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Modelling the Prospects of Economic Growth and Social Development: Results of Circular Flow Planning Models Applied to Pakistan 1980–1993

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1. INTRODUCTION

This paper presents for Pakistan an analysis of the country's recent economic growth and social development, and medium-term prospects covering the period of the Seventh Plan. The meaning of economic growth is self-evident. In contrast, by social development we shall mean the pace of progress as regards the distribution of income, the satisfaction of essential needs, balanced development and employment of human resources.

The paper has two purposes (i) to provide valuable information for policy making in the area of growth and development, and (ii) to demonstrate the attractiveness and usefulness of working with the models we have developed. We shall rely exclusively on the results obtained from the planning models which were developed in collaboration with the Pakistan Institute of Development Economics, Islamabad and Erasmus University, Rotterdam Netherlands.

Most of the past models which were developed for Pakistan served analytical purposes, were demonstrative in nature or were not updated. As a result, they are practically irrelevant for today's appraisal of future prospects. More recently, since 1980, a few models which have been updated regularly may turn out to have a future. In particular, among the macro models, PIDE's econometric model is the most widely publicised, cf. Naqvi *et al.* (1983). In the category of activity models one simple but handy model is available in Cohen, Havinga and Saleem (1985). In

*The author is Professor of Economics, at Centre for Development Planning, Erasmus University, Rotterdam, the Netherlands. The author acknowledges the programming assistance at various phases of Mr M. de Zeeuw and B. Kuijpers at Erasmus University and the collaborative effort with Prof. Syed Nawab Haider Naqvi, Dr M. Irfan, Dr S. Malik, Mr I. Havinga, Mr M. Rafiq and Masood Ishfaq Ahmad at PIDE. The models presented here were literally constructed and updated in pieces over the last eight years. In this regard we recall with great sorrow the loss of Dr Jawaid Azfar who consistently supported our collaborative effort and was a source of encouragement for introducing social development in the planning process. The collaborative effort was made possible by finances provided from the Dutch-Pakistan Technical Assistance Programme.

the category of activity/factor models a regularly updated and used manpower planning model which elaborates on the labour force matrix of Pakistan, is in Cohen (1985). Finally, two recently completed reports at the PIDE have been treating the circular flow models. these are of the social accounting type SAM (PIDE 1985), and of the consistency type COM (PIDE 1986).

The presentation in this paper will be based on the latter two circular flow models: partly on a simplified analysis of SAM multipliers (Section 2) and partly on the consistency model COM (Section 3) and its extension to the planning of manpower balances, i.e. extended COM (Section 4).

2. SAM

One of the first lessons in a textbook of economics is on the circular flow (Figure 1). In the lower bound, *households* supply labour and capital to *firms* who are organizers of *production activities* (i.e. sectors), and the latter paying back for the use of factors. In the upper bound, households spend their incomes on products which are delivered by the firms/activities. In the centre is a government which is involved in transfers to and from households and firms/activities. Furthermore, there are the economic relations between the country and the rest of the world.

The first published application of a social accounting matrix, SAM, to developing countries dates from 1977.[1] In fact, the SAM is nothing more or less than the transformation of the circular flow of Figure 1 into a matrix of transactions between the various agents, as in Table 1. In the rows of such a matrix we find the products,

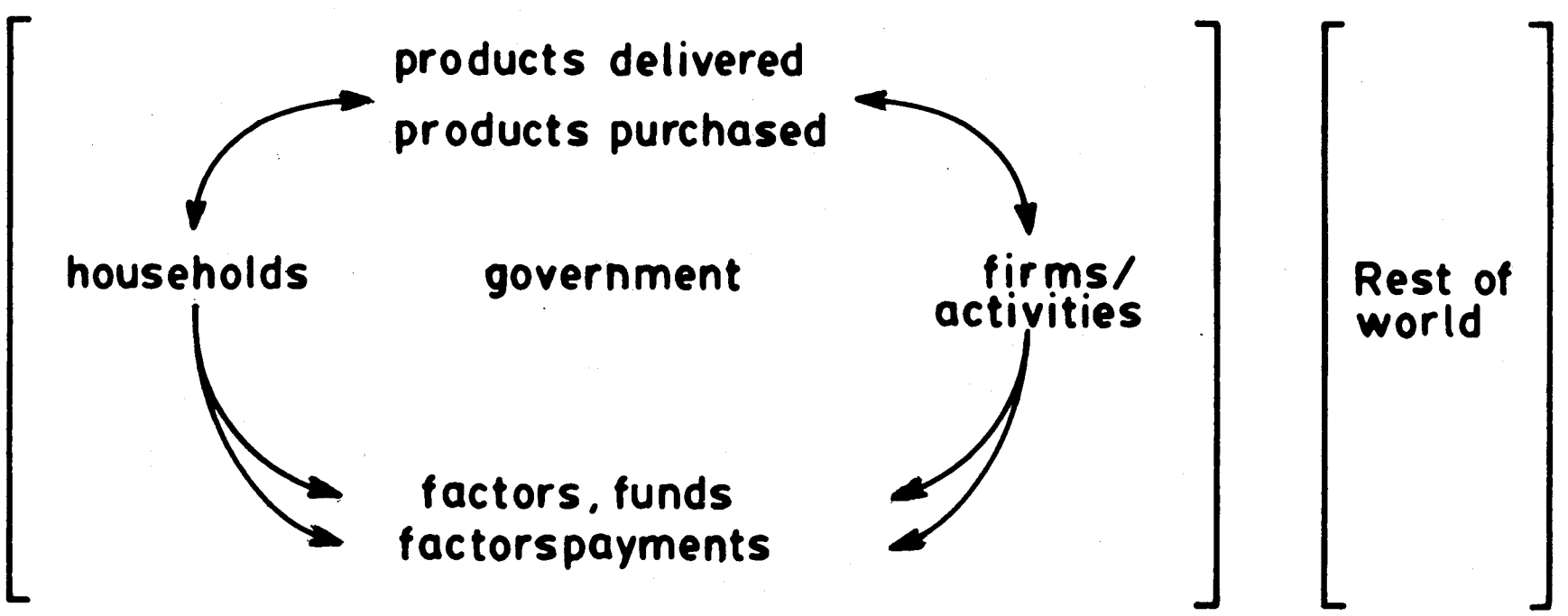

Fig. 1. Circular flow

[1] The first applications to countries of the Third World are in Pyatt and Roe (1977). There are presently SAMs of different shapes for more than 30 countries. Of course, several models in the Seventies had the shape of a SAM and appropriate SAMs were often constructed in the process of estimation of these models, see for instance, Cohen (1975).

Table 1

Aggregate SAM, Pakistan 1979-80

(billion rupees)

	1. Prod.	2. Fact.	3. Househ.	4. Firms	5. Govt.	6. Funds	7. Activ.	8. Rest of World	Total
1. Products			199						199
2. Factors							213	18	231
3. Households		214			1				215
4. Firms		16			1			−3	14
5. Government		2	2	4			24	−2	30
6. Funds			14	10	5			11	40
7. Activities	199				22	41	213	−25	450
8. Rest of World									0
Total	199	232	215	14	29	41	450	−1	1179

the factors, the institutions consisting of households, firms and government as well as the institutions capital account, the activities and the rest of the world. The columns are ordered similarly. Transactions between these actors take place at the filled cells and in correspondence with the circular flow. A particular row gives receipts of the actor while columnwise we read the expenditure of the actor. Various data from national accounts, household surveys etc. are utilised to estimate the filled cells. Table 1 gives, for instance, the aggregate SAM for Pakistan in 1979-80. This SAM has been disaggregated further into 8 products, 12 activities and 10 household groups, resulting into a matrix of 37 rows by 37 columns, as reported in PIDE (1985).

The required data for a SAM are not readily available for a later year than 1979-80, so that it is difficult to state with reliance the kind of growth and distributional changes which have taken place in the last 5 or 6 years. However, with appropriate handling, the SAM can be turned into an instantaneous circular flow model whose impact multipliers are able to reflect on the inner mechanisms of Pakistan's economy in the medium run, i.e. for years which are directly before and after 1980.[2] As such the SAM can be employed to tell us what has most probably

[2] The appropriate handling of the SAM referred to above consists of three steps which can be summarized as follows:

(1) A separation between independent variables, also called exogenous variables, (These are public or foreign demands for goods and services, and public or foreign transfers to institutions, together these are found in columns and rows 5, 6 and 8 of the SAM in Table 1; and dependent variables, also called endogenous variables, (these are the remaining columns and rows in the SAM).

(2) A calculation of a coefficient matrix for the endogenous variables.

(3) The inversion of the coefficient matrix to give the so-called impact multipliers of a million rupees addition in the exogenous on endogenous variables. The procedure is explained at length in a paper presented in a recent PIDE seminar, c.f. Cohen (1986).

been happening in the past few years, and how. In particular, the impact multipliers give an insight on two issues:

(a) What is the effect of additional demand for sectoral activities, on *growth* and *distribution;*
(b) What is the effect of *institutional transfers,* i.e. public transfers, private transfers and foreign remittances, on *growth* and *distribution.*

For purposes of presentation, Table 2 gives the impact multipliers of the SAM for 13 selected exogenous impulses. The impact of exogenous additions to sectoral activities on the functioning of the whole economy are found in Columns S10 to S13, while the impact of exogenous additions to institutional transfers are found in Columns I3 to I9.

Let us first consider growth effects. Column S10 would imply that an additional million rupees of purchases of wheat and rice (through government purchases and/or exports) ultimately leads to an additional 1.574 million rupees of production of wheat and rice, 1.8 of other agriculture, 5.9 of non-agriculture, and .5 of services, giving a total of 9.7. The contribution of an expansion in wheat and rice to the overall growth of output is highest, followed by other crops, industry and services. Note that while the narrower input-output framework, laying emphasis on interactivity relationships, gives higher values of multipliers for industry than for agriculture, and in fact has had the effect of encouraging investment in industry at the cost of agriculture; we have here different results from the broader SAM framework which considers the whole circular flow including interactivity relationships. The SAM would recommend expansion of agriculture at the cost of industry. Of course, both the input-output and the SAM frameworks consider the demand side only. Realistic planning requires considering both demand and supply sides.

Secondly, we consider the income distributionary effect. Wheat and rice lead with an income impact multiplier of 4.4. The rural small/no holdings group gains, collecting 1.6 out of the 4.4, or 36 percent. This is a higher share than the actual share of the income of this group in 1979-80 which amounted to 31 percent. As a result, it can be concluded that additional demand for wheat and rice is progressive in its income redistribution effect. The same applies to other agriculture. These progressive effects are partly due to (1) the persistence of a strong link between the agricultural factors of production and factor income for rural households at the lower end of the income scale, and (2) the ability of these households to plough back their consumption expenditures and those of other households to their benefit. In several countries where such an analysis has been made it was found that the consumption pattern of poorer households is inefficient in the sense that it leads to an income leakage to richer households. In this respect, Pakistan is better off.