THE ECONOMIC RESEARCH INSTITUTE

The Irish Economy in 1964 and 1965

## by.

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#### 1. Introduction

Since 1961 it has been the practice to incorporate in The Economic Research Institute's publication series an evaluation of recent Irish economic developments at annual intervals. At the same time an attempt was made to forecast the major national accounts totals for the whole of the current year by the time about half the year had elapsed and data for the first quarter at any rate were available. It was hoped thereby to fill a gap in our existing knowledge of economic conditions, since only a limited amount of short-term economic analysis was being undertaken in this country.

The situation has recently changed. The Central Bank Quarterly Bulletins have now become a vehicle for information arising out of studies made which deal with the relationships between monetary and national accounts aggregates, and it has now moved into the field of forecasting for 1965 (Banc Ceannais na hEireann, 1965). Moreover, official projections for the current year which have always been made in the Department of Finance at the beginning of each year have, in 1965, been published for the first time (Second Programme for Economic Expansion, 1965). The Economic Research Institute has also moved further into the field of short-term economic analysis by compiling a number of quarterly economic series and by computing seasonally adjusted data for series exhibiting marked seasonal patterns.

In the light of these developments, it seems worthwhile to reconsider the role which this annual review should play. A review of 1964 still seems appropriate, but to avoid duplication it seems desirable to concentrate on comparisons of previous forecasts with actual developments and an international comparison. Furthermore, rather than attempt a competing forecast for the national accounts in 1965, the author feels it worthwhile to give his current line of thought regarding the use of econometric models in short-term forecasting and to apply these considerations to an examination of the official forecasts made.

### 2. The year 1964 at home and abroad.

It is officially estimated that gross national product in real terms in 1964 was about 4.2% higher than in 1963. The main contribution to this rise came from industry; the volume of industrial production increased by 9.8% for manufacturing and by 9.6% for all transportable goods industries between 1963 and 1964 as a whole. But agriculture, with an estimated 4% increase in volume of net output, in that period also made a substantial contribution to the growth rate, whilst the contribution of the services sector appears to have been negligible.

Sec. 14

The author of this paper is a Research Professor of The Economic Research Institute. The paper has been accepted for publication by the Institute. The author is responsible for the contents of the paper including the views expressed therein. The exact timing of the economic growth which took place is by no means obvious. It has to be borne in mind that annual averages for 1963 and 1964 conceal variations during both calendar years, and that the difference between the two yearly averages is as much influenced by developments during 1963 as by developments during 1964.

With the help of seasonally corrected figures for the volume of production index, a rough estimate of the time pattern may be made for the rise in industrial production for the transportable goods industries. According to this estimate, the changes in the index were equivalent to a 2½% rise in the first half of 1963, a 7% rise in the second half of 1963, a 3½% rise in the first half of 1964 and a 2¼% rise in the second half of 1964. Thus the main upswing seems to have taken place towards the end of 1963, and the favourable results observed for the early part of 1964 chiefly indicate that the high levels reached in 1963 were well maintained as a base for further but more moderate rises.

Forecasts of major macro-economic data for 1964 were made during the year, first by Leser (1964) and later by Menton (1964-65). Advance estimates were also made by the Central Bank but these came out too late to qualify as "forecasts". Table 1 compares the proportionate changes in current and constant prices predicted with the recent official estimates.

Table 1. Predicted and Actual Changes in National

	Increase	1963-64 a f 1963	s %				
	Predicto	Predicted					
	Leser	Menton	ACTUAL				
At current prices:							
Personal expenditure Government current	8.2- 8.7	10.2	10.6				
expenditure Fixed capital	10.4	16.2	17.2				
formation Exports of goods and	16.2	19.9	19.9				
services	9.4-12.2	9.7	12.1				
services de Gross national product	12.0-12.6 8.6- 9.5	12.6 12.8	14.0 13.6				
At constant prices:							
Personal expenditure Government current	4.0- 4.4	3.5	3.7				
expenditure Fixed capital	5.5	4.8	4.8				
formation Exports of goods and	11.8	<b>14.2</b>	12.7				
services Imports of goods and	6.4- 9.2	4.3	5.0				
services Gross national product	9.5-10.2 4.2- 4.9	9.4 4.2	10.5 1.2 4.2				

Accounts Data, 1963-1964

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The forecast made by this writer during mid-1964 was based on a direct estimate of the implied changes in price indices for imports and gross national product, and of the volume changes in government expenditure, fixed investment and exports; the remaining figures were derived by means of econometric equations, taking some account of special circumstances. The main fault of the prediction was that the price increase, particularly for home produced goods and services, was considerably underestimated. In consequence, most increases in value terms were underestimated, though the estimates for the increases in real terms were not The exception was exports; in this too far out. field the optimistic forecast turned out to be correct in value terms, though too much of the export growth was attributed to volume changes and too little to rising export prices. On the whole, the cutturn in constant prices was reasonably close to the more conservative alternative of the two predictions given.

The prediction given by Menton was made towards the end of the year and thus succeeded far better in assessing the effect of price changes upon the national accounts data at current prices, though the foreign trade totals were somewhat underestimated. The prediction errors in the changes at constant prices were of the same order of magnitude as those in the earlier forecast. A wider range of data than those shown in Table 1 were predicted.

The rise in the value of agricultural output between 1963 and 1964 was also somewhat underestimated in the prediction made by Attwood and Ross (1964). The value of livestock and livestock products disposed of during the year, as well as the value of increases in livestock numbers, turned out higher than predicted; on the other hand, crops were generally less in quantity than in 1963 and did not show the expected value increase. All in all, gross agricultural output value appears to have increased by 12.7% and net output by 14.7%, instead of by 9.2% and 10.1% respectively as predicted.

For manufacturing industries, the Quarterly Industrial Survey conducted by The Economic Research Institute derived, at various times during the year, а forecast for the increase in production between 1963 and 1964 by weighting the quantitative prognostics furnished by various firms according to the importance of the industry. The resulting predictions varied during the year between a 6% and a 9% increase and erred somewhat on the low side, since the actual increase for all manufacturing came to almost 10%. The tendency towards a slight underestimation applied to all broad industrial groupings as seen from Table 2; the actual increases are derived as weighted averages from published volume index numbers.

Forecasts for changes in industrial exports were also given in the Quarterly Industrial Survey and varied between a 1% and a 5% increase, the figures for individual industry groups showing even larger variations. The true picture is not self-evident owing to the exceptionally large price rises and to some uncertainty as to what constitutes industrial exports. The official classification includes a number of processed foods with a substantial industrial content among agricultural products. It seems preferable for the present purpose to divide exports into live animals and all other categories.

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Table 2. Predicted and Actual Changes in

Increase 1963-64 as % of 1963 Industry Group. Quarter1y Survey Actual forecasts, Food, drink and tobacco 1- 4 5 Textiles and clothing 6-9 11 Metals, engineering and vehicles 11 - 2218 Other manufacturing 6 - 1012 All manufacturing 6- 9 10

Industrial Production, 1963-1964

Domestic exports of live animals increased 1.1 in value by 26.3% between 1963 and 1964. For all other categories including re-exports, the increase amounted to 8.7% and for total merchandise exports to 13.4%. From published price changes it is estimated that at 1963 prices, live animals exports increased by 19.0% or by £10.0 mill. For all exports, the volume increase appears to be 6.3% or £12.3 mill. It follows that for exports other than live animals, the increase at 1963 prices is only about £2.3 mill, or about  $1\frac{1}{2}$ %. This is a sobering reflection on the export performance of the economy in 1964 and shows that the Quarterly Industrial Survey forecasts have been on the optimistic side if seen from this point of view.

However, thanks to the large volume of live animal exports and to an improvement in the terms of trade, the value of merchandise exports rose in about the same proportion as the value of merchandise imports, viz. by about  $13\frac{1}{2}\%$  according to trade statistics or by over 14% according to the figures adjusted for balance of payments purposes. But invisible exports increased at a lower rate than either merchandise exports or invisible imports, and the balance of payments deficit thus grew not only in amount but also in relation to gross national product.

The slowing down of the growth rate which Ireland has experienced during 1964 is not a unique experience of this country but has in similar form. occurred in other Western European countries. Among the organisations currently studying European economic conditions, the Association of European Conjuncture Institutes may be mentioned. It has been the custom of this association, of which The Economic Research Institute, Dublin is a member, to send representatives to an annual conference in Liege each April, as well as to another conference elsewhere in autumn, and among other things to draw up a statement which has been generally agreed upon. This year's resolution, adopted at the Liege conference on 29 and 30 April 1965, appears to have succeeded particularly well in expressing the pertinent conclusions; and as it is not readily available in published form, it seems worthwhile to quote it in full, translated from the original French:

"The economic upsurge in Western Europe has continued during 1964 but has, on the whole, slowed down. This development is largely the result of more or less restrictive policies which the governments of several countries were obliged to adopt in their struggle against either inflationary tendencies or a disequilibrium in their balance of payments.

"In Italy, a slight recovery took place at the end of the year. In France, there was a slight drop in activity during the second half of 1964. The British economy has experienced, after several months of uncertainty, a certain acceleration in its expansion towards the end of 1964. In Western Germany, the economic expansion continues until the present; this also applies to most other countries, though with a slowing down of the growth rate.

"From now on till the end of 1965, it seems that in many countries demand will be the chief limiting factor for expansion. This is the case in Italy although conditions show an improvement, and also in France where a recovery is expected during the later part of the year. For Great Britain, the impact of the recent budget will no doubt permit no more than a moderate growth of home demand.

"However, in some cases the expansion will be mainly limited by supply which is tighter than in 1964. Nevertheless this permits a continuation of economic growth, notably in Western Germany.

"In the course of these developments, the European countries will encounter certain important problems. On the one hand, new wage rises, often combined with a smaller rise in productivity, will cut into the enterprises' profit margins. On the other hand, funds available for investment will be limited owing to restrictive monetary policies, and to measures taken by the United States to redress their balance of payments. Thus enterprises will find themselves in a vulnerable financial position.

"Thus, economic policy will require delicate handling. Where demand is weak but tensions persist, a progressive relaxation of restrictions may be envisaged but without compromising a still unstable equilibrium. Where the demand maintains its pressure, the authorities will have to contain the monetary expansion without preventing the necessary structural alterations.

"In conclusion, the overall growth rate of the Western European countries which was particularly high between mid-1963 and mid-1964 has since then been reduced to about 4% per annum. This rate will probably fall a little further".

How does Ireland compare with other countries? According to one O.E.C.D. publication: "For some years, Ireland has ranked among the fastest growing member countries of O.E.C.D., measured by the growth of GNP per head which has averaged over 4 per cent a year in real terms since 1958". (O.E.C.D., 1965 a, p.5.) Since the

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increase in income per head was accompanied by a decline or only slight increase in population, in contrast to most other countries, Ireland does not fare quite so well when the comparison is made in terms of real gross national product as such. The following figures are taken from another O.E.C.D. source (O.E.C.D., 1965 b); for Ireland, the latest official estimates which somewhat differ from the figures quoted are also given.

# Table 3. Annual Percentage Increase in Real Gross National Product for 14 Countries, 1960-1964

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Country	<b>1960</b> -61	1961 -62	1962 -63	1963 -64	Simple mean	Range
angertoring 1922				1		
Austria	4.8	1.5	4.4	6.0	4.18	4.5
Belgium	4.5	4.3	3.6	5.0	4.35	1.4
Canada	2.3	6.1	4.6	6.0	4.75	3,8
France	4.4	7.0	4.3	15.1	5.20	2.7
Germany (Fed.Rep.)	5.4	4.2	-3.2	6.2	4.75	3.0
Inclord (0.B.C.D.	4.8	3.3	4.0	4.5	4.15	1.5)
lerand Jc.s.o.	4.7	2.7.	3.8	. 4.3	3.85	2.05
Italy	8.3	. 6.3	4.8	- 2.7	5.52	5.6
Japan	15.9	·6.8	8.4	::9,5	10.15	. 9.1
Netherlands	3.5	2.6	3.6	5.5	3.80	.:, 2.9
Norway	6.4	3.0	5.0	6.0	an <b>5.10</b> 0	3.4
Sweden	5.4	3.3	3.7	6.2	4,65	2.9
Switzerland	7.3	5.1	-4.7	5.9	a 645.75	2.6
United Kingdom	3.5	0.7	3.8	4.3	· 3.08	3.6
United States	1.9	6.3	3.3	4.8	4.08	4.4
European O.E.C.D.	5.2	4.1	4.2	5.1	4.65	1.1
Total, O, E.C.D.	3.7	5.5	3.9	5.2	4.58	1.8
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The experience of Japan during this period has clearly been on quite a different level from that of the other O.E.C.D. member countries listed (in the case of some countries, figures were not available for all the years). In the other countries, the average growth in real GNP ranged from about 3% to  $5\frac{1}{2}$ %. Ireland's average growth rate by this standard is not high, though well above that of the United Kingdom and accompanied by virtually no population growth.

What is remarkable, however, is the stability of the growth rate observed for Ireland during this fouryear period; of the countries listed, only Belgium has shown greater stability. One may think of various explanations for this phenomenon. Perhaps it reflects the fact that economic conditions abroad and in Great Britain particularly have counteracting effects upon the Irish economy. On one hand; an economic upswing in Britain stimulates the demand for Irish products; on the other hand, it raises the demand for Irish labour and may tend to limit growth in Ireland through labour shortages here.

On the whole, however, the growth rate in Ireland falls into the same pattern as in most European O.E.C.D. member countries. Expansion was highest in the periods 1960-61 and 1963-64, with slower growth in the intermediate periods. It may be noted that the timing was quite different in Canada and the United States, where the period 1961-62 showed the most favourable result. The same applies to France, but this is probably only a coincidence.

The forecase growth rate in 1964-65 for the European O.E.C.D. members as a whole is 4.0% and for all O.E.C.D. members 4.3%. This prediction reflects the slowing down in the rate of economic expansion observed in the second half of 1964 and an expected continuation of this trend.

## 3. Econometric models and short-term forecasts.

The application of econometric models to shortterm forecasting, that is to say, forecasting up to one year ahead, has been frequently discussed, recently with application to this country by Menton (1964-65). Some of the discussion has been on the subject of econometric versus other forecasting methods. It is quite clear that short-term forecasting by means of noneconometric methods is possible, and that in many instances such forecasts have given satisfactory results. If, therefore, one wishes to dismiss econometric models from the realm of short-term forecasting, there is nothing more to be said. If, on the other hand, one believes that econometric models can make a useful contribution to the problem, then the question arises what kind of models can make the most useful contribution and in which circumstances.

The principle of model building for an economy as a whole consists in selecting a number of endogenous variables characterising economic conditions, the movements in which are to be explained by an equal number of numerical relationships. These relationships are mathematically formulated equations connecting the endogenous variables with each other, with a number of exogenous variables which are taken as determined outside the economic system analysed here, and with lagged variables - past values of endogenous or exogenous variables - which obviously may be taken as given. The numerical values of the constants appearing in the relationships are estimated by means of statistical methods on the basis of past observations.

For forecasting purposes, the equations are arranged in such a form that predicted values for the endogenous variables can be successively derived from current exogenous and lagged variables and from prediction values for current endogenous variables which have already been obtained. The published figures for lagged variables are then inserted, together with the best estimates for the current exogenous variables that the forecaster can make on the basis of any information that is available. Predicted values for the current endogenous variables are then obtained as solutions of the prediction equations.

Difficulties arise particularly in connection with the use of current exogenous variables. Estimates for these variables cannot be expected to be perfectly accurate but must always carry a margin of error. The econometric equations themselves are subject to error, whether on account of estimation errors inherent in any sample, on account of specification errors due to incorrect

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formulation of equations, or on account of changes in the structure of the economic system. If inaccurate values of exogenous variables are substituted into these equations, the errors may well be multiplied in their effect upon the predictions for the endogenous variables.

One may escape some of the difficulties if the model is formulated in such a way as to contain no current exogenous variables but only current endogenous and lagged variables. A model of this kind, which attempts to explain quarterly changes in personal consumption, in gross private domestic investment, and in government expenditure plus net foreign investment for the United States in terms of the past alone, was constructed by Gallaway and Smith (1961).

Whilst a model of this kind makes forecasting one period ahead an easy matter, it is clear that a price has to be paid for this simplification of the task. This is shown up by relatively low coefficients of determination in the Gallaway-Smith model, amounting to .23, .40 and .42 respectively in the three equations. If the fit of the equations to past data is not a good one, they cannot be expected to have a high predictive power for the future. Indeed, it would be surprising if it were otherwise, as the implication would be a very high degree of determinism in our economic affairs.

The use of current exogenous variables in the equation system seems justified in so far as the variables are truly exogenous, exerting an influence upon the endogenous variable but not in turn being influenced by them. In practice it is not always easy to find an adequate number of such variables when dealing with macro-economic systems; and the relationships which exist between the endogenous variables and those variables introduced as exogenous for practical reasons are often more complex than simple one-way cause-effect relations. Numerical relationships of this kind which are established may thus have only a limited theoretical value; and it would seem appropriate to judge their usefulness by the practical criterion of their predictive power, indicating the extent to which they can help in making forecasts.

In the new approach which is followed here, the distinction between endogenous and exogenous variables is side-tracked as not being of primary importance. Instead, a distinction is made between variables predicted on the basis of available information and variables predicted with the help of econometric relationships; in these relationships, the former set of variables act as predictor variables for the latter set. No implication of any cause-effect relationship is then contained in the equations, but merely one of association.

The problem then boils down to finding suitable predictor variables, which one may reasonably hope to be able to predict fairly accurately by extrapolation or other simple assumptions, and which at the same time can make a substantial contribution towards explaining the changes in the variables which are to be predicted by the model. As there is usually some information available about all the variables in the system, the choice of predictor variables may not be simple and may permit many alternatives.

In the model for Ireland to be developed here, the problem is taken as involving the forecast one year ahead - that is to say, for the current year as soon as the figures for the past year are known in at least provisional form - of the following national accounts totals at current prices:

· · C	personal expenditure
G G	government current expenditure
. I	gross fixed investment
. X	exports of goods and services
M	imports of goods and services
. Ү	gross national product
I X M Y	gross fixed investment exports of goods and services imports of goods and services gross national product

The following variables, at current prices, may also be introduced:

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В	stockbuilding
D	final demand

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which is defined here as excluding stockbuilding so that

$$D = C + G + I + X$$
  
= M + Y - B

The variables other than B may be converted into year-toyear percentage changes written as c, g, i, x, m, y and d respectively; thus

$$c = 100 (C - C_{1})/C_{1} etc.$$

Also the price changes p for imports and p for gross national product may be obtained by the formulae

$$p_{m} = 100 (m - m') / (100 + m')$$
$$p_{y} = 100 (y - y') / (100 + y')$$

where m' and y' are percentage changes for imports or gross national product at constant prices. p and p then represent the changes in the implied price y indices for the national accounts totals.

The change d in final demand is chosen as the main predictor variable. The justification for this choice lies in the fact that some general indication of the way final demand is moving is usually available at the beginning of the year, even though there is no concrete evidence for the numerical change in any one of its components. Alternative indicators could, of course, have been chosen as for example, the change s in total marked supplies S defined as

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S = M + Y= D + B

Furthermore, the difference  $p_{y} - p_{m}$  is introduced into the equations for m and y, as import prices and the national product price may show considerable divergence which is reflected in the movements of the two value totals.

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Finally, a lagged expression is introduced into each equation; except in the investment equation, the term consists in a difference between two lagged percentage changes. These expressions are in the nature of adjustment variables, indicating an adjustment in the opposite direction after a divergence between variables which display a considerable degree of long-term stability in their relation between each other. For example, an abnormally large increase in consumption as compared with the increase in gross national product in one year may be expected to be followed by a relatively small increase in the following year, and vice versa.

In the equation for i, the lagged term i does not represent an adjustment but reflects the cyclical nature of investment in the face of long-term decisions, thus predicting a large increase for the current year from a large increase in the past year.

Data for year-to-year changes from 1948/49 to 1962/63 have been computed from those given by the C.S.O. (1964). With their help, the following six equations have been estimated for the predicted changes by ordinary least squares:

 $c_{p} = 1.12 + 0.640 d - 0.157 (c_{-1} - y_{-1}) + k$   $g_{p} = -0.61 + 1.150 d - 0.076 (g_{-1} - y_{-1}) + k$   $i_{p} = -2.41 + 1.041 d + 0.563 i_{-1} + k$   $x_{p} = -0.39 + 1.139 d - 0.043 (x_{-1} - m_{-1}) + k$   $m_{p} = -3.45 + 1.808 d - 0.895 (p_{y} - p_{m}) - 0.410 (m_{-1} - d_{-1}) + k$   $y_{p} = 1.33 + 0.700 d + 0.374 (p_{y} - p_{m}) - 0.356 (y_{-1} - d_{-1}) + k$ 

Effectively, the equations are used only to estimate five differences between the rates of increase in value, since c, g, i and x must be consistent with the inserted value for d. Consistency is ensured by the additive correction term k which is the same in all equations but varies from year to year. For the 15 years of the observation period, k varies between -1.3and +1.0.

A coefficient of d equal to 1 would indicate that the variable concerned tends to increase proportionately with a higher rate of increase for final demand as a whole. The differences from 1 obtained here are not statistically significant but are in the expected direction. They show that, for example, imports are highly sensitive in the short run to changes in final demand, whilst gross national product and consumption are somewhat inelastic in the short run. Since the national product price tends to increase more rapidly than the import price the difference between expansion rates in imports and gross national product is not as large as would appear to be implied by the coefficients of d.

The coefficients of i and the coefficients of the adjustment variables also have the expected sign; though for consumption, government expenditure and exports the numerical values are smaller than anticipated and not statistically significant. Since the individual variables are components of the explanatory variable d one should expect to find reasonably high correlations in spite of the extremely simple nature of the equations. In fact, the coefficients of determination obtained in the various equations lie between .410 for  $x_p$  and .774 for  $y_p$ .

The year-to-year change 1963/64 was not used in the estimation of the equations but may be used as a check on their validity; this may serve here as an illustration of the computational procedure.

From the Second Programme (1965) we obtain for 1964 the following current price data:

 $D_{-1} = 597 + 99 + 146 + 32 = 1,164$  $D - D_{-1} = 63 + 17 + 29 + 39 = 148$ 

thus for 1963/64

$$d = 100 \times 148/1, 164 = 12.7$$

Furthermore we have

 $m' - m = \frac{48}{344} - \frac{34}{334} = 3.5$   $1 + \frac{m'}{100} = \frac{369}{334} = 1.105$   $y' - y = \frac{112}{826} - \frac{31}{737} = 9.4$   $1 + \frac{y'}{100} = \frac{763}{737} = 1.042$ 

thus

 $P_y - P_m = 9.0 - 3.2 = 5.8$ 

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.The lagged terms which refer to 1962/63 are:

<sup>c</sup> <sub>-1</sub> - <sup>y</sup> <sub>-1</sub>	п	6,8	-	6.4	н	0.4
<sup>g</sup> <sub>-1</sub> - <sup>y</sup> <sub>-1</sub>	11	8.8		6.4	=	2.4
i1						13.2
$x_{-1} - m_{-1}$	n	9.2	-	11.6	, H	-2.4
<sup>m</sup> -1 <sup>- d</sup> -1		11.7		8.4	=	3.3
y <sub>-1</sub> - d <sub>-1</sub>	NI.	6.4		8.4	. <b>n</b>	-2.0

Substituting all these figures into the equations, we obtain the following results:

 $c_{p} = 9.2 + k$   $g_{p} = 13.8 + k$   $i_{p} = 18.2 + k$   $x_{p} = 14.2 + k$   $m_{p} = 13.0 + k$   $y_{p} = 13.1 + k$ 

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But from the 1963 data it follows that

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$$(597 c_p + 99 g_p + 146 i_p + 322 x_p)/1, 164 = 12.7$$

since this is the increase in total final demand. Substituting the expressions for  $c_p, g_p, i_p$  and  $x_p$  we find that

$$12.1 + k = 12.7$$

63 3 4 5 1 5 4 1 5 1 5 1 1 **k** ty⊨ ( **0.6** 

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Thus the likely expansion rates consistent with a 12.7% increase in total final demand which the model gives may be compared with the actual estimates as follows

$c_{p} = 9.8$	c = 10.6
$g_{p} = 14.4$	g = 17.2
$i_{p} = 13.8$	i = 19.9
$x_{p} = 14.8$	x = 12.1
$m_p = 13.6$	m = 14.0
$y_{p} = 13.7$	y = 13.6

The results of the regression equations are in reasonably good agreement with the actual figures, particularly so for imports and gross national product.

There is no difficulty in converting the results into totals at current prices if desired. In this manner a theoretical figure for stockbuilding is also obtained, though this cannot be expected to be highly accurate as it is merely derived as a residual. In this case

C <sub>p</sub>	11	656	· • ·	C =	660	
G	H	113		G =	116	•
Ip	=	173	•	I =	175	
xp	11	370	• . •	X =	361	
D	H	1,312	·	D =	1,312	

These totals are equal by definition

M_; =	391		M: =	392 -	 elle Adame -
$Y_p =$	939	· · · · · · · ·	¥ =	938	
S_ =	1,330		S =	1,330	

These totals are not equal by definition but happen to coincide exactly so that the figure obtained for stockbuilding is also exactly right in this instance:

 $B_{p} = 18$  B = 18

4. National accounts for 1965.

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The econometric model developed here may now be applied to a consideration of prospects for the In ordinary circumstances, this would current year. require an estimate of changes in total final demand and of the difference between changes in import prices and national product price; the model then yields estimates for changes in final demand components, imports and gross national product at current prices. With the further help of individual price projections, changes at constant prices could also be obtained. It would, of course, be possible to make different estimates based on alternative assumptions. Also it would be possible to adjust the results of the prediction equations for the purposes of an actual forecast, to make allowance for special factors such as the British import surcharge. 

In this case, official 1965 projections have already been published for the major national accounts data. The task thus consists, in the first instance, in ascertaining whether the forecast values are consistent with the model equations and what the differences are. In so far as substantial discrepancies are observed the problem will then be to see whether some reconciliation of estimates is possible.

In the first instance, the numerical values of the lagged terms may be inserted, these are:

°-1	-	y_1	н	10.6	-	13.6	=	-3.0
<sup>g</sup> -1		y_1	8	17.2		13.6	=	3.6
i	J	L					m	19.9
x1	-	<sup>m</sup> -1	H	12.1	<b></b>	14.0	==	-1.9
. <sup>m</sup> -1	<u>.</u>	d1	=	14.0	-	12.7	=	1.3
У <sub>-1</sub>		d1	=	13.6	۔ مد	12.7	H	• 9

The prediction equations then simplify to the form

с <sub>р</sub>	=	1.59 +	0.640	đ			,			·+	<b>k</b> . ·
g p	53	-0.88. +	1.150	d				!		+	k
i P	=	8.79, +	1.041	đ				:		+	k
$\mathbf{x}_{\mathbf{p}}$	IJ	-0.31 +	1.139	đ		• •	•	•		ł	k
m P	=	-3.98, +	1.808	đ	-	0.895.	(p <sub>y</sub>	<u></u> :	p <sub>m</sub> )	÷	k
Уp	H	1.01. +	0.700	đ	+	0.374	(p <sub>y</sub>	-'	р <sub>т</sub> )	+	k
						,		,			

Now the projections imply that

d = 7.9  $p_{y} - p_{m} = 4.1 - 2.3 = 1.8$ 

Substituting these values and working out k which comes to -0.8 we obtain the following predicted values which may be compared with the official provalues which may be compared with the official jections: c = 5.8c = 7.7pg = 6.0i = 14.3

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s = 0.0 i = 14.3  $x_{p} = 7.9$  m = 5.1  $y_{p} = 6.4$  y = 8.3Thus the pattern of final demand which is expected on the basis of the model implies a larger expected on the basis of the model implies a larger increase in government expenditure, investment and exports and a smaller increase in consumption at current prices than that envisaged in the official projections. Furthermore, the equations suggests a larger increase in value of imports and a smaller increase in value of gross national product than the published figures published figures. ge cafest is the

= 3.7

= 3.6

 $p_{i} = 4.0$ 

 $p_{x} = 3.2$  $p_{m} = 2.3$  $p_{y} = 4.1$ 

p<sub>c</sub>

pg

The implied percentage changes in prices are

1. 1. 11 M. 11.

as

that is to say, price rises are envisaged to lie between 24% for imports and 4% for investment and national product. If these price changes are applied to deflate the predicted value changes in the same way as the actual ones, the following picture is obtained for volume changes predicted by the model and derived from official projections.

> $c_{p}' = 2.0$  c'' = 3.9 $g_{p}^{1} = 3.6$   $g^{1} = 2.3$  $i_{\rm p}! = 11.7$  $x_{p}^{\dagger} = 2.5.3$  $m_{\rm D}^{1} = 5.3$   $m^{1} = 2.7$  $y_{\rm p}! = 2.3$  y' = 4.0

The contrast between the two sets of figures is more striking when seen in real terms than when seen in money terms. Both sets of figures implicitly assume an expansion rate in real terms of 4.2% for total final demand, combined with a 3.6% price increase. But

the econometric model suggests that a real growth of  $2\frac{1}{4}$ % rather than 4% for gross national product would be compatible with the assumptions made, whilst an increase in import volume of over 5% is envisaged in place of one under 3%. Real personal consumption would be expected to increase by 2% instead of 4%, with corresponding modifications for other final demand components.

Now it is clearly realised that the model equations must not be taken as exact laws, and the predictions derived thereby cannot aspire to perfect accuracy. They just describe, as far as possible, an average experience over the post-war observation period; but each year there have been deviations from that experience, which to some extent tend to produce adjustments in the opposite direction in the following Moreover, whilst it is intended to maintain the year. basic idea and basic form of the prediction model for some time, the exact mathematical expressions are subject to modification. It may be possible to improve some of the equations by specification changes, i.e. by using somewhat different or additional variables; and with changes in the basic observation period the numerical estimates will be revised.

It seems reasonable to expect, in present circumstances, a lower increase in the value of exports in relation to the increase in total final demand. With fixed investment also being relatively somewhat lower, consumption expenditure must conversely be relatively higher. This may well have some bearing on the ratio of imports to gross national product, implying a somewhat smaller increase in imports and a somewhat larger growth of home production than the experience of the past would suggest.

The considerations would suggest for an actual forecast adjustments to the results of the econometric model in the direction of the official projections. It is, however, doubtful whether these adjustments should be as large as those implied by the published projections. One of several things may happen, depending to some extent on the performance of exports.

On the assumption of an increase in total final demand at current prices by £104 mill., the model suggests an increase in exports of goods and services by £29 mill., whilst the official projections envisage an increase by £21 mill. In the first four months of the year, the level of merchandise exports was disappointingly low, even allowing for the effect. of the British import surcharge and, perhaps even more so, the expectation and subsequent announcement of a reduction in the surcharge rate. A considerable improvement will be necessary to reach even the moderate official target, to say nothing of surpassing Unless this is done, the prospect of reaching it. the target of a 4% increase in real gross national. product is not very bright.

If, however, exports continue to lag, it would appear that a considerably smaller increase in final demand than £104 mill. should be envisaged. This would imply lower figures for the increase in gross national product and personal expenditure than the projections of  $\pounds78$  mill. and  $\pounds51$  mill. respectively, which even with a  $\pounds104$  mill. final demand increase are higher than the model projections of  $\pounds60$  mill. and  $\pounds33$  mill. respectively. Alternatively, if there should be a sustained boom in consumer demand, it could well lead to inflationary pressure and a greater price rise than the 3.7% foreseen for personal consumption; this might well be 4-5%. In this case, although the value increase in gross national product might be near to official expectations, the volume increase would fall below 4%.

The pure model prediction which makes no allowance for special factors gives an increase in imports of goods and services by £31 mill. and thus a rise in the balance of payments deficit by £2 mill. to £33 mill. If the figure for exports has to be revised downwards, it seems reasonable to revise the figure for imports in the same direction but to a smaller extent so that the balance of payments of deficit may well be even greater. The official projection of a rise in imports by £20 mill. only may therefore well be an underestimate, and the anticipated £30 mill. balance of payments deficit may be mildly optimistic.

The Central Bank projections for 1965 are not given in the same detail but postulate a balance of payments deficit which is reduced to £22 mill., accompanying an increase in gross national product at current prices by £80 mill. or 8.6% over 1964. To some extent these figures represent targets which should be aimed at rather than forecasts of what is actually going to happen. With the desirability of securing a high growth rate in combination with a balance of payment near equilibrium one can but concur. Whether such a desired state can and will be reached in the near future is another question.

The truth of the matter is that we do not know yet how to achieve a substantial rate of economic expansion whilst keeping the rise in prices and the balance of payments under control within desired limits. The recent experience of our nearest neighbour country has not been particularly encouraging in this respect.

Ireland faces particular difficulties, owing to vulnerability of exports and to strong dependence upon imports. There may as yet be structural weaknesses in the country's industry in so far as there is insufficient linkage, and an increased demand in any one sector does not produce a sufficiently high multiplier effect upon the economy but tends to overspill into imports. This may change in time, but a transformation of industrial structure does not happen overnight. In the meantime, some strains and stresses must be accepted as the price to pay for economic growth.

## 5. Final remarks.

The conclusions reached here must remain very tentative. No firm quantitative prognostic has been attempted for the current year; only indications based on experience and econometric analysis of past data have been given. The limitations of econometric methods for short-term forecasting purposes have been pointed out. Nevertheless, it must be realised that forecasting is only one of several objectives and applications of these methods. Econometric model building tries to explain how the economy works; and it is on this account that an econometric approach to Irish economic problems is felt desirable, side by side with other approaches.

The model described here represents only one of many possible ones. It may be modified in the light of further knowledge gained, and it may be supplemented by other models. In particular, econometric studies may be made on the basis of quarterly data, the importance of which for short-term economic analysis needs little explanation. On the other hand, relationships of a more long-term character also deserve further study.

When all is said and done, however, it still seems worthwhile to derive some conclusions from the model given here. As pointed out, it throws some doubt upon the official projections. In particular, it suggests a somewhat larger balance of payments deficit than the projected £30 mill., and a somewhat lower increase in real gross national product over 1964 than 4%.

At the same time, these possibilities must be viewed with a sense of proportion. A moderate balance of payments deficit, if largely brought about by deliberate investment from abroad, does not spell economic disaster but may be a natural and to some extent desirable feature. Some slowing down in the growth rate would be no more than in accordance with expected developments in other countries; when circumstances again permit a big spurt in exports, the prospects for economic expansion will be enhanced again.

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