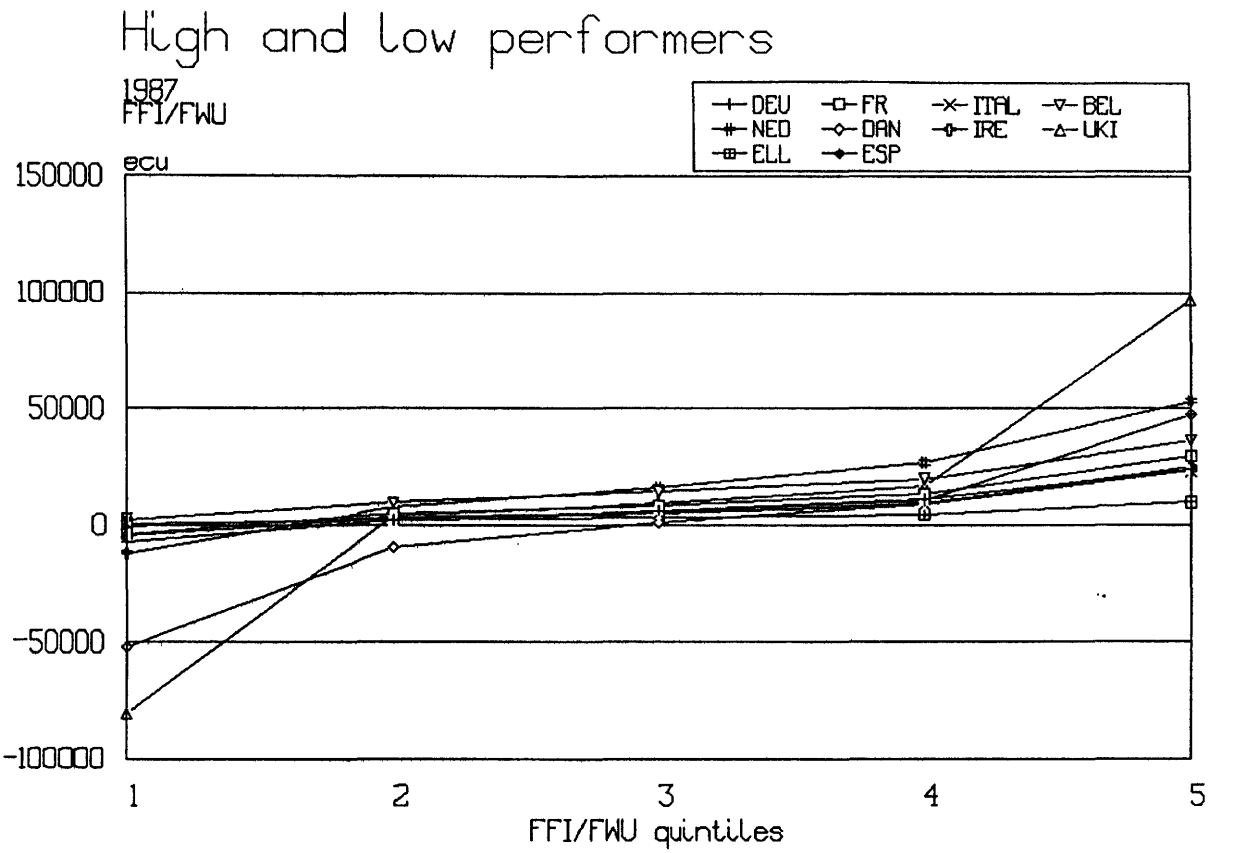


Fig A10.25b

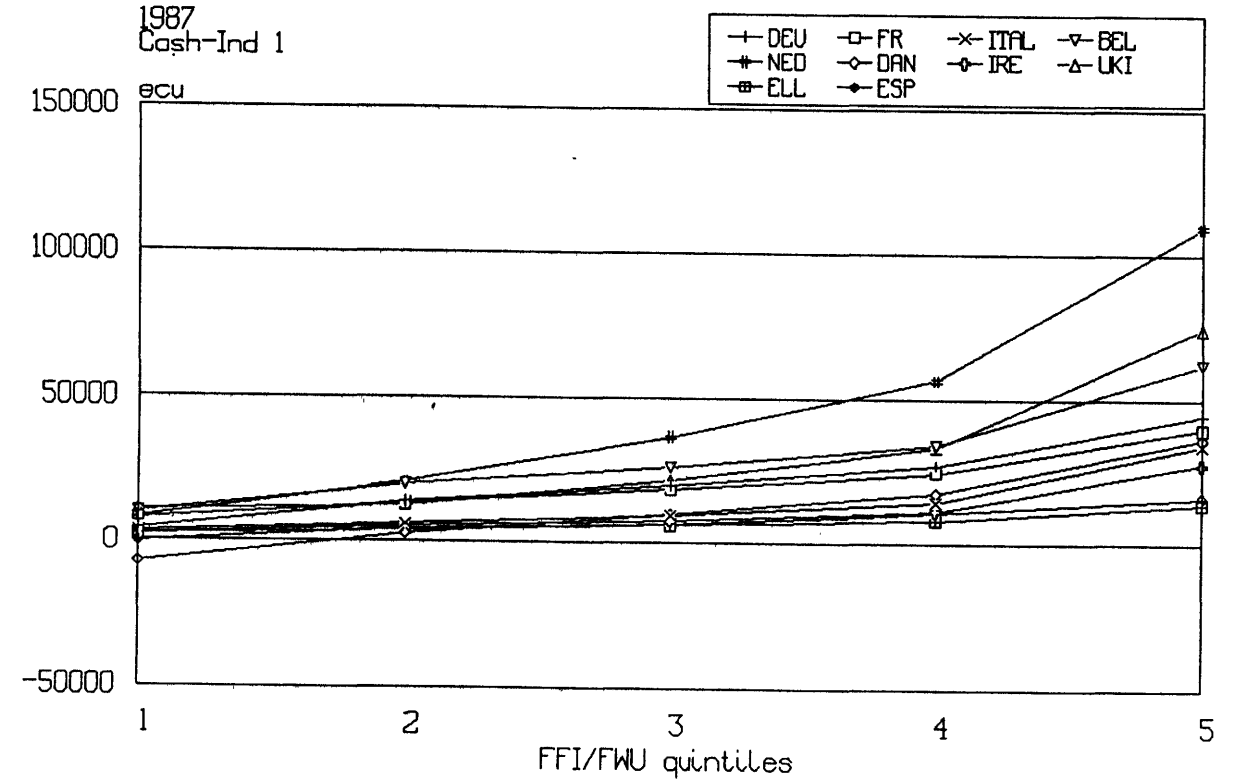


Fig A10.25c

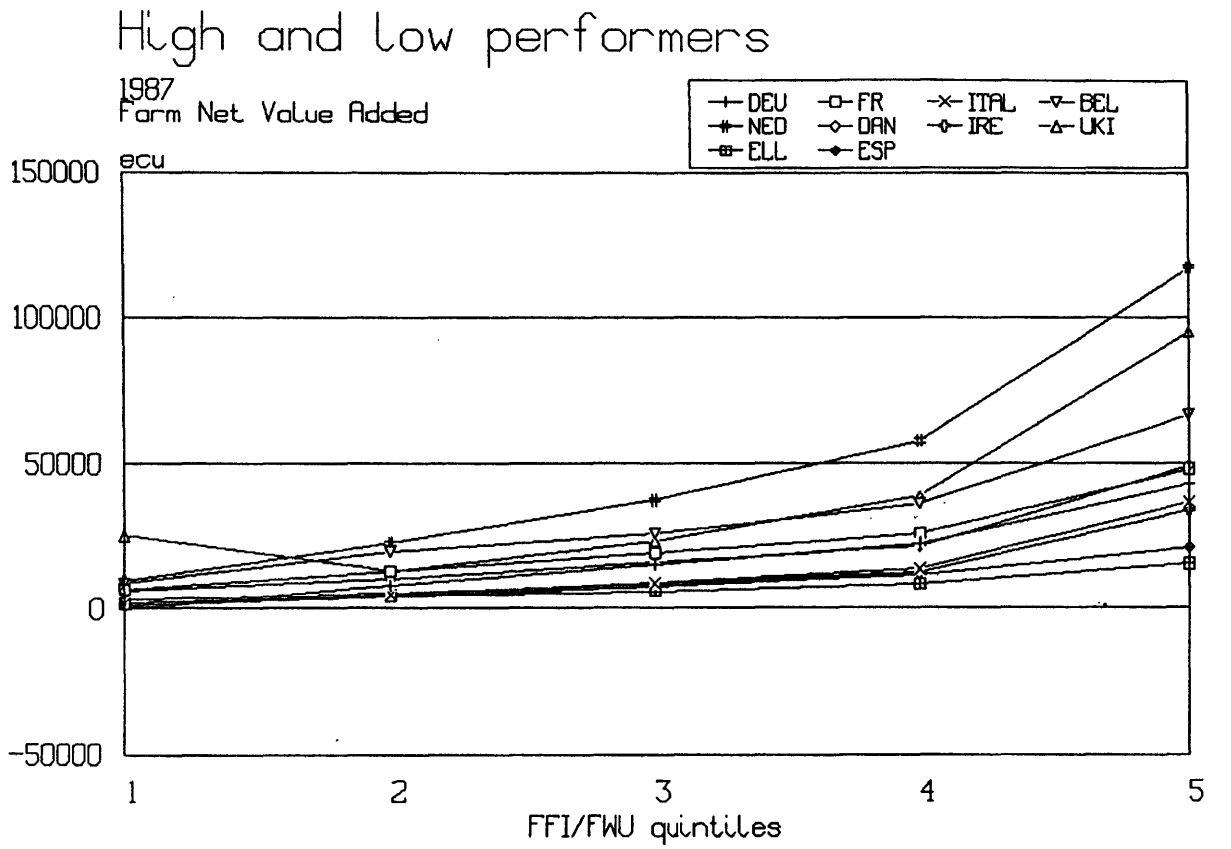


Fig A10.25d

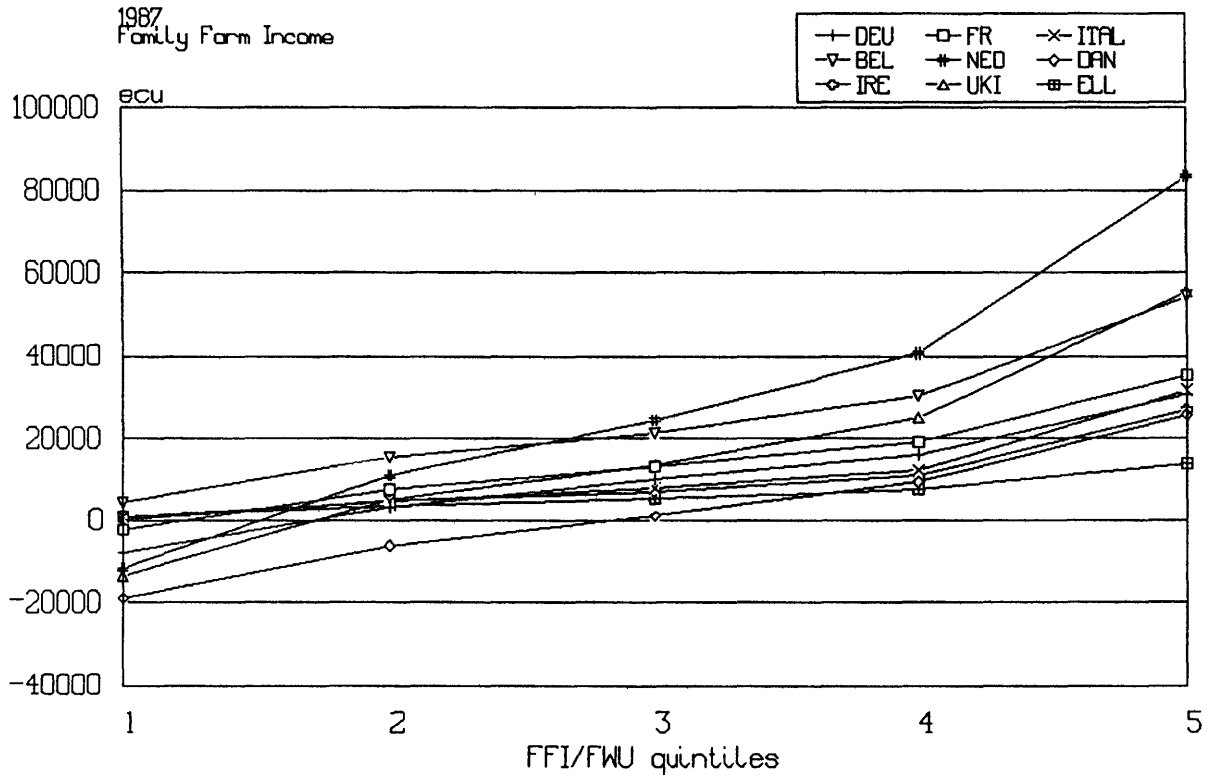


Fig A10.25e

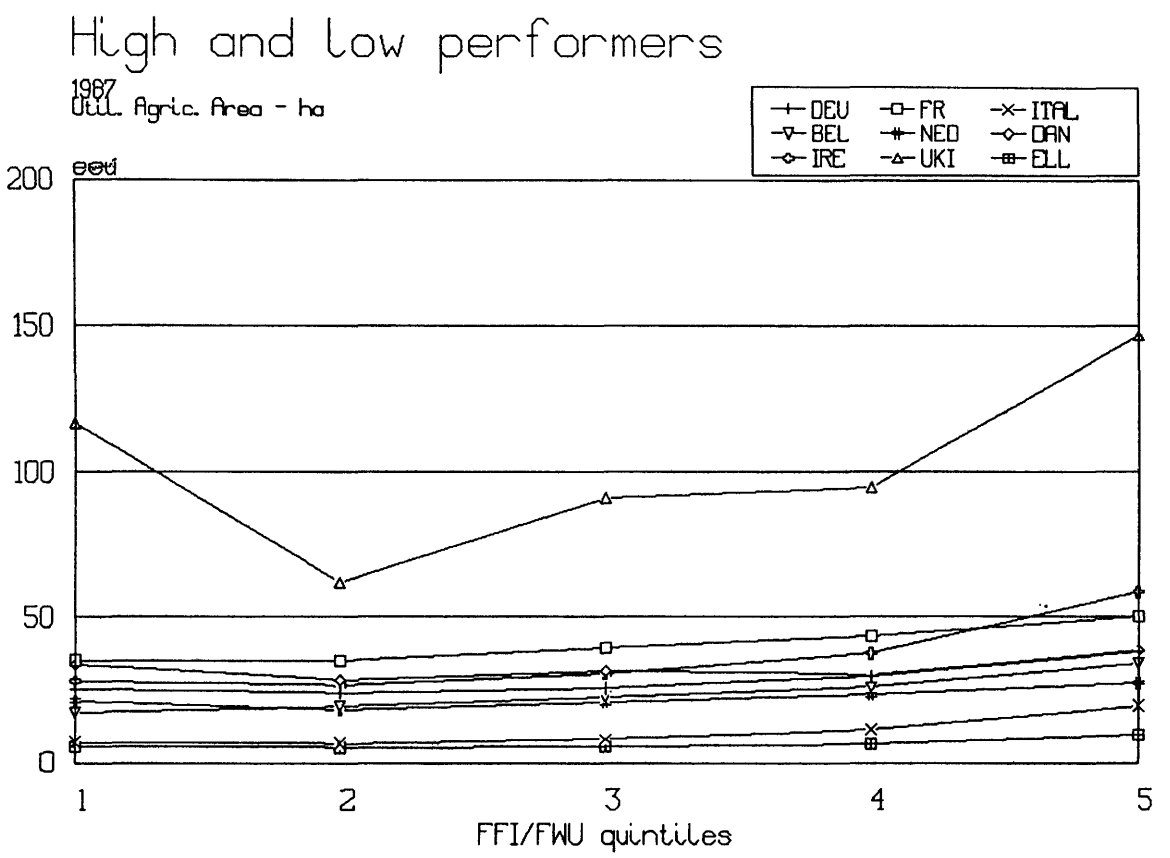


Fig A10.25f

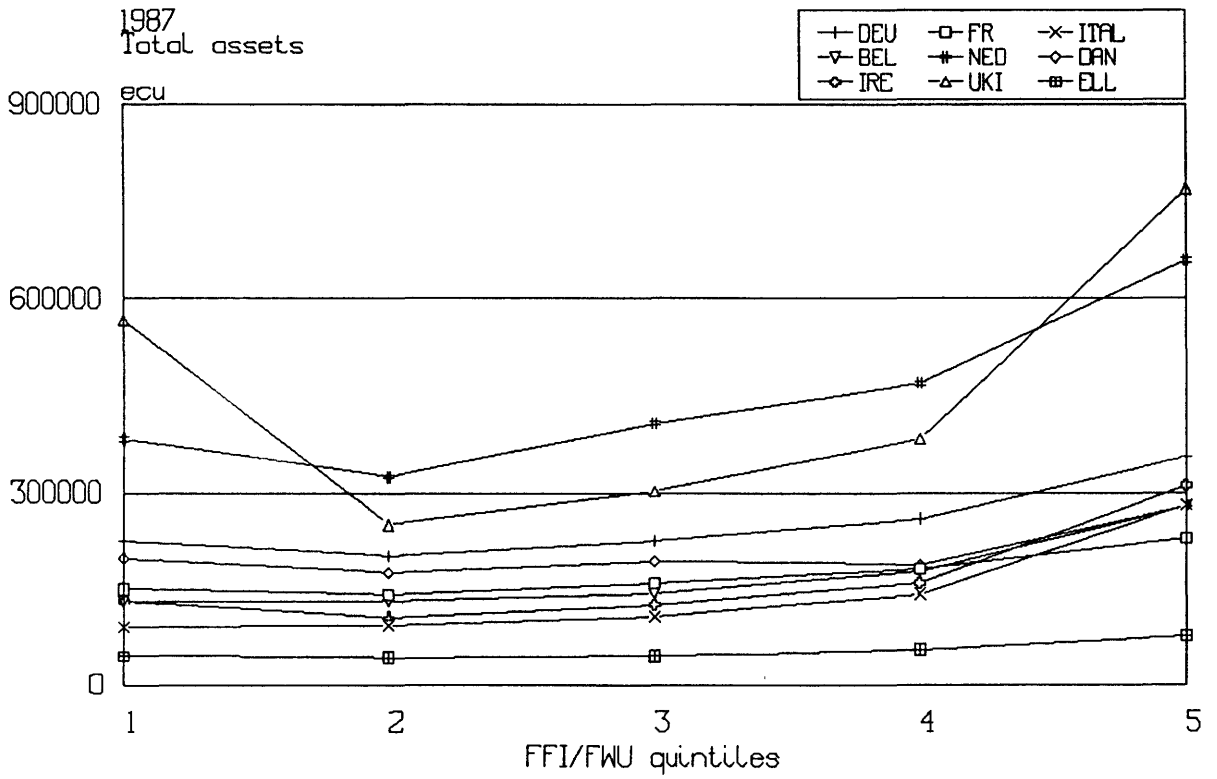


Fig A10.25g

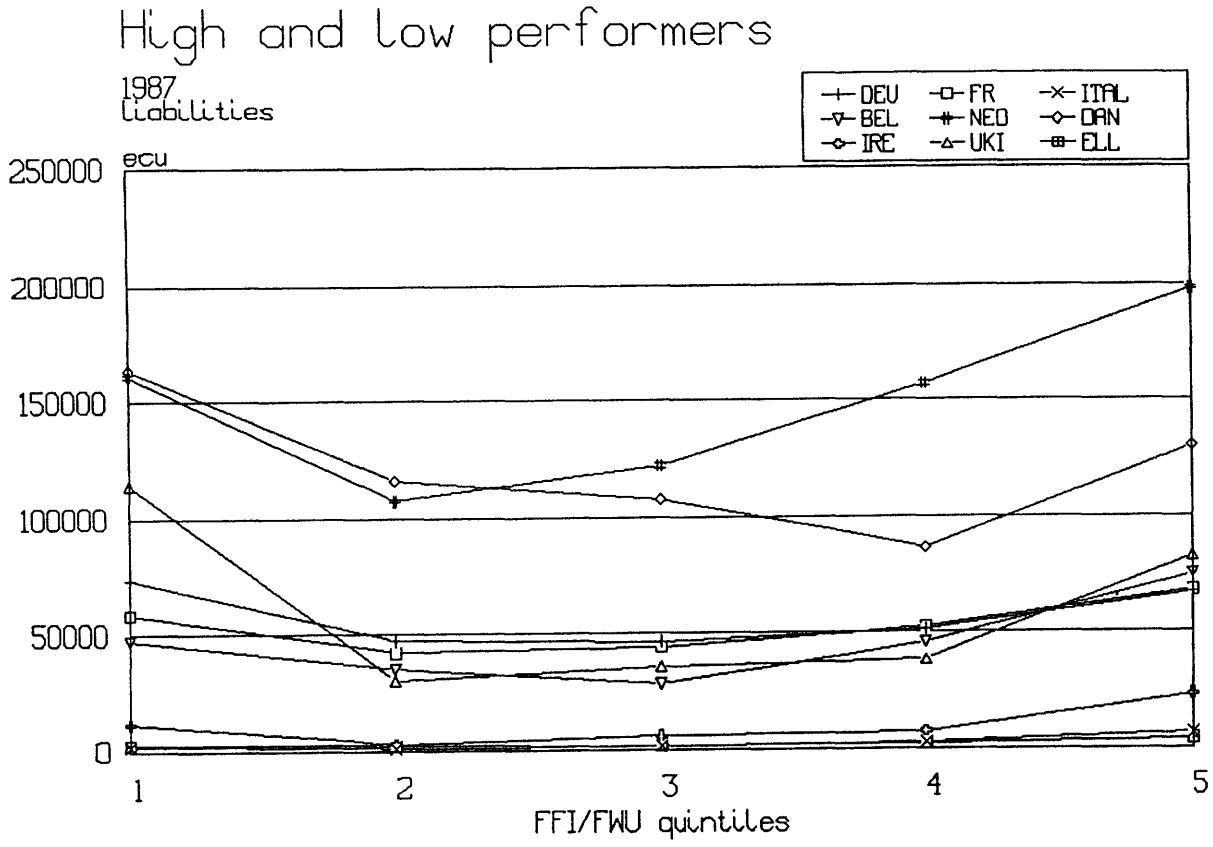


Fig A10.25h

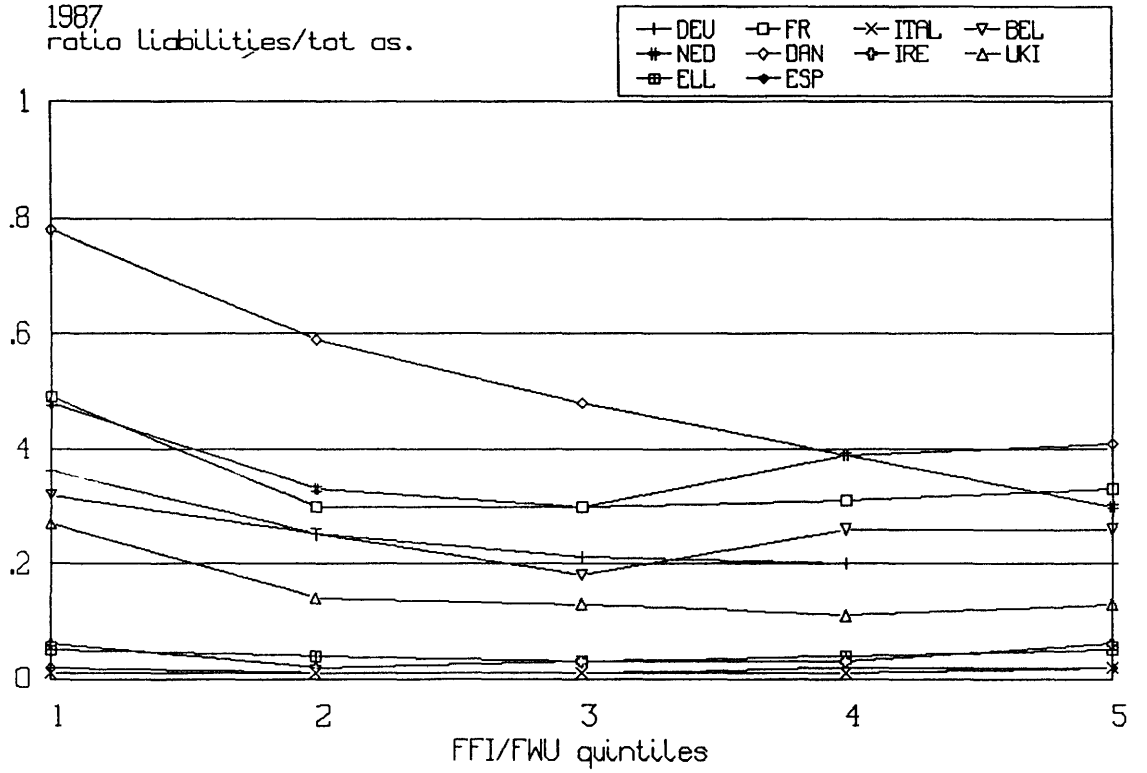


Fig A10.25i

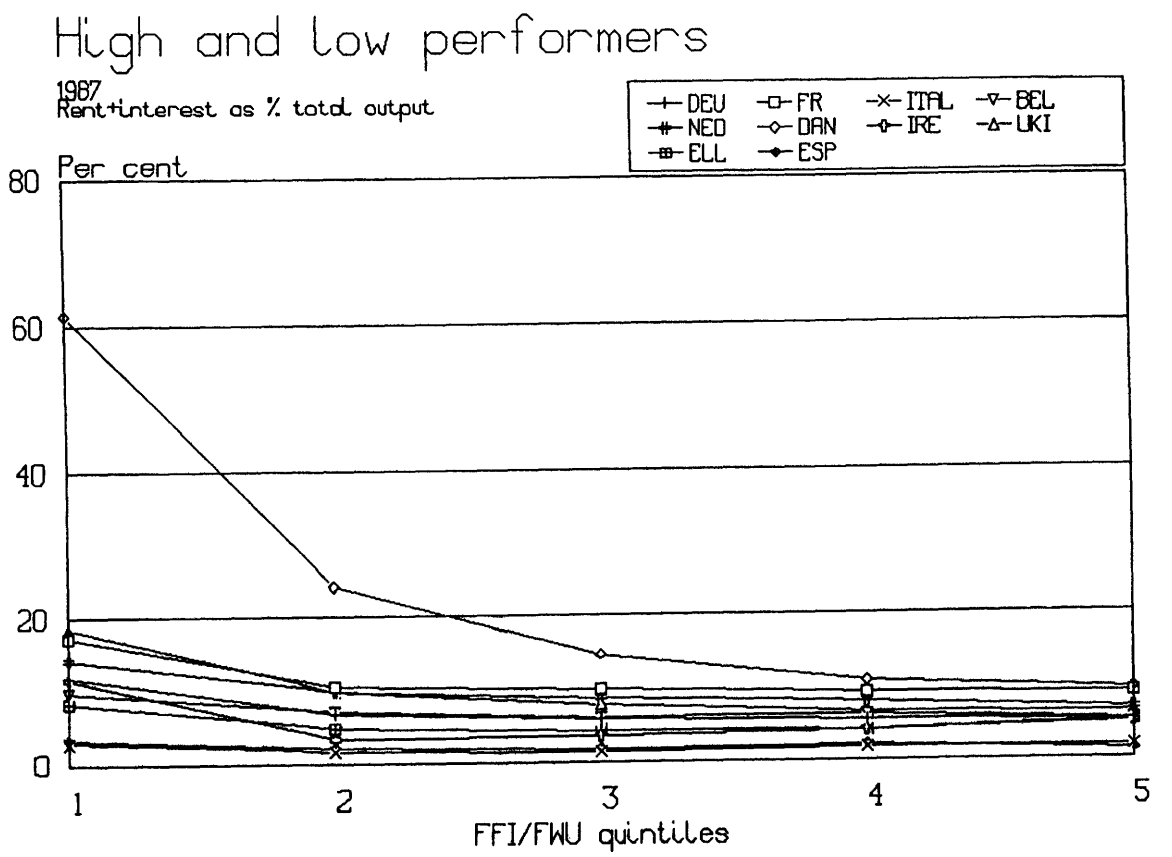


Fig A10.25j

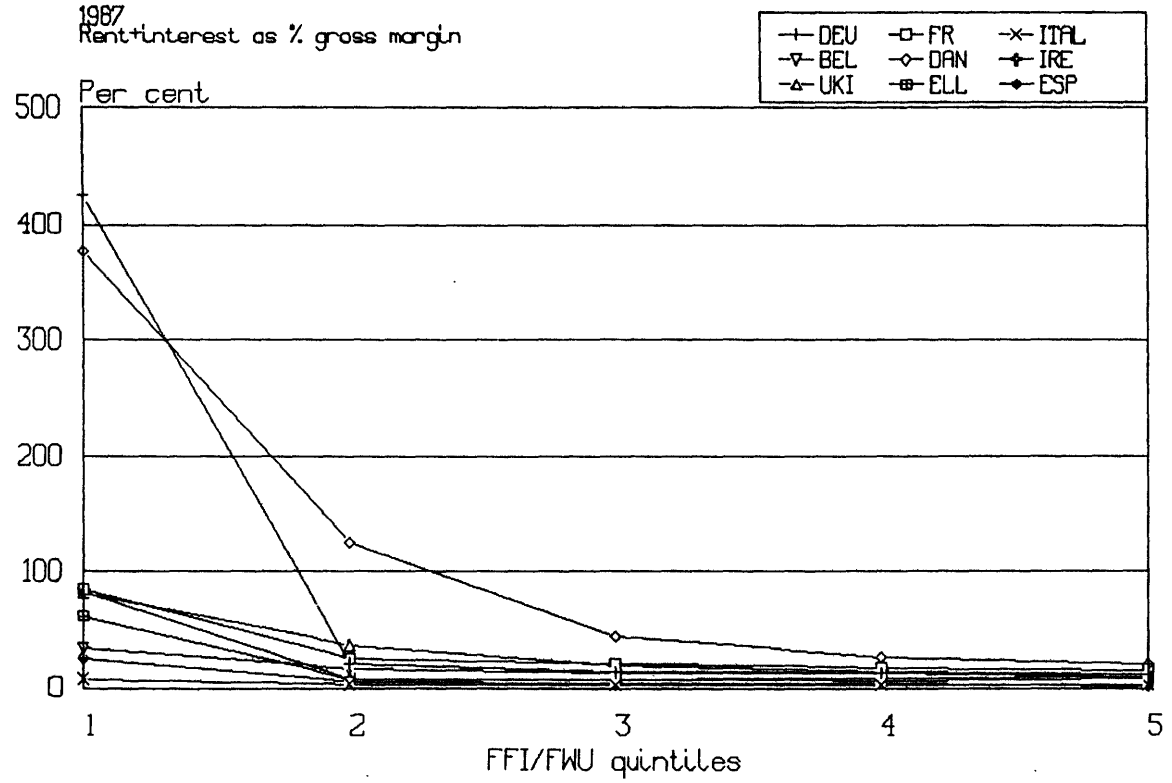


Fig A10.28a

Financial status and viability

1987
Interest and rent as % Gross margin

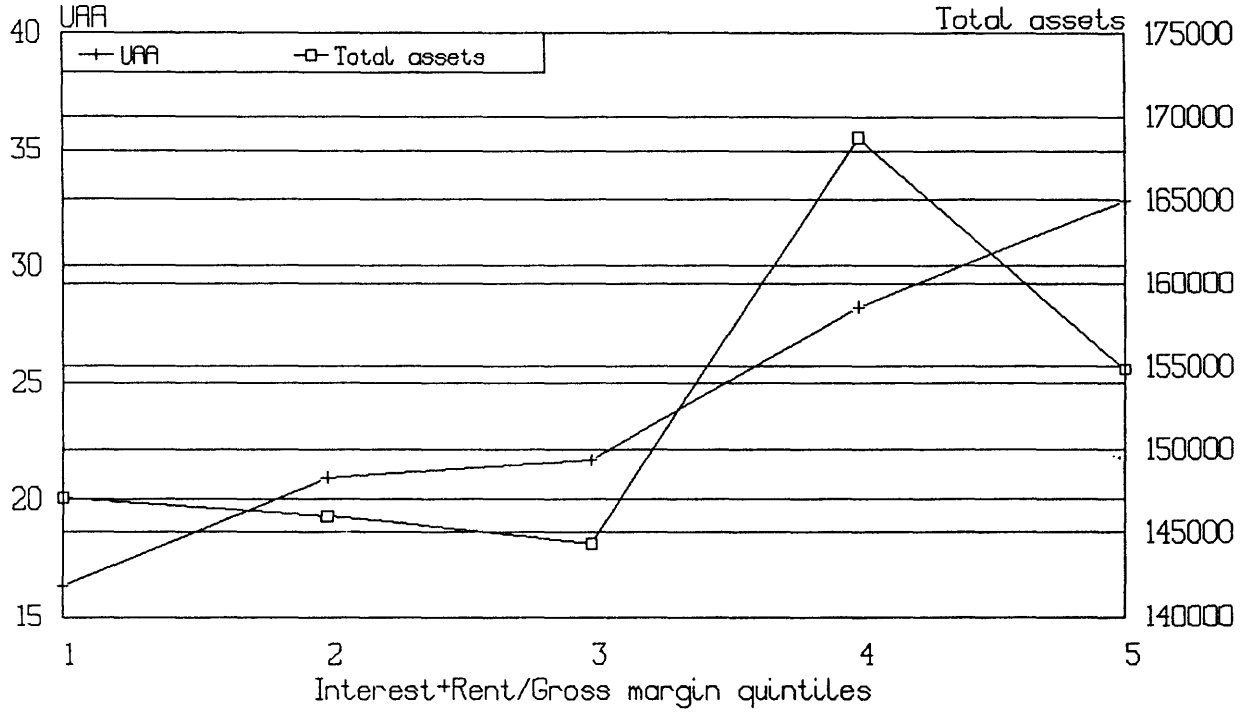


Fig A10.28b

1987
Interest and rent as % Gross margin

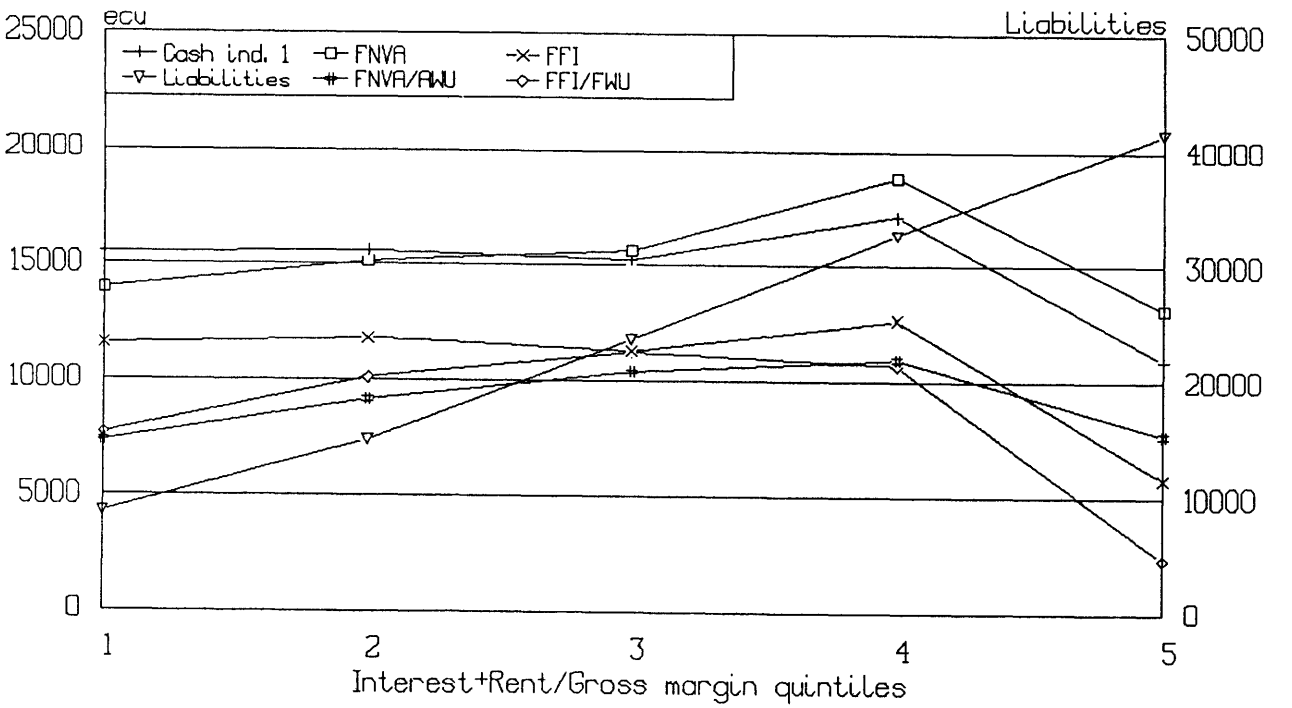


Fig A10.28c

Financial status and viability

1987
Interest and rent as % Gross margin

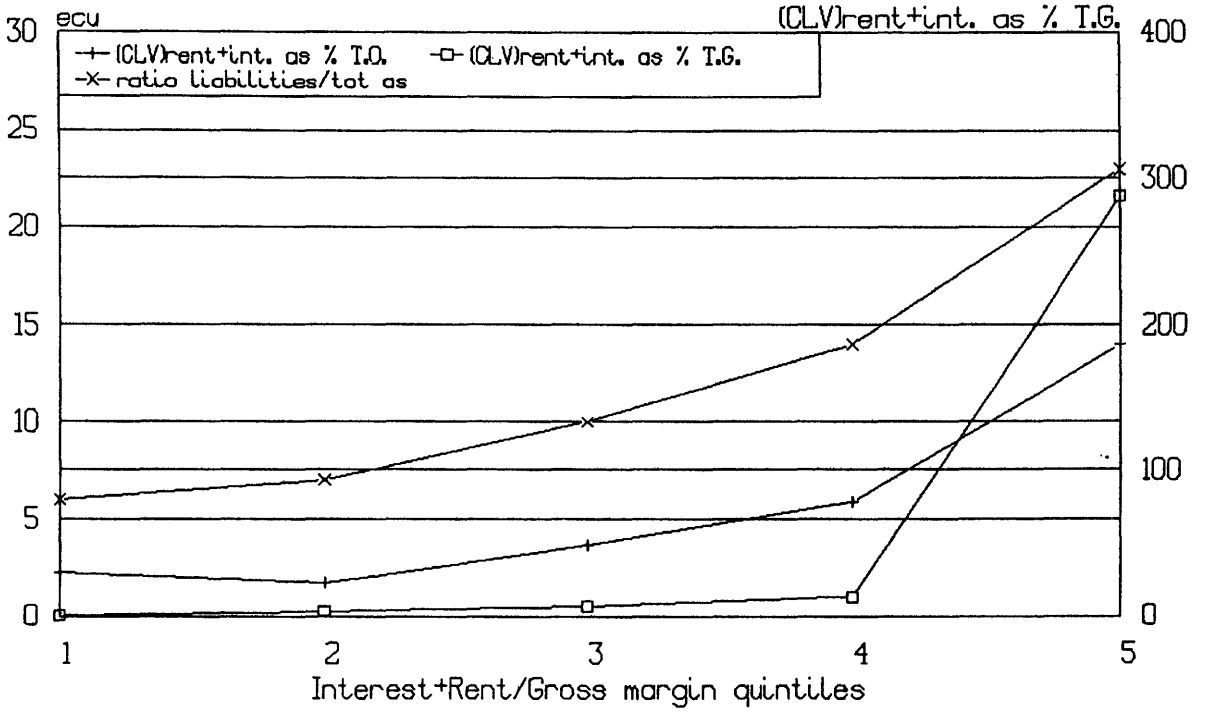


Fig A10.29a

Comparison of ECU exchange rates and PPS

FNVA

ECU exchange rates

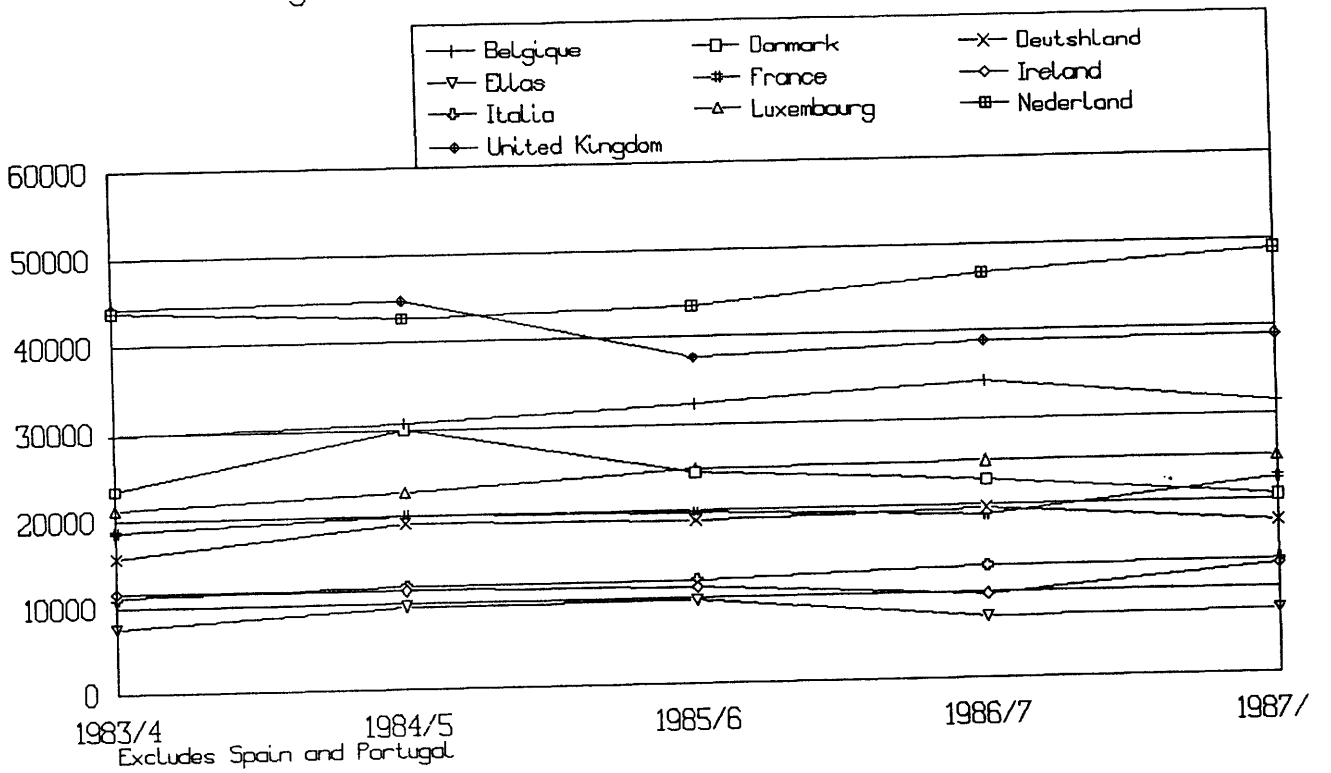


Fig A10.29b

FNVA

PPS rates

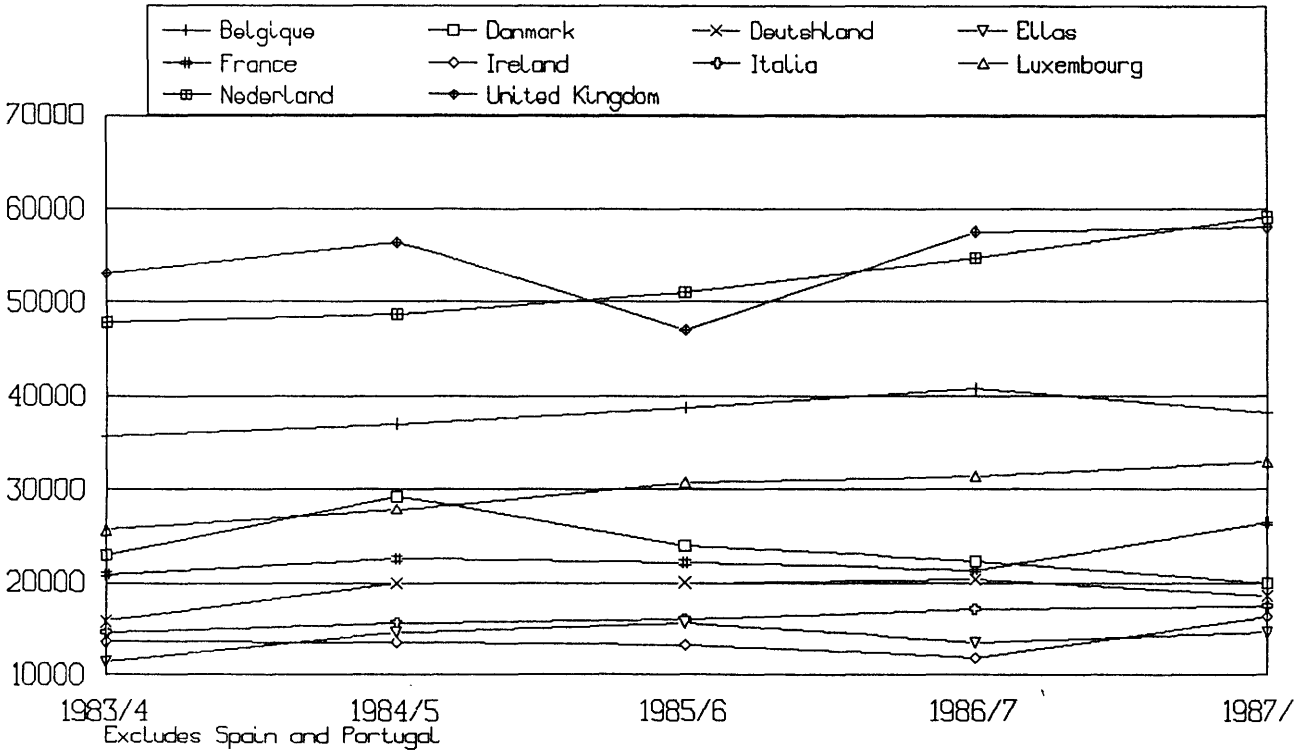


Fig A10.29c

Comparison of ECU exchange rates and PPS

FFI

ECU exchange rates

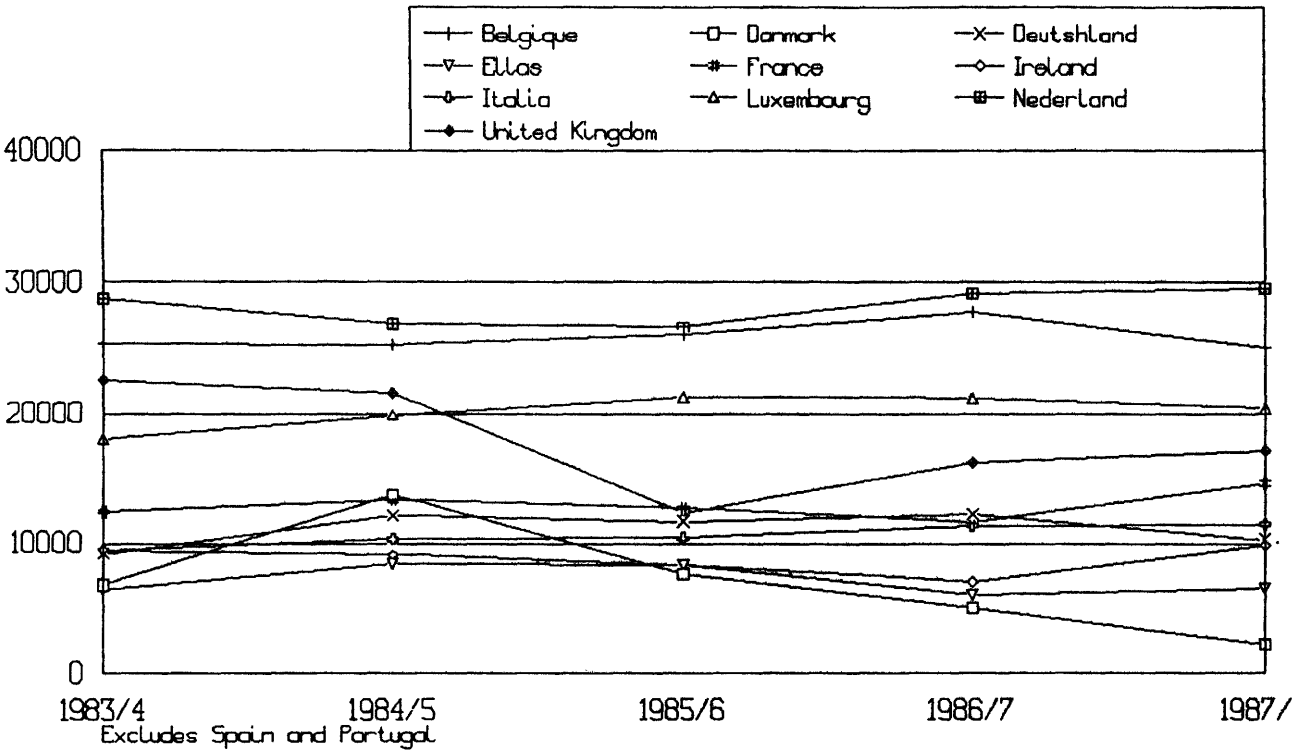
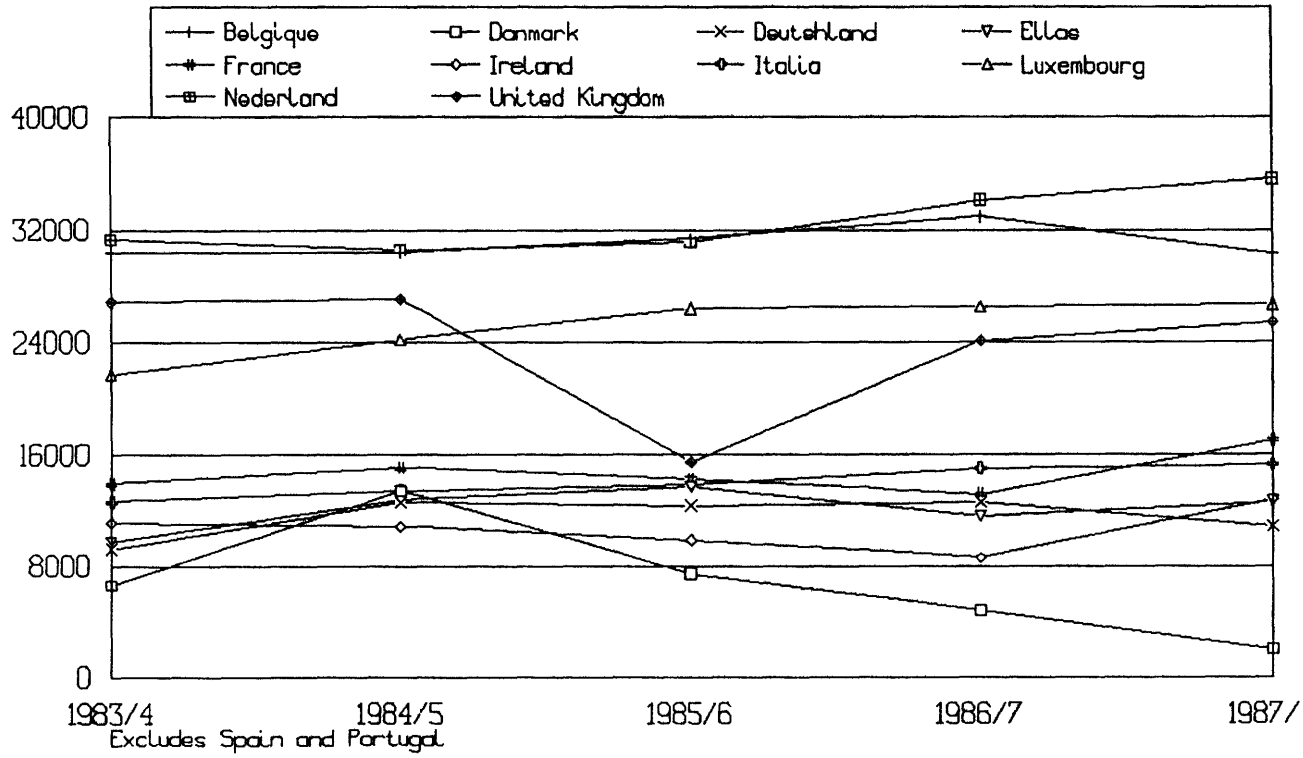


Fig A10.29d

FFI

PPS rates



CHAPTER 11: RECOMMENDATIONS FOR THE FUTURE DEVELOPMENT OF INDICATORS WITHIN RICA

11.1 Introduction

11.1.1 Here we bring together the salient points relating to the theory and practice of measurement of farm incomes which emerged from previous Chapters and assemble them into recommendations for the future development of indicators within RICA. These recommendations fall into two main groups:

(a) those concerning the types of data which are collected and the coverage of holdings and holders.
(b) those which involve a reworking of existing data to form new or additional indicators.

The first group includes proposals for indicators which would result in the need to collect data on aspects of the income situation of farmers which are at present not covered by RICA, and for changes in the field of observation to better represent the income of all those people who derive an income from agriculture (as distinct from the representation of total production). The terms of reference for this study were almost exclusively concerned with proposals for the second group, based on data already available, but it has become clear during the course of research that merely suggesting marginal adjustments to present practices would be an inadequate response to the evolving data needs of the CAP.

11.1.2 This research has been shaped by the objectives of policy. Time and again it has been necessary to pose the question of why measurement is needed. If RICA is to play an appropriate role in the monitoring and shaping of European Community policy, its must consider the more fundamental issue of the policy objectives it is expected to serve. Policy objectives lead on logically to indicators of performance. This objective-led approach is a prerequisite for assessing the appropriateness of alternative procedures and indicators for providing that information, questioning of the established practice in terms of coverage and sample. The first recommendation is therefore as follows:

> *Consideration should be given by the Commission, as user of RICA, of the information which is needed to serve present and future policies, predominantly the Common Agricultural Policy but also extending to others for which farm-level data could form an input (for example, spending under regional, social or environmental policies).*

In the absence of a recent official statement of the role of RICA data, inferences have had to be drawn on the information which is needed, judged according to statements of policy intent and uses of the existing data. These include the welfare of farm operators and their families, business profitability (and hence production levels and investment), and comparability of returns or incomes between the agricultural and non-agricultural sectors. Each will have its own set of appropriate indicators; there is a danger of using inappropriate indicators simply because they exist.

11.1.3 The main thrust of RICA has been related to measuring income developments on farms. Its methodology, rooted in surveys, means that its income information is inevitably less up-to-date than that emerging from the aggregate economic accounts for the branch agriculture, produced using a different methodology by Eurostat, though the RICA forecasting system can go some way to counter this disadvantage. RICA's role is more one of providing details which the aggregate figures are incapable of yielding, such as distributions by size, type and location of holding. Such details are of importance in a CAP which is turning increasingly to structural programmes and to the greater targeting of support. Recently the need to have information on the total income situation of farm operators and their families has risen in importance, though a case could be made that such a need existed from the outset of the CAP.

11.1.4 Some of the recommendations made here go to the core of the basis of RICA. They are in turn dependent on a fundamental questioning of the purpose of RICA within the information system of the EC. The greatest changes in stance of RICA relate to the recommendations concerning the extension of coverage to non-farm sources of income. It might be argued that the personal income situation of the agricultural community can be better pursued using alternative data sources, such as the Community's national family expenditure surveys. However, the fact that RICA exists using a

harmonised methodology backed by legislation, that it is conducted on an annual basis, that the additional information required is already collected in several Member States (indicating that it may be feasible elsewhere) all suggest that RICA should give careful consideration to extending its coverage so that the network can play a major part in providing statistics on the personal income situation of Community farmers. This may involve modification of the present legal framework. However, such modifications would be compatible with the purpose of setting up RICA - to meets the needs of the CAP.

11.1.5 The other area on which RICA was intended to throw light when first established, and which has received relatively little attention, is the "analysis of agricultural holdings". Such a phrase would include matters of profitability, efficiency, productivity, viability and other aspects of business performance which from time to time may assume significance to policymakers. Indicators which might be used to assess viability have a role to play when there is a desire to maintain the numbers of businesses in certain areas for social reasons, and data on the intensity of land use is similarly sought for use in policies concerned with extensification and the environment. Though perhaps not involving changes to the legal framework, the emerging needs of the CAP require that these hitherto little-explored analyses of performance be undertaken.

11.1.6 As a large and detailed data bank, RICA is a potentially valuable resource for a wide range of studies on the behaviour of farm businesses and their management. As part of many of these it will be desirable to manipulate the data in ways which are specific to the studies in hand. In making our recommendations, we have a more restricted view and have in mind only those uses and indicators which, judged by present and past demands, are likely to feature regularly.

11.1.7 The first two areas in which recommendations are made (11.2, coverage of information; 11.3, field of survey) belong to the group identified as (a) in 11.1.1 above. The third (11.4, longitudinal time series analysis) has elements of both groups (a) and (b). The remainder belong to group (b).

11.2 The coverage of information

11.2.1 There is ample evidence of the need to have available information of the total income situation of holders and their families, covering more than just the income arising from their farming activities. This comes from an examination of the objectives of the CAP (Chapter 2) with the related requirement for information on the living standards of the agricultural community, and from the observations about the personal income situations of farming households gathered from many fragmented data sources (Chapter 5). In addition to being a major and increasingly important determinant of farm families' ability to consume, also adding a degree of stability to their total income situation, the presence of additional income sources is likely to exert an effect on the farming behaviour observed on the holdings they occupy; a

satisfactory explanation of production and investment decisions is likely to require information on such additional income.

11.2.2 The first recommendation is therefore as follows:

> *Consideration should be given to the collection of additional information on income from off-farm sources (from independent activity, dependent activity, property, pensions and other transfers). This should be detailed for the farmer and spouse, and for other household members where possible.*

While in an ideal world a detailed and exact knowledge of this additional income (which may be the main income) should be collected, in practice some system of indicating bands into which the non-farm income falls may be the only practical possibility; this would be preferable to no information at all. Using this data, relationships between the economic parameters of the farm and household should be explored. For example, comparisons should be made between the levels of total income and farming income by size of farm and level of farming income. Those groups of farms (types, sizes and regions) with the lowest total incomes should be identified. One issue which must be confronted is the adequacy of measuring the monetary equivalent of income which agricultural households receive in kind.

11.2.3 The main income indicator used in studies of households as consumer units is disposable income. Also this is the main indicator which will emerge from the Eurostat TIAH project (Total Income of Agricultural Households); this indicator will come on stream for EC agricultural decision making in the early 1990s. The calculation of disposable income involves the deduction of some items which are treated as involuntary, such as personal taxation. In order to generate estimates of disposable income, and to be compatible with the Eurostat approach, we recommend the following:

> *Consideration should be given to the collection of data on taxation and other outgoings which would result in the calculation of disposable income along the lines of family budget surveys and similar in definition to that being employed by Eurostat for its aggregate indicator of disposable income of agricultural households.*

Analyses along lines similar to those in 11.2.2 above should be undertaken. Additionally, the tax take should be studied by size, type, income level and location of holding.

11.2.4 The unit over which income is measured for purposes of calculating disposable income is, normally, the household. RICA currently collects some information on the farmer and spouse and those family members who work on the holding. There is a need to expand this to include details about the household composition and its members. Consequently we put forward the

following recommendation:

> *Consideration should be given to collecting additional information about the farm labour force and household membership. For example, whether the hired and non-paid labour are members of the principal agricultural household (the holder's household) or have their own households, the years of birth of all members of the labour force (those of the holder(s) and/or manager(s) are already collected). The coverage of the household should identify members who do not work on the farm.*

Analyses of incomes could be generated according to socio-economic variables, such as the age of the farmer(s), presence of younger family members (potential successors), and numbers and sizes of households. Equivalence scales (which express children and additional adults as fractions) could be applied to give estimates of income per consumer unit for the entire household (including members who undertook no work on the holding), in addition to the more conventional measures of income per holding, per Work Unit, per household, and per household member.

11.2.5 We are aware of the practical problems of collecting data on non-farm income, tax paid and so on. Some are of a technical nature; for example, can declarations of non-farm income for taxation be accepted, with its conventions regarding non-taxed items and depreciation, or is a separate accounting system needed? Are details of incomes from employment only available net of tax and social contributions? Some concern the implications for the existing data collection system of imposing additional questions on non-farm income; some commentators feel that the response rate in what is in Member States a voluntary[1] survey of farm accounts would suffer.[2] Nevertheless there are models of procedure which an extension of RICA in to these areas of personal income might follow. Many of the required items are already collected within the farm accounts systems in FR Germany, the Netherlands, Denmark and, more recently, the UK. There are other examples outside the EC. These suggest that the task is feasible.

11.2.6 In this Chapter the focus of our attention is on measures of income.

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[1] The extent to which the individual farmer is required to give active cooperation in providing data is not clear from the Farm Accountancy Data Network: An A to Z of methodology (Commission 1989). For example, the position of a farmer who is approached as a potential cooperator in an official survey is perhaps different from one who regularly has his accounts processed by a farmers' association, in the knowledge that some of the accounts in the care of the association are forwarded to the national Liaison Agency as part of RICA.

[2] In the context of Eurostat's Total Income of Agricultural Households (TIAH) project Belgium has proposed a series of interlocking sample surveys, each concentrating on only one form of non-agricultural income (see Hill 1988). In this way no single farmer reveals the entirety of his income situation (which should minimise non-response) yet an overall picture of the incomes of a group of farmers can be established.

However, a related major issue is the ways in which these measures are used. Though there is a continuing interest in group averages, with increasing emphasis on the targeting of support by the CAP there is a need to know more about distributions within groups. For example, what proportion of farmers of a particular type have total incomes below some arbitrary threshold?

11.2.7 It has been shown (Chapter 5) that personal incomes in single years are not a good guide to longer-term income levels or to consumption spending. Hence there is a need to examine incomes over several years. This is a specific example of a general recommendation for longitudinal income studies, outlined below. The stabilising influence of non-farm incomes should be assessed. Questions on the relative stability of incomes on small or large farms, on high income or low incomes farms, by farming type and other factors should be addressed.

11.2.8 Studies have shown wealth to be a parameter of the economic situation of agricultural households. Personal wealth has been inadequately represented in the official monitoring system. To some extent, the influence of income-yielding wealth will be taken into account by the recommendations above to cover non-agricultural incomes. However, a more complete picture would be reached if the presence of wealth other than that represented by the farm business (which is already covered by the holding balance sheet data) could be obtained. Though given less weight than the above, our recommendation is that:

> *Consideration should be given to identifying and, where possible, valuing assets held by agricultural households, including non-agricultural net worth.*

Exploratory calculations should be made of economic status, its changes and distribution. Even in the absence of information on non-agricultural net worth, calculations based on data already available (on farm income, farm net worth, the age of the holder) and on additional information (such as interest rates) which may be readily to hand should be explored and comparisons drawn with other socio-professional groups.

11.2.9 Finally in this section, we must draw attention to the need to consider the collection of additional information on the costs faced by individual enterprises. The main thrust of this report is on the income and business analysis of the whole farm business. However, it was noted in Chapter 2 that RICA receives requests for analyses of the costs of production and profitability of milk, cereals and other commodities. At present RICA data on inputs relate to the whole farm business and are not allocated between its constituent parts. Therefore the preparation of gross margins or other partial indicators at the enterprise level direct from RICA returns is not possible. Though econometric analysis using whole-farm data could be used to throw light on enterprise performance, a more direct approach would be to request from Member States a breakdown of farm-level information on the use of intermediate consumption

items (fertiliser, fuel and so on). Such additional information could, perhaps, be provided on a regular basis from an elaboration of RICA. It might, however, be better collected on an occasional basis using special enterprise surveys. We are not in the position to recommend one option over any other. Though enterprise performance lies outside the main area of our study, there does appear to be an information gap which could impinge on the direction in which RICA is to be developed.

11.3 The field of survey

11.3.1 The nature of the field of observation (to which the sample relates) should be considered. In some Member States (especially the southern countries) it is felt that RICA is incapable of revealing much about the incomes of farmers because large numbers of them are excluded from the survey.[3] RICA has never attempted to monitor the income situation of all producers, but only those falling within a (defined) field of survey. In practice this has meant the imposition of a minimum size threshold, so that the overwhelming majority of production is represented, but no regard has been taken of the actual occupation or income structure of the occupiers. Many occupiers of small farms, some without other sources of income, are not represented. This was perhaps satisfactory when policy emphasis was on encouraging production and with the "commercial" farming activity which gave rise to the vast majority of marketed output, but is less acceptable now that there is more concern with the welfare of the members of the agricultural community. Our recommendation is therefore that:

> *Without necessarily reducing the ability of RICA to represent the great majority of production, thought should given to expanding or modifying the RICA field of observation so that it can be used as a means for representing the incomes of the great majority of people who are involved in agricultural production.*

11.3.2 This is not the place to discuss in detail the sampling and other statistical procedures appropriate to this end. One approach might be still to base sampling on the population of agricultural holdings, but to extend coverage to holdings which presently fall below the minimum size threshold. This could be done as part of the main survey; an alternative would be to hold a supplementary survey of these very small farms, which could be added to the main survey for some analytical purposes. The questions posed to the occupiers of very small holdings could be less comprehensive, reflecting the

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[3] In 1988 RICA's field of observation covered 95 per cent of all Standard Gross Margin (EUR10) but only 56 per cent of holdings (and therefore of holders) which appear in the Farm Structure Survey. In Italy and Greece, where the official percentages of holdings covered were 54 per cent and 53 per cent respectively (Economic Results of Agricultural Holdings No 6 - 1988-89, Commission 1991 forthcoming), a view has been expressed that RICA covers an even smaller proportion of people who consider themselves as farmers (see Hill 1988), presumably because they fall below the qualification for inclusion in the Structure Survey.

simpler types of economic activities taking place there. Another approach, less likely because of technical difficulties in some Member States, would be to rebase sampling on the population of farmers and spouses, selected from income or labour registers. On balance, it seems to us that RICA sampling, weighting and raising will continue to be based on the population of holdings. However, some analyses of the resulting data should be based on the socio-professional characteristics of the operators or operator-households, such as those who are deemed to be part of the "agricultural community" mentioned in Article 39 of the Treaty of Rome and those who are not.

11.3.3 A key decision in any such move must be the definition of what constitutes this "agricultural community". Possible definitions were put forward in Chapter 5. The one adopted by Eurostat, and therefore worthy of consideration for the sake of consistency within the agricultural data system, is in terms of households, agricultural households being those in which the sole or major source of income comes from self-employment (independent activity) in farming. An acceptable alternative might be those households headed by a reference person whose main occupation (judged on the basis of time or income or both) was as a farmer. Any such definition requires knowledge about other sources of income, though not necessarily in great detail.

11.4 Longitudinal time series analysis

11.4.1 The economic circumstances of holdings (and of farmers) are traced by RICA in terms of group averages. Over time the composition of the sample can change substantially, though there are facilities for comparing changes for the same group of farms in two adjacent years. One important finding of this Report, emerging in many different contexts, is the need for an ability to follow the circumstances of individual farms over a run of years. It is important to consider more than one year when examining personal incomes (Chapter 5, referred to in 11.2.5 above), incomes from farming (Chapter 3), efficiency and productivity (Chapter 6), profitability, business performance, financial status and viability (Chapter 7). Findings from the exploratory analysis of RICA serve to underline the desirability of such an approach. Thus our recommendation is that:

> *Steps should be taken to establish an identical sample of farms covering a number of years, so that their economic performance over this period can be examined.*

11.4.2 The length of period will depend on the type of economic problem under investigation, but empirical evidence suggests that much of the short-term variation caused by random factors is eliminated by taking a three-year average. Other studies have used five years. Eurostat, for purposes of describing long term income trends, has used a three-year moving average (Chapter 3 of the 1989 Agricultural Incomes report, Commission 1990), and for comparing absolute income levels in Member States has adopted a five-year average (Chapter 4 of the same report). Studies of patterns of growth might, however, use longer time spans. Our recommendation is that, on balance:

For the purpose of examining income movements, RICA should average (real) incomes over periods of three years.

11.4.3 If participation in farm accounts surveys has an effect on farm performance, there will be a need to constantly replace part of the RICA sample to maintain its representative nature. There may be a trade-off between the desire for information which is representative and that which can only come from a constant sample, which may be becoming less representative with the passage of time. Bearing in mind that the present RICA samples in most Member States may not conform to strict representivity, participation being voluntary, we recommend that:

RICA considers the competing information needs for which different forms of sample are appropriate, and establishes some orders of priority.

11.4.4 Various statistical approaches might be used which need not compromise the reliability of the results. A separate identical sample might be maintained for longitudinal studies. Businesses which have participated in the main sample for, say, five years and are due for displacement may be retained for the supplementary longitudinal sample. The respective advantages and disadvantages of alternative methods involving separate or combined samples requires professional advice from statisticians. What is clear is the need for some information that can only be obtained from farms which can be traced through a number of successive years.

11.5 Indicators of farm income

11.5.1 There are two distinct lines of argument underlying the choice of income indicators. The first is that microeconomic equivalents are needed for the indicators used at macroeconomic level in the aggregate economic accounts for the branch agriculture, produced by Eurostat. Part of the function of RICA should be to amplify these aggregate findings by providing distribution by size and type of farming group, region and so on. At present equivalents of only two of the existing four indicators are generated by RICA. Our recommendation is that:

RICA should produce equivalents to each of Eurostat's Indicators 1, 2 and 3 and its Cash Flow, using definitions as similar as is feasible.

This means the continuation of calculating FNVA/AWU and FFI/FWU and, in addition, the development of equivalents to "Net income from agricultural activity of total labour input" (termed Income to Labour 1 in Chapter 9) and of a cash flow using the Eurostat formulation (Cash Indicator 1 of Chapter 9).

11.5.2 Bearing in mind the need to collect additional data on non-farming income, taxes and so on, covered in 11.2 above, this policy of generating a

microeconomic equivalent should be extended to the new Eurostat indicator of household disposable income, expressed per household, per household member and (using equivalence scales) per consumer unit.

11.5.3 The second line of argument concerns the choice of indicators for the monitoring of farm business incomes *per se*. Chapter 3 described a wide range of these, varying in their degree of partiality in terms of coverage from, at one extreme, forms of cash flow to, at the other, measures including both current income and capital gains. Of the many set out in Chapter 9, and explored in the analysis described in Chapter 10, Family Farm Income is the concept which appeals most as an indicator of the surplus generated by the business for its operators which is available for consumption spending, investment or saving. It is much more straightforward to interpret than the current main measure (FNVA/AWU). Our recommendation is that:

> *Family Farm Income (FFI) should become the main concept used in describing the income situation of farms. We have a preference for expressing this on a per holding basis, but we would accept the desirability of also making estimates per FWU, assuming that the labour units are reliable.*

This is the residual reward to all the unpaid labour used on the holding. Family labour which is paid a normal wage is, in practice, treated as hired labour and its costs are deducted in reaching FFI.

11.5.4 In the short run cash flow measures are attractive for indicating changes in income. Our recommendation is for the following to be adopted:

> *Cash Indicator 1 (cash flow following the approach used by Eurostat)*
> *Cash Indicator 3 (cash flow as defined by RICA)*

The difference between the two is illustrated in Figure 11.1. In line with the recommendation given in 11.5.1 above, there should be liaison with Eurostat on the exact treatment of some of the elements within the calculation of Cash Indicator 1 to ensure conformity.

11.5.5 Income measures are also needed to indicate the residual reward remaining to all the fixed factors, or those owned by the farmer and his family. In this context the most promising are:

> *FNVA per holding (the reward to all the "fixed" factors)*
> *Standardised Income 1 (businesses converted to "full equity", being FNVA minus the remuneration of hired labour) per holding and per FWU*
> *Standardised Income 2a ("Management and Investment Income") per holding.*

The ways in which the new and existing income indicators relate to each other are illustrated in Figure 11.2.

Fig 11.1 Relationship of the recommended cash indicators

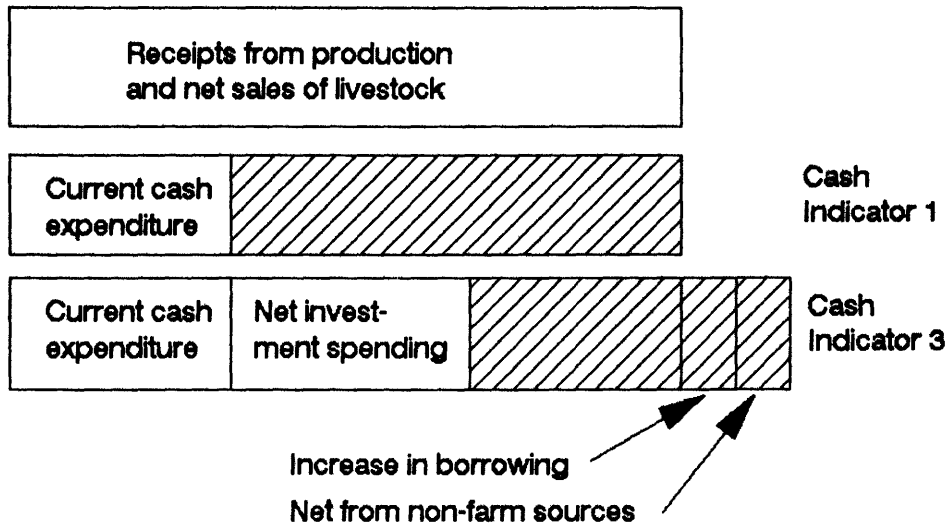
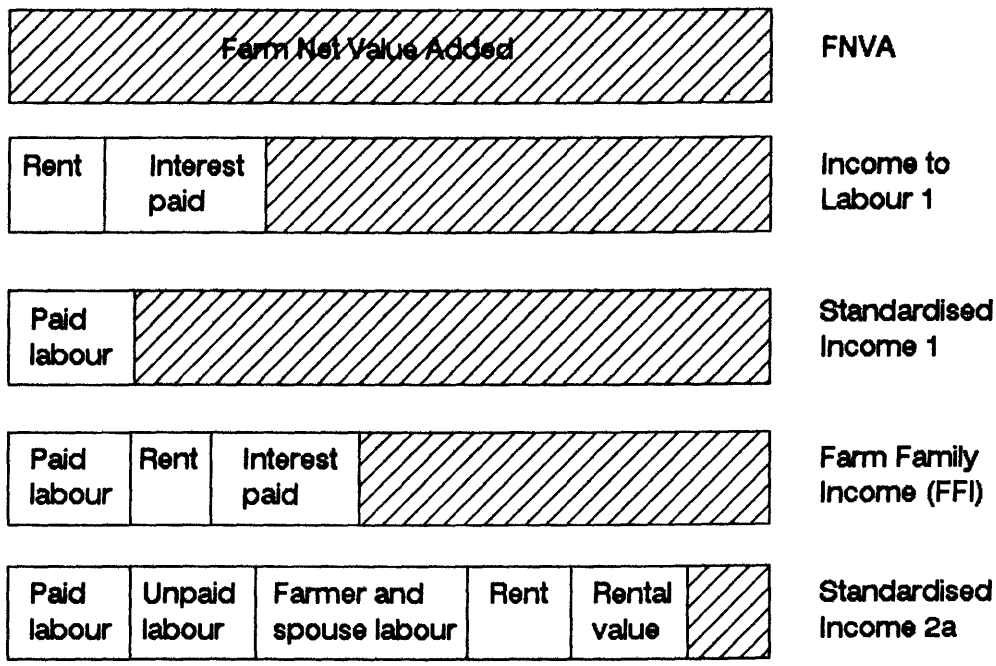


Fig 11.2 Relationship of the recommended farm income indicators



11.5.6 Among the multitude of income ratios which were considered in Chapter 9 and reported in Chapter 10, the following proved to be of particular interest:

FNVA/Total output (%)
FFI/Total output (%)
Cash Indicator 1/FFI (%)

Bringing together the above, the recommended list for consideration for regular calculation becomes:

Cash Indicator 1
Cash Indicator 3
FFI
FFI/FWU
FNVA
FNVA/AWU
Standardised Income 1
Standardised Income 2a
Income to Labour 1/AWU
FNVA/Total output (%)
FFI/Total output (%)
Cash Indicator 1/FFI (%)

11.6 Indicators of efficiency and productivity

11.6.1 Substantial reservations were raised in Chapter 6 concerning the use of whole-farm and partial measures of average factor performance. Nevertheless, as long as their limitations are understood so that they are not misused, there are circumstances in which such measures have a valid part to play in monitoring and guiding policy. The calculation of these simple average performance ratios should not, however, be seen as a substitute for econometric studies in the areas of efficiency and marginal relationships; such studies could find the large data base a valuable resource.

11.6.2 We have been convinced of the desirability of generating an overall farm business performance indicator, and therefore recommend the following:

RICA should calculate a Total Factor Product (TFP) ratio. Of the alternatives considered in Chapter 10, the preferred formulation is TFP3. This is the value of total enterprise output divided by the cost of a bundle of inputs comprised of intermediate consumption plus depreciation plus actual labour costs and imputed charges for the labour inputs of the farmer and other unpaid workers.

11.6.3 The ratio of output to inputs is affected to a high degree by the cost imputed for the unpaid labour; the relative performance of farms of different sizes can be transformed by the rates chosen. Some apparent anomalies have

come to light which suggest that improvement in the methodology adopted to produce the statistics used in this report is possible. Thus our recommendation is that:

> *RICA should investigate the alternative methodologies for imputation and should review the sensitivity of the patterns of relative performance to the assumptions built into them.*

11.6.4 Among the partial productivity measures, we recommend the calculation of the following:

> *Total output per ha*
> *Total output per AWU*
> *Standardised Income 2a (Management and Investment Income) as a percentage of total assets (excluding land)*
> *Cash Indicator 1 as a percentage of Total assets (excluding land)*

11.7 Financial status

11.7.1 Of the measures of financial status we suggest that the following be estimated regularly:

> *Total external liabilities as a percentage of Total assets*
> *Current liabilities as a percentage of Current assets*
> *Rent and Interest as a percentage of Gross Margin (output less variable costs)*

However, as is pointed out below, there may be some methodological difficulties with the last; Total Output might be substituted for Gross Margin.

11.8 Groupings and distributions

11.8.1 In Chapter 9 alternative ways of grouping farm businesses were considered. It is apparent that the relationships between **size** and income, intensity or efficiency are dependent on the criterion of size chosen. Which parameter is appropriate will depend on the policy problem in hand. For income and intensity purposes there are arguments for using UAA, AWU, Total output, and Total assets (excluding land) in addition to the ESU measure which is currently dominant. Limited analyses according to these measures should be undertaken in relation to problems for which each is appropriate.[4] In our interrogation of RICA data, grouping by size decile proved to be particularly enlightening, provided that absolute group means for the size parameter were also available.

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[4]It should be noted that the latest (1990) RICA Report for the year 1986/7 contains Level 2 analyses by size measured in ESU and UAA.

11.8.2 Of the other business parameters explored, many are appropriate for the grouping of farms to investigate particular problems. For example, studies of the environmental consequences of farming activity might wish to look at the income levels of farms grouped according to their intensity of land use, measuring the average incomes of farms with high or low outputs per ha. or high or low inputs per ha. Which analyses should be a regular feature of RICA reports and which the subject of special investigation is a matter of judgement, though our interpretation of policy demands and priorities lead us to suggest that attention should fall on the family or non-family nature of the farm, farms of low or high performance, and farms which vary in their viability.

11.8.3 The relative performance of **family and non-family farms** has engaged our attention. Various ways exist of defining a "family" farm. The ratio of family labour to the total labour on the farm (FWU/AWU) is a defensible and practical method of distinguishing between family, intermediate and non-family operation (see Chapter 10.9 above). There are differences between the groups in terms of many aspects of their performance; some of these can be linked with the greater sizes of non-family farms, though there is also evidence which suggests real differences exist. Non-family farms contain certain businesses which, though they use substantial amounts of hired labour, do not engage the farmer or any member of his family full-time. Our conclusions are as follows:

> *RICA should consider analysing farms according to their family status, based on labour input composition, as part of its regular breakdown of results. The relative incomes and business performances of family and other types of farm should be explored within each type and within each size group at Member State level.*

11.8.4 A need to clarify some methodological points can be expected to emerge. In particular this will centre on the reliability of the estimates of the labour
input of the farmer and spouse, and the appropriate treatment of those members of the family who are paid a regular wage from the farm (and who may or may not form part of the farmer's household).

11.8.5 Our exploration of farms with **different levels of performance** suggests that this form of analysis is also worthwhile.[5] Of the criteria of performance tried in Chapter 10, FFI/FWU produced results which were more instructive than FNVA/AWU. Given that the former is gaining importance within policy, it seems the criterion to prefer. We found results based on levels of FFI (per business) easier to interpret, showing that those with lowest incomes are not, on average, the smallest farms. Though the level of borrowing helps explain

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[5]The 1990 RICA Report contained an analysis at Level 2 of holdings grouped by FFI/FWU into seven classes. This had not been published at the time when the analysis for the current research was designed. Such an analysis by level of performance is, of course, to be welcomed.

their income level, there is also some suggestion that this group also contains farms which are only temporarily in a low income position, brought about by transitional low output. This points once again to the desirability of being able to consider individual incomes over a run of years. The recommendation is therefore:

> *RICA should conduct regular analyses by level of performance, as shown by FFI/FWU and FFI per business in order to concentrate attention on those holdings where incomes are particularly low.*

11.8.6 The examination of viability was very limited because data were only available for single years, with no links across years for individual farms. The attention was therefore focused on farm businesses which might be considered to be under financial stress. It seemed that, among the possibilities tried, Interest and Rent as a percentage of Total Output formed a particularly interesting basis for analysis, and the recommendation is that this should be pursued. When exploring Rent and Interest as a percentage of Gross Margin, which might be thought to have greater potential for indicating stress caused by these fixed costs, problems in interpretation were caused by some very atypical figures in a few countries, suggesting that caution should be exercised until the methodology used is checked.

11.8.7 Nevertheless, it was felt that RICA data offered substantial possibilities for predicting those businesses which are likely to be in financial difficulties. It would be a relatively simple matter to deduct from Gross Margin other external costs (such as hired labour, actual rent and interest) and to impute a minimum level of living expenses for each unit of family labour. This minimum might be taken from the European Community's network of family budget surveys, or related to average wage levels in the region, or set arbitrarily. The residual might be interpreted as the margin available for reinvestment and hence the continuation of the business. Negative residuals might be indicative of imminent disappearance of the business. What the level of imputed living costs should be, and how these should be modified to accommodate households of different sizes, are important methodological issues. Another approach might be to start from a cash flow measure, with the ability to borrow also taken into account. Our recommendation is that:

> *RICA should experiment with different formulations of the margin available for reinvestment, including a range of estimates of minimum living expenditures for the farmer and his family. The sizes of these margins should be compared with actual changes at the farm level over a prescribed period, including the complete disappearance of businesses.*

11.8.8 For each of the three issues explored above, especially the last, a knowledge of the sources of income to the farmer and his family coming from outside the farm would have added an important, often a fundamental, dimension which is currently missing. This only underlines the point made earlier; that the understanding of the income position of farmer households and

the ways in which they operate their farms requires full information, not just that relating to their farming.

11.9 Comparing across Member State boundaries

11.9.1 There are good theoretical reasons to be very cautious about making comparisons between Member States on the basis of farm incomes. For a host of reasons (including the incidence of non-farm income, different taxation regimes, the valuation of goods and services produced on the farm, the nature of income from independent activity as a mix of rewards, and so on), the relative levels of income from farming in different countries should not be assumed to directly represent differences in potential living standards. It may therefore be wise to restrict comparisons across national boundaries to the productivity indicators for single factors (output or NVA per AWU or per ha, etc) or other concepts far removed from that of the incomes of farmers. Nevertheless there is likely to be a demand for such income comparisons based on absolute figures taken from RICA, and therefore there will be a need to convert national currencies to a common monetary base.

11.9.2 From the discussion in Chapter 3 it was evident that there is no single and perfect means by which such conversions can be effected. Both the ECU exchange rates and Purchasing Power Standards (PPS) have merits and drawbacks. At present RICA uses the former. However, where the intent is to interpret income measures as indicators of the ability of the farm business to generate funds which the operator can consume or save, then it seems more appropriate to use PPS. This is also in line with the thinking of Eurostat in the context of the economic accounts for agriculture, where the two means of conversion are published together at present. However, in the absence of PPS for agriculture income receivers alone, PPS for the whole economies have to be used.

11.9.3 At present Eurostat uses real GVA/AWU and NVA/AWU as the income indicator by which absolute income levels in Member States are compared. This seems inappropriate where the superior income measure of Farm Family Income is available. PPS is more appropriate for comparing FFI than for value added.

10.9.4 Our experimentation with using the alternative conversion coefficients and three income indicators (FNVA, FFI and the cash indicator currently used within RICA) found that the relative position of Member States was little altered by the choice of ECU rates or PPS. Much larger changes in ranking resulted from the choice of the income indicator, with the position of Denmark in particular being much lower when ranked by FFI than by FNVA.

11.9.5 Our recommendation is that:

> *Before any comparisons between Member States are undertaken, attention should be given to the objective of the comparison, since*

this will affect the choice both of the indicator and the means of conversion to a common monetary base. For the purpose of comparing absolute levels of income between Member States with the intention of assessing the relative command over consumer goods and services, the appropriate income indicator seems to be Farm Family Income and the conversions from national currencies should be made using Purchasing Power Standards.

11.10 Wider availability of data

11.10.1 Perhaps the greatest impression gained from using RICA data in the course of producing this report is of the enormous analytical potential which it contains. The possibilities for arranging and classifying the data seem almost endless, and the research team frequently found themselves exploring hitherto uncharted avenues of importance to agricultural policy simply because the information was now available in electronic spreadsheet form and hence fairly easy to manipulate. Questions we have considered include, for example, are low income farms low intensity users of land?[6] How does this vary between countries and by type? What happens to the residual income of the farmer and spouse if wages have to be paid to family members at the rates paid to hired workers? Even though there are problems with the present coverage in terms of questions asked, sample and time series, the data bank contains so much of potential value that we put forward some suggestions for its greater use.

11.10.2 There is a balance to be struck between, on the one hand, the standard tables RICA publishes on a regular basis as part of its monitoring of the incomes of farms for the purpose of assisting with decision-taking by the CAP, and on the other hand those analyses which are of policy importance but which represent extensions to current practice. Some of these, can be satisfied by occasional examination.

We therefore fully support the plans which RICA has in hand to publish a "Periodic Report" which enables the longer-term income and other characteristics of the sample to be described, and for specific policy issues to be explored (such as the relative performance of family and non-family farms).

11.10.3 Not all the possible forms of analysis which might be of interest to potential users are likely to be generated as part of regular or periodic publications coming from RICA. There must be many other possible manipulations of data which are of concern only to agricultural economists and farm management experts. We have been convinced of the usefulness of tabulated data in electronic spreadsheet form. While not denying the

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[6]When farms are arranged in FFI decile, for EUR12 output per UAA increases progressively from the lowest to the highest income farms. However, intermediate consumption spending (plus depreciation) is virtually constant across the decile.

advantages which might flow from a wider access to the raw RICA data, such as more advanced forms of econometric study, in practice many issues can be explored from tabulations of grouped results. The number of people capable of working on the data using microcomputers if tables were issued using Lotus 1-2-3 (or some other common package) would be much greater than those who might use raw data tapes, needing special programmes and a main-frame computer capacity.

11.10.3 Careful consideration would need to be given to the nature of the contents of the spreadsheet tabulations. The degree of accounting detail should be balanced against the size of files, since they should remain within the handling capacity of frequently-encountered microcomputers. One option might be to make all the tables of the published annual RICA report available in electronic form. The latest (hardcopy) RICA Report (1990, covering the year 1986/87) contains a wealth of information, giving the detailed Level 1 results by Member State, and the less detailed Level 2 results by Member State subdivided (separately) by region, type, economic size, UAA, Less Favoured Area status, FFI/FWU and FFI/FWU quintile. To put all these in electronic form would not increase the amount of data available, but would greatly add to the ease of creating additional variables, charting and so on. An alternative option would be to issue all these tables at Level 1, which might remove the necessity to publish at this level in hardcopy. Also the use of more classification intervals (for example, decile rather than quintile, or a greater number of ESU size groups) becomes more feasible.

11.10.4 In practice some intermediate level of detail may be the best compromise. The present research project has been supplied with tables which corresponded broadly with Level 2 of the standard RICA analysis (but somewhat more detailed, and with interest, rent and hired labour costs shown separately), with businesses grouped according to a variety of criteria (by various measures of size, level of performance and so on). Of the various size criteria, ESU and UAA have obvious attractions for priority. In terms of breakdown, tables were subdivided by Member State and by farming type, but not by both. It is our experience that, even at this level, there is a tendency to be overwhelmed by the volume of data and ways in which it can be analysed; this is not intended as a negative criticism.

11.10.5 As the data are already published in weighted form, there does not seem to be, on *prima facie* examination, additional problems of confidentiality to be overcome. However, suitable methodological background documents would be needed, and some indication of the statistical reliability of the results attached. With these caveats our recommendation is that:

> *RICA should consider giving wider access to the results of analysis by making available tabulations in electronic spreadsheet form, usable by standard commercial packages and broken down by Member State and type of farming, with size groupings based on at least two measures of size (ESU and UAA).*

11.10.6 This last recommendation, while not directly within the terms of reference of this research study, seems fully in line with the aims set for RICA, given in Chapter 1, of providing objective and relevant information on incomes in the various categories of agricultural holdings and on the business operation of holdings coming within categories which call for special attention at Community level.

11.11 A retrospective on the terms of reference and work tasks for this research

11.11.1 Reference back to the tasks set for this research project (1.5.3) and comparison with the contents of this report shows that seven out of eight tasks have been attempted. The outstanding one is the preparation of a methodological handbook (or a supplement to an existing handbook) detailing the definitions found to be of most value to a range of policy contexts. Indicators have been described in broad terms, but their exact constitutions in terms of the variables shown in the legislation on the RICA farm return have not been listed. We think that such a precise listing would not be particularly helpful. As will have become apparent, the most of the indicators reviewed here are not novel. Many are already in use within the RICA system. Others are based on concepts used by Eurostat; detailed examination of the Eurostat methodology will be required and the availability of equivalent data within RICA will be needed in order to reach a satisfactory uniformity. Yet others are outside both frameworks; of these some, such as disposable income, have models within the Community information system, but the precise details needed to make them operational within RICA require further discussion. Hence the definition of many of the new indicators is better handled on a progressive basis rather than by prescription at this stage.

11.11.2 Each of the broad aims of the research project appears to have been tackled (see 1.5.1). The appropriateness of the existing indicators and the scope for developing new ones (both within the present RICA data framework and those which necessitate collecting additional information) have been reviewed (sub-aims (a) to (c)). However, judgement of the saliency of indicators cannot be undertaken in the absence of clear statements of why measurement is taking place. The greatest advances in the calculation of economic indicators are thus likely to flow from a closer examination of objectives of policy and how RICA is expected to serve those objectives rather than a study of the indicators themselves.

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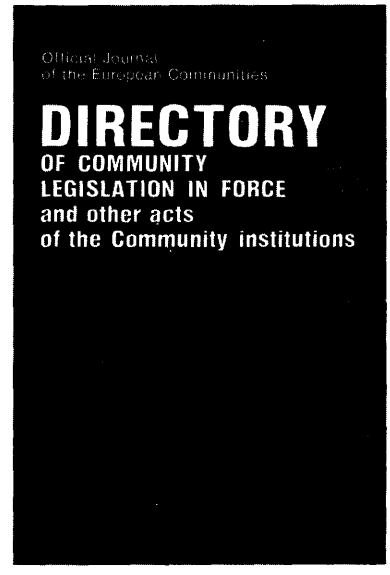

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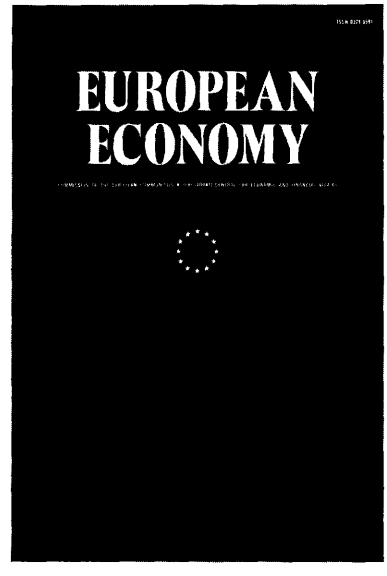

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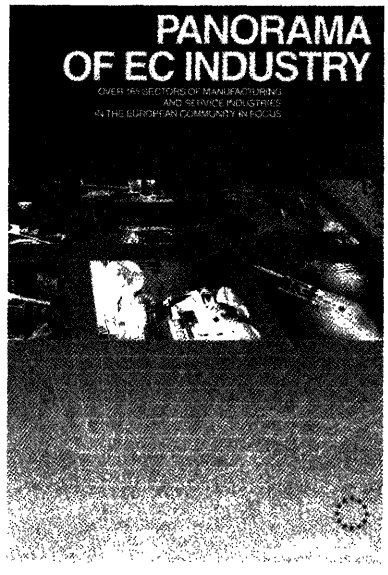

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