

WORLD CONGRESS OF THE ECONOMETRIC SOCIETY

Toronto, August 20-26, 1975

RECENT TRENDS IN FRENCH PLANNING

by

*Michel DELEAU et Pierre MALGRANGE*

CEPREMAP - PARIS

N° 7511 BIS

The authors would like to thank the persons who, by their remarks and criticisms, contributed to the elaboration of this note, particularly Mrs A. BERNARD, R. GUESNERIE, Cl. HENRY, J.P. PAGE, G. SICHERMANN. They take full responsibility of remaining errors and omissions. The interpretations and conclusions are those of the authors and do not purport to represent the views of the persons cited above or of any institution.

T A B L E   O F   C O N T E N T S

	Page
I - INTRODUCTION.....	2
II - <u>THE EXAMPLE OF THE VI<sup>th</sup> PLAN.</u>	
2.a) Nature and scope of the VI <sup>th</sup> Plan : from the "Plan of the Nation" to the "Plan of the Government".....	3
2.b) Planning process and quantitative methods.....	9
III - <u>PROBLEMS OF THE FRENCH PLAN, ECONOMIC THEORY AND QUANTITATIVE       METHODS.</u>	
3.a) Introduction.....	16
3.b) Dynamics and uncertainty.....	17
3.c) Regional planning.....	19
3.d) Macroeconomic objectives and microeconomic decisions.....	22
3.e) Planning in an open economy.....	23
IV - <u>CONCLUSION.</u>	24
<u>ANNEX 1</u> : A brief history of French Planning.....	26
<u>ANNEX 2</u> : The institutional structure of the Planning Process.....	28
<u>REFERENCES</u> .....	30

-oOo-

-oOo-

## I - INTRODUCTION.

National economic planning was introduced in France following the end of World War II. Over its more than 25 years of existence, French planning has considerably evolved both in its objectives and methods. The purpose of this paper is to point out the most recent trends through an analysis of the VI<sup>th</sup> Plan (1971-1975) and of the first works and procedures associated with the VII<sup>th</sup> Plan<sup>(1)</sup>.

Our perspective is mainly "economic" ([85]). In our analysis of the functions and functioning of the Plan we will refer to some specific branches of economic theory (general equilibrium, economic policy (f.i. MUSGRAVE [90], TINBERGEN [103]), planning (f.i. MALINVAUD [80], TINBERGEN [104])). Symmetrically, we will examine to what extent French planners resort to economic theory and quantitative methods to solve specific planning problems.

The scope of the paper which focuses over the most recent years and the retained perspective set precise bounds to the relevance of our exposition : "To be perfectly rigorous, the analysis should be imbedded in a wider perspective dealing with the relationship between the State and French Society of which French planning is but a particular form, specific to our country" (SEIBEL [99]). French planning in its present form is the outcome of an historical evolution dating back to more than five years and its functions, which, in a way, call for specific types of techniques, can not be fully appreciated without considering the political and social environment<sup>(2)</sup>.

./.

- 
- (1) Although preliminary works have been launched before, the preparation of the VII<sup>th</sup> Plan actually started in November 1974. The "preliminary phase" of the preparation procedure —an equivalent of the "options phase" of the previous plans— ended in June 1975 with the adoption of a report about the orientation of the Plan.
- (2) A short history of French planning giving the main characteristics of the successive plans is presented in Annex 1. Complements may be found in the following articles and books : BAUCHET [7], CAZES [23], DELANGE [44], GRUSON [63], HACKETT, HACKETT [64], MAC ARTHUR, SCOTT [76], SEIBEL [99].

Though it was not feasible to give an exhaustive analysis of French planning in so short a paper, we have tried nevertheless to avoid the drawbacks of a purely "technicist" approach which, for instance, would reduce the evolution of French planning to a history of quantitative methods<sup>(1)</sup>. In this respect, it appeared necessary to devote the first part of our exposition (Chapter II) to the example of the VI<sup>th</sup> Plan. It being the most recent plan covering a whole "planning cycle". Besides, while corresponding to the completion of a specific planning organization, it introduces relevant inflexions as well in the functions of planning (evolution from the "Plan of the Nation" to the "Plan of the Government" (§ 2.a) SEIBEL [99]) as in the techniques (use of simulation models (§ 2.b)). The second part (Chapter III) is more methodological and technical. It deals with themes particularly relevant for French planning and leading to interesting applications either of economic theory or quantitative methods. We will thus consider the problems of dynamics and uncertainty (§ 3.b), regional planning (§ 3.c), congruence of macroeconomic objectives and microeconomic decisions (§ 3.d), international environment (§ 3.e).

Our conclusion shows how the first orientations given to the procedures of the VII<sup>th</sup> Plan confirm the double evolution initiated before : explicit limitation of the operational scope of French planning to public action, expansion of the technical "apparatus" and of the function of "study" of the Plan.

## II - THE EXAMPLE OF THE VI<sup>th</sup> PLAN.

### 2.a) Nature and scope of the VI<sup>th</sup> Plan : from the "plan of the nation" to the "plan of the government".

- i) First let us recall the general characteristics of the French plans<sup>(2)</sup>.

The French Plan is a *medium-term* plan covering a five-year period (four years up to the V<sup>th</sup> Plan). It is based in particular on macroeco-

./.

---

(1) A history which would not be entirely peculiar.

(2) More details may be found in Annex 1 and 2.

conomic representations of the final year (named "esquisses", "projections", "comptes" according to plans and authors). The choice of this horizon implies that French planning deals with *structural* problems whose resolution may require several years.

The preparation of the Plan is conducted under the responsibility of the General Planning Board (Commissariat Général du Plan). The procedure is largely "public" with representatives of the administrations, employers and trade unions. This public character of the preparation procedure is a major original feature and distinguishes French planning from other planning schemes in Western countries where the preparation phase is much more administrative.

At last, the "options" (or "orientations") and the Plan itself are submitted to political assent. They are presented to the Economic and Social Council, they are discussed and voted by the Parliament.

Schematically, one may consider that the French planning procedure performs three major functions (C.G.P. [28]). It has first a function of "*study*", dealing with medium-term analysis and prevision. The corresponding technical tasks are most often performed by other administrative institutions<sup>(1)</sup> but the General Planning Board plays an important role in impulsion and coordination. The Plan also fulfills a function of "*concertation*". It makes possible a debate between representatives of the various social groups about economic and social development. At last it means to guide and lead economic "*action*" over a medium-term horizon, particularly *public action*.

Those three main functions of French planning —study, concertation, action— have been variously implemented in each successive plan. Indeed, the evolution of French planning may be seen as *a modification of the scope of these functions*, hence of the actual influence of planning upon the various economic agents.

The case of the VI<sup>th</sup> French Plan is particularly demonstrative.

./.

---

(1) Few people are permanently working at the General Planning Board (150 approximatively)

We will come back later to its function of study (§ 2.b and Chapter III). Let us now see its function of "economic action" for each category of agents. (The reader interested in the "concertation" aspect a function somehow outside our perspective, will find details in the following references : DELANGE [44], Mac ARTHUR, SCOTT [76], SEIBEL [99]).

- ii) As for *private firms*, all the plans - except for the first to some extent - have been rather *indicative* or at most *incitative*. There has never been a planning of the decisions of private firms which could be compared to what exists, for instance, in socialist countries. The VI<sup>th</sup> Plan, or its predecessors, have never tried to replace the market. However the VI<sup>th</sup> Plan abandons some previous ambitions about the possibility of globally orienting and coordinating the decisions of private firms over a medium-term horizon through the provision of an appropriate information system.

Indeed, this function of planning put forward by P. MASSE (MASSE [84] ([26])) and which is to implement a "generalized market study" is now dropped out. It is important to comment this point since this function has been particularly prominent in the IV<sup>th</sup> and V<sup>th</sup> Plans and considered by many observers as a major originality of French Planning. The corresponding approach is very simple and derives directly from general equilibrium theory : the Plan should supplement existing short sighted markets by providing a substitute to markets for future goods (f.i. MALINVAUD [79]) which are necessary for an efficient intertemporal allocation to be reached. Such a role being but very imperfectly implemented by financial markets (MALINVAUD [79]). The reference to general equilibrium theory is particularly clear in the report on the V<sup>th</sup> Plan options : "According to the French conception, plan and market are not permutable instruments to implement the same function but correspond to two complementary functions. The role of the market is to achieve daily adjustments of fluctuating demands and supplies without an excessive computation cost... The role of the Plan is to offer a global view of the economic development which reduces the uncertainty of individual choices and cannot be provided by the operation of markets. All long term decisions, particularly investment ones, rest in fact on a conception of the future. But it is clear that the market does not provide

this conception. No market exists which enables the prices of steel or transistors, or the freight rates from Labrador to Dunkirk, to be negotiated fifteen years in advance..." ([26]). In practice, the privileged technical instrument to implement this "generalized market study" is the Leontieff input-output table which takes into account the interdependencies of sectoral production decisions. Very detailed physical projections have been one major technical support for the preparation of the IV<sup>th</sup> and V<sup>th</sup> Plans. When known by economic agents, they were supposed to constitute a coherent system of expectations, fulfilled if considered as "true" ("self-fulfilling anticipations").

The VI<sup>th</sup> Plan abandons almost entirely this approach and the corresponding techniques. Detailed projections play a subordinate role only, as a desaggregation of the macroeconomic global projection. The objective of "congruence", so strongly looked for in previous plans (MASSE [84]), is now considered as non important in this area (C.G.P. [28]). One may of course discuss at length about the relevance or irrelevance of previous ambitions and advance political or technical arguments<sup>(1)</sup>. What must be stressed here is that the VI<sup>th</sup> Plan explicitly abandons all attempt at globally coordinating the economic decisions of private firms<sup>(2)</sup>.

./.

---

(1) Let us quote two technical arguments advanced against the relevance and efficiency of the "generalized market study". As pointed out by MAC ARTHUR and SCOTT [76], one may wonder about the relevance of a detailed balance given in *physical terms* for an open economy where national agents may substitute between national and foreign markets according to *prices*. Moreover, it has been checked that the knowledge of the physical projections was limited to very big firms only (CARRE, DUBOIS, MALINVAUD [19]). Of course the problem of coordinating or not private firms through planning is by no means a purely technical one.

(2) The "generalized market study", considered as a part of the function of economic action of the plan in the 60<sup>s</sup>, may be taken up again for the VII<sup>th</sup> Plan. But it would then be considered as a pure research output and not integrated to the Plan itself (project of "revolving detailed projections"). One might observe here a transfer of a technical activity from the function of "economic action" to the function of "study".

On the other hand, sectoral "priority" actions are still programmed in the plan. For instance the VI<sup>th</sup> Plan, Plan of the "industrial imperative", set priority on the development of some strategic sectors (chemicals, electronics...)

This can be paralleled with the framework of global 1975 projections where the distinction between sectors is essential for economic policy measures (§ 2.b). But here again, the "allocation" aspect (MUSGRAVE [90]) of this approach and of corresponding economic policy which was predominant in previous plans, is of very minor importance. The stress is on the "regulation" aspect which refers to the problem of public economic policy.

iii) As to this point, a medium-term plan may guide and lead *public economic action* in two ways. Firstly, the macroeconomic figures of the Plan (prices, employment, growth,...) may constitute references, "targets", for *annual economic policy* measures (DELEAU, GUESNERIE, MALGRANGE [48].

Secondly, the Plan may define and coordinate large scale *programming of public investments*, particularly collective ones.

The IV<sup>th</sup> and V<sup>th</sup> Plans tried fulfill both tasks. In particular, the introduction of "signals"<sup>(1)</sup> (fr. "clignotants") for the V<sup>th</sup> Plan was meant to provide a rather strict guideline to annual economic policy : "The definition of alarm indicators, which should trigger corrective policy measures, if necessary, will materialize the necessity of fulfilling two major objectives : stability and full employment ; this will allow a better adjustment of medium term development policy and short run economic action" ([26]). The VI<sup>th</sup> Plan renounces very largely to providing such a strict guideline to annual economic policy. Major choices are defined (f.i. development of industry) but the procedure of planning control (§ 2.b) does not mean anymore a quasi-automatic regulation ("indicators" succeed to "signals").

./.

---

(1) A "signal" is defined by an indicator and a "blinking" limit. Example for the price level :

- indicator : average growth of consumption price index over the last 12 months.
- blinking limit : same indicator for foreign countries + 1 % during three months.

On the other hand, the VI<sup>th</sup> Plan has put an emphasis on coherent programming of public investments ([73], [74]).

A global envelope of 228 Mds<sup>(1)</sup> has thus been split into nine "collective functions" following several arbitrations and iterations on a national and regional level. This repartition has then been completed by the elaboration of detailed regional programs ("Programmes regionaux de developpement et d'équipement" [73]).

- iv) We must eventually say that the influence of successive plans upon other agents (trade union f.i.) has been weak. During the preparation of the V<sup>th</sup> Plan, the planners thought of using the planning procedure for elaborating *medium-term contracts*<sup>(2)</sup> between social agents (particularly about prices and wages-1963 income conference, MASSE [83]). Those were only great expectations. They have been explicitly dropped in the VI<sup>th</sup> Plan. There remained only contractual procedures concerning local organizations.
- v) This brief analysis shows clearly that the VI<sup>th</sup> Plan embodies —or confirms— a noticeable evolution in the basic concepts of French planning and the functions of the Plan. With respect to this evolution, the VI<sup>th</sup> Plan stands at midway between a "Plan of the Nation" and a "Plan of the Government" (about French Planning "ideologies" see MAC ARTHUR, SCOTT [76], SEIBEL [99]).

The "Plan of the Nation", a capital notion for the IV<sup>th</sup> and V<sup>th</sup> Plans, means to be a "contract" between *all* social forces, an "ardent obligation" which founds the "third way" between capitalism and socialisms. The Plan does not replace the Market but supplements it by reducing uncertainty about future economic conditions. It provides a guideline for annual economic policy and defines a large-scale programming

./.

---

(1) 100 Mds were supposed to be financed by State budget. 20 % of those programs were itself declared priority ones. At last, P.P.S.S. techniques were used to define some "finalized" programs (traffic safety, ..., see LION [75]).

(2) Conception of the "Plan federating plans" (C.G.P. [28]).

of public investments. At last its aim is to associate all social groups through the elaboration of binding contracts and the fixation of norms.

In contradiction, the "Plan of the Government" may still perform an important function of study and concertation<sup>(1)</sup>. Its operational scope is definitely limited to public action. It means to provide a framework for the medium-term economic policy of the government, being binding only for a limited number of priority programs. Nothing is left of the ambitious desire to globally coordinate private economic decisions through a "generalized market study" or the fixation of contracts.

The VIth Plan stands at midway between these two polar conceptions of French planning. It keeps a very heavy "concertation" apparatus with a host of commissions, committees, technical groups... (approximately 3000 persons) (SEIBEL [99]). But, with it, economic action is explicitly limited to public economic policy. The way is paved to a plan of the government.

## 2.b) Planning procedure of the VI<sup>th</sup> Plan and quantitative methods

- i) In the planning procedure of the VI<sup>th</sup> Plan and associated works, there are elements of continuity and innovation too. In particular, the preparation phase corresponds to the completion of a specific type of organization tested during the previous plans. On the other hand it is the first time that planners resort on a large scale to a macroeconomic simulation model, Fifi. This model allows more projections to be made and widens the scope of medium term quantitative economic analysis.

We will see in this paragraph how these "modern" quantitative methods were used to support a traditional planning procedure.

- ii) The planning procedure of the VI<sup>th</sup> Plan, as with the IV<sup>th</sup> and V<sup>th</sup> Plans before, can be split into three phases : preparation, implementation, control (TINBERGEN [103]).

The *preparation phase*, dealt with now, being the culminating

./.

---

(1) The "concertation" function of planning is still useful for a plan of the government but its meaning is different. It must be seen as a "social simulation" (DELANGÉ [44], SEIBEL [99]) allowing the State to test the reactions of the various social groups to its economic policy and no longer as a search for a social consensus.

time of the procedure. A very large number of persons take part in this phase which is supported by numerous quantitative studies. Among these studies, the global macroeconomic projections relative to the final year of the Plan play an important role and the introduction of Fifi was indeed a major innovation<sup>(1)</sup>.

Details about the theoretical structure and specification of the model may be found in numerous articles (for instance AGLIETTA, COURBIS [ 1], AGLIETTA, COURBIS, SEIBEL [ 3], PHAN [94]). Let us briefly recall that Fifi is a 2 000 equations model with seven branches and products (Agriculture/Food industry/Energy/Manufacturing/Transport and Communications/Housing/Construction and public works, services and trade). Transfers between agents are very detailed. Given a basis year (1965 for the VI<sup>th</sup> Plan) projections are made for the final year of the Plan (1975). *The model gives a point, not a trajectory.* Besides, the theoretical scheme describes an economy "exposed" to international competition. The price of the "exposed" sector (manufacturing in Fifi) is almost exogenously set on international markets. This assumption, the hypothesis of a desired self-financing rate and the inclusion in the model of a Philipps curve imply the following consequences for economic policy (cf. Table 1 - for more details see COURBIS [37], DELEAU [46], PHAN[94]).

1. Standard Keynesian policies are inefficient, or even "perverse". They do not bring any substantive change of the employment level but lead to employment shifts and variations of imports.
2. Any economic measure which ex-ante raises the cash flow of the exposed sector (f.i. higher productivity, lower public prices, subventions, lower tax rates...) is very beneficial for employment and growth<sup>(2)</sup>.

./.

---

(1) Several projections ("esquisses") for the year 1970 had been computed for the V<sup>th</sup> Plan but they were non automatic methods of high (human) computation cost ([68], [69]). In comparison Fifi appears as a progressive innovation. It should be stressed however that the learning-by-doing gained during the V<sup>th</sup> Plan (INSEE [68]) as well as some associated studies (COURBIS [35]) played an important role in the elaboration of the model.

(2) It was said that Fifi was used to legitimate the following point of view : what is good for industry is good for France (C.G.P. [32]).

TABLE 1.

A SIMPLE MODEL OF AN "EXPOSED ECONOMY".

(From COURBIS [37])

- . Variables :
- Q = production (model with one product)
  - M = imports
  - I = investment
  - C = household consumption
  - $\bar{G}$  = public expenditure
  - R = household income
  - A = cash flow of industry
  - N = employment
  - p = price
  - w = wage rate.

. Equations :

Supply - demand equilibrium :

$$(1) \quad Q + M = C + I + \bar{G}$$

Technology :

$$(2) \quad I = \bar{k} Q$$

$$(3) \quad N = \bar{\omega} Q$$

Wages and incomes :

$$(4) \quad w = \bar{\alpha}_0 - \bar{\alpha}_1 p + \bar{\alpha}_2 N \quad (\text{Phillips' relation})$$

$$(5) \quad R = w N$$

$$(6) \quad A = p Q - w N$$

Consumption Function :

$$(7) \quad p C = \bar{\gamma} R$$

Desired self financing rate :

$$(8) \quad p I = \frac{A}{\bar{a}}$$

Exposed economy :

$$(9) \quad p = \bar{p}$$

. Resolution  $w = \frac{(1 - \bar{a} \bar{k}) \bar{p}}{\bar{\omega}}$

$$N = \bar{\alpha}_0 - \bar{\alpha}_1 \bar{p} + \bar{\alpha}_2 w \quad (\text{not dependent on } \bar{G})$$

As for its use in the preparation phase, three periods should be distinguished (BONNAUD, PAGE [15]).

The first period (March 68-Sept. 69), purely "administrative", led to the elaboration of a "diagnosis" synthesized by the "preliminary projection" ("compte de départ" Sept. 69 - AGLIETTA et al [2]). This projection, made with the help of Fifi, was based on assumptions elaborated by extrapolating the past. At this stage, the use of the model is of a "previsional" type. The planners want to study what "will happen" if "everything is the same". This "preliminary projection" disclosed several worrying features (weaker growth, strong inflation, unemployment, foreigntrade deficit).

The concertation procedure followed and the "preliminary projection" was submitted to the Commissions (see Annex 2). The research for alternative development schemes was based on a *simulation use* of Fifi, from *instruments or uncontrolled variables towards objectives*. This study of the set of feasible "economic states" led to three main synthetic projections<sup>(1)</sup> (with growth rates of 5,5 % ; 6 % ; 6,5 %) (BONNAUD, PAGE [15]). They were submitted to the Government who set "options" for the V<sup>th</sup> Plan close to the 6% scheme. A projection for the options ("compte d'options") was then built with the help of Fifi (July 70).

After the options had been adopted by the Parliament, an *iterative procedure* started so as to precise the *conditions of implementation of the options*. Schematically, the options can be seen as an implicit representation of the "preferences" of the Government. Fifi was then used in a kind of *iterative "optimization" procedure* (without explicit objective function) similar to those considered in planning theory (f.i. MALINVAUD [80] - functioning : objectives → instruments → objectives...). Simultaneously, the associated economic policy measures were thoroughly examined and detailed. This iterative process ended with the definition of a "projection for the Plan" ("Compte de Plan") a quantitative representation for the development scheme eventually adopted (July 71).

./.

---

(1) During this period, two other schemes were studied, one, about a "Japanese type" growth (demand of the employers), the other about a reduced labour time.

TABLE 2

USE OF FIFI IN THE PREPARATION PROCEDURE OF THE VI<sup>th</sup> PLAN.

Phase	Objective followed and type of use	Projections
Preliminary phase (68-69)	<ul style="list-style-type: none"> <li>. Identification of medium-term problems</li> <li>. Use in "prevision"</li> </ul>	<p style="text-align: center;">"Preliminary projection"</p>
Options phase (Oct.69- Jul1.70)	<ul style="list-style-type: none"> <li>. Definition of the set of feasible states</li> <li>. Simulation (instruments uncontrolled variables → → objectives)</li> </ul>	<p style="text-align: center;">Variants ↓ Synthetic projections ↓ Three projections preliminary to the options ↓ "Projection for the options"</p>
Terminal phase (Sept.70-Jul1.71)	<ul style="list-style-type: none"> <li>. Conditions of implementation of the options</li> <li>. Implicit optimization (Iteration : objectives → instruments → objectives → instruments...)</li> </ul>	<p style="text-align: center;">Synthetic projections ↓ Projection for the Plan</p>

Various "detailed" projections were also elaborated during the preparation procedure (for a complete presentation see

INSEE [70]). Some meant to elucidate assumptions of Fifi (f.i. demographic projections [70]). Others consisted in desaggregating the global projection (f.i. : projections in 36 branches) or making them more explicit (f.i. : sectoral studies).

Several of these detailed projections were themselves outputs of specific models (see Table 3 and corresponding references). There was thus a progressive and decentralized building-up of a *system of models* (see PAGE [92], SEIBEL [99]), characterized by the coexistence of a central model, Fifi, and specific peripheric models. The links between them are not entirely formalized and the management of the whole system is of a discretionary type with numerous so called "man-machine" interactions<sup>(1)</sup>.

TABLE 3.

<u>SECTORAL MODELS.</u>	
- Agriculture	[[98]]
- Housing	
FILO (Financing)	[[20]]
POLO (Policy)	[[21]]
- Energy	
FINER (Financing)	[[13b]]
- Imports	[[95]]
- Fiscality	
IRPP (Income tax)	[[10]]
- Administrations	[[89]]
-Models for desaggregation Fifi projections	
Fifi en 6, Confi 1	
-Detailed projections	
Tecal, Ecol (Public investments)	
Etat (Budget)	
Secus (Social security)	
Confi 2 (Financial accounts)	
Ospae (Semi-public organization)	
Apié	

./.

---

(1) About the problems raised by the use of a system of models for national planning, see PAGE J.P., ROYER J. [93].

iii) Let us now deal with the *implementation* and *control* of the Plan. Our exposition will be short since the Planning Board itself does not directly meddle with annual economic management. Besides, the recourse to quantitative methods is weaker during these two phases.

As for the implementation phase, the National Planning Board is not directly responsible for the execution <sup>(1)</sup> of the Plan but can *take part* in it. For instance, the Commissaire is a permanent member of some economic policy committees, specific types of investment projects must get the Board's approval etc... (for the case of industrial policy, see BONNAUD [14]). Nevertheless, the main part of public economic policy is directly implemented by the Ministry of Economy and Finance. The National Planning Board is more directly concerned whenever there is need of some kind of concertation (f.i. regional programming).

The National Planning Board is more autonomous in controlling the fulfillment of the Plan. We overlook here the traditional form of control which consists in the elaboration of an annual report presented to the Parliament. But we will comment upon two "technical" forms of control which resort to some quantitative methods.

The first consists in the publication of quarterly statistical "indicators" ("indicateurs associés au Plan") whose purpose is to "detect movements relevant from a medium term point of view" ([31]) and relative to Plan objectives, international environment and French industry. These "indicators", which succeed to the "signals" of the V<sup>th</sup> Plan, are devised as a pure information system with no automatic implication for economic policy.

Moreover, a better adjustment of the initial choices of the Plan with the actual events of the period has been looked for. A "revolving planning" scheme having been put aside (C.G.P. [31]) a midway exam

---

(1) The largely "indicative" character of French Planning and its atemporal and rigid formulation make the notion of execution rather ambiguous, at least for macroeconomic objectives (see MASSE [85]). The same remark can be made about control. Of course, the problem is much simpler for precise sectoral programs.

procedure was instituted. This procedure actually worked at the end of 1973. It was supported by three years projections given by the DFCA model ([13] and § 3.b) and checked the conformity, at that time, of the actual economic evolution with the initial objectives.

### III - PROBLEMS OF THE FRANCH PLAN, ECONOMIC THEORY AND QUANTITATIVE METHODS.

#### 3.a) Introduction.

The VI<sup>th</sup> Plan proved the end of previous ambitions about the operational scope of French Planning but it developed the technical "apparatus" of the preparation phase.

This last trend is of course related to a general development, in all countries, of the applications of economic theory and quantitative methods to economic policy problems. For the specific case of the French Plan, it indicates the increase of the function of "study" in planning. Of course, the National Planning Board has no monopoly over medium-term studies. Almost every ministry has got a department of research and prevision. Nevertheless, the Planning Board is the only administrative body with a specific mission for initiating medium term synthetic studies or coordinating more specialized ones. Even in the case of a "plan of the government" whose main finality is to support medium-term public economic policy, the function of study is capital.

The innovations introduced during the VI<sup>th</sup> Plan make up a progressive step but are not sufficient for an efficient treatment of several major economic problems particularly relevant for medium-term planning. We will see how some of these problems have been tackled with. In the perspective of this paper we chose to put the stress on those works where economic theory or quantitative methods are basic elements.

Some areas have been overlooked, where the corresponding works are of a more "statistical" nature (elaboration of series, indicators,

accounts...) or because the approach is still weakly formalized or quantitative (f.i. social problems see J. DELORS [49])<sup>(1)</sup>. Given this bias towards methodological relevance, we will deal with the following problems : dynamics and uncertainty (§3.b), national-regional integration (§ 3.c), consistency of macroeconomic objectives and microeconomic decisions (3.d), international environment (§ 3.e).

### 3.b) Dynamics and uncertainty.

i) Up to now, French plans have been based on representations relative to the final year and following from "ponctuel" assumptions without alternatives (DELEAU, GUESNERIE, MALGRANGE [48]). Hence the ambiguous meaning of the "average growth rates" of the Plan for guiding economic policy. The reference may even become useless if the actual events are too far from the initial assumptions. For instance, the relevance of the last two plans have been largely invalidated by major events (May 68 and the oil crisis). The improvement of the so called "short term-medium term link", more or less equivalent to a Plan-Budget coordination is not a purely technical problem. It could benefit however from quantitative studies in three areas :

- elaboration of dynamic models
- identification and quantification of elements of risk
- "strategic" approach to economic policy.

ii) We have mentioned before that Fifi gives a projection of the final year, a "point" not a trajectory. Intertemporal interpretations can be made ("average growth rates"- see C.G.P. [32]) but their meaning is not very precise. The least so as the characteristics of the starting period are more peculiar and preclude any reference to a smooth constant-rate growth. Improvements in the intertemporal explicitation of the Plan can be gained by the use of dynamic models. Several annual dynamic models

./.

---

(1) Nothing will be found either about the extension of quantitative methods to monetary and financial phenomena. These last few years several works have been done in this field (for a survey see LEVY-GARBOUA ed. [ ] although not directly connected with planning except for a miniaturized version of Fifi, Mini-Fifi-TOF (ROSSIGNOL, ROUX-VAILLARD [97]). It was meant to test the integration of financial operations in the big model. This project itself has not materialized yet.

have been elaborated during these last ten years by the Direction of Prevision of the Ministry of Finance (in a chronological order ZOGOL (HERZOG, OLIVE [66]), DECA (BILLAUDOT [13]), STAR (BOULLE & al. [17], [18])). These models however are mainly intended for short-run projections related with the elaboration of the Budget (f.i. BOULLE [16]). During the preparation of the V<sup>th</sup> Plan, DECA was used to associate a trajectory with the "preliminary projection" given by Fifi. The operation had but methodological results without actual implications for the preparation of the Plan. It seems that for the VII<sup>th</sup> Plan a study of the first two or three years will be made on the basis of projections given by STAR. Besides a dynamic multi-sectoral model intended for medium-term projections is being built at INSEE (FOUQUET [53]).

- iii) The identification and quantification of the main elements of risk also constitute a basic element for improving the coherency between objectives of the Plan and annual economic policy. Qualitative identification of the main "hazards" has been searched for during the preparation of the VI<sup>th</sup> and VII<sup>th</sup> Plans (groups "hazards" C.G.P. [29]). Moreover, three quantitative studies were devoted to this problem. The sensitivity of the macroeconomic projections of Fifi for the V<sup>th</sup> Plan with respect to uncertain parameters was thoroughly tested on the basis of numerous variants (AGLIETTA and al. [2]). Fifi was also used to elaborate "structural schemes" corresponding to polar types of economic growth (GUILLAUME M., ULLMO B. [62]). At last, a methodological study (DELEAU [47]) based on a miniaturized version of Fifi (ROSSIGNOL, ROUX-VAILLARD [97]) yielded a quantitative evaluation of the uncertainty "surrounding" the central projection of the V<sup>th</sup> Plan and an identification of its main sources. To give an example, the standard error about the growth rates of productions (average value = 6 %) is around 0,9 % (under an assumption of rigid policy). The main sources of uncertainty, contributing to 80 % of the total, come from the factors of determination of wages, incomes and prices (international environment, Philipps curve, self financing desired rates, productivity assumptions).
- iv) A good knowledge of the dynamic workings of French Economy and of the main elements of risks could ground a quantitative approach to a "strategic" definition of planning. In this perspective, the Plan would not

correspond any longer to a once-for-all-set-action, but to a "rule of action" (f.i. MARSCHAK, RADNER [87]). Such conceptions had been examined before (MASSE [84]) and gave birth to the notions of "selectivity", "priority" and "flexibility", introduced in the VI<sup>th</sup> Plan ([30]). In the same line, a methodological operation, Optimix, yielded a complete quantified formalization of the coordination between the VI<sup>th</sup> Plan objectives and annual economic policy (DELEAU, GUESNERIE, MALGRANGE [48]). The framework is a classical decision-making scheme (f.i. MARSCHAK, RADNER [87]). A social preference function for the VI<sup>th</sup> Plan (GUESNERIE, MALGRANGE [53]) is determined through interviews and "inverse optimum" techniques (FRISCH [54]).

This function yields a ranking of trajectories given by the dynamic model DECA. Three decision variables (public expenditures, subventions to firms, income tax) and two uncertain uncontrolled variables (wage increases, exports) are taken into account. Two types of computations are then made. "Rigid" trajectories are based on "certainty equivalents" (THEIL [101], MALINVAUD [82]) for the uncontrolled variables and illustrate the notion of "average path" of the Plan ([32]). On the other hand, stochastic decision rules (DELEAU, MALGRANGE [45]) are computed on a linear-quadratic approximation of the original scheme (f.i. THEIL [101]). Different information structures are considered and can be interpreted as different planning organisations (periodic revision schemes, ...)

### 3.c) Regional planning

The "regionalization" of the Plan has been considered for many years. In 1962, for the first time, global envelopes for public investments were split into a regional repartition. The regionalization of the Plan should serve two purposes : it should define a global policy for the organization of space, a field where "market failures" are prominent ; it should help to decentralize public decision-making.

However, up to now, regional planning has not been supported by very sophisticated quantitative methods. This is due in particular to a lack of reliable statistics. Methods of regional accounting were tested during the V<sup>th</sup> Plan (ANFRE [ 5]) and yielded accounts for some categories of agents ([55b],[75b],[93b]). Indeed standard regional projections about demography and employment remained the main quantitative support for regionalizing the VI<sup>th</sup> Plan [70].

The VII<sup>th</sup> Plan should benefit from a technical innovation : the "regional-national" macroeconomic simulation model, Regina (COURBIS, PRA-GER [41]). This model provides a synthetic framework for regional and national economic analysis. It is a "medium-term" model giving punctual projections (cf. Fifi). National space is split into five main regions, with a subdivision in three zones for some variables. Three types of location behaviour for the firms have been considered : location by "supply" (f.i. agriculture), location by "demand" (f.i. housing, services, trade), (cf. input oriented, output-oriented distinction ; f.i. BECKMANN [ 9]), location according to differential factors (food industry, manufactures). Supply and demand behavioural equations are treated at a regional level (man-hours productivity, capital ratio, Leontieff coefficients, Philipps curve, consumption functions). Table 5 gives the level of analysis for the different variables of the model ([39]). The scope of Regina implies that it is a very big model (8 000 equations). Hence possible problems in understanding and interpreting the simulation results. The first projections for 1980 should be available next Fall.

./.

TABLE 4

VARIABLES OF REGINA.

(from [39])

Level	Variables
ZONE	<p><u>Employment and demography :</u></p> <ul style="list-style-type: none"> <li>. Employment (/activity)</li> <li>. Foreign immigration</li> <li>. Migrations between zones</li> <li>. Frontier workers</li> <li>. Working population and unemployment</li> <li>. Total population and number of households.</li> </ul> <p><u>Incomes and demands :</u></p> <ul style="list-style-type: none"> <li>. Total wages (/activity)</li> <li>. Rents.</li> </ul>
REGION	<p><u>Demography :</u></p> <ul style="list-style-type: none"> <li>. Migrations between regions</li> </ul> <p><u>Goods and Services :</u></p> <ul style="list-style-type: none"> <li>. Regional input-output accounts ; interregional and international trade</li> <li>. Production and investment (/branch )</li> <li>. Household consumption</li> <li>. Housing investment</li> <li>. Public investment .</li> </ul> <p><u>Agent accounts :</u></p> <ul style="list-style-type: none"> <li>. Households</li> <li>. Local administrations</li> <li>. Agriculture.</li> </ul> <p><u>Wage rates and prices :</u></p> <ul style="list-style-type: none"> <li>. Wage rate</li> <li>. Service prices.</li> </ul>
NATION	<p><u>Sectoral accounts and prices (firms).</u></p> <p><u>Other accounts</u> (Non local administrations ; financial institutions ; foreign countries).</p> <p><u>Financial transactions account.</u></p>

3.d) Macroeconomic objectives and microeconomic decisions.

- i) The "liberal" nature of French economy where most economic decisions are decentralized raises the problem of coherency between Plan objectives and individual choices. The general Planning Board has thus been led to propose doctrines about prices, taxes and tariffs. They derive most often from the general equilibrium model conclusions on the correspondance between "efficient" or "optimal" economic states and "competitive equilibria". Thus in the line of an approach advocated for many years by French "engineers economists" (Cf. DREZE [52]) (principles of "true pricing", "deperequation of tariffs", "marginal cost pricing", "discounted value criterion"... ) (C.G.P. [33]).

Beyond these doctrines, two streams of quantitative studies are inspired from the microeconomic model, dealing respectively with the choice of a discount rate associated with the Plan and cost-benefit analysis techniques.

- ii) Evaluations of a "discount rate of the Plan" <sup>were</sup> first made for the V<sup>th</sup> Plan on the basis of a very aggregated one-sector growth model (MASSE [86]). The method is simple. A long-run growth path (20 years) is associated with the central projection of the Plan. The consumption program corresponding to a "marginal" increase of the investment rate is then computed. The Plan rate of discount is defined as the discount rate making the discounted sum of marginal consumption variations equal to zero. This is, in a way, an "inverse optimum" technique which reveals a discount rate "associated" with the Plan choices.

Such works have been done again for the VI<sup>th</sup> Plan, with the help of a more sophisticated econometric model, Antoine (BERNARD, MAIRESSE [11]), with five branches, Cobb-Douglas production functions and exogenous technical progress (cf. CASS [22]). A first evaluation reached by a similar method and based on a 1985 growth path (ANDREANI, GAURON [4]) gave a high value (20 %). The growth path of Antoine optimal for this discount rate coincides with the original path for the main characteristics only (rate of investment, rate of growth). The optimal production

techniques are far from the techniques of the reference trajectory. This led to a reformulation of the initial framework and a final evaluation of the discount rate in the neighbourhood of 10% (BERNARD, MAIRESSE [11]). This discount rate was then advised for an evaluation of investments by public firms and administrations (C.G.P. [ ]).

iii) Another quantitative study deals with cost-benefit analysis (GUILLAUME M., ROCHARD [58]). The evaluations made on the basis of market prices or shadow prices most often overlook feedback effects and implications for general economic policy objectives (trade surplus, employment...). The research about this theme led to the formulation of a general second best model (GUILLAUME M [59]). This model shows how the consideration of macroeconomic objectives and/or constraints alters traditional evaluation rules. It can be interpreted within the organizational framework given by MUSGRAVE [90] (distinction of offices for allocation, regulation and distribution). At last a numerical application, based on the preference function of the VI<sup>th</sup> Plan (GUESNERIE, MALGRANGE [56]), was made for the case of coal mining regression (GUILLAUME H., ROCHARD [58]). It led to conclusions contradictory to those of a more classical sectoral approach.

### 3.e) Planning in an open economy.

With the IV<sup>th</sup> Plan, the "open" character of French economy has given birth to a major problem: the change in tariffs and regulations following the Rome treaty led to an accelerated development of foreign trade, hence an increased dependency of France upon foreign economies. At the time of the IV<sup>th</sup> Plan, some economists even wondered about the feasibility of any national planning (f.i. BALASSA [6]). A sure point is that French planning, to remain operational, must take great care of the interactions between national and foreign economies.

This concern has been increasing with each successive plan and quantitative works tried to follow. Up to the VI<sup>th</sup> Plan, they are traditional methods of projecting imports and exports, not explicitly connected with national studies. Foreign trade aspects are integrated for

the VI<sup>th</sup> Plan within the framework of Fifi (see previously). However, besides criticisms about the theoretical assumptions, the treatment of foreign economies in Fifi is itself purely exogenous.

An entirely endogenous and integrated treatment is given in a new model, used for the VII<sup>th</sup> Plan, Moïse (COURCIER, LAFAY [43]). This model is a "world model" based on several interconnected regional blocks. Twenty zones are distinguished within three main classes (grosso modo OECD countries, socialist countries, third world). Foreign trade projections are given for 13 products. The specification is rough for each regional block (many allocation coefficients), more detailed about exports and imports equations (particularly for manufactured).

The model is used for punctual medium term projections. During the preliminary phase of the VII<sup>th</sup> Plan, world scenarios were made up (GEPI [55]). The model should be used again during the second phase to give foreign scenarios coherent with the global projections of Fifi.

#### IV - CONCLUSION.

The previous exposition points out a double evolution of French planning. The V<sup>th</sup> Plan embodies a shift from a "Plan of the Nation" to a "Plan of the Government". The main operational purpose being now to contribute to the definition of public action. At the same time, the same time, the function of "study" becomes more important and benefits from the introduction of sophisticated techniques and methodological tools which apply economic theory and quantitative methods to medium-term planning.

The first procedures and works of the VII<sup>th</sup> Plan follow the line of the VI<sup>th</sup> Plan. Its new institutional characteristics <sup>(1)</sup> are typical of a plan of the government : creation of a "central planning council" under the direct heading of the President, transformation of the "options phase" into a

./.

---

(1) It is sometimes said that these transformations were imposed by the lack of time due to the peculiar features of the starting period (oil crisis, new presidential election). Of course, events may have accelerated the transformation but are not the fundamental motives.

"preliminary phase", lightening of the concertation apparatus. What may be known about the future procedures (stress put on "priority programs" elaborated under the direct responsibility of various ministries) is also coherent with this new conception.

Simultaneously, the recourse to simulation economic models for the preparation of the Plan increases. Besides the global 1980 projections given by Fifi, world simulations have been operated with Moïse and regionalized projections will be available next fall. Here again, the trend is towards an increased "technicity".

-oOo-

A N N E X 1.

A SHORT HISTORY OF FRENCH PLANNING.

This short history gives brief informations about the general characteristics, contents and techniques of each successive Plan.

I<sup>st</sup> Plan (1947-1950 ; extended until 1953)

- . Plan of "reconstruction"
- . Stress put on six "basic sectors" (coal mining, electricity, steel, cement, agricultural machinery, transportation). Definition of "capacity" objectives and indications about corresponding investments (elimination of bottlenecks).
- . Sectoral studies.

II<sup>nd</sup> Plan (1954-1957)

- . Plan of "modernization" (restoring a competitive economy)
- . Stress put on competitiveness and definition of "basic actions" (technical and scientific research, specialisation of firms, normalisation and standardisation, organisation of markets, reconversion)
- . Global production study plus sectoral studies.

III<sup>rd</sup> Plan (1958-1961) (with an "intermediary" Plan 60-61)

- . Plan of "foreign competition" (Rome treaty)
- . Stress put on monetary stability and foreign trade equilibrium
- . Use of an input-output tables and of national accounts.

IV<sup>th</sup> Plan (1962-1965)

- . Plan of "economic and *social* development" (Gaullist ideology of the "third way", "concerted economy"...) )
- . Stress put on social aspects (public investments, income distribution)
- . Projection of interindustrial accounts and national accounts (constant prices). Test of financial accounts. First regional studies. "Generalized market study".

V<sup>th</sup> Plan (1966-1970)

- . Plan of "balanced growth"
- . Stress put on competitiveness, price stability and income distribution.
- . Projection of interindustrial accounts, national accounts (*current prices*), financial accounts. Regionalized demographic projections "Generalized market study".

VI<sup>th</sup> Plan (1971-1975)

- . Plan of the "industrial imperative"
- . Stress put on the development of a competitive and strong industrial sector.
- . Simulation model (Fifi). Projection of financial accounts. System of specific models. Regression of sectoral projections.

A N N E X I I

INSTITUTIONAL STRUCTURE OF THE PLANNING PROCESS.

1. THE "CENTRAL PLANNING COUNCIL" (Conseil Central de Planification).

This "council" was created in October 1974. It is directly headed by the President of the Republic. The permanent members are the Prime Minister, The minister of Economy, the Minister of Labour, the Plan Commissaire. This council meets every month, deals with the main planning problems and defines directives.

2. THE "NATIONAL PLANNING BOARD" (Commissariat Général du Plan).

The National planning Board is the permanent planning administration. It is headed by a Commissary. An average of 150 people work at the National Planning Board.

3. THE "COLLABORATING" ORGANIZATIONS.

The two main collaborating administrations are the National Institute for Statistics and Economic Studies (INSEE) and the Direction of Prevision. Both are directions of the Minister of Finance. They execute most of the quantitative technical works used in the preparation and control of the Plan.

The National Planning Board may also get the collaboration of research centers which it subsidizes (CREDOC, CEPREMAP) or with which it signs contracts (GEPI, GAMA, BIPE...).

4. THE "CONCERTATION" APPARATUS.

The concertation is operated inside a system of "Commissions". They are composed of representatives of the administrations, trade unions, employers and of "experts".

This concertation apparatus has become increasingly important up to the VI<sup>th</sup> Plan (which introduces a distinction between Commissions and Committees).

I <sup>st</sup> Plan	8 Commissions	494 Persons
II <sup>nd</sup> Plan	22 Commissions	604 Persons
III <sup>rd</sup> Plan	21 Commissions	704 Persons
IV <sup>th</sup> Plan	26 Commissions	1055 Persons
V <sup>th</sup> Plan	30 Commissions	1950 Persons
VI <sup>th</sup> Plan		3000 Persons (approximatively)

Up to the VI<sup>th</sup> Plan, there was a distinction between "vertical" Commissions (productive sectors, collective functions) and "horizontal" Commissions.

In opposite, the preliminary phase of the VII<sup>th</sup> Plan was supported by only 4 Commissions (130 persons approximatively<sup>(1)</sup>) dealing with themes : Growth, employment and financing/Organization of space and quality of life/Social Inequalities/International economic Relations.

The second phase should be supported by a larger apparatus (15 commissions perhaps).

##### 5. THE POLITICAL CONTROL OF THE PLAN.

Two main bodies partake to the political control of the Plan :

- the Economic and Social Council
- the Parliament.

-oOo-

---

(1) With 200 persons more in technical groups.

## R E F E R E N C E S

---

- ( 1 ) AGLIETTA M., COURBIS R. (1969)  
Un outil pour le Plan : le modèle Fifi, Economie et Statistique, n° 1.
- ( 2 ) AGLIETTA M., DUBOIS P., PAGE J.P., SAUTTER Ch., SEIBEL C., ULLMO B. (1971)  
Etudes macroéconomiques pour 1975, Collections de l'INSEE, C9.
- ( 3 ) AGLIETTA M., COURBIS R., SEIBEL C. (1974)  
Le modèle physico-financier, Collections de l'INSEE, C .
- ( 4 ) ANDREANI E., GAURON A. (1970)  
Cinq esquisses de croissance pour 1985, Economie et Statistique, n° 15.
- ( 5 ) ANFRE J., (1971)  
Le système français de comptabilité régionale, Review of Income and Wealth Série 17, n° 2.
- ( 6 ) BALASSA B. (1965)  
Whither French Planing ?  
Quarterly Journal of Economics, Vol.79, n° 4.
- ( 7 ) BAUCHET P. (1966)  
La planification française. Du premier au Sixième Plan.  
Eds du Seuil, PARIS.
- ( 8 ) BAUCHET P. (1966)  
La cohérence des entreprises publiques doit-elle être assurée par le marché ou par le Plan ?, Economie Publique, Editions du CNRS (English version in : Public Economies, MARGOLIS GUITTON ed., London, Macmillan).
- ( 9 ) BECKMANN M. ( )  
Location theory
- (10) BEGIN C., LAMARE J., PONTAGNIER C. (1971)  
Le modèle de l'impôt sur le revenu, Statistiques et Etudes Financières, Série Orange n° 3.
- (11) BERNARD A., MAIRESSE J. (1970)  
Un modèle de croissance à long terme linéarisé pour l'économie française, Cahiers du Séminaire d'Econométrie, n° 12.
- (12) BERNARD A. (1972)  
Une nouvelle évaluation du taux d'actualisation pour l'économie française, Revue Economique, Vol. 23, n° 3.

- (13) BILLAUDOT B. (1971)  
Le modèle DECA, Statistiques et Etudes Financières, Série Orange n° 1.
- (13b) BLAIN D., MAGNART P. (1974)  
Le modèle de financement dans le Secteur de l'énergie, Statistiques et Etudes Financières, Série Orange n° 5.
- (14) BONNAUD J.J. (1970)  
Les instruments d'exécution du Plan utilisés par l'Etat à l'égard des entreprises, Revue Economique, n° .
- (15) BONNAUD J.J., PAGE J.P. (1973)  
L'utilisation d'un modèle de simulation économique dans la procédure de préparation du VIème Plan, Revue Economique, Vol. 24, n° 6.
- (16) BOULLE J. (1975)  
Les budgets économiques et leur réalisation, Statistiques et Etudes Financières, Série Orange n° 15.
- (17) BOULLE J., BOYER R., MAZIER J., OLIVE G. (1974)  
Le modèle STAR, Statistiques et Etudes Financières, Série Orange n° 15.
- (18) BOYER R., MAZIER J., OLIVE G. (1974)  
Un nouveau modèle de prévision macro-économique : STAR, Economie et Statistique, n° 61.
- (19) CARRE J.J., DUBOIS P., MALINVAUD E. (1972)  
La croissance française. Un essai d'analyse économique causale de l'après guerre, Eds le Seuil, PARIS.
- (20) CARSALADE Y., NICOLOS (1973)  
Filo : un modèle de financement du logement, Statistiques et Etudes Financières, n° 9.
- (21) CARSALADE Y., PINCON R. (1973)  
Polo : un modèle de politique du logement, Statistiques et Etudes Financières, n° 10.
- (22) CASS D. (1966)  
Optimum Growth in an Aggregative Model of Capital Accumulation. A turnpike Theorem, Econometrica, Vol. 34, n° 4.
- (23) CAZES B. (1962)  
La planification en France et le IVème Plan. Ed. de l'Epargne, PARIS.
- (24) CAZES B. (1973)  
Des indicateurs sociaux, pour quoi faire ?, Problèmes Economiques, n° 1319.
- (25) CAZES B. (1974)  
L'utilisation des études à long terme dans la planification Française, Consommation, n° 2.

- (26) (1964) Préparation du Vème Plan - Rapport sur les principales options, J.O.
- (27) (1965) Cinquième Plan de développement Economique et social (1966-1970), J.O.
- (28) C.G.P. (1969) Note sur la nature du Plan, Commission de l'Economie Générale et du financement (ronéo.).
- (29) C.G.P. (1969) Aléas analytiques et VIème Plan, Groupe Aléas (Ronéo.).
- (30) (1970) Préparation du VIème Plan - Rapport sur les principales options, J.O.
- (31) (1971) Sixième Plan de développement économique et social (1971-1976), J.O.
- (32) C.G.P. (1971) Le modèle physico-financier dans la préparation du VIème Plan (Rapport du Groupe technique de la Commission de l'Economie Générale et du financement), Documentation Française.
- (33) C.G.P. (1974) Calcul Economique et Planification, Documentation Française.
- (34) (1975) Rapport sur l'orientation préliminaire du VIIème Plan
- (35) COURBIS R., (1968) Prévision de prix et étude sectorielle des entreprises pendant la préparation du Vème Plan - Etudes et conjoncture n° 11.
- (36) COURBIS R., (1970) Le modèle physico-financier de projection à moyen terme (Fifi), Cycle d'études de Varna, Commission Economique pour l'Europe (ronéo.).
- (37) COURBIS R. (1971) La détermination de l'équilibre général en économie concurrentielle, Editions du CNRS.
- (38) COURBIS R., PAGE J.P. (1973) Techniques de projection macro-économique et choix du Plan Français, Revue Economique, Vol. 24, n° 6.

- (39) COURBIS R. et al. (1973)  
Le modèle Régina. Analyse économique du modèle, Rapport GAMA (ronéo.).
- (40) COURBIS R., LAFAY G. (1974)  
Projections détaillées 1980 des comptes de secteurs pour la préparation du VIIème Plan, Rapport GAMA (ronéo.).
- (41) COURBIS R., PRAGER (1974)  
Analyse régionale et planification nationale : le projet de modèle Régina, Collections de l'INSEE, R 12.
- (42) COURBIS R. (1974)  
Les méthodes de planification française ; évolution et perspectives. Zeitschrift für Volkswirtschaft und Statistik Heft 3.
- (43) COURCIER M., LAFAY G. (1972)  
Simulation économique multinationale, Statistique et Etudes Financières, Série Orange, n° 8.
- (44) DELANGE G. (1974)  
Evolution de la planification française face aux contradictions sociales, in La Planification dans la Société Française, ed.
- (45) DELEAU M., MALGRANGE P. (1972)  
Informations et politiques dynamiques contraléatoires, Annales de l'INSEE, n° 9 (English version : European Economic Review, n° 1).
- (46) DELEAU M. (1973)  
Une analyse des mécanismes de Mini-Fifi, Annales de l'INSEE, N° 12 - 13.
- (47) DELEAU M. (1973)  
Recherche d'une caractérisation synthétique de l'incertitude affectant une esquisse du Plan", Rapport CEPREMAP, (ronéo.).
- (48) DELEAU M., GUESNERIE R., MALGRANGE P. (1973)  
Planification, incertitude et politique économique. L'opération Optimix, Revue Economique, Vol. 24, n° 5 et 6.
- (49) DELORS J. (1971)  
Les indicateurs sociaux, SEDEIS, Paris.
- (50) DUMONTIER J. (1972)  
Le système d'indicateurs du VIème Plan, Consommation, n° 3.
- (51) D.P. - INSEE - CEPREMAP (1970)  
Premières contributions de cheminements à la préparation du VIème Plan, Note D.P., (ronéo.).

- (52) DREZE J. (1964)  
Some Post-war contributions of French economists to theory and public policy with special emphasis on problems of resource allocation, American Economic Review, V. 54, n° 4, Part 2.
- (53) FOUQUET D. (1974)  
Propositions de recherches pour l'élaboration d'un modèle dynamique multisectoriel de moyen terme, Note INSEE, ronéotypée.
- (54) FRISCH R. (1961)  
Numerical determination of a quadratic preference function for use in macroeconomic programming - Giornale degli Economisti - Fev. 61
- (55) GEPI (1975)  
Crise de l'énergie ou crise de l'échange international ? Avenirs possibles de l'économie mondiale jusqu'en 1980. Rapport GEPI, (ronéo).
- (55b) GOMBERT M., LATTES G., PRAGER J.C. (1973)  
Les comptes régionaux des collectivités locales de 1962 à 1967, Collection de l'INSEE, R 10.
- (56) GUESNERIE R., MALGRANGE P. (1972)  
Formalisation des objectifs à moyen terme. Application au VIème Plan, Revue Economique, Vol. 23, n° 3.
- (57) GUESNERIE R. (1972)  
Valeur des réserves de liquidité internationale, Cahiers du Séminaire d'Econométrie, n° 4.
- (58) GUILLAUME H., ROCHARD D. (1973)  
Compatibilité entre approches sectorielle et globale, Statistique et Etudes Financières, Série Orange, n°
- (59) GUILLAUME H. (1973)  
Prix fictifs et calcul économique décentralisé, Monographie n° du Séminaire d'Econométrie, Editions du CNRS.
- (60) GUILLAUME M. (1968)  
L'évaluation du taux d'actualisation associé à la croissance Française, Economie Appliquée, Vol. 21, n° 3-4.
- (61) GUILLAUME M. (1972)  
Révélation des préférences dans l'analyse des choix collectifs, Revue Economique, Vol. 23, n° 3.
- (62) GUILLAUME M., ULLMO B. (1972)  
Six schémas structurels pour 1975, Economie et Statistique, n° 32.
- (63) GRUSON C. (1968)  
Origines et espoirs de la planification française, Dunod, Paris.
- (64) HACKETT, HACKETT (1963)  
Economic Planning in France, Allen Urvin, London.

- (65) HANSEN B. (1966)  
Lectures in Economic Theory Part II, Studdulitteratur, Lund.
- (66) HEAL G.M. (1975)  
The Theory of Economic Planning, North Holland, Amsterdam,  
American Elsevier, New York.
- (66b) HERZOG , OLIVE  
Le modèle de projection à court terme Zozol I, Note INSEE-DP  
(ronéo).
- (67) HICKMAN B. (1965)  
Quantitative planning of Economic Policy, The Brookings  
Institution.
- (68) INSEE (1966)  
Méthodes de programmation dans le Vème Plan, Etudes et  
Conjoncture, n° 12.
- (69) INSEE (1967)  
Rapport technique sur le Vème Plan, Etudes et Conjoncture,  
n° 5.
- (70) INSEE (1973)  
Rapport technique sur les projections associées au VIème  
Plan, Collections de l'INSEE, C 24-25.
- (71) JOHANSEN L. (1971)  
Public Economies, North Holland, Amsterdam.
- (72)
- (73) GIRARDEAU et al. (1973)  
Fonctions collectives et planification, Notes et Etudes  
Documentaires, n° 3991-3992, La Documentation Française.
- (74) GIRARDEAU et al. (1973)  
Le contenu des fonctions collectives, Notes et Etudes Do-  
documentaires, n° 4037-4038, La Documentation Française.
- (75) LION B. (1973)  
Les programmes finalisés dans le VIème Plan, Notes et  
Etudes Documentaires, n° 3959-3960, La Documentation Fran-  
çaise.
- (75b) LORI L. (1973)  
Les comptes régionaux des ménages de 1968 et 1969,  
Collection de l'INSEE, R 11
- (76) MAC ARTHUR, SCOTT (1969)  
Industrial Planning in France, Harvard University.
- (77) MAIRESSE J., SAGLIO A. (1971)  
Estimation d'une fonction pour l'industrie française,  
Annales de l'INSEE, n° 6.

- (78) MALGRANGE P. (1972)  
Etude analytique du modèle DECA, Annales de l'INSEE, n° 4.
- (79) MALINVAUD E. (1965)  
Interest rates in the allocation of resources in The Theory of Interest rates, Hahn, Brechling eds., Mac Millan London ; St Martin's Press, New York.
- (80) MALINVAUD E. (1967)  
Decentralized procedure for planning in Activity analysis in the theory of growth and planning, Malinvaud, Bacharach eds., Mac Millan, London ; St Martin's Press, New York.
- (81) MALINVAUD E. (1968)  
Notes for the study of planning procedures, Canadian Journal of Economics.
- (82) MALINVAUD E. (1969)  
First order certainty equivalence, Econometrica, Vol. 37, n° 4.
- (83) MASSE P. (1963)  
Rapport sur la politique des revenus, Documentation Française.
- (84) MASSE P. (1965)  
Le Plan ou l'anti-hasard, Gallimard, Collection Idées.
- (85) MASSE P. (1965)  
The French Plan and Economic Theory, Econometrica, Vol. 33, n° 2.
- (86) MASSE P. (1969)  
Croissances optimales, théorèmes limites, particularisation, Cahiers du Séminaire d'Econométrie, n° 11.
- (87) MARSCHAK J., RADNER R. ( )  
Economic Theory of Teams, John Wiley Ed.
- (88) MARTEL P., LAURAY J.P., PERDRIO H. (1972)  
Le modèle de projection des opérations de la Sécurité Sociale, Statistiques et Etudes Financières, Série Orange, n° 6.
- (89) MOUSEL M. (1973)  
Système de modèles à moyen terme "Administrations", Statistiques et Etudes Financières, Série Orange, n° 10.
- (90) MUSGRAVE R.A. (1959)  
The Theory of Public Finance, Mac Graw Hill, New York.

- (91) MUSGRAVE R.A., MUSGRAVE P.B. (1973)  
Public Finance in Theory and Practice, Mac Graw Hill,  
New York.
- (92) PAGE J.P. (1974)  
Le système de modèles utilisés en France pour la p réparation  
des plans à moyen terme, Séminaire de Moscou, Commission  
Economique pour l'Europe, (ronéo.).
- (93) PAGE J.P., ROYER J. (1975)  
Systèmes de modèles et planification. Introduction au  
compte rendu du Séminaire sur l'utilisation des systèmes de  
modèles dans la planification, Moscou, Décembre 1974. Com-  
mission Economique pour l'Europe.
- (93b) OUSSET J. (1973)  
Les comptes régionaux de l'agriculture de 1962 à 1967,  
Collection de l'INSEE, R 13.
- (94) PHAN D.L. (1973)  
Le modèle Fifi et la politique à moyen terme, Revue Econo-  
mique, Vol. 24, n° 6.
- (95) ROCCA M. (1974)  
Le modèle contenu en importation, Statistiques et  
Etudes Financières, Série Orange, n° 14.
- (96)
- (97) ROSSIGNOL, ROUX-VAILLARD (1973)  
Annales de l'INSEE, n° 12-13.
- (98) RUCH J.M., MONFORT A., WINTER G. (1975)  
Un modèle agricole à long terme de simulation, Statistiques  
et Etudes Financières, Série Orange, n° 16.
- (99) SEIBEL C. (1973)  
Planification en France, Conférence sur "la Planification  
Economique, Est et Ouest", Université de Michigan, Note  
INSEE, (ronéo.).
- (100) THEIL H. (1961)  
Economic Forecasts and Policy, North Holland, Amsterdam.
- (101) THEIL H. (1964)  
Optimal decision rules for government and industry, North  
Holland, Amsterdam.
- (102) TINBERGEN J. (1954)  
Centralization and decentralization in economic policy,  
North Holland, Amsterdam.

(103) TINBERGEN J. (1956)

Economic Policy, Principles and design, North Holland,  
Amsterdam.

(104) TINBERGEN J. (1964)

Central Planning, Yale University Press.