

BUILDING A SAM FOR THE ANALYSIS OF RURAL POLICIES: INSIGHTS FROM AN ITALIAN CASE STUDY.

Benedetto Rocchi

Department of Agricultural and Resource Economics
University of Florence
P.le delle Cascine 18
50144 Florence Italy
benedetto.rocchi@unifi.it

1. Introduction

In recent years an increasing emphasis on the concept of rural emerged in the field of agricultural studies. It has been argued that a deep understanding of the interrelationship existing between production activities, regional and local development processes and the connected social network was necessary to really assess the role that agriculture play in the economy. As a consequence, a corresponding shift of agricultural policies towards supporting rural development processes more than agricultural production emerged as well.

In their critical review of studies on developing countries, Ellis and Biggs (2001) highlight an emerging vein that may be characterized by the theme of “livelihood strategies” in studying rural development. In these studies the identification of small farmers with “rural poor”, characterizing most of the literature from 60ties to 80ties, is questioned against the increasing evidence of livelihood strategies based on part-time farming supplemented by a variety of alternative sources of income from other activities and transfers. As a consequence “...the cross-sectoral and multi-occupational diversity of rural livelihoods may need to become the cornerstone of rural development policy”

(Ellis and Biggs, 2001: 445). Also with reference to developed economies the linkages between agriculture and rural economy appear more and more feeble. Thompson (2001) recalls three major features of the empirical evidence on this process: a large part of rural population is employed in other industries rather than in agriculture; farmers use a large part of their income outside the rural space; an increasing part of income sources for rural households are external to rural economy (wages earned by commuters, pensions and other social security transfers and son on). The consequence is a decreasing effectiveness of rural development policies that are still “agricultural-oriented”.

To support the analysis models able to represent the complexity of relations between agriculture, rural space and the whole economy need to be developed. Within the input-output approach to economic modelling, the Social Accounting Matrix (SAM) framework seems effective in full accounting for the backward and forward linkages between productive activities and institutions (households, firms and government). After the seminal work of Adelman and Robinson (1986) several SAM models for structural and policy analysis of the agricultural sector have been proposed both at the national and regional level. In recent years, following the growing interest on rural development, bi-regional models based on a rural-urban concept has been developed to study the economic structure of rural economy and to assess the impact of relevant policies (see for example Roberts, 2003 and 2005; Psaltopoulos et al. 2006). If this approach seems to be promising when a border between the two regions can be drawn using simple criteria, problems emerge when the evolution in the interdependencies between the two “sides” of the economy leads to spatial diversification of activities and functions in rural spaces (Saraceno, 1992).

In this paper a Social Accounting Matrix for the analysis of rural policies is proposed. An existing SAM of the Italian economy is adapted improving an approach proposed by Rocchi et al. (2005). Two features qualify the modified SAM: a separate accounting for the “agricultural households” institutional sector; the inclusion of accounts for different farm types, in which the process of income distribution to factors is represented. The availability of suitable, specific microeconomic information from a national-wide farm business survey, allowed a full tracking of incomes from factors to institutions.

The paper is organized as follows. After a methodological discussion on concepts used to represent rural community (farms and households), data used and hypothesis assumed building the modified SAM will be presented. The description of relevant distributive flows in the SAM and a multiplier analysis of a SAM-based model will follow, to highlight the potentiality of the approach for structural analysis and policy assessment. A comparison with the rural-urban approach to SAM modelling and a critical evaluation of the ability of the proposed SAM to support the analysis of rural policies will conclude the paper.

2. The representation of the rural community in the SAM framework

As long as rural can be identified with agriculture, the study of institutional features of the industry it is sufficient in characterizing also the rural community, that is people whose economic and social life are rooted in the rural economy. On the classification of agricultural holdings for purposes of structural analysis a long term debate among

agricultural economists developed in Italy. During the first half of XX century, starting from the fundamental work of Arrigo Serpieri (1941), an institutional classification of holdings by “management forms” was defined and widely accepted by agricultural economists. The classification was grounded on the observation of contractual relationship existing between the entrepreneur and the other stakeholders (workers and land owners). Insofar as different management forms are able to discriminate between different socio-economic groups involved in farming, the groups of holdings defined on this basis show different structural features and specific ways in managing production processes. At time the classification was defined, its substantial adherence to socio-economic groups involved in agricultural production allowed for an accurate depiction of institutional features of the industry.

The classification of production units on the basis of an institutional criterion may enrich the SAM framework with a new dimension in the representation of the circular flow of the economy. Indeed, the inclusion of accounts for production units can link the primary distribution of incomes with the organization of factors resulting from choices made to achieve socially differentiated goals.

Through the second half of the XX century the structural dynamic of agriculture caused by development processes asked for a re-definition of farm typologies for analysis (Rocchi and Stefani, 2005). With the onset of part-time farming and the wide diffusion of pluri-activity in farming households, become more and more difficult to identify a clear link between farm typologies and well defined socio-economic groups. Production units with similar structural and institutional characteristics are often managed within household strategies that can be of different nature. In modern rural, a multiplicity of goals is assigned by households to farming, among which income is

often a secondary one. The consideration of livelihood and well-being strategies asks to correctly place the role played by income from farming within the total income strategy of families (Unece et al, 2005). Within the SAM framework these feature of rural economy could be represented disaggregating the households sector in groups assigning different goals to farming. The concept of “agricultural households” sector, defined within the national accounting framework on a source-of-income-prevalence basis (Hill, 1998), represent a first, obvious solution to this analytical requirement.

In the case study that follows either ways will be adopted to improve the original SAM for the representation of rural community in a modern economy. Through the inclusion of specific accounts the process of income formation and distribution to factors will be represented for differentiated groups of agricultural holdings. Moreover, a separate accounting for agricultural households will be introduced in the institutional block of the accounting framework. In the next paragraph the characteristics of the original SAM, data and methodology used to adapt it will be described.

3. Data and methodology

The original SAM of the Italian economy used in the analysis was estimated by the Regional Institute for Economic Planning in Tuscany (IRPET) for the year 2002. The original structure includes a total of 101 accounts: besides a production block accounting for 30 industries and 5 factors of production, a detailed description of consumptions (12 private plus 11 collective consumption functions) and a highly disaggregated institutional sector block (10 household groups by deciles of per-capita

equivalent income, 3 group of firms, 9 government branches at the national and local level) represent the most interesting features of the accounting scheme. Separate capital accounts by each institutions and ROW accounts assure the overall balancing of the matrix.

The approach followed in the adaptation of the matrix was a top-down one, using microeconomic information to calculate relevant shares to split the flows of the original table. The resulting figures were constrained to maintain the original balancing of the table. The main source of information used was the Farm Business Survey, a sample of agricultural holdings representative of the whole industry carried out by the Italian National Institute of Statistics (ISTAT) to provide information for national accounting purposes (Rocchi e Pizzoli, 2005). Together with structural variables (cultivated areas, employed labour and so on), the FBS collects also data on revenues and costs of farming. The most interesting feature of the survey is that, even if designed with an “industry” approach (i.e. a sample of production units), it provides useful information also on the institutions managing production activities. Detailed data on labour supplied by the farming household are collected as well as data on the composition of the total household income (other sources of income by type and by income class). As a consequence the survey can be used both to classify farms by type and to associate each observed holding with a specific institutional group.

First of all, re-arranging flows recorded in the original table, an account for agricultural holdings was included. The inflows of holdings account are the gross valued added from agriculture and the transfers from government. On the relevant column agricultural holdings pay taxes on production, set aside depreciation rates and

distribute income to factors. On the basis of FBS data a specific flow of rents paid for the use of agricultural land was separately accounted for.

Second, the agricultural holdings account was divided among three groups: self-consumption (revenues less than 2.000 €), capital constrained (revenues > 2.000€ and European Size Unit¹ < 7) and professionals holdings (ESU > 7). The classification is a simplified version of a more detailed one proposed for the analysis of results of the 2000 Census of agriculture in Tuscany (Rocchi and Stefani 2005). Following this approach the holdings are classified according to the degree of dependency/autonomy in the relationships with the markets that characterize the managing process.

Within the accounts of holdings the links between production activities and institutions is explicitly represented through the distribution of mixed income from farming (value added at factor prices net of depreciation, incomes paid for hired labour, capital and rented land) among institutions. In Italy the largest part of this flow is directed towards self-employed labour. Using again FBS, the flows accruing to “agricultural” households were accounted separately from the others. Following a “narrow” definition of the institutional sector (Eurostat, 1995) a households was defined as “agricultural” only when the incomes from farming represented at least the 50% of total household income. The “sectoral” classification was then crossed with the original one by income level assigning households to income classes defined for the whole economy. The final disaggregation of the institutional sector resulted into 10 groups (agricultural vs. non agricultural by 5 levels of per-capita equivalent incomes).

¹ The ESU are measured in terms of gross margin calculated assigning standard values to physical variables measuring the size production processes are carried out within the holding (hectares of arable land and plantations, number of livestock etc.). One ESU is equal to 2.220€. The ESU are the basis of the systems of classification by farm type used for statistical purposes and sectoral policy analysis at the European level.

Other microeconomic information was gathered by the two households' budget surveys carried out respectively by ISTAT (used to disaggregate the households' consumptions according with the new classification) and by the Bank of Italy (used to disaggregate incomes from factors other than self-employed labour). The balancing of the new households' accounts was assured by an appropriate allocation of savings among groups, with total savings for each income class constrained to the original level.

In the next paragraph, on the basis of the adapted SAM, incomes from agriculture will be tracked from factors to institutions

4. Tracking agricultural incomes from factors to institutions

Table 1 synthesizes the accounts of agricultural holdings included in the modified SAM. The total inflows for agricultural holdings accounts amount to 30.553 millions of €, the 90% of which is value added from production. Professional holdings, which are about the 20 % of agricultural production units, account for more than 80% of produced value added and of transfers to production due to sectoral policies.

[INSERT TABLE 1]

The total of mixed income from farming amounts to 12.895 millions of €, about 42% of total inflows of agricultural holdings. The remaining part of value added is distributed among wages, rents paid for land, depreciation and taxes on production. The percentage of mixed income accruing to professional holdings is again more than 80% of total.

The distribution of agricultural incomes from farming is fully represented in the modified SAM. In the columns of Table 2 are shown the percentage distributions of figures in the last row of table 1. Different holding types are clearly associated with different socio-economic groups. Due to the small economic size of production units, self-consumption farming is mainly managed by non-agricultural households, for which agriculture represent a minor source of income. Moving from self-consumption towards the other type of holdings, the percentage of mixed incomes accruing to agricultural households increase to 50% for capital constrained holdings and to more than 95% for professional farms. It is also worth to stress the relative importance of different income levels within the group of agricultural households: mixed income produced in non professional farms is, for the major part, earned by households with a low total income; an opposite distribution is conversely shown in the case of professional farms, the incomes of which are or more than 70% directed towards households included in the three higher income quintiles f.

[INSERT TABLE 2]

A thorough analysis of distribution can be carried out using income multipliers calculated from the modified SAM. Table 3 shows household income nominal multipliers from a SAM linear model in which accounts for government, capital formation and rest of the world have been considered exogenous. Figures in the first four columns refer to the increase in the incomes of different groups of households caused by an exogenous increase of incomes in each type of agricultural holding. Through the circular flow, the nature of industrial interdependencies, the structure of property rights on production factors, the pattern of consumption of different groups generate a total impact on incomes that, on the average, is higher for non-agricultural

and richer households. In the table multipliers for exogenous shocks on holdings incomes are contrasted with those for exogenous shocks on final demand for agricultural products, which show a similar structure but a lower total multiplier effect.

[INSERT TABLE 3]

An interesting differentiation between agricultural holdings is highlighted by the targeting index shown in the last row of the table. The figures express the sum of final effects on households classified as agricultural as a percentage of the initial, unitary shock. For example, only the 24% of the initial shock on self consumption holdings positively affects the income of agricultural households. Due to the existing link between typology of farms and socio economic groups, the figures in table show an increasing value of targeting index moving from smaller to larger farms.

The full accounting of income formation and distribution allows also for a deeper understanding of equity effects of alternative measures of support. A particular transformation of multiplier matrix, is applied in Table 4. The “redistribution matrix” proposed by Roland Holst and Sancho (1992) highlight only the changes in the relative position of different household groups caused by exogenous shocks, off-setting the total change in incomes due to the multiplier effects. In Table 4 shocks on accounts for different farm types generate only a zero-sum transfer of incomes among households group.

[INSERT TABLE 4]

To better appreciate the proposed results it should be stressed that an important share of support to agriculture within the EU Common Agricultural Policy is currently supplied through payments directed towards *holdings*. As a consequence, figures in table 4 can be interpreted as redistributive impacts of alternative support policy directed towards different groups of holdings. Only payments directed toward professional farms

are able to exclude from the positive redistributive non-agricultural households; the support of smaller farms, conversely, improve the relative position also of non-agricultural ones, especially in the case of self-consumption. The magnitude of redistributive effects can be compared looking at the totals: supporting professional farm generates a larger redistribution between households.

Expressing redistributive effects in percentage terms (Table 5) makes simpler the comparison of alternative measures of support from an equity point of view. The support through payments to smaller farms shows more desirable features from an equity point of view, with a larger share of positive effects accruing to poorer household; all the same supporting professional farms allows for a better targeting of beneficiaries, improving only the relative position of agricultural households.

[INSERT TABLE 5]

The trade-off between equity and targeting is a typical feature of supporting measures that are “coupled”, i.e. measures for which farmers are eligible only when they carry out production activities (Rocchi et al, 2005). The more the support is “decoupled”, the more positive distributive effects can be directed towards a pre-determined group of beneficiaries. The modified SAM presented in this paper allows for an evaluation of redistributive effects of a hypothetical totally decoupled measure of support, such as a direct payment to agricultural households totally independent from production activities. In Table 6 the percentage profiles of redistributive effects are shown for exogenous increases in the income of the five groups of agricultural households.

[INSERT TABLE 6]

Positive effects are now quite completely directed towards the group selected as beneficiary. Moreover, only non agricultural households get a worse relative position in the income distribution. Finally the equity features of supports improve moving the support towards richer agricultural households: in fact, in the last column a larger share of negative effects is bear by richer group of non agricultural households.

5. Discussion

The proposed approach to the representation of rural community seems to be effective in accounting for linkages between agriculture and the rest of the economy. The proposed classification of households sector shows in which extent incomes from farming are earned by families as a part of a wider income strategy. At the same time, the representation of primary income distribution to factors in the form of accounts for holdings (i.e. production units) with different institutional features draws the connection between alternative modalities in organizing production activities and different socio-economic goals achieved through farming.

A high degree of complementarity with the regional, rural-urban approach in SAM modelling seems to emerge. While the latter is an effective one in accounting for backward and forward linkages between the two “regions” of the economy, the accounting framework presented in this paper can improve the representation of cross-sectoral, multy-source income strategies of households: a feature more and more characterizing rural development processes both in developed and developing economies. The case study presented here focused on agriculture as a key activity to

understand rural at a national level. In regional models, however, the same approach could be used to highlight the role played by other industries, more or less connected with agriculture, but perceived as important in determining the total income of rural households. Moreover, even if in the analysis presented here a “sectoral” (agricultural vs. non-agricultural) classification of households was adopted, when the relevant information was available, the rural-urban concept could be suitable to improve the model, either in classifying households and in classifying production units.

A final remark is necessary about data requirements. The structure of the proposed SAM strictly rely on information retrieved from ISTAT’s farm business survey. The peculiar feature that makes the FBS database suitable to support the proposed approach is the collection of institutional information within a survey designed following an industry approach (a sample of production units). In fact a proper statistical coverage of agriculture as an industry ensures also a good statistical coverage of the institutions managing agriculture. This allows for a complete account of income formation and distribution from a specific production activity to institutions accruing for the deriving incomes, which is the distinctive feature of SAM approach to modelling (Round, 2003).

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Table 1
Agricultural holdings account for Italy
Italy 2002 - millions of €

	self consum- ption	capital constrained	professionals	Total
Gross value added at	851	3 903	23 029	27 783
Transfers to production	214	305	2 251	2 770
Total inflows of	1 065	4 208	25 280	30 553
Wages	97	764	6 255	7 116
Rents for land	8	48	845	902
Depreciation	326	1 169	7 230	8 724
Taxes on production	145	292	1 448	1 886
Corporate farms mixed	0	-46	-924	-970
Agricultural self employed	489	1 980	10 426	12 895

Table 2
Distribution of agricultural self-employed labour incomes in Italy
Italy, 2002 - column percentages

	self consum- ption	capital constrained	professionals	Total
Agricultural hholds I	20.0	27.0	1.7	6.3
Agricultural hholds II	3.2	9.6	4.9	5.6
Agricultural hholds III	3.1	9.9	11.5	10.9
Agricultural hholds IV	1.1	2.9	20.9	17.4
Agricultural hholds V	0.0	0.0	56.7	45.8
Other hholds I	26.1	19.8	2.4	5.9
Other hholds II	15.1	6.9	0.1	1.7
Other hholds III	30.8	19.4	1.3	5.2
Other hholds IV	0.7	4.4	0.6	1.2
Other hholds IV	0.0	0.1	0.0	0.0

Table 3
Household income nominal multipliers for agriculture
Italy, 2002 - €

	holding types				final demand for agriculture
	self consum-	capital constrained	professionals	average	
Agricultural hholds I	0.018	0.049	0.023	0.030	0.021
Agricultural hholds II	0.018	0.050	0.050	0.039	0.020
Agricultural hholds III	0.010	0.019	0.090	0.040	0.037
Agricultural hholds IV	0.022	0.025	0.251	0.099	0.059
Agricultural hholds V	0.174	0.164	0.065	0.134	0.162
Other hholds I	0.169	0.162	0.100	0.144	0.072
Other hholds II	0.299	0.295	0.162	0.252	0.102
Other hholds III	0.230	0.310	0.224	0.255	0.168
Other hholds IV	0.517	0.629	0.481	0.542	0.220
Other hholds IV	0.438	0.481	0.338	0.419	0.467
Total	1.894	2.184	1.785	1.954	1.328
Targeting index	24%	31%	48%	34%	30%

Table 4
Redistributive effects of support to agricultural holdings
Italy, 2002 – Absolute values (€)

	self consum- ption	capital constrained	professionals	average
Agricultural hholds I	0.092	0.127	0.007	0.075
Agricultural hholds II	0.016	0.046	0.021	0.028
Agricultural hholds III	0.015	0.047	0.047	0.036
Agricultural hholds IV	0.005	0.013	0.085	0.035
Agricultural hholds V	0.002	0.001	0.232	0.079
Other hholds I	0.049	0.016	-0.053	0.004
Other hholds II	-0.013	-0.053	-0.070	-0.046
Other hholds III	0.050	0.001	-0.071	-0.007
Other hholds IV	-0.093	-0.072	-0.080	-0.082
Other hholds IV	-0.121	-0.125	-0.119	-0.122
Total*	0.227	0.251	0.393	0.290

*Only for values >0

Table 5
 Redistributive effects of supporting agricultural holdings
 Italy, 2002 – Percentage values

	self consum- tion	capital constrained	professionals
Agricultural hholds I	40.3	50.5	1.7
Agricultural hholds II	6.9	18.4	5.4
Agricultural hholds III	6.4	18.6	12.0
Agricultural hholds IV	2.1	5.3	21.8
Agricultural hholds V	0.9	0.5	59.1
Other hholds I	21.4	6.5	-13.4
Other hholds II	-5.9	-21.2	-17.9
Other hholds III	22.0	0.2	-18.2
Other hholds IV	-41.1	-28.9	-20.3
Other hholds IV	-53.1	-49.9	-30.2

Table 6
 Redistributive effects of supporting agricultural households incomes
 Italy, 2002 – Percentage values

	Agricultural households				
	I	II	III	IV	V
Agricultural hholds I	99.6	-0.1	-0.1	-0.1	-0.1
Agricultural hholds II	0.0	99.9	-0.1	-0.1	-0.1
Agricultural hholds III	0.0	0.0	100.0	-0.1	-0.2
Agricultural hholds IV	-0.1	-0.1	-0.2	99.7	-0.3
Agricultural hholds V	0.4	0.1	-0.4	-0.7	98.8
Other hholds I	-16.6	-14.6	-12.2	-10.9	-9.0
Other hholds II	-18.3	-16.6	-14.8	-13.8	-12.4
Other hholds III	-19.5	-18.3	-17.5	-17.1	-16.3
Other hholds IV	-19.9	-19.7	-20.2	-20.4	-20.7
Other hholds IV	-25.6	-30.7	-34.5	-36.5	-39.7