Negative Income Tax and Technological Choices in a Matching Model with Differentiation of Skills

Samir AMINE and Pedro LAGES DOS SANTOS

CERENE, UNIVERSITY OF LE HAVRE
Faculty of International Affairs-Department of Economics
25 rue Philippe Lebon, BP 420
76057 Le Havre Cedex
France

samir.amine@univ-lehavre.fr
pedro.lages@univ-lehavre.fr

April 2005

Abstract

In this article, we stress the effect of a Negative Income Tax (NIT) scheme on the firms' behaviour as regards their technological choices. We show that, within the framework of a matching model with differentiation of the agents (like Marimon and Zilibotti [1999]), a NIT reduces inequalities and rises employment making agents less selective. Moreover, the repercussions of such a policy as regards technological choices are generally underestimated. We show that the introduction of a NIT can encourage the firms to invest in skill substitutability. In other words, they can be brought to lead a "*despecialisation"* of the jobs offered to the workers which is prejudicial to the productivity, in particular in the long run.

Key words : Matching, Negative Income Tax, Technology

JEL numbers : D63, H21, J41, J64.

1. Introduction

One of the major problems that economists have been studying (and faced by social policies) holds in the following question : how can we maintain the interest of activity compared to inactivity while supporting the poor and unemployed people ? This question, depending on the famous "equity-efficiency" dilemma, brought a broader analysis on the efficiency of the French welfare system. It is well known, for example, that the loss of social security benefits after getting a job implies very high implicit marginal tax rates at the bottom of the income distribution (Laroque and Salanié [2000]). Indeed, in France, like in all the countries of beveridgian tradition, social policies are generally inefficient because of the externalities induced on workers behaviour.

However, Anglo-Saxon "liberalism" tends to present the same kind of problem even if the causes are then different. The increase of the "working poor" class obliged the numerous countries concerned to seek means of fighting this poverty on job without interfering with the labour market flexibility (as the legislation on the minimum wage does). Then, today, following the United States with the *Earned Income Tax Credit* (EITC) and the United Kingdom with the *Working Family Tax Credit* (WFTC), many countries (including France) turns to the *Negative Income Tax* (NIT) of Friedman (1962). Conceived like a "reverse tax", the NIT makes possible to bind low wages to a proportional allowance. In theory, such a reform improves the situation of the poorest while it incentives those which do not work, first, to participate to the labour market and, second, to seek actively a job.

The EITC and the WFTC have both been existing for several years. Even if these measures are based on the same idea, they are different in different ways such as the means of management, the amounts involved, the treatment of partial time or the family dimension. Thus, it is difficult to make a true comparison of these policies since the results of those must be necessarily put in prospect with the objectives and the means for each one. Blundell and *alii.* [2000], Bontout [2000], Delarue [2000], Saez [2000] or even Eissa and Liebman [1996] show that even if one can show positive effects on employment, activity rates and inequalities, those are closely related to the policy characteristics and vary according to the populations considered.

In France, the law of May 30, 2001 founded the "*Prime Pour l'Emploi*" (PPE) which corresponds to a tax credit for workers whose incomes of activity lie between 0,3 and 1,4 full-time minimum wage. The main objective of the law instituting the PPE is to improve the activity rates. Just like work relating to the EITC and the WFTC, the studies concerning the PPE (Bargain and Terraz [2003] for example) tend to moderate the positive effect expectations of the PPE on employment or on the situation of the poorest. From the theoretical point of view, the NIT is generally regarded as an effective mean of increasing work supply. However, a simple analysis in terms of "substitution effect" and "income effect" (possibly reinforced, according to the household structure, by an effect of additional worker (Blundell and McCurdy [1999])) tend to moderate this idea. Indeed, the earned income credit systems have different effects on economic variable (employment, wages, etc.) according to the model selected. Cahuc [2002] shows clearly that, regarding the elementary neoclassical model, the effects of the earned income credit systems depend on the labour market conditions and also on the populations considered. Moreover, Bassanini and *alii.* [1999] suggest that the NIT efficiency could be weaker in the countries, like France, which are characterized by a tightened income distribution, high reservation wages and significant labour income taxes. In addition, this elementary neoclassical model neglects many significant aspects of the labour market like the process of

creation and destruction of jobs which induces, with transaction costs, a frictional unemployment. Thus, it omits the possibility of wage negotiations just as it suitably treats neither the question of the participation in the labour market nor that of the job demand representation.

In order to mitigate these insufficiencies, the NIT is also studied within the framework of the matching models (Pissarides [2000]) and then the NIT can present completely different effects. For example, making employment remunerated by the minimum wage more attractive, the NIT can increase the unemployed people research effort. Consequently, the earned income credit, which had a null effect on employment in the presence of a minimum wage regarding the elementary neoclassical model, can reduce unemployment when the frictions on the labour market are taken into account. But other works show precisely the opposite. Lages Dos Santos [2003] shows that, within the framework of a matching model with differentiation of the agents, even if the NIT remains interesting in the reduction of the inequalities and poverty, the introduction of a minimum wage cancels the "incentive to work" effect of the policy. Moreover, Gravrel, Lages Dos Santos and Lebon [2005] show that a NIT scheme effectively allows, on the one hand, to increase employment as well as workers participation and, on the other hand, to reduce the income inequalities.

Thus, the majority of work deals mainly with the work supply behaviour of the agents (on the extensive and/or intensive margins) and with the hiring behaviour of the firms. But it is rare that the implications of the employment policies on technological choices of the firms are evaluated while they are not negligible taking into account the long-term effects on productivity and growth. Many works show a direct link between inequalities and/or unemployment and "*skill-bias*". Thus, in most of the developed countries, incomes and employment obviously evolved in different ways but generally in disfavour of the less qualified workers (Manacorda and Petrongolo [1999] ; Marimon and Zilibotti [1999] (MZ thereafter)). Theoretical analysis tried to explain this report. In the literature, these evolutions are rather allotted to a shock on the relative work demand due to a distorted technological change in discredit of low-qualified work (Aghion and Howitt [2002] ; Autor, Katz and Krueger [1998]). The fall of the labour market tightness is generally seen as an exogenous technological skill-bias (Bound and Johnson [1992] ; Pissarides [1999] ; MZ). Acemoglu [2002] shows that the rise of the labour supply of skilled workers encourages the firms to create jobs increasingly specialized and adapted to this kind of workers only able to ensure a certain adaptation to the technology involved. Gavrel and Lebon [2003] or Peter and Thorsten [2004] also highlight an increasing relation between unemployment and job specialization.

This paper deals with the implications of an employment policy such as the NIT on the firms behaviour as regards technological choices. To that aim, we use a matching model *à la* MZ with endogenous job specialization (Amine [2004]). We show that, within such a framework, a NIT scheme reduces inequalities and increases employment but at the expense of the productivity because of a less selectivity of the agents ; this last effect being then accompanied by a reduction on job specialization. Thus, such an employment/social policy can lead, on the one hand, to a modification on the hiring behaviour of firms which is favourable to the unemployment reduction but also, on the other hand, to a reaction in terms of technological choice prejudicial to the long-term productivity. This paper proceeds as follows. Section 2 presents the model which is solved in section 3. Then, we specify the analytical results carrying out simulations in section 4. Lastly, we conclude our study in a fifth and last part.

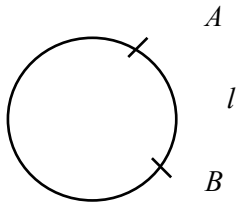
2. THE MODEL

2.1. Differentiation and hiring process

2.1.1 The skill circle

We assume that workers and jobs are uniformly distributed on a circle which circumference is equal to 2. This distribution is exogenous. The position of a worker on the circle represents its "type" of skill whereas those of a firm define the "type" of skill that perfectly suits its needs.

Figure 1. The skill circle



On the circle of skills (held or required), the distance l ($0 \leq l \leq 1$) between a worker (in A) and a firm (in B), measures the match (or mismatch). Thus the match is perfect when the distance l equals 0. On the opposite, the mismatch is maximized when l reaches unity. Then, the productivity of a worker for a given representative firm, denoted *y(l),* is a decreasing function of this distance l such as :

$$y(l) = A - al \qquad (1)$$

$$A = F(a) \qquad (2)$$

F(a) is the job specialization function and the parameter " a " represents technological choices of the firms. a measures the specialization degree (*i.e.* the skill substitutability). Indeed, an increase of a means that a firm creates jobs more specialized . Then, it also means a positive effect on the productivity of well-matched workers. Thus, F is supposed to be an increasing and concave function ($F'(a) > 0$; $F''(a) < 0$).

2.1.2 The hiring process

Concerning the hiring process, we retain the approach of Marimon and Zilibotti [1999] for the matching function. Each unemployed people can meet each firm located on the circle with the same probability. We suppose that the density of meetings between firms located on "i" and workers on "j" is an increasing function of the density of job vacancies "V_i" and the one of unemployed people "U_j". Then, the matching function $m(V_i ; U_j)$ is an increasing function on V_i and U_j. $m(V_i ; U_j)$ is an homogenous function of degree 1. Considering the free-entry condition and the existence of a steady state equilibrium, the probability of meeting a firm (a worker) is

the same for all the workers (the firms) independently of their location on the circle. The labour market tightness (θ) has to be steady all around the circle[1] ($\theta_{ij} = \theta$; $\theta = V/U$).
Thus, the probability for a firm to meet a worker is as follows :

$$k = \frac{m(V;U)}{V} = m(\theta) \qquad (3)$$

It is obvious that the "success" of the meeting between a firm and a worker depends on the distance separating both. That means the existence of a *mismatch threshold* noted λ which at this stage is considered as exogenous. Then, the probability of filling a job vacancy is :

$$q = \lambda\, m(\theta) \qquad (4)$$

This probability is an increasing function of the threshold λ. If the agents are less selective, the rise on the labour market tightness (θ) has a negative effect on this probability. Concerning workers, the hiring probability is wrote as follows :

$$p = \theta q = \theta \lambda\, m(\theta) \qquad (5)$$

As one could expect, this probability is an increasing function of λ and θ.

2.2. Intertemporal utilities and profits

2.2.1 Workers

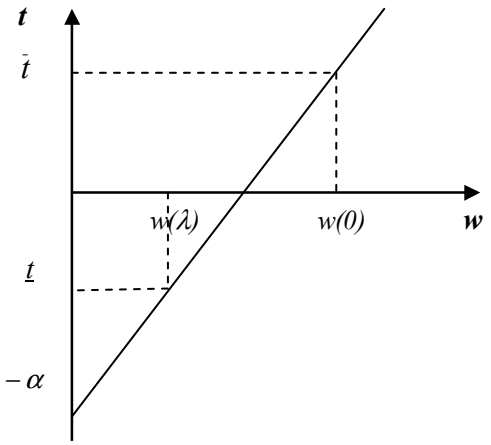
When a worker is hired, his productivity *y(l)* and, then, his gross wage *w(l)* depends on the distance *l* between his "type" and that of the firm which employs him. We denote $W_E(l)$ the intertemporal utility of the hired worker. We assume that unemployed people receive unemployment benefits *b*. Their intertemporal utility W_U also depends on the mismatch threshold λ that is, the distance above which a firm rejects a worker. λ influences the hiring probability *p* and the expected intertemporal utility of a worker who is hired. Since the distribution of vacancies is uniform, the average value of any variable *x* (depending on *l*) of this model is defined as follows :

$$E[x(l)] = \bar{x} = \frac{1}{\lambda}\int_0^{\lambda} x(l)dl \qquad (6)$$

We introduce in this model a particular tax system based on a NIT scheme. We will consider a function of this form : $t[w(l)] = -\alpha + \gamma w(l)$. Note that this only applies to workers. The amount of the tax *t[w(l)]* imposed on each worker depends on the level of income he gets. Then, we admit that high incomes pay a tax whereas low incomes gain from tax credit. Besides, workers collecting average income are tax exempted. Let's suppose $t[w(0)] = \bar{t}$ the highest amount of tax paid by a worker and $t[w(\lambda)] = \underline{t}$ the maximum tax credit amount collected.

[1] see Marimon and Zilibotti [1999], p 288.

Figure 2. The tax function



Moreover, we consider a budget constraint as follows :

$$\int_{w(\lambda)}^{w(0)} t(w)dw=0 \tag{7}$$

In stationary equilibrium, intertemporal utilities $W_E(l)$ and W_U satisfy:

$$rW_E(l) = w(l) - t\left[w(l)\right] - s\left[W_E(l) - W_U\right] \tag{8}$$

$$rW_U = b + p\left[\overline{W}_E - W_U\right] \tag{9}$$

2.2.3 The firms

The jobs firms offer are either vacant or filled. Obviously, the value of a filled job, denoted by $J_F(l)$, depends also on the distance l between the types of the employer and the employee. Let J_V be the value of a vacant job. The value of a filled job, $J_F(l)$, is then given by:

$$rJ_F = y(l) - w(l) - s\left[J_F(l) - J_V\right] \tag{10}$$

The value of a vacant job, J_V , is a function of the threshold λ. Indeed, this limit affects the probability, q, of filling this job as well as the expected value of a job which is filled. This latter conditional expectation, denoted by $\overline{J}_F$, satisfies :

$$rJ_V = -c + q\left[\overline{J}_F - J_V\right] \tag{11}$$

2.3. Wage bargaining and Surplus sharing

Following the generalized Nash rule, the surplus of a firm/worker match is divided between the two parties according to their bargaining powers. Let β ($0<\beta<1$) be the bargaining strength of workers. Let us write the optimization problem :

$$\underset{w(l)}{Max}\ \beta \ln[W_E(l)-W_U]+(1-\beta)\ln[J_F(l)-J_V]$$

That is to say the first order condition:

$$\beta[1-t'(w(l))][J_F(l)-J_V]=(1-\beta)[W_E(l)-W_U]$$

The tax scheme retained gives a marginal constant rate of imposition ($t'(w(l))$ that we will note γ. The previous equation can thus be rewritten in the following way:

$$\beta(1-\gamma)[J_F(l)-J_V]=(1-\beta)[W_E(l)-W_U] \qquad (12)$$

Hence, the expected rent of workers is :

$$W_E(l)-W_U=\beta[W_E(l)+J_F(l)-W_U-J_V]-\beta\gamma[J_F(l)-J_V] \qquad (13)$$

Thus, the proportion of the total surplus collected by a worker is lower than his bargaining powers (β). Indeed, taking into account the tax scheme selected, the average rate of imposition is increasing on wages. Consequently, firms benefit from the fact that workers are incited to negotiate weaker wages in order to collect a more significant share of the collective surplus.

3 The model equilibrium

3.1 Optimal specialization and selectivity

The degree of specialization (a_i) and the *mismatch threshold* (λ_i) are obtained by optimization of the value of a vacant job of firm-*i*. Considering that the derivative of the average productivity with respect to a_i is written:

$$\frac{\partial \bar{y}_i}{\partial a_i} = F'(a_i) - \frac{\lambda_i}{2} \qquad (14)$$

And taking into account the surplus sharing, the first order conditions impose:

$$F'(a_i) = \frac{\lambda_i}{2}$$

$$y(\lambda_i) = r(J_{Vi} + W_U) \qquad (15)$$

Consequently, with symmetrical equilibrium, the specialization of jobs (a) decreases with the rise of the threshold λ. In other words, more selectivity of the agents is accompanied by a more intense specialization of jobs. Indeed, when λ decreases, the firms recruit workers who are better adapted. Then, they can increase the degree of specialization since its impact on the average productivity falls.

From the equations (8), (10) and (15), one can show that the agents decide a *mismatch threshold* such as:

$$W_E(\lambda)+J_F(\lambda)-W_U-J_V = 0 \qquad (16)$$

According to equations (12), (13) and (16), we obtain:

$$W_E(\lambda)=W_U \Leftrightarrow J_F(\lambda)=J_V \tag{17}$$

Obviously, the threshold λ is defined such as the rent of the least productive employee is null. Then, the threshold (λ) constitute an optimal stop rule of research for firms and workers. Taking into account the free-entry condition, at equilibrium $J_V = 0$ and the reservation wage, $w(\lambda)$, is then given by:

$$w(\lambda) = y(\lambda) \tag{18}$$

3.2 Selectivity, specialization and the tightness of the labour market

The equations (8), (9) and (17) imply:

$$y(\lambda) - \underline{t} = b + p\left[\overline{W}_E - W_U\right] \tag{19}$$

According to free-entry condition, the equations (10) and (11) give:

$$\overline{J}_F = \frac{\overline{y} - \overline{w}}{r+s} = \frac{c}{q} \tag{20}$$

However, taking into account the equations (12) and (20) :

$$\overline{W}_E - W_U = \frac{\beta(1-\gamma)}{(1-\beta)}\overline{J}_F = \frac{\beta(1-\gamma)}{(1-\beta)}\frac{c}{q} \tag{21}$$

Consequently, according to the equations (1), (2), (19) and (21) :

$$F(a) - a\lambda = b + \underline{t} + \frac{\beta(1-\gamma)}{(1-\beta)}c\theta \tag{22}$$

Considering a given level of maximum tax credit ($\underline{t}$), the increase of the labour market tightness strengthens the agents selectivity as well as the job specialization (*i.e.* a increases). An increase of the labour market tightness results in a rise of the hiring probability p. Workers have better external opportunities and the agents are then more selective. Like in Marimon and Zilibotti [1999], the *mismatch threshold* decreases. Consequently, taking into account the decreasing relation between a and λ, firms offer more specialized jobs.

In addition, according to the relation (22), the earned income tax system makes the agents less selective and decreases the job specialization. Indeed, since the least productive jobs obtain a tax credit, the area of agreement between workers and firms increases. Consequently, the fact that the productivity decreases encourages the firms to reduce the specialization.

3.3 Vacancy creation and wage setting

Taking into account the equations (8), (9), (12) and (20), one show that :

$$\overline{W}_E - W_U = \frac{\beta(1-\gamma)}{(1-\beta)} \frac{\bar{y} - \overline{w}}{r+s} \tag{23}$$

$$\overline{W}_E - W_U = \frac{\overline{w} - b}{r+s+p} \tag{24}$$

From the two preceding relations, one can deduce the *wage setting equation* :

$$\overline{w} = \frac{\beta(1-\gamma)(r+s+p)\bar{y} + (1-\beta)(r+s)b}{\beta(1-\gamma)(r+s+p) + (1-\beta)(r+s)} \tag{25}$$

However, from the relation (20), one obtain a second expression of $\overline{w}$:

$$\overline{w} = \bar{y} - \frac{(r+s)c}{q} \tag{26}$$

From the equations (25) and (26), one show:

$$\frac{(r+s)c}{q} = \frac{1-\beta}{1-\gamma\beta}\left[\bar{y} - y(\lambda) + \underline{t}\right]$$

thus :

$$(1-\gamma\beta)(r+s)c = (1-\beta)\left(\frac{a\lambda}{2} + \underline{t}\right)\lambda m(\theta) \tag{27}$$

According to the relation (27), with a given level of tax credit, a fall of the agents selectivity causes an increase in the labour market tightness and a fall of the specialization of jobs (*a* decreases). Indeed, if firms and workers are less selective, they get along on less productive and less remunerated jobs. Consequently, firms create more vacant jobs and employment increases ; thus, reducing the tightness of the labour market. Since, as one explained previously, the area of agreement between workers and firms is extended, the introduction of NIT system decreases the agents selectivity and, then, increases the labour market tightness and reduces the job specialization.

4 SIMULATIONS

In this fourth part, we carry out simulations so as to specify the results obtained with the analytical study. Let us note that it is not here an exercise of calibration. These simulations aim only to sign the effects on the economic variables. Besides, let us specify that the results presented in the tables below do not change according to the values of the parameters. Moreover, if we consider a tax function such as $t(w) = -\alpha + \gamma w$ and since $w(\lambda)<w(0)$, the budgetary constraint imposes:

$$\frac{w(\lambda) + w(0)}{2} = \frac{\alpha}{\gamma}$$

Tables 1 and 2 present the effects of the NIT system on several economic variables.

Table 1. Negative tax, job specialization and unemployment

	λ	θ	a	u	$\bar{y}$	$\bar{w}$
$(-\underline{t})$	+	+	-	-	-	-

The table 1 shows that the introduction of a NIT makes firms as well as workers less selective. However, this extension of the area of agreement between the two parts (represented by the increase in the threshold λ) causes a reduction in the average productivity. Indeed, the tax credit given to low paid workers encourages them to decrease their reservation wages. Then they are incited to accept jobs further away from the type which perfectly suits their skills. This least agents selectivity tends to increase the probability of filling a job for a firm and the hiring probability for unemployed people, reducing unemployment. However, the average quality of matches reduces and then the average productivity falls. Consequently, since workers as a whole are less well-adapted to their job, firms are encouraged to decrease the degree of job specialization.

Table 2. Negative tax, intertemporal utilities and profits

	$W_E(0)$	$\overline{W}_E$	$W_E(\lambda)$	$W_E(\lambda_i)$	$\bar{J}_F$	SC
$(-\underline{t})$	-	-	-	+	-	-

Moreover, taking into account the NIT scheme, one shows a reduction of the inequalities. Thus, the richest workers see their situation degraded since they partly finance the tax credit from which benefit the poorest. Because of the wage negotiation, the other part of the financing of the NIT system is supported by the firms whose the expected value of jobs (J_V and $\bar{J}_F$) decrease. In addition, thanks to the tax credit, those who were initially the poorest experience an improvement of their situation ($W_E(\lambda_i)$ increases). However, because of the fall of the average productivity, among the new hired workers, the poorest are then poorer than the previous ($W_E(\lambda)$ decreases). That are the reasons why, on the one hand, in spite of the improvement of the situation of some of them, on average the situation of the workers worsens ($\overline{W}_E$ decreases) and, on the other hand, in spite of the fall of unemployment, the collective surplus (SC) decreases.

5 FINAL COMMENTS

The Employment Policies are generally led in order to improve the situation of the workers (in particular, of the low qualified) and to incentive those and the firms to modify their behaviour in terms of recruiting.

Indeed, we show in this paper that a NIT system really allows, while making the agents less selective, to reduce inequalities and to increase employment. However, the repercussions of such a policy as regards technological choices are generally underestimated. We show that the introduction of an earned income tax credit system can encourage firms to invest in the substitutability of competences. In other words, they can be brought to lead a *despecialization* of the jobs offered to workers which could be prejudicial to the productivity, in particular in the long run.

Moreover, it would be interesting to confirm the intuition according to which the policies of subsidy of the low-qualified workers recruitment can present the same type of effects.

REFERENCES

ACEMOGLU D. [2002], « Technical Change, Inequality and the Labour Market », *Journal of Economic Literature*, 40, p. 7-73.

AGHION P. and HOWITT P. [2002], « Wage Inequality and the New Economy », *Oxford Review of Economic Policy*, 18, p. 306-323.

AMINE S. [2004], « Spécialisation des Emplois et Chômage dans un Modèle d'Appariement », Communication to the LIIè Congress of AFSE.

AUTOR D., KATZ L. and KRUEGER A. [1998], « Computing Inequality: Have Computers Changed the Labour Market ? », *Quarterly Journal of Economics*, 113, p. 1169-1214.

BARGAIN O. and TERRAZ I. [2003], « Evaluation et mise en perspective des effets incitatifs et redistributifs de la Prime pour l'emploi. », Working papers, DELTA.

BASSANINI A., RASMUSSEN J.H. and SCARPETTA S. [1999], « The economic effect of unemployment conditional income support schemes for the low-paid : An illustration from CGE model applied to four OECD countries. », Document de travail du Département des affaires économiques de l'OCDE, n°224.

BLUNDELL R., DUNCAN A., MCCRAE J. and MEGHIR C. [2000], « The Labour Market Impact of the Working Families Tax Credit », *Fiscal Studies*, 21, 65-74.

BLUNDELL R. and McCURDY T. [1999], « A labour supply : a review of alternative approaches ». In O. Ashenfelter et D. Card (eds). Handbook of Labor Economics III, 1559-1695.

BONTOUT O. [2000], « L'*Earned Income Tax Credit*, un crédit d'impôt ciblé sur les foyers de salariés modestes aux Etats-Unis », *Economie et Statistique*, 335, 27-46.

BOUND J. and JOHNSON G. [1992], « Changes in the Structure of Wages in the 1980s: An Evaluation of Alternative Explanations », *American Economic Review*, 82, p. 371–392.

CAHUC P. [2002], « A quoi sert la Prime pour l'emploi », *Revue Française d'Economie,* 16, 3-61.

DELARUE V. [2000], « Le *Working Families Tax Credit*, un nouveau crédit d'impôt pour les familles de travailleurs à bas revenus au Royaume-Uni », *Economie et Statistique*, 335, 47-61.

EISSA N. and J. LIEBMAN [1996], « Labor Supply Response to the Earned Income Tax Credit », *The Quaterly Journal of Economics*, 111, 605-637.

GAVREL F., LAGES DOS SANTOS P. and LEBON I. [2005], « L'impôt négatif peut-il augmenter la participation des travailleurs à faible productivité? », Working paper, CERENE.

GAVREL F. and LEBON I. [2003], « Providing Pissarides' stochastic job matchings model with microeconomic foundations. A reconsideration of Marimon and Zilibotti (1999) circle model », Communication to the Congress of the European Economic Association, Madrid.

LAGES DOS SANTOS P. [2003], « « Prime à l'emploi », salaire minimum et chômage dans un modèle d'appariement », Communication to the LIIè Congress of AFSE.

LAROQUE G. and SALANIE B. [2000], « Une décomposition du non-emploi en France », *Economie et statistique*, n°331, INSEE.

MANACORDA M. and PETRONGOLO B. [1999], « Skill Mismatch and Unemployment in OECD Countries », *Economica*, 66, p. 181-207.

MARIMON R. and ZILIBOTTI F. [1999], « Unemployment vs. Mismatch of Talents: Reconsidering Unemployment Benefits », *Economic Journal*, 109, p. 266-291.

PETER F. and THORSTEN V. [2004], « Endogenous Skill Bias », *Journal of Economic Dynamics and Control*, 28, p. 2155-2193.

PISSARIDES C. [1990], *Equilibrium Unemployment Theory*, MIT Press. Reedited in 2000.

SAEZ E. [2000], « Optimal Income Transfer Programs : Intensive versus Extensive Labor Supply Responses », *Discussion Paper 7708,* NBER.

SALOP S. [1979], *Monopolistic competition with outside goods*. Bell Journal of Economics.