A Summary of Input-Output Studies of The Economy of Pakistan

by

GHULAM RASUL*

INTRODUCTION

The technique of input-output analysis is now being widely used as a tool for development planning. This technique aims at a quantitative evaluation of the processes of production and consumption and the presentation of the results in a single picture. The quantitative relationships existing between different segments of the economy are shown in the form of an input-output flow-table which are then used as coefficients in a mathematical model. The model so formed is intended to reflect the most important economic variables in the system and the interrelationships existing between them. Such a model can indeed be of considerable help in determining consistent sets of economic policy and facilitating the task of the policy maker in making a choice between them.

The input-output approach has two distinct aspects. Its more pedestrian side is to depict, by means of a consistent accounting framework, the inter-industry transactions flow-table for the entire system and the interdependence between its sectors for the period to which the data relate. This type of tabulation would obviously be of considerable intrinsic value by way of showing in summarized form the availability of the different types of products classified by industries of origin and their disposal over "intermediate" and "final demand"—the former created by the productive sectors and the latter involving goods which will not be subjected to any further process of production.

But this descriptive purpose is not the most important one. The more sophisticated aspect of the application of this technique is to offer a means of predicting output levels with the help of certain assumptions regarding the production functions of different industries. In other words, its application offers a means of quantifying the interrelationships of the various sectors of the economy, in the light of which one can see the repercussions of any change in final demand on the rest of the economy.

* The author is Senior Research Economist at the Pakistan Institute of Development Economics, Karachi and wishes to acknowledge his gratitude to Dr. Bruce Glassburner, Senior Research Advisor at the Institute, for his valuable comments on an earlier draft of the article and also for his assistance in improving its style and language. However, the mistakes which may still persist in the article should be attributed to the author alone.

The formulation of such ambitious development planning programmes as are underway in Pakistan obviously comprehend relationships of a large number of interdependent variables, some of which are of the well-known input-output type. The need for building up an equally detailed model reflecting these intricate relationships of our economy can hardly be over-emphasized. Work on input-output lines for the Pakistan economy was not started until recently. The process of comprehensive development planning was started, in the form of five year planning programmes, more than a decade ago. But the planners of the First Five Year Plan dismissed the very idea of applying input-output analysis to planning on the ground that sufficient data were not available for this purpose. An unpublished document, *National Accounts and Input-Output Analysis* [17] coming out of the Economic Research Section of the Planning Commission in 1963 reveals that the work on input-output analysis *vis-a-vis* national income accounting was started by the Planning Commission towards the end of that year. That paper was intended to serve as an introduction to the application of input-output analysis to Pakistan especially meant for those serving the Planning Commission. This has been followed by the building up of input-output tables of the Pakistan economy as in [1], [9], [15] and [16], from within the Planning Commission during the last couple of years.

Outside the Planning Commission, Fei's work [7] constitutes a landmark by way of tabulating Census of Manufacturing Industries (CMI) data for 1955 on manufacturing industries in the form of an input-output table. The present author's book [21] is the first endeavour to prepare a comprehensive inter-industry relationships flow-table. This study was related to the 1954 calendar year as the base period.

Practical application of the technique to Pakistan's economic planning is still at an experimental stage; most of the attempts as mentioned above have been limited to its rather pedestrian aspect, *viz.*, the construction of a *tableau economique* of the input-output type. Nevertheless, the collection of an enormous amount of statistical data usually available in a completely scattered form and giving it the shape of a detailed input-output table comprising forty to fifty or even more sectors is an extremely laborious job and its significance is not small. Moreover, some applications of a more sophisticated nature have been tried as in [9], [15], [16] and [21].

In the text which follows we have taken up these various attempts in [1], [7], [8], [9], [10], [13], [15], [21] and [22] to give a summary review and then make certain comparisons between them as far as possible.

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The notations and definitions used in the course of this article are as follows:

V_i^D = domestic output of commodity i (including intra-industry deliveries, unless stated otherwise. i = 1, ..., n refers to commodities.

V_i^M = imports of commodity i

$V_i = V_i^D + V_i^M$ = total availability of commodity i both from domestic production and from imports

F_i^D = final demand for the domestic output of commodity i.

F_i^M = final demand for the import of commodity i.

$F_i = F_i^D + F_i^M$ = total or "combined" final demand for commodity i.

C = household consumption of commodity i.

J_i = Use of commodity i in capital formation

S_i = change in stock of i

E_i = Exports of i

$F_i = C_i + J_i + S_i + E_i$ = total or "combined" final demand comprises household consumption, investment, change in stocks and exports.

V_j^D = Output level of industry j, j = 1, ..., n refers to industries

V^M = level of importing activity j

V_{ij}^D = domestic output of commodity i used as input by industry j

V_{ij}^M = imports of commodity i used as input by industry j

$V_{ij} = V_{ij}^D + V_{ij}^M$ = "Combined" flow of commodity i going into industry j

Y_j = value-added in sector j

W_i = total intermediate use of i

U_j = total intermediate inputs of industry j

$W_i^D = \Sigma_j V_{ij}^M$ = part of the total intermediate use of commodity i flowing from domestic production

$W_i^M = \Sigma_j V_{ij}^M$ = part of the total intermediate use of i coming from imports

$U = \Sigma_j U_j$ = total row sum of U_j for all values of j

$W = \Sigma_i W_i$ = total column sum of W_i for all values of i

$u_j = \frac{U_j}{V_j^D}$ = ratio between total intermediate inputs and total production of industry j

$w_i = \frac{W_i}{V_i}$ = ratio between total intermediate use and total demand for commodity i

I. THE BASIC TABLES

Preliminary Input- Output Table for Large Scale Industries in Pakistan for 1955 [7]

This study is the first attempt at converting CMI-1955 data on the large-scale manufacturing industries of Pakistan into an input-output flow-table. The table comprises the flow of 32 different commodities shown in an equal number of rows with 15 columns showing the cost structure of as many industry groups. Fifteen of the 32 different commodities actually correspond to the 15 industry groups from which these are supposed to be originating; there are 14 agricultural and 3 mineral products each identified with a producing sector. An additional row of "the unallocated" is also provided.

The row for "value added" is divided into two having "wages bill" separated from "non-wages incomes".

The final demand categories consist of investment, consumption and export.

Detailed imports have been drawn from foreign trade statistics published by the Central Statistical Organization and have been reclassified in accordance with the industrial classification of the input-output table and introduced into it as competitive in nature to the domestic products. In other words, an item of import has been added to the supply of a commodity produced domestically with which it is either identical or very similar in nature. The total supply of a product (both from imports and domestic sources) is then routed towards meeting "intermediate demand" created by the productive sectors and/or the demand of final users.

In algebraic symbols, the rows and columns of the table are made to fulfil the following accounting identities:

$$V_i = \sum_{j=1}^{n} V_{ij} + F_i \quad \ldots\ldots\ldots\ldots \quad (i)$$

$$V_j^D = \sum_{i=1}^{n} V_{ij} + Y_j \quad \ldots\ldots\ldots \quad (ii)$$

Equation (i) gives the distribution of commodity i ($i=1, \ldots 33$) over "intermediate" and "final" demand. Equation (ii) gives the cost structure of each industry j ($j=1, 2 \ldots . 15$) along the columns of the table.

In recording the transactions in the flow-table, final demand (F_i) for the products of 15 large scale manufacturing industries is obtained as a residual from the total availability of a product after meeting the intermediate demand. Since the table shows the cost structure only of large scale industries of the

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economy, the final demand for a product is exaggerated to the extent that the intermediate demand of sectors other than large scale is not taken account of.

At any rate, the above exercise provides a good illustration of the conversion of the census data and the statistical information contained in foreign trade statistics of the country into the form of an input-output table. In doing so the author brings to light n umber of statistical difficulties and gaps which were faced in the course of the exercise [*see* 7, pp. 66-67].

Input-Output Relationships in Pakistan, 1954 [21]

Input-Output Relationships in Pakistan, 1954 [21] is the first attempt at a comprehensive tabulation of inter-industry relationships in the Pakistan economy as a whole. Table 1.A in [21] shows the transaction flows of 71 products along the rows corresponding to the cost structure of 27 different productive sectors. The selection of commodity flows and the differentiation of sectors was mainly determined by the nature of data available. The transaction flows in value terms as shown in the table were backed by a balancing of total availabilities against the various "intermediate" and "final" uses of products in physical terms as far as the available information could permit. Apart from the major sources of information like the *Census of Manufacturing Industries,1954, The First Five Year Plan, Production and Trade Statistics of Pakistan,* the relevant sources of Indian origin such as the *Census of Indian Manufactures 1950,* the *National Income Committee Reports, etc.,* were also drawn upon to supplement the information available from Pakistani sources. This is especially true in the case of estimating the overall costs of agriculture, animal husbandry, electricity, *etc.* [*see,* 21, Chapter II].

As noted above, the table in [7] is related to the large scale manufacturing industries only but Table 1.A in [21] is aimed at giving an overall view of the inter-industry transaction flows in the economy.

The treatment of imports in [7] and [21] is similar. But the treatment of "depreciation" in [21] is shown as a current input flowing from the capital goods producing sectors so that sectoral value-added (Y_j) is shown as net of depreciation in [21].

Both tables are at purchasers' prices.

For purposes of making applications, Table 1.A [21] has been consolidated to a 13 × 13 input-output table and given as Table 1.B in the book.

Interdependence of the Economy of Pakistan

A part of Chapter III discusses the nature and measure of interdependence in the Pakistan economy. If the overall measure of interdependence in terms

quently the entire economy could be looked upon as a vertically integrated whole with its sectors so arranged that each sector receives deliveries only from its preceding sectors while it makes deliveries only to those which follow it or vice versa.

However, in actual practice the circularities of the type mentioned above do exist in practically all the input-output tables. Hence a measure of "circularity" or of "triangularity" in an optimally triangularized input-output matrix could measure the degree of its one-way dependence.

There are three investigations made so far into the problem of establishing an hierarchy of sectors of the type mentioned above. Henry Aujac [2] is interested in finding out as to which industries in an economic structure are the "dominant" ones. He speaks of "domination" by one industry over another if a change in the production level of the former requires a change in the production level of the latter, but the reverse is not true or not true to the same extent. Checking up on each industry with this rule in hand will provide a certain hierarchy of sectors. With some minor improvements further one could get a fairly good triangulation of the matrix which may lead to the optimal point in triangulation, *i.e*, most of the deliveries lie on one side of the diagonal and no revision of the order of sector would improve triangulation.

Another attempt at an approximate triangulation of a transactions matrix is made by Chenery and Watanabe [3]. The authors suggest that an approximate triangulation could be achieved by arranging sectors according to the rule of falling shares in deliveries to other industries with the rising share in deliveries to final demand. However, the authors do not guarantee optimal arrangement.

The third attempt in this case is made by Helmstadter [10] who has dealt with the problem of triangularization of an input-output table at some length. The author lays down a number of conditions to test the optimality of the matrix. Chapter III [21, pp. 71, 74, 76] provides a simplified version of the method of triangulation to an optimal degree by following three simple rules. These rules are applied to the Pakistani input-output table and Table 1.B optimally triangularized is given as Table IV in the book. Further more the book provides an exercise in measuring the degree of "triangularity" or of "circularity" in the above-mentioned Table IV [21].

Apart from providing an insight into the pattern of industrial structures whether linear or circular, an optimally triangulated transaction would be more

suited to the application of iterative procedures in determining the effects, direct as well as indirect, of changes in final demand on the rest of the economy[1].

The usual assumption of proportionality between inputs and outputs in the transactions flow matrix was introduced into Table 1.B in terms of the well known technical relation

$$a_{ij} = \frac{V_{ij}}{V_j}$$

and a whole 13×13 matrix of technical input coefficient (a_{ij}) or (A) is derived. The Leontief type inverted matrix$[1-A]^{-1}$ or the matrix of cumulative production coefficients showing in each column the supplies directly and indirectly required from every industry to satisfy a unit of final demand for the product of the industry named at the top of each column is also included in the book [21]. Matrix of input-output coefficients and the inverted matrix are given as Appendix A-I and Appendix A-II respectively.

Chapter IV in [21] is devoted exclusively to an exercise in the well-known "semi-input-output" method devised by Professor Tinbergen. The method was evolved primarily for purposes of evaluating individual investment projects in development planning or for the appraisal of sectors. The method aims at making a priority list of sectors from the national point of view as far as their profitability is concerned. According to this method, the sectors of an economy are divided into two main categories, termed as "national sectors" and "international sectors". "National sectors" are defined as those whose products, for technical reasons, cannot be imported or exported; for example, buildings, electricity, inland water and other transport, wholesale and retail trade, *etc.*, personal services.

"International sectors" are defined as those whose products can be imported or exported.

An important implication of such a sub-division would be that an extension of an international sector would necessitate the entension of the national sectors because of the interdependence of the sectors, unless all the national sectors are under-utilized. In other words an investment project would always require complementary investments in national sectors. By definition we presume that additional requirements of international sectors would be met from imports.

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[1] For an understanding of the method of special input-output solution by iterative procedures for determining the effects, both direct and indirect, of changes in final demand on the rest of the economy, *see*, Chenery and Clark [4, pp. 43-46].

Hence it is argued that the appraisal of investment projects should be based on the assessment not of the direct "yield" only (output-capital ratio) but the direct as well as indirect effects of the project in terms of the "national" sectors should be assessed in estimating the comparative advantage.

Such an approach would require the entire matrix of input coefficients, but for the solution only a part of the matrix will have to be inverted, thus facilitating the task of inversion—taking into account only those indirect relations that are relevant and ignoring the rest.

The application of the above method to the case of Pakistan has yielded some interesting changes in the order of priority of a number of sectors [21, p. 89].

In the end, the author has jotted down some of the difficulties which confronted him during the course of his work.

The Basic Tables in the Works of Saeed Ahmad [1], O.D.K. Norbye [13], Harvard Advisory Group [9], Pakistan Planning Commission [15]

Saeed Ahmed's basic Table [1] is a 40×40 inter-industry transactions flow table of the Pakistan economy relating to the year July 1959 to June 1960. Norbye's tabulation in [13] relates to a 30×30 input-output flow-table for the calendar year 1960. Wouter Tims's 30×30 input-output flow-table [9] of Pakistan for 1960/61 is built up on the basis of the above two tables. Major sources of data in these three attempts are more or less the same, namely—CMI—1959/60, and production and trade statistics as published by the various government departments.

Lack of detail with regard to the methodology used in the construction of above tables, especially those in [1] and [13] restricts us to a mere overall view of the extent of coverage of economic activity in the three.

In order to make the three tables comparable, we have aggregated the industries in each to a 14 industry classification as follows:

S. No.	Consolidated sector	Classification number(s) comprising the consolidated sector		
		in [1]	in [13]	in [9]&[15]
1.	Agriculture, forestry, fishing, *etc.*	I+II+III	1—7	01
2.	Mining	IV	12	02
3.	Modern manufacturing	V	14—34	03—17
4.	Traditional manufacturing	VI	35—38	19—21
5.	Electricity and gas	VII	8+10	22
6.	Construction	VIII+IX	39	18
7.	Banking and insurance	X		24
8.	Goverment administration	XI		23
9.	Transport and communication	XII+XIII	40	25
10.	Rental housing	XIV+XV		26
11.	Trade	XVI		27
12.	Education	XVII		28
13.	Health	XVIII		29
14.	Other services	XIX		30

For purposes of comparison we take up the column vectors of total intermediate deliveries to productive sectors and final demand, and the row vectors of total intermediate inputs and value added of the various sectors as denoted by W_i, F_i, U_j and Y_j respectively. These are presented below in Table I on pages 418-420. Disparity in the coverage of economic activity in the three cases is made evident by this comparison.

Treatment of Imports in the Works of Harvard Advisory Group [9] and Planning Commission [15]

The 30×30 input-output flow-table in [9] and [15] treats imports as non-competitive. This means that the input flow of commodity i into sector j is split up over *i*) the domestic input flow (*i.e.*, V^D_{ij}) and *ii*) import input flow represented by V^M_{ij} so that the accounting identity between flows from different sectors against inputs received by the sectors is made up as follows:

Output flows from sector i ($i = 1 \ldots n$) along rows are expressed by

$$V^D_i = \sum_{j=1}^{n} V^D_{ij} + F^D_i$$

Inputs received by sector j ($j = 1 \ldots n$) along columns are depicted by

$$V_j = \Sigma_i V^D_{ij} + \Sigma_i V^M_{ij} + Y_j$$

Import components of "household consumption" and "capital formation" are shown in lump sums against the row for imports which describe the total of import inputs into productive sectors so that

$$V^M_i = \Sigma_i \Sigma_j V^M_{ij} + C_m + J_m$$

That is to say C_m and J_m indicate the total value of imports of consumer goods and capital goods respectively with no commodity breakdown. Imports are recorded at c.i.f. price so that the evaluation of imports are contrary to the general recording of transactions in the table in [9] in which the transactions are recorded at "purchasers' prices" so that the manufacturers are regarded as selling their products directly to the user, at a price including the so-called trade and transport margins. All intermediaries are supposed to be selling their services to the producer. In effect, all the input flows (*i.e.*, V^D_{ij}s) derived as residuals (after deducting the V^M_{ij} at c.i.f.) include the trade and transport margins accruing to the intermediaries between the port of landing and the using sector. In effect, the value added by the trade and transport sector estimated by the so-called "income approach", as conventionally done in the national income accounting estimates of the country, will not be the same as the value added

TABLE I

COMPARISON OF DATA AGGREGATED FROM DIFFERENT INPUT-OUTPUT TABLES

		Intermediate demand $W_i = \sum_{j=1}^{n} V_{ij}^{D+M}$			Final demand (F_i)			Total demand (V_i)		
		A	B	C	A	B	C	A	B	C
		(1)	(2)	(3)	(4)	(5)	(6)	(1)+(4)	(2)+(5)	(3)+(6)
I.	Agriculture (Incl. forestry and fisheries	12560.9	10383	4968.8	5444.0	5658	14892.2	18004.9	16041	19861.0
II.	Mining	146.7	122	25.4	30.7	21	12.3	177.4	143	37.7
III.	Modern manufacturing ...	2648.5	3107	2814.2	10306.5	5243	5107.9	12955.0	8350	7922.1
IV.	Traditional manufacturing ...	971.9	344	130.1	10824.8	9825	6411.5	11796.7	10169	6541.6
V.	Electricity	99.2	138	110.4	128.5	78	59.2	227.7	216	169.6
VI.	Construction	103.2	127	—	2204.4	2320	1488.0	2307.6	2447	1488.0
VII.	Banking and insurance ...	205.7	143	68.1	21.2	67	67.9	226.9	210	136.0
VIII.	Transport and communications	1705.2	1721	1120.5	119.6	589	400.1	1824.8	2417	1520.6
IX.	Government	10.3	107 —	—	930.2	1270	—	940.5	1270	—
X.	Rental housing	171.6	82	—	3563.2	968	—	3734.8	1050	—
XI.	Trade	2337.9	—	—	582.5	3200	2273.4	2920.4	3200	3531.6
XII.	Education	235.7	—	1258.2	272.8	400	—	508.5	400	—
XIII.	Health	28.1	—	—	490.3	400	—	518.4	400	—
XVI.	Other services	168.6	44	285.3	2462.8	1756	3372.7	2631.4	1800	3658.0
		21393.5	16318	10781.0	37381.5	31795	34085.2	58775.0	48113	44866.2

(continued)

TABLE I (*contd.*)

COMPARISON OF DATA AGGREGATED FROM DIFFERENT INPUT-OUTPUT TABLES

		Intermediate purchases $U_j = \Sigma_i V_{ij}^{M+D}$			Primary inputs (value added + indirect taxes — subsidies) Y_j			
		A	B	C	A	B	C	D
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
I.	Agriculture, forestry and fisheries ...	1855.0	636.0	2326.9	15986.8	15120.0	17119.0	15916.0
II.	Mining	15.6	11.0	21.5	103.2	83.0	8.4	67.0
III.	Modern manufacturing	6906.0	4525.0	4150.8	2692.8	1936.0	2307.8	1408.0
IV.	Traditional manufacturing	10528.8	8954.0	3639.2	1247.0	1216.0	2902.4	1297.0
V.	Electricity	67.6	70.0	65.9	160.1	146.0	103.7	101.0
VI.	Construction	1006.4	1062.0	558.1	1292.3	1385.0	1429.9	634.0
VII.	Banking and insurance	4.5	35.0		180.0	150.0		215.0
VIII.	Transport and communications ...	265.5	709.0	600.6	1559.3	1648.0	920.0	1563.0
IX.	Government	263.8	—		676.7	1270.0		1264.0
X.	Rental housing	154.8	57.0		3580.0	993.0		1305.0
XI.	Trade	20.4	685.0		2900.0	2540.0		3593.0
XII.	Education	85.7	—		422.8	400.0		( )
XIII.	Health	126.9	40.0		391.5	360.0		( )
XIV.	Other services	91.4	42.0		2540.0	1643.0		(2012.0)
		21392.4	16826.0	11362.0	33732.5	28890.0	24791.5	29375.0

(*continued*)

TABLE I (*contd.*)

COMPARISON OF DATA AGGREGATED FROM DIFFERENT INPUT-OUTPUT TABLES

		Domestic output V_j^D			Imports V^M		
		A	B	C	A	B	C
		(8)	(9)	(10)	(11)	(12)	(13)
I.	Agriculture, forestry and fisheries	17841.8	15756.0	19446.1	163.1	645.0	414.9
II.	Mining	118.8	94.0	29.9	58.6	49.0	7.8
III.	Modern manufacturing	9598.8	6461.0	6458.6	3356.1	1892.0	1463.5
IV.	Traditional manufacturing	11775.8	10170.0	6541.6	20.9	—	—
V.	Electricity	227.7	216.0	169.6	—	—	—
VI.	Construction	2298.7	2447.0	1988.0	8.9	—	—
VII.	Banking and insurance	184.5	185.0	—	—	25.0	—
VIII.	Transport and communications	1824.8	2357.0	1520.6	—	60.0	—
IX.	Government	940.5	1270.0	—	—	—	—
X.	Rental housing	3734.8	1050.0	—	—	—	—
XI.	Trade	2920.4	3225.0	—	—	—	—
XII.	Education	508.5	400.0	—	—	—	—
XIII.	Health	518.4	400.0	—	—	—	—
XIV.	Other services	2631.4	1685.0	—	—	115.0	—
		55124.9	45716.0	36154.4	3607.6	2786.0	1886.2

Note: Breakdown of total imports under A are explained in the text in a later section.

Sources:
i) data under A derived from [9]
ii) data under B derived from [13]
iii) data under C derived from [1]
iv) data under D refer to the National Income Commission's revised estimates of the sectoral contribution, to net national income "at current factor cost" for 1959-60 as given in Commission's September 1955 Report.

estimates made on the basis of the total value of output of the sector minus the cost of inputs of the sector. Since no alternative source of information on the performance of the trade sector as a whole exists, except the one used in the national income accounting estimates, it seems advisable to use this available information directly or indirectly. The 30×30 input-output table in [9] is given as Table IV-A in the Appendix. It may be noted here that in [21] the value added of the trade and transport sector was taken from the national income accounts and augmented by the inputs of the sector to the same extent as in official estimates to get a figure for the total output of the sector. On the other hand, the trade and transport margins were obtained for separate products. The difference between the factory and market price of different commodities, after making allowance for indirect taxes; and between c.i.f. and market prices of imports, is attributed to the manufacturers or the using sector. A cross check was, thus, made before choosing a figure for total output of the sector.

The Assumption of Proportionality

For applications of the input-output technique the well-known assumption of propor ionality between inputs and outputs of various sectors reflected by the so-called technical input coefficient, *i.e.*, $a_{ij} = \frac{V_{ij}^{D}}{V_j^{D}}$ is introduced.

A separate import input coefficient matrix $[a_{mj}]$ is built in on the basis of the import input flow, which is used for determining the import requirements of Pakistan for the period 1964/65 as in [16]. The matrix of import input coefficients is given as part of Table IV in the Appendix.

The above matrices $[a_{ij}]$ and $[a_{mj}]$ are further made use of as part of the input-output model which constitutes the conceptional framework of the Third Five Year Plan. These are dealt with later in this article.

II. INDIRECTNESS OF PRODUCTION EXHIBITED BY GHULAM RASUL [21] AND HARVARD ADVISORY GROUP [9]: A COMPARISON

As a measure of the indirectness of production we take the ratio of total intermediate inputs to total outputs of sectors denoted by u_j and the ratio of total intermediate deliveries to total requirements of a product denoted by w_i.

For purposes of comparability, the 13×13 input-output table in [21, Table 1.B] and the 30×30 table of [9] were consolidated as follows:,

CONSOLIDATION OF SECTORS

S. No.	Name of sector	Original number of the sector(s)	
		in [21]	in [9]
1.	Agriculture, forestry, fisheries and animal husbandry	$V_1 + V_2$	01
2.	Mining and quarrying	V_3	02
3.	Fuel and power excluding electricity	V_4	10
4.	Chemicals	V_5	09
5.	Engineering	V_6	05 + 12 + 13 + 14 + 15 + 16
6.	Agricultural Processing	V_7	17
7.	Food industries	V_8	03
8.	Other consumer goods	V_9	04 + 07 + 08 + 19 + 11 + 20 + 21
9.	Jute, paper *etc.*	V_{10}	06
10.	Construction	V_{11}	18
11.	Electricity	V_{12}	22
12.	Services	V_{13}	(23—30)

The values of u_j and w_i obtained for the 12 consolidated sectors based on [21] and [15] are given in Table IIa below

TABLE IIa

INDIRECTNESS OF PRODUCTION

	$\left(u_j = \frac{\Sigma_i V_{ij}}{V_j^D}\right)$ and $\left(w_i = \frac{\Sigma_i V_{ij}}{V_j}\right)$			
	1954 u_j (1)	1960/61 u_j (2)	1954 w_i (3)	1960/61 w_i (4)
1.	.178	.103	.553	.697
2.	.486	.406	.614	.860
3.	.883	.707	.869	.942
4.	.625	.594	.633	.509
5.	.608	.734	.514	.444
6.	.625	.909	.271	—
7.	.757	.731	.029	.092
8.	.604	.843	.263	.088
9.	.825	.658	.119	.459
10.	.503	.437	.477	.044
11.	.466	.297	.770	.435
12.	.127	.076	.382	.366
Aggregate	.359	.388	.347	.364

Sources: Columns (1) and (3) derived from [21, Table 1.B] and the other two columns from 30 × 30 input-output table in [9].

As is clear from the above table, the overall U for the entire economy increased from 35.9 per cent in 1954 to 38.8 per cent in 1960/61. This is in line with the findings of Gustav F. Papanek in his *Survey of Industrial Production and Investment in Pakistan*[18]. According to the above source, the "value-added as a proportion of sales varied only between 32 and 36 per cent on the basis of data in the five Censuses of Manufacturing Industries in Pakistan."

However, at the sectoral level the divergence is much more pronounced. Sectors with a divergence below 8 per cent are the following[2]:

Sector I (agriculture, *etc.*) shows u_j as 17.8 per cent of total output in 1954 against 10.3 per cent in 1960. The higher percentage of inputs in 1954 can be explained by the inclusion of such items as the imputed costs of cultivation which are not taken care of by the Pakistan national accounting estimates and probably omitted from 1960/61 table. These additional items of expenditure that are covered by the 1954 table [21, pp. 22-26] are the following[2]:

i) imputed costs of animal services to agriculture,

ii) imputed costs of cowdung used as manure, and

iii) rental costs of farm buildings which are used for productive purposes.

sectors 4 (chemicals) and 7 (food industries) show more or less the same divergence as the overall figure, *i.e.*, around three percentage points. Sectors 12 (services) and 10 (construction) show a difference of 5.1 and 6.6 per cent respectively for the two periods.

In the case of the rest of the sectors divergence is much too large. In view of the lack of detail on the methodology used in recording of transactions in [9] and [15], it would be hard to explain the above divergences.

Sectors 5 (engineering), 6 (agricultural processing industries), 8 (other consumer goods) and 10 (jute, paper, *etc.*) show differences of 13.4, 18.4, 23.9 and 16.7 per cent respectively. However, the large scale industries section of the above sectors is covered under CMI-1959/60. We compare below in Table IIb the $(1-u_j)$ for a number of industries comprising the above sectors derived from the detailed table of [4, Table 1-A] and their counterparts in CMI-1959/60.

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2 *Cf.*, "Inter-industry Relations in the Indian Union, 1951-52" by the Inter-Industry Relations Section of the Indian Statistical Institute in [20]. In the 36×36 input-output table of the Indian Union, the percentage of total inputs to total outputs in agriculture is 24.3. Over 70 per cent of the inputs originated in the animal husbandry sector.

TABLE IIb

VALUE ADDED PER UNIT OF OUTPUT

		$(1-u_j)$	
		as in [21, Table 1.A]	as in CMI1959-60
VI.	2. Steel-rerolling	.628	.377
	3. Manufacture of machinery other than transport	.399	.427
	4. Transport machinery and equipment	.538	.459
	6. Manufacture of metal products	.411	.483
	7. Manufacture of electrical machinery and goods	.595	.455
	8. Manufacture of non-ferrous metal products	.331	.695
	9. Manufacture of woodware	.591	.318
VII.	1. Cotton ginning	.086	.197
	2. Jute baling	.172	.671
	3. Saw milling	.495	.416
	4. Tea processing	.125	—
VIII.	1. Rice milling	0.81	.074
	2. Wheat mills	.121	.144
	4. Sugar mills	.314	.363
	6. Seed oils	.134	.383
	8. Tobacco manufacture (L.S.)	.536	.514
	9. Food preparations, n.e.c.	.284	.50
IX.	1. Cotton textile	.421	.368
	4. Match industry	.717	.722
	5. Manufacture of leather and leather products	.395	.537
	6. Footwear manufacture	.410	
	7. Manufacture of rubber products	.437	.528
	8. Soap manufacture	.443	.234
X.	1. Jute manufacture	.468	.464
	2. Manufacture of paper and paper products	.410	.356
	3. Printing and publishing	.676	.466
XI.	2. Cement manufacture	.463	.466
		33.27	32.62

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It may be noted that the industries listed above constitute a major part of all the large scale industries covered under CMI-1959/60. (More than 80 per cent of total value added by CMI industries originated in industries listed in the above table). The overall (1—u) did not vary much in the two cases. However, at the sectoral level the deviations are substantial, although well below those exhibited by the consolidated sectors in all the above cases. The differences are more pronounced in industries which are aggregated with industries working on small scale using primitive technique; for instance, seed oils manufacturing, manufacture of leather and rubber products, and saw-milling.

III. A TEST OF PREDICTABILITY

In this section, we experiment with the 13 ×13 matrix of cumulative production coefficients of [21, pp. 72-73] as a tool for predicting output levels. For this purpose we apply the figures of final expenditures of 1960/61 as given in [9] and compare the output levels so projected with those mentioned as actuals in [9]. But before proceeding with the above exercise several adjustments had to be made in the vector of final demand in order to bring it as nearly as practicable into line with the definitions and valuation used in the input-output Table of 1954.

This meant, first of all, that the split input flows in the intermediary transactions flow matrix of [9] had to be "recombined" so as to show the treatment of imports on the same lines as in [21]. Also the composite figures of consumption and capital goods (C_m and J_m respectively) in the 30×30 table [9] had to be broken down over the 30 commodity classification of the table. The task of obtaining the "combined" input flow and the resulting vector of total intermediate outputs by sectors of origin was not difficult. The distribution of the imported consumption and capital goods was greatly facilitated by the work-sheets used by Joseph Stern and Wouter Tims[3] in the construction of the table made available to the present author, and by the publication of [14]. A breakdown of imports of the above categories as derived from the work sheets, with some modifications given in the footnotes of the table are given as Table A-IV in the Appendix.

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[3] The author is indebted to Messrs Wouter Tims and Joseph Stern, advisors to the Planning Commission, Karachi, for making available their work sheets on imports. These sheets contain details of imports collected from sources like CSO, Karachi and the Central Board of Revenue, and classified according to their use as

i) raw materials for consumer goods and/or capital goods,

ii) consumer goods, and

iii) capital goods.

While listing the above imports in Table A-IV, besides valuation, some important discrepancies were noticed between the two studies under examination, so far as the "routing" of certain items of import in the flow-table are concerned. For instance, the items of steel and steel products are shown as part of intermediate deliveries in [21, Chapter II], whereas these are included in final demand, according to Table A-IV. In order to bring the treatment of imports in the two tables on to the same footing as far as possible, the whole range of commodity imports was recast. This was done with the help of the single to seven digit commodity by country classification for the financial year 1960/61 given in [14]. Imports were routed under "intermediate" and/or "final" demand as presented in Table A-IV in the Appendix. The results of the above exercise are presented below in Table III.

Valuation of Imports

In order to bring them as nearly as possible, in view of the available information, in line with the treatment of imports in [21] we have augmented the c.i.f. price of imports (consumption and capital goods only) by the excises, sales and import duties. Lewis and Qureshi's classification of import, excise and sales duties on imports for 1960/61 [11, Appendix] was used for this purpose[4]. It may be noted that the estimation of the value of imports so derived, is still short of the trade and transport margins on the various items for the valuation "at purchasers' prices".

Sector 3 (fuel and power excluding electricity and gas) is given a special treatment due to a sharp contrast: *a*) in the allocation of its product over intermediate and final demand; and *b*) in the large discrepancy between the value of imports (at c.i.f. prices) as worked out from the original 30×30 import flow matrix and the work sheets on imports of consumption and capital goods and the actual imports of the petroleum products and coal as published in [14]. The market or purchasers' price of fuel and power products have been built up from the seven digit commodity classification of imports given both in quantity and value terms and adjusted for the import, excise and other duties plus the trade transport margins. These are presented in Table A-VII and B-1 in the Appendix.

On the basis of the consolidation of the 30×30 table in [9] and the various adjustments made in the "routing" and evaluation of imports as mentioned in the previous paragraphs, the vectors of final demands and the corresponding output levels are given in Table IV.

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[4] *See*, Table A-VI for the distribution of import plus sales tax on imports for July 1960 to June 1961 as based on [11] and classified according to the above 12 consolidated sector (p. 422).

TABLE III

12×12 CONSOLIDATED INPUT-OUTPUT TABLE FOR PAKISTAN: 1960/61
INTERMEDIATE AND FINAL DEMAND

	Name of sector	W_i^D	W_i^M	W_i^{D+W}	F_i^D	F_i^M	F_i	V_i^D	V_i^M	V_i
		(1)	(2)		(3)	(4)		(1)+(3)	(2)+(4)	
I.	Agriculture, forestry and fisheries	12398.3	(646.8) 162.6	2560.940	5443.5	(71.9) .5	5444.0	17841.8	163.1	18004.9
II.	Mining	88.1	(15.2) 58.6	146.7	30.7	—	30.7	118.8	58.6	177.4
III.	Fuel and power (excl. gas and electricity)	71.9	88.1	160.0	9.8	101.2	111.0 148.0	81.7	189.3 831.1	271.0
IV.	Chemicals	108.3	(160.2) 250.6	358.9	345.0	(160.1) 104.0	449.0	453.4	354.6	808.0
V.	Engineering	467.3	(538.8) 740.0	1207.3	1508.3	(888.0) 1204.6	2712.9	1975.5	1944.6	3920.1
VI.	Agricultural processing ...	—	—	0.0	1691.2	(1.8) —	1691.2	1691.2	—	1691.2
VII.	Food industries	186.6	18.1 (—)	204.7	2017.8	631.2 (109.2)	2649.0	2204.4	649.3	2853.7
VIII.	Other consumer goods ...	1387.1	(18.6) 140.4	1527.5	13257.3	(89.3) 67.4	13324.7	14644.4	207.8	14852.2
IX.	Jute and paper	133.7	(18.6) 28.2	161.9	190.3	3.2 (9.9)	193.5	324.0	31.4	355.4
XI.	Construction	103.2	— (30.8)	103.2	2195.5	8.9	2204.4	2298.7	8.9	2307.6
X.	Electricity	99.2	—	99.2	128.5	—	128.5	227.7	—	227.7
XII.	Services	4863.1	4863.1	8442.6	—	8442.6	—	13305.7	—	13305.7
	Total : ...	**19906.6**	**1468.6**	**21393.4**	**35260.5**	**2121.0**	**37381.5**	**55167.3**	**3607.6**	**58774.9**

Notes: *i*) Figures in parentheses under columns (2) and (4) refer to imports as in Table A-V of the Appendix whereas their counterparts were obtained directly from Table A-IV consolidated.
ii) Imports are valued at c.i.f. price.

Basis: Tables A-III, A-IV and A-V

TABLE IV

FINAL DEMAND (IMPORTS VALUED AT C.I.F. PRICE PLUS IMPORT DUTIES, SALES TAX AND OTHER CHARGES)

(in million rupees)

	imports (at c.i.f. price) F_i^{D+M}	Imports at c.i.f. plus import duties & sales tax *etc.*) F_i^{M}	F_i	V_i
	(1)	(2)	(3)	(4)
I	5443.5	81.6	5525.1	18570.2
II	30.7	—	30.7	184.0
III	9.8	148.4	157.9	953.7
IV	345.0	179.4	524.4	812.2
V	1508.3	1070.8	2579.1	3696.2
VI	1691.2	4.2	1695.2	1695.4
VII	2017.8	140.6	2158.4	2345.0
VIII	13257.3	131.1	13388.4	14904.6
IX	190.3	9.9	200.2	367.0
X	2195.5	0.5	2196.0	2330.0
XI	128.5	—	128.5	227.7
XII	8442.6	—	8442.6	13305.7

Sources : *i*) Column (1) is derived from Column (3) of Table III.

ii) Column (2) is based on the c.i.f. value of imports given in Column (4)—figures in parentheses—Table III plus import duty and sales tax, *etc.*, derived on the basis of Table A-VI.

With the final demands built up in this way and by means of the 13×13 inverse matrix (Table A-II) giving the supplies directly and indirectly required from every industry to satisfy a unit of final demand for the product of the industry concerned, we can project the total outputs (intermediate and final deliveries) of all the thirteen industries. But as is clear from Table IV above the estimates of final expenditure on the products of animal husbandry for 1960/61 were not available separately and on the same lines as dealt with in [21]. We have therefore, identified the products of animal husbandry with those of agriculture. The final expenditure on agriculture in 1960/61 presumably contains a component of final expenditure on the products of animal husbandry. The column of direct and indirect requirement for agricultural output in Table

A-II is considered as applicable to the entire amount of final expenditure on agriculture and animal husbandry products for 1960/61 as derived from [9]. With this adjustment we apply the "final bill of goods" comprising twelve commodities to the 12×12 matrix of production multiplier and thus calculate the estimated output levels. The projected output levels by industries are given in Table V.

TABLE V

PROJECTED OUTPUT LEVELS BY INDUSTRIES

(in million rupees)

I	Agriculture, forestry and fisheries	11,205.2
II	Mining	339.4
III	Fuel and power (excl. gas and electricity)	1,259. 9
IV	Chemicals	1,443.9
V	Engineering	4,567.5
VI	Agricultural processing	3,619.3
VII	Food industries	2,535.0
VIII	Other consumer goods	18,806.2
IX	Jute and paper	412.4
X	Construction	3,215.4
XI	Electricity	328.7
XII	Services	15,050.8

In order to see how far the calculated outputs and the actual outputs deviate from each other, we apply a straight forward comparison of the two sets of outputs. Such a comparison is sometimes used as a test for the input-output method's powers of predictability. We have computed the difference between the projected and actual outputs and expressed it as a percentage of the former. The results are presented in Table VI below.

TABLE VI

DISCREPANCIES BETWEEN THE "ACTUAL" AND INPUT-OUTPUT ESTIMATES OF TOTAL OUTPUTS BY INDUSTRIES

I	—
II	—
III	24.2
IV	—
V	19.1
VI	—
VII	7.5
VIII	20.8
IX	11.0
X	27.5
XI	30.7
XII	11.6
Aggregate	5.5

Note: — denotes discrepancy higher than 40 per cent.

In the case of sectors 1 (agriculture, *etc.*), II (mining), IV (chemicals) and VI (agricultural processing industries) the discrepancy between the input-output estimate and the actual outputs runs as high as 40 per cent or higher. We have already dwelt on the differences in method logy used in building up the agriculture-*cum*-animal husbandry sector for the two studies under examination. Sectors II, III and VI were too small in 1954 and the information on their inputs and outputs was so scanty that the results could not be expected to come out any better. As is readily clear from the table above, the deviations for other sectors ranged between 7.5 and 30.7 per cent[5].

5 Discrepancies between census and input-output estimates of total outputs by industries ranged between —7.6 and 23.3 per cent for 1930 in British economy: the basic "matrix multiplier" related to the year 1935.

Concluding Remarks

First of all it must be emphasized that owing to imperfections in the data and the lack of information in detail regarding the construction of the basic tables it is very hard to express any definite opinion about the assessment of the basic tables in terms of their capacity or the lack of it to predict. However, on the basis of the above results one could emphasize the need for further investigation into this field and more experimentation with the input-output technique as a tool for prediction. Again it must be noted with emphasis that the precondition for a successful testing of the technique as a means for predicting future levels of output is the building up of rather correct estimates of final demands. Needless to say that this side of the problem was perhaps one of the weakest points in the above exercise.

IV. GROWTH MODEL FOR PAKISTAN ECONOMY [15]

This section of the article is devoted to a summary with some comments by way of a critical appreciation of the *Growth Model for Pakistan Economy* [15]. The model is of great significance insofar as it forms the basic conceptual framework for the Third Five Year Plan of Pakistan.

The model is of the well-known input-output type comprising seven industry-groups corresponding to an equal number of commodity-groups consolidated on the basis of the 30×30 input-output transactions flow-table for the year 1960/61 (July-June) and the 22×80 transactions flow-table for 1963/64 [22], and thus a system of equations is built up as follows:

Output flow of domestically produced commodity i ($i = 1, 2 \ldots 7$) along the row of the input-output table is given by

$$\overset{D}{V_i} = \Sigma_j \overset{D}{V_{ij}} + C_i + J_i + N_i + E_i \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where N_i refers to change in stocks of i.

Input structure of industry j ($j = 1, \ldots 7$) along the column of the table is shown by

$$\overset{D}{V_j} = \Sigma_i \overset{D}{V_{ij}} + M_j + Y_j + T_j \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$M_j = \Sigma_i \overset{M}{V_{ij}}$$

where $M_j = \Sigma_i \overset{M}{V_{ij}}$ and T_j refers to indirect taxes (minus sudsidies) charged to the porducing sector j.

Which defines

$$Y_j = \overset{D}{V_j} - (\Sigma_i \overset{D}{V_{ij}} + M_j + T_j)$$

$\Sigma_i Y_i = Y$ = the gross national product.....(3)

Import input relations are given by

$\frac{M_j}{V_j} = m_j$ which yields the following equation

$$M_j = m_j V_j^D + d \quad \text{..... (8a)}$$

The import component of consumption is derived by the assumption of constant relation $\frac{C_m}{C} = c_m$ yielding the following identity:

$$C_m = c_m C + d \text{.....(8b)}$$

Investment equations

$$J_i = \sum_{i=4}^{7} K_{ij} \qquad [-i = 4, 5, 6, 7]$$

Assuming $K_{ij}/J = k_{ij}$

$$J_i = \Sigma_j k_{ij} J \text{ .....(9i)}$$

$$J = \sum_{i=4}^{7} J_i \text{ .....(9ii)}$$

In this way the deliveries from domestic production towards capital formation are related to total investment by the weighted coefficient k_{ij}

The imported capital goods are related to total investment by the following relation:

$$J_m = j_m J \text{.....(10)}$$

Similarly $T = t_j J$ .....(11)

Since $J = \sum_{i=4}^{7} J_i + J_m + T_i$

the above relations in (9), (10) and (11) are modified to allow for import substitution.

The assumption of a constant technical relationship (a_{ij}) given by $\frac{V_{ij}^D}{V_j^D}$ helps to build up a structural relationship of the input-flows of the following type:

$$V_{ij}^D = a_{ij} V_j^D + d \text{.....(4)}$$

where d measures the intercept on the Y-axis. The demand for commodity i for consumption under final demand is measured by $\frac{C_i}{C}$ (c_i), which is further used to derive the input flow of commodity i as related to total consumption expenditure by the following relation:

$$C_i = c_i C + d \quad \text{..... (5)}$$

in which $C = C_i + C_m + C_t$ and d is a constant.

The assumption of proportionality between additional indirect taxes (minus subsidies) corresponding to additional output levels denoted by $\frac{T_j}{V_j^D} = t_j$ gives the following equation:

$$T_j = t_j V_j^D + d \quad \ldots\ldots(6).$$

Addition to stocks is assumed as a constant proportion of additional outputs with unit elasticity, so that

$$N_i = n_i V_j^D \quad \ldots\ldots(7a) \quad \left[V_i^D = V_j^D\right]$$

Similarly, the import component of additional outputs to stocks is given by

$$N_m = n_m M \quad \text{where } n_m = \frac{N_m}{M} \quad \ldots\ldots(7b)$$

Investment in each sector (aggregated to 4 in all) is related to output through "marginal capital output ratios" using a time lag between investment and output in the following manner:

$$J_j^t = qY_j^t (g-1)\, g^n \quad \ldots\ldots(12)$$

$$J_j^t = q\,(Y_j^{t+1} - Y_j^t)$$

So that

$$Y_j^{t+1} - Y^t = q \text{ for a time lag of one period.}$$

This is used for further estimates of investment requirements and an allowance is made for import substitution of capital goods.

Foreign trade equations

$$E = E_i + T_e + E_s \quad \ldots\ldots(13)$$

Total of exports will comprise the export of all commodities plus the export duties and import substitution

$$M = M_j + C_m + J_m + N_m \quad \ldots\ldots(14)$$

Balance of payments equilibrium:

$$B = E - M \quad \ldots\ldots(15)$$

Saving equation

$$S = J + B + N_i + N_m \quad \ldots\ldots(16)$$

The author counts 98 equations with 105 variables in the above model. Hence the solution of the entire system in terms of seven "exogenous variables" *viz.*, V_1, S, E_2, E_3, E_4 and E_7

Summary Remarks

Needless to say that a tremendous amount of labour of the author must have gone into assembling this huge amount of information on the various aspects of Pakistan economy; and the skill with which information was "scaffolded" into the model deserves to be highly appreciated. However, some comments are being added with regard to some of the fundamental assumptions made in the model.

Modification of the Proportionality Assumption

The assumption of proportionality between input flows and output levels which is assumed to exist, at least over short periods, in the traditional approach has been abandoned and the concept of the "marginal input coefficient" has been used instead. This has been done not only with respect to intermediate inputs produced domestically, but also those which are imported. As is clear from the foregoing summary of the model, a_{ij} of the above model does not refer to input flow of commodity required for a unit increase in the output level of the sector. The bases for computing these a_{ij}'s are the 30×30 input-output table for 1960/61 and a table for 1964/65. For instance, the input flows of consumers goods into the "intermediate goods production" sector are shown as 59 and 76 in the input-output transactions flow-tables for 1960/61 and 1964/65 respectively, while the corresponding output levels of the intermediate goods producing sector are 3545 and 6293 for 1960/61 and 1964/65 respectively; $a_{ij} = .0062$. Hence the set of equations as in [4] above.

It is not quite clear from the text why the traditional approach was abandoned and this new experiment introduced, especially when the number of observations was so limited that one had to work only with the two tables. Moreover, it is not known whether the author used any test for the predictibility of the method, especially with reference to Pakistan.

However, two different reasons have been given for abandonment of the traditional approach and the adoption of the new one, namely,

i) the developing nature of the economy and the subsequent presumption of a change in the so-called "technical coefficients", and

ii) the consolidation of sectors with different input structures and different "rates of growth".

As regards *i*), whatever little information we have on the input sructure of Pakistani industries, it is broadly indicative of more or less stable input-output relationships. The following sources may be quoted in support:

a) Gustav F. Papanek's findings in [18] where he claims "little change in the technology of the firms". On the basis of the five censuses of manufacturing industries of Pakistan he finds "the value-added as a proportion of sales varied only between 32 and 36 per cent suggesting the relationship is quite stable".

b) The example of the Indian planners in connection with the projections of inter-industry flows for 1975 on the basis of the assumption of a constant technical input coefficient matrix derived from a 1960 input-output flow-table of the Indian economy would not be out of place, although it is not known whether the basic input coefficient matrix used for projections withstood any test of predictability or not. But the formulation of the basic table was on much firmer grounds than any one built for Pakistan so far. The 1960 Indian table was preceded by a number of inter-industry relationship studies which could have provided some insight to the Indian planner on the behaviour of input flows in response to output flows.

c) A summary review of the broad input-output relationships as presented in Section II of the present article also lends support to the argument advanced by Papanek as mentioned above.

With regard to the problem of aggregation it could be said that a complete elimination of error is practically impossible. This could be made clear by giving an example: Suppose m and n are two sectors to be combined and are receiving inputs of i, so that the combined technical coefficient

$$a_i\,(m+n) = a_{im}\frac{X_m}{X_m + X_n} + a_{in}\frac{X_n}{X_m + X_n}$$

So that the combined input coefficient is a weighted average of the two coefficients with $\frac{X_m}{X_m + X_n}$ and $\frac{X_n}{X_m + X_n}$ as weights.

No error is likely to be introduced by consolidation under two conditions, namely:

i) if $a_{im} = a_{in}$, and

ii) if X_m and X_n keep the proportion between them as constant.

The present author's attempt at aggregating sectors with roughly similar inputs from a 69×27 matrix of inter-industry flow-table for the calendar year 1954 to a 13×13 matrix is a case in point[6].

On the basis of the short survey of the input-output studies on Pakistan, we could say that the work done so far in this field is only of a pioneering nature and a great deal of work still needs to be done before one could claim to have achieved a certain degree of accuracy in predicting the future. This means:

a) the construction of a detailed basic input-output table of the economy, preferably built up from the inter-sectoral flows in physical terms as far as practicable, subject to the limitation of the availability of data.

b) independent estimates of final demand, which should be consistent and accurate as far as possible. Obviously a great deal would depend on the accuracy in predicting final expenditures so far as the prediction of future output levels is concerned, and

c) a test of predictability should decide how far the basic table could be used for predictive purposes.

6 *See*, pages 411-426 of the text above.

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Appendix A

TABLE A-I

13×13 MATRIX OF PRODUCTION COEFFICIENTS, PAKISTAN: 1954

	Agriculture	Animal husbandry	Mining	Fuel *etc.*	Chemicals	Engineering	Agricultural processing	Food industries	Other consumers goods	Jute *etc.*	Construction	Electricity	Services
Agriculture incl. forestry	0.046	0.176			0.019	0.205	0.487	0.644	0.002	0.264	0.118		
Animal husbandry (incl. fishery)	0.068	0.001						0.002	0.022				
Mining		0.003		0.166	0.019	0.001				0.022	0.018		
Fuel & power (except electricity)					0.042	0.011	0.007	0.003	0.007	0.016	0.018	0.156	0.047
Chemicals			0.008		0.302	0.001			0.017	0.069	0.037		
Engineering (incl. rural smithies, *etc.*)	0.028	0.004	0.035	0.011		0.207	0.012	0.004	0.007	0.036	0.098	0.253	0.007
Agricultural processing industries	0.003					0.017		0.031	0.092				
Food industries ...		0.016			0.034			0.001	0.016		0.002		
Other consumer goods						0.001			0.287				0.003
Jute, paper, *etc.* ...							0.009	0.006	0.002	0.065	0.010		0.012
Construction	0.010					0.007	0.003	0.002	0.007	0.036	0.150		0.015
Electricity				0.006	0.023	0.004	0.001	0.002	0.003	0.020	0.005	0.058	0.002
Services	0.024	0.168	0.444	0.700	0.187	0.156	0.106	0.062	0.141	0.295	0.047		0.041

Source: [21, Table II, p. 65].

TABLE A.II

13×13 MATRIX MULTIPLIER, PAKISTAN: 1954

	Agriculture	Animal husbandry	Mining	Fuel, *etc.*	Chemicals	Engineering	Agricultural processing	Food industries	Other consumers goods	Jute *etc.*	Construction	Electricity	Services
Agriculture (incl. forestry)	1.075346	.203886	.015522	.013653	.070814	.294011	.532092	.714558	.103963	.333277	.193542	.081226	.015074
Animal husbandry (incl. fishery)	.073205	1.014930	.001105	.001010	.004953	.020076	.036235	.050656	.038037	.022737	.013202	.005559	.000818
Mining	.001086	.004873	1.004786	.173718	.041502	.006370	.003263	.002278	.005777	.034996	.028772	.030479	.009530
Fuel & power (except electricity)	.003245	.009811	.025121	1.042583	.084090	.027424	.015535	.009838	.026740	.048478	.034461	.180023	.052901
Chemicals	.000901	.000696	.012801	.004081	1.434146	.003318	.001982	.001632	.036074	.109976	.064750	.001567	.002729
Engineering (incl. rural smithies, *etc.*)	.040847	.015633	.051800	.035567	.022029	1.279252	.038702	.035267	.026140	.082742	.159935	.349468	.015428
Agricultural processing industries	.003984	.001461	.001142	.000988	.002251	.022906	1.002340	.033850	.130651	.002717	.003526	.006316	.000727
Food industries	.001235	.016305	.000508	.000245	0.48931	.000517	.000686	1.001903	.024356	.004254	.004798	.000180	.000221
Other consumer goods	.000272	.000853	.002168	.003641	.001597	.002836	.000704	.000524	1.403691	.001940	.000845	.001365	.004631
Jute, paper, *etc.*	.000850	.002721	.006514	.011143	.005200	.003607	.011779	.008350	.008062	1.075758	.014617	.002814	.014293
Construction	.013924	.006178	.009696	.016020	.007937	.018621	.013347	.013524	.018597	.057848	1.183319	.007654	.020277
Electricity	.000424	.000695	.001949	.009038	.036699	.006423	.002028	.002906	.006663	.027431	.009401	1.064793	.003222
Services	.050932	.197477	.497996	.853411	.372104	.247588	.154412	.112871	.268533	.433428	.147587	.207826	1.095391

Source: [21, pp. 72-73].

TABLE A-III

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN. 1960/61

(in million rupees)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
01	823.3 (.684)	(0.079)	819.3 (99.820)	650.6 (34.783)	1.3 (2.477)	15.0	48.7 (0.700)	0.9 (13.082)	9.1 (4.469)		0.5		1.0
02	0.0		5.3	17.1	0.2				3.1 (15.034)	13.1 (9.900)	14.0 (29.100)	0.3 (0.651)	1.7
03	82.4		71.0	0.1			1.4		10.8 (18.115)				
	0		7.9 (1.958)	91.3 (50.999)	(0.152)	0.1 (0.573)		6.8	1.1 (0.762)		17.3 (0.698)		
			0.0 (0.868)	(0.131)	5.8 (0.119)				10.2		0.8 (0.220)	0.7	2.9 (0.033)
			27.0 (4.134)	14.6 (1.471)		33.9 (19.693)			15.9 (1.543)		(1.265)		
				20.9 (1.072)									
				3.5 (5.313)									
				6.0 (33.200)	0.6 (0.834)	3.2 (17.900)	0.9 (4.447)	1.1	6.1 (33.600)	1.1	3.8	1.2	4.1
				)0)	(0.100)	8.6 (5.300)			3.9 (2.283)	1.9	6.2 (5.700)	1.3 (1.500)	0.5 (1.400)
					(0.328)				0.5 (2.980)		1.5 (5.674)		

(continued)

TABLE A-III (*contd.*)

TER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

				(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
						4.4	6.7		1.2	0.4	3.4	14.0 (54.600)	38.7 (151.200)
			3)										
			9.2 (1.671)	0.8 (3.905)	(0.234)	1.1 (0.075)			2.8 (0.628)		(0.557)	4.4 (0.321)	5.5 (0.451)
			0.5	6.1 (19.827)		0.4 (2.839)						0.7	(0.664)
												(1.112)	(0.618)
19	48.4												
20	5.2												
21	0.0												
22	5.2	2.2	23.1	39.2	0.1	1.0			3.3		2.3	2.8	1.3
23	0.0	0.0											
24	30.9	5.6	16.0	36.3		5.4			3.6		2.0		8.3
25	412.0		73.2	36.3	12.1	13.4	7.0	3.4	3.6	18.4	16.2	11.8	31.1
26	51.5		20.0	24.2		6.7			2.2				
27	288.4	6.7	399.0	363.0	24.1	67.0	21.0	11.3	72.0	11.5	18.0	35.4	124.2

(continued)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
28													
29													
30	5.2		6.7	18.2		6.7			36.0	1.5	1.8	2.4	10.4
Total: inter industry	1785.5	14.7	1485.9	1335.2	44.2	166.9	85.7	23.5	185.4	47.9	88.8	75.0	229.7
Gross value added	16002.0	103.2	277.2	767.9	7.1	104.2	13.9	12.3	157.5	7.8	89.7	52.4	80.0
Imports	69.5	0.9	125.9	174.1	4.2	46.4	5.1	13.1	84.4	9.9	37.6	58.2	154.4
Indirect taxes subsidies	15.2	0.0	315.4	193.2	2.3	6.5	10.3	3.9	26.1	16.1	14.3	23.4	52.1
Gross production value	17841.8	118.8	2204.4	2470.4	57.8	324.0	115.0	52.8	453.4	81.7	230.4	209.0	516.2

(*continued*)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
01	(0.824)			1229.1 (0.922)		8034.0	634.0	106.1		
02	0.4		0.9	5.7				6.4 (3.900)	19.9	
03										
04	0.8 (2.680)		(0.457)	3.9 (0.054)			28.7 (0.046)			
05	0.1	0.4	(0.200)	0.8 (2.356)	12.8 (23.217)					
06					10.6 (0.112)					
07	(1.865)									
08	(2.681)		3.0 (15.307)		0.9			20.6		
09	0.8	1.8 (0.707)	0.2 (0.800)	0.3 (13.434)	4.9 (27.200)		1.9 (10.000)			
10	1.1 (0.900)		3.6 (2.800)	3.0 (5.400)	(6.747)			(5.500)	5.2 (5.500)	
11					196.4 (28.340)					
12	7.0 (29.900)	6.2 (24.000)	2.4 (9.500)		4.0 (65.551)			6.3 (24.600)		
13	8.5	0.3 (3.236)	29.2 (2.890)	1.4 (11.876)	35.0 (103.932)					

(*continued*)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN 1960/61

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
14	25.6 (25.102)	1.3 (5.686)	4.7 (9.532)	2.1 (0.912)						
15		3.4 (20.161)			14.5 (17.646)					
16			13.3 (80.000)		(2.994)					
17										
18										
19						617.9				
20							131.3			
21					151.9			17.2		
22	0.9		2.4	2.3	1.1					
23						10.3				
24			23.2	11.1	10.7					
25	8.7	4.6	138.9	155.4	214.0	453.2	34.0		16.2	
26		0.0	9.3	11.1					10.8	
27	23.2	11.5	277.8	66.6	64.2	206.0	120.5	61.8		
28										235.7
29										28.1

(*continued*)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
30	2.9	2.3	23.2	11.1	10.7					
Total: inter industry	80.6	31.8	632.1	1503.9	730.8	9321.4	950.4	218.4	52.1	263.8
Gross value added	43.0	43.0	100.4	145.5	1230.0	669.5	314.2	235.9	157.0	676.7
Imports	64.0	53.8	123.3	35.0	275.6	0.0	10.1	28.5	15.5	0.0
Indirect taxes subsidies	17.9	17.2	85.4	6.8	62.3	27.4	0.0	0.0	3.1	0.0
Gross production value	205.5	145.8	841.2	1691.2	2298.7	10018.3	1274.7	482.8	227.7	940.5

(*continued*)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total inter industry demand	Final demand	Total demand
01							25.4	12398.3 (162.640)	5443.5	17841.8
02		(50.0)						88.1 (58.585)	30.7	118.8
03							20.3	186.6 (18.115)	2017.8	2204.4
04								157.9 (58.379)	2312.5	2470.4
05					15.9			50.4 (28.944)	7.4	57.8
06					31.7			133.7 (28.218)	190.3	324.0
07								20.9 (2.937)	94.1	115.0
08		10.7 (15.308)						37.8 (38.609)	15.0	52.8
09					5.3	29.0 (45.00)		108.4 (250.556)	345.0	453.4
10		26.3 (16.300)						71.9 (88.130)	9.8	81.7
11								198.6 (40.506)	31.8	230.4
12								96.0 (362.884)	113.0	209.0

(continued)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total inter industry demand	Final demand	Total demand
13		(0.494)						98.2 (130.270)	418.0	516.2
14		0.6 (2.449)						42.0 (67.011)	163.5	205.5
15								17.9 (39.537)	127.9	145.8
16		49.4 (16.661)						162.7 (111.436)	678.5	841.2
17								0.0	1691.2	1691.2
18			103.2					103.2	2195.5	2298.7
19								666.3	9352.0	10018.3
20								136.5	1138.2	1274.7
21								169.1	313.7	482.8
22		2.4		4.3	5.3			99.2	128.5	227.7
23								10.3	930.2	940.5
24			51.6					205.7	21.2	184.5
25		(16.4)			10.6	15.9	15.2	1705.2	119.6	1824.8
26	4.5	10.4		5.4		5.3	10.2	171.6	3563.2	3734.8
27					12.7	31.7	20.3	2337.9	582.5	2920.4
28								235.7	272.8	508.5

(*continued*)

TABLE A-III (*contd.*)

INTER-INDUSTRY RELATIONSHIPS, PAKISTAN: 1960/61

	(24)	(25)	(26)	(27)	(28)	(29)	(30)	Total inter-industry demand	Final demand	Total demand
29								28.1	490.3	518.4
30		14.6		10.7	4.2			168.6	2462.8	2631.4
Total inter-industry	4.5	214.4	154.8	20.4	85.7	81.9	91.4	19906.8	35218.1	55124.9
Gross value added	180.0	1497.6	3580.0	2900.0	422.8	380.5	2540.0	32791.3		
Imoports	0.0	51.1	0.0	0.0	0.0	45.0	0.0	1485.6	2114.4	3600.0
Indirect taxes subsidies	0.0	61.7	0.0	0.0	0.0	11.0	0.0	941.2	578.8	1520.0
Gross prod. value	164.5	1824.8	3734.8	2920.4	508.5	518.4	2631.4	55125.4		

TABLE A-IV

IMPORTS OF CONSUMER AND CAPITAL GOODS FOR 1960/61 (IN CURRENT PRICES) "ROUTED" UNDER FINAL DEMAND OF TABLE III

Number of sector as in Table IV	Consumer goods		Capital goods		Final demand fed by		Total final demand
	SITC code	Value in million rupees	SITC code	Value in million rupees	Imports (3)+(5)	Domestic production in million rupees	(3) + (4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
01	241	.516	—	—	.516	5443.5	5444.0
02	—	—	—	—	—	30.7	30.7
03	0 and 121	631.183	—	—	631.183	2017.8	2649.0
04	652-3, —4; 655-09; 654; 84	25.466	—	—	25.466	2312.5	2338.0
05	632-09, and 82	1.380	—	—	1.380	7.4	8.8
06	642	3.245	—	—	3.245	190.3	193.5
07	612-09 and 85	.192	—	—	.192	94.1	94.3
08	629-02	.662	—	—	.662	15.0	15.7
09	54 and 55	104.045	—	—	104.045	345.0	449.0
10	313-01/2	101.208	—	—	101.208	9.8	111.0
11	665 and 666	20.104	—	—	20.104	31.8	51.9
12	—	—	681-04; 10; 681-07; 681-12; 681-15; 699-01	852.569	852.569	113.0	965.6

(continued)

TABLE A-IV (*contd.*)

IMPORTS OF CONSUMER AND CAPITAL GOODS FOR 1960/61 (IN CURRENT PRICES) "ROUTED" UNDER FINAL DEMAND OF TABLE III

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
13	699-08; 699-13; 699-14	2.619	682-0[2]; 683-02; 684-02; 685-02; 686-02; 687-02; 689-02	111.650	114.269	418.0	532.3
14	—	—	—	—	—	163.5	163.5
15	—	—	—	—	—	127.9	127.9
16	—	—	681-08, 681-11	236.301	236.301	678.5	914.8
17	—	—	—	—	—	1691.2	1691.2
18	—	—	81	8.855	8.855	2195.5	2204.4
19	—	—	—	—	—	9352.0	9352.0
20	—	—	—	—	—	1138.2	1138.2
21	657; 699-16; 699-17; 699-22; 699-29; 864	20.694	—	—	20.894	313.7	334.6
22						128.5	128.5
23	—	—	—	—	—	930.2	930.2
24	—	—	—	—	—	21.2	21.2
25	—	—	—	—	—	119.6	119.6
26	—	—	—	—	—	3563.2	3563.2
27	—	—	—	—	—	582.5	582.5
28	—	—	—	—	—	272.8	272.8
29	—	—	—	—	—	490.3	490.3
30	—	—	—	—	—	2462.8	2462.8
Total		911.500		1209.500	2121.000	35260.5	37381.5

TABLE A-V

RECLASSIFICATION OF IMPORTS FOR 1960-61 (JULY-JUNE) AND THEIR DISPOSAL OVER "INTERMEDIATE AND/OR FINAL DEMAND"

(c.i.f. Value in million rupees)

Domestic producing sector	Competitive imports				
	Total $= V_i^M$	Intermediate demand $= W_i^M$		Final demand $= F_i^M$	
		Commodity specification with PSTC code in brackets		Commodity specification with PSTC code in brackets	
(1)	(2)	(3)	(4)	(5)	(6)
I. Agriculture, forestry, fisheries and animal husbandry	718.7	Hides, skins, *etc*, undressed (21)	.7	Food (0) except those items which are included in (041, 042, 043, 044, 045, 06, 09, 071, 072, 073, 074)	71.9 (9.7)
		Oilseeds, nuts & kernels (22)	2.8		
		Wood, lumber and cork (24)	29.7		
		Crude rubber (23)	13.1		
		Pulp, *etc.* (25)	10.8		
		Textile fibres, not manufactured into yarn or thread (26)	35.4		
		Cereals, unmilled (041, 042, 043, 044, 045)	548.1		
		Tobacco, unmanufactured (122)	6.2		
			646.8		

(continued)

TABLE A-V (*contd.*)

RECLASSIFICATION OF IMPORTS FOR 1960-61 (JULY-JUNE) AND THEIR DISPOSAL OVER "INTERMEDIATE AND/OR FINAL DEMAND"

(c.i.f. Value in million rupees)

(1)	(2)	(3)	(4)	(5)	(6)
II. Mining	15.2	Crude minerals, metalliferous ores (27, 28)and crude petroleum (312)	15.2		
III. Coal and petroleum	363.0	Coal, coke, petroleum products (311, 313)	363.0 (723.9)		(148.1)
IV. Chemicals	320.3	Fertilizers, manufactured; chemical element and compounds (51)	35.5	Medical and pharmaceutical products (54); essential oils and perfume materials (55)	104.2
		Dyeing, tanning and Colouring material (53)	124.7	Misc. chemical materials and products: insecticides, disinfectants (599)	55.9
			160.2 (19.3)		160.1 (19.3)
V. Engineering	1427.0	Base metals (68)	434.1	All machinery and transport equipment (7, 72)	831.1
		Manufactures of metals such as iron and steel structural parts, steel door, beams of iron and steel (699)	88.0	Glassware, ashtrays, tumblers, *etc.* (665, 666)	20.1
		Glass: sheet glass, *etc.* (664)	5.4	Furniture and fixtures (821)	1.0
		Wood and cork manufactures such as plywood & wooden crates (63).	3.0	Professional scientific and controlling instruments *etc.* (86)	36.0
		Plumbing sanitary, heating and lighting fixture (812)	8.3		
			538.8 (111.0)		888.2 (182.8)

(*continued*)

TABLE A-V (*contd.*)

RECLASSIFICATION OF IMPORTS FOR 1960-61 (JULY-JUNE) AND THEIR DISPOSAL OVER "INTERMEDIATE AND/OR FINAL DEMAND"

(c.i.f. Value in million rupees)

(1)	(2)	(3)	(4)	(5)	(6)
VI. Agricultural processing	1.8			Tea, coffee (071, 074)	1.8 (2.364)
VII. Food industries	109.2			Animal, vegetable oils and fats (4)	103.8
				Miscellaneous food preservations (09)	1.4
				Fruits and vegetables, preserved (053, 054, 055)	2.8
				Sugar and sugar preparations (06)	1.2 109.2 (31.4)
VIII. Other consumer goods	176.7	Leather and leather manufactures (611, 612)	2.9	Tobacco, manufactured (122)	.6
				Cotton fabrics (652)	2.4
		Rubber and rubber manufactures (621, 629)	40.4	Textile fabrics (653-657)	17.2
		Textile yarn and thread (651)	44.1	Clothing (84)	12.1
				(86 and 89 excluding 892)	57.0
			87.4 (41.7)		89.3 (41.8)
IX. Jute and paper	28.5	Paper and paperboard (641)	18.6 (14.5)	printed matter (892)	6.7
				Articles made of paper and paper-board (642)	3.2 9.9

(continued)

TABLE A-V (*contd.*)

RECLASSIFICATION OF IMPORTS FOR 1960-61 (JULY-JUNE) AND THEIR DISPOSAL OVER "INTERMEDIATE AND/OR FINAL DEMAND"

(c.i.f. Value in million rupees)

(1)	(2)	(3)	(4)	(5)	(6)
X. Construction	31.3	Non-metallic mineral manufactures (661, 662, 663)	30.8	Prefabricated building	.5
Total	3191.7		1860.8		1330.9

Notes: *i*) PSTC refers to Pakistan Standard Trade Classification based on Standard International Trade Classification. The single digit code implies the section, double digit the division and three digits the group of the commodity classification. Explosives and some minor items have not been accounted for in the re-classification, for analytical purposes.

ii) Figures in parentheses refer to import duty plus tax on the relevant imports.

Source: Derived from [14].

TABLE A-VI

DISTRIBUTION OF EXCISE DUTY PLUS SALES TAX ON DOMESTIC OUTPUT AND IMPORT PLUS SALES TAX ON IMPORTS:1960/61

(in million rupees)

No. of sector	Excise + sales tax on domestic production	Import duty + sales tax on imports
	(1)	(2)
I	—	9.745
II	18.600	—
III	51.100	112.777
IV	8.792	38.623
V	19.746	293.776
VI	57.550	6.024
VII	151.223	31.440
VIII	270.585	83.474
IX	5.698	14.545
X	31.491	—
Total:	614.785	590.404

Source: Column (1) is based on Table II-A and Column (2) On Table A-III in [11]. The grouping of commodities is identical to the integrated sectoral classification as given on page 422 of the text.

TABLE A-VII

EVALUATION OF COAL AND PETROLEUM PRODUCTS AT PURCHASERS' PRICES

	PSTC code	Imports-quantity in million imp. Gall. (million)	Price per gallon (c.i.f.)	Chargeable rate of duty per gallon	Wholesale price per gallon at			Price per gallon paid by using industry CMI
		(1)	(2)	(3)	(4)			(5)
					Lahore	Karachi	Chitta-gong	
Aviation	3130101	14.58	.79	Rs. 1/8/9 incl. Refugee tax	—	—	—	—
Motor spirit	3130102	31.26	.85		—	2.81	2.94	2.59
Light oil	3130109	.29	.87		—	—	—	—
Kerosene	3130201	80.20	.63		1.37	1.58	1.77	1.36
Illuminating oil	3130209	1.79	.56	2½ annas	—	—	—	—
Crude diesel	3130301	1.32	.62	3 annas	—	—	—	—
H.S. diesel	3130302	117.49	.59		—	—	—	—
Diesel	3130303	21.14	.54		—	—	—	1.15
Light diesel	3130306	34.46	.51	1 anna	—	.91	.91	—
Furnace oil	3130304*	158.91	.42	½ anna	—	.44*	—	—
Greases	3130407*	.70	3.69	3 annas	—	—	—	—
Lubricants	3130409*	13.06	3.06		—	—	—	—
Total:		475.31						

(continued)

* Conversion.

TABLE A-VII (*contd.*)

EVALUATION OF COAL AND PETROLEUM PRODUCTS AT PURCHASER'S PRICES

ad Valorem rate of duty	Purchasers' price per gallon applied	Total duty in million rupees	Total value of Imports at Purchasers' price	Domestic Production	Domestic output evaluated at purchasers' prices	Industrial use by CMI industries in million rupees	Total supply value in million rupees	Disposal over	
								Intermediate use	Final use
(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
		(1) × (3)	(1) × (7)		10 × (7)	(11) × (9)			
			40.82	—	—	—	40.82	40.82	—
54%	2.8	71.50	87.53	28.50	79.80	2.04	167.33	167.33	—
			.81	—	—	—	.81	.81	—
		12.53	136.34	5.70	9.69	.78	146.03	1.00	145.03 3.04
10%	1.7	.28	3.04	—	—		3.04	—	
			1.19				1.19	1.19	—
27%	.9	26.24	105.74	10.10	9.09	30.47	114.83	114.83	—
			19.03				19.03	19.03	—
		2.15	31.01	9.40	8.46		39.47	39.47	—
—							82.58	82.58	—
—	.45	4.97	71.51	24.60	11.07		.27	.27	—
—	3.8		.27						
	3.9	2.60	46.10	1.96	6.86	9.41	52.96	52.96	—
		120.27	543.39	80.26	124.97	42.70	668.36	520.29	148.07

(*continued*)

Notes : Conversion factor of 224 imperial gallons to a ton for greases, 249 to a ton for lubricants and 237 to a ton for furnace oil applied: *See* [6].

The disposal of the total supply over "Intermediate" and "Final" demand is done in the same way as in [21].

Sources:– *i*) Column (1) is derived from the seven digit commodity by country classification of imports in [14].

ii) Column (2) computed from the same source as [1].

iii) Column (3) is extracted from "Customs Tariff" issued by the Ministry of Commerce, Government of Pakistan, July 1960.

iv) Column (4) taken from the wholesale prices as published in the Statistical Yearbooks of Pakistan; prices of kerosene and motor spirit and diesel oil for Karachi are reported by Burmah Shell of Pakistan, Karachi; the price of kerosene for Lahore is obtained from the Chamber of Commerce, Lahore. Also *see*, *The List of Items Included in Whole-sale Price Index for Pakistan.* (Mimeographed. (Karachi: Pakistan Institute of Development Economics).

v) Column (5) is computed from the date on the consumption of petroleum products, both in quantity and value in CMI.

vi) Column (6) is derived from [20] in which Ghulam Mohammad Radhu converted the specific duty on various products of petroleum with the following formulae: ad valorem rate of duty $= \frac{\text{rate of excise}}{\text{Wholesale price—rate of duty}} \times 100$. In this way the ad valorem rate (c.i.f. price basis) is depressed by the extent of trade and transport margins are not included in the denominator.

vii) Column (7): the unit price is chosen on the basis of the c.i.f. price plus the import-rate and excise duties charged plus a reasonable trade and transport margin as indicated by the price paid by the purchaser in Column (5) and the wholesale market price in Column (4).

viii) Cf. the total import duty plus sales plus excises on petroleum products in [20].

ix) Column (12) computed from CMI-1959/60.

Appendix B

TABLE B-I

COAL AND COKE

Domestic production of coal is shown as .818 million tons for 1960[1] Imports of coal for 1960/61 (July-June) amounted to a little over 1.284 million tons, out of which more than 1.266 million tons came from India[2].

Consumption of coal by industries reported under C.M.I. and showing it both in quantity and value yields Rs. 104.50 as the price paid per ton of coal. The wholesale market price of Indian coal reported by the Coal Commissioner, Karachi is mentioned below[3].

	Price per ton for 1959-60
i) Steam coal (S. African)	Rs. 94.00
ii) Steam coal (Indian) selected 'B' grade	Rs. 76.00
iii) Hard coke (Indian)	Rs. 100.00
iv) Hard coke (Indian)	Rs. 99.00

A large part of coal supply is obtained by the using sector (this is specially true of railway sector) from direct imports. Moreover, in view of the well-known tendency among industrialists to report a higher price than the actual price for their purchases, a round figure of Rs. 100.00 per ton is applied for a rough estimate of the value of imports of coal for the year under examination.

The domestic output of coal is evaluated at a price of Rs. 40.00 per ton (according to certain sources, auction price of domestic coal varies in the range of Rs. 35 to Rs. 40 per ton at different auctioneering centres).

The entire amount of coal available during 1960/61 is assumed to be satisfying the "intermediate" demand.

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1 *Source;* Pakistan Statistical Yearbooks.

2 See under PSTC Code 3110101, 10109 in [14].

3 See, *List of Items Included in Wholesale Price Index for West Pakistan.* Mimeographed. (Karachi: Pakistan Institute of Development Economics).