Equilibrium evaluation of active labor market programmes enhancing matching effectiveness

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Discussion Paper 2005-7

Département des Sciences Économiques de l'Université catholique de Louvain

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Equilibrium evaluation of active labor market programmes enhancing matching effectiveness*

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March 4, 2005

Abstract

This paper evaluates counselling programmes in an equilibrium matching model where workers are heterogeneous in skill levels. Job search effort, labour demand and wages are endogenous. When wages are bargained over, raising the effectiveness of or the access to counselling programmes pushes wages upwards and leads to lower search effort among nonparticipants. The effects of increasing the access of the low-skilled are evaluated numerically by enlarging successively the set of endogenous behaviours. Induced effects outweigh substantial positive micro effects on low-skilled employment when all 'margins' are taken into account. The inter-temporal utility of the low-skilled nevertheless increases because search effort declines. On the contrary, when the net wage of the low-skilled is a fixed proportion of the one bargained by the high-skilled, raising the access to counselling programmes has small positive effects on all criteria.

Keywords: active programmes; labour market policies; evaluation; policy complementarities; wage bargaining; equilibrium unemployment; equilibrium search.
JEL classification : J63, J64, J65, J68.

*This research is part of a programme supported by the Belgian government (Poles d'Attraction interuniversitaires PAI P5/21. I thank Bart Cockx, Gabriele Cardullo, Edward Vytlacil and participants to the ERMES seminar (Université of Paris 2) for useful comments.

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1 Introduction

Despite rather mixed conclusions about their effects, active labour market policies (ALMPs) play a very important role in the European Employment Strategy (EES). Among other things, the underlying diagnostic considers that the matching between job-seekers and vacancies is inefficient. To address that problem, European guidelines recommend to reform tax and benefit systems and to develop services such as advice and guidance, job search assistance and personalized action plans (henceforth "counselling programmes"). The first group of reforms have been analyzed elsewhere (see in particular Holmlund, 1998, Fredriksson and Holmlund, 2003, Boone and Bovenberg, 2005, and Choné and Laroque, 2005). This paper focusses on counselling programmes. Several countries have already implemented such programmes (e.g. the *intensive contact programme* in Denmark, the *new deal* in the U.K., the *Programme d'Action Personnalisé* in France and the *Plan d'Accompagnement des Chômeurs* in Belgium). These labour market interventions are developed on a rather large scale. This raises the question of their equilibrium effects. This paper addresses two policy issues. How does the equilibrium impact of counselling programmes vary with their size and their microeconomic effectiveness? How do these programmes interact with labour market institutions such as unemployment insurance and wage formation?

The EES considers the employment rate as the major evaluation criterion. Since the Nice European Council in 2000, there is however a growing concern for the quality of jobs. The well-being of the job-seekers is also a matter of concern. Heckman (2001) urgently calls for equilibrium evaluation approaches that care about distributional consequences and cover a range of evaluation criteria. The present analysis distinguishes different skill groups and adopts labor market performance and the level of welfare as criteria.

This paper makes two methodological contributions to the literature. First, ALMPs have complicate effects on employment, wages and welfare that are not well understood yet (see Calmfors, 1994, and Calmfors, Forslund and Hemström, 2002). This paper explains the complex mechanisms in a simple and yet fairly general setting of a Continental European labour market. Infinitely-lived individuals are risk averse, job-search effort and participation to the labour market are endogenous and wages are bargained over by incumbent employees on behalf of all workers. Moreover, workers are heterogeneous in two dimensions: Their skill and their utility when inactive. Calmfors, Forslund and Hemström (2002) point to the need of a better understanding of an omitted relationship, namely the one between policies and job-search effort. The present paper investigates this relationship. The complex picture proposed by Calmfors, Forslund and Hemström (2002) should then become even more intricate. It is not. The model developed here actually allows to simplify the presentation of the effects at work. Many of these can be characterized analytically.

Second, this paper does not only confirm that general equilibrium programme evaluations can lead to conclusions that are very different from those based on a partial equilibrium analysis. By distinguishing the various effects at work, this paper shows that the general equilibrium effects themselves heavily depend on *(i)* the type and the range of behavioral adjustments endogeneized by the researcher and *(ii)* labour market institutions (in particular those governing wage formation).

From a policy viewpoint, it is shown that increasing the rate of entry of the low-skilled into counselling programmes has a positive direct effect on their employment rate if certain conditions (that are more stringent in the presence of a two-tired benefit system) are fulfilled. However, the indirect effects are detrimental to employment through wage formation and through the adjustment in job-search among nonparticipants. A simulation exercise indicates that as more unemployed enter the programme, the sign of the change in employment shifts from positive to negative when more and more induced effects are taken into account. The adjustment in job-search effort among those who do not (yet) participate seems to be decisive. Actually, wage bargaining is the key assumption. If the low-skilled wage is no more negotiated but proportional to the high-skilled bargained wage, counselling programmes targeted on the low-skilled have small net positive effects on their employment rate. The simulation exercise also illustrates the possible conflict between evaluation criteria. The (un)employment rates and welfare criteria often lead to opposite conclusions.

From social experiments, Martin and Grubb (2001) conclude that counselling programmes generally "show positive outcomes". This is confirmed by a recent non-experimental evaluation using (un)employment duration data for France (see Crépon, Gurgand and Dejemeppe, 2004). Blundell, Costas Dias, Meghir and Van Reenen (2004) use micro-data to evaluate the effects of the first stage of the "New Deal" programme that mainly consists of job-search assistance. They find small positive employment effects. By carefully designing several control groups, they are able to estimate the importance of substitution effects and induced effects on wages. They conclude that the latter are rather small. The present paper reaches similar conclusions.

Counselling programmes can be used jointly with monitoring and sanctions. This complementarity is not considered here (for an overview, see Fredriksson and Holmlund, 2003). Counselling programmes are very different from (long-duration training) schemes that intend to enhance skills (see Albrecht, van den Berg and Vroman, 2004, and Boone and van Ours, 2004) or to enlarge the set of occupations that are accessible (see Masters, 2000). In the present paper, as the programme only affects matching effectiveness, the distribution of skills is exogenously given.

The rest of the paper is organized as follows. Section 2 develops the model. Section 3 disentangles the equilibrium effect of ALMPs. A numerical analysis is conducted in Section 4. Section 5 develops a sensitivity analysis and Section 6 concludes the paper.

2 The Model

The model deals with publicly-provided short-duration active programmes organized for the unemployed. The policies considered here aim at improving the matching effectiveness of the beneficiaries through job-search assistance, job clubs, individual counselling, interviews and the like.

2.1 Basic assumptions

Exogenous differences in skill and in utility levels while inactive are the two sources of heterogeneity in this economy. The model features a homogeneous good (the numeraire) and labour. The good market is perfectly competitive. Returns to scale are constant. Each firm uses one and only one type of skill $n \in \{1, ..., N\}$. The labour market is therefore by assumption segmented in the skill dimension. For simplicity, a representative firm will be modeled for each skill. Each firm is composed by filled and vacant occupations. In the simulation exercise of Section 4, an aggregate budget constraint of the State will introduce a link between the labour markets.

A markovian model is developed in a continuous-time setting and in steady state for a Continental European country (see Figure 1). In accordance with institutions in many OECD countries, a two-tired benefit system is assumed to prevail. An insured unemployed whose 'high' benefits has expired enters a state where (s)he indefinitely can benefit from a (typically) lower unemployment or assistance benefit. High benefits expire at an exogenous rate π_n. For jobless individuals, three states are identified: Insured unemployment with high benefits (U_n), insured unemployment with low benefits (X_n) and participation in a counselling programme (T_n). Employment (E_n) should be understood as salaried employment in private firms. Inactivity, I_n, is the fifth state. These upper-case symbols will designate both the states and the number of individuals occupying them in steady state.

In a frictional economy, the flow of hires, M_n, is a function of an indicator of the number of job-seekers, S_n , and of the number of vacancies, V_n. The matching function $M_n = m(S_n, V_n)$ is assumed to be increasing, concave and homogeneous of degree 1.

Firms post vacancies and this costs a fixed amount K_n per unit of time. Jobless workers search for a job or stay out of the labour force. Having Continental Europe in mind where collective bargaining is widespread and following Cahuc and Lehmann (2000), it is assumed that the current wage is bargained over by incumbent employees on behalf of all workers. The fall-back level for theses 'insiders' is the intertemporal discounted utility of an unemployed entering state U_n, $V_{U,n}$. If an agreement is reached, production occurs and the total surplus is shared between the worker and the firm. An exogenous fraction ϕ_n of the matches is destroyed. The workers who occupied these jobs enter insured unemployment[1] and these jobs become vacant. As will soon be clear, workers have no incentive to quit.

Search intensity is *endogenous*. Let $s_{U,n}, s_{X,n}$ and $s_{T,n}$ denote search intensities in the various states. A unique *exogenous* matching effectiveness parameter c_n will be associated to states U_n and X_n.[2] For participants to the programme, this parameter can be different and will be denoted $c_{T,n}$. It is assumed that $c_{T,n} > c_n > 0$. The programme can intrinsi-

[1] This is a good approximation for countries such as Belgium that will be analyzed later. For other countries, a distinction between eligible and ineligible workers can be important (see e.g. Lise, Seitz and Smith, 2004).

[2] A true-duration dependence effect is not introduced for two reasons. First, the recent econometric literature downplays the importance of this effect in Continental Europe (see Cockx and Dejemeppe, 2005, and the papers they quote). Second, if true-duration dependence was included in our setting, changing the rate π_n would at the same time affect the time-profile of benefits and the one of matching effectiveness. This would be very confusing.

cally improve the effectiveness of search effort. The Public Employment Service ('PES') can also give priority to participants to these programmes, in particular in the case of a closed treatment of job offers. Then, the measure of the supply-side in the matching function is $S_n \equiv c_n\,(s_{U,n}\,U_n + \,s_{X,n}\,X_n) + c_{T,n}\,s_{T,n}\,T_n$.

Due to the constant returns to scale in the matching process, the model can be developed in terms of tightness indicators *measured in efficiency units*, namely $\theta_n \equiv \frac{V_n}{S_n}$. The rate at which vacant jobs become filled is $q(\theta_n) \equiv M_n/V_n = m(\frac{1}{\theta_n}, 1), q'(\theta_n) < 0$. An 'efficient job-seeker' moves into employment according to a Poisson process with rate $\alpha(\theta_n) \equiv \frac{M_n}{S_n} = \theta_n\,q(\theta_n)$, with $\alpha'(\theta_n) > 0$. An insured unemployed i endowed with skill n and searching for instance with a search intensity $s^i_{U,n}$ exits to employment at a rate to $c_n\,s^i_{U,n}\,\alpha(\theta_n)$.

The unemployed are assigned to treatment at an exogenous rate γ_n (conditioning the access to a programme on the level of unemployment benefit would arguably be considered as discriminatory). Full compliance is assumed.[3] The micro-econometric evaluation literature emphasizes that an average favourable effect often conceals heterogeneous impacts. This heterogeneity here implies that matching effectiveness is not enhanced for a number of programme participants. This is captured by an exogenous rate, λ_n, at which participants drop out. Their marching effectiveness is then the one of non-participants. It is quite natural to assume that $\lambda_n > \phi_n\ (\forall n)$.

2.2 Preferences and search effort

Individuals are risk averse and have no access to capital markets. Equilibrium search model with risk averse workers are notoriously difficult to handle. So, a simple separable instantaneous utility function is adopted, namely $\ln(c) - \psi_n \frac{s^{\xi_n}}{\xi_n}$, with c denoting consumption and s effort while $\psi_n > 0$ and $\xi_n > 1$ are parameters. Effort in employment is fixed and normalized to zero.[4]

Let w_n denote the net wage of an employed worker endowed with skill n. If wages were bargained individually, this wage would be different according to the state of origin, at least at the level of entry into the firm. With the type of bargaining chosen here, there is a single skill-specific wage. Let $b_{\iota,n}$ be the level of benefit ($\iota = U, X, T$). The following very plausible ranking is assumed: $w_n > b_{T,n} \geq b_{U,n} > b_{X,n} > 0$. Let $v_{\iota,n} \equiv \ln(b_{\iota,n}) - \psi_n\,\frac{(s_{\iota,n})^{\xi_n}}{\xi_n} \geq 0$, $\iota \in \{U, X, T\}$.

Let r be the discount rate assumed to be common to all agents. Holding a job yields an

[3] It will turn out that entering a programme implies a gain for the unemployed. In principle, waiting for a job offer could be more advantageous. Nevertheless, the model rules this out. Programme participation is nowadays more and more compulsory. As it is observed in several countries, participation to active programmes is a sufficient condition to become eligible to high benefits again. Relaxing this assumption substantially complicates formulas without adding much insight.

[4] It could equally well be normalized to any other value without changing the results. An appendix in Van der Linden (2003a) summarizes the major changes when an isoelastic function of consumption is used instead of $\ln(C)$. A log disutility of search could also be chosen instead of the isoelastic specification.

intertemporal utility $V_{E,n}$ defined by:

$$rV_{E,n} = \ln(w_n) + \phi_n(V_{U,n} - V_{E,n}) \tag{1}$$

The level of job-search is optimized at any point in time. For an individual i endowed with skill n, the intertemporal utility levels solve the following state-dependent Bellman equations:

$$rV^i_{U,n} = \max_{s^i_{U,n}}\{v_{U,n} + c_n s^i_{U,n}\alpha(\theta_n)(V_{E,n} - V^i_{U,n}) + \gamma_n(V^i_{T,n} - V^i_{U,n}) + \pi_n(V^i_{X,n} - V^i_{U,n})\} \tag{2}$$

$$rV^i_{T,n} = \max_{s^i_{T,n}}\{v_{T,n} + c_{T,n}\, s^i_{T,n}\, \alpha(\theta_n)(V_{E,n} - V^i_{T,n}) + \lambda_n(V^i_{U,n} - V^i_{T,n})\}, \tag{3}$$

$$rV^i_{X,n} = \max_{s^i_{X,n}}\{v_{X,n} + c_n\, s^i_{X,n}\, \alpha(\theta_n)(V_{E,n} - V^i_{X,n}) + \gamma_n(V^i_{T,n} - V^i_{X,n})\}. \tag{4}$$

Only symmetric equilibria are considered, where all agents (of type n) have the same level of search effort. Henceforth, superscript i will be dropped. The flows in Figure 1 require that jobless people have an incentive to accept job offers. The following proposition establishes the ranking of intertemporal utilities (proofs of propositions are left to the appendix).

Proposition 1. *$\forall n$, if $w_n > b_{T,n} \geq b_{U,n} > b_{X,n} > 0$, $c_{T,n} > c_n$ and $\phi_n < \lambda_n$, then $V_{E,n} > V_{T,n} > V_{U,n} > V_{X,n}$.*

It will later be clear that the net wage verifies the sufficient condition in Proposition 1. The optimal levels of search effort $s_{U,n}, s_{X,n}$ and $s_{T,n}$ equalize the marginal cost and the marginal return of search. So, they solve to the following (sufficient) first-order conditions:

$$\psi_n\,(s_{U,n})^{\xi_n - 1} = c_n\,\alpha(\theta_n)(V_{E,n} - V_{U,n}), \tag{5}$$

$$\psi_n\,(s_{X,n})^{\xi_n - 1} = c_n\,\alpha(\theta_n)(V_{E,n} - V_{X,n}), \tag{6}$$

$$\psi_n\,(s_{T,n})^{\xi_n - 1} = c_{T,n}\alpha(\theta_n)(V_{E,n} - V_{T,n}). \tag{7}$$

In each state, search effort increases with the corresponding matching effectiveness parameter, tightness and the net utility gain. These first-order conditions and Proposition 1 imply that $s_{X,n} > s_{U,n}$. As far as $s_{T,n}$ and $s_{U,n}$ are concerned, by assumption, $c_{T,n} > c_n$ but according to Proposition 1, $V_{E,n} - V_{T,n} < V_{E,n} - V_{U,n}$. The sign of the difference $s_{T,n} - s_{U,n}$ is therefore analytically unclear. The same is true for $s_{T,n} - s_{X,n}$.

2.3 Job creation

For simplicity, taxation is linear. The tax rate is denoted τ_n. The firm's discounted expected return from an occupied (respectively, vacant) job is denoted $\Pi_{E,n}$ (resp., $\Pi_{V,n}$) if this firms operates in the skill segment n. Since, conditional on their skill, workers are equally productive, let y_n be the constant marginal product of a filled vacancy. Consider that K_n, the cost of posting a vacancy and of selecting applicants, is proportional to y_n : $K_n \equiv k_n\, y_n$. For each skill n, the discounted expected returns satisfy the following conditions:

$$r\Pi_{E,n} = y_n - (1+\tau_n)w_n + \phi_n\left(\Pi_{V,n} - \Pi_{E,n}\right), \quad (8)$$

$$r\Pi_{V,n} = -k_n\, y_n + q(\theta_n)\left(\Pi_{E,n} - \Pi_{V,n}\right). \quad (9)$$

Under free entry of vacancies, $\Pi_{V,n} = 0$ in equilibrium. This condition combined with (8), (9) yields the skill-specific 'vacancy-supply curve'. The latter is a decreasing relationship between the net wage and the corresponding indicator of tightness:

$$w_n = VS(\theta_n \mid k_n, y_n, r, \phi_n, \tau_n) \equiv \frac{y_n\left(1 - (r+\phi_n)\frac{k_n}{q(\theta_n)}\right)}{1+\tau_n}, \text{ with } \frac{\partial VS}{\partial \theta_n} < 0, \frac{\partial VS}{\partial \tau_n} < 0. \quad (10)$$

2.4 The wage bargain

Wage rigidities will be introduced in Section 5. Until then, it is assumed that wages are collectively bargained over in each segment (firm) n by 'insiders' whose inter-temporal utility is $V_{U,n}$ in case of layoff. Nash bargaining is assumed. This assumption per se is not essential, though rent sharing is essential. For each n, the Nash maximization programme can be written as:

$$\max_{w_n}\left(V_{E,n} - V_{U,n}\right)^{\beta_n}\left(\Pi_{E,n} - \Pi_{V,n}\right)^{1-\beta_n}, \quad (11)$$

with $0 < \beta_n < 1$. The assumption of a single representative firm has been made for the sake of simplicity. It does not imply that the wage bargain is centralized in such a way that insiders and the representative firm take care of the equilibrium effect of wages. So, tightness, the level of allowances and of the tax parameters are taken as fixed when wages are negotiated. The first-order condition can then be written as:

$$w_n = \frac{1}{1+\tau_n}\frac{\beta_n}{1-\beta_n}\frac{\Pi_{E,n} - \Pi_{V,n}}{V_{E,n} - V_{U,n}}, \quad (12)$$

2.5 Wages and tightness in a symmetric equilibrium

Taking (1), (8), and free entry into account, condition (12) can be rewritten as:

$$\ln(w_n) = rV_{U,n} + \frac{\beta_n}{1-\beta_n}\left(\frac{y_n}{w_n(1+\tau_n)} - 1\right), \quad (13)$$

If β_n was equal to zero, the instantaneous utility in employment would be equal to the minimum compensation that an unemployed requires to stop searching. As β_n increases, a growing share of the gain $y_n - w_n(1+\tau_n)$ (scaled by $w_n(1+\tau_n)$) accrues to the worker. The next step consists in replacing $rV_{U,n}$ in (13) by a function of $\theta_n, s_{U,n}, s_{X,n}, s_{T,n}$ and the parameters of the model. First, the appendix shows that $rV_{U,n}$ can be written as a weighted average of the instantaneous levels of utility in the three states of joblessness augmented with a term capturing in some way the return of search, namely $v_{\iota,n} + c_{\iota,n}\ s_{\iota,n}\ \alpha(\theta_n)(V_{E,n} - V_{U,n})$, $\iota \in \{U, X, T\}$, in which $c_{U,n} = c_{X,n} = c_n$. Next, combining (8), (10), (12) and the free-entry conditions allows to rewrite $V_{E,n} - V_{U,n}$ as:

$$\mathcal{V}(\theta_n \mid \beta_n, k_n, r, \phi_n, y_n) \equiv \frac{\beta_n}{1-\beta_n} \frac{\frac{k_n}{q(\theta_n)}}{(1-(r+\phi_n)\frac{k_n}{q(\theta_n)})} \text{ with } \frac{\partial \mathcal{V}}{\partial \theta_n} > 0. \tag{14}$$

Henceforth, $\mathcal{V}(\theta_n)$ will designate $\mathcal{V}(\theta_n \mid \beta_n, k_n, r, \phi_n, y_n)$. So, if $\mathbb{S}_n = (s_{T,n}, s_{U,n}, s_{X,n})$ designates the levels of search effort, $\mathbb{B}_n = (b_{T,n}, b_{U,n}, b_{X,n})$ the levels of benefits and $\mathbb{Z}_n = (c_n, c_{T,n}, \phi_n, \gamma_n, \lambda_n, \pi_n, k_n, y_n, r, \beta_n)$ all the exogenous parameters except τ_n, the (net) 'wage-setting curve' can be written in a compact way as (see the appendix for a precise definition):

$$\ln(w_n) = WS(\theta_n, \mathbb{S}_n \mid \mathbb{Z}_n, \mathbb{B}_n) \tag{15}$$

For each skill n, the wage-setting curve is upward-sloping in a (θ_n, w_n) space. It can be shown that the position of this curve is not affected by marginal changes in search effort levels (see also Fredriksson and Holmlund, 2001, and Lehmann and Van der Linden, 2004).

The downward-sloping vacancy-supply curve (10) and the upward-sloping wage-setting equation (15) define the equilibrium value of w_n and θ_n. The ln of (10) and (15) yield an implicit equation for θ_n, namely $F(\theta_n, \mathbb{S}_n \mid \mathbb{Z}_n, \tau_n, \mathbb{B}_n) = 0$ with :

$$F(\cdot) \equiv \ln\left(VS(\theta_n \mid k_n, y_n, r, \phi_n, \tau_n)\right) - WS(\theta_n, \mathbb{S}_n \mid \mathbb{Z}_n, \mathbb{B}_n) \tag{16}$$

Marginal changes in search effort do not affect function F. Under constant replacement ratios, the wage-setting curve is vertical. Put differently, this curve fixes the equilibrium value of tightness and the level of wages is then read from the vacancy-supply curve.

2.6 Search effort as a function of tightness in equilibrium

Search effort levels verify conditions (5), (6) and (7). The differences in utility levels that appear in these expressions can now be replaced by their values in a symmetric equilibrium. The procedure consists in expressing the differences in utility levels as a function of $V_{E,n} - V_{U,n}$. Next, the properties of the wage bargain and the free entry condition are used via (14). The equalities relating the levels of search effort to equilibrium tightness can then be expressed in a compact way as (see the appendix for a precise definition):

$$\begin{aligned} \Sigma_U(\theta_n, s_{U,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0, \quad \Sigma_X(\theta_n, s_{U,n}, s_{X,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0 \\ \text{and } \Sigma_T(\theta_n, s_{U,n}, s_{X,n}, s_{T,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0 \end{aligned} \tag{17}$$

As long as benefits $\mathbb{B}_n$ are fixed in levels, equilibrium search efforts do not explicitly depends on wages. In addition, it can be checked that there are no cross-effects: $\frac{\partial \Sigma_\iota}{\partial s_{\iota'}} = 0\ \forall \iota, \iota' \in \{\{T, n\}, \{X, n\}, \{U, n\}\}, \iota \neq \iota'$. Moreover, search effort increases with tightness.

2.7 Extending the model

Conditional on $(\mathbb{Z}_n, \tau_n, \mathbb{B}_n)$, it is easily seen that the equilibrium, if any, is unique. Up to now, the budget constraint of the State has been ignored. For each skill, let L_n denote the size of the labour force and $\mathcal{P}_n$ the exogenous size of the working age population ($\mathcal{P} \equiv \sum_n \mathcal{P}_n$). Let lower case letters e_n, u_n, x_n, t_n and v_n be the rates obtained by dividing the absolute numbers by L_n (e.g. $e_n \equiv \frac{E_n}{L_n}$). The budget of the State scaled by $\mathcal{P}$ can be written as follows:

$$\frac{Q}{\mathcal{P}} + \sum_n \left(b_{U,n} u_n + b_{X,n} x_n + (b_{T,n} + C) t_n \right) p_n \frac{\mathcal{P}_n}{\mathcal{P}} = \sum_n \tau_n \, w_n \, e_n \, p_n \, \frac{\mathcal{P}_n}{\mathcal{P}}, \tag{18}$$

where Q is an exogenous level of net expenses, $p_n \equiv L_n/\mathcal{P}_n$ is the participation rate and C is the average cost of the programme. Constraint (18) establishes the unique link between the labour markets. To meet this constraint, one could either adjust the level of allowances ($\mathbb{B}_n$) or the one of taxes. Adjusting taxes is the most standard approach. Then, the uniqueness of equilibrium is preserved if the replacement ratios are constant.

Participation is modeled in a very simple way (see Pissarides, 2000). Inactive people have an arbitrage condition: Staying inactive or entering state X_n.[5] Let $[V_{1,n}, V_{2,n}]$ be the finite support of the distribution of intertemporal utility levels in inactivity, $V_{I,n}$. With a uniform distribution, the participation rate is simply defined as

$$p_n = \frac{V_{X,n} - V_{1,n}}{V_{2,n} - V_{1,n}}. \tag{19}$$

3 Decomposing the effects of counselling programmes

The model is now used to analyze the effects of the '*policy parameters*', namely the rate of entry into counselling, γ_n, the rate of drop out, λ_n, and the matching effectiveness of the participants $c_{T,n}$. These effects are measured in steady state, tax rates τ_n being considered as free parameters. The proofs are again left to the appendix.

3.1 Direct effects on employment

Direct effects are defined as the impacts of $c_{T,n}, \gamma_n$ and λ_n conditional on tightness *measured in efficiency units* θ_n and on search $\mathbb{S}_n$. If direct effects were defined conditional on the number of vacancies and search, an increase in matching effectiveness $c_{T,n}$ would improve the hiring rate of participants but it would also reduce tightness in efficiency units. This would create an externality that would in particular be unfavourable to nonparticipants (crowding-out or substitution effect). So, the impact on employment would a priori be ambiguous. Here,

[5] Alternatively, they could enter uninsured unemployment (i.e. start an unemployment spell without any benefit). However, in many OECD countries, people who are ready to take a job and have no income are eligible to a minimum income guarantee. The latter is typically closely related to the lowest level of unemployment benefits, $b_{X,n}$. So, the simplifying assumption made here is not a substantial limitation.

conditional on tightness in efficiency units and on search effort, raising $c_{T,n}$ can intuitively only be good for employment. The reasoning is similar for an increase in any search effort level conditional on the others and on θ_n. Moreover, if the hiring rate of participants is higher than the one of nonparticipants, one should expect that an increase in participation (higher γ_n or lower λ_n) be also good for employment. This is true for λ_n. The same holds for γ_n if benefits are completely flat: $\pi_n = 0$ (see the appendix). However, this condition in no more sufficient when benefits decline over time. For, each additional unemployed who flows from state U_n into the programme would instead have increased his (her) search effort at the moment of entry in state X_n. This is an argument in favour of targeting the programme on those with low benefits. It has however been argued above that this selectivity would be considered as discriminatory. Notice that this discussion holds conditional on θ_n and $\mathbb{S}_n$. When these variables become endogenous, their equilibrium values will be different whether $\pi_n > 0$ or $\pi_n = 0$.

Proposition 2. *For each skill n,*

1. *The employment rate e_n increases with $\theta_n, s_{U,n}, s_{X,n}, s_{T,n}$ and the parameter $c_{T,n}$.*

2. $\frac{\partial e_n}{\partial \gamma_n} \geq 0$ *if $c_{T,n}s_{T,n}$ is sufficiently larger than $c_n s_{U,n}$ and $c_n s_{X,n}$*
   $\frac{\partial e_n}{\partial \gamma_n} < 0$ *if $c_{T,n}s_{T,n} \leq c_n s_{U,n}$ and $c_{T,n}s_{T,n} \leq c_n s_{X,n}$*

3. $\frac{\partial e_n}{\partial \lambda_n} \leq 0$ *if $c_{T,n}s_{T,n} \geq c_n s_{U,n}$ and $c_{T,n}s_{T,n} \geq c_n s_{X,n}$*
   $\frac{\partial e_n}{\partial \lambda_n} > 0$ *if $c_{T,n}s_{T,n} < c_n s_{U,n}$ and $c_{T,n}s_{T,n} < c_n s_{X,n}$*

Corollary 1. *If $\pi_n = 0$, $c_{T,n}s_{T,n} > c_n s_{U,n}$ is a sufficient condition for $\frac{\partial e_n}{\partial \gamma_n}$ to be positive.*

3.2 Effects on vacancy supply and wage-setting

The vacancy-supply curve (10) relates the net wage to the rate at which vacancies are filled. The latter only depends on tightness in efficiency units. So, a shift in $c_{T,n}, \gamma_n$ or λ_n cannot affect the position of this curve. Since the programme has to be financed, it is also useful to notice that the vacancy-supply curve shifts downwards if the tax rate is augmented. Intuitively, a rise in taxation reduces the net instantaneous return of a filled vacancy. This implies that for any level of tightness, the firm pays lower net wages under free (perfectly elastic) entry of vacancies.

As the treatment is efficient at the individual level ($c_{T,n} > c_n$), it improves the intertemporal position in unemployment and therefore has a wage-push effect. This was a major point made by Holmlund and Lindén (1993). Then, increasing participation (rising γ_n or lowering λ_n) or the effectiveness ($c_{T,n}$) increases wage pressure. This should be understood at constant tightness (in efficiency units) and tax levels. By the way, notice that the framework developed above allows to sign the net impact of the variety of effects on wage formation enumerated in Calmfors, Forslund and Hemström (2002). That marginal changes in search effort do not affect the position of the wage-setting curve is clearly key to reach these clear-cut conclusions. To sum up,

Proposition 3. *The vacancy-supply curve is not affected by $c_{T,n}, \gamma_n$ and λ_n, while it shifts downwards if τ_n increases. For any θ_n, the net wage increases (resp. decreases) with γ_n and $c_{T,n}$ (resp., λ_n). For any θ_n, the net wage is independent of the tax rate τ_n.*

3.3 Effects on equilibrium tightness and wages

The policy parameters do not affect the vacancy-supply curve (10). So, their impact on equilibrium tightness θ_n is an immediate consequence of their impact on the wage-setting curve. Any variation that has a wage-push effect leads to a higher equilibrium net wage and to lower tightness and conversely:

Proposition 4 *For each skill n, the equilibrium net wage w_n (respectively, the level of tightness θ_n) increases (respectively, decreases) with γ_n and $c_{T,n}$. The equilibrium net wage w_n (respectively, the level of tightness θ_n) decreases (respectively, increases) with λ_n. The marginal tax rate τ_n has a negative effect on the equilibrium net wage and on tightness. The effect of τ_n on tightness disappears under constant replacement ratios. Tax changes are then entirely absorbed by net wages.*

3.4 Effects on search effort

Looking at (5), (6) and (7), it is obvious that a more tight labour market stimulates search effort for given values of the intertemporal utility levels. In equilibrium, taking the wage bargain and the free-entry condition into account, the relationships (17) between search effort and equilibrium tightness are still increasing. How do these relationships vary with the policy parameters? Conditional on tightness, the equilibrium difference $V_{E,n} - V_{U,n}$ is given by the wage bargain and free entry: $V_{E,n} - V_{U,n} = \mathcal{V}(\theta_n)$, where the function $\mathcal{V}(\theta_n)$ does not depend on the policy parameters (see (14)). Remembering the optimality condition (5), the relationship between $s_{U,n}$ and θ_n is therefore not affected by the policy parameters. From (6), $s_{X,n}$ increases with $V_{E,n} - V_{X,n} = \mathcal{V}(\theta_n) + (V_{U,n} - V_{X,n})$. As $V_{T,n} > V_{U,n} > V_{X,n}$, those in state X_n gain more from the programme than those in state U_n. So, the difference $V_{U,n} - V_{X,n}$, computed from (2) and (4), shrinks with γ_n and so does $s_{X,n}$ (conditional on θ_n). Finally, from (7), $s_{T,n}$ increases with $V_{E,n} - V_{T,n} = \mathcal{V}(\theta_n) - (V_{T,n} - V_{U,n})$. The lower $V_{T,n} - V_{U,n}$, the higher $s_{T,n}$. Quite intuitively, a higher rate of drop out, λ_n, reduces this difference. The higher γ_n, the higher $V_{U,n}$ and, as we have just seen, the lower $V_{U,n} - V_{X,n}$. Therefore, $V_{T,n} - V_{U,n}$, computed from (2) and (3), declines with γ_n. In sum, the relation between $s_{T,n}$ and θ_n shifts upwards when γ_n (resp., λ_n) increases. The effect of $c_{T,n}$ is more complex. It can however be shown that the direct positive effect (obvious from (7)) dominates indirect effects.[6] Table 1 summarizes these properties (look at the columns with the symbols '$\mid \theta_n$').

Table 1 also presents the comparative static properties when the adjustment in θ_n is taken into account according to Proposition 4 (see the columns $s_{U,n}{}^*$, $s_{X,n}{}^*$ and $s_{T,n}{}^*$). Table 1 indicates that because of its wage-push effect (Proposition 4), γ_n also reduces the equilibrium level of job-search effort in states U_n and X_n. The role of the other parameters on these levels of effort is an immediate consequence of Proposition 4. The net impacts of γ_n and $c_{T,n}$ on $s_{T,n}$ is ambiguous because these parameters have negative effects on tightness. The tax parameters τ_n affect equilibrium search efforts via their impacts on tightness if benefit levels, $\mathbb{B}_n$, are given. Under constant replacement ratios, equilibrium search effort is no more influenced by τ_n.

parameter	$s_{U,n} \mid \theta_n{}^{\circ +}$	$s_{U,n}{}^*$	$s_{X,n} \mid \theta_n{}^{\ddagger +}$	$s_{X,n}{}^*$	$s_{T,n} \mid \theta_n{}^{\dagger +}$	$s_{T,n}{}^*$
γ_n	0	-	-	-	+	?
λ_n	0	+	0	+	+	+
$c_{T,n}$	0	-	0	-	+	?
τ_n	0	-	0	-	0	-

Table 1. The sign of the adjustment in equilibrium job-search effort induced by marginal changes in the listed parameters.

$^\circ$ i.e. $s_{U,n}$ solving $\Sigma_U(\theta_n, s_{U,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0$.

‡ i.e. $s_{X,n}$ solving $\Sigma_X(\theta_n, s_{U,n}, s_{X,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0$.

† i.e. $s_{T,n}$ solving $\Sigma_T(\theta_n, s_{U,n}, s_{X,n}, s_{T,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0$.

$^+$ These partial effects should be interpreted carefully. Exploiting (14) implies that wages are endogenous but also that the behavior of firms is optimized. However, in (17), tightness θ_n is taken as a free variable. An interpretation would be that the number of vacancies is optimally chosen by the employers but S_n is adjusted to keep θ_n unchanged. Pissarides (2000) adopts the same approach.

* means that the adjustment in θ_n in equilibrium is taken into account.

3.5 Effects on participation to the labour market

From (19), policy parameters that improve the intertemporal utility of job searchers $V_{X,n}$ will raise participation to the labour market. The impact of the policy parameters on $V_{X,n}$ is hard to sign analytically (see the appendix). The participation rate mainly influences the budget constraint of the State (18) and hence the tax rates τ_n. The induced effects of taxation have already been discussed above.

[6] Following Boone and van Ours (2004), the effect of counselling programmes could be modelled as a decline in the level of search cost. One way of formalizing this would be trough a parameter, say $\chi_n \in [0, 1[$, in the instantaneous utility functions: $\ln(b_{\iota,n}) - (1 - \chi_n)\psi_n (s_{\iota,n})^{\xi_n}/\xi_n$. Raising χ_n would at the same time reduce the marginal cost of search and its level. This would lead to an ambiguous adjustment in search effort. For, the lower the level of search costs, the higher the utility in the corresponding state and hence the lower search effort. This is the so-called 'locking-in effect'.

4 A numerical analysis

Because analytical results about the net effects of counselling programmes on employment and on welfare are ambiguous, I conduct computational experiments that illuminate the model's implications *in steady state.*

4.1 Calibration

The model is calibrated for Belgium with the month as unit of time. Various surveys[7], published statistics[8], other statistics collected for the purpose of this evaluation, and results found in the literature have been used to calibrate the model. It should be stressed at the outset that I do not have access to individual data about (non-)participants nor to a pilot-study.

Due to statistical availability, only two levels of skill are distinguished. Holding at most a lower-secondary degree captures the notion of 'low skill' relatively well. The period 1997-1998 has been used as a reference because the stocks were fairly stable at that time and some crucial variables are not available for more recent years. At that time in Belgium, it turns out that many beneficiaries of active programmes participated (often simultaneously) to a combination of three interventions:[9] Individual advice and guidance[10], job-search assistance (such as job clubs, tips on finding jobs and writing a successful resume) and short-duration vocational training[11]. Due to constraints on data, those policies are taken as an aggregate and henceforth called 'counselling programmes' or 'the programme' for short. Data in Eurostat (2002a, 2002b) allow to estimate that the average cost C of these programmes amounted to 130 EURO per worker and per month (net of transfers to beneficiaries of these programmes). The stock of participants to the programme was about 30,000 individuals (i.e. 0.7% of the labour force).

A detailed description of the calibration and some information on the Belgian labour market and institutions are left to the appendix. Table 2 presents the calibrated values and the rates of people in the various states. From this table, an increase in γ_n has a direct positive effect on employment (Proposition 2). Skilled workers search more intensively. As expected, they have higher matching effectiveness parameters. The hiring rate of skilled participants to the programme is 51% (respectively, 22%) higher than the one of the unemployed in state U_h (respectively, X_h). In the case of the low-skilled, the corresponding rates are respectively 78% and 45%.[12]

[7] Simoens, Denys and Denolf (1998), Denolf, Denys and Simoens (1999) and Delmotte, Van Hootegem and Dejonckheere (2001).

[8] Published by national and regional PES in Belgium and by Eurostat (2002a) and Eurostat (2002b).

[9] See Vos, Struyven and Bollens (2000).

[10] "Plan d'accompagnement des chômeurs" i.e. a small number of meetings with a member of the PES during a period of four months.

[11] According to annual reports of the regional PES, there exist very short programmes mixing counselling and short-lived training that lasted about 100 hours on average.

[12] No microeconometric evaluation of the programme is available for Belgium. These relative differences are

The calibrated values imply that the wage elasticity of salaried employment amounts to low but reasonable values, namely -0.35 for low-skilled workers and -0.11 for skilled ones. Finally, the elasticity of unemployment duration with respect to the level of unemployment benefits (tightness remaining fixed) is equal to 0.28 for the high-skilled and 0.16 for the low-skilled. The latter elasticities are relatively low (according to Meyer (2002), an elasticity of 0.5 is a standard order of magnitude).

4.2 Simulation results

In the following simulations, the low-skilled rate of entry into the programme, γ_l, is increased from 0 to 2% per month (0.6% being the calibrated value). The focus on this parameter is motivated by current trends in Europe, namely the propensity of decision makers to use counselling (and other) programmes on a large scale. In the following exercise, the treatment is randomized and there is full compliance. Those assigned to the programme enter without delay. So, this setting can be interpreted as an ideal social experiment.

Among the various evaluation criteria, $\exp[rV]$ denotes the certainty equivalent (in EURO/month) of the skill- and state-specific levels of intertemporal utility. In addition, a utilitarian criterion is considered: It weights the $\exp[rV]$ terms by the corresponding rates of people in the various states.[13] An other evaluation criterion will be the difference between the hiring rate of participants, $c_{T,l}\, s_{T,l}\, \alpha(\theta_l)$ and a counterfactual (the hiring rate of participants if they did not take part to the programme). This counterfactual is here measured by the hiring rate of the unemployed in state U_l, $c_l\, s_{U,l}\, \alpha(\theta_l)$ (state X_l is obviously an alternative). Those people have a positive probability of entering the programme at some future date however. Therefore, their search behavior varies as γ_l increases. The other evaluation criteria displayed in Figure 2 are labor market indicators with an emphasis on the low-skilled (among which the unemployment rate $u_l + x_l + t_l$).

Four approaches are distinguished that integrate step by step new channels through which the programme can affect the economy and the population. Consider first the microeconomic perspective (thin solid black lines in Figure 2) where the net wage, w_l, tightness, θ_l, search effort of nonparticipants, $s_{U,l}$ and $s_{X,l}$, the participation rate, p_l and the tax levels τ_n are *taken as given and fixed at their calibrated values.* In this first case (and the following ones), the level of search effort, $s_{T,l}$, is affected by changes in γ_l because the low-skilled inter-temporal levels of utility and hence the pay-off of search effort vary with γ_l. From the first-order condition (7), the marginal cost of search is increasing with $s_{T,l}$. Tightness being fixed, the

nevertheless in line with the post-programme effects of vocational training found by Cockx (2003). In the preferred specification, he found that the exit rate out of unemployment increases by 62% after participation. Informal evidence states that this might be induced by the counselling received by trainees rather by the training content itself.

[13]The model is built under standard assumptions (see Pissarides, 2000). Consequently, intertemporal utility levels are jump variables and a comparison of their steady-state values make sense even when $r > 0$. When tax rates solve (18) and in the case of the utilitarian criterion, stocks of people in the various states matter. The latter do not adjust instantaneously because of labour market frictions. For a fully rigorous welfare analysis, the dynamic paths of adjustment of these indicators towards the steady state should be taken into account.

marginal gain of search is proportional to the difference $V_{E,l} - V_{T,l}$. For a given value of $s_{T,l}$, this difference is increasing with $V_{T,l} - V_{U,l}$ (see (23) in the appendix).[14] Since the programme enhances matching effectiveness, raising γ_l pushes $V_{U,l}$ upwards. This is also true for $V_{T,l}$ but the effect is delayed. So, the difference $V_{T,l} - V_{U,l}$ shrinks with γ_l. And so does $V_{E,l} - V_{T,l}$. The decline in the net gain of search induces participants to search less (and this further reinforces the decline in $V_{E,l} - V_{T,l}$). Obviously then, the difference in hiring rates, $(c_{T,l}\, s_{T,l} - c_l\, s_{U,l})\alpha(\theta_l)$, decreases with γ_l. The parameters in Table 2 are such that an increase in γ_l has a direct positive impact on the (salaried) employment-workforce ratio e_l (Proposition 2). The decline in $s_{T,l}$ is not sufficiently strong to outweigh this effect. The steady-state unemployment rate $u_l + x_l + t_l$ is therefore somewhat reduced (the decline in x_l outweighs the increase in the relatively small rates u_l and t_l). Therefore, the net effect on $c_l(s_{U,l}\, u_l + s_{X,l}\, x_l) + c_{T,l}\, s_{T,l}\, t_l$ is a priori ambiguous. Since it turns out to be negative and tightness is fixed, more vacancies are created (see the evolution of the vacancy-workforce ratio v_l). Turning to intertemporal levels of utility, two effects are at work. First, as γ_l rises, those in states U_l and X_l have more chances to benefit from a welfare gain. Second, all welfare gains and losses appearing in (1) to (4) shrink with γ_l. The rising profiles of $V_{U,l}$ and $V_{X,l}$ result from these opposite effects. On the contrary, $V_{E,l}$ and, since search $s_{T,l}$ is optimally chosen, $V_{T,l}$ unambiguously increase.

Second, the endogeneity of wages and of labour demand is now introduced keeping search effort of nonparticipants, the participation rate and taxation at their calibrated values.[15] Henceforth, replacement ratios are constant. An effective programme raises the intertemporal utility in unemployment. This has a direct wage-push effect (Proposition 3) and induced negative effects on tightness (Proposition 4) and finally on the level of search effort of the participants (that now solves $\Sigma_T = 0$ in (17)). The dotted red lines in Figure 2 indicate that multiplying the rate of entry γ_l by about 3 ($\approx 0.02/0.006$) raises net wages by 0.8%. As in Blundell, Costas Dias, Meghir and Van Reenen (2004), this effect is rather small. Tightness θ_l decreases by 3%. This and declining search effort among participants compensate the direct positive effect of γ_l. So, low-skilled employment and unemployment remain approximately constant. Compared to the microeconomic perspective, the decline in search effort among participants is reinforced by the cut in tightness. Somewhat lower hiring rates and higher wages lead to some increase in intertemporal utility levels compared to the microeconomic evaluation.

Third, in addition to wages and tightness, 'supply decisions' (search effort of nonparticipants and participation to the labour market) are endogeneized. In Figure 2, dashed blue lines display the effects (in some panels, they are indistinguishable from the thick grey curves that relate to the fourth evaluation setting). As expected from the theory, wages and tightness are nearly not affected.[16] As explained in sub-section 3.4, $s_{U,l}$ and $s_{X,l}$ shrink with γ_l

[14] Wage negotiation being ignored here, the analysis necessarily differs from the one in sub-section 3.4.

[15] The minimum wage introduces a wage-floor in the simulations. This constraint is not binding below.

[16] As the difference between the value of γ_l and 0.006 increases, the difference in search effort becomes far from marginal. This explains the (small) difference between dotted and dashed curves.

because tightness declines.[17] The magnitude of the effect should be noticed. The elasticity of search effort with respect to the benefit it generates is equal to $1/(\xi_l - 1)$. So, it could be argued that our calibrated value for ξ_l is too close to 1. If this was true, the calibration should lead to a high elasticity of unemployment duration with respect to the level of unemployment benefit. This is however not the case (see Sub-section 4.1). Compared to the second setting (dotted lines), the decline of $s_{U,l}$ explains why the difference $(c_{T,l}\, s_{T,l} - c_l\, s_{U,l})\alpha(\theta_l)$ is flatter with respect to the rate of entry into the programme γ_l. Comparing again dashed and dotted curves, the decline in search effort among nonparticipants leads to *a cut* in v_l and e_l. Therefore, the unemployment rate is now *increasing* with γ_l. From a welfarist point of view, the decrease in search effort, the rise in net wages and the more probable entry in the programme do more than compensate the depressed employment perspectives. The rise in $V_{X,l}$ has a positive yet small effect on the participation rate p_l.

Finally, this conflict between criteria could disappear when the budget of the State becomes binding (the thick grey lines in Figure 2). Since the programme turns out to create a loss in employment and an increase in participation of the low-skilled, a rise in taxes is unavoidable. For concreteness, I here assume somewhat arbitrarily that both tax rates τ_l and τ_h are adjusted proportionately. Since unemployment benefits are indexed to wages, real wages are flexible and they absorb changes in (linear) taxation. The low-skilled net wage is now somewhat *declining* with γ_l. Changes in linear taxes do not affect tightness, employment nor search efforts. In spite of lower net wages, whatever the state, the intertemporal welfare of the low-skilled is still increasing in γ_l. On the contrary, higher taxes obviously lower the welfare of the high-skilled. Because of these opposite effects, the evolution of the utilitarian criterion is hard to predict. It turns out to be declining with γ_l.

To sum up, *on the basis of microeconomic evidence*, programmes that enhance matching effectiveness should be recommended in Belgium according to a wide range of criteria. This conclusion would still be supported by all the criteria when wages and vacancies are endogeneized (although the gain in employment becomes negligible). The unanimity between the various criteria falls apart as soon as the nonparticipants' search effort becomes endogenous: (Un)employment deteriorates with γ_l while the low-skilled intertemporal indicators of welfare are improving. This conflict still holds when the financing of the programme is taken into account. Then, since the burden of financing policies lies on both skill groups, there is in addition a trade-off between the welfare of the low-skilled and the one of the high-skilled. At least for some criteria, this simulation exercise highlights the possible conflicts between recommendations made on the basis of micro evaluation and those emerging from a general equilibrium perspective. Lise, Seitz and Smith (2004) conclude in the same way for the Self-Sufficiency Project in Canada.

[17] In a similar way, Lise, Seitz and Smith (2004) conclude that welfare recipients delay exit in order to qualify for an income supplement.

5 Sensitivity analysis

These programmes look relatively cheap. At the same time, the available information on their costs is relatively poor. For sufficiently high values of the average cost C, unreported simulation results show that the relationship between $rV_{E,l}$ and γ_l reaches a maximum and then starts declining. To see this effect, the average cost C has to be multiplied by at least 6. For such a value, the decline of $\exp[rV_{E,l}]$ starts at $\gamma_l \approx 30\%$. As C further increases, the maximum is reached for lower values of γ_l and the relationship between $\exp[rV_{T,l}]$ and γ_l also becomes inverse U-shaped. This discussion rests on the strong assumption that the average cost C stays constant whatever the rate γ_l. As this parameter becomes sufficiently higher than the calibrated values, the average cost C could be (strongly) increasing. In Belgium at least, there is a lack of data that would allow to specify a realistic cost function.

Programmes that improve matching effectiveness and declining unemployment benefits could be two alternative ways of enhancing exit rates towards employment. The former improve matching effectiveness while the latter intends to boost search intensity (at least at the beginning of an unemployment spell). The general-equilibrium effects of declining benefits are analyzed elsewhere (see Cahuc and Lehmann, 2000, Fredriksson and Holmlund, 2001, and Van der Linden, 2003b). Proposition 2 suggests that the marginal *direct* impact of the programme on employment should be more favourable when unemployment benefits are flatter (i.e. lower π_n). To illustrate that point for the low-skilled, keeping search and tightness at their calibrated values, this marginal effect amounts to 0.43 when $\pi_l = 0.083$ and to 0.69 when $\pi_l = 0.0083$. The design of unemployment insurance however affects equilibrium tightness θ_n and search effort $\mathbb{S}_n$ and their adjustment to changes in γ_l. For some criteria, Tables 3 and 4 illustrate that the relative effects of increasing the size of counselling programmes often worsen as unemployment benefits become more generous. Comparing the second to the third and fourth columns, this is true in the case of low-skilled employment when the low-skilled replacement ratios rise and when the highest level of benefits is on average paid for a longer duration. The same conclusion holds for the welfare criteria when the financing of policies is taken into account.[18] This suggests that active programmes that enhance matching effectiveness are not a substitute for a declining time-profile of benefits.

The model and the evaluation are based on the assumption that all wages are bargained over. OECD data covering the period 1985-95 suggest that wage differentials are fairly stable in Belgium. It is therefore worthwhile to envisage the case where the relative net wages are fixed and only the high-skilled one is negotiated. According to unreported simulations results, all the induced effects of a rise in γ_l become then very small. The last columns of Tables 3 and 4 display net effects on some evaluation criteria. Table 3 corresponds to a situation where the level of the low-skilled wage remains constant. A rise in the entry rate into the programmes raises employment and the utility level of the unemployed (the same is true for participants and those in employment). Turning to Table 4, given the assumption made about the cost C, it turns out that the tax rates diminish slightly with γ_l. Each type of worker

[18] As low-skilled workers are hired at a very low rate, the criterion $V_{U,l}$, yet not the utilitarian criterion, is higher when unemployment benefits are raised.

then benefits from an increase in γ_l. To conclude, programmes that enhance the low-skilled matching effectiveness have small positive effects when relative wages are rigid. Above, the assumption that the low-skilled wage is negotiated appears therefore to be essential to reach opposite conclusions between micro and general equilibrium evaluations.

A final sensitivity analysis deals with the normative criterion. In the previous section, the low-skilled intertemporal utility level and the (un)employment criterion lead to opposite conclusions as soon as search effort of nonparticipants becomes endogenous. In the policy debate, job-search effort rarely enters value judgements. So, imagine that the normative criterion becomes the intertemporal value of the ln of income. Unreported simulation results indicate that this criterion measured for the low-skilled shrinks with γ_l as soon as search effort of nonparticipants becomes endogenous. For those in state U_l, the relative variation of this criterion is -0.7% when taxes are fixed (to be compared to $+3.0\%$ in the 2nd column of Table 3) and -2.0% when the budget of the State is binding (to be compared to $+1.6\%$ in the 2nd column of Table 4).

6 Conclusion

This paper has developed an equilibrium matching model that is well-suited to conduct evaluations of short-duration programmes that raise the matching effectiveness of participants. In this model, workers are risk averse and heterogeneous in skill, job-search effort is endogenous and wages are bargained over. As other ALMPs, these programmes have quite complex effects in general equilibrium (see Calmfors, Forslund and Hemström, 2002). This paper has endogeneized new variables (job-search effort and participation to the labour market) and yet many clear-cut effects have been analytically shown. Under certain conditions that are more stringent in the presence of a two-tired benefit system, increasing the rate of entry in these programmes has a positive direct effect on the employment rate. However, the indirect effects are detrimental to employment through wage formation and the adjustment in job-search among nonparticipants.

This paper has also developed a simulation exercise. The calibration has been based on an extensive and well-informed use of statistics and studies for Belgium. The results strongly emphasize the importance of the choice of the evaluation criterion: Performance indicators of the labour market and welfare criteria quite often lead to opposite conclusions because the latter take care of the disutility of job-search effort. This concern is quite natural in a welfarist perspective but much less present in policy debates. The numerical analysis also illustrates that the effectiveness of labour market policies can vary as more and more 'margins' (wages, labour demand, search, participation,...) are endogeneized. In particular, the impact of these programmes on employment changes from positive to negative as additional margins are taken into account. As Calmfors, Forslund and Hemström (2002) were anticipating, the role of search effort turns out to be key. However, this property hinges upon the presence of wage bargaining. The various 'margins' and in particular search effort play a minor role when relative wages are fixed and only the high-skilled wage is negotiated. A microeconomic evaluation of such programmes should then be sufficient to guide decision makers about the sign of the net effects and to produce good approximates of their magnitude.

The precise microeconomic impact of couselling programmes matters. In this paper, counselling programmes are assumed to enhance the matching effectiveness of job seekers. Instead of affecting the matching technology, they could reduce the level of search cost, either in a fixed way or via a decline in the marginal cost of search (Boone and van Ours, 2004). These choices matter for an equilibrium evaluation. For instance, increasing matching effectiveness gives participants an incentive to search harder while a fixed reduction in search costs raises the participants' utility and hence lowers their search effort. Unfortunately, most microeconometric evaluations take programmes as a black-box and hence cannot help decide among these alternatives. An additional effect of counselling programmes could be to improve the quality of the match and hence to reduce the probability of separation (see Crépon, Gurgand and Dejemeppe, 2004). Such an effect would raise the intertemporal value of holding a job and hence moderate wages and stimulate equilibrium search effort.

Finally, the targeting of the programme is also worth to be mentioned. In this paper, after a job loss, people enter unemployment. Entry in the counselling programme comes later. A drawback of this timing is that before entry, there is a locking-in effect if the programme is effective (for participants and in a microeconomic perspective). An alternative design would make (some) people enter the programme immediately after the loss of their job and not later on. This would avoid the locking-in effect but would reinforce the wage-push effect of effective programmes. Conversely, with a two-tier benefit system, entry into the programme could arguably be restricted to the unemployed in the second tier. Direct effects on employment would then be more often favourable and the wage-push effect would be less severe. However, this design would reinforce the locking-in effect before participation. Which targeting is preferable? There is no general answer to that question. Everything depends on wage-setting institutions and on the elasticity of job-search effort with respect to its pay-off.

Appendix

Proof of Proposition 1

Let

$$\begin{aligned}
\Delta_{1,n} &\equiv (r + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)\,[[r + c_n s_{U,n}\alpha(\theta_n) + \phi_n][r + c_{T,n}s_{T,n}\alpha(\theta_T) + \lambda_n] \\
&+ \gamma_n[r + c_{T,n}s_{T,n}\alpha(\theta_n) + \phi_n]] + \pi_n[[r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n][r + c_n s_{X,n}\alpha(\theta_n) + \phi_n] \\
&+ \gamma_n[r + c_{T,n}s_{T,n}\alpha(\theta_n) + \phi_n]], \\
\Delta_{2,n} &\equiv r + \pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n, \\
\Delta_{3,n} &\equiv r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n + \gamma_n, \\
\Delta_{4,n} &\equiv r + c_{T,n}s_{T,n}\alpha(\theta_n) + \phi_n.
\end{aligned}$$

Let $\delta_{ET,n} \equiv \ln(w_n) - v_{T,n}$ and $\delta_{\iota\iota',n} \equiv v_{\iota,n} - v_{\iota',n}, \iota, \iota' \in \{U, X, T\}, \iota \neq \iota'$. The following differences can be derived from Equations (1) to (4):

$$\begin{aligned}
&V_{E,n} - V_{U,n} = [(r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n)\,[(r + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)\,(\ln(w_n) - v_{U,n}) \\
&+\pi_n(\ln(w_n) - v_{X,n})] + \gamma_n\,(r + \pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)\,(\ln(w_n) - v_{T,n})]\Delta_{1,n}^{-1}, \qquad (20) \\
&V_{U,n} - V_{X,n} = [\delta_{UX,n} + c_n(s_{U,n} - s_{X,n})\alpha(\theta_n)(V_{E,n} - V_{U,n})]\,\Delta_{2,n}^{-1}, \qquad (21) \\
&V_{T,n} - V_{U,n} = [(r + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)\,(\delta_{TU,n} + (c_{T,n}s_{T,n} - c_n s_{U,n})\alpha(\theta_n)(V_{E,n} - V_{U,n})) \\
&+\pi_n\,(\delta_{TX,n} + (c_{T,n}s_{T,n} - c_n s_{X,n})\alpha(\theta_n)(V_{E,n} - V_{U,n}))][\Delta_{2,n}\Delta_{3,n}]^{-1}, \qquad (22) \\
&V_{E,n} - V_{T,n} = [\delta_{ET,n} + (\lambda_n - \phi_n)(V_{T,n} - V_{U,n})]\,\Delta_{4,n}^{-1}. \qquad (23)
\end{aligned}$$

By (20), it is obvious that $V_{E,n} > V_{U,n}$. Van der Linden (2003a) shows that $V_{U,n} > V_{X,n}$ and $V_{E,n} > V_{T,n}$.

Rewriting $rV_{U,n}$

Substituting expressions (21) and (22) in (2) allows to write $rV_{U,n}$ as a function of $V_{E,n} - V_{U,n}$, namely:

$$\begin{aligned}
rV_{U,n} \;=\;& \Omega_{U,n}\,[v_{U,n} + c_n s_{U,n}\alpha(\theta_n)(V_{E,n} - V_{U,n})] + \Omega_{T,n}\,[v_{T,n} + c_{T,n}s_{T,n}\alpha(\theta_n)(V_{E,n} - V_{U,n})] \\
&+\Omega_{X,n}\,[v_{X,n} + c_n s_{X,n}\alpha(\theta_n)(V_{E,n} - V_{U,n})], \text{ where} \qquad (24)
\end{aligned}$$

$\Omega_{U,n} \equiv [r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n][r + \gamma_n + c_n s_{X,n}\alpha(\theta_n)]/(\Delta_{2,n}\Delta_{3,n}), \Omega_{T,n} \equiv \gamma_n/\Delta_{3,n}, \Omega_{X,n} \equiv \pi_n[r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n]/(\Delta_{2,n}\Delta_{3,n})$ and $\Omega_{U,n} + \Omega_{T,n} + \Omega_{X,n} = 1$.

The (net) wage-setting curve

Combining (13) with (10), (14) and (24) yields then an *explicit* (net) wage-setting curve:

$$\begin{aligned}
&\ln(w_n) = WS(\theta_n, \mathbb{S}_n \mid \mathbb{Z}_n, \mathbb{B}_n) \equiv \Omega_{U,n}\,[v_{U,n} + c_n s_{U,n}\alpha(\theta_n)\mathcal{V}(\theta_n)] \qquad (25) \\
&+\Omega_{T,n}\,[v_{T,n} + c_{T,n}s_{T,n}\alpha(\theta_n)\mathcal{V}(\theta_n)] + \Omega_{X,n}\,[v_{X,n} + c_n s_{X,n}\alpha(\theta_n)\mathcal{V}(\theta_n)] + (r + \phi_n)\mathcal{V}(\theta_n)
\end{aligned}$$

Equilibrium search as a function of tightness

Replace $V_{E,n} - V_{X,n}$ by $V_{E,n} - V_{U,n} - (V_{X,n} - V_{U,n})$and $V_{E,n} - V_{T,n}$ by $V_{E,n} - V_{U,n} - (V_{T,n} - V_{U,n})$. Replace then $V_{U,n} - V_{X,n}$ by (21) and $V_{T,n} - V_{U,n}$ by (22). Finally, substitute Expression (14) for $V_{E,n} - V_{U,n}$. For each n, the first-order conditions (5), (6) and (7) become then:

$$\Sigma_U(\theta_n, s_{U,n} \mid \mathbb{Z}_n, \mathbb{B}_n) \equiv \psi_n\, s_{U,n}^{\xi_n - 1} - c_n\, \alpha(\theta_n)\mathcal{V}(\theta_n) = 0, \tag{26}$$

$$\Sigma_X(\theta_n, s_{U,n}, s_{X,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0 \tag{27}$$

where $\Sigma_X \equiv \Delta_{2,n}\, \psi_n\, s_{X,n}^{\xi_n - 1} - c_n\, \alpha(\theta_n)\left[\delta_{UX,n} + (\Delta_{2,n} + c_n\left[s_{U,n} - s_{X,n}\right]\alpha(\theta_n))\ \mathcal{V}(\theta_n)\right],$

$$\Sigma_T(\theta_n, s_{U,n}, s_{X,n}, s_{T,n} \mid \mathbb{Z}_n, \mathbb{B}_n) = 0 \tag{28}$$

where $\Sigma_T \equiv \Delta_{2,n}\, \Delta_{3,n}\, \psi_n\, s_{T,n}^{\xi_n - 1} - c_{T,n}\, \alpha(\theta_n)\, [(\Delta_{2,n}\, \Delta_{3,n} - [r + c_n\, s_{X,n}\, \alpha(\theta_n) + \gamma_n]$
$[c_{T,n}\, s_{T,n} - c_n\, s_{U,n}]\alpha(\theta_n) - \pi_n[c_{T,n}\, s_{T,n} - c_n\, s_{X,n}]\alpha(\theta_n))\, \mathcal{V}(\theta_n)$
$- (r + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)\ \delta_{TU,n} - \pi_n\, \delta_{TX,n}].$

Proof of Proposition 2

Equalities between entries and exits in each state and the identity $1 \equiv e_n + u_n + x_n + t_n$ determine e_n, u_n, x_n and t_n. If

$$\begin{aligned}\Delta_{5,n} \equiv{}& [c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n]\left([c_n s_{U,n}\alpha(\theta_n) + \phi_n]\left[c_n s_{X,n}\alpha(\theta_n) + \gamma_n\right]\right.\\ &\left. + \pi_n\left[c_n s_{X,n}\alpha(\theta_n) + \phi_n\right]\right) + \gamma_n\left[c_{T,n}s_{T,n}\alpha(\theta_n) + \phi_n\right]\left[\pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n\right],\end{aligned} \tag{29}$$

the employment rate is given by:

$$\begin{aligned}e_n ={}& [[c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n]\left(c_n s_{U,n}\alpha(\theta_n)\left[c_n s_{X,n}\alpha(\theta_n) + \gamma_n\right]\right.\\ &\left.+\pi_n c_n s_{X,n}\alpha(\theta_n)\right) + \gamma_n c_{T,n}s_{T,n}\alpha(\theta_n)\left[\pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n\right]]\Delta_{5,n}^{-1}.\end{aligned} \tag{30}$$

From (29) and (30), the marginal effects of $s_{T,n}, s_{U,n}, s_{X,n}, c_{T,n}$ and θ_n are clear. Moreover,

$$\begin{aligned}\frac{\partial e_n}{\partial \gamma_n} ={}& \frac{\phi_n(c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n)}{\Delta_{5,n}^2}[\pi_n(c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n + \gamma_n)\, c_n(s_{U,n} - s_{X,n})\\ &+ (\pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)((c_n s_{X,n}\alpha(\theta_n) + \gamma_n)(c_{T,n}s_{T,n} - c_n s_{U,n})\\ &+ \pi_n(c_{T,n}s_{T,n} - c_n s_{X,n}))]\alpha(\theta_n).\end{aligned}$$

Since $s_{U,n} < s_{X,n}$, this derivative is only positive if $c_{T,n}s_{T,n}$ is sufficiently larger than $c_n s_{U,n}$ and $c_n s_{X,n}$. If $\pi_n = 0$, $c_{T,n}s_{T,n} > c_n s_{U,n}$ is a sufficient condition for $\frac{\partial e_n}{\partial \gamma_n}$ to be positive. Next,

$$\begin{aligned}\frac{\partial e_n}{\partial \lambda_n} ={}& \frac{\phi_n\gamma_n(\pi_n + c_n s_{X,n}\alpha(\theta_n) + \gamma_n)}{\Delta_{5,n}^2}[(c_n s_{X,n}\alpha(\theta_n) + \gamma_n)(c_n s_{U,n} - c_{T,n}s_{T,n})\\ &+ \pi_n(c_n s_{X,n} - c_{T,n}s_{T,n})]\alpha(\theta_n),\end{aligned}$$

which is negative if if $c_{T,n}s_{T,n}$ is larger than $c_n s_{X,n}$.

Proof of Proposition 3

Differentiating (25), it can be checked that $\frac{\partial WS}{\partial \gamma_n} = \frac{r + c_{T,n}s_{T,n}\alpha(\theta_n) + \lambda_n}{\Delta_{3,n}}(V_{T,n} - V_{X,n}) > 0$, $\frac{\partial WS}{\partial \lambda_n} = -\frac{\gamma_n}{\Delta_{3,n}}(V_{T,n} - V_{U,n}) < 0$ (by Proposition 1) and that $\frac{\partial WS}{\partial c_{T,n}} = \frac{\gamma_n \psi_n s_{T,n}^{\psi_n}}{c_{T,n}\Delta_{3,n}} \geq 0$. From (25), the lack of effect of τ_n is obvious.

The intertemporal utility in state X_n

$V_{X,n}$ can be computed by exploiting the equality $V_{X,n} = V_{U,n} - (V_{U,n} - V_{X,n})$ and (21). $V_{U,n}$ can then be replaced by $V_{E,n} - (V_{E,n} - V_{U,n})$ with $V_{E,n}$ defined by (1). Finally, $V_{E,n} - V_{U,n} = \mathcal{V}(\theta_n)$ is substituted everywhere. This leads to the following expression:

$$V_{X,n} = \frac{ln(w_n) - (r + \phi_n)\mathcal{V}(\theta_n)}{r} - \frac{\delta_{UX,n} + c_n(s_{U,n} - s_{X,n})\alpha(\theta_n)\mathcal{V}(\theta_n)}{\Delta_{2,n}}. \tag{31}$$

The calibration

Belgium is a country plagued with long-term unemployment. More than 60% of the stock is unemployed for more than a year. The median duration *in the stock* amounts to about 2 years. In Belgium, negative duration dependence is very strong but Cockx and Dejemeppe (2005) have shown that it is largely spurious. The level of skill (understood as education) is one of the key individual characteristics that affect the hiring rate. Low-skilled workers represent about 34% of the labour force and 64% of the stock of unemployed. The salaried employment-active population ratio is very low for this group ($e_l = 0.61$).[19]

Administrative data indicate that less than 2.5% of claimants do not receive unemployment benefits in Belgium. Neglecting this phenomenon, there is first a period of one year where unemployment benefits stay constant. With the month as unit of time, π_n is therefore equal to 0.083. For about two-third of the insured unemployed, the level of benefits decreases afterwards. Except for one sub-group, unemployment benefits can be paid indefinitely. In 1998, less than 2% of the unemployed have lost their entitlement (after a very long spell of unemployment). This phenomenon is therefore neglected, too. The time-profile of skill-specific unemployment benefits is an average computed from administrative data. The replacement ratios are displayed in Table 2.[20]

Net wages and average tax rates are computed from the Panel Survey on Belgian Households and Immervoll (2002). As Nordic countries, Belgium is characterized by low wage differentials[21]. The calibration and the simulation of Section 4.2 use the model of Section 2 where all wages are bargained over, the legal minimum wage acting as a lower-bound.

The discount rate is fixed at 0.004 (5% on an annual basis). Annual reports of the PES allow to fix parameters ϕ_n, λ_n and γ_n (see Table 2). As many other papers, let us assume the following Cobb-Douglas matching function (see Petrongolo and Pissarides, 2001):

[19]The model deals with private salaried employment. The calibration and the simulation take other categories of employment and vacancies as exogenous. These categories include some labour market programmes such as direct job creation for the unemployed in the public sector.

[20]The replacement ratios are lower than reported values by the OECD on the basis of a range of earnings and family situations (see e.g. Table A.1 of OECD, 1999). However, these OECD statistics exclude some groups whose replacement ratio is quite low in Belgium.

[21]For Belgium, OECD data measure gross weekly earnings of full-time workers. In 1995, the D75/D25 ratio was about 1.6 and D5/D1 amounted to 1.4. Income taxation being progressive in Belgium, it is not surprising that net wage differentials are even lower.

$m(S_n, V_n) \equiv m_0 S_n^{0.5} V_n^{0.5}$. Parameter m_0 is a scaling factor for the various c_ι's and for k_n. Assuming that $m_0 = 0.5$ yields reasonable values.

The expected duration of a vacancy (2.5 month) and the share of the low-skilled in the total number of recruitments (0.38) is used to calibrate the θ's. The 'vacancy-supply curves' (10) are then used to calibrate the k's. The unobserved vacancy costs can be interpreted as a black-box capturing search, screening and training costs incurred by firms to recruit workers. More generally, they implicitly also include all other set-up costs incurred in order to create the job. This explains why the calibrated values of the cost $K = k \cdot y$ per vacancy are often large in the literature.[22] Parameter k_n also affects the wage-setting curve and hence the calibrated value of the bargaining power. The marginal products y_n are chosen so as to produce sensible values for the ratio of the skill-specific wage bill to output net of vacancy costs.

The products $c_\iota s_\iota$, $\iota = \{T, n\}, \{X, n\}, \{U, n\}, n \in \{l, h\}$ can be computed from the flow equilibrium conditions. Conditional on these products, the calibration then fixes the c_ι's, the s_ι's, ξ_n, and the bargaining power of the workers β_n. This part of the calibration is based on equations (15) and (17). This system is solved conditional on the assumption $\psi_l = \psi_h = 7.4$. Raising this parameter induces a proportional increase in $c_{T,n}$ and c_n and a proportional reduction in all search-effort levels without affecting the other parameters.

Since workers are risk averse, the Hosios conditions $\beta_n = 0.5$ does not guarantee that a *laissez-faire* economy is optimal (see Lehmann and Van der Linden, 2004). One could wonder why β_l is higher than β_h in Table 2. The relatively strong bargaining power of the low-skilled clearly rationalizes the high value of w_l relative to y_l. In Belgium, unionization is a widespread phenomenon, especially among blue-collar workers where union density is around 95%. In addition, almost all workers are covered by collective agreements due to state extensions of collective agreements. Finally, following Immervoll, Kleven, Thurstup Kreiner and Saez (2004), the elasticity of the participation rate p_n with respect to w_n is fixed to 0.4 for the low-skilled and 0.2 for the high-skilled. These assumptions and the participation rates allow to calibrate the boundaries $V_{1,n}$ and $V_{2,n}$ introduced in (19).

To check the validity of this calibration, I first look at two properties of the model that were not used during the calibration and about which some data are available. Then, I compute two major elasticities and compare them to standard values found in the literature (see Section 4.1). In 1997, the average stock of vacancies registered by the PES amounted to 24,500. With a market share of the PES in the range $[0.4, 0.5]$, the calibrated stock of vacancies (53,000) is an acceptable order of magnitude. The expected duration of an unemployment spell amounts to 11 months for the skilled and 31 months for the low-skilled. Weighted by the share of each skill in the inflow into unemployment, the mean duration would then be equal to 19 months, a result that is in line with the computations of Dejemeppe (2005).[23]

[22]See Fredriksson and Holmlund (2001) and the references cited in their footnote 20.

[23]From her analysis of unemployment dynamics in Belgium, the average unemployment duration in 1992 was equal to 2 years in the South of Belgium and to 1.5 years in the North.

References

Albrecht, J., G. van den Berg and S. Vroman (2005) "The knowledge lift:The swedish adult education program that aimed to eliminate low worker skill levels". Working Paper 1503, IZA, Institute for the Study of Labor, Bonn.

Blundell, R., M. Costas Dias, C. Meghir and J. Van Reenen (2004) "Evaluating the employment impact of a mandatory job search program". *Journal of the European Economic Association*, 2:569–606.

Boone, J. and L. Bovenberg (2005) "Optimal welfare and in-work benefits with search unemployment and observable abilities". *Journal of Economic Theory*, 120:Forthcoming.

Boone, J. and J. van Ours (2004) "Effective active labor market policies". Working Paper 1335, IZA, Institute for the Study of Labor, Bonn.

Cahuc, P. and E. Lehmann (2000) "Should unemployment benefits decrease with unemployment spell?" *Journal of Public Economics*, 77:135–153.

Calmfors, L. (1994) "Active labour market policy and unemployment : Framework for analysis of crucial design features". *OECD Economic Studies*, 22:7–52.

Calmfors, L., A. Forslund and M. Hemström (2002) "Does active labour market policy work? lessons from the Swedish experiences". Working Paper 2002:4, IFAU, Institute for Labour Policy Evaluation, Sweden.

Choné, P. and G. Laroque (2005) "Optimal incentives for labor force participation". *Journal of Public Economics*, 89:395–425.

Cockx, B. (2003) "Vocational training of unemployed workers in belgium". *Konjunkturpolitik - Applied Economics Quarterly*, 49:23–47.

Cockx, B. and M. Dejemeppe (2005) "Duration dependence in the exit rate out of unemployment in belgium. Is it true or spurious?" *The Journal of Applied Econometrics*, 20:1–23.

Crépon, B., M. Gurgand and M. Dejemeppe (2004) "Counseling the unemployed: Does it lower unemployment duration and recurrence?" Working Paper, CREST, INSEE, France.

Dejemeppe, M. (2005) "A complete decomposition of unemployment dynamics using longitudinal grouped duration data". *Oxford Bulletin of Economics and Statistics*, 67:45–70.

Delmotte, J., G. Van Hootegem and J. Dejonckheere (2001) *Les entreprises et le recrutement en Belgique en 2000.* Hoger instituut voor de arbeid, Katholieke universiteit Leuven, Belgium.

Denolf, L., J. Denys and P. Simoens (1999) *Les entreprises et le recrutement en Belgique en 1998.* Hoger instituut voor de arbeid, Katholieke universiteit Leuven, Belgium.

Eurostat (2002a) *Labour market policies: Expenditure and participants (European Union and Norway, data 1998).* Eurostat, Luxembourg.

Eurostat (2002b) *Labour market policy.Expenditure and participants - data 2000.* Eurostat, Europena Social Statistics, Luxembourg.

Fredriksson, P. and B. Holmlund (2001) "Optimal unemployment insurance in search equilibrium". *Journal of Labor Economics*, 19:370–399.

Fredriksson, P. and B. Holmlund (2003) "Improving incentives in unemployment insurance: A review of recent research". Working Paper 2003-05, IFAU - Institute for Labour Market Policy Evaluation, Uppsala, Sweden.

Heckman, J. (2001) "Accounting for heterogeneity, diversity and general equilibrium in evaluating social programmes". *The Economic Journal*, 111:F654–F699.

Holmlund, B. (1998) "Unemployment insurance in theory and practice". *Scandinavian Journal of Economics*, 100:113–141.

Holmlund, B. and J. Lindén (1993) "Job matching, temporary public employment, and equilibrium unemployment". *Journal of Public Economics*, 51:329–343.

Immervoll, H. (2002) "The distribution of average and marginal effective tax rates in European Union member States". Working Paper EM2/02, EUROMOD.

Immervoll, H., H. Kleven, C. Thurstup Kreiner and E. Saez (2004) "Welfare reform in European countries: A micro-simulation analysis". Working Paper 4324, Centre for Economic Policy Research.

Lehmann, E. and B. Van der Linden (2004) "On the optimality of search matching equilibrium when workers are risk averse". Working Paper 1172, IZA, Institute for the Study of Labor, Bonn.

Lise, J., S. Seitz and J. Smith (2004) "Equilibrium policy experiments and the evaluation of social programs". Working Paper 10283, National Bureau of Economic Research, Cambridge (MA).

Martin, J. and D. Grubb (2001) "What works and for whom: A review of OECD countries' experiences with active labour market policies". Working Paper 2001-14, IFAU - Institute for Labour Market Policy Evaluation, Uppsala, Sweden.

Masters, A. (2000) "Retraining the unemployed in a model of equilibrium employment". *Bulletin of Economic Research*, 52:323–340.

Meyer, B. (2002) "Unemployment and workers' compensation programmes: Rationale, design, labour supply and income support". *Fiscal Studies*, 23:1–49.

OECD (1999) *Implementing the OECD jobs strategy: Assessing performance and policy.* OECD, Paris.

Petrongolo, B. and C. Pissarides (2001) "Looking into the black box: A survey of the matching function". *Journal of Economic Literature*, 39:390–431.

Pissarides, C. (2000) *Equilibrium unemployment theory.* MIT Press, Cambridge (MA).

Simoens, P., J. Denys and L. Denolf (1998) *Les entreprises et le recrutement en Belgique en 1997.* Hoger instituut voor de arbeid, Katholieke universiteit Leuven, Belgium.

Van der Linden, B. (2003a) "Unemployment insurance and training in an equilibrium matching model with heterogeneous agents". Working Paper 2003-01, CREST, INSEE, and Institut de Recherches Economiques et Sociales, Department of Economics, Université Catholique de Louvain, Malakoff (France) and Louvain-la-Neuve (Belgium).

Van der Linden, B. (2003b) "Unemployment benefit profile, monitoring and active labor market policies: The role of normative criteria". Working Paper 127, Chaire Hoover d'Ethique Economique et Sociale, Université catholique de Louvain, Belgium.

Vos, S., L. Struyven and J. Bollens (2000) *Werk, werkloos, werk: effectiviteit en kostenbatenanalyse van reïntegratietrajecten voor werklozen.* HIVA, Katholieke Universiteit Leuven, Belgium.

Parameters	l	h
ϕ	0.009	0.006
y (EURO/month)	3400	4500
k	9.56	20.10
b_U/w	0.55	0.55
b_X/w	0.43	0.40
τ	0.64	0.77
γ	0.006	0.02
λ	0.1	0.1
π_n	0.083	0.083
ψ	7.4	7.4
ξ	1.22	1.27
β	0.45	0.30
c	0.14	0.37
c_T	0.17	0.43
Endogenous var.		
u	0.056	0.031
x	0.139	0.027
t	0.008	0.006
e	0.61	0.75
p	0.54	0.72
s_U	0.20	0.33
s_X	0.24	0.41
s_T	0.30	0.43
θ	2.22	0.83
$V/(U+X+T)$	0.09	0.14
w (EURO/month)	1229	1512

Table 2. Calibration: Stocks in steady state, parameters and levels of endogenous variables.

e_l	Figure 2	$\mathbb{B}_l/w_l + 25\%$	$\pi_l/10$	w_l/w_h rigid
$\gamma_l = 0.001$	0.621	0.465	0.548	0.612
$\gamma_l = 0.02$	0.591	0.368	0.512	0.617
Relative change	-4.8%	-20.9%	-6.6%	+0.8%
$\exp[rV_{U,l}]$	Figure 2	$\mathbb{B}_l/w_l + 25\%$	$\pi_l/10$	w_l/w_h rigid
$\gamma_l = 0.001$	685.95	768.36	726.83	690.12
$\gamma_l = 0.02$	706.65	812.48	746.12	695.14
Relative change	+3.0%	+5.7%	+2.7%	+0.7%

Table 3. Sensitivity analysis when all variables but taxes are endogenous. Impact on the low-skilled (salaried) employment-active population ratio, e_l, and on the low-skilled intertemporal utility for entrants in unemployment, $\exp[rV_{U,l}]$ (in certainty equivalent; euros/month). "$\mathbb{B}_l/w_l$+25%" means that the low-skilled the replacement ratios are raised by 25%."$\pi_l/10$" means that the rate at which the unemployed move from 'high' to 'low' benefits is divided by 10 ($0.08 \rightarrow 0.008$). The last column is such that the ratio w_l/w_h remains at its calibrated value i.e. 0.81.

Utilitarian activ. pop.	Figure 2	$\mathbb{B}_l/w_l + 25\%$	$\pi_l/10$	w_l/w_h rigid
$\gamma_l = 0.001$	895.57	836.32	861.59	892.90
$\gamma_l = 0.02$	885.48	778.28	844.87	893.81
Relative change	-1.1%	-6.9%	-1.9%	+0.1%
$\exp[rV_{U,l}]$	Figure 2	$\mathbb{B}_l/w_l + 25\%$	$\pi_l/10$	w_l/w_h rigid
$\gamma_l = 0.001$	688.44	715.17	689.12	690.09
$\gamma_l = 0.002$	699.48	701.87	692.74	695.94
Relative change	+1.6%	-1.9%	+0.5%	+0.8%

Table 4. Sensitivity analysis when all variables *including* taxes are endogenous. Impact on the utilitarian criterion within the active population and on the low-skilled intertemporal utility for entrants in unemployment, $\exp[rV_{U,l}]$ (in certainty equivalent; euros/month). Note that the impact on the low-skilled (salaried) employment-active population ratio, e_l, is the same as in Table 3. Information about the meaning of each column are provided under Table 3.

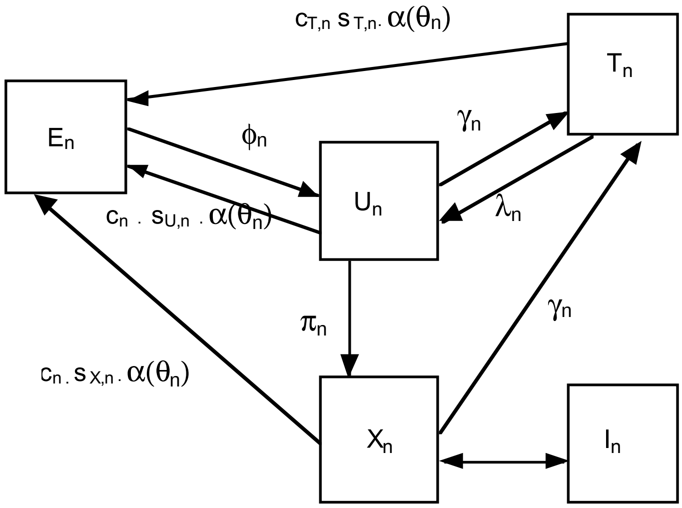

Figure 1: Labor market flows.

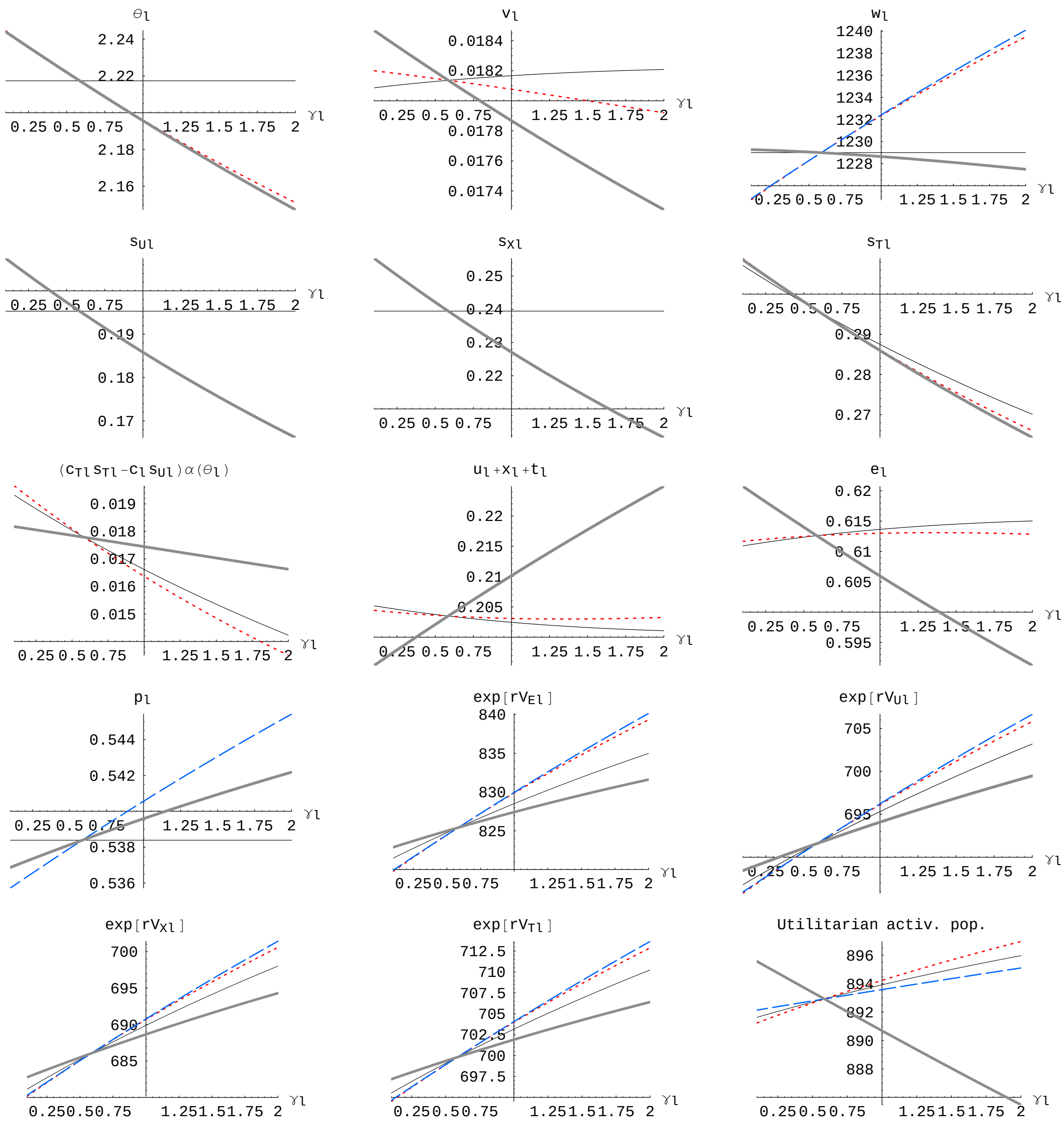

Figure 2: Simulated effects of the entry rate into programmes that enhance matching effectiveness, γ_l. Legend: Scale on the horizontal axis : $100 * \gamma_l$; Indicators: Low-skilled tightness θ_l, vacancy rate v_l, net wage rate w_l (euros/month), search effort levels $s_{.,l}$, difference in hiring rates $(c_{T,l}s_{T,l} - c_l s_{U,l})\alpha(\theta_l)$, unemployment rate $u_l + x_l + t_l$, salaried employment-active population ratio e_l, participation rate p_l, intertemporal utility levels $\exp[rV_{.,l}]$ (in certainty equivalent; euros/month); utilitarian criterion within the active population.

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ISSN 1379-244X D/2005/3082/007