under constraints

$$3x_1 + 2x_2 \geq 18, \quad x_1 + 3x_2 \geq 13, \quad x_1 + 4x_2 \leq 26, \quad 3x_1 + x_2 \leq 23.$$

It is evident that the system

$$s_1 + 2s_2 \leq 0$$
$$5s_1 + 3s_2 \leq 0$$
$$8s_1 + 11s_2 \leq 0$$
$$3s_1 + 4s_2 = 0$$

with the sign < in at least one inequation has no solution. Namely, the straight line $3s_1 + 4s_2 = 0$ does not pass through the cone determined by the system of inequations, in fact, by the first and second inequation. According to the theorem every feasible solution, that is, every point of the quadrilateral with the vertices in the points A (2, 6), B (4, 3), C (7, 2) and D (6, 5) is efficient solution. Our characterization of complete efficiency does not depend on the set of feasible solutions but on the objective functions. If the common numerator had been, for example, the function $2x_1 + 5x_2$ instead of $3x_1 + 4x_2$, only the extreme point A (2, 6) would have been efficient. Then $x_1 = 2$, $x_2 = 6$ would have been the perfect solution to the problem.

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MICRO PAYMENTS FLOWS AS A DATA SOURCE FOR THE NATIONAL ACCOUNTS[1]

Ivo LAVRAČ*

Yugoslavia's particular socio-economic setting offers possibilities to the compilation of national accounts and the use of computers which differ from the prevailing practices in Europe. I shall not refer here to the established official practice used in the compilation of Yugoslav accounts, which, although it offers many interesting aspects, particularly in the field of regional accounts, does not differ in principle from the traditional data sources. The aggregates which are usually used in the compilation of national accounts are provided by the statistical services, mainly by the aggregation of data from the micro accounts of firms and other transactors in the economy. Computers are widely used for this aggregation, but not for the compilation of the national accounts proper. Partly computerised are only the input-output tables.

Instead of the established practice, I'd like to report on some experimental work which tries to explore the particular advantages offered by the Yugoslav socio-economic system. This work consists of exploiting a new kind of micro data; the data on the flows of payment, which offer some particular possibilities to the national accountant and might therefore also be of more general theoretical interest. I first exposed the idea on which this work is based in the discussion at the 17th IARIW conference and later in a Yugoslav article.[2] Meanwhile, and independently, it was also adopted as one of the directions in the development of the official Yugoslav statistics.[3] The Federal Statistical Office does not follow these ideas yet by practical implementation on the national level, so I shall report on some empirical work being done along these lines in the region of Slovenia in the

* Faculty of Economics, Ljubljana, Yugoslavia.
Planning office of Slovenia, Ljubljana, Yugoslavia.

[1] Reported at the 18th general conference of the International association for research in income and wealth IARIW, Luxemburg, August 1983.

[2] Ivo Lavrač: *Nekatera možna izhodišča dela na sistemu bilanc za republiko.* IB revija za planiranje, št. 12, december 1981.

[3] Savezni zavod za statistiku: *Program razvoja statističkog sistema — zajedničke osnove.* Beograd 1982, str. 39.

framework of my research project by my students and with the support of the Planning Office and the Social Accounting Service which provides data, programmers and computers. After exposing the motive and justification of this approach, I shall briefly present one finished experiment — a monthly interregional input-output table, and one experiment in progress — a system of regional income accounts.

The payments among firms and institutions in Yugoslavia are effectuated by sending orders of payment to a special nation-wide organisation, the Social Accounting Service, which keeps track of the accounts of all the users of social capital which form a great majority of the economy. The Service executes the orders by changing the book value of the accounts of the liquid assets of the transactors involved. These assets are at the same time the obligations of the banks at which the accounts are kept. The Social Accounting Service daily records in its computers millions of such individual transactions in a standardised manner. It also classifies each record, according to the purpose of payment and the nature of the receipt, into 29 classes. This makes it possible to distinguish between current and capital transactions, to distinguish payments for goods and services from transfer payments and purely financial transactions. It is also possible to distinguish transactions with the population and private producers. The Social Accounting Service provides, on the basis of this data, monthly series of several important flows and the balance of all payments and receipts for the main groups of transactors. It is certainly tempting for a national acountant to use this data source further in order to arrive at a complete system of accounts with some valuable new properties.

Compared to the traditional statistical information at the disposal of the national accountant, this data source offers several advantages. The main one is certainly, that the record of each micro flow contains all the information necessary for its detailed classification on both the payments and the receipts side, by type of transactor and nature of transaction. Usually the national accountant needs to painstakingly reconstruct such information and is limited to the aggregate national level. Other valuable properties of this data source are the inherent consistency between the payments and the receipt side of the accounts, its reliability, minimum time delay, which permits almost real time processing, and its relative cheapness, as side product of the already computerised administrative data. These advantages are so huge, and so novel to a national accountant, especially when working on the regional level, that they seem to justify our effort to overcome the inherent disadvantages of such data.

The first disadvantage concerns the fact that the payments themselves are strictly speaking just financial flows and differ in size as well as in timing from the counter flowing real and other flows. Payments flows and counter-flows are two distinct kinds of flows and not substitutes, as our approach seems to suggest. Therefore we cannot use payment data to represent the real counter-flows. Those are the consequences of the principle adopted by the national acountants to record each transaction at the time of change of ow-

nership of the asset. While not denying the validity of such arguments I'd like to point out that the change of ownership criterion for the recording of transactions is not universally applied and has as its disadvantage that it dissociates real and financial flows completely, although they are in fact connected. As it offers many other advantages, it is convenient for certain uses to record transactions at the time of payment. This leaves as financial transactions mainly those transactions pertaining to loans proper, and leaves out some imputed and barter transactions.

As a second major disadvantage I should mention the huge number of the micro transactions which have to be processed, which require a lot of computer time and ingenious programming solutions. But, as the computers can be used for national acoounting when they are not otherwise employed, and their cost is declining, this problem is not insurmountable. It makes it easier to work on the regional instead of the national level, contrary to the usual situation in national accounting.

Other disadvantages we can mention concern the incompleteness of this data source. This time the problem does not arise from the nature of this type of data source, but involves its particular stage of development in Yugoslavia. The payments system inside the country, in national currency, is at the moment still not integrated with payments with the outside world, so in our experiments we limited ourselves to the data from the first system. Secondly, the present level of computing and communication facilities allows for the adequate computer capture only of those payment records where both the payer and the payee are in the region covered by the same Social Accounting Service center. It leaves out some 15% of all records which cross these boundaries and which have data on the payer available only in the computers in the region of the payer and data on the receiver in his region only. We tried to overcome this difficulty by matching the computer tapes of different regions by amounts transferred to reconstruct the complete information for each record. We found that because of many equal amounts transferred daily this procedure works only approximately and would have to be supplemented by a manual check. We chose to avoid this problem by limiting our first experiments to the accounts of the regions covered by these Social Accounting Service centers and by waiting with more ambitious applications for the technology of the present payments system to advance to the required level.

Our first experiment[4] resulted in the approximation of the input-output table for the region of Gorenjska, covered by one of the 14 Slovene Social Accounting Service regional centers.

We limited ourselves to those classes of payments which constitute a receipt for a regional producer and to those which constitute its current expenses. We grouped the producers into four industries. We should mention that in Yugoslavia the units with rather homogeneous

[4] Potočnik Janez: *Poizkus uporabe podatkov plačilnega prometa za izdelavo medsektorske tabele.* Ekonomska fakulteta, Ljubljana 1982.

production inside firms keep their own accounts and have their own payment flows, so that the distinction between institutional sector and industry largely disappears. We also grouped the producers by the county inside the region (there are six such counties in the region of Gorenjska), so that we ended up with an interregional table. The table was compiled for two different months, which enabled us to detect significant seasonal variation. The main pattern of intersectorial and interregional (both inside Gorenjska and with other regions) flows remained unchanged and displayed features explained by the region's production and trade structure.

The second experiment is still in progress and aims at compiling the income accounts for the region of Ljubljana.

This region makes up about one third of the economy of the republic of Slovenia. Some 150 thousand payments records are processed daily. Our approach classifies and aggregates this daily flow into a matrix, so that a particular kind of payment by a particular sector, presented in a column, is shown in rows as a kind of receipt by the receiving sector. This initial matrix is then daily checked, stored and cumulated with other daily matrices into a monthly matrix, which provides a basis for different kinds of presentations of the accounts. Beside providing a matrix of sector transaction accounts, it is also possible to separate these accounts into current accounts, capital and financial accounts by grouping the flows accordingly.

We envision using a thus established system of accounts, not as a substitute to the accounts now currently in use, but as their complement. In particular, we expect it to be an indication of the monthly dynamics of flows and a valuable guide into the interregional dimension. It will also enable us to provide a more articulated system of accounts; we shall better know the origin of inflows and destination of outflows from particular sectors. For all those reasons further efforts in the direction of this approach seem warranted.

MANAGEMENT AND PRODUCTION PROBLEMS IN GROUP FARMING COOPERATIVES IN THE SAVANNAH ZONES OF SOUTH-WESTERN NIGERIA

Remi ADEYEMO*

Abstract

This study was conducted among 100 group farmers from 25 different cooperative group farms in the savannah area of south-western Nigeria. The objectives of the study are to examine the structure and then identify the production and management problems facing the group farms.

The result of the study shows that group farming is still in its rudimentary stage of operation in the area of study. Consequently, they are not yet efficiently organized. The problems confronting group farmers include untimely payment of credit to farmers, high labour cost, inadequate income and lack of equipment, machinery and other inputs.

It is therefore suggested that the authority should make appropriate modern inputs readily available to the farmers. More agro-service centres should be established in each local government area in order to bring their services nearer to the farmers. It is also recommended that agricultural loans of the required amount should be made available to the farmers at the right time.

INTRODUCTION

A number of approaches has been used to develop agriculture in Nigeria. They range from individual family farms, plantation system and farm settlement schemes. In most cases these approaches have not been able to meet the goals for which they were designed. However, like any other developing country, Nigeria has embarked on various forms of cooperation (group farm inclusive) to overcome most of the constraints to agricultural development. In Nigeria, farmers pool their plots of farmland together so as to enjoy the inherent ad-

* Department of Agricultural Economics University of Ife, Nigeria