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THE APPLICABILITY AND UTILIZATION OF INPUT - OUTPUT MODEL IN A DEVELOPING ECONOMY

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THE APPLICABILITY AND UTILIZATION OF THE INPUT-OUTPUT MODEL IN A DEVELOPING ECONOMY. THE CASE OF EGYPT EXAMINED

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PART I.
THE APPLICABILITY OF THE INPUT-OUTPUT MODEL IN A DEVELOPING ECONOMY

So far two Input-Out tables have been constructed for the Egyptian Economy, one for the year 1954 and the other for the year 1959. In this paper reference will only be made to the 1954 table, and aggregated version of which is included in the Appendix. The original table is of the order of 83 X 83[1] and was later aggregated to 33 X 33 and 7 X 7. The final demand is divided into 6 sectors. A distinction was made between household consumption and government consumption and also between government and private investment. It should also be mentioned that the sectors "education" and"medical services" which are included in the interflow matrix represent those services which are rendered by the private sectors. Government education and medical services on the other hand are included in the final demand sectors under government consuption. This is due to the fact that it could always be argued that government policy in these two fields could not be conceived as matters to be determined through a set of technical coefficients. As regards the primary factors, the original table shows a detailed breakdown. However, this breakdown was dispensed with when reproducing the 33 X 33 table and only one row of value added appears.

As regards the prices utilized in the 1954 table we followed a traditional path. Transactions from domestic production were evaluated at producers' prices. Imports were evaluated at "CIF" prices. Trade & Transportation margins were included in separate sectors in the interflow matrix. In choosing producers' prices we were influenced by the idea that the use of purchasers'prices is somewhat inferior for analytical purposes. However this is not really of any significance particularly if we look at prices merely as veils covering the real significant figures which are in physical units. In fact it is sometimes maintained that it is preferable, particularly if the input-Output table is a detailed one to utilize purchasers'prices. As regards exports they were evaluated at FOB prices.

As it is clear the table shows gross transactions in the sense that the inputs from one sector to itself are recorded. This prodecure we preferred, as it gives additional information of vital importance. Another characteristic of the table and perhaps the most important, is that inputs from domestic production and from imports are shown separately in every cell. This is a very significant step and a necessary one in constructing an input-output table in developing countries. This gives us two interflow matrices, one represents the inputs from domestic production and the other indicates the inputs from imports which will be referred to later as the import matrix.

1 The 1959 table is of the order of 33 X 33 and a 7 X 7 table is also available. Both tables were constructed by the Input-Output Unit of the National Planning Committee and under my direction and the supervision of Dr. I.H. Abdel Rahman, then under Secretary of the Ministry of Planning and Dr. N. Dief, the Assistant Under Secretary.

Whereas it may be appropriate to group together the inputs from both the domestic production and imports in an input-output tables for a developed economy like that of the United States, this is not so in the case of a developing economy like that of Egypt simply because of the heavy reliance of the latter economy on imports. This is even more so in other economics where reliance on imports is heavier than in the case of the Egyptian Economy. Of course some Input-Output Analysts prefer to include all inputs in the appropriate cells leaving only inputs from noncompetitive imports to be grouped together in a separate row. This, however, we did not favor as we thought an important matrix would be an essential tool in the calculation of the net savings in imports which could be achieved from adopting a certain policy which aims at import substitution, a phenomenon which could be easily observed in Egypt at the present time. Furthermore, the grouping of the inputs from domestic production and import together in one figure would not give the straight forward answer which we would get if we used only the domestic production matrix. This is due to the fact that the inputs from inports are produced exogenously from the system, and in including them in the coefficients of the interflow matrix we are in fact allowing these inputs to have indirect reactions which will be embodied in the levels of production resulting from our solution, which means an overestimation of the latter and underestimation of imports.

THE INTERDEPENDENCY IN THE EGYPTIAN ECONOMY

The usefulness of constructing input-output tables for developed economies has more or less ceased to be a topic of argument. This, however, is not always the case as far as developing economies are concerned. The usefulness of constructing such tables for these economies has been a subject of lengthy discussions and the validity of the above statement has been under critical examination by a number of economists, particularly those who chose to construct tables in some of the highly underdeveloped countries of Africa and others who are engaged in planning activities in some Asiatic countries. Their argument is based on the idea that in these countries, there is a drastic lack of statistics, particularly that type of statistics which is necessary for the construction of an input-output table. Other accounting systems, like the national income accounts, were favored on the grounds that it requires less effort and serves better the needs of these economies which were sometimes naively stated. In the case of Egypt, however, a significant observation about the availability of data should be made. It could be safely stated that the necessary data for the construction of the input-output table was dispersed rather than scarce. Our main task therefore was the finding, verification and processing of this data in the proper form. This however did not exclude the fact that we were confronted, as is naturally expected, with a number of contradictory statements which were due in most cases to the adoption of different definitions by the barious statistical sources.

But the most serious among these criticisms is the one which rests upon the argument that in these economies there is hardly any significant interdependency among the different sectors, with the result that after exerting great effort to construct an input-output table one ends with a productive matrix which is practically ecpty except for some insignificant transactions. The table which was prepared for the Gold Coast has been quoted by some as an example of this lack of interdependency. It was maintained that only three of the 36 elements included in the productive matrix contained figures of any statistical significance.[1] It was also shown that the productive sectors received inputs worth 4.2million pounds out of the total domestic production of 59.7 million. The case of Tanganyka was by no means less depressing than the Gold Coast. Professor Peacock found that the state of interdependency is a grave one and illustrated his point by showing that it was possible to fill no more than 23 cells of the interflow matrix which contained 306 such cells. Moreover he points out a more discouraging sign of the lack of interdependency in the economy by stating the fact that the deliveries from domestic production to intermediate consumption were only 8.3 million pounds as compared to 181.6 million which was delivered by the productive sector to final demand. Cyprus is another example which may also be referred to. The two tables which were prepared for that Economy be Mr. Simous Vassiliou show insignificant structural relationship among the productive sectors of the economy.[2] A point of great significance, which Mr. Vassiliou attracts attention to, is the fact that the 14% increase in output which occurred between 1954 and 1957 had no significan effect on the structural relationship between the productive sectors, nor did it reduce their reliance on imports.

On the other hand, other experiences of Latin American countries show that the construction of Input-Output Models for those economies is not an impossibility as far as the basic statistical data is concerned. However the experiences of ECLA in Columbia shows that there is a heavy reliance on imports both for intermediate and final deman. Nevertheless it was found that the input-output model provided an unique tool for calculating the effects of an import substitution policy. But it may be argued that those economies, though not developed, are not the type which may be described as highly underdeveloped economies. The latter being characterized with lack of interdependency among the productive sectors.

Although the lack of reliable statistics is certainly a stumbling block for the construction of input-output tables in underdeveloped countries, yet this should not be a hinderance and the model should not be stamped on this account as a useless tool of analysis in those countries. In fact the postponement of constructing such tables may lead still to the postponment of a

1. Peacock, A.T. and Dosser, D.M. "Input-Output Analysis in an Underdeveloped Country", The Review of Economic Studies, Vol 25, No. 66, Oct. 1954.
2. Simous Vassiliou, Input-Output Analysis for the Economy of Cyprus, Harvard University, 1958 - 1959, p. 53.

serious review of the gaps in the data and its processing. On the other hand one is tempted to state that the lack of interdependency in the highly underdeveloped economies makes the rewards for the effort and costs spend on the construction of input-output tables extremely frail. It is this lack of interdependency rather than the lack of statistics which present the most serious charge against the construction of input-output table in underdeveloped countries. However at this point we should not make sweeping statements but we should be careful to distinguish between developing economies and highly underdeveloped economies.

When constructing the input-output table for Egypt we were highly aware of these arguments and our doubt as to the possibility of constructing the table as well as its usefulness was not related to the lack of the necessary data but rather to the amount of interdependency which exists in the economy, and whether or not this would justify our efforts. However, these fears did not seem to have solid grounds as it was clear to any economic analyst that a substantial interdependency exists among the different productive sectors of the Egyptian Economy, despite the heavy reliance of the economy on imports. Out of the 1056 cells which are included in the productive matrix of the aggregated table for 1954, 542 cells contained entries from domestic production or about 50% of all the cells in the matrix. These figures, as it is clear, represent a sharply contrasted picture from that given in the case of the countries cited above. In the case of Italy, however, Paul G. Clark stated that out of 462 cells in the interflow matrix (he excluded the row of construction) of the aggregated 22 X 22 table for 1950, 340 cells contained entries or 73% of all the cells. This is a higher percentage if compared to that given for Egypt. It could also be taken as an indication of the higher level of development of the Italian economy which is indicated by the higher degree of interdependency which one could consider as a good indication of the level of development. However it must be mentioned that in comparing the two percentages we sought a rough illustration of the degree of interdependency in the two economies. This is only a rough comparison simply because of the fact that the level of aggregation in the two tables is not the same since the Italian table to which Clark referred is of the order of 22 X22, whereas the Egyptian table to which we referred is of the order of 33 X 33. As it is clear, the more aggregated the table is, the higher the number of cells to contain entries.

Furthermore the extent of interdependency in the Egyptian Economy could be illustrated by the fact that the deliveries from domestic production to intermediate consumption in 1954 were 847 million Egyptian Pounds as against 1006.9 million pounds which were delivered to the final demand sectors. This extent of interdependency will be even more vivid if one compares these figures with those given by Peacock for Tanganyika.

1 See Chenery & Clark, The Structure and Growth of the Italian Economy.

THE STABILITY OF THE INPUT COEFFICIENTS OF THE EGYPTIAN TABLE

The lack of interdependency among the productive sectors of the Egyptian Economy is not , as we mentioned, a phenomen to worry about. In fact what deserves examination is the stability of this type of interdependency which reflects itself in the stability of the technical coefficients. The examination of the degree of stability of these coefficients in developing countries is of paramount importance as this would indicate the degree of dependence on the input-output table for projection purposes. As it is known, the technical coefficients included in the interflow matrix of the Input-Output table are expressed in values. Therefore they are bound to be sensitive to any change in relative prices. Those coefficients would also change under two other circumstances, if the economy adopts a new technology or a change in the scale of production occurs. It is important, therefore, to examine how frequently those factors occur in a developing economy like that of Egypt and in what manner do they affect the technical coefficients.

In order to predict the frequency and nature of these changes one should examine closely the structure of the Egyptian economy as well as the path of development which this economy will tend to take in future years. For a long time the Egyptian Economy depended on imports for its supply of goods which it needed for its production capital intensive investments. Although this picture has changed substantially since 1952 yet there is still a heavy reliance on imports for the supply of that type of goods. Before 1952 these types of commodities were imported to satisfy the consumption needs, but from 1952 on a shift in the type of imported commodities has occurred. Egypt started an extensive industrialization program, as well as programs designed for the development of the remaining sectors of the economy. The shifts therefore have been from consumer commodities to capital goods. This in itself made the reliance on imports more prominent than before. This is supported by the fact that the import content in the type of investments included in the national plan is almost 47% whereas this is only 15% for household consumption, 12% for government consumption and only 7% for exports. For this reason we found it essential to show separately the inputs from imports and those from domestic production in our input-output table.

For the sake of our argument it is important to examine briefly what has happenedsince 1952 and what will be the pattern of development in the future. Before that date it could be safely stated that the Egyptian Economy was mainly an agrarian one with a minor industrial sector. But as we mentioned before, the country embarked on a large development program. These were even increased in their magnitude in the last couple of years. These programs aimed at a balanced development of all the sectors of the economy. However the achievement of a faster rate of growth meant that a larger investment had to be poured into the industrial sector. For a country with a minor irdustrial sector this means that any new production from that sector will substitute a commodity which was imported before or an increase in the production of a commodity which was being produced beforehand in quantities insufficient to meet the demand that this difference had to be imported. This

in fact has happened. Leaving aside the investments in the high dam and the other sectors whose production could not be imported -- electricity for instance -- the bulk of the investment allocated for the industrial sector aimed at the production of the type of goods which we imported. Here we are not interested in examining the wisdom of this policy of import substitution or its effect on the balance of payment or whether this policy will result, in the long run, in a net savings in imports or not. All that we are concerned with at the moment is to state the fact that this trend of import substitution has been a decisive element in forming the industrial policy in the country. It is my opinion, if we accept the argument that a faster rate of growth in Egypt necessitates a faster growth of the industrial sector, that this is an inevitable step merely because of the fact that a larger number of the newly produced commodities will be substitutes for imports. It is therefore not merely a deliberate policy but rather a consequence of the industrialization drive, a fact which cannot be escaped. This, in my opinion, will be the main characteristic of the industrialization in Egypt for some years to come and in the light of this statement we could proceed with the examination of the stability of the technical coefficients of the input-output table for Egypt and how the table could be used effectively under such conditions. To be able to do that, we will examine the factors which affect the technical coefficients, which are mentioned above, assuming of course that for some years to come import substitution will play an effective role in the pattern of industrilization in Egypt.

A. TECHNOLOGICAL CHANGE

In a developed economy technological change may be looked upon as continuous attempts to increase the amount of output per unit of input or to reduce the amount of inputs per unit of output. To achieve this, substitution plays a prominent role. This may be substitution of capital for labor or capital for materials or material for material which means that such changes will be reflected in the input structure of the productive sectors. The frequency of such changes has been the subject of extensive examination (see Leontief's) in developed economies like that of the U.S. and it was found, as it is widely known, that input-output tables in such economies need not be subject to extensive revision except every ten years.

This, however, is not the case, in an economy like that of Egypt. If economic development is pursued as it is determined, the technical structure of the Egyptian economy, is bound to change rapidly. In fact the introduction of the majority of the new industries in Egypt, which had fewer major ones before, should be looked upon as a positive step in that direction. Here we are assuming that the types of new industries installed are those using the highest techniques which are available in the more developed economies. The wisdom of this step as well as the reasons for is are not of major interest here. What is important to emphasize is that the introduction of these

techniques will mean major changes in the technical structure of the economy. If in the meantime we accept the argument that the results of these investments will be in the direction of substitution of imports be locally produced goods, then in this case we will have to examine separately the effect of substituting competitive imports and those of non-competitive imports on the technical coefficients.

I. SUBSTITUTION OF COMPETITIVE IMPORTS

The definition of a competitive import used here is similar to that which is traditionally used. According to that definition a competitive import is that which has already a similar product from local production, whatever the magnitude of the latter may be. Local production of this commodity may only supply a very minor part of the demand for that commodity yet the fact still remains that the production of the commodity in question could be increased whenever it is found possible and desirable to do so. Having separate entries in every cell from both domestic production and imports we have therefore two sets of input coefficients representing inputs from local production andcoefficients representing inputs from imports (no distinction is made in our table between competitive and non-competitive imports in the sense that the input coefficients from imports include both types of imports, but this should not affect our argument [1]). The separation of the input coefficients into those from local production and from imports is, as we mentioned before, a desirable thing in an economy which depends heavily on improts, like that of Egypt. Now the substitution of a competitive import will have a variety of repercussions on the technical coefficients, the magnitude and type of which will depend on a variety of factors regarding the magnitude of subsitution, the distribution of the new production over the purchasing sectors as well as the technology utilized in the new production.

The straight forward effect of any such substitution would be expressed in a higher input coefficient from local production and a lower import coefficient. The simplest form of change of this type will occur if the new production will be distributed along the row with the same proportions. That is to say, if we are substituting 40% of the imports from agriculture then all deliveries from imports from agriculture to all the purchasing sectors including the final demand sectore will be reduced by 40%. In this case the correction of the coefficients along the row will not require elaborate changes? Along the colums also it will be an easy job once we know the magnitude of the substitution and its distribution.

But this is not always the case since the substitution of a certain competitive import may be limited to a particular brand of this commodity which goes entirely to the final demand sectors or to a particular sector or sectors. If all the new production will substitute for the imports which were purchased by the final demand sectors this will not require the introduction of any changes on the technical coefficients of the productive sectors. But if the new production will substitute, the imports purchased by a particular sector or sectors, this, as it is clear, will necessitate a change in the

1 In the table which was prepared for Prof. Ragner Frisch we differentiated between competitive and non-competitive imports as in that table only non-competitive imports appear in a separate row.

input coefficients of these sectors.

In all the above cases, however, we assumed that the substitution of these competitive imports will be done by an investment using the same techniques which have already been utilized. Consequently we anticipated no changes in the coefficients of the industries which are increasing their production to substitute for imports except by the portion of the increase of the delivery from local production from the sector itself. But this is not always the case as the substitution of a certain import may be accompanied also by the introduction of new technology. As we have not made it a condition, when defining the competitive imports, that it should be produced by the same technology which is utilized in the production of the domestic commodity, we therefore cannot make sure that the substitution of such commodity will not entail the introduction of an entirely new technology. In fact what happens in a developing economy is that there is a strong leaning towards the introduction of the latest techniques which are available in the more developed economies. If this is the case, then substitution of competitive imports will entail certain modifications in the input structure of the particular industry, the magnitude of which depends upon the deviation of the new technique from that which is already being utilized as well as on its magnitude. The new technology may utilize less labor or different types of inputs in different proportions. The new technical coefficients in this case should embody all these changes in a weighted manner.

As we can see from the above discussion, the substitution of competitive imports will entail certain changes in the technical coefficients. We can also see that these changes will depend on the magnitude of the substitution, the distribution of the new production on the purchasing sectors and the introduction of new technology. The frequency of these changes, however, will be closely tied to the rate of industrialization which we assumed will maily take the shape of import substitution. The reader's attention should be attracted to the fact that we are not concerned, at this level of discussion, about the nature of the substitutions, i.e. what type of imports to be substituted and in what proportion as this is a strictly programming problem, the examination of which would take us from the realm of our discussion. All that concerns us here is the assumption that import substitution will take place and if it does how will it affect the technical coefficients. This we have tried to answer, and what we should attempt to answer now is that, given this state of affairs, how can these changes be embodied in the solution so that the table would be effectively used for projecting the future production levels required to meet a final bill of goods.

This could be done in different ways, the first of which is to restrict the coefficients in the interflow matrix to only one type which would embody the inputs from domestic production and from competitive imports. Only non-competitive imports should be excluded and grouped in one row of inputs. These coefficients (i.e. of domestic and competitive imports) are the ones to be inverted instead of inverting only the coefficients of inputs from domestic production, as is normally the case when we separate the inputs from imports.

This means that in solving for the levels of production required to meet a final bill of goods our production targets will be overestimated simply because we allowed the inputs from imports to have indirect effect which they do not actually have. This may be a correct procedure in an economy with insignificant reliance on imports or if we are substituting all competitive imports by domestic production. However if this is not the case, which generally is true, then the following should be done to correct this overestimation. We can consider the imports which are not going to be substituted as final demand and then by utilizing the same inverse of the matrix we can calculate the direct and indirect requirements necessary for the production of these goods. This should be deducted later from the levels of gross production which we get from our solution, and the result will present new levels of production which should be achieved after taking into consideration the magnitude of imports for which substitution will be made.

This is more or less a satisfactory method if the substitution of competitive imports does not entail the introduction of a new technology or a different distribution of the new production. However another method or solution may be offered to deal with those last points. Provided that the magnitude of substitution, the distribution of new production along the purchasing sectors and the new technology, if any, are known, we can then incorporate their effects on the technical coefficients from domestic production and consider that these will be the coefficients from domestic production and consider that these will be the coefficients in the year for which the production level will be calculated. Then we can proceed as usual by ulitizing the inverse of the new coefficients of domestic production which incorporat all the changes necessitated by the substitution of domestic production for part of the imports. In this case we will not have to have another set of calculations as in the first case simply because inputs from imports were not included in the inverted matrix. Imports could later be calculated by simply multiplying the required production from every sector by the import coefficient. Having an import matrix, a greater breakdown of the required imports could be achieved.

2. SUBSTITUTION OF NON-COMPETITIVE IMPORTS

For our purpose a non-competitive import is an import which has no similar from domestic production. This may be due to the fact that it is impossible, except with too high cost, to produce it or that the state of development did not so far allow for its production. It may be concluded therefore that the number of such imports corresponds inversely with the state of economic development in the country and that the faster the rate of development the faster the rate at which non-competitive imports become competitive in the sense that each commodity will be produced domestically. If we accept the definition of a non-competitive import just given then we consequently accept the fact that the substitution of such imports would mean the installation of an entirely new activity in the economy and with it a new

technology would be introduced. Motor cars were up to recently a non-competitive import in Egypt, but as new motor factories are under construction such import will be a competitive one. Now let us examine how this substitution will affect the technical coefficients in a country like Egypt.

As we mentioned, the substitution of non-competitive imports would mean the installation of new industries which did not exist before. This means that the inputs from such commodities which had to be imported will now be produced domestically. As is the case with competitive imports, a shift in the input coefficients from import to the coefficients from to the coefficients of the inputs from domestic production will occur. But unlike the competitive imports, the non-competitive imports could not be fit into the old matrix as that industry did not exist before. This fact, therefore, necessitates the insertion of a new row to show the deliveries from the new industry. Similarly that new industry will have to be represented by a column which shows its purchases from the other sectors of the economy as the introduction of such industry will entail automatically a claim on the domestic resources as well as imports.

In short we can say that the substitution of non-competitive imports will not only change slightly the technical coefficients as it is the case with the competitive imports but will also entail the insertion of new rows and columns in the interflow matrix. In such a case it would be necessary to introduce, as explained before, the necessary changes on the technical coefficients before utilizing the table for projecting the levels of production for a future year during which these changes will be anticipated. The important point to emphasize here is that the substitution of non-competitive imports will affect the technical coefficients and the frequency of the changes in these coefficients will be tied with the rate of substitution which in itself is tied with the rate of development.

B. THE STABILITY OF RELATIVE PRICES

The second factor which affects the technical coefficients is the change in relative prices. It is the assumption that prices move in the same general direction with a minimum of relative changes. This being the case it is assumed that changes in the technical coefficients on the account of changes in relative prices would be negligible. This assumption was made to fit the case of a developed economy with minimum reliance on foreign trade to satisfy the need of its productive sectors. It is also generally stated that prices are nothing but a veil which covers the real coefficients which are set originally in physical units and they are only restored to for the sake of conventience. It is also argued that changes in relative prices, once they are known, could always be incorporated in the solution.

These arguments are only partly satisfactory when if comes to the case of a developing economy. The mere fact that we express the coefficients in value terms makes us concerned about the changes in prices in general and in these economies in particular. It is difficult in a case of an economy where movements in prices are accompanied with changes in technology to separate the effects of each on the technical coefficients. Also if these changes occur freauently, and that is what we like to examine, costly operations like to examine, costly operations

like inverting a

sizeable matrix would be a less fruitful investment and in this case a close observation of these changes should be kept, if the utilization of the input-output table is to be of value and therefore other methods of solutions should be restored too.

Now let us examine the frequency of these changes in the light of our previous statement, that the Egyptian economy relies to a sizable degree on imports and that import substitution will play a dominent role in economic development in the coming years. If we accept the first part of our statement then the technical coefficients, expressed as they are in value terms, will not only depend on the stability of relative prices of the domestically produced

commodities but also on the stability of the prices of imports. These prices, as it is known, are subject to world supply and demand and also other exogenous factors, and therefore their stability depends a great deal on movements in these factors. Not only that but a country like Egypt with limited supply of hard curriencies may decide or be obligated to change the suppliers of its imports, a step which often entails drastic revision of the previous cost structure of the productive sectors. The frequency of such moves could not be predicted a long time ahead as they are subject to economic as well as political considerations. The point to emphasize here, however, is that these changes do happen and that their frequency is very likely to be higher than it is in other developed countries with less reliance on imports and with stable foreign markets.

If we consider the second part of our statement then relative prices of inputs most likely will be subject to change, the frequency and magnitude of which depends on the role of import substitution. It is not always the case that the inputs from the new domestic production will have the same prices as those of the old inputs from imports. In fact the contrary is more frequently the case. The point to emphasize here, however, is that the frequency of these changes in a developing economy is more than it is in an already developed economy with less reliance on imports and with minor amounts of substitution among the inputs.

From the above we can see that the likehood of changes in relative prices is greater in a developing economy than in a developed one. In dealing with this problem the technical coefficients will not only have to be adjusted to take into consideration the changes in technology, which we have already discussed, but should also take into consideration the anticipated changes in relative prices which are likely to happen more frequently than assumed. The discussion of this point is very difficult indeed, neverthless it is of paramount importance if the most realistic picture is to be drawn from the utilization of its input-output table.

C. PRODUCTION OF SCALE

The third factor which affects the technical coefficients is that the increase in the scale of production may bring about a change in the input coefficients. The general assumption in the input-output model is that there is a linear relation between the inputs and the outputs of a sector. This, however, is not always the case as it may happen that by increasing the level of production, more of particular inputs and outputs than indicated by their average coefficients will be needed. In this case different coefficients, which may be called marginal coefficients, sould be utilized.

The occurence of such phenomenon in a developed economy depends of course on the type of industry and its production function. Until better information in this direction is collected, one can always be contented with the assumption of proportionality between the inputs andthe level of production. However, what we like to emphasize here is that the occurence of that phenomenon may be frequent in a country like Egypt. An argument in support of this view may run as follows. Industries may be set below their optimum size for limitation of markets or other reasons. The expansion of these industries at a later stage may bring about a change in the input coefficients of the type we have mentioned. Similarly the substitution of competitive imports by local products would entail the expansion of the industries concerned which may have already been operating at a size below the optimum.

The way to deal with this problem is not in itself very difficult, but only adds to the complication of the solution, as well as it requires additional information about the marginal or incremental coefficients. These latter take more effort to determine than is the case with the average coefficients and we may have to rely to a greater extent on technical experts and to a lesser extent on historical data. Having determined these coefficients, the iterative method of solution wouldbe the best to utilize. The procedure would be to examine the level of production after each round and then utilize for the different levels of production the appropriate marginal coefficient.

To sum up, we developed the argument that the lack of interdependency, which is often quoted as an objection to the construction of input-output tables in underdeveloped countries, is not valid as far as the Egyptian economy is concerned. On the other hand, we questioned the stability of the technical coefficients and came to the conclusion that owing to the present structure of the Egyptian economy and the future development of that economy, the frequency of changes in the technical coefficients will be more than it is in a developed economy like that of the United States. We attempted to show how in a country with a minor industrial sector and an over populated agricultural sector a faster rate of growth would require a faster rate of development of the industrial sector. This being the case we attempted to show that industrialization for some years

will take the shape of substituting domestic production for imports. The wisdom of this policy was not examined but we showed that it is a necessity since the construction of a new industry would mean an exodus of a previously imported commodity. In the light of this statement we attempted to examine the stability of the technical coefficients of the Egyptian table. To do that we picked on the most important factors which generally cause changes in these coefficients andwe foundthat the futute pattern of development and its magnitude will affect the technical coefficients in that it will introduce drastic changes in the technical structure of the productive sectors. Relative prices were also shown as likely to be affected by the anticipated pattern of development more frequently than is the case in an already developed economy. We also came to the conclustion that the effects of production of scale may occur more frequently than anticipated in case of a developed economy. Although this is the case, the usefulness of the input-output table for long term projections is not by any means questioned. We only indicated the fact that certain considerations should always be made when the table is utilized for such projections. Adjustments of the technical coefficients to a future situation should always be considered seriously as an effective way to deal with these problems. However it should be mentioned that in this case we are always putting the cart before the horse in the sense that we are deciding before hand the shape of our future technical coefficients. We are assuming certain variables as given. For example, the adjustment of these coefficients, according to our argument, will necessitate complete information about the size of imports to be substituted for and also the distribution of the new domestic production as well as a good knowledge as to whether of not this operation will entail the introduction of new technology. These, however, are questions which are generally dealt with by programming methods and we have not concerned ourselves with its examination.

PART II
THE UTILIZATION OF THE INPUT-OUTPUT TABLE FOR NATIONAL BUDGETING IN EGYPT

In reviewing the utilization of the input-output tables for the Egyptian Economy it is safe to state that they have been heavily utilized, relatively of course to the short time during which they were available. First of all, one should mention the fact that the 1954 table, after certain re-adjustments[1], was utilized by Professor Ragner Frisch in his work on the "Channel Model" which he carried out during his several stays with the National Planning Committee. The tables were also utilized on several occasions and served a variety of purposes which varied from the study of the effects of the Agricultural investment program to the preparation of a national budget for the Egyptian Economy. In this paper we will be dealing only with the work which was carriedout for the construction of a national budget for Egypt for the year 1960-61. Preparing such a budget, we took as our starting point the projection of the changes in final demand between the year 1959-60 and 1960-61. We also had to do a great deal of computation to derive the necessary coefficients which we will discuss below.

A. DIRECT AND INDIRECT REQUIREMENTS OF IMPORTS PER UNIT OF FINAL DEMAND FROM EACH OF THE PRODUCTIVE SECTORS.[2]

The inverse of the matrix of technical coefficients as it is known contains elements which give the direct and indirect requirements from a sector per one unit of final demand. If we indicate these elements by r then the coefficients rij would refer to the direct and indirect requirements from sector i per unit of final demand from sector j. As we have mentioned before, entries from domestic production were included separately in the interflow matrix of the Egyptian Table. Therefore the coefficients of the inverse will show only the direct and indirect requirements from domestic production per unit of final demand. In this case the import requirements to satisfy a final bill of goods could be obtained by multiplying the production levels derived from the solution by the appropriate coefficients of imports which are included in every column and could be referred to as M_j. These coefficients indicate the total requirements of every sector from imports per unit of its

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1 These adjustments entailed the aggregation of the original table in only 31 productive sectors. The final demand sectors were on the other hand disaggregated in much larger number of sectors. As for the primary inputs they included non-competitive import, non-distributed ownership income and residual inputs.

2 These calculations were carried out by the Input-Output Unit and the Balances Unit of the National Planning Committee, Cairo. The planning of these calculations however was the joint effort of Dr. Dief, Dr. Shazly, Mr. Tore Thonstad of Oslo University and myself. It should alsobe mentioned that after these calculations were executed, I had to introduce some minor change on the 1954 table concerning the production of the sector "financial services". However this should not effect the results in any significant manner.

production. A further breakdown of these imports could also achieved as we have shown the entries from imports separately in every cell of the interflow matrix. All what we do therefore is to multiply the gross production of the sector by the coefficients of its imputs from imports which we could refer to as m_{ij} . The coefficients m_{ij} indicate the inputs from imports which has the same industrial origin as sector i per unit of production from sector j.

Having these import coefficients forming a matrix of their own which will be referred to as the import matrix M, we could calculate another set of coefficients which show the import requirements in terms of final demand rather than gross production. This means that the new coefficients should indicate the direct and indirect requirements from a particular import per unit of final demand. This is particularly important to know if we desire to examine for instance the effects of different investments on imports especially in a country with limited supply of foreign currencies and where the investment criterion gives a special weight to that problem.

To be able to derive such coefficients we have to multiply the import matrix by the inverse of the interflow matrix from domestic production.[1] We can denote the new matrix by $\overset{*}{M}$ and the elements in it by $\overset{*}{m}$. Then $\overset{*}{m}_{ij}$ is the direct and indirect requirements of imports which is of the same industrial orgin as sector i per unit of final demand from sector j.

Having the $\overset{*}{M}$ matrix and following the same method of solution as is the case when utilizing the inverse of the matrix of technical coefficients from domestic production, we can calculate the direct and indirect import requirements from every sector which is needed to satisfy a final bill of goods. In this case we can calculate the import requirements for any number of different investments or any different sets of final demand. But to derive at such coefficients from a 33 X 33 table would require 33^3 Multiplications. [2] However once we have these coefficients they could always be used for alternative solutions.

Unfortunately these direct and indirect import coefficients were not calculated but instead we calculated other coefficients which show the total imports per unit of final demand. In other words the coefficients we calculated are the type which give us the total requirements of imports rather than a breakdown of these imports into their industrial origin as the $\overset{*}{m}_{ij}$'s would have given us. These coefficients were derived as follows:

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1 The elements of the new matrix will look like this:

$$\begin{bmatrix} m_{11} & m_{12} & m_{13} \\ m_{21} & m_{22} & m_{23} \\ m_{31} & m_{32} & m_{33} \end{bmatrix} \begin{bmatrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{bmatrix} = \begin{bmatrix} (m_{11}r_{11}+m_{12}r_{21}+m_{13}r_{31}) & (m_{11}r_{12}+m_{12}r_{22}+m_{13}r_{32}) & (m_{11}r_{13}+m_{12}r_{23}+m_{13}r_{33}) \\ (m_{21}r_{11}+m_{22}r_{21}+m_{23}r_{31}) & (m_{21}r_{12}+m_{22}r_{22}+m_{23}r_{32}) & (m_{21}r_{13}+m_{22}r_{23}+m_{23}r_{33}) \\ (m_{31}r_{11}+m_{32}r_{21}+m_{33}r_{31}) & (m_{31}r_{12}+m_{32}r_{22}+m_{33}r_{32}) & (m_{31}r_{13}+m_{32}r_{23}+m_{33}r_{33}) \end{bmatrix}$$

2 The number of multiplications will be less than that as there are cells which have no entries.

As we know, r_{ij} gives us the direct and indirect requirement for sector i per unit of final demand from sector j. Also M_j gives us the total imports to sector j per unit of gross production from sector j. Then if we multiply the row of the total import coefficients in every sector by the inverse of the matrix of the technical coefficients from domestic production, then we get a row matrix which we can call M^{**} and its elements m^{**}_j [1]. In this case m^{**}_j indicates the direct and indirect requirements from inports per unit of final demand from sector j. If we subtract each direct input coefficient from the direct and indirect import coefficient we get another coefficient which shows only the indirect requirements of imports per unit of final demand . The results of these calculations for 1954 are shown in Table 1. The table shows clearly that inputs from imports although represent sizable amounts in every sector yet they are of significant importance to certain ones. The table shows that the direct requirements from imports is particularly high per unit of production from the electricity sector, basic metallurtical, metal products and other sectors of similar nature. The coefficients of imports on the other hand are lower in the lighter type of industry and also in the agricultural sector. The table shows also an interesting fact with which those who are working in the input-output field are familiar. It shows that the indirect requirements from imports from a sizable part of the total direct and indirect requirements. This is very clearly illustrated particularly in the services sectors where the indirect requirements represent a very high percentage of the total requirements from imports.

B. DIRECT AND INDIRECT IMPACT ON VALUE ADDED AND HOUSEHOLD INCOME PER UNIT OF FINAL DEMAND FROM EACH OF THE PRODUCTIVE SECTORS

For our purpose it was found essential to calculate the direct and indirect effects on value added and household income[2] per unit of final demand from each of the productive sectors. To do that similar calculations to those for imports were done and the results were reproduced in Tables 2 and 3. The first of these tables shows the value added per unit of production from each of the production sectors. It shows also the indirect, as well as the direct and indirect effects on value added per unit of final demand from the different productive sectors. Table 3 shows similar coefficients but only for household income. The two tables however illustrate clearly how important it is to calculate the indirect effects as in both cases they form a sizable part of the total effects.

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[1] The elements of the new matrix will look as follows:

$$\left|M_1 M_2 M_3\right| \left|\begin{matrix} r_{11} & r_{12} & r_{13} \\ r_{21} & r_{22} & r_{23} \\ r_{31} & r_{32} & r_{33} \end{matrix}\right| = \left|\begin{matrix} (M_1 r_{11} + M_2 r_{21} + M_3 r_{31}) & (M_1 r_{12} + M_2 r_{22} + M_3 r_{32}) \\ & (M_1 r_{13} + M_2 r_{23} + M_3 r_{33}) \end{matrix}\right|$$

[2] Household income includes wages, salaries and distributed profits only.

C. DIRECT AND INDIRECT REQUIREMENTS OF IMPORTS FOR DIFERENT SETS OF FINAL DEMAND.

So far we have discussed the effects on imports per unit of final delivery from each of the productive sectors. We have derived coefficients which could give us the direct import requirement per unit of production from the different sectors. We also computed coefficients which give us the direct and indirect requirements from inports per unit of final demand from those sectors. The use of these coefficients is to tell us the requirements from imports to satisfy a final bill of goods. As it is known a detailed breakdown of the final demand into different sectors is very essential if we are to arrive at an accurate picture of the import requirements. This is so, simply because the input structure differs from one type of final demand to the other. The input structure of the household consumption column is very different from that of exports and both are certainly different from investment. Not only that but also the input structure of one type of investment may be drastically different from the other. However, the usefulness of the coefficients which we have calculated is illustrated by the fact that whatever the input structure of a certain final demand column may be we can always, once this structure is known, calculate its impact on imports. This, as we mentioned before, is important particularly if we desire to examine the impact on imports by a variety of final bills of goods which may represent a variety of investments.

To illustrate this point we have examined the direct and indirect requirements of imports for four different types of final demands which are contained in the Egyptian Input-Output table for 1959[1]. The entries are in 1954 prices and the coefficients utilized were those which have just been discussed and which are derived from the 1954 table. The results of these calculations are reproduced in Table 4 in the appendix, which shows clearly that not only the direct import requirements differ from one final bill of goods to the other but also the indirect impact of these different final demands differ rather dramatically. The table shows that the total (direct and indirect) import content in investment is about 47 percent whereas this is only 15 percent in household consumption, 12 percent in government consumption and only 7 percent in exports.

The idea behind those calculations is rather a simple one and could be explained as follows: To facilitate our task, we will assume having one column of final demand, which we will call Y. This could later, as we will see, be broken down to different investment columns which could be referred to as I_1, I_2 and so on.

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[1] As mentioned in the text, an input-output table for the Egyptian Economy was prepared for the year 1959.

Also let us call the deliveries from the productive sectors to final demand as $Y_i \ (i = 1, 2 \cdots n)$. Let us also denote the deliveries from imports directly to final demand by M_y and the value added created in final demand by V_y. In this case

$$Y = \sum_{i=1}^{n} Y_i + M_y + V_y \qquad (1)$$

Now in order to derive the direct and indirect imports required by the final bill of goods Y which we will call M^*_y.

$$M^*_y = m^{**}_1 Y_1 + m^{**}_2 Y_2 + \cdots + m^{**}_n Y_n + M_y$$

or

$$M^*_y = \sum_{i=j=1}^{n} m^{**}_j Y_i + M_y \qquad (2)$$

Now if we desire to know the import contents to that particular final demand column all that we do is to divide

$$\frac{\sum_{i=j=1}^{n} m^{**}_j Y_i + M_y}{Y}$$

This gives us the import contents in a particular final demand and the figures included in the third column of Table 4 are derived in this manner. This type of coefficient is particularly helpful for planning purposes particularly in countries with heavy reliance on imports. As for the other coefficients in Table 4, they could be derived simply be dividing each of the direct imports and the indirect ones by the total final demand. The first is included in column I and the second in column 2 and could be written as follows :

$\frac{My}{Y}$ i e. the direct import content (4)

$\frac{\sum_{i=j=1}^{n} m^{**}_{j} Y_i}{}$ i.e. the indirect import content (5)

In the case of Egypt, however, we did similar calculations for 4 different types of investments and we attempted also a finer breakdown of exports into four categories. Besides these 29 columns of final demand we had also two more, one representing household consumption and the second representing government consumption. The first thing we did, of course, was to project these different investments, consumption and exports. The projection was made for the fiscal year 1960-61 and was carried out by the appropriate units of the National Planning Committee. It is important, however, to mention that the projection of investments was in conformity with those contained in the first version of the Five Year Plan. The second step was to break down these magnitudes of final demand into their input components or deliveries from the different productive sectors. These are shown in Table . This table shows the deliveries from the productive sectors to only one column of investment, but the deliveries to the different investment channels are given in Table 6. Having these deliveries to the different investments and the other types of final demand and applying the same method which was used to build Table 4, we were able to calculate the direct and indirect requirements of imports. Those are shown in Table as percentages of the different investments, exports and consumption. The table shows clearly that the imports are lowest for exports and both household and government consumption. As a contrast the import contents in investments is high. Meanwhile one could easily observe the differences between one investment and the other and that the import contents are lowest in the investment channels housing, construction and others which entail a great deal of construction like horizontal expansion in agriculture, irrigation and drainage. The High Dam is of course an exception. However in reading these results one should be aware of a very important factor which we did not take into consideration which should be given special attention if better results are to be achieved. The projection of investment entailed those which would be executed in the fiscal year 1960-61 and in carrying out our calculations we did not take into account the stage at which the investment would be during that year. The projected sum for a particular channel of investment may represent only a prelimiary stage of study and implimentations of the preliminary plans and in each case the import content projected may not be a representative one for that type of investment. It may also happen that other investments were at the latest stage, that is the stage of installation of machinery, a fact which means a heavy import requirement and so on.

D. THE IMPACT OF DIFFERENT CATTEGORIES OF FINAL DEMAND ON VALUE ADDED AND HOUSEHOLD INCOME

As is the case with imports we did similar calculations for value added and household income. Having the coefficients of direct and indirect value added and household income per unit of final demand from sector j which we will denote by and V^*j and h^*j respectively and which are contained in Tables 2 and 3 we can calculate the effect of the different 31 columns of final demands on value added. In this case the total value added created by a particular bill of final goods would be

$$V_1^* Y_1 + V_2^* Y_2 + \cdots + V_n^* Y_n + V_y$$

or

$$\sum_{i=j=1}^{n} V_j^* Y_i + V_y \qquad (6)$$

Similarly if we divide this equation by Y then we get the direct and indirect import requirements per unit of that type of final demand.

$$\frac{\sum_{i=j=1}^{n} V_j^* Y_i + V_y}{Y} \qquad (7)$$

Also $\dfrac{V_y}{Y}$ will give the direct value added per unit of that final demand. (8)

and $\dfrac{\sum_{i=j=1}^{n} V_j^* Y_i}{Y}$ will give the indirect requirements of imports per unit of that final demand. (9)

In the same way if we denote h^*j to the direct and indirect household income created by a unit of final demand from sector j and hy as the direct household income created by the final demand. Then the total direct and indirect household income created by a certain type of final demand would be

$$h_1^* y_1 + h_2^* y_2 + \cdots\cdots + h_n^* y_n + hy$$

or: $\sum_{i=j=1}^{n} h^*_j y_i + hy$ (10)

Similarly we can derive the direct, indirect and total of direct and indirect household income per unit of a particular final demand.

The direct and indirect householdincome per unit of a particular final demand will be

$$\frac{\sum_{i=j=1}^{n} h^*_j y_i + hy}{y} \qquad (11)$$

The indirect household income per unit of that particular final demand would be

$$\frac{\sum_{i=j=1}^{n} h^*_j y_i}{y} \qquad (12)$$

and the direct household income per unit of that demand would be

$$\frac{hy}{y} \qquad (13)$$

Having the deliveries from the productive sectors from the 31 different final demand columns as projected for 1960-61 and having the v^*_j and h^*_j we were able to calculate the impact, direct and indirect, of these different final demands on value added and household income. The results are presented in Table 8. The table shows that only two final demand sectors contained direct inputs from value added. These are household consumption and government consumption. In the case of the first sector, the direct value added represents domestic services and in the case of the second sector, i.e. government consumption, it represents wages and salaries paid by the government. The table also shows that total value added created by final consumption and exports is by far higher than that created by the investment channels. In the meantime the total of direct and indirect value added created by the individual investment channels vary from one type of investment to the other reaching the highest figure in the case of horizontal investment in agriculture and the lowest figure in the investment of the High Dam. The figure for the High Dam, however, should not be taken without reservation as the projected investment in the High Dam for the year 1960-61 is but a fraction of the total investment and therefore the figure presented represents only the impact of that portion of investment on value added.

E. PRELIMINARY NATIONAL BUDGET FOR THE EGYPTIAN ECONOMY FOR THE YEAR 1960-61

Having computed these sets of coefficients we were in a position to construct a rough national budget for the year 1960-61. As we mentioned before, changes in final demand between the years 1959-60 and 1960-61 were taken as our starting point. These changes were, as far as possible, in conformity with the figures included in the preliminary drafts of the Plan Frame. Some adjustments of these figures, however, were essential in order to carry out our input-output calculations. For the eight different types of final demand included in Table 9 total requirements of imports to meet the change in each of the final demands was calculated by means of the coefficients in Table 7. Also by the means of the coefficients in Table 8 value added and household income created as a result of these changes in final demand were also calculated.

Table 9 shows that a change in final demand of 181 million Egyptian pounds would require total inputs of 84 million pounds. On the other hand the value added created would be 97 million pounds. The depressing feature about these results, however, is the fact that whereas the preliminary estimates of the increase in private consumption is 42.4 million Egyptian pounds we found that household income would increase by 76.5 millions. Unless a drastic increase in taxes is anticipated, these results seem very inconsistent. The inconsistency of the figures may be due, besides other reasons, to the underestimation of the import increases for consumption purposes. One reason for that was the assumption that agricultural production is determined by demand whereas it is in fact limited by capacity. However it must be mentioned that better results could have been achieved had we reviewed our preliminary assumptions about private consumption as it should be the case when carrying out such calculations.

m/z.

Table 1.

Direct and Indirect Requirements of Imports Per Unit of Final Demand from each of the Productive Sectores.

Sectors	Direct imports per unit of production	Indirect import requirements per unit of final demand	Direct and indirect requirements per unit of final demand
Agriculture	0.041	0.018	0.059
Mining and quarrying	0.068	0.029	0.097
Electricity	0.158	0.043	0.201
Basic metallurgical industry	0.225	0.062	0.287
Metal products	0.221	0.071	0.292
Cement industry	0.131	0.063	0.194
Petroleum refining	0.132	0.051	0.183
Manufacture & repair of machiney	0.166	0.097	0.263
Basic chemicals	0.076	0.048	0.124
Other basic industies	0.146	0.047	0.193
Construction	0.143	0.067	0.210
Slaughtering & meat production	0.026	0.050	0.076
Dairy products	0.028	0.054	0.082
Grinding & processing of grain	0.027	0.057	0.084
Bread & bakery products	0.064	0.065	0.129
Sugar industry	0.032	0.034	0.066
Oils & fats	0.052	0.019	0.071
Other food products	0.080	0.063	0.143
Spinning & weaving	0.055	0.072	0.127
Ginning & pressing of cotton	0.006	0.060	0.066
Manufactue of ready made clothes	0.049	0.095	0.144
Paper & paper products	0.236	0.090	0.326
Tobacco & cigarettes	0.059	0.078	0.137
Wood & furniture	0.186	0.064	0.250
Fertilizers	0.075	0.026	0.101
Other industries	0.162	0.068	0.230
Transportation & Communication	0.085	0.027	0.112
Suez Canal	0.015	0.007	0.022
Education	0.034	0.027	0.061
Medical services	0.143	0.052	0.195
Trade & financial services	0.017	0.020	0.037
Banking & insurance	0.012	0.026	0.038
Other services	0.006	0.106	0.112

Direct and Indirect Value Added Created Per Unit
of Final Demand from each of the Productive Sectors.

Sectors	Direct imports per unit of production	Indirect import requirements per unit of final demand	Direct and indirect requirements per unit of final demand
Agriculture	0.431	0.510	0.941
Mining & quarrying	0.659	0.244	0.903
Electricity	0.524	0.275	0.799
Basic metallurgical	0.434	0.279	0.713
Metal products	0.416	0.292	0.708
Cement industry	0.419	0.387	0.806
Petroleum refining	0.318	0.499	0.817
Manufacture & repair of machinery	0.337	0.400	0.737
Basic chemicals	0.432	0.444	0.876
Other basic industries	0.371	0.435	0.806
Construction	0.446	0.344	0.790
Slaughtering & meat production	0.105	0.819	0.924
Dairy products	0.261	0.657	0.918
Grinding & processing grains	0.052	0.864	0.916
Bread & bakery products	0.166	0.705	0.871
Sugar industry	0.451	0.483	0.934
Oils & fats	0.759	0.170	0.929
Other food products	0.078	0.779	0.857
Spinning & weaving	0.164	0.709	0.873
Ginning & pressing of cotton	0.025	0.909	0.934
Manufacturing of ready made clothes	0.271	0.583	0.854
Paper & paper products	0.177	0.407	0.674
Tobacco & cigarettes	0.119	0.744	0.863
Wood & furniture	0.464	0.284	0.748
Fertilizers	0.630	0.269	0.899
Other industries	0.393	0.377	0.770
Transportation & Communication	0.704	0.184	0.888
Suez Canal	0.879	0.099	0.978
Education	0.696	0.243	0.939
Medical services	0.395	0.400	0.795
Trade & financial services	0.759	0.212	0.971
Banking & insurance	0.727	0.235	0.962
Other services	0.947	0.041	0.988

Table 3.

Direct and Indirect Household Income[x] Per Unit of Final Demand from each of the Productive Sectors.

Sectors	Household income per unit of production	Indirect household per unit of final demand	Direct and indirect household income per unit of final demand
Agriculture	0.406	0.402	0.808
Mining & quarrying	0.236	0.197	0.433
Electricity	0.214	0.143	0.357
Basic metallurgical	0.301	0.174	0.475
Metal products	0.360	0.194	0.554
Cement industry	0.256	0.222	0.478
Petroleum refining	0.127	0.288	0.415
Manufacture & repair of machinery	0.304	0.293	0.597
Basic chemicals	0.297	0.291	0.588
Other basic industries	0.254	0.279	0.533
Construction	0.374	0.217	0.591
Slaughtering & meat production	0.109	0.674	0.783
Dairy products	0.265	0.550	0.815
Grinding & processing of grains	0.051	0.726	0.777
Bread & bakery products	0.166	0.576	0.742
Sugar industry	0.060	0.349	0.409
Oils & fats	0.563	0.119	0.682
Other food products	0.075	0.523	0.598
Spinning & weaving	0.164	0.514	0.678
Ginning & processing of cotton	0.018	0.771	0.789
Manufacture of ready made clothes	0.215	0.428	0.643
Paper & paper products	0.152	0.381	0.533
Tobacco & cigarettes	0.060	0.379	0.439
Wood & furniture	0.455	0.187	0.642
Fertilizers	0.499	0.168	0.667
Other industries	0.361	0.262	0.623
Transportation & Communication	0.694	0.113	0.807
Suez Canal	0.503	0.078	0.581
Education	0.675	0.186	0.861
Medical services	0.316	0.290	0.606
Trade & financial services	0.288	0.164	0.452
Banking & insurance	0.417	0.170	0.587
Other services	0.790	0.032	0.822

x Wages, salaries and distributed profits.

Table 4.

Direct and Indirect Imports Per Unit
of Four Different Categories of Final Demand.

Final demand categories	Direct imports to final demand	Indirect imports required by a unit of final demand	Direct and indirect imports required per unit of final demand
Investment in fixed capital	0.327	0.138	0.465
Household consumption	0.053	0.094	0.147
Government consumption	0.075	0.040	0.115
Exports	0.000	0.074	0.074

Table 5.

Projected Deliveries to Final Demand for the Fiscal Year 1960/61.

Deliveries from	House-hold con-sumption	Govern-ment con-sumption	Exports	Total investment in fixed capital	Total final demand (ex-cluding changes in inventories)
Agriculture	136.3	4.0	6.1	1.0	147.4
Mining & quarrying	-	0.1	6.4	-	6.5
Electricity	4.3	0.6	-	-	4.9
Basic metallurgical	-	0.1	-	-	0.1
Metal products	0.8	3.3	0.7	-	4.8
Cement industry	-	-	2.8	-	2.8
Petroleum refining	7.9	3.1	1.9	-	12.9
Manufacture and repair of machinery	2.6	2.3	-	26.3	31.2
Basic chemical industry	10.2	1.7	-	-	11.9
Other chemical industries	1.6	0.6	-	-	2.2
Construction	-	3.8	-	138.4	142.2
Slaughtering and meat products	69.0	2.1	-	-	71.1
Dairy products	57.9	2.4	-	-	60.3
Grinding and processing of grains	51.4	1.2	4.0	-	56.6
Bread and bakery products	84.8	2.5	-	-	87.3
Sugar industry	22.5	0.3	-	-	22.8
Oils and fats industry	12.0	0.4	-	-	12.4
Other food industry	14.4	1.0	3.3	-	18.7
Spinning and weaving	80.3	4.2	25.4	-	109.9
Ginning and processing of cotton	-	-	103.9	-	103.9
Manufacture of ready made clothes	17.9	3.5	-	-	21.4
Paper and paper products	2.0	1.4	-	-	3.4
Tobacco and cigarettes	40.8	0.2	-	-	41.0
Food and furniture	7.1	-	-	-	7.1
Fertilizers	-	-	-	-	-
Other industries	15.8	0.6	8.7	-	25.1
Transportation and Communication	44.1	3.5	13.0	-	60.6
Suez Canal	-	-	46.5	-	46.5
Education	7.6	-	-	-	7.6
Medical services	13.9	-	-	-	13.9
Trade and financial services	85.1	6.2	21.0	8.3	120.6
Banking and insurance	0.9	-	0.6	-	1.5
Other services	205.2	2.7	3.0	-	210.9

(cont.)

(cont. of Table 5).

Total deliveries from domestic sectors	996.4	51.8	247.3	174.0	1469.5
Imports directly to final demand	56.6	14.2	-	124.0	194.8
Total deliveries	1053.0	66.0	247.3	298.0	1664.3
Value added directly created by final demand	19.0	154.7	-	-	173.7
Sum of final demand	1072.0	220.7	247.3	298.0	1828.0

Table 6.

The Required Deliveries to the Projected Investment for the Year 1960/61

(in million £ E)

Type of investment	Total of investment	Required deliveries from:					
		Construction	Domestic production of machinery and equipment	Agriculture	Trade and financial services	Total deliveries from domestic sectors	Imports directly to investment
Vertical investment in agriculture	12.3	5.6	1.9	0.4	0.6	8.5	3.8
Horizontal " " "	29.7	18.7	3.9	0.6	1.3	24.5	5.2
Irrigation and drainage	25.9	19.9	-	-	-	19.9	6.0
High dam	9.0	1.4	-	-	-	1.4	7.6
Mining and quarrying	3.2	0.5	0.8	-	0.3	1.6	1.6
Electricity	13.5	3.0	2.0	-	0.7	5.7	7.8
Basic metallurgical	6.7	2.0	0.2	-	-	2.2	4.5
Metal products	0.9	0.3	0.1	-	-	0.4	0.5
Petroleum refining	14.8	1.1	3.9	-	1.2	6.2	8.6
Chemical and pharmaceutical	13.1	3.0	1.3	-	0.4	4.7	8.4
Manufacture of machinery	12.5	2.6	2.4	-	0.8	5.8	6.7
Rural industries	1.0	0.3	0.4	-	0.1	0.8	0.2
Food, beverages and tobacco	4.8	2.2	0.9	-	0.3	3.4	1.4
Textiles and clothing	9.8	1.7	1.7	-	0.5	3.9	5.9
Paper products and printing	3.8	1.5	0.5	-	0.1	2.1	1.7
Wood and furniture	0.5	0.1	0.1	-	-	0.2	0.3
Non metallurgical	0.3	0.1	0.1	-	-	0.2	0.1
Other industries	3.0	0.7	-	-	-	0.7	2.3
Vocational training	2.0	0.6	0.5	-	0.2	1.3	0.7
Replacement	3.4	-	-	-	-	-	3.4
Transportation and Communication	56.4	25.1	5.1	-	1.6	31.8	24.6
Suez Canal	14.9	6.8	-	-	-	6.8	8.1
Housing	28.0	22.3	-	-	-	22.3	5.7
Public utilities	14.6	9.3	-	-	-	9.3	5.3
Services	13.9	9.6	0.5	-	0.2	10.3	3.6
Total	298.0	138.4	26.3	1.0	8.3	174.0	124.0

Table 7.

Direct and Indirect Import Requirements as Percentage of Different Categories of Final Demand for Year 1960/61.

	Direct imports	Direct and indirect imports
Household consumption	5	14
Government consumption	6	10
Total exports	-	7
Total investment in fixed capital	42	54
Exports of cotton	-	7
Exports of yarn and cloth	-	13
Suez Canal	-	2
Other exports	-	10
Investments in		
Vertical investment in agriculture	31	45
Horizontal investment in agriculture	18	34
Irrigation and drainage	23	39
High dam	85	88
Mining and quarrying	50	59
Electricity	58	67
Basic metallurgical	67	75
Metal products	56	67
Petroleum refining	58	67
Chemical and pharmaceutical	64	72
Manufacturing of machinery	54	63
Rural industries	20	40
Food, beverages and tobacco	29	44
Textiles and clothing	60	68
Paper and printing	45	57
Wood and furniture	60	80
Non metallurgical industries	33	67
Other industries	77	80
Vocational training	35	50
Replacement	100	100
Transport and Communication	44	55
Suez Canal	54	64
Housing	20	37
Public utilities	36	50
Services	26	42
Total investment in construction	-	21
Total investment in domestically produced machinery and equipment	-	26

Table 8.

Direct and Indirect Value Added and Household Income as Percentages of Different Final Demands for the Year 1960/61.

Type of Fianl Demand	Value added directly created by final demand	Direct & indirect value added created by final demand	Direct household income created by final demand	Direct and indirect household income created by final demand
Household consumption	2	86	2	68
Government consumption	70	90	67	82
Total exports	-	93	-	69
Total investment in fixed capital	-	46	-	34
Exports of cotton	-	93	-	79
Exports of yarn	-	87	-	68
Suez Canal	-	98	-	58
Other exports	-	90	-	61
Investments in				
Vertical investment in agriculture	-	55	-	41
Horizontal investment in agriculture	-	66	-	49
Irrigation and drainage	-	61	-	46
High dam	-	12	-	9
Mining and quarrying	-	41	-	28
Electricity	-	33	-	24
Basic metallurgical industries	-	25	-	19
Metal products	-	33	-	22
Petroleum refining	-	33	-	24
Chemical and pharmaceutical	-	28	-	21
Manufacturing of machinery	-	37	-	26
Rural industries	-	60	-	60
Food, beverages and tobacco	-	56	-	42
Textiles and clothing	-	32	-	22
Paper and printing	-	44	-	32
Wood and furniture	-	20	-	20
Non metallurgical industries	-	33	-	33
Other industries	-	20	-	13

(cont.)

(cont. of Table 8).

Vocational training	-	50	-	35
Replacement	-	-	-	-
Transport and Communication	-	45	-	33
Suez Canal	-	36	-	27
Housing	-	63	-	47
Public utilities	-	50	-	38
Services	-	58	-	44
Total investment in construction	-	79	-	59
Total investment in domestically produced machinery and equipment	-	74	-	60

Table 9.

A Rough National Budget for 1960/61 Giving Changes in Imports, Value Added and Household Income for Given Changes in Final Demand

(in million £ E)

	Changes in total final demand (1)	Changes in imports required (2)	Changes in total value added required (3)	Changes in household income created (4)
Private consumption	42.4	6.1	36.3	28.8
Government consumption	17.2	1.7	15.5	14.1
Exports of cotton	-2.4	-0.2	-2.2	-1.9
Exports of yarn and cloth	8.3	1.1	7.2	5.6
Suez Canal	1.0	-	1.0	0.6
Other exports	6.7	0.7	6.0	4.1
Investment in construction	40.4	0.7	31.9	23.9
Investment in domestically produced machinery etc.	2.1	0.6	1.5	1.3
Imported machinery and equipment	65.1	65.1	-	-
Other investment expenses	-	-	-	-
TOTAL	180.8	183.6	97.2	76.5