Mixed Unemployment in an Open Economy.  
Basis and Limits of Economic Policies 
Over the Short Term

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La notion de chômage mixte (coexistence de chômage classique et de chômage keynésien) paraît être au centre des reconstructions nécessaires à la fois en théorie macro-économique et en politique économique.
Le modèle proposé dans l'article constitue une synthèse d'autres approches. C'est un modèle à deux secteurs (l'un en situation keynésienne, l'autre en situation classique) conforme aux enseignements de la théorie de l'équilibre partiel en économie ouverte : l'excès de demande donne lieu à des hausses de prix qui, simultanément, élèvent les quantités offertes, réduisent la consommation interne et dégradent le commerce extérieur (importations et exportations), jusqu'à ce que le déséquilibre initial se résorbe.
La recommandation centrale qui ressort de l'analyse est que l'amélioration de l'ensemble des performances macro-économiques, et notamment de l'emploi, passe par des politiques sectorielles de l'offre portant sur les déterminants non-salariels et notamment sur l'accroissement des capacités de production dans les branches en excès de demande - analyse statique - ou à accroissement rapide de la demande-analyse dynamique.

"What we need is a theory which takes the existence of two categories of market into account, a theory in which both fixed price as well as flexible price markets have their place."


* For a developed version of this paper, see M. CATINAT, G. CETTE and D. TADDEI (1988).
I. General Introduction

There have been important developments in work on disequilibrium econometrics since the beginning of the eightees, not only in France but also in most other European countries (including on occasions in Eastern Europe, where the hypothesis of "imperfect" functioning of price mechanisms is obviously of particular interest ...): cf. bibliography.

Despite the happy diversity of methodologies used (macro-, meso- or micro-economic, studies of the overall economic climate or business panels making use of company information ...), sufficiently sound results on the two decades generally studied (1965 to 1985) permit conclusions to be drawn which are clear, yet qualified at the same time: Keynesian unemployment has almost always existed alongside classic unemployment, in what is known as mixed unemployment, with a tendency to be more of the first than of the second. Of course, the proportional rates vary according to the specifications adopted, the fluctuations of the economy and the field of analysis (country, industry or all market sectors ...). The fact remains that the idea of mixed unemployment appears to be at the centre of the essential reconstruction of macro-economic theory and economic policy. Even then, what we normally call classical unemployment has to be clarified in a realistic way, in other words it is necessary to define the way in which the excess of demand over supply EX-ANTE (what Keynes called "the inflationary gap" in 1940) leads EX-POST to a given level of transactions and prices. Here, the theory proposes three principal methods:

- The first, in line with the original formulation of the "fixed price" disequilibrium theory, assumes quantitative rationing "on the short side", that is to say on the demand side. We have retained this solution in our first model of mixed unemployment (G. CETTE and D. TADDEI (1988-a)); its main drawback is that it ignores dissymmetric flexibility in prices and wages;
The second method is based on the flexibility of price rises in line with the normal methodology of partial or general equilibrium. We have retained this in a second model (G. CETTE and D. TADDEI, (1988-b)) as being less unrealistic. However, known values of price elasticities of supply and demand are generally weak and there would therefore have to be considerable price rises to explain the absence of rationing of demand;

A third method assumes that the whole inflationary gap is cancelled out by the increase in imports and/or the decrease in exports. This is the procedure followed notably by H.R. SNEESSENS and J. DREZE (1986). Although this solution is possibly acceptable in a SMALL OPEN ECONOMY (A. DIXIT (1978)) like Belgium, it does not include price rises in the procedure of absorbing excess demand.

From this point of view, this model is a combination of the two last approaches and applies the lessons of the theory of partial equilibrium in an open economy: the excess of demand gives rise to price increases¹, which simultaneously raises the quantities supplied, reduces internal consumption and erodes external trade (imports and exports) until the initial disequilibrium is eliminated. It can be seen that with this more realistic hypothesis, it is preferable to talk about (neo)classic unemployment, given the role played by price mechanisms.

We begin by introducing the general analytical framework (II); then we shall study all mixed unemployed situations, where opposing disequilibria coexist in micro-markets for goods and services (III). We can then compare this last model to some other recent ones and finally suggest few extensions of this analysis (IV).

¹ The same approach is described as short term relative to the very short term and to the hypothesis of fixed prices by F. PADOA-SCHIOPPA (1988).
II. General Framework of Analysis

II-A. General Presentation

We are dealing with an economy in which the agents exchange goods and services or work - the only factor of production which we consider in this static short-term analysis\(^2\) - for money.

We shall study for groups of agents: business, salaried consumer, government administration and the rest of the world.

In the different markets under consideration we examine how initial disequilibria when markets open (EX-ANTE) lead to transactions carried out when markets close, which respect to the accounting similarities between purchases and sales (EX-POST). It is therefore advisable to differentiate the two types of variable with care:

i. For each system of prices and nominal wages ($\bar{P}_1, \bar{P}_2, \ldots, \bar{P}_j, \ldots$, $\bar{w}$) initially put forward for all the micro-markets for goods (indicated by "j") and for the labour market, the micro-markets can be classified under two (separate) categories, called sectors 1 or 2, according to the direction of the disequilibrium which is observed in them between supply ($\bar{O}_j$) of domestic producers and the demand ($\bar{D}_j$) with which they are faced. The first or (neo)classic sector 1 is made up of all the micro-markets in which, for the system of prices and nominal wages indicated, supply is less than or equal to the demand ($\bar{O}_j \leq \bar{D}_j$) for domestic goods. The second or Keynesian sector 2 includes all the micro-markets in which domestic supply is strictly greater than the corresponding demand ($\bar{O}_j > \bar{D}_j$).

We call magnitudes EX-ANTE when these correspond to the system of prices and nominal wages indicated initially. By aggregating the EX-ANTE quantities over all the micro-markets which make up each

\(^2\) To account for this empirically, the appropriate timescale should be between one quarter and a year.
of the two sectors, it is possible to write down the inequalities (1) between supply and demand cf. box 2).

ii. Flexibility in rising prices leads to an equalization of the quantities supplied and demanded on the micro-markets which make up sector 1 \((0_j = D_j)\) for two reasons. On the one hand, the rise in price of goods 1 raises the level of the quantities supplied by the producers of these goods. On the other hand, this price rise modifies the consumption decision, notably between domestic and imported goods in favour of the latter.

Rigidities in falling prices lead by contrast to an equilibrium with a rationing of domestic suppliers on the micro-markets which make up sector 2, according to actual demand \((\bar{0}_j = 0_j > D_j)\). The direction of the rationing recorded in each micro-market is assumed to be identical, after adjusting for price rises, to that which corresponds to the system of prices and wages indicated initially: if \(\bar{0}_j \leq \bar{D}_j\), then \(0_j = D_j\) and if \(\bar{0}_j > \bar{D}_j\), then \(0_j > D_j\).

We call magnitudes EX-POST when there are determined after the operation of market mechanisms, in particular the adjustment for price rises. The transactions in domestic goods which are carried out on the micro-markets of sector 1, are equal to the supply from domestic producers and to the demand which is directed to them EX-POST \((0_j = Y_j = D_j)\). On the other hand, the transactions in domestic goods carried out on the micro-markets in sector 2 are equal to the short side of the EX-POST quantities which are found there, in other words to the demand for domestic goods \((0_j > Y_j = D_j)\). By aggregating the EX-POST quantities over all the micro-markets which make up each of the two sectors, the accounting equations are obtained (2).

Moreover, the hypothesis of flexibility in price rises and rigidity in price falls makes it possible to write down equation (3), after aggregating the prices on the micro-markets which make up each sector.
Box 1: The Notation for the Model

- The suffixes "1" or "2" refer to sectors 1 or 2;
- '-' above a variable designates an "ex-ante" quantity, which has been determined before the operation of market mechanisms and in particular before the upward adjustment of prices;
- The absence of a sign above a variable designates an ex-post quantity, which has been determined after the operation of these market mechanisms and the upward adjustment of prices;
- A double suffix designates a partial drift: $\Delta l_{i,w} = \frac{\Delta l_i}{\Delta w}$;

The variables (for $i = 1$ or 2):

- $0_i$ : Supply of i goods from domestic businesses, in real terms;
- $D_i$ : Demand for i goods directed to domestic businesses, in real terms;
- $C_i$ : Consumption of i goods by households, in real terms: domestic and foreign goods;
- $Y_i$ : Quantity of i domestic goods exchanged in real terms or the level of transactions carried out in i domestic goods;
- $l_0$ : Supply of labour;
- $l_i$ : Demand for labour in sector i. As $l_1 + l_2 < l_0$ is always presupposed here, the demand for labour in sector i equal to employment in this sector;
- $F_i$ : Function of production of sector i: $Y_i = F_i (l_i)$;
- $w$ : Nominal wage rates per worker, presupposed to be identical in the two sectors;
- $t_m$ : Net State tax rate (taxes less transfers) on households, calculated on the basis of wages;
- $t_f_i$ : Net State tax rate (taxes less subsidies) on businesses in sector i, calculated on the basis of wages;
- $M_o$ : Initial currency reserves;
• $c_i$ : Marginal propensity to consume $i$ goods;
• $\lambda_i$ : Share of domestic products in household consumption in $i$ goods;
• $\epsilon_1$ : Inflationary gap (in sector 1);
• $\alpha_i$ : Marginal propensity to distribute additional earnings of businesses in sector $i$ in the form of wages (net of tax);
• $k_i$ : Partial multiplier of sector $i$, without taking the interdependence of the two sectors into account;
• $X_i$ : Volume of exports of $i$ goods;
• $M_i$ : Volume of imports of $i$ goods;
• $YE$ : Level of the foreign GDP in local currencies;
• $e$ : Rate of exchange (value of the Franc in local currencies);
• $PN_i$ : Price of $i$ product supplies by domestic businesses on the domestic market (in Francs);
• $PX_i$ : Export price of $i$ product exported by domestic businesses (in local currencies);
• $PE_i$ : Price of $i$ product supplied by foreign businesses on foreign markets (in local currencies);
• $PM_i$ : Price of $i$ product supplied by foreign businesses on foreign markets (in Francs);
• $P_i$ : Price for the consumption of $i$ goods (in Francs), $P_i = \lambda_i PN_i + (1 - \lambda_i) PM_i$;
• $GN_i$ : State demand for $i$ goods produced by domestic businesses (by volume);
• $GM_i$ : State demand for imported $i$ goods (by volume);
• $BA$ : Financing requirement of Public Administrations;
• $BN$ : National financing requirement.
Box 2: General Framework of Analysis (equations 1 to 21)

(1) \( \tilde{0}_1 \leq \tilde{D}_1 \) and \( \tilde{0}_2 > \tilde{D}_2 \)

(2) \( 0_1 = Y_1 = D_1 \) and \( 0_2 > Y_2 = D_2 \)

(3) \( PN_1 \geq \overline{PN}_1 \); and \( PN_2 = \overline{PN}_2 \)

(4) \( \varepsilon_1 = \tilde{D}_1 - \tilde{0}_1 = (0_1 - \tilde{0}_1) - (D_1 - \tilde{D}_1) \)

(5) \( w = \tilde{w} \)

(6) \( l_0 > 1 \) with \( l_1 = l_1 + l_2 \)

(7) \( Y_i = F_i(l_i) \) with \( F_i > 0 \)

(8) \( l_i = F_i^{-1}(Y_i) \) with \( l_i, Y_i > 0 \)

(9) \( F_i' = Y_{1,l_1} \frac{w(l+tf_1)}{PN_1} > 0 \) with \( F_i'' < 0 \); \( Y_{1,PN_1} > 0 \);

\[ Y_{1,w} = - \frac{PN_1}{w} Y_{1,PN_1} < 0 \]; \( Y_{1,tf_1} = - \frac{PN_1}{1+tf_1} Y_{1,PN_1} < 0 \)

\( l_1 = F_i^{-1} \left[ \frac{w(l+tf_1)}{PN_1} \right] \) with \( l_i,PN_1 > 0 \); \( l_i,w = \frac{PN_1}{w} l_i,PN_1 < 0 \)

\( l_i,tf_1 = - \frac{PN_1}{1+tf_1} l_i,PN_1 < 0 \)

(10) \( F_2 = Y_2,l_2 > \frac{w(l+tf_2)}{PN_2} \) with \( Y_2,w = Y_2,PN_2 = Y_2,tf_2 \)

\[ = l_2,w = l_2,PN_2 = l_2,tf_2 = 0 \]

(11) \( D_i = \lambda_i \ C_i + X_i + G \mathbf{N}_i \)

(12) \( C_i = C_i \ [w \ (1-tm) + M_o; \ P_1; \ P_2] \)
\begin{align*}
(13) \quad P_i &= \lambda_i \, PN_i + (1-\lambda_i) \, PM_i \\
(14) \quad \lambda_i &= \lambda_i \left[ \frac{PN_i \, \lambda_{i,PN_i}}{PM_i} \right] \text{ with } 0 \leq \lambda_i \leq 1; \lambda_{i,PN_i} < 0; \\
\lambda_{i,PM_i} &= -\frac{PN_i}{PM_i} \, \lambda_{i,PN_i} > 0 \\
(15) \quad c_i &= \frac{P_i \Delta C}{\Delta w \, 1 \, (1-tm)} \text{ with } 0 \leq c_1; c_2 \leq c_1 + c_2 < 1 \\
C_{i,w} &= \frac{c_i}{P_i} \, (1-tm) \, 1 > 0; C_{i,1} = \frac{c_i}{P_i} \, (1-tm) \, w > 0; C_{i,tm} = -\frac{c_i}{P_i} \, w \, 1 < 0; \\
C_{i,PN_i} < 0; C_{i,PM_i} &= \frac{1-\lambda_i}{\lambda_i} \, C_{i,PN_i} < 0; C_{i,PN_i'} < 0; \\
C_{i,PM_i'} &= \frac{1-\lambda_i'}{\lambda_i'} \, C_{i,PN_i'} < 0 \\
(16) \quad M_i &= (1 - \lambda_i) \, C_i + GM_i \\
(17) \quad X_i &= X_i \left( YE, \frac{PX_i}{PE_i} \right) \text{ with } X_{i,YE} > 0; X_{i,PX_i} < 0; \\
X_{i,PE_i} &= -\frac{PX_i}{PE_i} \, X_{i,PX_i} > 0 \\
(18) \quad PX_i &= PN_i \, e \text{ with } PX_{i,PN_i} = e > 0 \text{ and } PX_{i,e} = PN_i > 0 \\
(19) \quad PM_i &= \frac{PE_i}{e} \text{ with } PM_{i,PE_i} = \frac{1}{e} > 0 \text{ and } PM_{i,e} = -\frac{PM_i}{e} < 0 \\
(20) \quad BN &= \sum_{i=1}^{2} \left[ PM_i \, M_i - \frac{PX_i}{e} \, X_i \right] \\
(21) \quad BA &= \sum_{i=1}^{2} \left[ PN_i \, GN_i + PM_i \, GM_i - (tm + tf_i) \, w \, 1_i \right]
\end{align*}
iii. We call the inflationary gap (shown as \( e_1 \)) the EX-ANTE excess of the demand for over the supply of domestic goods 1, which disappears for the EX-POST quantities \(^3\) because of the flexibility in price rises, as equation (4) shows.

II-B. The Labour Market

The supply of labour \( l_o \) is assumed to be exogenous, although its likely endogenous determination starting from the level of nominal wages does not change the sense of the analysis which follows. Indeed, a rigidity in nominal wages is assumed (equation 5).

The exogenous level of wages is such that involuntary unemployment (equation 6) exists because of an EX-ANTE lack of demand for labour from businesses. In other words, there is EX-POST a quantitative rationing of the supply of labour, and the actual level of employment is entirely determined - on the short side - by the demand for labour.

II-C. The Behaviour of Businesses

We take a function of ordinary production determined by the single factor of labour (equation (7)) over the short term for all businesses in each sector \( i \). First of all by inversion, the demand for labour is obtained, the determining role of which on employment we have just seen (equation (8)). Moreover, businesses evolve on the markets for goods and services in a general situation of imperfect, indeed monopolistic competition. Normally, the maximization of profits is pursued by equalizing marginal productivity \( (F'_i = Y_{i,+}) \) and marginal cost \( \frac{w(l+ t_i)}{PN_i} \). However, the conditions for this maximization to be carried out vary according to the direction of the disequilibria in each market for goods and the system for determining prices associated with it:

\(^3\) This notion of the inflationary gap is introduced and discussed at greater length in G. CETTE and D. TADDEI (1988-a).
In market 1, price flexibility is such that firms are not under constraint, and the above equalization is effectively achieved under the usual hypothesis of diminishing returns (equation (9)). This (neo)classic equilibrium is attained in an open economy from the moment one presupposes, as we do later on, that the prices of supply are the same on the domestic as on the external markets, the exchange rate apart (equation (17)).

In market 2, on the other hand, the lack of demand prevents the discounted maximization of profits from being achieved: an EXTRA margin then appears, which can compensate only in part for the loss of earnings, due to the weakness of sales (inequality (10)).

II-D. The Determinants of Demand

Businesses receive demands from domestic consumers, the rest of the world and the public sector (equation 11)). Let us examine these three components in succession:

i. The function of consumption, expressed in volume terms (equation (12)), normally takes income and price effects into consideration. In so far as the former are concerned, we have retained for consideration total wages which are disposable after tax, from which the marginal propensity to consume is aken (equation (15)). Compared to the other more common simplification, disposable income, we can thus take into consideration the problems of distribution which flow in particular from the fact that the marginal propensity to spend by wage earners is greater than that of the beneficiaries of profits. Consequently, when one wants to examine the relevance of wage policies, it is possible to take into account the ambivalence of wages in terms of both costs and incomes.  

4 The opposite course leads to the conclusion that the maximum possible reduction in wages is always an effective policy (at worst, its effect would be neutral)!
In so far as price effects are concerned, the share of purchases between domestic and foreign goods depends on their relative prices (equation (14)). Moreover, the formulation retained makes it possible to take crossed price effects into account, which express relationships between (neo)classic and Keynesian markets. However, their signs will be generally uncertain because of contradictory influences: first, the variations in price of the goods concerned can bring about both effects of substitution (positive) and of complementarity (negative); next, modifications in budgetary constraint depend on the value of the price elasticity of the goods concerned; finally, the usual effect, negative real reserves.

It will be noted finally that imports (equation (16)) can originate with agents in the private or public sectors.

ii. Exports, expressed in volume terms, take income and price effects into account equally (equation (17)).

iii. Public demand directed to domestic business is assumed to be exogenous, in accordance with established tradition.

**II-E. Rate of Exchange and Marginal Behaviour in International Transactions**

We begin with an exchange rate (e) the variations of which permit us to discuss the consequences of modifications in monetary parity. The marginal behaviour of suppliers, both domestic and foreign, is simplified (equations (18) and (19)) by assuming that they apply the same price whatever the market at which they are aiming; this boils down to the consideration that they are always PRICE MAKERS in the world of imperfect competition in which we find ourselves.
II-F. Needs for (or Capacities of) Financing

The two accounting equations (20) and (21) here account for the State and the Public Administration respectively.

III. General Model of Mixed Unemployment: Endogenous Solution and Exogenous Shocks

We are defined the situations of mixed unemployment above as those in which firms in a (neo)classic situation exist alongside others in a keynesian situation. If one is being rigorous, these general results are not obtained in a simple way by calculating any form of average between the two opposite situations, weighted by the number of businesses which experience the corresponding disequilibrium: the essential reason for this is that the interdependence between the two types of micro-markets for goods and services must be taken into account and that this interdependence is asymmetrical.

It is to analyze this asymmetrical interdependence that we have distinctly aggregated the micro-markets into (neo)classic (sector 1) and keynesian (sector 2) situations.

III-A. The Method of Endogenous Solution

For each sector, the EX-ANTE disequilibria have been redrawn by the equations (1) and their solution EX-POST by the equations (2). All the behavioural equations and the relevant similarities which account for the needs for (or capacities of) financing, analyzed in II above, apply to each of the two sectors. In these conditions, the endogenous treatment of the mixed unemployment model is successively undertaken for each of the two sectors before studying their interdependence.
III-A.1. In sector 1:

The equations of the (neo)classic model show the interdependence of the two sectors. The variation in demand (equation 26) depend of the term:

$$\tilde{\lambda}_1c_1\tilde{\alpha}_1 \frac{PN_2}{P_2} \frac{D_2 - \tilde{D}_2}{PN_1} < 0$$

The latter, the direction of which is generally speaking indeterminate, is an indirect income effect passing through the modification induced in the level of activity in sector 2.

Of course in these conditions, equations (24) and (26) do not of themselves permit the determination of the actual equilibrium of market 1, without analysing market 2 and in particular the direction and value of $D_2 - \tilde{D}_2$.

III-A.2. In Sector 2:

Here, the equilibrium income, and therefore the degree of rationing of business in sector 2, will be influenced by the variation of the demand for goods $D_2 - \tilde{D}_2$, which has been induces by the conditions to achieve equilibrium in market 1. Since the demand of public administrations and the rest of the world is exogenous here, the variation of the demand for goods 2 is equal to that of household consumption.

As the general form of the functions of consumption retained here (equation (12)) enabled it to be foreseen, the influence of the businesses in sector 1 on those of sector 2 is a double one: it is first of all due to a positive income effect which depends on the marginal propensity to buy domestic goods 2, thanks to an excess of income distributed in sector 1 ($\tilde{\lambda}_2c_2\tilde{\alpha}_1$) and then to a crossed price effect having an indeterminate direction and probably a weak value.
Box 3: Endogenous Solution of the Mixed Unemployment Model (equations 22 to 28)

\[ \alpha_1 = \frac{1-tm}{1+tf_1} \quad 0 \leq \alpha_1 \leq 1 \]

\[ \alpha_2 = (1-tm) \frac{w}{PN_2} l_{2,Y_2} \quad 0 \leq \alpha_2 \leq 1 \]

\[ 0_1 - \tilde{0}_1 = Y_{1,PN_1} (PN_1 - \overline{PN}_1) \]

\[ 0_2 - \tilde{0}_2 = 0 \]

\[ D_1 - \tilde{D}_1 = [\tilde{\lambda}_1 C_1, PN_1 + c_1 \tilde{\lambda}_1 \alpha_1 \frac{PN_1}{\bar{P}_1} Y_{1,PN_1} \]
\[ + c_1 \tilde{\alpha}_1 \alpha_2 \frac{PN_2}{\bar{P}_2} D_2 - \tilde{D}_2 + \bar{C}_1 \lambda_{1,PN_1} + eX_{1,PIX_1}] [PN_1 - \overline{PN}_1] \]

\[ D_2 - \tilde{D}_2 = \tilde{k}_2 \tilde{\lambda}_2 [c_2 \alpha_1 \frac{PN_1}{\bar{P}_2} Y_{1,PN_1} + C_{2,PN_1}] [PN_1 - \overline{PN}_1] \]

\[ PN_1 - \overline{PN}_1 = e_1/ [(1 - c_1 \tilde{\lambda}_1 \alpha_1 \frac{PN_1}{\bar{P}_1} - c_1 \tilde{\lambda}_1 \alpha_2 \tilde{\lambda}_2 \tilde{k}_2 c_2 \alpha_1 \frac{PN_2}{\bar{P}_2} \overline{PN}_1] Y_{1,PN_1} \]

\[ [a] > 0 \quad [b] < 0 \quad [c] < 0 \]

\[ \tilde{\lambda}_1 \tilde{C}_{1,PN_1} - \tilde{C}_1 \lambda_{1,PN_1} + eX_{1,PIX_1} - c_1 \tilde{\lambda}_1 \alpha_2 \tilde{\lambda}_2 \tilde{k}_2 \frac{PN_2}{\bar{P}_1} C_{2,PN_1} \]

\[ [d] > 0 \quad [e] > 0 \quad [f] > 0 \quad [g] < 0 \]
III-A.3. Interdependence of the Sectors:

The interdependence of the two sectors appears in the equations (26) to (28) which, when the initial inflationary gap is taken into account (equation (4)), allow a reduced form for all the endogenous variables of the mixed unemployment model to be obtained. As an example we provide (equation (28)) the reduced form of the endogenous rise in prices, in which all the effects already analyzed are found. It will be noted that only direct [b] and indirect [c] income effects attenuate the equilibrium by the rise in prices, to which the improvement in profitability [a], the reduction in the volume of consumption [d] and international trade [e] and [f] contribute. As for the crossed price effect [g], its influence is of course ambiguous. Whatever its direction, it passes into sector 2 through multiplier effects and a feedback effect through the demand aimed at sector 1. Finally, for reasons which have already been analyzed, it may be considered that this last effect is hardly significant 6, and it will be neglected in the analyses of comparative statics.

III-B. Exogenous Shocks

Making use of table 1, which indicates the signs of all the multipliers in mixed unemployment, we shall draw here only the main lessons which are appropriate to that situation.

1. - The general superiority of differentiated policies over strictly global policies is quite in keeping with intuition. It is verified on two levels:

   - Firstly, policies affecting household income, which are very tricky, if not impossible, to differentiate according to their subsequent impact, have unconvincing effects. Thus household taxation has very contradictory results (mediation between activity and the variables having

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5 By combining this equation (24) with equations (26), (28) and (29) the solutions which are reduced for $O_1 - O_2, D_1 - D_2, D_2 - D_2$ are obtained.

6 A similar conclusion can be found in P. ARTUS, S. AVOUYI-DOVI and J.P. LAFFARGUE (1987).
"financial tensions" : prices, the financing needs of the nation and the State). As for wages policy, the uncertainty surrounding these results is even greater than in a (neo)classic system, since the existence of a keynesian sector increases the importance of the effects of distribution;

- Secondly, better results are obtained with a differentiated policy for public expenditure, the costs to business or a system of price fixing.

First of all, in so far as public expenditure is concerned, similar signs obtained from the shocks $\Delta G N_1$ and $\Delta G N_2$ should not mislead. Even though the effects which are induced are clearly the same in the two cases, the initial impact is different : when applied to sector 2, it affects volumes alone, whereas in sector 1 it is divided between volume and price. The result in particular is, that it is always preferable to target a stimulus for sector 2 and a slowing down for sector 1, subject of course to the respective collective utilities of the two types of goods. Or again, that a redeployment of the budget from sector 1 towards sector 2, at constant budgetary totals, would be favourable over all the indicators at the same time 7. The application of such a targeting of public expenses should not present any difficulty, because behaviour of no other agent is involved.

Then, in so far as the costs to business are concerned, to the extent that the results of an easing are favourable for almost all the indicators (they are uncertain only for financing needs) when it is applied to sector 1, so in the keynesian sector they succeed only in aggravating the situation of the public finances. In other words, with a constant budgetary effort EX-ANTE, the effectiveness of such an easing on all the indicators, including the public accounts EX-POST, is proportionate to its "targeting". Once more, this kind of policy should not induce specific problem in its application.

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7 We have already demonstrated this result in a closed economy in G. CETTE, D. TADDEI (1988, a and b).
### TABLE 1: The signs of the (209) multipliers of mixed unemployment

|          | \( \Delta Y_1 \) | \( \Delta l_1 \) | \( \Delta C \) | \( \Delta \text{PN}_1 \) | \( \Delta M_1 \) | \( \Delta X_1 \) | \( \Delta Y_2 \) | \( \Delta l_2 \) | \( \Delta C_2 \) | \( \Delta M_2 \) | \( \Delta X_2 \) | \( \Delta Y \) | \( \Delta l \) | \( \Delta C \) | \( \Delta \text{PN} \) | \( \Delta M \) | \( \Delta X \) | \( \Delta BN \) | \( \Delta BA \) |
|----------|-----------------|-----------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| \( \Delta G N_1 \) | + | + | ? | + | ? | - | + | + | + | + | 0 | + | + | (+) | + | (+) | - | (+) | (+) |
| \( \Delta G N_2 \) | + | + | + | + | + | - | + | + | + | 0 | + | + | + | + | - | + | - | + | (+) |
| \( \Delta \text{tm} \) | - | - | - | - | + | - | - | - | + | - | - | - | 0 | - | - | - | + | - | - | - | ? | (-) |
| \( \Delta \text{tf}_1 \) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | + |
| \( \Delta w \) | ? | ? | (+) | (+) | - | ? | ? | (+) | (+) | 0 | ? | ? | ? | + | (+) | - | (+) | (-) | (-) |
| \( \Delta \text{PN}_2 \) | - | - | - | - | - | + | - | - | - | + | - | - | - | ? | - | - | - | ? | (-) | (-) | ? | ? |
| \( \Delta e \) | (+) | (+) | ? | (+) | ? | + | (+) | (+) | + | ? | + | (+) | (+) | (+) | (+) | ? | (+) | (+) | ? | (+) | (+) | ? |
| \( \Delta Y_e \) | + | + | ? | + | ? | + | + | + | + | + | + | + | + | (+) | (+) | (+) | + | + | + | + | ? |
| \( \Delta \text{PE}_1 \) | (+) | (+) | ? | (+) | - | + | (+) | (+) | + | 0 | (+) | (+) | ? | (+) | (-) | (+) | (+) | (+) | ? |
| \( \Delta \text{PE}_2 \) | (+) | (+) | + | (+) | + | - | (+) | (+) | + | - | + | (+) | (+) | (+) | (-) | (+) | (+) | (+) | (+) | (+) | ? |

+ : Always positive effect  
(+): Probably positive effect  
? : Indeterminate effect  
0 : Null effect  
(-): Probably negative effect  
- : Always negative effect

To determine the sign of the effects on the whole of the economy,  
\[ 1 \] the sectorial effects for \( \Delta l (\Delta l = \Delta l_1, \Delta l_2) \) are aggregated directly;  
\[ 2 \] the sectorial effects are aggregated in volume terms by weighting them with the initial prices for \( \Delta Y, \Delta C, \Delta M \) and \( \Delta X \)  
(for example \( \Delta Y = \text{PN}_1 \Delta Y_1 + \text{PN}_2 \Delta Y_2 \));  
\[ 3 \] the variations of sectorial prices are aggregated with the initial values of sectorial production for \( \Delta \text{PN} \)  
\( \Delta \text{PN} = \frac{\text{PN}_1 \Delta Y_1 \Delta \text{PN}_1 + \text{PN}_2 \Delta Y_2 \Delta \text{PN}_2}{\text{PN}_1 Y_1 + \text{PN}_2 Y_2} \)  
\[ 4 \] the variations in value for \( \Delta BN \) and \( \Delta BA \) (equations (40) and (41)) are indicated.
Finally, a general a priori attitude on price formation does not appear to be essential: to the extent that an intervention in the classic sector could succeed only in rarefying domestic supply and will steer consumers who have been rationed towards foreign products, so any form of monitoring or control of prices in the Keynesian sector will have an effect on activity. Admitted that monitoring should not be curried on when no more needed by the situation of the sector, this policy should present no difficulty in its application.

2. - Amongst these differentiated policies, it is clearly apparent that the one affecting the supply of sector 1 \((t_{f1} < 0)\) seems the most effective.

There are three arguments here:

- Firstly, it is known that the trickiest mediation in contemporary economic policies is between levels of activity and external constraint (referring to the inflation/unemployment dilemma); now demand policies, even when they are differentiated, fall into the framework of this mediation, whereas judicious supply policies improve the two terms of the mediation;

- Secondly, demand policies are essentially one-sided (ONE SIDE POLICY), whereas supply policies which are effective on activity induce by the same token an increase in distributed income, which stimulates demand. Of course, one must avoid falling into an exaggerated optimism: it is not credible, as J.B. SAY seems to think, that the additional markets will be equivalent! The large French econometric (D.M.S.) or international (HERMES) models show external and public surpluses in this case, which suggest that the demand induced is in general not as great as the extra supply. Furthermore, this provides degrees of freedom for economic policy. These analyses do at least have the merit of showing that in a "healthy" recovery (non-inflationary and balanced) of activity, the action of demand is called upon to play an accompanying role and not a driving one which is passed on to profit-earning capacity;
Thirdly, we shall see that the most effective supply-side policies generally require time, which suggests that they should be implemented as quickly as possible.

3. \( \Delta t_{f1} \), in addition to employer's costs based on wages - which is its precise definition in this model - symbolises all the non-wage determinants capable of varying profit-earning capacity: we can mention interest rates, prices of intermediate consumption, as well as fiscal or social costs ... In all these cases, the improvement brought about by this reduction in global unit costs will be especially strong since \( Y_{1,PN1} \) will be high. This implies in particular that extra profitability does not come up against physical constraints on capacity (sharply falling, indeed almost nil output) which are too great. Now, the known empirical studies are not very reassuring from this point of view:

- On the one hand, the works of B. DORMONT (1986-1988) show that large industrial concerns can remain in a prolonged situation of classic unemployment. This may presuppose that they have largely used up their room to manoeuvre at a constant capacity \(^8\).

- On the other hand, capacity utilization rates of the major European countries were equivalent, last years, to what they were in the sixties "at a time of full employment". If these indications on the weak value of \( Y_{1,PN1} \) are confirmed, that would incontestably strengthen scepticism about all short-term policies - whether of supply or demand - but not about longer-term supply-side policies: it is clear in fact that any enlargement of physical capacity is eminently desirable in such a context, whether it is a question of an increase in investment (if this is not strict rationalization), delayed obsolescence, an increase in the length of time equipment can be used or any other improvement in the apparent productivity of capital.

\(^8\) This conjecture makes the current research to put together the data from centres for company information with those from economic studies particularly interesting.
Graphs A and B show the respective opposite situations of the two types of supply-side policy. It is, of course, sometimes possible to combine them, notably in all the cases where investment is made both in capacity and in rationalization or again to increase the productivity of the existing capital. The distinction between these two types of supply-side policy is essential: according to the value of $Y_{PN}$ (which can be conveniently appreciated from the starting point of utilization rates), one or the other can be much more effective; moreover, they are not on the same time horizon: a reduction in non-wage costs can be obtained in a relatively short period, whereas the increase in capacity evidently requires more time.

* * *

In the end, what could be concluded from the present analysis is a strong complementarity between long and short term policies. More precisely, when rates of utilization are low (low conjuncture), a well think mix of public expenses in keynesian sectors and decrease of non wage costs in classic ones should lead to a significant boost of global activity and employment. Rates of utilization should increase, which is a property of high conjuncture. Then, an increase in productive capacities should be more and more efficient, this increase could be issued either from longer operating hours of capital or increase in capacity investment. Fiscal or financial incitation, from Government, to those capacity increases, need no targeting. It is clear that only the firms which need capacities will benefit from this policy. Then, the strategy for growth and employment should be think in term of supply and demand side policies, long and short term policies, control of production cost and extension of productive capacities.

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9 Out of concern for simplicity, we have merely shown the comparative statics of partial equilibrium in a market in a (neo)classic situation. It is a question in fact of the act of generation. The consequences (in the same sense) for general equilibrium can be shown from the algebraic presentation of the mixed unemployment model.

10 In particular we have established this for the increase in the length of time productive equipment is used: cf. for example M. CATINAT, G. CETTE and D. TADDEI (1986 a and b) or again D. TADDEI (1988).

Illustration of the Two Types of Improvement of Supply in a Neoclassic Situation

Graph A: The consequences of a reduction of unit costs are considerable (shift from \( E_A \) to \( E_B \)) if \( Y_{PN} \) is strong and lessened (shift from \( E_A \) to \( E_C \)) if \( Y_{PN} \) is weak.

In the case where \( Y_{PN} \) is weak

\[ \text{in the case where } Y_{PN} \text{ is strong} \]

Graph B: The consequences of an increase in production capacity are considerable (shift from \( E_A \) to \( E_C \)) if \( Y_{PN} \) is lessened and weak (shift from \( E_A \) to \( E_B \)) if \( Y_{PN} \) is strong.

In the case where \( Y_{PN} \) is weak

\[ \text{in the case where } Y_{PN} \text{ is strong} \]

In these two illustrations, the respective share of the reduction (smaller rise) in prices and the increase (greater) in activity depends on the value of the price elasticities of the functions of demand.
Some econometrics studies, based on either EEC or french models, show that there are real degrees of freedom provided by those mixed policies. More over, they are much important than those ones could expect from undifferential and one-side policies.

IV. Comparison with Other Mixed Unemployment Models and Possible Extensions of the Analysis

IV-A. An Other Mixed Unemployment Models

To our knowledge, the principal mixed unemployment models currently implemented either confirm the common distinction between sheltered and exposed sectors, or are based on a single-sector aggregation of the C.E.S. type. We propose here to compare these two approaches and the present model quickly.

J.P. LAFFARGUE (1986) and P. ARTUS, S. AVOUYI-DOVI and J.P. LAFFARGUE (1987) propose a bi-sectorial distinction between a manufacturing sector, open to international competition, and a "sheltered" sector for services. The first is supposed to be in a classic situation, whereas the second would experience a keynesian situation \(^{12}\).

1. On the level of economic policy the procedure of these authors \(^{13}\) seems to be sufficiently close to ours to emerge in similar prescriptions, notably as to the decisive stimulation of productive capacity in sector 1 (industrial and/or exposed).

2. On the analytical level, it can be seen that the results obtained by these authors speak more for the existence of mixed unemployment in each

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\(^{12}\) S. CUEVA, D. TADDEI and X. TIMBEAU (1991) suppose the sheltered sector know a perfect flexibility of price, and the competitive sector an imperfect flexibility (price-taker). The principal originality of this last approach comes from the responsability of the capacity gap in the industrial sector.

\(^{13}\) Including P. ARTUS (1987) when he shows that French exports are greatly constrained by supply.
of the two sectors defined than for a purely contrasting assessment: consequently, the problem of aggregation remains in its entirety for each of them...

Moreover, this is the same observation, due notably to B. DORMONT (1986 and above all 1988), about a fine mix of unemployment, obtained from the micro-economic data of panels which have led us to abandon the SUMMA DIVISIO between the upside and downside sectors, having taken up the distinction proposed by C. FOURGEAUD B. LENCLUD and P. MICHEL (1980) and M. CATINAT, G. CETTE and D. TADDEI (1986-b).

An ingenious form of single sector aggregation was proposed first of all by J.P. LAMBERT (1984) and since taken up by several authors in the C.O.R.E. at the university of LOUVAIN and in France by A. D'AUTUMNE (1987). It is notably at the root of the "SNEEZE" model (H. NESSENS and J. DREZE, 1986). Starting with disequilibria on the micro-markets (not only, as we did, for goods and services but also for labour ¹⁴ which operate in opposite directions and which are normally resolved by a MINIMUM condition, a C.E.S. condition (constant elasticity substitution) is obtained on the micro-markets in reasonably acceptable conditions of log-normal dispersal of micro-disequilibria.

Aside the well-know merits of this approach, it will be observed that this model cannot deal with two questions to which our model has endeavoured to supply solutions. It does not permit the asymmetrical influences maintained by the keneysian and (neo)classic micro-markets to be brought out. Finally and above all, it prevents the calculation of sectorial multipliers. This reduces economic policy to undifferentiated shocks and to results which are fairly generally contradictory: a widespread feeling of powerlessness may well then ensue from this.

Finally, for lack of a formalized synthesis (which appears to be difficult

¹⁴ This goes back to a situation of frictional unemployment where firms could be constrained over their demand for labour of certain descriptions or in certain areas of employment. However, our authors confirm that these constraints are today much less significant than those which result from the disequilibria in the markets for goods and services.
to implement) between the CORE approach and ours here, it may be thought that two complementary approaches are involved here, based on the same general vision of transitory equilibria. The first allows the reality to be observed more easily and in this sense, is a matter for the positive economy; the second would allow possible intervention by the public authorities to be better differentiated. This is more the concern of the normative economy.

**IV-B. Possible Extensions of the Analysis**

With these model as a base, we may first of all wish to complete the proposed short-term analysis.

It should be noted that the inadequacy of certain categories of labour could be introduced here in the same way as in the SNESSENS and DREZE (1986) model. Likewise, by drawing inspiration from the ordinary theories, two principal courses deserve to be noted which consist in introducing respectively wage-price cycles on the one hand and through a modelling of the type IS-LM on the other.

Then, starting from the strategic importance of physical capacity, we may also look for ways of making productive capacity more dynamic in order to define the axes of a growth strategy in activity and employment in a longer term. Essentially, this can be envisaged in two ways: the variations in operating hours, specially in the (neo)classical sector, and the introduction of a dynamic function of capacity in both sector.

**Bibliography**


