A Detailed Projection of the Irish Economy to 1970

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1. Principles

The fundamental principle of the study is
that better forecasts can be made of coefficients and
flows in the economic system by direct methods than by
mechanical projection. By direct methods we mean the
enlistment of expert and technical advice for the
compilation of specific estimates. In each sector of
economic activity there exist sources of information,
either published in the form of trade association
memoranda, consultants' reports, technical journals,
etc., or unpublished, in the notes of businessmen,
which remain largely untapped. These sources can
provide not only estimates of particular parameters,
but also the background information essential to
investigate the variance of any parameter.

The superiority of the direct method is
acknowledged by Stone and others who have made
projections of interindustry coefficient matrixes. But
the size and diversity of a large industrial economy
has so far ruled out the method for practical purposes
in projections of the U.S. and U.K. interindustry
matrixes although selected coefficients have been
projected this way in both matrixes. However, in the
Irish economy there is much more scope for direct
methods.

This is so, not only because of the size of
the economy, and particularly of the industrial sector,
but because of the highly skewed distribution by size

of the coefficients in the Irish interindustry matrix.
Several studies in different countries have shown
that input-output estimates are relatively insensitive
to errors in small coefficients: it is the larger
coefficients which have the determining influence on
results.   Accordingly, the study will concentrate on
the larger coefficients, or rather flows[1].   In any
case, it would be quite impossible to obtain information
on the smaller items for some future year   so the
projection to 1970 must be based upon the existing
input-output tables for 1956 and 1960.   These will be
used as the bench-mark, from which all adjustments will
be made.

It would naturally be an advantage to have
a table for a more recent year.   But even if such a
table were available one would still have to revise the
coefficients to 1970.   This year is not only the
terminal one of the Second Programme, but one in which
many of the tariff reduction will make themselves felt.
Once a matrix representing the economy of the period
1969-71 has been constructed one can then make a great
number of experiments which may be of some practical
as well as academic interest.

[1] Errors in the estimates of sector outputs in input-
output systems are a function of the input coefficients,
weighted by final demand.   Although final demand
cannot be predicted exactly, the relative value of
such sector's share is known.   Accordingly, errors in
output estimate will be minimised by attempting to
minimise errors in the estimates of large flows in the
system rather than large coefficients.   Our objective
is, therefore, to estimate the coefficients corres-
ponding to the principal flows in 1970.

Of practical importance would be calculations
of the consequences of alternative patterns of exports
and imports.   It would also be useful to calculate
the effects of variations in cattle prices upon incomes
in other sectors of the economy.   A comparison of the
movement of the single factoral terms of trade (i.e. the
quantity of imports purchased by one unit of Irish
labour) from 1956 through 1960 to 1970 would be of more
academic interest.   Another purpose which the projection
could serve would be as a planning framework, which
would be continually adjusted as new information became
available, ultimately turning into a historical table
for 1970.

It is the objective of the present study to
disaggregate the existing sectors of production as far
as is useful, and as far as information permits.   New
sectors will be added for major new industries
established between 1960 and 1970.

The initial projection will be in constant
1960 prices.   A further objective would be the
creation of a table, perhaps more aggregative than the
original, in 1970 relative prices.   This would be
obtained by applying to the original projection indexes
of the change of the relative prices of the outputs
of each sector between 1960 and 1970.

2. Practical Problems

The foregoing principles can be implemented
to a greater or lesser extent, depending on the
resources - principally man hours - which can be
devoted to gathering and compiling data.   The avail-
able resources are quite small, and therefore there
must be severe economies of effort.   The general
objective, however, is not to obtain the most accurate

possible picture of the Irish economy in 1970 - far beyond our means - but to demonstrate the practicability and usefulness of the methods outlined above. The general objective will be satisfied if the results obtained are better than those which would be obtained by more mechanical projections.

(i) Sector Classification

Of the three major divisions of the economy, agriculture, industry, and services, the first is well-documented. The input-output table for the agricultural sector, 1960, prepared by An Foras Taluntais, illustrates the extent to which agriculture can be disaggregated into its component activities. We hope that a similarly detailed table can be prepared for 1970, i.e. about fifteen sectors.

The services division generates about 35% of the GDP, but there is very little information about this sector abailable (- other than employment data -). Fortunately, it purchases relatively little from other sectors - except labour - so that errors in the estimates of services output will not seriously affect the output estimates of industrial and agricultural sectors. We would not expect to revise for 1970 the input coefficients into the services sectors, unless specific information becomes available. We should, however, like to separate trade from transport, and divide the latter into its principal constituents.

There were 22 industrial sectors in the 1960 input-output classification. This number can be more than doubled if each Census of Production Industry is treated as a separate sector, and if major projects - including new industries - are allocated to sectors of their own. The actual extent of disaggregation will

depend upon the importance of the activity, the
stability of coefficients under the existing class-
ification system, and the availability of data. It
is clear that the industrial division of the economy
will provide the greatest increase in employment and
income to 1970, and that the establishment of new
industries, and the differential growth rates of those
existing in 1960, will lead to substantial changes in
many coefficients.

(ii) General Procedure

1960 is the year to which the detailed
information in most C.I.O. Survey Reports refer. It
is also the year of the latest input-output table,
and the base year for the N.I.E.C. projections. For
these reasons, it seems likely that 1960 will be the
'bench-mark' year for most projections of inter-
industry flows in 1970.

The published C.I.P. reports show the
principal inputs and outputs of each Census industry
in 1960. This will be the principal source of data
for disaggregation of columns: the breakdown of the
row distribution is more difficult. Henry's worksheet
will be helpful as will be the C.I.O. Reports in this
connection. The "other" inputs and outputs which are
not specified in the C.I.P. reports must be distributed
in some arbitrary manner, using the 36 sector table as
a guide. Proceeding by one column at a time, a detailed
table for 1960 will result, which will be most accurate
in its principal flows.

The purpose of preparing this table is to
identify the major flows and the unstable flows (i.e.
those which are likely to change most between 1960 and
1970). Several types of substitution are possible: one

material for another, (e.g. synthetic for natural

fibres in textiles), imports for domestic products,

(and vice versa), purchased services for direct

labour, energy for labour, capital for labour etc.

The first two types are perhaps the most relevant in

present circumstances.

As Geary's work has shown, the most

important inputs in any column are often value added

and imports.   The N.I.E.C. projections of net

output and gross output may be a useful guide to

changes in value added. Changes in imports, by

purchasing industry, are much harder to forecast.

This is the type of information which can best be

collected directly - in fact it can only be collected

directly. Nor can historical statistics be any guide

to future changes in product mix and technology, which

may be however within the planning horizon of the

intelligent business-man.

(iii) Outline of work

The first step is to prepare an input-output

table for 1960 in which the industrial sectors have

been disaggregated.   The basic data come from the

Census of Production, supplemented by the CIO Reports,

Trade and Shipping Statistics and the 36-order table.

The work at this stage involves essentailly the re-

conciliation of the detailed table to the 36-order

table.   In this connection, Henry's worksheets will

be essential.   The worksheets used for the present

study show the different goods produced and consumed

by each industry as reported in the Census of Production

for 1960 with their sectors of origin and destination

estimated.

The second step is the estimation of the

principal flows - or more exactly, the coefficients

corresponding to the principal flows - at this level
of classification in 1970.   No general rule can be laid
down as to how this is to be done, except perhaps that
one tries to find the best information available.   A
few examples may make this clear:

a) The amount of flour used in a loaf of
bread, the amount of tobacco in a cigarette, and the
amount of timber used in a house are all fractions which
are quite stable, and their corresponding coefficients
can be expected to change very little by 1970.

b) Coefficients of household consumption
expenditures can be computed, using the results of
household budget studies in Ireland and Britain.
Such coefficients are generally quite stable.

c) "In a year of normal water flow, output
from hydro-electric stations is estimated at 720
million units.   In a very dry year this figure could
fall by a half, and in a very wet year it could
increase by a third".   Booth, IV, p.45.

d) The quantities of cotton cloth domest-
ically produced and vehicles domestically assembled
in 1970 depends upon factors which cannot easily be
foreseen.

Information in these examples comes from
a variety of sources, and a different degree of con-
fidence can be attached to the estimates in each case.
One of the advantages of the direct method, however,
is that it provides background information so that
conditional forecasts can be used intelligently in
applications of the estimates.   The gathering of
such background information on the factors determining
these estimates is often a useful addition to knowledge
of the economy, apart from the numerical values
concerned.

Each flow can be treated in each of three ways. As dependent on the output of the consuming sector, as dependent on the output of the producing sector, or independent of either. A fourth treatment gives a linear relation. The precise treatment in each case depends upon the appropriateness of the assumptions, which in turn depends upon a knowledge of the circumstances prevailing in each sector.

The detailed projection for 1970 requires the synthesis of information from various sources within the input-output framework. It must be regarded as an exploratory study with two objectives subsidiary to the main objective of obtaining the numerical estimates. These are

a) to show that detailed information which can contribute to an improved model of the future economy is readily available.

b) to identify major gaps in statistical information.

In order to apply a range of analytical models, it is essential to have a flexible data framework. This means that information should be kept as detailed as possible. In particular, ancillary tables will show the sources of supply and disposition of the principal commodities, and imports will be recorded likewise.

The final stage will be reached when a consistent table or set of tables has been prepared for 1970. This will be the foundation for a variety of experiments, of which three may be mentioned:

a) An analysis of changes in relative prices, including wages and taxes

b) An analysis of different patterns of foreign trade

c) An analysis of the factoral terms of trade.

APPENDIX

Procedure for identifying principal flows

In 1960 the total value of intermediate flows was £438.7 million (295.7 domestic and 143.0 imports). This compares with flows for final consumption of £837.9 million (745.2 domestic and 92.6 imported).

Given any level of sector classification the number of non-zero flows can be counted and some mean or median value chosen as the cut-off point, below which size all flows could be neglected for the purpose of specific projection to 1970.

However, as the level of aggregation is lowered from 36 sectors to CIP industries and then to commodity flows, and we must necessarily work with a flexible classification, it is impossible to establish a priori a fixed cut-off point. For example, the flow Soap/Households may be larger than some arbitrary level, but when soap is disaggregated to soft, hard, toilet, shaving, other, each flow may fall below that level.

One systematic procedure would be to begin by listing in order of size the largest flows in the 1960 36-order table, including imports. These would then be broken down into their constituent commodity flows, taking care that these commodity flows are not smaller than commodity flows possibly concealed in the "smaller" 36-order flows.

As a working rule, one might suggest that one could ignore, in 1960, flows which fell below

at 36-order level, £0.667 million
at CIP level, £0.3335 million
at commodity level, £0.1 million.