

SAMs, THE SNA AND NATIONAL ACCOUNTING CAPABILITIES

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In this paper, the author argues for radical revision of the 1968 SNA in the direction of simplification, in order to give greater emphasis to essential concepts, and for flexibility, so that each country can develop its own SAMs within a general conceptual framework as a response to domestic priorities and issues. It is suggested that general equilibrium models should replace input-output as the central conceptualisation of the system, leading to an equal emphasis on prices and quantities, and an equal concern within the SNA for income distribution, factor markets and production structure, set in the context of external flows and balances.

1. INTRODUCTION

The United Nations System of National Accounts (the SNA), published by UNSO (1968) is a central reference document for economic statistics at the national level. The system is supported both by a series of manuals on particular aspects and, for many countries, by technical assistance, part of which is organised through the United Nations Statistical Office. Such activities are in turn reinforced by the requirement on countries receiving aid from most multinational agencies to prepare national accounts of an acceptable standard. In practice this requirement may be one of the main reasons why national accounts are afforded the priority they enjoy in a number of countries which have a limited capability to collect and compile statistical data. For the developed countries the SNA is no less important and the present system has an antecedant which was promoted by the OEEC for the benefit of its own members.¹ Similarly, the European Community has developed a variant of the SNA to meet its current requirements. Given the importance of the subject, the decision of the United Nations Statistical Commission to allow a revision of the 1968 SNA to go forward after more than 20 years is a significant event which provides an obvious occasion for reviewing the role of the system as well as the substantive recommendations which it promotes. The present paper is submitted as a contribution to such a review.² It leads to suggestions which have much in common with some earlier contributions

¹See OEEC (1952).

²An earlier and longer version of this paper was presented under the title "SAMs and the SNA" as a contribution to the Twenty-First General Conference of the International Association for Research in Income and Wealth, held in Lahnstein, West Germany in August 1989. The proximate reason for writing it was that the process of revising the UN SNA (UNSO 1968) has been advised by a series of expert groups, meeting jointly with a core group which is responsible for the revision overall. As a member of an expert group on the household sector which convened in Florence in 1987, I was asked to volunteer a paper for the core group on SAMs in relation to the SNA. The earlier version of this paper can be read as a response to that request. However, the subsequent revision reflects not only the need to reduce the length of the earlier version for publication purposes, but also my own responses to the reactions provoked by the Lahnstein paper.

to the debate, notably those of van Brochove and van Tuinen (1986) and Ruggles (1986), which approach many of the same issues from an information technology perspective in the former case and, in the latter case, from a point of view which owes much to the recent developments in microsimulation methods. By comparison the position to be argued here gives greater emphasis to developments in economic theory and the supporting modelling techniques, on the one hand, and to those policy issues, on the other hand, which are likely to remain high on the agenda of governments for the foreseeable future. Given these somewhat different perspectives, the mutual compatibility of various recommendations as to what to do in future is potentially encouraging.

The 1968 SNA is in many ways an important achievement and arguably should be allowed to stand without any significant modification.³ Against this, it can be suggested that the period since 1968 has not seen any marked improvement in national accounting capabilities around the world. On the contrary, there has been a noticeable deterioration in many countries so that, perhaps in one country out of every three, the quality and timeliness of the accounts has regressed over the years. This unfortunate deterioration is, of course, hardly the fault of the SNA as such, but it is an important part of the context in which the revision is taking place. An aspect of the challenge posed by the SNA revision is, therefore, to articulate a perspective which will encourage the development of national accounting capabilities while, at the same time, building on what is essential from the old system and rejecting only those parts which have been superseded by developments during the intervening years in theory or technology, or by a shift in current policy issues.

The argument to be presented in this paper begins in Section 2 with a stylised view of the context within which a system of national accounts is a useful contribution. Some key aspects of the 1968 SNA from this perspective are then identified. In Section 3 some of the changes since 1968 which together define both the opportunities and the need for a fresh look at the official SNA are noted. These are grouped under four headings. Under the first heading both the new priority issues facing economic decision makers—characterised here as people issues and price issues—and some new developments in economic theory which can be helpful in addressing these new emphases, are brought together and discussed. The second heading refers to new developments in primary data collection, particularly household surveys, which can support an SNA. Under the third heading, the rapid change over 20 years in computer technology is noted. Finally, two important contributions to the new generation of methodologies are discussed under the fourth heading. These refer to microsimulation methods and general equilibrium modelling. In the concluding section of the paper, some suggestions are made for a reorganisation of the SNA in the direction of simplification, so as to give greater emphasis to essential concepts, and for flexibility, with encouragement for each country to develop its own SAMs within a general conceptual framework as a response to domestic issues and priorities. It is suggested that general equilibrium models should replace input-

³This has been recognised in many ways, not least by the award of the Nobel prize in Economics to the principle architect, Sir Richard Stone.

output as the central conceptualisation of the system, leading to an equal emphasis on prices and quantities, and an equal concern within the SNA for income distribution, factor markets and production structure, set in the context of external flows and balances.

2. THE UNITED NATIONS SYSTEM OF NATIONAL ACCOUNTS

2.1. Locating the SNA

From the perspective to be developed in this paper, the SNA is central to the process whereby the interplay of theoretical constructs and practical issues together determines the national accounting capability which a country would like to have and hence, through the translation of these ambitions into actual capability, the ability to monitor performance, to provide policy analysis, and hence to advise and comment on contemporary issues. Figure 1 represents an attempt to locate the SNA in this general context of theory, issues and policy analysis.

Starting points for the interpretation of Figure 1 are with economic theory at the top left of the chart and the issues which need to be addressed at the top right. These are the natural starting points for our discussion if the development

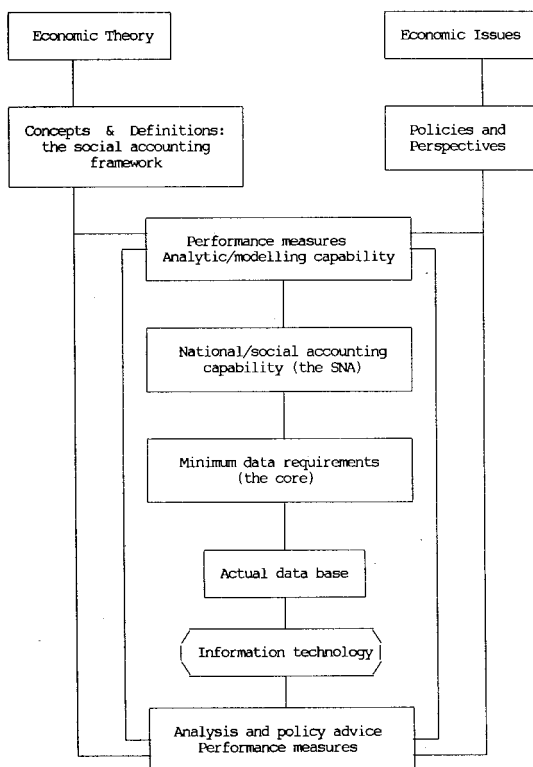


Figure 1. Locating the SNA

of an SNA is to be demand led in the sense of being a response to real issues. The eventual nature of this response is represented at the bottom of the Figure 1 and involves both measures of actual economic performance and the advice that follows from analysis. The role of the SNA is not, therefore, simply to define such performance measures as the GDP or the rates of saving and investment. These are incidental to the main purpose, which is to provide a frame of reference for the development within each country of a capacity to analyse economic problems and to monitor progress. The SNA is centrally located in Figure 1 where it is associated with the national or social accounting capability which countries would like to have. This seems to be an appropriate interpretation of the purpose of the SNA. Certainly it is consistent with the view which guided the previous 1968 revision, as expressed in the following:

“The scope of the new system is such that a source of misunderstanding must be removed at the outset. While the new system provides a target for statistical development . . . it is not to be supposed that this target will everywhere be reached quickly or that the order of development of statistics will be the same in all countries.” (UNSO, 1968, para 1.76.)

In arriving at such a target there are a number of steps to be gone through and Figure 1 is an attempt to give these some essential structure.

The first step is to translate economic theory into a set of concepts and definitions which build into an overall conceptual framework. Following Hicks (1942) this can be referred to as a social accounting framework. It embodies such basic distinctions as domestic versus foreign, current versus capital, etc., together with the fundamental notions of a transaction and the definition of institutions, factors of production, and so on. Following Stone (1949) the interrelations between these concepts can be expressed in a matrix format. This is demonstrated in Table 1.⁴ Various aspects of Table 1 require some comment at this point. Firstly, it can be noted that there is no attempt to account for assets in the table. This is a useful simplification in so far as there is little prospect of being able to construct asset accounts for most countries in the foreseeable future. However, it would be perfectly possible to extend the conceptual framework which is shown as Figure 1 so as to include asset accounts in the schema. Indeed, it would eventually be most desirable to do so. Such a development is not required for the present argument, however. Secondly, the various entries in the table are understood to be current value flows with all transactions valued at purchaser or market prices. Thirdly, there is no explicit disaggregation within any of the six blocks of accounts which are shown in the table, but such disaggregation is to be understood. Institutions may therefore be disaggregated so as to recognise different types of households, of companies, and different components of government. Each of these may have its own current and capital account within the framework of Table 1. Similarly, there can be many different types of labour, capital and natural resources recognised within the factor accounts; there can

⁴A matrix representation of the transactions among a group of people is adopted in Frisch (1934). However, the Stone reference cited is the earliest I have traced to date for the matrix representation of the social accounts. The transition from the former to the latter is explained from first principles in my Lahnstein paper previously cited.

also be numerous distinct products; and there can be separate accounts for each of a variety of activities. Fourthly, the Rest of the World can be disaggregated into currency areas, regions or individual countries. Fifthly, and independent of whatever system of taxonomies or disaggregations is adopted, the corresponding row and column totals of Table I must be equal. Such equivalence follows directly from the concepts which are embedded in the table and their interrelationship, i.e. the symmetry is inherent in the concepts themselves. Finally, and following from this last point, the table embodies all the fundamental identities of national income accounting. Indeed, it can be seen as the conceptual framework within which any system of national accounts must be developed. In this sense it is the essential starting point and any more specific system has to be the result of imposing on this general schema a particular perspective as to the issues that matter and the policies which a particular data system is needed to support. Accordingly, Figure 1 suggests that in order to decide on the performance measures and the analytic or modelling capabilities which a country would like to have it is necessary to give some specific content to the general framework set out as Table I by reference to the policies and perspectives which are eventually to be served or supported. Not least, it is necessary to develop systems of classifications based on concepts which are useful and on levels of disaggregation which yield the detail that is thought to be necessary. Whatever national accounting capability is eventually created it will be expected to serve a variety of purposes. A certain range of statistics will be needed to monitor performance; probably a greater range will be wanted for analytic reasons; and perhaps most demanding of all, there will be a need to support overall macroeconomic analysis of the economy as a whole.

Implicitly, if not explicitly, macro-economic analysis has to be based on a model of the economy. And here it is important to note two related points:

- corresponding to every complete macro-economic model there is an accounting framework; and
- all such frameworks are a special case of the social accounting matrix framework set out as Table 1.

Accordingly, if an SNA is to be capable of supporting macro-economic analysis then it must fit within the framework of Table I. It also follows that the selection of any one SAM as being the unique SNA would restrict the range of models and analyses which could then be supported. Such selection is, of course, a matter of conscious choice. Accordingly Figure 1 shows the desired social accounting capabilities (the SNA) as being derived from those performance measures and analytic capabilities which are deemed to be useful in this context by the authors of the system.

The next step in Figure 1 is to derive the (minimum) data requirements needed to support the desired accounting capability. Taking this step raises an important set of issues which can be approached as follows. If we use notation T to indicate a particular social accounting matrix i.e. a particular realisation of Table I, then the entries in T are of two types. Hence T can be written as $T = U + V$ where the elements of U are to be thought of as actual cash transactions in the economy. Elements of U can be measured directly, therefore. In contrast,

TABLE I
A BASIC SAM

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| | | Outlays | | | | | | | |
|---------|-------------------|--------------------------|------------------------------|---------------------------|-----------------------|----------------------------|----------------------------------|-------------------------------------|---------------------------|
| | | Our Economy | | | | | | | |
| | | Institutions | | Production | | | Rest of the World | Totals | |
| | | Current | Capital | Factors | Products | Activities | | | |
| Incomes | Our economy | Institutions | Current | 0 | Factor Income | Taxes on products | Taxes on activities | Current transfers from abroad | Current disposable income |
| | | Capital | Savings | Capital transfers | 0 | 0 | 0 | Capital transfers from abroad | Available funds |
| | Production | Factors | 0 | 0 | 0 | 0 | Payments for factor services | Factor incomes received from abroad | Factor incomes |
| | | Products | Consumption expenditure | Investment expenditure | 0 | 0 | Intermediate demand for products | Exports of products | Demand for products |
| | | Activities | 0 | 0 | 0 | Sales of products | 0 | 0 | Revenue |
| | Rest of the World | Current transfers abroad | Capital transfers abroad | Factor income paid abroad | Imports of products | 0 | * | Uses of foreign exchange | |
| Totals | Use of income | Use of funds | Allocation of factor incomes | Supply of products | Allocation of revenue | Available foreign exchange | | | |

the elements of V are imputed transactions which therefore have to be estimated indirectly. The data needed to sustain a given social accounting capability are evidently those data which are needed to estimate both U and V . With respect to imputations it is apparent that both the desired range of imputations and their quality will determine the data that is needed. There is therefore no single answer to the question: what data are necessary in order to estimate V ? Much the same is true for the estimation of U also, but in this case there is an additional consideration which should be discussed.

Since T is a realisation of Table I, it follows that, in theory, the corresponding row and column totals of T must be equal. For the V component of T , this condition creates no new problems since imputations enter the SAM symmetrically as both receipts and expenditures. However, with respect to the U component, the situation is somewhat different. Many different data sources must be pooled in order to estimate the U component of a SAM, and these will inevitably be subject to different biases and stochastic error. The raw data will therefore be numerically inconsistent. The estimation of U will consequently have to involve some reconciliation of discrepancies in the underlying data. This is a simpler task when data are sparse. On the other hand, the quality of the matrix which is eventually obtained should be better, the greater the amount of relevant information available.

The actual data base which emerges in a country is shown in Figure 1 as being derived from the data requirements of the desired system. Through information technology, this actual data base will then condition the range and quality of analysis which is available within each country, and the scope and timeliness of its performance monitoring. The actual achievements in this regard will also be conditioned by the analytic capability which a country would like to have. As an intervening step in the process whereby desires are translated into realisation, the SNA can be seen as having a critical function to perform. By the same token, the intent which underlines a revision of the SNA should be to enhance its role in helping countries to realise their aspirations and, where possible, to remove any hindrances which might stand in their way.

2.2. *The 1968 SNA*

In 1968 full employment was normal in OECD countries and this was typically regarded as a triumph of Keynesian economics. OPEC was undreamed of at that time and neither privatisation nor the environment received much attention. Some early concern was being expressed over the failure of economic development to make significant inroads into the problems of poverty in many parts of the world, but some growth was considered normal and the debt crisis had yet to cast its shadow over the aspirations of the South. Many countries were engaged in some form of economic planning, with encouragement from the World Bank for those in the Third World. Economic structure and growth were therefore the main concerns at that time and this was reflected in a preoccupation among economists with growth theory on the one hand and, on the other, with linear models derived from the work of Leontief. Rapid strides had been made in information technology in the twenty years of development from the original

Atlas machines at Manchester and Cambridge so that, by 1968, it was a relatively straightforward task in a developed economy to approximate the Leontief inverse for a forty sector model. In the field of national income accounting, most of the important conceptual issues had been resolved by 1968, not least through the work of the Cambridge Growth Project.⁵ It was therefore appropriate to record that:

“The work of the last fifteen years which is relevant to this report has proceeded in two directions: the elaboration and extension of national accounting and the construction of disaggregated economic models. Each of these developments has helped to make possible the formulation of the new system and, at the same time, has made a new system necessary if international standards and international reporting are to keep pace with the work that is going on in a large and increasing number of countries” (UNSO, 1968, para 1.4).

These were some of the important considerations when the 1968 SNA was drafted. As a result, a number of major innovations were introduced. One of the most important was to emphasise structure by presenting the SNA in a matrix format, i.e. as a particular realisation of Table I, with relatively little emphasis on aggregate measures. As an aspect of this, particular attention was given to the distinction between products and production activities. Indeed, crucial parts of the text were devoted to the generalisation of the Leontief input-output model which follows from this distinction.

The focus on production structure in the 1968 SNA was at the expense of details about people or regions. Consequently it was left to a subsequent system of Social and Demographic Statistics (UNSO, 1975) to discuss the distribution of income in a way that was compatible with the SNA. Correspondingly, the general availability of household income and expenditure data was not anticipated by the architects of system. Rather, they had in mind that the national accounts would be estimated by adopting a commodity balance approach. This approach was made easier if reliable household expenditure data were absent: in such circumstances consumption can be estimated residually, thereby making it much easier to achieve the overall balance of the accounts.

This short-cut approach to the reconciliation of inconsistent data could be defended on the grounds that the balancing of SAMs using full information and formal statistical techniques was precluded by the limitations of computing capacities. Stone, Champernowne and Meade (1942) previously addressed this problem, but it was not until Byron (1978) that it was shown to be tractable for a moderately sized SAM using the hardware then available.

Computing capacity is almost certainly the explanation for another feature of the 1968 SNA which has caused a good deal of trouble. As was noted earlier, in Section 2 above, the conceptual scheme set out as Table 1 envisages that all transactions will be recorded at purchaser or market prices. If we now combine this conception with the Leontief rule that prices should be homogeneous along each row of an input-output table, then we are confronted with the prospect of

⁵See Cambridge, Department of Applied Economics (1962-1974).

having a very large number of commodities. This is because a given output from production activity can easily become several different commodities which are differentiated from each other, not by their physical characteristics, but by season of the year and/or distributive margins and taxes; and hence by price. Since, in 1968, the commodity balance approach was to be implemented manually in most countries, with the results recorded on very large worksheets, it followed that there was a physical limit to the number of commodities which the statistician could accommodate in practice. Hence something had to be done to constrain the number of commodities which it was necessary to distinguish separately.

The “ideal” method arrived at in 1968 was to regard each commodity as a linear combination of basic commodities so that each actual commodity could be treated as a combination of three elements viz, its own “essence,” a transport component and a distribution component. Given a theory as to how prices are formed, a value can be attached to each of these components so that purchases of actual commodities can be represented for accounting purposes as purchases of each of the three elements. The value of that part of each commodity which is independent of transport and distribution margins is referred to in this approach as its basic price. The advantage of the scheme is that any variants of a commodity which are differentiated only by margins will all have the same “essential” element with the same basic price. Hence proliferation of the number of commodities through variations in margins and taxes is avoided. The disadvantages of this approach are two-fold. First, to compute basic prices requires the inversion of what is potentially a very large matrix. It was thought that this might be beyond the capability of many statistical offices. An approximation, yielding a system of evaluations known as approximate basic prices, was therefore proposed as an alternative. The second difficulty is that, as noted above, in order to be able to compute either actual or approximate basic prices a theory is needed as to how market prices are formed from costs. This depends *inter alia* on a particular view as to the nature of the underlying technology. In recommending the use of (approximate) basic prices the 1968 SNA has therefore recommended the imposition on primary data and agreed concepts set out in Figure 1 a particular theory which is contentious as to how the economy actually works.

The nature of this imposition is discussed in Pyatt (1985) and is shown there to involve a transformation of the SAM matrix shown in Table 1 as a result of which the original detailed data cannot be recaptured. This manipulation entails an important loss of information and the value of the data for purposes of analysis is seriously compromised by it. This is because the theory which “justifies” the manipulation is modelled on strict Leontief assumptions. It is therefore an extreme expression of the rigidity of technology and its independence of changes in relative prices.

The limitations of information technology, circa 1968, may also contribute to an explanation of why the 1968 SNA recommends only one particular SAM rather than a range of SAMs corresponding to a range of purposes. Given the demands of the commodity balance approach in an environment of large worksheets and soft pencils, it is not to be expected that countries would produce more than one SAM each year. The fact that in practice they often have owes most to a lack of coordination between Central Banks, Statistical Offices and

Ministries of Planning, which is no doubt born of frustration over delays in providing results and a lack of mutual sympathy for each others' problems in attempting to implement the 1968 SNA. By the same token, the IMF and World Bank now produce their own (and yet again different) estimates of the national accounts and their major components for many of the developing countries.⁶

3. PARTICULAR DEVELOPMENTS SINCE 1968

Developments over the past twenty years in various subject areas are relevant to a revision of the SNA. Many of these should accordingly have an influence on the revision of the system. At the risk of omitting some of the more important, developments to be noted in this paper can be grouped under four general headings:

- issues and theories;
- new data sets;
- developments in technology; and
- advances in methodology.

Particular changes within each of these groupings are discussed in this section of the paper.

3.1. *Issues and Theory*

Changes in economic circumstances and perspectives since 1968 have brought to the fore two important themes which are likely to characterise the foreseeable future. People, poverty and living standards are one of these. The other emphasises prices, incentives and the role of the market versus that of the state. The 1968 SNA is not particularly attuned to either of these themes, and many would argue that its revision should accordingly respond to this weakness.

With reference to the first of the above themes, it can be noted that there is no disaggregation of the household sector in the 1968 SNA although this would not be difficult to remedy as noted in UNSO (1975). Indeed, Stone (1985) has supported the suggestion that the household sector should be disaggregated and there may now be some hope that this recommendation will be adopted.⁷ Based on research since 1968, the problems of disaggregating the household sector in order to show income distribution among socio-economic groups within the overall framework of an SAM have largely been resolved. To incorporate such details in a new SNA would go some way towards establishing the point that people and their living standards are (or should be) the primary concern of economic policy and that their importance in the national accounts is (or should be) central. Here we can usefully step back from contemporary concerns and note from Table II that this is exactly how Gregory King saw the matter some 300 years ago.⁸ We should also note, however, that simply to disaggregate the

⁶Such duplication of effort has recently lead to some confusion and acrimony in debating the impact of World Bank structural adjustment loans in Sub-Saharan Africa.

⁷See Harrison (forthcoming) for a discussion of some of the issues.

⁸See King (1696).

household sector within the SNA does not take us very far. Such a development is sufficient to provide a record of income levels and consumption baskets for different socio-economic groups. However, that is not enough to sustain an analysis of how those income levels are determined or how they might be affected by policy interventions. For that we need data on the structure of the economy as a whole and hence the need to review the structure of the SNA in its entirety. As will be argued subsequently, such a review will involve, *inter alia*, an explicit recognition of differences in factor endowments by socio-economic groups and hence a disaggregation of factors themselves, not least so that different types of labour can be recognised. These same developments are also called for in any analysis of employment that goes beyond the treatment of labour as if it was homogeneous.

No new theory is needed to address the issues touched on above, although the experience and findings of model builders, developed since 1968, is highly relevant. However, relatively recent theoretical developments may be invoked as a conceptual basis for some other developments which are relevant to national accounts and might also be considered desirable. In particular, questions of time use play an important role in an increasing range of subject areas: subsistence production; poverty; education; the role of women; DIY; and the hidden economy. Becker (1965) provides a generalisation of the classical theory of consumer behaviour which is most helpful in allowing these issues to be addressed, and it is evidently important in the relevant contexts to implement his approach, at least in some degree. Just how far one should go is probably not a matter for universal prescription but, if the general viewpoint is accepted, then it follows that the SNA should adopt an open-ended attitude on imputations of time: as at present, some imputations should be urged as being highly desirable in most contexts while others should be considered as options which may or may not be important in particular cases.

Similarly, there are major problems that arise in deciding what might be the best way to handle the hidden economy and illegal activities in any particular country. Again, theory is available to offer some guidance. Consider, for example, a quota restriction on imports of some particular commodity. If the restriction is binding then the shadow price of the commodity exceeds its import price and the difference is correctly represented in theory as an implicit tariff which accrues as revenue to those who receive allocations within the quota. The considerable importance of non-tariff barriers suggests, perhaps, that the SNA should say something about them, and one way of proceeding would be to calibrate the above scenario as a part of the national accounts. Another approach is simply to record actual cash transactions, and ignore the implicit tariff. This simpler approach will work in a narrow accounting sense provided there is no illegal behaviour associated with the restriction. However, if an importer has to bribe a government official to obtain an import licence, thereby making the tariff become explicit to some extent, then evidently the national accounts will be out of balance if the bribes are ignored. A more flexible approach to the SNA would allow governments and analysts to choose how they address such difficulties, even allowing them to adopt different approaches in internal documents and published reports.

TABLE II
KING'S "SCHEME OF THE INCOME AND EXPENSE OF THE SEVERAL FAMILIES OF ENGLAND CALCULATED FOR THE YEAR 1688"
(in pounds sterling)

| Number of Families | Ranks, degrees, titles and qualifications | Heads per Family | Number of Persons | Yearly Income per Family | Total of the Estates or Income | Yearly Income per Head | Expense per Head | Increase per Head | Total Increase per Annum |
|--------------------|---|------------------|-------------------|--------------------------|--------------------------------|------------------------|------------------|-------------------|--------------------------|
| 160 | Temporal lords | 40 | 6,400 | 2,800 | 44,800 | 70 | 60 | 10 | 64,000 |
| 26 | Spiritual lords | 20 | 520 | 1,300 | 33,800 | 65 | 55 | 10 | 5,200 |
| 800 | Baronets | 16 | 12,800 | 880 | 704,000 | 55 | 51 | 4 | 51,200 |
| 600 | Knights | 13 | 7,800 | 650 | 390,000 | 50 | 46 | 4 | 31,200 |
| 3,000 | Esquires | 10 | 30,000 | 450 | 1,200,000 | 45 | 42 | 3 | 90,000 |
| 12,000 | Gentlemen | 8 | 96,000 | 280 | 2,880,000 | 35 | 32 | 2 10 .. | 240,000 |
| 5,000 | Persons in offices | 8 | 40,000 | 240 | 1,200,000 | 30 | 27 | 3 | 120,000 |
| 5,000 | Persons in offices | 6 | 30,000 | 120 | 600,000 | 20 | 18 | 2 | 60,000 |
| 2,000 | Merchants and traders by sea | 8 | 16,000 | 400 | 800,000 | 50 | 40 | 10 | 160,000 |
| 8,000 | Merchants and traders by sea | 6 | 48,000 | 200 | 1,600,000 | 33 | 28 | 5 | 240,000 |
| 10,000 | Persons in the law | 7 | 70,000 | 140 | 1,400,000 | 20 | 17 | 3 | 210,000 |
| 2,000 | Clergymen | 6 | 12,000 | 60 | 120,000 | 10 | 9 | 1 | 12,000 |
| 8,000 | Clergymen | 5 | 40,000 | 45 | 360,000 | 9 | 8 | 1 | 40,000 |
| 40,000 | Freeholders | 7 | 280,000 | 84 | 3,365,000 | 12 | 11 | 1 | 280,000 |
| 140,000 | Freeholders | 5 | 700,000 | 50 | 7,000,000 | 10 | 9 | 10 | 350,000 |
| 150,000 | Farmers | 5 | 750,000 | 44 | 6,600,000 | 8 | 8 | 10 .. 5 .. | 187,500 |
| 16,000 | Persons in sciences and liberal arts | 5 | 80,000 | 60 | 960,000 | 12 | 11 | 10 | 40,000 |
| 40,000 | Shopkeepers and tradesmen | 4½ | 180,000 | 45 | 1,800,000 | 10 | 9 | 10 | 90,000 |
| 60,000 | Artisans and handicrafts | 4 | 240,000 | 40 | 2,400,000 | 10 | 9 | 10 | 120,000 |
| 5,000 | Naval officers | 4 | 20,000 | 80 | 400,000 | 20 | 18 | | 40,000 |
| 4,000 | Military officers | 4 | 16,000 | 60 | 240,000 | 15 | 14 | | 16,000 |
| 511,586 | | 5¼ | 2,675,520 | 67 | 34,495,800 | 12 18 | 12 .. | .. 18 .. | 2,447,100 |

| | | | | | | | | | | | | | |
|----------------------------|--------------------------------------|----------------|-----------|----|------------|----|----|----|----|----|----|----|-----------|
| 50,000 | Common seamen | 3 | 150,000 | 20 | 1,000,000 | 7 | .. | 7 | 10 | .. | 10 | .. | Decrease |
| 364,000 | Labouring people and outservants | $3\frac{1}{2}$ | 1,275,000 | 15 | 5,460,000 | 4 | 10 | 4 | 12 | .. | 2 | .. | 75,000 |
| 400,000 | Cottagers and paupers | $3\frac{1}{4}$ | 1,300,000 | 6 | 2,000,000 | 2 | .. | 2 | 5 | .. | 5 | .. | 127,500 |
| 35,000 | Common soldiers | 2 | 70,000 | 14 | 490,000 | 7 | .. | 7 | 10 | .. | 10 | .. | 325,000 |
| 849,000 | | $3\frac{1}{4}$ | 2,795,000 | 10 | 8,950,000 | 3 | 5 | 3 | 9 | .. | 4 | .. | 562,000 |
| | Vagrants | .. | 30,000 | .. | 60,000 | 2 | .. | 3 | .. | 1 | .. | .. | 60,000 |
| 849,000 | | $3\frac{1}{4}$ | 2,825,000 | 10 | 9,010,000 | 3 | 3 | 3 | 7 | 6 | .. | 4 | 622,000 |
| So the General Account is: | | | | | | | | | | | | | |
| 511,586 | Increasing the wealth of the Kingdom | $5\frac{1}{4}$ | 2,675,520 | 67 | 34,495,800 | 12 | 18 | 12 | .. | .. | .. | 18 | 2,447,100 |
| 849,000 | Decreasing the wealth of the Kingdom | $3\frac{1}{4}$ | 2,825,000 | 10 | 9,010,000 | 3 | 3 | 3 | 7 | 6 | .. | 4 | 622,000 |
| 1,360,586 | Net totals | $4\frac{1}{4}$ | 5,500,520 | 32 | 43,505,800 | 7 | 18 | 7 | 11 | 3 | .. | 6 | 1,825,100 |

Source: Gregory King 1696.

This last example touches on a limitation of the 1968 SNA which has previously been commented on, viz that the input-output model which underpins much of the approach assumes explicitly that relative prices are independent of the level of economic activity. This is clearly not so when import quotas restrict the physical flow of goods. Indeed, the fixed coefficient input-output model breaks down much more generally as, for example, when an economy manages to reduce its reliance on oil imports through substitution effects or by efficiency gains which are prompted by an increase in the price of oil. These then, are further reasons why the valuation of transactions at (approximate) basic prices is regrettable. They imply that the 1968 SNA is not an appropriate information base for analysing relative price effects on interindustry relations and import substitution. Yet such effects are crucial to an evaluation of policy alternatives in relation to the structural adjustment of an economy, be it a poor country trying to get out of debt or a European economy responding to the changes of 1989 or of 1992. It is not surprising, therefore, that there have been new developments in economic theory, focusing on the open trading economy, which are increasingly supplanting the closed economy model of unreconstructed Keynesian economics. Within this new framework the distinction between traded and non-traded goods is crucial, leading to the important notion of a real exchange rate within the economy. There is, as a result, an emphasis on classifications and prices that is new and significant, not least because it is basic to the policy advice that the developing economies are now receiving, and to the policy analysis that many of the developed economies are currently adopting for their own benefit. These theories did not exist in 1968.

3.2. *New Data Sets*

Given that new issues have emerged during the past twenty years, it is not surprising that new types of data have been collected in response to them. Developments in the field of household surveys provide an important illustration of how new approaches can and should have an influence on a country's social accounting capability. Household expenditure surveys have a long tradition, but it is largely as a result of the greater emphasis on people and poverty since 1968 that a much expanded effort in the survey field has developed in recent years. The UN Household Survey Capability Program signals the importance of the ongoing work in this field. Similarly, a prominent example of the more recent developments has been the introduction of Living Standards Surveys in various African countries that receive Adjustment Loans from the World Bank.⁹ These surveys contain collections of data on a variety of topics ranging over health, nutrition, housing and education as well as the economic parameters of living standards such as income, consumption and employment.

Consumption data are especially important for national income accounting because they can contribute to the overall commodity balances for an economy that we have previously identified as being the typical starting point for estimation.

⁹While the World Bank programme in Africa, known as the Social Dimensions of Adjustment, is of relatively recent origin, the work of the Living Standards Movement Study goes back to 1980. See LSMS (1980-Ongoing).

However, as we have also noted previously, many countries do not use survey data for this purpose, preferring instead the simpler approach of estimating consumption expenditure essentially as a balancing residual within the commodity balance approach. This convenient and inefficient practice will be more difficult to sustain if the new SNA calls for separate details of consumption expenditure for different socio-economic groups. However, this consideration is only a starting point for the re-thinking needed if people and their living standards are to assume (or resume) their rightful place at the centre of social accounting. The Living Standard Surveys, in common with many others for Third World countries especially, call for a collection of data simultaneously both on income and on expenditures. Hence they provide an important source of information for a detailed income and outlay balance for all the institutions of an economy. Such balances are different from, and an important adjunct to, the commodity balances which currently play the primary role in estimating the national income. It is only by combining both sets of balances that a full description of the interrelations between income distribution and production structure can be obtained. It can be suggested that such a development is essential to providing an adequate basis for analysis of the determinants of living standards and how they are affected by policy change. Such analysis is, of course, of primary interest to many governments and to students of their policies alike. Arguably then, the SNA revision should not let the opportunity pass of encouraging those governments that have the necessary statistical sources and a concern for the issues to develop their national accounts in ways which are both feasible and relevant to these important concerns.

3.3. *Developments in Technology*

Molding inconsistent sets of primary data so as to strike a balance simultaneously and consistently between commodity demands and supplies, on the one hand, and income and outlay accounts on the other, is evidently a difficult task. It is therefore some encouragement for the statistician that new technology can be helpful in addressing the problem. The formal mathematical characteristics of this problem are relatively straightforward to state, especially when the basic accounts are expressed as a SAM, and alternative methods have been proposed to assist the statistician in deriving a solution.

One of these which has already been mentioned uses a generalised least-squares formulation that was originally suggested in Stone, Champernowne and Meade (1942) and has now been developed by Byron (1978) to allow large problems of data reconciliation to be solved using today's hugely expanded computing capacities. An alternative approach, which relies ultimately on linear programming, is also under development, and this may have greater appeal to the practising statistician because it builds more directly on expert understanding of data sources and their relative reliability. The approach allows the statistician to specify bounds (which do not have to be symmetric) on the accuracy of each primary information source; on the ratios between particular pairs of variables; and generally to impose any other restrictions which are linear on the relationship between true values and estimates of them. Assuming that these bounds and restrictions permit a feasible solution to the problem of balancing the accounts

(and if they do not, then the bounds must be too tight) a range of objective functions, such as GDP, foreign savings, or total consumption, can be both maximised and minimised in order to identify (through the shadow prices of the constraints) those aspects of the economy on which, in the longer term, more accurate information would be helpful and, meanwhile, those bounds which have to be tightened in order to reduce the feasible space for final estimates based on the data which is currently available. Such an approach allows the statistician to express his confidence in alternative data sources, to focus on areas of weakness in the primary data, and to revise and update initial estimates as new information becomes available simply by adding the new data to the accumulating information base, along with a statement about the bounds of accuracy that should be associated with them. The flexibility of this linear programming approach presents the prospect of being able to compile various alternative sets of national accounts, using different systems of classification and levels of aggregation, without a prohibitive amount of extra effort. Pilot studies in this area have already demonstrated the feasibility of the approach for relatively simple economies, and reference can be made to the dramatic improvements over twenty years in data storage and retrieval. Such developments provide a potentially robust infrastructure to support the information base that must underlie the national accounts of every country. Formalising the methods of estimation that are applied to the primary data is not just desirable in terms of flexibility, documentation and replicability, but also becomes necessary at some point as the information base expands. It seems, then, that the SNA should anticipate a break with the large pieces of paper or worksheets which have characterised the past towards a future in which primary information is suitably stored in large data banks and custom-made software packages permitting a variety of tabulations to be developed, each of them tailored to a different set of user requirements.

3.4. *Advances in Methodology*

The development of computing capacities has encouraged vigorous new developments in economic modelling as a response to the new issues and perspectives that have previously been discussed and the new data sources that have started to emerge. Two developments in particular are relevant to the present discussion. One is the comparatively recent evolution of microsimulation techniques. The other is variously referred to as computable or applied general equilibrium modelling.

The essence of the microsimulation approach is to model in detail the behaviour that is observed at the micro level of individual firms or households. To do this often calls for different micro data sources to be used, which first requires that these data sets be rendered consistent, one with another. The approach, which owes much to Orcutt, has developed rapidly in recent years because of the growing body of micro survey data and the capacity of computers to retain the large amounts of information which are inherent in such exercises. One obvious use of microsimulation is to provide estimates of how various aggregates may change in response to policy innovations. It is therefore helpful if the national accounts aggregates are consistent with the microsimulations. The

advent of microsimulation has raised in a particular guise the problems of reconciling inconsistent data and of treating household consumption in particular as a balancing residual rather than as a key component to be estimated directly.

General equilibrium models have by now been built for a great many countries and accordingly have a growing pedigree. Decaluwe and Martens (1988) reference 73 models for 26 economies, mostly drawn from developing country experience and based in part on the pioneering work of Adelman and Robinson (1978). There is an even longer tradition in the developed world that goes back to Johanson (1960) working on Norway and continues with the Cambridge (UK) Growth Project, the work of Shoven and Whalley (1972) on the U.S., and Powell and others working on the Orani model in Australia.¹⁰ These are some of the more important contributions but by no means exhaustive of activity in this field, which is now supported by various user-friendly software packages and a growing number of textbooks.

While improvements in computing capacities have been critical to the development of general equilibrium models, it has also proved helpful to recognise that the accounting systems which correspond to these models can usefully be expressed in a matrix format. Hence social accounting matrices (SAMs) and general equilibrium models can be explicitly linked and should be, as argued, for example, by Hanson and Robinson (1989).¹¹ The basic requirements of general equilibrium modelling can therefore provide a ready agenda for a revision of the SNA, just as the requirements of input-output were similarly relevant back in 1968. To address this agenda is, perhaps, the primary challenge for today's revision.

4. FUTURE DIRECTIONS

The main conclusion invited by the above argument is that the UN SNA should cease to promote a specific social accounting matrix that all countries might be encouraged to reproduce, and that this SNA structure should be replaced by an open-ended invitation to each country to build its own social accounting matrices in response to its own needs, capabilities and priorities.

The starting point for this more flexible approach is the conceptual framework that is set out in Figure 1 and a first task of the UN SNA should be to provide an explanation of the framework and the concepts on which it is based. From there on it is a matter of recognising various policy issues and perspectives and of demonstrating how these translate into SAMs or sub-components thereof.

To begin this process, the SNA could usefully recognise that for certain purposes a limited set of international comparable data are required. It is highly desirable, for example, to have internationally recognised definitions of gross domestic product and the national income. However, it is probably not necessary, and ultimately impossible, to have common definitions for all countries of all

¹⁰The work of the Cambridge Growth Project dates from 1959. Among the most recent of many publications is Barker and Peterson (1987). The Australian contributions in this field are discussed, for example, in Powell and Parmenter (1979), while Shoven and Whalley (1984) provides a useful survey.

¹¹See also Pyatt (1988) and de Melo (1988), both of which are contributions to a special issue of the *Journal of Policy Modelling* on SAM-based models.

the different types of institutions to be encountered around the world. On the other hand, a consistent treatment among countries of international financial transactions and, *inter alia*, of offshore activities, embassies, etc., has obvious merit. The SNA should bring together the legitimate requirements for an internationally comparable set of data and proceed to define the simplest SAM which is consistent with them. This would be one of the SAMs that countries would be encouraged to have the capability to implement.

Apart for this minimum SAM that is required for comparative purposes, the SNA should encourage variety across countries in response to different needs and circumstances. In practice this means that individual countries will want to develop their own systems of classification for disaggregating the various accounts in Table 1 and their own way of describing the various mappings which are represented by the non-zero submatrices of the table. For example, some countries may want to disaggregate production by form of organisation rather than according to the principle product produced. Similarly, for some purposes it may be preferable to disaggregate value added into types of payment (wages, social security, payments in kind, etc.) rather than according to factors employed (e.g. a disaggregation of the labour force by sex and skill level, or by occupation). There seems to be no particular reason why the UN SNA should take a position on such choices, beyond pointing out that alternatives exist and that different disaggregations are useful for different purposes. The SNA could, for example, explain the SAM which is needed to support the basic models used by the World Bank and IMF in their policy dialogues with borrowing countries.

If one of the purposes is to support a computable general equilibrium model or, more generally, a macro economic analysis which has within it a concern for people and their living standards, then there is a further set of considerations which must enter into the choice among alternative classification systems. This can be approached by noting that if the linkages between accounts shown in Table 1 are reproduced as a flow diagram, the picture which then emerges is as given by Figure 2. This figure makes it clear that, within the macro-economy, there is a circular flow process and that what happens at one point on the circuit will have implications for experience at other junctures. This observation translates into the notion that, at some point, there is a need for being equally concerned with all the different aspects of technology and behaviour that together describe the circular income flow and the connections (or lack thereof) that characterise an economy. This is the full force of the general proposition that production structure and income distribution are inextricably interwoven, so that the one cannot be analysed properly without reference to the other. In illustrating this argument, the figure shows that the income that institutions derive from their contributions to productive activity is transmitted through, and therefore modified by, the markets for factor services. It therefore follows that if one is interested in the distribution of income across socio-economic groups, i.e. in how different types of people are affected by policy change or exogenous events, then it is necessary to examine in corresponding detail what is happening in labour markets. It is not realistic to expect that poverty can be analysed without reference to unemployment. More generally, to the extent that labour services are far from homogeneous, e.g. with respect to location, education, age, sex or race, then

different labour markets must be recognised in the SNA if it is to be relevant from this point of view.

A further point which is implicit in the above arguments is that richness in the system of classification that is used to describe one aspect of an economy is lost as we go around the circuit in Figure 2 unless a similar richness is adopted

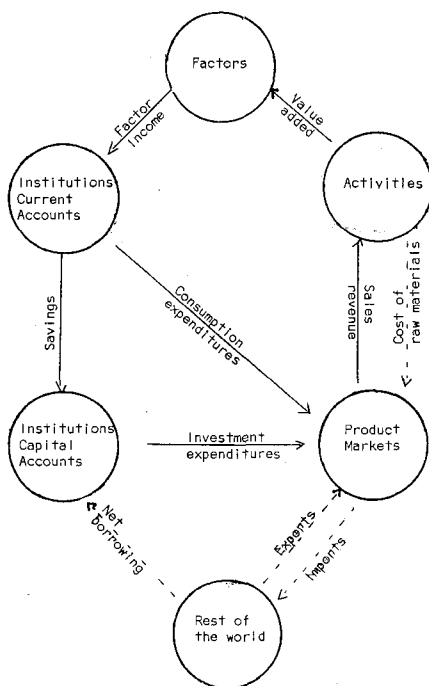


Figure 2. The Circular Flow of Income

for the classification of all other aspects. If there is only one type of labour distinguished in the SAM, then changes in export demands are not allowed to have much influence on income distribution. If exports are produced mainly by a plantation sector with its own identifiable and separate labour force, then an increase in export demand for plantation crops will obviously favour those who work on the estates and be of indirect benefit at best to subsistence farmers or the urban sector. Whether or not such essential characteristics of an economy are captured in its system of national accounts will depend entirely on the classification systems adopted within the general framework of Table 1. Within such general guidelines it is essentially for countries to develop their own systems of classification to meet their particular needs and institutional realities. In EEC countries it makes little sense to talk of a plantation sector. Elsewhere it is self-evident that agriculture is far from homogeneous and must be disaggregated, not necessarily by crop produced, but by forms of organisation and the different methods of production that distinguish subsistence farms, sharecroppers, smallholders, ranches and plantations.

In a similar spirit to these arguments, it can be suggested that the incorporation of environmental statistics within the national accounting capability is a matter to be left to separate initiatives at the national level. The environmental problems of national and global economies alike are belittled by the suggestion that they can be dealt with as a side show in a system of satellite accounts. Equally, there is no consensus as yet on which to base the specification of internationally comparable data which all countries should be urged to supply. Research is moving quickly so that this situation may evolve quite rapidly. If UNSO was to adopt a flexible approach to the SNA, it would be relatively easy to promote the new ideas that may soon emerge in this or other fields. The possibility that progress in monitoring our environment may otherwise be held back is perhaps reason enough for thinking that a monolithic SNA is not what is needed in today's world.

From the perspective that has been argued in this paper there is little more to be said about the form that a revised SNA might take. However, other authors have given a much greater emphasis to the data aspect of the issues, moving upwards from the foot of Figure 1 in order to arrive at their preferred form for the SNA, rather than the top-down approach that has been followed here. Given that there is a mutual sympathy between the conclusions suggested here and those of other authors, it is useful to make the connection with their views. According to the position taken in this paper the development of a national accounting capability involves, in the first instance, developing the ability to construct alternative SAMs involving alternative systems of classification, different mappings and different degrees of disaggregation within the framework of the structure which is shown as Table 1. This in turn necessitates an adequate data base and the ability to use the information within it for SAM construction. Accordingly, the data that are required are the data that are sufficient to sustain a given set of SAMs. These data may therefore be thought of as a sufficient statistic for the given set of SAMs. As such they can be thought of as a relatively basic and untransformed set of details on actual transactions at market prices, for which the parties to the transaction and the nature of what is being transacted can be readily identified.

This notion of the data set as a sufficient statistic for building alternative SAMs takes us very close to the concept of a core which has been suggested by van Bochove and van Tuinen, who write:

“if the SNA is to serve as the basis for the construction of SAM's, the need to bring it closer to institutional reality and subjective experience of transactors bulks large” (van Bochove and van Tuinen, 1986, p. 136).

and then go on to say that

“... instead of trying to provide the comprehensive framework for the statistical description of economic systems, (the SNA should) be comprehensive in the sense of facilitating the construction of all the alternative descriptions that are relevant for science, policy, business, both now and in future. The best way to achieve this is by means of a systems structure that consists of, on one hand, a *core* and on the other a range of *building blocks*” (van Bochove and van Tuinen, 1986, p. 139).

(The "building blocks" referred to here are specific multipurpose tabulations that can be derived from the core, such as an input-output table.)

Support for this general approach has been expressed by other authors, and in a notable contribution to the debate, the late Nancy Ruggles argued that:

"although additional subsectoring, intermediate accounts, satellite accounts, and supplementary tables can furnish some of the needed additional information about distributive questions, they do not provide the type of data needed for microanalytic modeling and simulation. In a number of countries governments and research organisations are not engaged in carrying out studies of this kind on such topics as the distributional impacts of the tax system or government expenditure programs. The availability of microdata bases for both households and enterprises is increasing rapidly, but the possibility of linking these microdata bases to the macro accounts is still quite limited. The van Bochove and van Tuinen (1986) paper, with its core consisting of simple aggregation of the micro transactor accounts, provides the basis for such an integration, while at the same time encompassing the content of the existing SNA." (Ruggles, 1986 p. 126.)

The fact that these arguments ultimately take us back to SAMs has also been noted by Hansen and Robinson in the following terms:

"Both microsimulation and CGE models focus on the underlying structure of the economic system. They both emphasize market and non-market linkages among micro actors. It is through these linkages that the structural adjustment processes we are observing will work themselves out. With the increased need to support structural analysis in an economywide framework, the SAM accounting system provides the best available framework for reconciling the accounts of microactors with the macro aggregates which have traditionally been the focus of statistical agencies." (Hanson and Robinson, 1989 p. 15).

It would seem that there is a growing consensus on future directions emerging in the literature. How it is arrived at or expressed may be a secondary matter, but it would seem that the monolithic SNA that has served in the past is not what is wanted for the future. What is wanted instead is firstly a framework for data on actual transactions at actual prices and by actual institutions and, secondly, some guidance on the appropriate design of social accounts to serve particular policy concerns. One must then look to the revolution in information technology for access to whatever data base is available, and for the capability to process its contents in support of quantitative analysis of contemporary issues.

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