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structure and growth

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In considering the implications of economic growth, one important set of questions concerns the future of imports. In particular, it may be asked, firstly, whether there is a tendency for imports to grow at a faster rate than gross national product; and secondly, if this is so, whether constant balance of payment difficulties will be involved.

The answer to the former question at any rate has been answered in the affirmative in both the studies by R.C. Geary [1] and J. McGilvray [2]. Geary envisages a 1% increase in the import ratio - i.e. the ratio of imports to G.N.P. - as accompanying a 1% rise in G.N.P. This relationship has been derived from a cross-section study of 21 countries; but whilst its applicability to Ireland may be suggested, it does not necessarily follow.

McGilvray predicts an increase in the import ratio from 39% in 1960 to 48% in 1965. This has been derived by breaking down imports into four components and by estimating their relationship to industrial production, consumption etc. In particular, it is assumed that imports of raw materials will rise twice as fast as the output of the transportable goods industries; and a similar relationship between growth in consumer goods imports and total consumption is implied in the relevant regression estimate.

Such high values for elasticities of demand for imports are open to doubt. A multiple regression analysis over the years 1953-61, introducing relative prices of imports and home production into the equations, suggests a percentage increase in the demand for imported raw materials of about 1.5 times the percentage increase in industrial production, and a percentage increase in imported consumer goods below that of total

consumption; part of the observed rise in real imports of consumption goods may be ascribed to a price effect.

In order to throw some further light on this problem, as well as other related ones, the Irish input-output table for 1956, made available by the Central Statistics Office, has been subjected to a preliminary analysis. To permit computation on a desk machine, the industries have been consolidated into five sectors. This, of course, implies a great deal of simplification and approximation; but at the same time, it is hoped that the most important contrasts are highlighted.

With the aid of an electronic computer, it may be possible to do a full analysis later on.

The five sectors distinguished may be described as follows:

1. Agriculture
2. Food, drink and tobacco
3. Miscellaneous transportable goods
4. Construction and public utilities
5. Services.

Apart from the fact that sector 1 includes forestry and fishing, sector 3 mining and quarrying, the terms are self-explanatory. The figures for intermediate and final output of sector 3 have been adjusted to allow for sales by final buyers:

The distinction between the two groups of transportable goods industries is considered important on account of the different degree of linkage with agriculture. From this point of view, it might appear preferable not to include the tobacco industry with the food and drink industries. This inclusion is, however, a well established practice and may be justified on other grounds.

In the classification of final demand, three categories have been distinguished. For this purpose, household and government consumption have been combined into "Consumption", government and other capital formation

as well as stock changes into "Investment", and "Exports" form the third category. In consequence of this treatment of stock changes, small negative figures may appear among the investment demand and requirements for a few sectors, but this is of no practical importance.

For the purpose of the present analysis, it has been found convenient to ascribe all indirect taxes and subsidies to consumption; this is not strictly correct but it is suggested that this procedure is preferable to assuming the same taxation content for consumption and exports. This means that net indirect taxes are deducted from gross and net output of each sector for the purpose of computations and are added back to gross national product and consumption later on.

Furthermore, competitive imports have been treated in the same way as non-competitive imports, i.e. as an import content of the consuming industry. The input-output data permit this, though less accuracy may be expected from the data as used here than from data showing domestic output and imports combined.

The input-output table as given shows some direct national product and taxation contents of final demand, some of them negative. With the exception of the G.N.P. content of exports, representing invisible exports, these adjustments have been disregarded.

Table 1 shows the figures obtained for the main macroeconomic entities here, as well as the corresponding totals in "National Income and Expenditure". Although there is broad agreement, some discrepancies remain; these are not important and do not affect the analysis which is based on comparisons rather than totals.

Table 1. Components of final demand,  
Ireland 1956.

	Input-output analysis £ Mill.	National income and expenditure £ Mill.
Consumption	468.0	493.7
Investment	87.7	81.6
Exports	195.4	194.5
Total final demand	751.1	769.8
less: Imports	-193.3	-208.9
Gross National product	557.8	560.9

The distribution of final demand and its components over the products of the various sectors is shown in Table 2.

Table 2. Final demand for products of  
each industrial group

Industry group	Consumption £ Mill.	Investment £ Mill.	Exports £ Mill.	Total final demand £ Mill.
Agriculture	68.6	-.7	49.3	117.2
Food, drink and tobacco	115.3	-.1	38.0	133.2
Misc. trans- portable goods	74.6	19.7	28.9	123.2
Construction & pub. utilities	23.7	55.4	---	79.1
Services	185.8	13.4	79.2	278.4
	468.0	87.7	195.4	751.1

The first row of figures show the value of agricultural products sold as such, the second row the value of processed foods, drink and tobacco, and similarly for the third and fourth row. Valuation

is at producers' prices, which means that transport costs and trade margins form part of the output of the service trades, together with professional services, public administration etc. Exports of goods produced by the first three industry groups include tourist expenditure as well as merchandise exports. Most invisible exports are, however, included into the category of "Services". For the reasons outlined, the export figures do not tally with the classification adopted in the trade statistics.

By ordinary methods of input-output analysis - that is to say, by inversion of the structural coefficients matrix - it is possible to derive home production levels for the various industry groups, as well as import levels required for each of the final demand components. Using published labour force data and assuming the labour force of food and non-food industries to be proportionate to Census of Production employment, labour force requirements may also be obtained. The totals, and some ratios derived from them, are shown in table 3.

Table 3. Requirements of final demand

	Consumption	Investment	Exports	Total
Gross national product (£ Mill.)				
Agriculture	83.7	-.2	50.4	133.9
Food, drink and tobacco	48.3	-	10.0	58.3
Misc. transportable goods	33.8	9.7	17.1	60.6
Construction and public utilities	17.0	30.7	1.2	48.9
Services	164.2	9.7	82.2	256.1
Total G.N.P.	347.0	49.9	160.9	557.8
Indirect imports	62.1	17.6	29.2	108.9
Direct imports	58.9	20.2	5.3	84.4
Total final demand	468.0	87.7	195.4	751.1
Imports per £100 of G.N.P. (£)				
Direct	17.0	40.5	3.3	15.1
Indirect	17.9	35.3	18.1	19.5
Total	34.9	75.8	21.4	34.6
Total imports (£ Mill)				
Competitive	77.9	20.8	20.3	119.0
Non-competitive	43.1	17.0	14.2	74.3
Total	121.0	37.8	34.5	193.3
Non-competitive proportion (%)	35.6	45.0	41.2	38.4
Labour force	741	104	318	1,163

It will be noted that the contribution of agriculture to the gross national product is higher than its share in the final demand for both home-produced and imported goods. This is explained by the fact that the agricultural content of industrial products is included with agriculture in table 3 though not in table 2. Similar considerations apply to other sectors' contributions to exports. The small negative agricultural production requirement by investment may be interpreted as a deduction from other requirements, brought about by stock decreases.

Various conclusions can be drawn from the figures in table 3 for G.N.P. content. Read vertically, they show that services form more than one-half of the home output for exports and nearly one-half for consumption though only one-fifth for investment. Agriculture's contribution is three-tenths towards exports and nearly one quarter towards consumption. Construction and public utilities contribute three-fifths to investment and only small amounts to consumption and exports. The output of all transportable goods industries is about one fifth of G.N.P. required for each component of final demand; but the food, drink and tobacco industries contribute more than the miscellaneous industries only in the case of consumption, less in the case of exports and nothing in the case of investment. Altogether, the services content is nearly one half, the agricultural content nearly a quarter, and the contents of the other sectors about a tenth each, of G.N.P.

Read horizontally, the figures show that consumption absorbs about 60%, exports about 30% and investment about 10% of G.N.P. Of course, these shares vary greatly between sectors, the share of investment being nearly two-thirds for "Construction and public utilities" but small elsewhere. Exports absorb a relatively high proportion of the net output of agriculture but a relatively low proportion of that of the food, drink and tobacco industries.

The proportions of the total labour force which are absorbed by home production for consumption

investment and exports respectively are roughly the same as those for G.N.P., though a little higher for consumption and a little lower for exports. This conclusion would be modified if the labour required for emigrants' remittances were taken into account.

Furthermore, table 3 shows totals of imports, consisting of direct imports for final use, which were given in the input-output table, as well as indirect imports, or content of imported raw materials and other intermediate products in home production, which were obtained by computation. The total import content was also split up into competitive and non-competitive imports.

The import ratio is seen to be far higher for the production required to meet investment needs than for the other final demand categories, and this is in spite of the large weight attached to local constructional activity. Imports of goods for both intermediate and final use in investment are relatively high. The proportion of non-competitive imports is also higher in investment than for either consumption or exports.

Exports have about the same indirect import content as home consumption, but the proportion of exports directly imported - i.e. re-exports - is far lower than the corresponding proportion for consumption. Non-competitive imports, however, form a slightly higher proportion of all imports in the field of exports than for consumption.

As far as the total of imports is concerned, it may also be stated that a little over three-fifths are used in consumption, and a little under one-fifth each in investment and exports.

The main implication of these results is that other things being equal, the import ratio will tend to increase if a greater proportion of resources is devoted to capital formation. Whilst this is true, the numerical effect is not as large as might be



believed. For example, assume that 5% of an unchanged total final demand was diverted from consumption to investment, exports remaining at the same level as before this implies a fall in consumption by 8% and a 43% increase in investment. To what extent a higher rate of capital formation is required in connection with sustained economic growth is in itself debatable. However, even such a radical re-allocation of resources would raise the import content of total final demand, at the expense of the G.N.P. content, only to the tune of £65 Mill., and the overall import ratio from 34.6% to 36.2%. More generally, the import ratio can be written as

$$\frac{M}{Y} = \frac{.259 C + .431 I + .177 E}{.741 C + .569 I + .823 E}$$

where M denotes imports, Y gross national product, C consumption, I investment and E exports.

There has, of course, been no substantial increase in the rate of capital formation in recent years, and any observed rise in the import ratio must be explained by other factors.

The analysis has so far been based on fixed patterns of demand for each separate component, viz. consumption, investment and exports. Changes in the pattern of demand, matched by changes in the pattern of production, do, however, take place; and it would be quite possible for consumption, investment or exports to shift towards products of industry groups with a high import content.

Some changes in consumption pattern are undoubtedly taking place; examples are shifts from farm produce, clothing and domestic service to processed food, durable consumer goods and miscellaneous services. However, the effect of these changes, which are in themselves not very large, upon industries with high and low import contents would appear to be diffused and, on balance, comparatively small. Nor is there much scope for changes in the pattern of investment. Major variations, on the other hand, may and do occur

in the pattern of exports.

The most cursory glance at external trade statistics shows that since 1953, the relative importance of goods other than food, drink and tobacco has greatly increased. In the immediate post-war period, it was the export of commodities in the food group which grew most rapidly; but after 1953 they suffered a decline and did not, in money terms, regain the 1953 level till 1961. Exports of Class III goods - raw materials and manufactured goods - which, before 1953, had grown at a less rapid pace than food exports, almost trebled in value in the period 1953-60, and their share among all domestic exports of merchandise rose from 13.4% to 29.5%. The pattern of industrial production changed in the same direction.

It is therefore of some interest to examine, in addition to total exports, exports of the products of each separate industry group, as shown in table 2, and to obtain G.N.P. and import contents for each type of exports. For this purpose, we distinguish exports of the products of agriculture, of the food, drink and tobacco industries, of miscellaneous transportable goods industries, and invisible exports. In the latter category, only those exports are included of which direct G.N.P. and import contents are given in the input-output table. Exports attributed to service trades in the input-output table are largely transport and trade margins, and their contents have been proportionately distributed over the exports of the three types of goods. There are, of course, no exports from construction and public utilities. Table 4 gives the main results of this analysis.

Table 4. Requirements of each type of exports

Content	Exports of				
	Agricultural product	Food, drink & tobacco industry products	Misc. industry products	Total	
				excluding invisibles	including invisibles
Gross national product (£ Mill.)					
Agriculture	35.4	14.5	.5	50.4	50.4
Food, drink & tobacco	.9	9.0	.1	10.0	10.0
Miscellaneous transportable goods	1.8	1.7	13.6	17.1	17.1
Construction & public utilities	.4	.4	.4	1.2	1.2
Services	14.4	12.6	9.2	36.2	82.2
Total G.N.P.	52.9	38.2	23.8	114.9	160.9
Indirect imports	6.1	10.3	12.8	29.2	29.2
Direct imports	3.3	.2	.3	3.8	5.3
Total	62.3	48.7	36.9	147.9	195.4
Total imports per £100 GNP (£)	17.8	27.5	55.1	28.7	21.4
Labour force (000)	163	100	55	318	318
G.N.P. per worker (£)	325	382	433	361	506

The main conclusion to which the figures in table 4 lead is that the import content is far higher in relation to home production content for production required in connection with exports of the non-food industries than with other exports. If, therefore, the emphasis in the field of exports shifts towards miscellaneous industrial products, this automatically means an increase in the import ratio.

This does not mean that such a development necessarily creates balance of payment difficulties,

since the higher import content also appears on the export side, and as long as the same amount of home resources are utilised, the balance of payment remains unaffected. What it means is that the economy must settle down to a higher level of both imports and exports in value terms, relatively to the level of G.N.P.

Another interesting feature in table 4 is the relative high output per worker associated with exports of miscellaneous products. This may appear surprising in view of the fact that net output per head is, on the average, lower in those trades than in the food, drink and tobacco trades. The high agricultural content of the food and drink industry products, coupled with the low output per worker in agriculture, explains why the overall result is less favourable for these industries than for the non-food industries. The recent shift in exports may thus well have beneficial effects on the economy, as far as the size of the national product is concerned.

Thus, there appears to be no reason to believe that factors inherent in the structure of the Irish economy will tend to make imports grow faster than exports. A tendency for the value of imports to rise relatively to gross national product is likely to be largely counteracted by a rise in the value of exports.

This does not exclude the possibility that bottlenecks in production will lead to a more than proportionate increase in imports of raw materials if some industries experience a sudden growth. This phenomenon should be of a temporary character and should not lead to a permanent rise in the import ratio. Whilst there is some evidence for an occurrence of this kind in the short run, there is also an indication of import substitution by home production in the long run.

It is also possible that a change in relative prices of imports to home production, which would be

brought about by a reduction in tariffs, would tend to produce structural changes in the Irish economy, in that the ratio of imported to home-produced materials used in industry, or the ratio of imports to home production for final use, would tend to rise. It is one of the limitations of input-output analysis that the constancy of such ratios is implicitly assumed.

It must be remembered, though, that the effect in money terms will be less marked than the effect in real terms, and that the former may be negligible if the elasticity of substitution is near 1. The fact that in many fields of consumption, home produced goods tend to be at a premium compared with imported goods, may also be borne in mind. Whilst the possibility may not be excluded that a liberalisation in trade will bring about a rise in imports which is not matched by a rise in exports, it is quite another matter to envisage a disastrous gap.

Whilst the foregoing analysis does not offer conclusive proof, it at least suggests that the ratio of imports to gross national product will remain within reasonable bounds. Changes in the pattern of exports and production raise other problems which have been touched upon here but which deserve further study.

References.

- [1] R.C. Geary, "A simple macro-economic growth model, Part I", The Economic Research Institute. (unpublished)
  
- [2] J. McGilvray, "Projection of the Irish economy to 1965", The Economic Research Institute. (unpublished)