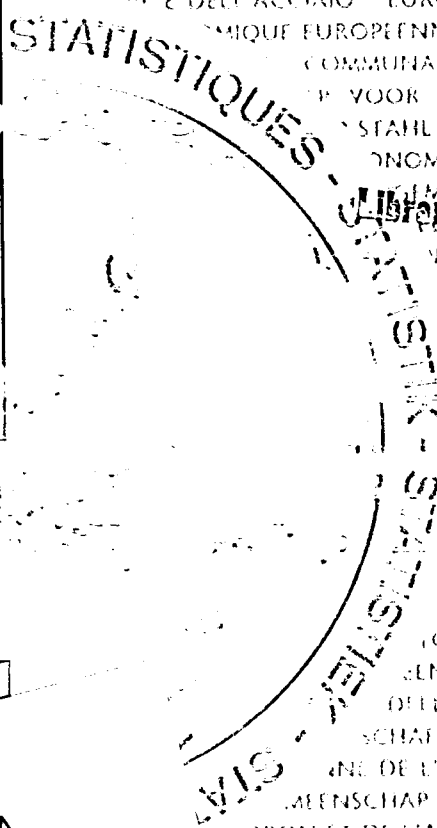
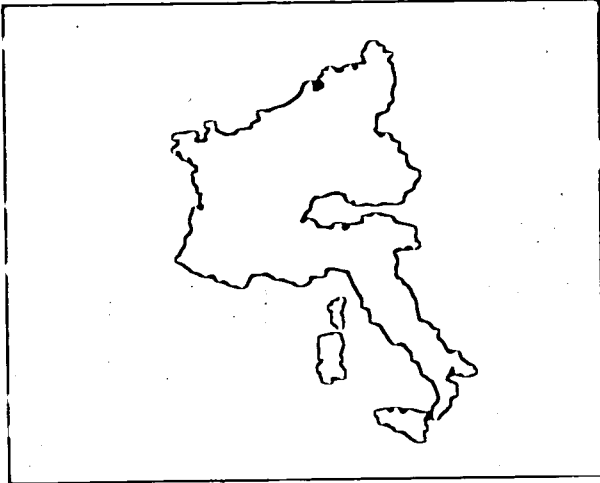


# STATISTICAL INFORMATION

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**Methods of forecasting long-term economic growth**

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1960 - No. 6

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**METHODS OF FORECASTING  
LONG-TERM ECONOMIC GROWTH**

**Report by a group of experts**

## FOREWORD

This issue completes the eighth year of "Statistical Information".

Some readers may find the report which follows rather technical and, therefore, complicated; but the subject considered by the experts — a critical analysis of methods of forecasting long-term economic growth — is of such importance and their findings are set out so competently that the Statistical Office felt that their report should be circulated as widely as possible.

The experts are, of course, solely responsible for the study carried out.

We would ask readers of "Statistical Information" to excuse the slight delay in publishing this issue, caused by technical factors.

Luxembourg /Brussels, 1<sup>st</sup> March 1961.

Rolf WAGENFÜHR  
Director - General of the  
Statistical Office of  
The European Communities

Monsieur Pierre Malvestiti  
President of the High Authority  
of the European Coal and  
Steel Community, Luxembourg

Sir,

In May 1958, the High Authority instructed the undersigned Group of Experts to prepare a report on long-term forecasting methods.

The scope of this report was defined as follows in a letter, dated 29th July 1958, from the chairman of the Group :

“The aim of your studies will be to lay down a method :

- a) which can be used in all countries of the Community without undue preliminary work;
- b) which will enable forecasts to be made on the basis of certain hypotheses formulated by the experts.....”

We believe that we have complied with these terms of reference by seeking to assemble the essential elements of a method suitable for use in each of the six members of the Community. We have not tried, therefore, to formulate a method of forecasting for the Community as a whole, but to establish an uniform methodological basis for national forecasts, to be combined subsequently in a forecast for the whole Community.

In the course of our studies we found differences not only between the methods used in the six countries but also in the aims of long-term forecasting, the legal status of forecasting departments and the form of forecasts. We, therefore, decided to summarise work on the subject to date in the countries of the Community and, at the same time, to review the present state of knowledge and scientific methods for long-term forecasting.

While recognising that forecasts may have different purposes in the various countries, we have felt able to recommend some standardisation of long-term forecasting methods.

Such standardisation is essential to enable national forecasts to be compared and later to be checked for mutual consistency; it is made easier by the fact that the procedures used in the various countries have many points in common. At the same time, it must be flexible enough to suit the economic policies and institutions of each country.

On this basis, we now have the honour, Sir, to transmit the report we were asked to prepare.

In so doing, we should like to draw special attention to a number of points.

First, our report does not claim to be exhaustive, because scientific research into long-term forecasting, although very active for some years, has not yet definitely formulated completely acceptable rules regarding methods.

However, a number of points concerning methods and possible solutions, which will be of interest to specialists only, are discussed in the various chapters and appendices. The whole report is briefly reviewed in the first chapter to facilitate application of the methods which we recommend. This summary sets out our main findings.

Finally, we wish to make it clear that the members of the Group are personally responsible for the drafting of the report. The views and proposals put forward do not therefore, commit the organisations and services from which some members of the Group are drawn.

Representatives from the following organisations also took part in our studies :

- Organisation for European Economic Co-operation (O.E.E.C.);
- Commission of the European Economic Community;
- Commission of the European Atomic Energy Community.

Mr. Abraham, a member of the Power Economy Directorate of the High Authority, acted as secretary to the Group and drafted the report in final form. We wish to thank him most warmly for the highly efficient manner in which he has carried out his duties.

Yours faithfully,

Rudolf Regul, Luxembourg, *Group Chairman*,



Wilhelm Bauer, Essen



Jean Benard, Poitiers




Vera Cao-Pinna, Rome



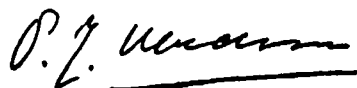
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## CHAPTER ONE

### INTERPRETATION OF TERMS OF REFERENCE, METHOD OF APPROACH SUMMARY OF STUDIES

#### A — INTERPRETATION OF TERMS OF REFERENCE

1. By its terms of reference to the group of experts, the High Authority stated its intention that all forecasts made by the various European institutions in collaboration with the competent authorities in member countries should be based on jointly-formulated methods, allowing comparison between countries.

We believe that we have complied with these terms of reference by seeking to assemble the elements of a method suitable for use in each of the six countries of the Community.

We have not tried, therefore, to define a method of forecasting directly applicable to the Community as a whole or a specific method for each country, but to work out a *uniform methodological basis* for national forecasts, to be combined subsequently into a forecast for the whole Community.

Any method of forecasting must be related to the particular target. Economic forecasting is not a self-contained activity but is always designed to provide more or less accurate information as a basis for a decision, or a number of decisions, to be taken by undertakings, governments or international organisations. The form and method of forecasting depend not only on the basic data used but also on the kind of decision to be taken.

These two fundamental points — the kind of decision to be taken and the type of basic data available — must, therefore, be stated clearly, first of all with reference to the work of the High Authority itself. The latter has to make forecasts, partly to keep in touch with the general economic trend of the countries of the Community, but principally to assess the prospects in terms of which separate coal and steel production targets have to be set and more general proposals formulated for energy policy. The problem is similar for the European Atomic Energy Community for matters within its province. Beyond the special requirements of these two communities, the European Economic Community wishes to compare the long-term forecasts of its six member countries, in order to discover any inconsistencies. The basic data for forecasts must be provided by the member countries.

In view of the foregoing, the High Authority's long-term forecasts must be :

— sufficiently detailed to show clearly the elements on which coal and steel production targets mainly depend;

— produced by combining national forecasts, which must be compiled on a co-ordinated basis to make forecasting possible.

2. This led us to consider the manner in which member countries produce their forecasts, and the possibility of co-ordinating the latter. Forecasts differ quite substantially from country to country; their aims are not the same, the agencies responsible differ as regards administrative status and methods used, and the actual forecasts are produced in different forms.

### i) *Aims of long-term forecasts*

The aim of forecasts in their general form is to deduce the main lines of economic progress as determined by the main growth mechanisms, namely, the increase of the labour force, and particularly of the industrial labour force, the growth of fixed capital and technical progress.

In most cases, forecasting aims are now also considered to include identification of the structural changes which accompany economic growth.

In some countries, forecasts also have to form the basis for government planning and, particularly, for financial measures to promote what are considered to be necessary changes in the structure of industry, agriculture and commerce. In addition, they have to provide basic data for production sectors using long-term capital and therefore needing to take account of the government's economic development plans.

### ii) *Status of forecasting agencies*

In some countries, forecasts are produced by public bodies with varying and still indeterminate powers of co-ordination over all State economic services. They may even be required to work in conjunction with private firms or their representative associations.

In other countries, the responsible agencies are government services associated with the departments responsible for the implementation of economic policy and with undertakings, but playing no active part in formulating government decisions and investment programmes.

In yet other cases, long-term forecasts are produced by private research institutes working independently.

### iii) *Types of forecast*

A very general distinction can be made between, first, an overall forecast estimating the future level of a few major aggregates, such as gross domestic product, private and government consumption, capital resources and capital formation for a whole economy and, secondly, a more *detailed* forecast analysing the future course of the various components of final and intermediate demand in order to arrive at conclusions regarding *output trends* in the various sectors and branches of the economy, the labour and capital requirements of those sectors and branches, and the growth of imports of the various classes of commodities.

3. In some countries, the *overall* estimate is the *main* stage of the procedure. In its most developed form, the aim is to compute the rate of growth and future level of the various aggregates by means of a series of functional relationships expressing the interaction of the most representative variables of general economic progress. The purpose of the detailed forecast is then to provide a transposed image of the overall growth hypothesis, which can be used direct by individual economic sectors for their own forecasts.

In other countries, the overall forecast is regarded only as a *preliminary* stage, and is merely a first exploration providing a basis for formulating one or more growth hypotheses. The purpose of the detailed forecast is then to study the possibility of implementing these hypotheses, by assembling complete data regarding the growth conditions of final demand and output and comparing them by the application of a number of consistency tests, so that the overall forecast finally becomes a synthesis of all data assembled concerning conditions of growth for each element in demand and each branch of production. Government plans are, of course, included in these data :

- plans which, although not linked with a growth target, form part of the premises of economic growth :
- specific measures to achieve a growth target and forming part of a co-ordinated programme.



## B — BASIS AND STRUCTURE OF THE REPORT

4. The Group's task was, therefore, to find a common basis and points of comparison between studies differing substantially as regards aims, form and body responsible.

We thought this to be possible because, regardless of the approach adopted, the various forecasts raise a number of common problems and use techniques which overlap to a certain extent.

The common problems relate mainly to the actual purpose of a long-term forecast, the fundamental hypotheses on which it is based, the kind of techniques likely to be used and the general manner in which those techniques can be applied. These general aspects of long-term forecasting are dealt with in Chapter II.

As regards the techniques used in forecasting, a basis for comparison can be found by studying the methods adopted for detailed forecasts.

Under the practice currently followed in the Community, detailed forecasts are not obtained by solving a system of simultaneous equations expressing the interaction of the various categories of demand and supply; they are, rather, the culmination of a series of successive approximations and of an iterative process leading, by stages only, to a final estimate of the future level of the different variables. A detailed forecast therefore, implies an overall pattern based on the overall forecast.

We, therefore, concluded that we should, in any case, define a *method of producing an overall forecast*, because this first stage is necessary for all countries, either to fulfil the main purpose of forecasting by identifying the main lines of future growth, or as an exploratory procedure to determine the basic hypothesis for a detailed forecast.

The methods to be used for the overall forecast are discussed in Chapters III and IV. Under the title "Overall estimate of supply" we have tried in Chapter III, to construct a model to be used essentially for computing the future *output of non-agricultural* undertakings.

For this aggregate, averaging 80 % of gross domestic product in the Community, we were able to recommend a number of methods and formulae, the theoretical basis of which has been discussed in detail in economic literature. They have also been checked statistically for a number of countries.

An overall forecast of *gross domestic product* is then arrived at by adding an estimate for the sectors which we regard as exogenous, namely agriculture, public services, and housing.

In Chapter IV we show how a semi-overall estimate of *demand* can be fitted to this overall forecast of output, by adding to the first estimates for capital formation, analysing public demand, formulating a hypothesis for the foreign trade balance and computing the probable growth of private consumption by main classes of needs. This part of the report concentrates on the procedure to be followed and the flexible codification of the criteria to be applied when estimating the main components of final demand. This section concludes with a suggested method for a preliminary comparison of the supply and demand forecasts.

We then considered at length whether our attempt to find a common basis for forecasts should extend to the detailed forecasts, and should, therefore, cover special growth conditions for the individual elements in final and intermediate demand and, correspondingly, for the various branches of production.

We found that national procedures vary most widely on this point. At this stage differences between "pure" forecasts and those forming the basis of government planning become more marked and it becomes very difficult to lay down uniform methods because of the diversity of the basic data available and the techniques which can be applied.

We are, however, aware of the need to define a framework and a method for the transition from overall to detailed forecasts.

This second stage must clarify and develop the overall forecast, indicate structural changes as a guide to government action and provide undertakings with fuller details of the prospects with which they will be faced. In the case of the High Authority, this stage must provide the necessary information on iron and steel, coal and energy in general and must allow the incorporation of special studies of these sectors into a general economic pattern.

Furthermore, it is only at the stage of growth forecasts that national growth hypotheses can validly be compared by a detailed analysis of foreign trade prospects.

The present report is only a first contribution to the solution of these problems.

First, the procedure suggested in Chapter IV for the semi-overall estimate of demand assists the transition to detailed forecasts by suggesting an estimate by main *classes of use*, particularly for private consumption. In this way, detailed forecasts can be started by breaking down these estimates into separate products.

Secondly, Chapter V quotes, as an example, the procedure used for detailed forecasts in France. Without expressing any final opinion regarding the application of these methods in the other member countries, the Group consider that this contribution offers a useful guide to the techniques which can be used and the conclusions which can be drawn from detailed forecasts.

The general tenor of the report can now be defined in the light of the foregoing remarks. It recommends a procedure for the solution of a detailed growth model by a series of successive approximations. It divides the forecasting process into a number of stages which vary in complexity, starting with an overall forecast of supply and concluding with a detailed forecast by elements of demand and sectors of production. Each stage has a separate model but the models for all stages are linked with each other. At the overall stage, the main emphasis is on econometric systematization, but more use is made of direct estimates for the detailed forecasts.

## C — SUMMARY OF STUDIES

5. In conclusion, we thought it useful to summarise our studies and the results obtained.

We began by reviewing the present *state* of long-term forecasting in the countries of the Community, noting differences and possible points of similarity.

As indicated in the previous sub-section, we consider that a common basis can be found primarily at the *overall* forecast level, but that the transition to detailed forecasts raises problems.

In order to comply with our terms of reference, we next had to undertake a *series of statistical studies* to provide a basis for the formulation of proposals regarding methods.

These studies comprised an empirical check of the various types of overall production function and an attempt to classify data from the input-output tables available in the countries of the Community according to a simplified nomenclature providing a basis for comparison between the various countries. The basic material and results of these studies are set out in the appendices.

For our work on *production functions* we had to collect or construct sufficiently long time series for output, employment and capital resources for a number of member countries.

Here we found the existing data to be inadequate, particularly in the matter of figures for the capital resources. Chapter III therefore contains an urgent recommendation that the governments of the six member countries should take steps, in conjunction with the Statistical Office of the European Committee, to *estimate their country's capital resources*.

From our calculations using the available basic material we concluded we concluded that it is preferable to analyse economic growth by means of functions allowing substitution between the labour and capital factors, but that studies only give statistically valid results when restrictions are imposed on the numerical values of certain parameters.

As regards *input-output tables*, our studies show that the difficulty of standardising the tables for the various Community countries is not primarily a matter of differences in nomenclature but rather of differences in the principles followed in the evaluation of transactions and the treatment of imports. Our attempt at harmonisation was confined to the nomenclature for the time being.

These statistical studies have some intrinsic value, insofar as they help to clarify certain aspects of the present economic structure and of earlier economic growth.

Within our terms of reference, however, they could not be regarded as the basis of *methodological studies relating to long-term forecasting*. The results of our studies and discussions on this particular point can be summarised as a series of proposals concerning :

- i) The general aspects of long-term forecasting;
- ii) The overall forecast of supply;
- iii) The demand forecast and comparison of the supply and demand forecasts;
- iv) The transition to detailed forecasts.

i) *General aspects of long-term forecasting*

a) Long-term forecasts exclude cyclical and chance fluctuations and are concerned with the normal growth which can be expected with full employment of the factors of production.

b) The premise of full employment assumes that unemployment is reduced to what can be regarded as a reasonable minimum for each country. It does not imply an identical level of unemployment in all countries.

c) Of the various forecasting techniques — extrapolation of trends, use of information obtained by inquiry, application of models — the last-named should be preferred as a general basis for long-term forecasting. The forecast then takes the form of a series of functional relationships expressing the interaction of the different variables.

d) With the *detailed* forecasts there is the difficulty that a complete econometric model cannot usually be constructed direct from the basic data. We therefore, recommend a series of successive approximations, using an *iterative process* with a specific model at each stage. These specific models will be linked and solved in a fixed order, with the possibility of returning to a previous stage.

e) Any serious analysis of prospects must consider the consistency of the estimates produced. Consistency tests will check the *probability* of the results obtained and also the *compatibility* of estimates for the same variable at different stages of the forecast, if the method of successive approximations is used.

ii) *Overall forecast of supply*

a) The first stage in the process of successive approximations will be a *forecast of total output*. At this stage the model must be kept simple, and will differentiate only between the non-agricultural sector and the three sectors treated as exogenous i.e. agriculture, public services and housing.

b) We recommend that the estimate for *non-agricultural undertakings* should be based on a production function explaining the growth of output in terms of the growth of labour and capital and of a time trend which is considered to represent the influence of all other factors, and of technical progress in particular.

In its general form, this function is written as :

$$v = \beta a^{\lambda} k^{\mu} e^{\nu t}$$

where :

- v = volume of output,
- a = quantity of labour,
- t = time, which is considered to represent all other factors, and technical progress in particular,
- k = capital resources,
- $\lambda$  = labour elasticity of output,
- $\mu$  = capital elasticity of output,
- $\nu$  = annual rate of increase of the residual trend.

For forecasting purposes, we recommend that only the number of persons employed should be included in variable "a", and that a variable "h" representing hours of work, should be added to the formula. Forming the differential of the function so modified we have :

$$\frac{\dot{v}}{v} = \lambda \frac{\dot{a}}{a} + \mu \frac{\dot{k}}{k} + \tau \frac{\dot{h}}{h} + \nu$$

where :

$$\frac{\dot{v}}{v} = \text{annual rate of output increase,}$$

$$\frac{\dot{a}}{a} = \text{annual rate of increase in the number of workers,}$$

$$\frac{\dot{k}}{k} = \text{annual rate of capital increase,}$$

$$\frac{\dot{h}}{h} = \text{annual rate of variation in hours of work;}$$

$\lambda, \mu, \tau$  = elasticity of output in relation to the various factors of production,

$\nu$  = rate of increase of the residual trend.

c) The estimate of the rate of increase of the output of non-agricultural undertakings then involves :

— The determination of numerical values for the parameters  $\lambda, \mu, \tau$  and  $\nu$ .

On the basis of empirical studies, we propose that the value of  $\lambda$  and  $\mu$  should be 2/3 and 1/3 respectively.

The value of  $\tau$  need not be the same for all countries. It is noted, for guidance, that a value of 0,7 was recorded for one member country.

Previous experience gives values ranging from 0,1 % to 1,6 % for  $\nu$ . In our opinion the new impetus given by the establishment of the common market justifies raising these figures to 0,5 % and 2 % respectively. If forecasters in certain countries wish to use values outside these limits they should explain clearly the nature of their choice and give their reasons. If such values are adopted for *exploratory purposes* the forecasts for other countries should include variants based on these hypotheses.

— *An estimate of the growth of the independent variables a, k and h.*

Changes in variable "a", the number of workers, will be estimated exogenously on the basis of direct demographic and economic data, allowing for the anticipated agricultural and public labour force.

The growth of variable "k", capital resources, should preferably be estimated by means of an investment function linking output and capital formation over the whole economy or directly in the non-agricultural sector.

Variable "h" average hours of work, must be estimated direct.

d) At this stage, the estimates for the *exogenous sectors* — agriculture, public services and housing — will be provisional hypotheses arrived at in various ways. These hypotheses will have to be reviewed at subsequent stages of the forecast.

e) An estimate of *gross domestic product* is finally obtained by aggregating the estimates for the non-agricultural sector and the three exogenous sectors.

### iii) *Forecast of demand and comparison of the supply-and-demand forecasts*

a) At this stage, a forecasting hypothesis has to be formulated for the main components of final demand i.e. private public consumption, gross fixed capital formation, increase in stocks and foreign trade balance.

These estimates will form part of a functional analysis preparing for the transition to detailed forecasts.

Some calculations, such as those for public consumption and the foreign trade balance, will be more clearly exogenous than others.

b) The main elements for the estimate of *fixed capital formation* will already have been obtained in connection with the forecast of total supply, because the capital resources, will have been estimated by means of an investment function linking output and capital formation. Public capital formation will be estimated as part of the functional analysis of public expenditure (see d) below) and housing capital formation as part of the estimate of housing expenditure (see f) below).

c) *Increase in stocks* will be covered by a straightforward hypothesis based on the increment of domestic product during the terminal year of the period covered by the forecast.

d) Estimates of *government consumption and capital formation* can be arrived at by a study confined to *final demand* and therefore covering current consumption of goods and services, expenditure on staff and purchases of capital goods. However, when these estimates have to prepare for the transition to detailed forecasts and must be suitable for full consistency tests, it may be preferable to include the analysis of final demand in a wider study covering *all* public expenditure (including transfers), sub-divided into the main administrative functions i.e. general administration, education, economic policy, welfare, national defence etc.

Expenditure on the different functions will be estimated, as appropriate, according the aims pursued or the general characteristics of economic growth, or on the basis of discussions with experts *from certain sectors*.

c) In the case of *foreign trade*, it may be sufficient at this stage to estimate only the *balance* of such trade on the basis of certain economic and political requirements or targets. In some cases, it will be preferable to estimate separately :

- either imports, in relation to domestic product, relative price levels and a time trend,
- or exports, in relation to the domestic product of customer countries, relative price levels and a time trend.

f) The volume of *total private consumption* may either be calculated as a *residual figure*, representing the difference between domestic product and the sum of all other elements in final demand, or may be computed *independently*. In the latter case, the fraction of the total product absorbed by private consumption may be treated either as a premise of economic policy or as a structural constant.

In all cases, consumption must be analysed by *main classes of commodity* (food, clothing, etc.).

The necessary material is provided by retrospective series, family budget inquiries and international comparisons.

According to circumstances and the data available, one or more of the following factors will be used as a variable explaining the growth of a particular class of expenditure :

- population,
- available income per head, represented for practical reasons by total consumption per head or per consumption unit,
- the distribution of incomes,
- relative prices,
- the effects of economic and social policy,
- spontaneous variations in consumption habits,
- the total stock of durable consumer goods.

The significance of each individual factor and the extent to which its influence can be incorporated as a quantitative term in the forecasting analysis, differ not only as between commodities but also as between countries. No uniform rules can, therefore, be proposed. For guidance, the report summarises the results of studies carried out in France.

g) When estimates have been made for output and the various elements in final demand, a preliminary comparison will be made of the results so far obtained.

The main points to be considered are :

- the consistency of the results obtained by aggregating the various estimates of consumption by classes of commodity;
- the compatibility of the output forecasts for the exogenous sectors (agriculture, housing and public services) with the corresponding items in final demand;
- the compatibility of the estimates for the foreign trade balance, imports and exports when they have been arrived at separately;
- the equilibrium of total resources and uses.

The *probability* of the levels forecast for the different variables will be checked and corrections made to equalise supply and demand, while at the same time ensuring at least roughly consistent relationships between the various components.

#### iv) *Transition to detailed forecasts by sector of production*

a) We recommend that the detailed forecasts should be produced in each country by methods enabling all data to be re-grouped in a simplified table of relationships between resources and uses, sub-divided into seventeen sectors of economic activity. The model proposed in table 1 is based on study of inter-industry relationships,

TABLE 1

Overall interrelation between resources and uses

RESOURCES	INDUSTRIES																	Capital formation		Public sector	Households	Rest of world		Total uses					
																		Change in stocks	Gross fixed capital formation			Consumption	Consumption	Exports to E.C. countries	Exports to rest of world	Final goods and services	Intermediate and final goods and services		
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17			Total intermediate uses									
01 Agriculture, forestry																													
02 Agricultural and food industries		-																											
03 Coal, coke and industrial gas			-																										
04 Electric power				-																									
05 Petroleum and fuels, natural gas					-																								
06 Building materials and glass						-																							
07 Iron ore, iron and steel (E.C.S.C. products)							-																						
08 Non-ferrous ores and metals								-																					
09 Engineering and electrical industries									-																				
10 Chemicals										-																			
11 Textiles, clothing, leather											-																		
12 Timber, paper and miscellaneous industries												-																	
13 Building													-																
14 Transport														-															
15 Housing services															-														
16 Other services																-													
17 Commercial activities																	-												
Total intermediate resources																													
Value added (a)																													
Total output																													
Imports from E.E.C. countries																													
Imports from rest of world																													
Indirect taxation, less subsidies																													
Total resources																													

(a) Includes: Households, wages, profits, other incomes; capital formation; depreciation.

which have developed rapidly in most of our countries since the basic work of Leontief. We recommend the use of this table, particularly for the international comparison.

b) In the present state of theoretical and empirical studies we were unable to formulate a common methodological basis for the forecasts by branches of production.

One of the major gaps in the existing material is the shortage of information on production functions by sectors and on the causes and effects of variations in relative prices. We urgently recommend a thorough study of both these subjects.

c) In Chapter V the method at present used by the French Government services is described as an example of a forecasting procedure whereby estimates of output by branches are arrived at by successive approximations and the detailed information so obtained is then used to revise the overall forecast.

While unable to advise the application of this pattern in all the Community countries, we nevertheless recommend that all concerned should study it in detail. In this description they will find useful guidance on means of overcoming difficulties in the construction of a complete econometric model by a procedure comprising the following stages :

- breakdown of final demand by categories of *products*,
- study of intermediate demand with the help of a table of inter-industry relationships,
- estimate of output, productive investment and labour requirements by sectors, with the help of an input-output and by consultation of experts,
- return to the overall forecast on the basis of information obtained during the detailed forecast; revision of hypotheses formulated in the overall forecast, study of alternative solutions and consistency tests.

6. These are our main recommendations, which should be regarded as a first contribution only. We hope, however, that our suggestions, as summarised above and developed in subsequent chapters, will be of assistance in long-term forecasting.

Before closing this introductory section, we wish to add to these recommendations, forming the practical result of our studies, two *general conclusions*, which emerge from our discussions as a whole.

The preference expressed in this report for the application of models and the importance attached to consistency tests in the case of forecasts by successive approximations, reflect our desire that long-term forecasts should follow a logical pattern respecting inter-relationships between the different variables and ensuring the consistency of all estimates.

To this end, we have used econometric relationships wherever this has seemed possible and opportune.

On the other hand, we have abandoned such formulae whenever, at a given stage of the forecast, they have seemed to be too general or based on assumptions which cannot certainly be regarded as permanent in future, even though they have proved so in the past.

In such cases, we have recommended direct estimates, where, in addition to quantitative data, the element of *judgment*, based on knowledge which cannot be measured statistically and on the powers of deduction, and even the "flair", of the forecaster, play an important part. The value of a procedure using successive approximations lies precisely in the fact that it allows comparison of various approximations, some based on functional relationships adequately proved to be reliable and of general application and others resulting from direct estimates, in which the element of judgment and knowledge of exogenous and intentional factors play a significant part.