INPUT OUTPUT ANALYSIS AND THE FIRST MALAYSIA PLAN 1966 - 1970.

by

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B.Comm., Dip. Ed., University of Melbourne, 1964.

A Thesis Submitted In Partial Fulfillment Of

The Requirements For The Degree Of

MASTER OF ARTS

in the Department
of

ECONOMICS.

We accept this thesis as conforming to the
required standard

THE UNIVERSITY OF BRITISH COLUMBIA
May, 1970.

ABSTRACT

This paper is divided into four distinct sections.

1. An explanation of the meaning of input/output analysis, especially the derivation and significance of the table of direct and indirect requirements.

2. An outline of the decisions taken in constructing the West Malaysian 1960 transactions table from a set of National Accounts - especially the treatment and valuation of imports and exports; producer versus purchaser price valuation of transactions; and problems of inconsistent and incomplete double entry records.

3. An explanation of the method of forecasting from input/output tables. This includes discussion of :

a. A method of estimating aggregate demand for Malaya for 1970.

b. A method of projection of value added for each sector, 1970.

c. The likely stability of the input coefficients over time.

4. Results: a. Differences between the 1960 and 1965 table projections due to changes in Leontief inverses and value added coefficients over time, as the economy undergoes change.

b. Comparison of the table projections with the First Malaysia Plan projections: i. Are the Plan projections likely to be reached in 1970? ii. Why are some of the table projections so inaccurate?

The paper concludes that 1. The projections from the 1965 input/output table are generally superior to those from the 1960 table.

2. Under conditions of structural change, even 5 years is too far ahead to expect input/output analysis to yield accurate projections for most sectors.

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I. INTRODUCTION

The basic purpose of this paper is to enquire into the suitability of input output analysis as a forecasting tool. In order to do this, I:(a) constructed a transactions table from a set of National Accounts of West Malaysia.

(b) estimated final demand projections for 1970.

(c) used an InterIndustry Flow Program to project value added for each sector for 1970.

These projections are then compared with Official projections from the First Malaysia Plan. It should be emphasised that this comparison is legitimate, since the Official Plan estimates were made independently of input output analysis.

How The Official Plan Estimates Were Made.

(a) aggregate targets. The output and income growth targets of the Plan were determined on the basis of a priori notions of the maximum attainable growth rates during the period 1966-70. During the period 1961-65, production of non export goods and services grew at the very rapid rate of 9.2% p.a. However, the government realised it would be incapable of expanding spending so rapidly in the First Plan period(1966-70). Unfortunately, lacking a model to tell them what growth rate to set, they arbitrarily chose 7%p.a.(in real terms).

Exports were envisaged to grow at 2.4% p.a.(constant prices). This was close to the growth rate in the early sixties, and they obviously assumed that the growth of exports could not be accelerated much in just 5years, since the dependence on slow maturing tree crops is heavy.

Gross Domestic Product would grow at a weighted average of these two rates. This works out to 4.7% in terms of real product, or, 4.8% p.a. in current prices.[1]

The targets in the Plan imply an overall Incremental Capital-Output Ratio considerably higher (by $\frac{1}{3}$) than that which prevailed in the period 1961-65 (3.9).

(b) sectoral growth targets for Malaya were loosely related to these aggregate targets. They were initially derived from a priori assessments of the growth potential in each industry, then adjusted so as to average out at 4.8% p.a. With three exceptions arbitrary annual growth rates were applied. The exceptions were rubber planting; forestry; and mining and quarying industries, in which income originating was assumed to follow the trend already projected for Malayan production, valued at average export prices.

All of this will serve to illustrate the kind of highly simplified model building that went into the formulation of the Plan. Hence, at the end of the analysis, I may be in a position to criticize some of the sectoral projections in the Plan, as well as to decide on the usefulness of input output analysis for projection in Malaya's case.

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1 D. Snodgrass. Four Lectures on Development Planning and Statistics.
11. The structure of the first Malaysia plan. p.35

II. EXPLANATION OF INPUT OUTPUT ANALYSIS

The input output method is essentially an attempted application of the theory of general equilibrium to empirical quantitative analysis. The economy is visualized as a combination of a large number of interdependent activities. Each of these activities involves the purchase of goods and services originating in other branches of the economy on the one hand, and the production of goods and services which are sold to and absorbed by other sectors of the economy on the other. Each industry or sector requires certain inputs which it acquires from other sectors; it then sells its output to other sectors to meet their input requirements. Each exchange of goods and services between sectors in the model is recorded in double entry fashion as both a sale of output and a purchase of input. The basic static version of the model is normally presented in the form of 3 tables:

(1) the transactions table
(2) the technical coefficient table
(3) the table of direct and indirect requirements

(1) <u>The Transactions Table</u>. This is constructed on the basis that the aggregate sales of a particular sector are equal to the aggregate purchases of that sector. The transactions table shows how the <u>output</u> of each industry is distributed among other sectors of the economy. At the same time it shows the inputs to each industry from the other industries or sectors.

Mathematically this can be expressed as follows - the economy consists of n sectors, and total production in any one sector (X_i) is distributed as follows.

(1) $X_i = X_{i1} \dots + X_{ij} + \dots X_{in} + F_i \, (i=1 \dots, n)$

X_i = total output of industry i
X_{ij} = amount of commodity i required by industry j
F_i = autonomous final demand for commodity i

(2) We can also use an expression for input flows which incorporates the condition in the table that total inputs of the fabricating sectors equal total output ie.

$$X_j = X_{1j} \dots + X_{ij} \dots X_{nj} + V_j + M_j \, (j=1 \dots, n) = X_i \, (i=j=1 \dots, n)$$

X_j = total purchases made by sector j
V_j = value added by sector j
M_j = purchases of imports by sector j

(11) <u>The Technical Coefficient Table</u>.

After a transaction table has been constructed for a given year, a table of technical coefficients can be developed from it. A technical coefficient table shows the amount of inputs required from each industry to produce one dollars worth of output of a given industry. Technical coefficients are calculated for processing sector industries only and may be expressed in either monetary or physical terms. The tables for West Malaysia are expressed in monetary terms.

Two steps are involved in the calculation of technical coefficients: (1) gross output is adjusted by subtracting inventory depletion during the period covered by the table to obtain adjusted gross output for each sector.

(11) divide all the entries in each industry's column by the adjusted gross output for each industry.

Notice that the model employs the assumption of fixed technical coefficients ie. the demand for part of the output of one non autonomous sector X_i by another non autonomous sector X_j is a unique feature of the level of production in X_j ie.

$$X_{ij} = a_{ij}X_j \quad (i,j=1,\ldots n)$$

where X_j= the total output of industry j
a_{ij}= the technical coefficient defined by X_{ij} and X_j above.

The model's second table is thus the $[a_{ij}]$ matrix computed from the transactions table thus: $a_{ij} = \frac{X_{ij}}{X_j}$

The table of direct coefficients by itself is of limited usefulness because it shows only the "first round" effects of a change in the output of one industry on the industries from which it purchases inputs. This forms the basis however for a <u>general solution</u> of an input output problem.

(111) <u>The Table of Direct and Indirect Requirements</u>.

An increase in final demand for the products of an industry within the processing sector will lead to both direct and indirect increases in the output of all industries in the processing sector. For example, when industry A expands output it uses more B and C, but because C and B have expanded they need more A,D,E,etc; and these effects will continue to spread throughout the processing sector.

An integral part of input-output analysis is the construction of a table which shows the direct and indirect effects of changes in final demand. It shows the total expansion of output in all industries as a result of the delivery of one dollar's worth of output outside the processing sector by each industry.

Taking the inverse of the difference between an identity matrix and the input coefficient matrix yields the table with both direct and indirect effects.

i.e. (1) $X_i = X_{ii} + X_{ij} + \ldots X_{in} + F_i \quad (i=1,\ldots,n)$

(2) $X_{ij} = a_{ij}X_j \quad (i,j,=1,\ldots,n)$

Substituting (2) into (1)

$$X_i = a_{i1}X_1 \ldots + a_{ij}X_j \ldots + a_{in}X_n + F_i \quad (i=1,\ldots,n)$$

which may be written more compactly in vector form as

$$X = AX + F$$

or $X - AX = F$

ie. $(I-A)X=F$ where $A=(a_{ij})$ and I is the identity matrix.

The general solution, by matrix inversion, may now be expressed as: $X = (I-A)^{-1}F$

The matrix A in the previous notation is the table of Technical Coefficients (Table 2) derived from the Transactions Table (Table 1) as described earlier. The Leontief Inverse $(I-A)^{-1}$ is our third table, and is usually transposed $(I-A)^{-1^t}$, in order that the relevant information can be read along the rows rather than down the columns.

Now, from the transactions table(see equation 2):

$$v_i = \frac{VA_i}{X_i} \qquad (i = 1......,n)$$

where VA_i = value added for sector i.

X_i = gross output of sector i.

v_i = Value added coefficient.

Therefore,

$$VA_i = v_i X_i$$

That is, given the value added coefficient and the projection for gross output, one can derive the value added projection for each sector.

111. CONSTRUCTION OF THE 1960 TRANSACTIONS TABLE.

1. Classification and Aggregation.

The primary classification criteria in the table were already determined in advance of my work, ie. the basic sector design of the table had been decided on. My task was:

(a) to fit a set of national accounts of West Malaysia into this 29 sector classification;

(b) to modify the form of the table where necessary.

Appendix Table 1 shows the chart of accounts used by West Malaysia and the way that I classified these into the 29 sectors for the table. (a) Broadly speaking, the accounts classify agricultural sectors according to commodities, (for example industry 113, rubber estates and smallholdings, are classified together even though the activities are different). Manufacturing, on the other hand, is classified on an activity basis (eg. chemical products includes such diverse industries as the manufacture of vegetable oils and the manufacture of paints and varnishes).

(b) The degree of aggregation used in the accounts and the table depends loosely on the importance of the item in national income. For example, for important sectors like rubber, the manufacture of rubber products and rubber processing have been given seperate sectors rather than being included in say, the chemical industries sector or miscellaneous manufacturing. This contrasts with a high degree of aggregation in relatively smaller sectors like food industries (6), or chemical products (18).

2. Producer versus Purchaser prices.

The accounts at my disposal had estimates in both producer prices (ie. the price received by the producer), and purchaser prices (the price paid by the purchaser); the difference is composed of marketing costs, which include such things as transport costs, wholesale and retail trade mark ups, insurance and warehouse costs, and net indirect taxes.

It was decided to use the producer price values in constructing the tables because purchaser price tables suffer from three disadvantages.

(1) The row total of each sector, which forms the output control total for computing input coefficients, includes the marketing costs incurred in each delivery of that sectors output. Now marketing costs will probably vary as the inter-sectoral distribution of output changes, and thus lead to variations in the value of total output even if the actual production of that sector remains unchanged. This means that coefficients estimated in the base year are likely to be unstable.

(11) With purchaser prices, all marketing costs are counted twice - in the value of the output of the producing industry, and as inputs to that industry from the marketing costs sectors. Under the producer prices system, on the other hand, all outputs, including the control totals, are valued f.o.b. plant, and marketing costs are therefore counted only once.

(111) With producer prices, marketing costs will vary with the input structure of an industry, which is generally more stable than the output structure, so that the coefficients computed in the base year from a table valued at producer prices is likely to be more stable than one valued at purchaser prices. As well, the system of producer prices explicitly separates each element which makes up the final purchasers value so that the value of each transaction corresponds more closely to the flow in physical units.

Thus the added stability of the coefficient matrix makes the estimation of the table in producers prices more desirable.

3. Net or Gross Sector Outputs.

The table I have constructed includes intra industry transactions, so that all cells on the principal diagonal are entered, ie. gross industry output is counted. It is a simple matter to produce another table excluding such transactions for particular applications of the table, if necessary.

4. Treatment of Taxation.

a. Direct Taxes: ie. taxes levied on factor services are not distinguished in this table since the value of the services before tax are entered.

b. Net Indirect Taxes form part of the margin between the producers price and the purchasers price, and consequently, under the former system of valuation they are generally entered in a special primary input row (ie. in row 34, primary factors of production), and in the column of the purchasing industry. Thus all general sales taxes levied on clothing and footwear, for example, are recorded at the intersection of the primary factors of production row and the clothing and footwear column.

5. Treatment of Exports.

The method of recording Exports is perfectly straight forward: that part of the output of a given sector which is exported is entered in a final demand column under "Rest of the World". Notice that there is no corresponding row, since the"Rest of the World" sector is not a domestic producing sector, but only a recipient of final goods.

6. Treatment of Imports.

Imports may be treated in 4 basic ways.

Method 1: the method adopted here. All imports are allocated in a single row to the consuming sectors. In this case, all intermediate flows are of domestic products only and the construction of the import row requires an identification of the destination of imports.

The drawback of this method is that if some imports are "competing"(a commodity that has a "good substitute" in some domestically produced commodity), substitution will tend to occur, restricting the usefulness of the input coefficient matrix as time passes.

Method 2: All imports are distributed along the row of a similar domestic sector - so flows contain imported and domestically produced elements without distinction. Here there is no problem of instability but the presence of non competing imports in the rows gives rise to inaccurate estimates of output requirements when the inverse matrix computed from this version of the table is post-multiplied by a bill of goods comprising final domestic demand and exports.

Method 3: Tries to combine the virtues of the previous two, while avoiding their faults , by distributing only those imports which are judged to be competing along the rows of the corresponding domestic sector(thus obtaining stable input coefficients) and distributing the non competing imports as a seperate row(thus preserving the homogeneity of the output structure). This is the method which is most highly recommended, usually because it is more accurate than the others, but to use it you need to be able to distinguish between competing and non competing imports.

Method 4: A final possibility is that all imported goods can be distinguished both by industry of origin and by industry of destination. This is equivalent to the preparation of two tables - one for domestic flows and one for imported products.

This method was impractical in this case because the statistical requirements were too demanding.

I decided to use method one because:

(1) It is the least demanding statistically, as competitive and non competitive imports are not distinguished in national accounts.

(11) In 1960-61 Malaysia began a policy of allowing her traditionally large surplus in the Balance of Payments on Current Account to run down, by substantially increasing imports. Method one allows us to see the effects of this change in policy on the trade sector and the economy in general.

The weakness of using method one in this case, is that substantial import substitution took place in Malaysia during the 1960's.

7. Valuation of Imports and Exports.

(a) The value of a country's exports f.o.b. at the port of embarkation consists of the producers value plus the various marketing costs necessary to get the goods to the port. Exports were recorded down the "Rest of the World" column according to the producer price of the commodity. If any domestic marketing costs were incurred then they are entered in this column where it intersects the wholesale and retail trade row.

(b) The value of imports c.i.f. comprises three items:

1. the foreign port value.
2. freight charges to the domestic port of entry.
3. insurance charges.

A fourth item, import duties levied by the domestic government, may be added to give what is called <u>Domestic Port Value</u> of imports as they enter the domestic economy. The way in which the different elements are usually entered in an input-output table depends upon the system of valuation (producers or purchasers prices) used, as well as upon the mehtod adopted for recording imports. The domestic port value (including import duties) is often preferred for valuing imports, primarily because this figure is comparable to the value of domestic products at producer prices (ie. domestic port value is method A below).

	foreign port value.	B	A	Producer price
+	freight and insurance charges to reach our port.		+	freight and insurance
			+	markup
+	import duties		+	indirect taxes
	Domestic Port Value		=	Purchaser price

In this case, however, it was decided to separate out import duties and value imports at their c.i.f. value (ie. method B). This separation was done mainly because it seemed feasible to compare at some stage the ratio of import duties to imports in various sectors, and to observe the effects of changes in this ratio over time. Although it would be desirable to incorporate an $\frac{\text{Import duties}}{\text{Imports}}$ row as a separate appendage to the table, this is not feasible while the data is in its present form because imports are classified in the national accounts according to <u>which sector made use of them</u>, not according to the <u>nature of the imported goods</u>. (For Example, industry 2129, forestry, no imports ended up here but 0.2 import duties were levied against forestry goods.)

An illustration of the treatment of imports.

An import of type A, which is consumed by industry 6 has a foreign port value of $100; the cost of transport to the domestic port of entry, $10, is borne by a foreign carrier; the cost of insurance (also $10), is borne by a domestic enterprise; and an import duty of $5 is levied by the domestic government- so the total domestic port value of the import is $125. This transaction would be entered in the table as below.

Sector	Industry 6	Rest of World	Gross Output.
insurance		10	10
imports	120		120
Total	120		
import duties	5		

To the extent that freight and insurance on imports are provided by domestic services, the value of imports will be overstated - the correct treatment is to ignore this and include these services again as an output of domestic industry (rows 25 and 27) that is supplied to column 30 (Rest of the World), ie. the margin items are double counted.

8. Treatment of Unspecified Column (32).

For many goods and services which are used as inputs, it is not possible to specify the industries in which these goods and services are consumed. This is, for instance, the case with stationery, cleaning materials, audit and secretarial fees, printing and postage services.

These totals have been originally deducted, by the Malaysian Department of Statistics, from the household column and theoretically should be added to the Rest of the

World and Government Consumption columns, if we had sufficient information to do so.

9. <u>Problems involved in Constructing the table from the Set of Accounts</u>.

A. <u>The production accounts</u>: were all consistent in their double entry recording, hence the first 29 rows and columns were completed and verified from the other accounts. In one or two cases there was a slight discrepancy between the valuation of a particular transaction in two different accounts. To make the double entries compatible, the average of any figure in dispute was taken, and the balance between receipts and payments accounts maintained by putting a balancing item into the unspecified column and row.

<u>For example</u> (1) Row 11 column 3, the entry is (a)65.2 across the row.
(b)64.8 down the column.
(11) 65.0 was the item entered in this space and (a)0.2 is taken from the unspecified row entry in column 3. (to keep column 3 total unchanged.)
(b)0.2 is added to the unspecified column entry in row 11. (to keep the row 11 total unchanged.)

B. <u>Treatment of the Final Demand Sectors</u>. Here, verification of entries was not possible because: (1) with the introduction of the rest of the world there is no <u>closed</u> (balancing) system of double entry records for all final demand transactions. (11) some of the accounts which I used to construct the final demand sections of the table were not complete and in these cases I had to rely on single entries from the other accounts to fill in the columns. For example, Government (row 35a) - spending on Agriculture (row 1) was not recorded. I had to rely on agricultural receipts from government in the agricultural account.

For other specific details of problems encountered in constructing final demand sectors, see Appendix 3.

Other questions relating to the structure of the accounts and the preliminary structure of the table were sent to the Department of Statistics in Malaysia for clarification. For a copy of these questions, (and the crux of the answers provided), see Appendix 4.

My completed 1960 Transactions Table appears as Appendix 2; the Government version of the 1965 Malayan Transactions Table is in Appendix 5.

10. <u>Reconciliation of My 1960 Transactions Table with Gross Domestic Product.</u>

(a) <u>1960 estimate of G.D.P. from the table.</u>

There are two methods of calculating Gross Domestic Product from the transactions table.

Using a 2 sector example:

	1	2	Intermediate Output	Unspecified	Final Demand
1			a	c	e
2			b	d	f
Intermediate Output	g	h			
Unspecified	k	l		q	r
Imports	m	n		s	t
Value Added	o	p		u	v

I. <u>Balance Equations.</u>

A) $a + b = g + h$

B) $a + c + e = g + k + m + o$

C) $b + d + f = h + l + n + p$

II. Estimating GDP using the value added method.

$GDP_{va} = o + p + u + v$

$= \$M\ 6101.4$ in my 1960 transactions table.

III. Estimating GDP using the final sales method.

$GDP_{fs} = c+d+s+q+u+e+f+t+r+v-m-n-s-t$

But, $c = g+k+m+o-a-e$

$d = h+l+n+p-b-f$

$a+b = g+h$

$\therefore GDP_{fs} = GDP_{va}$ + Unspecified row total

$= 6101.4 + 535.2$

$= \$M\ 6636.6$

To verify this answer:

add	Consumption	3625.3
	Investment	754.8
	Inventories	100.4
	Government	710.2
	Exports	3189.9
		8380.6
minus	Imports	2232.8
		6147.8
plus	Unspecified column	488.8
		6636.6
minus	Unspecified row	535.2
		6101.4

(b) GDP at market price in the Official Accounts for Malaya in 1960 = \$M 6134 mill.

Considering some of the specific difficulties I encountered in constructing the table(see Appendix 3 and 4), I am satisfied with the accuracy of my two methods of estimating Gross Domestic Product, relative to the official estimate.

1V. CONSISTENT FORECASTING

"Consistent forecasting" is the term applied to the projection of a transactions table. This does not mean that the consistent forecast will turn out to be right, but what it does is ensure that projections for the individual industries and sectors will add up to a total projection. (For example, it ensures that four wheels will be projected for every projected car.)

There are two major steps involved in consistent forecasting:

(A) it is necessary to make projections for each entry in the final demand sectors of the input output table, then,

(B) a new transactions table is projected on the basis of the assumed changes in final demand.

(A) Projection of Final Demand for Malaya for 1970.

After the individual components of final demand have been projected, the individual final demand columns are added together to form a single column.

Table II. Projections of Final Demand For 1970

	Malaya / Malaysia 1961-66 [1]	Total Malaysia 1970, current prices. $M mill. [2]	Malaya Spending 1970, current prices. $M mill.
Government Consumption	0.86	2226	1914.36
Private Consumption	0.88	6946	6112.48
Gross Capital Formation	0.84	2248	1888.32
Exports	0.82	4676	3834.32
		16096	13749.48
Imports	0.79	4594	3609.26
GDP at market price		11502	10140.22

1 Department of Statistics, Malaysia. National Accounts Of West Malaysia, 1955-64. p.32

2 Department of Statistics, Malaysia. Mid Term Review - First Malaysia Plan 1966-70. (1969) p.28

(1) Notice from column one - in most cases the proportion of Malaya in the total of each expenditure category did not change over the period, but where slight change did occur the most recent figure was taken. For example,

Imports in 1963 & 64 =.84
1965 & 66 =.79 I used .79

(2) a. From the 1965 transactions table:

$$\frac{\text{GDP factor cost}}{\text{GDP market price}} = \frac{6883.1}{7919.8}$$

Therefore, for 1970, GDP factor cost $= \frac{6883.1}{7919.8} \times 10140.22$

$= \$M\ 8812$ mill.

b. According to the official Plan output projection for 1970, GDP at factor cost for Malaya = $M 8650 mill.[1] The fact that my method of calculating GDP at factor cost, (using the ratio of Malaya/Malaysia for each of the main spending categories) yields a result close to the official estimate of GDP, indicates that the use of the ratio to calculate aggregate demand for Malaya gives fairly satisfactory results.

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1 Ibid p68.

(B) Projection of Gross Output and Value Added of Sectors to 1970.

1. Given the aggregate demand projection for 1970, this is distributed down the final demand column according to the percentage distribution of this column in 1965. Hence we have measures of aggregate demand for each industry producing.

2. The transactions table for 1965, and the estimated final demand data are recorded in the Inter Industry Flow Program (see Appendix 6), which i. derives the Leontief inverse for 1965; ii. derives total gross output for 1970 for each of the producing sectors.

3. Since the ratio of $\frac{\text{value added (at factor cost)}}{\text{total gross output}}$ is assumed to be constant over time, the value added at factor cost for each sector for 1970, can be calculated using the formula:

$$\frac{\text{Total Factor Payments - Net Indirect Taxes (1965)}}{\text{Total Gross Output (1965)}} \times \text{Total Gross Output (1970)}$$

4. The proceedure can be repeated, using the 1960 transactions table and the Program to estimate projected value added for 1970.

(C) Accuracy of Input/Output Analysis as a Forcasting Tool.

The stability or constancy of the input coefficients, (a_{ij}) is one of the critical assumptions of input/output analysis. If this assumption is inappropriate then all estimates obtained by input/output analysis will be inaccurate. These coefficients do not normally change rapidly, and the small changes that might occur over a relative short period would not lead to serious errors in the projected transactions table.

My projections, however, are 5 years for the 1965 coefficients and 10 years for the 1960 coefficient table. Over these longer time spans, the input coefficients will be affected by three kinds of changes:

(1) changes in relative prices.
(2) changes in the composition of sector output, or the appearance of new industries.
(3) the effects of technological change.

(1) Changes in relative prices.

If the relative prices of factors of production change during the period covered by the projection, it is possible that input patterns and hence some of the input coefficients will be changed. This will only happen, however, if input substitution is possible.

For example, in the 1965 table, the Metal Products and Machinery sector uses wood fuel, coal fuel and petroleum. If the price of wood fuel rises, and it can technically substitute coal and oil, at least in part, then it may do so to avoid the extra cost. Hence the input coefficients of this sector's column with the wood and cork row, and with the products of petroleum and coal row will change.

(2) Changes in the composition of sector output.

This arises from an inadequate classification of economic activities, so that some sectors contain products with different input structures; eg., in the 1960 Malayan table chemical products and the products of petroleum and coal appear in one sector - they do have different input structures (see 1965 transactions table), and if in the future the outputs of these products change non proportionately, the overall input structure of the sector will change. This argument also applies to the appearance of new industries within a particular sector. For example, the rapid growth of the missile industry of the United States in the 1950's, with a relative decline in some parts of the aircraft industry, would have been hard to project in 1950. Thus a 10 year input output forecast of the United States economy made in 1950 would no doubt have understated the expansion of the missile industry, and would have overstated the growth of the aircraft industry. This type of structural change in the economy is dramatically illustrated with reference to the difference in projections for 1970 between the Malayan 1960 and 1965 tables. I shall return to this later.

(3) <u>The effects of technological change</u>.

Changes in technology, by which is meant all changes in the physical input relations between economic activities, can be classified as:

(a) The substitution of some products for others in a particular process (eg. the substitution of synthetic for natural fibres in textiles.)

(b) Savings in material of energy input into processes (eg. the constant decrease in the quantity of electricity required to manufacture a ton of aluminium.)

(c) Changes in the output composition of particular processes. (For example, the increase in the proportion of special steels in iron and steel production.)

While it is difficult to attribute observed changes in the values of input coefficients to particular causes, the general consensus seems to be that changes in technology exert only a gradual influence upon the coefficients, and affect principally the inputs of energy, and the inputs of primary factors such as labour and capital.[1]

The effects of technological change on input coefficients can be handled more easily within a general framework of input-output analysis than the other 2 types of change - it involves the use of dynamic input-output analysis, which is still in its early stages of theoretical development. No attempt will be made here to adjust the Malayan tables according to changes in technology.

1. United Nations <u>Problems Of Input Output Tables and Analysis</u>. p.107.

V. RESULTS

(1) Comparison of 1965 and 1960 Table Projections.

Final demand projections for Malaya in 1970, were obtained in section IV (see page 20). It was estimated that consumption + investment + government spending + exports $\simeq$ \$M 13750 million. This figure is distributed down the aggregate demand column according to the percentage of each sector in total aggregate demand.

For Example: (a) Agriculture and Livestock = 5.3% aggregate demand in 1965. The aggregate demand projection 1970 =13750. Therefore, Agriculture and Livestock 1970 = 5.3% of 13750

$\simeq$ 728.8

(b) However, Agriculture and Livestock was only 5.1% of aggregate demand in the 1960 table - so the demand for Agriculture and Livestock in 1970 = 5.1% of 13750

$\simeq$ 701.2

Theoretically, we should compare the 1970 projections of

(1) the 1960 table using 1960 percentage breakdown of aggregate demand.

(11) the 1965 table using the 1965 percentage breakdown of aggregate demand.

But much of this discrepancy between our two projection measures may be the result of the changing percentage of that item in aggregate demand from 1960 to 1965, rather than any change in the coefficient matrix itself over this period.

So I have also included the 1960 table with the 1965 percentage breakdown of aggregate demand to make projections. It is the result of this projection that should be compared with the projections of the 1965 table in order to discover the changes in the input coefficient matrix that have taken place over time.

<u>For Example</u> - <u>Rubber Planting</u>

(a) The 1960 matrix with 1960 aggregate demand percentages, greatly overstates projected production for 1970 (1919.4) compared with the Plan (1115). This is because in 1960 rubber prices reached their peak of 107¢ per pound, so the value of the final use component of natural rubber was inordinately high in that year (relative to total aggregate demand in 1960).

(b) Notice that when we use the 1965 aggrgate demand percentages, (ie. abstract from this boom demand year of 1960), the 1960 table gives a figure very close to the 1965 table(indicating that the input coefficients for this sector of the table had not changed significantly.)

In table III on the following page, the results of projecting sectoral value added, using the 1965 matrix, is compared with projections using the 1960 matrix (with both 1960 and 1965 aggregate demand % breakdowns).

If one assumes that the 1970 plan projections are accurate (this assumption will be investigated later), then from column 5, it is clear that for the majority of sectors the 1965 table projections are better than the 1960 projections. (This is not true, however, for Fishing, Forestry and Mining.)

The rest of this paper shall be devoted to:

(a) Explaining the reasons for the differences between the 1960 and 1965 table projections (both using the 1965 aggregate demand percentages).

(b) Examining the accuracy of the plan projections and why the 1965 table projections in some sectors are inaccurate.

Table III. 1970 Plan and Table Projections.

MALAYA: $M mill - Current Prices.

	(1) 1960 Matrix 1960%	(2) 1960 Matrix 1965%	(3) 1965Matrix 1965%	(4) Plan Projection	(5) Better Projection Column 2 compared with Column 3.
Agriculture and Livestock	881.4	1055.1	856.1	910	1965
Rubber Planting	1919.4	1190.7	1179.0	1115	1965
Forestry	149.2	164.0	108.2	205	1960
Fishing	143.1	174.0	148.7	210	1960
TOTAL AGRICULTURE	3093.1	2583.8	2292.0	2440	
Mining	472.3	582.7	705.3	475	1960
Manufacturing	691.7	664.8	994.5	1070	1965
Construction	247.1	349.8	373.1	530	1965
Electricity and Water	108.1	137.6	154.5	200	1965
Dwellings	372.9	348.1	357.0	370	1965
Wholesale and Retail Trade	1215.5	1194.8	1296.0	1370	1965
Other Services	1450.9	1685.5	1660.8		
Banking, Insurance etc.	111.4 } 1860·3	133.4 } 2133·1	135.7 } 2087·4	2160	1960
Transport, Communications	298.0	314.2	290.9		
Gross Domestic Product at Factor Cost	8061.0	7994.7	8259.8	8615	

(2) Reasons for the differences between the 1960 & 1965 Table Projections.

In comparing the projections from my 1960 table and the projections from the 1965 table, there are 2 possible reasons for discrepancy.

(1) The value added coefficient has changed. Given gross output projections for 1970, the value added by each sector was calculated using:

$$\text{gross output projection 1970} \times \frac{\text{value added}}{\text{gross output}}$$

Clearly, the ratio of value added to gross output in the 1965 table may differ from that in the 1960 table for any sector. Hence the two tables would yield different value added projections for each sector, even if the gross output projections yielded by both tables were the same.

(2) Gross output projections given by the two tables will be different because the Leontief inverse has changed, as structural change has occurred in the economy. Each column in the transposed Leontief matrix shows the total dollar production directly and indirectly required from the sector at the top of the table for each dollar of delivery to final demand by each of the sectors at the left of the table.

On the following page table IV shows the changes in the value added coefficient and in the relevant row totals in the Leontief inverse for each sector, and how these have affected value added projections for 1970.

Table IV. Value Added Coefficient and Leontief Inverse Changes 1960 to 1965.
MALAYA: $M mill - Current Prices.

	1960 Matrix 1965%	1965 Matrix 1965%	value added at f.c. / gross output 1960	1965	Row totals of Leontief Inverse 1960	1965
Agriculture and Livestock	1055.1	856.1	74.1	69.4	2.60	1.94
Rubber Planting	1190.7	1179.0	95.4	91.9	2.05	1.99
Forestry	164.0	108.2	75.2	67.4	1.90	1.59
Fishing	174.0	148.7	92.3	93.3	1.12	1.035
Mining	582.7	705.3	61.9	66.7	1.76	1.91
Manufacturing	664.8	994.5	13.4	16.6	19.05 (1.12)*	18.70 (1.10)
Construction	349.8	373.1	32.9	35.4	1.27	1.27
Electricity and Water	137.6	154.5	59.1	65.1	1.34	1.36
Dwellings	348.1	357.0	90.0	92.1	1.00	1.00
Wholesale and Retail Trade	1194.8	1296.0	48.2	53.7	3.58	2.94
Other Services			91.9	92.0	1.01	1.01
Banking, Insurance etc.	2133.1	2087.4	72.8	74.1	1.00	1.00
Transport and Communications			57.9	55.6	1.27	1.23
Gross Domestic Product at Factor Cost	7994.7	8259.8				

* The figure in brackets is the average for manufacturing, and is derived by dividing the aggregate figure by the number of manufacturing sectors (17). For example: 19.05 ÷ 17 = 1.12.

From the table, it can be seen that value added projections using the 1965 matrix in Agriculture and Livestock, Forestry, Rubber Planting and the Composite Item (other services, banking and transport), are all below the 1960 matrix projections. This is because both the value added coefficient and the relevant row total of the Leontief inverse have fallen between 1960 and 1965 for these sectors.

In Rubber Planting, both projections are fairly close, yet dramatic changes took place in the industry in the 1960's. Two major forces were at work in rubber production in this period. (1) The price of natural rubber fell from its 1960 peak of 107¢ to a level of 69¢ per pound in 1965. This was due to the increased competition arising from the expansion of capacity for synthetic rubber production in the industrial countries, and the increasing substitution of synthetic for natural rubber.

(2) Over the same period, the volume of Malayan rubber exports increased by 12%. This was not sufficient to offset the dramatic fall in rubber prices, but it did help soften its impact on the economy.

This example serves to show why it is more meaningful in Malaya's case to use current rather than constant prices in valuing production (especially exports).

The example also explains why the lower 1965 table projection for rubber was due to the fall in the value added coefficient over the period (as a result of lower world rubber prices).

The rubber row total of the Leontief inverse fell only slightly.

In <u>Fishing</u>, the rise in the value added coefficient between 1960 and 1965 had been more than offset by a fall in the relevant row of the Leontief inverse, so the 1965 matrix yields a lower projection than the 1960 matrix.

It is interesting to note that for all of Agriculture, Forestry and Fishing, the relevant row total of the Leontief inverse, in each case has fallen over the period.

<u>Mining</u> and <u>Electricity and Water Supply</u> projections using the 1965 matrix are above the 1960 matrix projections because both the value added coefficient and the relevant row total of the Leontief inverse have risen between 1960 and 1965 for these sectors.

With <u>Manufacturing</u> and <u>Wholesale and Retail Trade</u>, the rise in the value added coefficients between 1960 and 1965 have more than offset the fall in the relevant row totals of the Leontief inverse over this period, and the projections based on the 1965 matrix are higher than those based on the 1960 matrix.

In <u>Construction</u> and <u>Dwellings</u> the row totals of the Leontief inverse have not changed over time, yet the 1965 matrix yields higher projections because the value added coefficient for 1965 is higher than that for 1960.

The table shows that considerable discrepancies exist between projections from the two matrices - and that these discrepancies are especially marked in Forestry, Manufacturing, Mining, and Agriculture and Livestock. These discrepancies are not surprising in view of

(a) The significant structural shange that took place over the period 1960 to 1965.

(b) The change from an outward to a relatively inward looking strategy by the government.

A. Structural Change: (a) Growth in the period 1960 to 1965 was achieved without significant expansion of export earnings, but rather was based on increases in domestic demand. Hence the export sector declined from 48% of Gross Domestic Product (at current prices) in 1960 to 40% in 1965.

(b) In current market prices, Gross Domestic Product grew at 5.2% on average. The most rapid rates of growth were registered by i. the Construction Sector (17.9% p.a. in constant 1960 prices). The expansion here was due to rapid growth in capital expenditures on dwellings, non residential office buildings, schools, factories, road and bridge construction and other public works.

ii. Public Utilities (11.9% p.a.)

iii. Manufacturing (11.1% p.a.), especially building materials and light manufacturing (eg. motor parts, tobacco manufactures).

B. <u>An Inward Looking Strategy</u>.

Around 1960 the Malayan Government dramatically changed its traditional "outward looking" strategy, and began to experiment with a policy of ad hoc import substitution. The most notable increases in self sufficiency occurred in mining, textiles, paper and paper products, rubber processing and rubber products, where in each case the ratio of $\frac{\text{commodity imports}}{\text{gross output}}$ decreased by 50% or more in 1965 over 1960.[1] This would, for example, help to explain the rise in the Mining row total of the Leontief inverse in 1965 compared with 1960.

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1. Hainsworth and Davis. Import Substitution and Economic Growth in West Malaysia 1960 - 65, page 21.

(3) Are the Plan Projections Likely to be Realized?

(a) General: The plan projected an average annual rate of growth of G.D.P. of 4.8%.[1] Yet the volume of G.D.P. at constant prices rose by 5.2% p.a. between 1966 and 1968,[2] due mainly to the fact that exports grew by over 7% in volume, more than five times the rate projected in the plan. However, in current prices the rise in G.D.P. was smaller, largely because of the fall in the price of rubber and to a lesser extent in the prices of tin and palm oil.
In any case, the growth rate of G.D.P. has been nearly on schedule with the target to 1968.[3]

(b) Agriculture: This is the largest sector in the economy and its planned rate of growth (5.5% p.a. in constant prices),[4] was markedly higher than growth in the 1961 to 1965 period (3.3% p.a. in constant prices).
This higher target reflected in part the growth of rubber output generated by replanting in the 1950's and most importantly, the dramatic expansion in palm oil, forestry and fishing output. Rubber was expected to grow at about 7% p.a. in real terms to achieve the plan target. (Of this, falling prices would hold income growth in the industry to 2% p.a.) Yet rubber grew at an average of only 4.7% p.a. in real terms in 1966 and 1967.

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1. Department of Statistics, Malaya. First Malaysia Plan p 52.
2. " " " " Mid Term Review of the First Malaysia Plan p 14.
3. Ibid, p 33.
4. Ibid, p 45.

<u>Fisheries</u> and <u>Timber</u> were expected to grow at about 6% p.a. in constant prices, but in the first 2 years of the plan they have already exceeded their 1970 targets. Fisheries grew at an annual rate of 17.6% in real terms, while forestry grew at an annual rate of 12.2% in 1966 and 1967.
Similarly, <u>Palm Oil and Kernals</u> have been well in excess of planned targets.
So, in effect, aggregate agricultural production during the first 2 years of the plan is almost on target, owing to a pattern of growth substantially different from that expected ie. the rate of growth of agriculture in 1966 and 1967 was 5.3% p.a. in constant prices.

(c) <u>Manufacturing</u>: The plan incorporated a target rate of increase in manufacturing output of 10% p.a., whereas the average rate of increase in 1965-7 was 9.8% p.a., hence requiring an average rate of increase of 10.1% in 1967-70 (all in current prices).
However, it has proven difficult to predict which industries are likely to manifest the highest growth rates. For example, the plan singled out food and beverages, wood products, rubber products, chemicals, basic metals and machinery as the ones which were expected to play a leading role in industrial growth, and to record annual average output gains of greater than 10%. However between 1965 and 1967 only one

of these (food and beverages) achieved more than 10% growth - while the highest growth industries in the range 12-25% p.a., were rubber remilling and latex processing, tobacco products, textiles, printing and publishing. It should be pointed out that by the end of the plan period the original selections may assert themselves.

Preliminary and incomplete data indicate that the manufacturing sector continued to expand rapidly in 1968. One indicator of this is the 20% growth in consumption of electric power by firms during the first half of the year compared with a 16% gain in the comparable period a year earlier. A more reliable indicator is the backlog of applications for new pioneer companies. By mid 1968, 95 applications with a planned called up capital of $M115 mill. had been approved in principle by the government, some of these projects are in an advanced stage of planning and should be expected to be implemented soon. These observations support the conclusion that the manufacturing sector will maintain a good average growth rate, in the neighbourhood of the plan target, in the next few years.

Attention needs to be focused on the <u>pattern</u> of manufacturing development as well as its <u>size</u>. Much of the past growth has been in import substitution and this process has reached a stage where the danger of setting up uneconomical plants is becoming more real.

(d) Mining: Here production was expected to decline by 4.6% p.a. in current prices from 1966to 1970 according to the plan.[1]

For West Malaysia, mining production in 1966and 1967 grew by 2.8% p.a. in constant prices,[2] but in current dollar terms events proved worse than expectations, primarily because of a sharp fall in the world price of tin by 14%. For Malaysia as a whole value added in mining dropped by 22% from 1965 to 1967. The original fall in tin prices in 1965 was due to sales from the United States strategic stockpile, but by 1967 world output of tin for the first time in 10 years, exceeded consumption. Similarly, iron ore production and exports have declined because of competition from Australian ore in the Japanese market, and to some degree because of inadequate port facilities on the east coast of Malaya.

(e) Construction: The growth of construction industries has been rapid since the beginning of the 1960's, with an average annual growth rate of 11.4% in constant prices 1961-1965. According to the first plan, the target rate of increase was set at 8% p.a. in current prices 1966-70,[3] which in the light of the experience of the early 60's seemed fairly modest.

But with i. The beginning of the fall in tin prices in 1965, the large decline of rubber prices in 1967 (17%)

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1. Department of Statistics, Malaya. First Malaysia Plan p 52.
2. " " " " Mid Term Review of the First Malaysia Plan. p 14.
3. Ibid. p 52.

and palm oil prices in 1967(6%).

ii. The recession slack of private investment spending which was experienced partly because of the separation of Singapore.

iii. The eventual slowing down of the rate of government investment.

Hence construction grew at an annual average rate of only 3.5% in 1966 and 3% in 1967 (both at constant prices)[1]. With the upturn of the economy in the last quarter of 1968, capacity began to be more fully utilized. It is a reasonable expectation that the growth rate of construction will recover to its planned level. Whether the 1970 target will now be achieved, however, is unlikely, as a result of this 2 year slack.

(f) Transport and Communication: During the period 1961 to 1965, total public development spending on transport and communications in Malaya was $M702 mill.,and it was planned to spend $M546 mill. between 1966 and 1970 ie. to reduce substantially(by 25%), expenditures on road, rail, and air transport, as these facilities are already relatively well developed. Funds would be diverted to concentrate more on the two Borneo States.

But in 1966-68, $M332.5mill. (or 60.9%) of the plan target had already been spent, so the plan target was revised

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1. Ibid, p.14

upwards to $M705.7 million for 1966 to 1970.

(g) For <u>other sectors</u> of the economy, difficulties were encountered in comparing plan targets with performance in 1966 and 1967 because i. Plan targets were all expressed in current 1970 prices.

ii. All 1966and 1967 performance figures were expressed in constant 1964 prices.

iii. No data on sectoral price changes over the period was available.

The available statistics are set out in the table below:

sector	Plan 1970* current prices	1966-67* constant prices
Electricity, Water and Sanitary Services.	10.0	11.4
Wholesale and Retail Trade.	4.5	3.2
Dwellings.	4.0	2.5
Public Administration and Defence.	4.0	4.5
Banking, Insurance and other services.	6.0	5.2

* Figures are all average annual rates of growth.

Since the rate of domestic price increase in the first 2 years of the plan was modest and not expected to increase much by the end of the plan period, one can loosely conclude that each of these tertiary sectors are growing at rates not inconsistent with the achievement of plan targets by 1970.

So, in summary, it does seem that the targets for aggregate Agricultural production, Manufacturing, Transport and Communications, and the other tertiary sectors all have a good chance of being achieved.

Only Construction and Mining seem to be overstated in the targets(as well as parts of Agriculture, namely rubber production). Transport, Fisheries and Timber have been understated in the plan.

(4) The discrepancy between the 1965 table projections and actual performance through 1968.

Using the results outlined above, and the information from table III, it is obvious that the 1965 table projections are close to being realised for Total Agriculture, Manufacturing, and the Composite item.

However, Forestry, Fishing, Electricity and Water, and Construction have all been badly underestimated in the 1965 table projection. Mining has been grossly overstated in the table projection.

Under these circumstances, how can the discrepancies between the 1965 table projections and the actual performance likely to be realised for 1970 be explained?

Notice that in calculating value added for each sector from the table : (1)Aggregate demand for each sector was taken as that sector's % share of aggregate demand in 1965.

(2)The Leontief inverse was used to get Gross Output for the sector.

(3)The value added to Gross Output Coefficient was used to get value added of the sector.

So the inaccuracy of the 1965 table projections is due to one or more of these 3 items being inappropriate. For example, Mining production. Here the projection based on the 1965 table is much higher than the production level likely to be realized by 1970. This is because the latter figure is based on the realization that: (a) Malayan tin resources are rapidly approaching exhaustion, and although over 400 new mines have been opened since 1960 in response to rising world tin prices, production has not been able to surpass the levels of the mid 1950's. (b) Iron Ore production has slowed noticeably. The industry enjoyed a period of rapid expansion up to 1963, but deposits declined and some fall in prices also was experienced due to the availability of high grade ores in the world market.

Hence between 1965 and 1970:

(1) The supply of mining to final demand sectors will likely fall.

(2) The row total of the Leontief inverse relevant to mining will probably be reduced.

That is, structural change has taken place in the economy in the period 1965 to 1970 which renders the 1965 input output table inappropriate for making projections for some sectors (like mining).

CONCLUSIONS:

1. The projections based on the 1965 matrix are generally better than those based on the 1960 matrix. This is true of Agriculture and Livestock; Rubber Planting; Manufacturing; Construction; Electricity and Water; Dwellings; Wholesale and Retail Trade.

This is to be expected on theoretical grounds as the Leontief inverse based on the more recent data should more closely correspond to the conditions that should actually prevail in the economy in 1970.

2. Notice however, that: (a) in some cases (ie. Forestry, Fishing and Mining) the 1960 table projections are better.

(b) in some cases, really large discrepancies exist between actual performance and the projections of the 1965 table. This is especially true of Mining, but large errors also exist in Forestry, Fishing and Construction. This indicates that the use of even the 1965 matrix for projections of output for 1970 does not yield meaningful results for many sectors, especially when the economy concerned has undergone considerable structural change (as is the case in Malaya).

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TABLE 1.

CLASSIFICATION OF INDUSTRIES.

(1) AGRICULTURE	
account no.	
111	Other Agriculture
112	Livestock Production
116	Palm Oil Estates
119	Coconut Estates
123	Tea Estates
(2) RUBBER PLANTING	
113	Rubber Estates and Smallholdings
(3) FORESTRY	
129	Forestry
(4) FISHING	
140	Fishing
(5) MINING	
210	Coal Mining
220	Metal Mining
240	Stone Quarrying
(6) FOOD INDUSTRIES	
125	Tea Factories
304	Canning and Preserving of Sea Food
301	Preparation of Meat
302	Manufacture of Dairy Products
303	Canning and Preserving of Fruit and Vegetables
305	Manufacture of Grain Mill Products
306	Manufacture of Bakery Products
307	Sugar Factories and Refineries
308	Manufacture of Cocoa, Chocolate and Sugar Confectionary
309	Miscellaneous Food Products
(7) BEVERAGES	
311	Distilling, Rectifying and Blending of Spirits
312	Breweries, Manufacture of Soft Drinks etc.
(8) TOBACCO	
320	Tobacco Products Manufacturing
(9) TEXTILES	
331	Spinning, Weaving and Finishing of Textiles
332	Knitting Mills
333-339	Manufacture of Cordage, Rope, Net etc.

CLASSIFICATION OF INDUSTRIES CONTINUED

(10) CLOTHING AND FOOTWEAR		
	341	Manufacture of Footwear
	343	Manufacture of Wearing Apparel and Made Up Textile Goods
(11) WOOD AND CORK		
	351	Saw Milling, Plan Milling etc.
	352	Other Manufacture of Wood and Cork
(12) FURNITURE AND FIXTURES		
	360	Manufacture of Furniture and Fixtures
(13) PAPER AND PAPER PRODUCTS		
	370	Manufacture of Paper and Paper Products
(14) PRINTING AND PUBLISHING		
	380	Printing, Publishing and Allied Industries
(15) LEATHER AND LEATHER PRODUCTS		
	390	Manufacture of Leather and Leather Products
(16) RUBBER PROCESSING		
	115	Rubber Processing
(17) RUBBER PRODUCTS		
	400	Manufacture of Rubber Products
(18) CHEMICAL PRODUCTS		
	117	Palm Oil Factories
	121	Coconut Smallholdings
	411	Manufacture of Industrial Chemicals
	412	Manufacture of Vegetable and Animal Oils and Fats
	413	Manufacture of Paints, Varnishes and Laquers
	419	Miscellaneous Chemical Products
	420	Manufacture of Products of Petroleum and Coal
	612	Gas Manufacture and Distillation
(19) NON METALLIC MINERAL PRODUCTS		
	430	Manufacture of Non-Metallic Mineral Products
(20) BASIC METAL INDUSTRIES		
	440	Basic Metal Industries
(21) METAL PRODUCTS, MACHINERY ETC.		
	450	Manufacture of Metal Products
	460	Manufacture of Machinery
	470	Manufacture of Electrical Machinery etc.
	480	Manufacture of Transport Equipment

CLASSIFICATION OF INDUSTRIES CONTINUED

(22) MISCELLANEOUS MANUFACTURING INDUSTRIES

490	Miscellaneous Manufacturing Industries

(23) CONSTRUCTION

510	Construction

(24) ELECTRICITY, WATER

620	Water and Sanitary Services

(25) TRANSPORT AND COMMUNICATION

812	Other Road Transport
813	Air Transport
814	Services Incidental to Transport etc.
830	Communications

(26) WHOLESALE AND RETAIL TRADE

710	Wholesale and Retail Trade

(27) BANKING AND INSURANCE

730	Banks and Other Financial Institutions
740	Insurance
750	Real Estate

(29) OTHER SERVICE INDUSTRIES

921	Education
922	Medical and Health Services
924	Religious Organizations
926	Legal, Technical and Business Services. Non Business Institutions
940	Recreation Services
951	Domestic Services
952	Hotels and Restaurants
954	Laundries, Personal Services etc.

APPENDIX 2: States of Malaya. Interindustry Accounts 1960. M$mill. producer prices.

Delivered From:	Agriculture & Livestock (1)	Rubber Planting (2)	Forestry (3)	Fishing (4)	Mining (5)	Food Industries (6)	Beverages (7)	Tobacco (8)	Textiles (9)	Clothing & Footwear (10)	Wood & Cork (11)	Furniture & Fixtures (12)	Paper and Paper Products (13)	Printing and Publication (14)	Leather and Leather Products (15)	Rubber Processing (16)	Rubber Products (17)	Chemical Products (18)	Non-Metallic Mineral Products (19)	Basic Metal Industries (20)	Metal Products & Machinery etc. (21)	Misc. Manufacturing ind. (22)	Construction (23)	Electricity & Water (24)	Transportation & Communications (25)	Wholesale and Retail Trade (26)	Banking Insurance etc. (27)	Dwellings (28)	Other Service Ind. (29)	Rest of the World (30)	Unspecified (31)	Fixed Assets (32)	Inventories (33)	Government (34)	Households (35)	TOTAL
1. Agriculture & Livestock	14.7					186.4		9.1							0.5			91.3					18.4							45.3		6.6	6.4	1.2	386.7	766.6
2. Rubber Planting ..																1166.4																120.2		5.5		1292.1
3. Forestry											65.0	0.3						0.1	0.9				9.3							16.8	3.5				28.6	124.5
4. Fishing						24.5																								9.6					64.8	98.9
5. Mining																			1.4	367.3		1.9	1.5							154.2			-31.4			404.9
6. Food Industries ..	19.2					8.1																				6.3				40.0	0.7		15.9		270.6	360.8
7. Beverages																															0.6		0.3		20.4	21.3
8. Tobacco																														0.3			8.4		93.9	102.6
9. Textiles																														3.7	0.4		0.6		3.9	8.6
0. Clothing & Footwear ..																																			4.1	4.1
1. Wood & Cork ..										0.3	5.3	8.6						0.3			0.2		56.3							37.6	2.2		0.9		16.1	127.8
2. Furniture & Fixtures ..																														0.1		6.6			18.0	24.7
3. Paper & Paper Products																															0.7				2.8	3.5
4. Printing & Publishing..							0.1																							0.6	14.6			1.6	17.3	34.2
5. Leather & Leather Products ..										0.4					0.4																				1.3	2.1
6. Rubber Processing ..																264.7	11.9													1407.2			19.2			1703.0
7. Rubber Products ..																	2.2				0.1									11.5	5.6	0.6			22.4	42.4
8. Chemical Products ..	17.3					1.9												14.0					3.6							98.3	10.0		1.0		56.1	202.2
19. Non-Metallic Mineral Products ..																		0.1	1.1				27.6							1.2	1.2				1.3	32.5
20. Basic Metal Industries																				0.1			1.5							505.8	0.4		12.9			520.7
21. Metal Products and Machinery ..	0.2																						13.4		13.1					1.1	28.9	11.7	1.1		14.9	84.4
22. Misc. Manufacturing Industries ..																														5.3	0.2				37.8	43.3
23. Construction ..																								15.4	5.8			18.6		20.1	6.5	328.4		85.8		480.6
24. Electricity & Water ..					31.8	1.3	0.1	0.1	0.1		0.7	0.2		0.3		1.9	0.8	0.9	1.8	0.2	0.7		10.1	4.6						0.5	16.7			7.7	37.5	118.0
25. Transportation and Communication ..																							5.9			117.4				12.0	47.9			15.1	135.0	333.3
26. Wholesale & Retail Trade	27.7	6.3	1.9	4.8	21.4	19.1	2.4	55.9	1.0	0.4	14.0	1.8	0.6	2.4	0.1	11.3	2.5	10.5	5.1	1.6	8.4	0.6	44.4	10.4	29.6	15.0	0.8		6.9	380.9		59.9	10.2	14.5	876.7	1649.1
27. Banking & Insurance etc.																												0.8			55.4	2.9			38.2	97.3
28. Dwellings																																			265.0	265.0
29. Other Service Industries																							3.7							119.7	33.6			524.4	323.9	1005.3
30. Import Trade ..	70.0	11.2	-	2.1	27.6	32.5	4.9	15.8	5.5	0.5	1.7	3.1	2.1	7.7	0.4	57.2	4.5	13.8	2.6	140.3	22.7	6.0	99.7	14.0	23.7	5.2	12.5		20.1	187.0	211.7	191.8	-2.1	11.3	1026.0	2232.8
31. Unspecified ..	30.4	13.0	10.5	0.6	25.9	38.0	2.6	9.4	0.4	0.7	8.3	1.3	0.4	5.1	0.3	32.5	5.5	22.5	4.8	2.0	9.9	28.4	27.2	3.8	21.3	26.9	4.8		31.4	131.1	48.0	26.1	57.0	43.1	-138.0	535.2
32. Primary Factors of Production (1) ..	587.1	1261.6	112.1	91.4	388.2	49.0	11.2	12.3	1.6	1.8	32.8	9.4	0.4	18.7	0.4	169.0	15.0	49.0	14.8	9.2	42.4	6.4	158.0	69.8	239.8	1478.3	79.2	245.6	946.9							6101.4
Total	766.1	1292.1	124.5	98.9	494.9	360.8	21.3	102.6	8.6	4.1	127.8	24.7	3.5	34.2	2.1	1703.0	42.4	202.2	32.5	520.7	84.4	43.3	480.6	118.0	333.3	1649.1	97.3	265.0	1005.3	3189.9	488.8	754.8	100.4	710.2	3625.3	18913.2
(1) Salaries and Wages ..																												-								
Enterpreneurial Income ..																																				
Indirect Taxes ..	18.8	28.3	18.4	0.1	82.8	0.4	-		-	-			-		-			4.6		-		-	0.1		46.4	683.1	8.3	6.9	22.2							
Subsidies ..																																				

APPENDIX 3: Treatment of Final Demand Sectors.

(1) Rest of the World: (column 30) completed fully.

(11) Unspecified: (column and row 31)

(a) The inclusion of this sector is necessitated by inaccuracy in the statistical data. Notice also that there is a discrepancy between the row and the column totals of this sector.

(b) Data for the unspecified column is incomplete - and this column was filled in from the double entry records of other accounts.

(c) The double entry records show minor discrepancies for transactions described in row 31 columns 1, 2 and 21.

(111) Government: (column 34)
The figures for government spending are grossly incomplete, so I had to rely on the double entry records of other accounts to fill in this column.

(1V) Inventories: (column 33)
Almost perfect conciliation exists between the summary account for inventories and the double entry from other accounts. The only clash is in row 31, across (1.9) and down (2.1).

(V) Households: (column 35)

(a) Minor discrepancies in the double entry records occur in - row 30: 1026.0 across and 1033.5 down
- row 22: 37.8 " and 37.5 "

(b) Using producer price valuation, the wholesale and retail trade markup 876.7, does not appear in the household spending account and has to be added from the receipts of the wholesale and retail sector.

(V1) Fixed Assets: (column 32)

(a) The summary account for fixed assets agrees with the double entry transactions that have already completed this column, except:
Row 31 Unspecified i. in the fixed asset summary account this cant be traced directly but evolves as a balancing item = 26.1. ii. in the unspecified receipts account this item equals33.7

(b) There is a discrepancy between the individual capital accounts and the summary account.

Total in individual accounts = 742.7
Total in summary account = 754.8

The latter figure is taken as the correct total since it is likely that the individual accounts are incomplete.

APPENDIX 4: Correspondence with Department Statistics Malaysia.

(1) Industry Classification.

Question: I believe that tea factories (125) has been classified under Food industries. Is this correct? Why was it not classified with spirits and brewing under Beverages?

Answer: Beverages was used for alcoholic beverages only.

Question: Why were palm oil factories off estates; coconut processing; and vegetable and animal oils and fats all classified under Chemical industries in the original 1960 table? Why were they not classified under Agriculture?

Answer: They all involve processing, and not strictly food processing.

I also requested descriptions of industries number 611, 810, 811, 910, 911. No answer was provided, but fortunately no transactions involving these were encountered in the table which I constructed.

(2) Gross Domestic Product.

Question: Figures in the account do not seperate the contributions of salaries and wages and entrepreneural income in the value added figure. Do you have any information that would enable me to make this distinction for each sector.

Answer: The information is not part of the National Accounts but is provided in seperate statistics elsewhere.

(3) Household Spending Sector:

Question: The household accounts at my disposal show that no payments were made to the Wholesale and Retail Trade sector. Yet the double entry in the Wholesale and Retail Trade income account shows this sector receiving $M876.7 million from households. Can you explain this?

Answer: When using the producer price valuation of transactions (ie. net of markups), it is correct that no payment to Wholesale and Retail Trade is recorded.

APPENDIX 5 : Interindustry Accounts 1965. States of Malaya . M$ mill. Producer prices.

	Agriculture & Livestock	Rubber Planting	Forestry	Fishing	Mining	Food Industries	Beverages	Tobacco	Textiles	Clothing & Footwear	Wood & Cork	Furniture & Fixtures	Paper and Paper Products	Printing and Publishing	Leather and Leather Products	Rubber Processing	Rubber Products	Chemical Products	Products of Petroleum & Coal	Non-Metallic Mineral Products	Basic Metal Industries	Metal Products & Machinery etc.	Misc. Manufacturing Ind.	Construction	Electricity & Water	Transportation & Communication	Wholesale and Retail Trade	Banking, Insurance etc.	Dwellings	Other Service Ind.	Rest of the World	Import Trade	Unspecified	Fixed Assets	Inventories	Government	Households	Jumlah
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36a)	(36b)	
Delivered From																																						
1. Agriculture & Livestock	48.8					210.1		13.5										137.1						14.9							30.0			11.5	2.7		577.5	1,046.1
2. Rubber Planting ..																947.0																		142.9				1,089.9
3. Forestry					0.8						69.5	0.6				0.1		0.4						7.3							27.5		1.7				26.8	134.7
4. Fishing						18.8																									25.7						100.2	144.7
5. Mining																				2.0	705.2			3.4							185.4				-1.5			894.5
6. Food Industries ..	42.2					10.7	0.5																				6.6				84.6		8.8		4.3		441.1	598.8
7. Beverages																															1.2				1.2		40.4	42.8
8. Tobacco																																			8.1		185.8	193.9
9. Textiles										0.1		0.1					8.0														7.8				1.4		16.6	34.0
10. Clothing & Footwear ..																															0.2						5.6	5.8
11. Wood & Cork ..										0.2	8.1	8.4										0.9	0.1	81.4							57.9		5.0		0.5		19.6	182.1
12. Furniture & Fixtures ..												0.9																			0.2			11.3	0.1		22.9	35.4
13. Paper & Paper Products													0.9	2.5	0.1		0.1														1.7		5.3		1.8		0.5	12.9
14. Printing & Publishing..																															2.9		28.6		3.5	4.1	29.0	68.1
15. Leather & Leather Products ..																															0.1						2.9	3.0
16. Rubber Processing ..																~~176.8~~	15.8														1,097.2				4.0			1,293.8
17. Rubber Products ..												0.5					3.7														23.2		10.8	1.1	11.5		48.9	99.7
18. Chemical Products ..	32.7	6.5				3.6	0.2					0.7				0.2	0.9	31.5				0.4	0.1	10.6							160.2		25.4		14.5		89.3	376.8
19. Products of Petroleum and Coal ..		0.4		1.5	14.1	0.5					0.3					2.8	0.2	0.4	0.1	1.1	0.3	0.3	0.1	4.1	6.6	11.0					45.0		34.3		0.3		14.3	137.7
20. Non-Metallic Mineral Products ..																		0.1		8.0				72.4							6.1		2.6		0.8			90.0
21. Basic Metal Industries												0.7										0.1		22.1							867.7		0.4	0.6	-43.1			848.5
22. Metal Products and Machinery ..	1.0																0.1			0.2		0.8		39.6		13.3					8.8		52.1	41.4	2.8		41.1	201.2
23. Misc. Manufacturing Industries ..																								0.3							3.4		0.6		1.0		56.0	61.3
24. Construction ..																									26.9	13.9			16.4		29.1		4.8	672.9		136.4		900.4
25. Electricity & Water ..					41.7	3.5	0.6	0.5	0.5		1.2	0.2	0.1	0.7		3.0	2.0	1.8	0.1	4.7	0.4	2.1	0.3	21.4	7.2	1.6				0.2	0.8		37.1			20.2	48.4	200.3
26. Transportation and Communication ..																								9.6		2.3	130.1				13.5		104.3			22.7	165.1	448.6
27. Wholesale & Retail Trade	37.3	8.3	2.9	5.0	29.8	48.6	4.5	8.8	4.2	0.5	22.1	2.6	1.0	3.9	0.3	7.8	9.0	34.9	4.4	9.5	6.2	20.1	2.1	79.5	10.2	26.4		1.3		14.1	296.2	324.7		87.4	17.7	29.4	833.6	2,044.5
28. Banking & Insurance etc.																													0.8				84.0	4.6			58.5	147.9
29. Dwellings																															6.8						316.0	322.8
30. Other Service Industries																								9.5									76.4			966.3	492.3	1,544.5
31. Rest of the World ..																										0.7	0.6	18.2		18.5		2,630.5	30.5			43.8	145.8	2,888.6
32. Import Trade ..	96.1	19.7	-	1.6	18.5	135.9	11.8	117.0	19.5	2.0	5.8	4.6	3.8	12.2	1.2	9.7	9.0	42.0	95.8	7.4	110.0	65.7	12.5	151.0	2.1	23.5	6.2			1.4	144.5		309.3	353.0	13.0	33.2	1,189.4	2,955.2
33. Unspecified ..	38.1	13.5	17.2	1.1	34.4	63.0	6.8	21.4	2.2	1.0	10.2	4.0	0.9	17.6	0.5	19.4	13.6	36.9	4.2	14.0	1.0	31.7	32.3	55.4	15.2	22.5	167.1	6.8		53.3	[2] 199.9			[3] 415.4	[4] 20.8	[5] 101.2	[6] 197.8	822.0
34. Inventories ..																																						
35. Primary Factors of Production (1) ..	749.9	1,041.5	114.0	135.5	755.2	104.1	18.4	32.7	7.6	2.0	56.9	11.9	6.2	31.2	0.9	127.0	36.5	91.7	33.1	43.1	25.4	79.1	13.8	317.9	132.1	333.4	1,733.9	121.6	305.6	1,457.0								7,919.8
Total	1,046.1	1,089.9	134.7	144.7	894.5	598.8	42.8	193.9	34.0	5.8	182.1	35.4	12.9	68.1	3.0	1,293.8	59.7	376.8	137.7	90.0	848.5	201.2	61.3	900.4	200.3	448.6	2,044.5	147.9	322.8	1,544.5	3,327.6	2,955.2	822.0	1,311.3	71.4	1,357.3	4,740.8	27,790.3
(1) Salaries and Wages ..	47.0	482.0	46.9	17.8	166.8	34.3	5.7	6.3	3.3	0.9	30.5	6.3	1.3	13.9	0.3	60.0	14.7	13.3	3.8	13.0	7.4	43.6	6.1	209.6	54.5	161.7	240.2	61.9	-	1,118.2								2,881.3
Enterpreneurial Income ..	679.5	520.1	44.2	117.2	431.0	69.8	12.7	26.3	4.3	1.1	26.0	5.5	4.9	12.1	0.6	65.0	21.6	61.8	29.3	30.0	18.0	35.2	7.7	105.9	77.4	87.7	857.2	47.7	298.3	302.7								4,001.8
Indirect Taxes ..	23.8	39.4	23.5	0.5	157.4	-	-	0.1	-	-	0.4	0.1	-	0.2	-	1.0	0.2	11.6	-	0.1	-	0.3	-	2.4	0.2	84.0	636.5	12.0	7.3	36.1								1,037.1
Subsidies	-0.4																																					-0.4

APPENDIX 6 : INTERINDUSTRY FLOW PROGRAM.

The University of British Columbia
School of Community and Regional Planning

Dr. Davis
PLANNING 521 (Fall)

INTERINDUSTRY FLOW PROGRAM

Purpose: Matrix Operations: Aggregation, Inversion, Transposition, etc.

Machine: IBM 360/67

Deck Set-up (card #1, card #2, etc.)

#1 Request for service card
Print name and check type of service desired (computer run)

#2 Col. 1
$ SIG PLO6 JOHN SMITH

#3 DAVIS

#4 $ RUN SERVØBJ 5 = * SØURCE * SPRINT = * SINK * SPUNCH = * DUMMY *

#5 Title Card (e.g. PL 521 PROB No. 1)

#6 Title Card (may be left blank)

#7 Control Card (all entries right adjusted)

a. Cols. 1-4: order of input matrix

b. Col. 7:
- print output matrix
+ do not print output matrix

c. Col. 8: output matrix
1 F matrix (transactions matrix)
2 A matrix
3 (I-A) matrix
4 (I-A) inverse matrix

d. Col. 11-12:

0 or blank input matrix is not to be aggregated
>0 order of aggregated matrix

e. Col. 13-16:
no. of column vectors by which output matrix is to be multiplied

f. Col. 20:
1 input matrix will be printed

g. Col. 24:
1 transposed output matrix is post-multiplied by diagonal matrix formed from input vector

h. Col. 32:
1 transposed output matrix is post-multiplied by column vectors designated in Cols. 13-16

1. for punched output, see instructor

#8 Input format card--describes format of input data e.g. (7F10.2) punched anywhere on card

#9 Output format card--describes format of punched output and must be of the form (7F10.d,7X,I3) where d (no. of decimal places) may vary from 0 to 8, e.g. (7F10.2,7X,I3) punched anywhere on card

#10 - #n-2 Data cards--order:
a. grouping cards (if Col. 12 not 0)
b. input matrix F (not more than one column per card)
c. X vector
d1 Col. vector (if 1 in Col. 24)
or d2 Col. vectors (if Cols. 13-16 not 0) preceded by vector title cards (1 title card per vector)

#n - 1 $ENDFILE

#n $SIG