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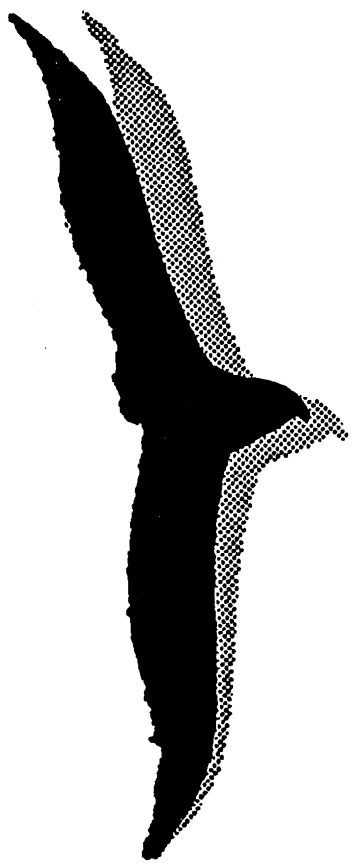

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LABOUR MARKET DYNAMICS IN A HETEROGENEOUS MARKET

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Abstract

This paper develops a flow model in a dual labour market with heterogeneous workers and heterogeneous jobs that allows for upward mobility or promotion flows via the internal market and demotion or deskilling flows through the state of unemployment. Dynamic impulse-responses analyses are used to examine the effects of labour market policies that aim to generate institutional changes in the wage bargaining process, make job creation less costly or job matching more efficiently to reduce unemployment, and increase competitiveness through a rise in labour productivity. We find that the usual trade-off between wages and employment shows up clearly as a result of changes in bargaining power. Moreover, the short-run and long-run effects on unemployment of active labour market policy instruments differ considerably dependent on which segment of the labour market is influenced initially. Finally, unemployment among workers without experience (skills) goes down most strongly when productivity gains are not directed to them directly, but - instead - realized for workers in the primary segment of the labour market.

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1. Introduction

The interest in labour market dynamics is growing at an increasing rate as becomes clear from the high number of studies that make use of the flow-approach (see for a recent overview, for example, Gautier, 1997). Attractive features of this flow--approach to the labour market include - among other things - the evaporation of the distinction between micro and macro-economics, its theoretical foundation in the search equilibrium model (see e.g., Mortensen and Pissarides, 1993, 1994) and - more in general - the insight to be obtained for policy makers from gross labour market flows.

This paper builds on two streams of literature on flow models. First, the empirical implementation of macro labour flow models to be used for policy analysis that endogenizes the processes of wage formation and vacancy creation as developed in the theoretical search equilibrium models (see Pissarides, 1990, 1994). Previous studies of empirical macro flow models for the Netherlands can be found in Gautier and Den Butter (1995) in which wages and vacancies are endogenous in a homogenous labour market. Den Butter and Gorter (1998) extend this empirical flow model by allowing for heterogenous jobs (i.e., make a distinction between good and bad jobs) so that job-to-job mobility is modelled endogenously also. The second strand of literature departs from the Blanchard and Diamond's model (1989, 1990) in which comovements of unemployment and vacancies are modelled in the Beveridge space by means of an aggregate matching function. In De Larquier (1998), an internal labour market is added to this framework with the existence of heterogeneous jobs (ranked in hierarchical order) and allows for promotion flows through the internal labour market. The promotion flows then lead to a segmented (dual) labour market of inexperienced and experienced workers.

The present paper develops a labour market flow model with heterogeneous jobs and heterogeneous workers that allows for promotion flows through the internal market (moving from a lower level to a upper level job) and "deskilling" flows through the state of unemployment (losing work experience and effectively becoming inexperience again). Hence, this paper extends the empirical labour market flow models with heterogeneous jobs with *heterogeneous workers* and integrates this framework with the concept of *promotion flows* in an internal labour market. A vital characteristic of the model remains that wages and job creation are endogenously modelled, that is determined by the optimal

behaviour of two types of individual workers and employers in a search-theoretical framework (see Pissarides, 1990, 1994).

The ultimate goal of the paper is to calculate the effects of policy options that aim to decrease unemployment, and in particular to lower unemployment among inexperienced workers. Impulse response analyses are performed to estimate the effects on the size and composition of unemployment of (i) institutional chances in the bargaining process, (ii) various types of labour market policies (e.g., reduction of opening cost of a vacancy), and (iii) external (productivity) shocks.

The structure of the paper is as follows. Section 2 describes the dynamic flow model with heterogenous workers and heterogenous jobs. The calibration of the model to compute a central projection (equilibrium) will be presented in section 3. The effects of a number of policy measures will be obtained by using dynamic impulse-response simulations in section 4 and subsequently discussed. Section 5 will offer some concluding remarks.

2. The Model

We consider a labour market flow model where an internal market is introduced with two types of jobs (a: and *b*) ranked in hierarchical order and linked by a promotion flow. In that way, we would like to model the macroeconomic consequence of the 'job experimentation' microeconomic hypothesis: a match with an upper level position ***b*** is possible only for who have previously succeed a match with a low level job *a* (Viscusi, **1983).** Thus, the experimentation process induces a dynamic and endogeneous segmentation of the labour force: people who occupy or look for a job ***a*** are 'inexperienced' workers, people who have been promoted to a job ***b*** are 'experienced' workers.

More precisely, following Novos (1992), we assume that production is 'a set of activities for which people are more or less suited according to their ability and previous experience'. In that case, when information on worker ability is not publicly observable, firms gain efficiency when they integrate jobs ***a*** and ***b*** and use information on the quality of the previous matches in low level jobs a to assign their employees to upper level jobs ***b.*** Of course, firms can hire from the outside to fill jobs ***b*** but 'hiring' from

inside (that is to say, promoting) may be less costly and may increase the chances of an appropriate match. Information available to the employer on an experienced worker who applies to a vacancy ***b*** is either a direct experimentation observed in his firm or a resume of previous experience with other employers. The decision between promoting (from inside) and recruiting (from outside) depends on the relative costs and efficiency of internal and external information (which depend on organisational and institutional parameters, as public, private or social networks).

Consequently, at a given date, the weight of internal labour market may vary according to the organisation and development of internal and external markets, so may the flow dynamics. For example, with a similar core assumption, G de Larquier (1998) finds that temporary activity and reallocation shocks may be transformed into structural irreversible 'mismatch' shocks via the internal labour market reaction. Bigger is the initial promotion flow, bigger is the structural mismatch effect (and in an economy without internal market, there is no permanent mismatch induced by a temporary shock). However, we can regret that G. de Larquier (1998) focuses only on internal flow and doesn't allow any opposite flow between experienced and inexperienced unemployment to counterbalance the internal effect.

In the present, we introduce a 'deskilling' flow from the state of experienced worker to the state of inexperienced worker. This last flow occurs during unemployment periods. So, we consider an economy where upward flows take place on the internal market and downward flows on the external market. At this stage, Figure 1 summarises the labour flow dynamics described.

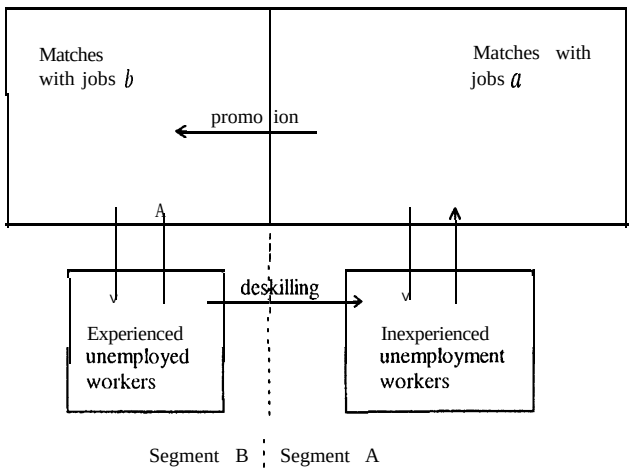

Figure 1. Worker flows.

More specifically, the model describes the various flows between the following stocks at the macro level: E: employment;

V: vacancies;

U: unemployment.

Total employment (E) consists of two parts, low-level jobs (Ea) and upper-level jobs (Eb):

$$E = Ea + Eb \quad (1)$$

Consequently, vacancies may relate either to low or upper-level jobs (Va and Vb):

$$V = Va + Vb \quad (2)$$

Total unemployment is composed of inexperienced unemployed workers (Ui) and experienced unemployed workers (Ue):

$$U = Ui + Ue \quad (3)$$

We consider both worker and job flows between these six stocks. Inflows and outflows of vacancies are symbolised by VIa, VIb, and VOa, VOb. We note Fxy a worker flow from stock x to stock y: for example, Faui and Fuia represent the flow of separated workers from Ea into Ui and the flow of new hired workers from Ui to Ea.

2.1. Matching Process.

The central feature of every labour flow models is the description of the matching

mechanism in action. The supposed organisation of the six stocks Ea, Eb, Va, Vb, Ui and Ue implies an internal market and two segments A and B on the external market. So the process of matching workers and jobs is threefold: a promotion process (Fab) and two market processes on the external segments (Fuia and Fueb).

a. The Promotion Process.

First we assume that a fraction γ of the vacant jobs *b* are filled by promoting workers employed in jobs *a*:

$$Fab = \gamma.Vb \quad (4)$$

Bigger y is ($0 < y < 1$), more employers, in order to fill their upper-level positions, prefer promoting workers coming from the internal market rather than recruiting experienced unemployed workers on the external market B (from Ue). So the parameter y is crucial for all the dynamics of the model. We interpret y as an institutional parameter: the weight of the internal market in the economy. In our simulations, we attribute two possible values to y: 17% and 27%.

At last, let π_{ab} be the rate at which an inexperienced employed worker in a job *a* is promoted to a job *b:*

$$\pi_{ab} = Fab/Ea \quad (5)$$

b. The Market Process.

The process of matching unemployed workers and jobs is not instantaneous. On each segment of the market, following Blanchard and Diamond, we formalize the hiring activity by a matching function of unemployment and vacancies (with constant return to scale).

$$Fuia = m_a(Ui, Va) = \lambda_a . Ui^{\alpha_a} . Va^{1-\alpha_a} \quad (6)$$

$$Fueb = m_b(Ue, Vb) = \lambda_b . Ue^{\alpha_b} . Vb^{1-\alpha_b} \quad (7)$$

a, and (1-a,) [α_b and $(1-\alpha_b)$] are the weights given respectively to unemployment and vacancies in the matching process on the external segment A [B]. λ_a and λ_b represent the efficiency of the matching process ($\lambda_a > 0$, $\lambda_b > 0$ and $0 < a, < 1$, $0 < \alpha_b < 1$).

On the external market, inexperienced unemployed workers don't compete with experienced workers for high-position *b*. That means that employers of jobs *b* are only

looking for workers who have experienced a job a. On the other hand, the experienced unemployed workers don't compete with inexperienced workers for low-positions *a*. In other words, experienced unemployed workers don't agree to start again their careers from the beginning. It isn't unrealistic during the first periods of unemployment. But we can imagine that experienced unemployed workers loss their skill over time. So there exists a 'deskilling' or a 'demotion' flow from Ue to Ui: Fueui. Actually, this external flow is the reverse of the internal promotion flow. Here, it is convenient to assume that Fueui is a constant fraction of experienced unemployed workers:

$$Fueui = \delta.Ue \quad (8)$$

Finally, let π_i and π_e be the escape probabilities respectively from Ui and Ue to employmen t:

$$\pi_i = Fuia/Ui \quad (9)$$

$$\pi_e = Fueb/Ue \quad (10)$$

2.2. Separations Process.

At any instant, employed workers may quit their jobs or may be dismissed. In the latter case, there is no new vacancy because we assume that the reason of the dismissal is the destruction of the job[1]. On the contrary, when a worker quits his job, his employer has to post a vacancy to fill it again.

Let Faui and Fbue be the outflows from Ea and Eb, given s_a and s_b the respective separation rates, it holds on each segment A and B:

$$Faui = s_a.Ea \quad (11)$$

$$Fbue = s_b.Eb \quad (12)$$

Let VIaui and VIbue be the numbers of jobs which become instantaneously a vacancy again when someone quits a job ***a*** and ***b*** respectively. Given θ_a and θ_b the part of quits in total separations on each segment, we assume:

$$VIaui = \theta_a.Faui \quad (13)$$

$$VIbue = \theta_b.Fbue \quad (14)$$

Higher θ_a and θ_b are, higher the part of 'churning'[2] in worker mobility is. **If** $\theta_a = \theta_b = 1$,

[1] In France and Holland, it is not allowed to hire and fire simultaneously for the same job.
[2]

all separations are induced by workers only, without job destruction (total churning or 'pure' worker mobility). If $\theta_a = \theta_b = 0$, all separations are produced by job destruction (no churning or 'total constrained' worker mobility). Consequently, θ_a and θ_b may be also interpreted as continuation job probabilities. Note that the continuation probability of jobs *a* quit by promoted workers is supposed equal to 1; that is to say, Fab more vacancies *a* are posted.

At this stage, it follows from our matching and separation assumptions that employment and unemployment dynamics are given by four equations (stocks are calculated at the beginning of each period t; flows are calculated at the end of each period t):

$$Ea(t) = Ea(t-1) + Fuia(t-1) - Faui(t-1) - Fab(t-1) \quad (15)$$

$$Eb(t) = Eb(t-1) + Fueb(t-1) - Fbue(t-1) \quad (16)$$

$$Ui(t) = Ui(t-1) - Fuia(t-1) + Faui(t-1) + Fueui(t-1) \quad (17)$$

$$Ue(t) = Ue(t-1) - Fueb(t-1) + Fbue(t-1) - Fueui(t-1) \quad (18)$$

To write job flows dynamics in the same way, we have to specify the job creation process which closely depends on the wage formation.

2.3. Job Creation Process.

In the equilibrium, Va and Vb have to be such that opening new jobs *a* and ***b*** are no more profitable for employers. Thus Va and Vb result from a rational calculation. But, at the beginning of each period some vacancies *a* and ***b*** are inherited as the product of the previous matching and separation dynamics. Consequently, given the optimal values Va and Vb, employers have to adjust the both stocks of vacancies: to obtain the optimal levels Va and Vb, sometimes they create new vacancies, sometimes they destroy old vacancies inherited from the previous periods. Let's describe the vacancy dynamics in details.

For jobs a:

$$Va(t) = Va(t-1) + VIa(t) - VOa(t-1) \quad (19)$$

with:

$$VOa(t) = Fuia(t-1) \quad (20)$$

$$VIa(t) = VIaui(t) + VIaa(t) + Fab(t-1) \quad (21)$$

For jobs ***b:***

$$Vb(t) = Vb(t-1) + VIb(t) - VOb(t-1) \quad (22)$$

$$VOb(t) = Fueb(t-1) \quad (23)$$

$$VIb(t) = VIbue(t) + VIbb(t) \quad (24)$$

Equations (20) and (23) mean that outflows of vacancies VOa and VOb are associated with the successful matches described by the two matching functions. They are equal to the worker flows from unemployment (Ui and Ue) to employment (Ea and Eb). Equations (21) and (24) imply that inflows of vacancies VIa and VIb are partly induced by pure worker mobility (quits without job destruction). At last, VIaa and VIbb are adjustment variables. They may be positive (vacancy creation) or negative (vacancy destruction) in order that equations (19) and (22) are equal respectively to the optimal values of Va and Vb.

To settle Va or Vb, we need to know the expected profit from opening a new vacancy ***a*** or ***b***. Obviously, this expected profit depends on the expected match surplus and the sharing rule of this surplus between the employer and the worker. So wage formation plays a key role in the determination of the supply of vacancies.

2.4. Wage Formation.

Before specifying the employer's and worker's expected returns from a job and then describing the wage formation, we need to introduce some useful notations:

q_a: rate at which an employer with a vacancy ***a*** finds a worker: $q_a = Fuia/Va$;

q_b: rate at which an employer with a vacancy ***b*** finds a worker: $q_b = Fueb/Vb$;

k_a, k_b: costs of opening a job ***a*** or ***b;***

y_a, y_b: output of a match with job ***a*** or ***b;***

w_a, w_b: wage of a job ***a*** or ***b;***

r: discount rate.

Wage formation is modelled in a similar framework as developed by F. den Butter and C. Gorter (1998). They settle the different expected profits to employers in a dual labour market where jobs are "good" or "bad", occupied or vacant. We do the same thing for our jobs *a* and ***b*** in the segmented labour market. In the other hand, F. den Butter and C. Gorter assume homogenous workers and determine their asset values as employed or unemployed. Here, we have to distinguish inexperienced and experienced workers cases.

a. The asset values.

In case of an unfilled job ***a,*** the expected profit from opening a vacancy ***a*** is denoted by Za. It holds that:

$$rZa = -k_a + q_a(Ja - Za) \quad (25)$$

The asset value of an unfilled job *a* (rZa) is equal to the probability that a vacancy ***a*** is filled (q_a) times the associated change in value when it is filled (Ja - Za) minus the costs of having an open position (k_a).

If the job is filled, Ja, the expected profit, satisfies:

$$rJa = y_a - w_a - s_a(Ja - \theta_a Za) - \pi_{ab}(Ja - Za) \quad (26)$$

The asset value of a filled job *a* is equal to the productivity in job a (net of wage costs) minus the change in wealth when a job separation takes place and the job becomes vacant (the separation rate times the continuation probability: $s_a.\theta_a$) or when a promotion occurs with a probability π_{ab} (here, the continuation job probability is equal to 1).

In the same way, the expected profit from opening a vacancy ***b*** is denoted by Zb.

$$rZb = -k_b + q_b(Jb - Zb) \quad (27)$$

where Jb is the expected profit if a job ***b*** is filled:

$$rJb = y_b - w_b - s_b(Jb - \theta_b Zb) \quad (28)$$

The asset value of a filled job ***b*** is equal to the productivity in job *b* (net of wage costs) minus the change in wealth when a job separation takes place and the job becomes vacant (the separation rate times the continuation probability: $s_b.\theta_b$).

In equilibrium, the rents of opening new jobs are assumed to be fully exploited which makes the expected profits of having a vacancy equal to zero. That is Za = Zb =0. Thus, equations (25) and (27) become:

$$Ja = k_a/q_a \tag{25b}$$

$$Jb = k_b/q_b \tag{27b}$$

Let us now present the workers asset values of being inexperienced or experienced unemployed and employed in either a job a or *b*. The asset value of being inexperienced and unemployed is rBi:

$$rBi = \pi_i(Wa - Bi) \tag{29}$$

The asset value of being inexperienced unemployed worker depends on the wealth gains of becoming employed in a job *a* times the probability to get that job, with Wa the expected utility of being inexperienced and employed in a job *a*.

$$rWa = w_a - s_a(Wa - Bi) + \pi_{ab}(Wb - Wa) \tag{30}$$

The asset value of having a job a is equal to the wage plus the wealth gain of being promoted to a job *b* with the probability π_{ab} (given Wb the expected utility of being experienced and employed) minus the wealth loss that occurs in case of a separation with probability s.

In the same way, the asset of being experienced and unemployed is rBe:

$$rBe = \pi e(Wb - Be) - \delta(Be - Bi) \tag{31}$$

where δ is the probability that the worker losses his skills and becomes an inexperienced unemployed worker. At last, the asset value of being experienced and employed in a job *b* is:

$$rWb = w_b - s_b(Wb - Be) \tag{32}$$

The asset of having a job *b* is equal to the wage minus the wealth loss that occurs in case of a separation.

b. Wage bargaining and formation.

It is assumed that wages split the surplus of a match between the worker and the firm. So we get for jobs *a:*

$$Wa - Bi = \beta [(Ja - Za) + (Wa - Bi)] \tag{33}$$

and for jobs *b,* this becomes:

$$Wb - Be = \beta [(Jb - Zb) + (Wb - Be)] \tag{34}$$

where β is the worker's share of the match surplus.

Using now the no-profit conditions (Za = Zb =0), together with (26), (30), (31) and (33) for the final step, we obtain for w_a:

$$w_a = \beta y_a + (1-\beta)(r+\pi_{ab})Bi - (1-\beta)\frac{\pi_{ab}}{\pi_e}[(\pi_e + r + \delta)Be - \delta Bi] \tag{35}$$

and using (28), (32), and (34), we get for w_b:

$$w_b = \beta y_b + r(1-\beta)Be \tag{36}$$

c. Steady state equilibrium.

In equilibrium, the following conditions hold:

(i) In steady state, all stocks are constant:

$$AEa=AUi=AUe=AEb=O \tag{37}$$

that is:

$$AEa=O \quad \Leftrightarrow \quad Fuia = Faui + Fab$$

$$AUe=O \quad \Leftrightarrow \quad Fbue = Fueb + Fueui$$

$$AUi=O \quad \Leftrightarrow \quad Fueui + Faui = Fuia$$

$$AEb=O \quad \Leftrightarrow \quad Fab + Fueb = Fbue$$

(Obviously, the third first conditions imply the fourth one.)

(ii) Rents of jobs a are exhausted:

$$Ja = k_a/q_a \tag{25b}$$

(iii) Rents of jobs *b* are exhausted:

$$Jb = k_b/q_b \tag{27b}$$

The model can now be solved for the stocks of vacancies (Va and Vb) by making use of the conditions for vacancy entry (ii) and (iii). The asset values of unemployment become (using (29) and (33)):

$$rBi = \frac{\beta}{1-\beta} k_a \frac{Va}{Ui} \tag{38}$$

and using (31) and (34):

$$(r+\delta)Be = \frac{\beta}{1-\beta}\left[\frac{1}{\frac{1}{Vb}+\frac{\gamma}{Fueb}}\frac{k_b}{Ue} + \delta k_a \frac{Va}{Ui}\right] \tag{39}$$

Finally, the equations for the vacancy variables become as follows:

$$Va = \frac{y_a - w_a \quad Fuia}{r + s_a + \pi_{ab} \quad k_a} \tag{40}$$

$$Vb = \frac{y_b - w_b}{(r + s_b)k_b - \gamma(y_b - w_b)} Fueb \qquad (41)$$

3. Calibration and baseline simulations

Our examination of the model starts by computing a central projection of the simulation experiments. The central projection (or baseline simulation) is computed as a dynamic equilibrium of our model, based on average monthly values for the exogenous flow variables and also conditional on the equilibrium values of the (endogenous) stock-variables (see for similar analyses, Den Butter and Gorter, 1998, and Den Butter and Van Dijk, 1998).

The basic projection assumes 400,000 unemployed, and a total level of employment of 6 million, which mimics the situation in the Netherlands in the beginning of 90's. It should be emphasized that in the baseline simulation of our model all stocks and flows are constant, but not exogenous (except total labour force equal to 6,4 million). The stocks of employment and unemployment are endogenous in the model and will deviate from their equilibrium values in impulse simulations where the economy is hit by a shock which brings it temporarily out of equilibrium. To solve the model numerically we use the equations describing the optimal level of vacancies (type *a* and *b,* see equations (40) and (41) in section 2) jointly with the - first three - equilibrium conditions of constant stocks (that is, inflow equals outflow) of the two types of employment and unemployment (see also section 2). Given the initial fixed levels of total employment and total unemployment, this results in a non-linear system of five equations in which four endogenous variables have to determined (Va,Vb,Ea,Ui) and to which the promotion flow-variable (Fab) can be added to resolve this system[3]. This implies that it is chosen to fix the promotion rate in the internal labour market (γ) when simulation experiments are to be carried out (as will be the topic of the subsequent section). The motivation to choose to anchor this structural parameter is that different kind of labour markets in terms of the importance of the internal labour market (relative size of the promotion flow) can be used

[3] Alternative choices could be made here, for example one of the matching flows (type *a* or *b*) could be taken instead which would fix the corresponding matching efficiency parameter (type *a* or *b*) in the simulations. Note that this was the approach followed in the previous empirical flow models for the Dutch labour market (see Den Butter and Gorter, 1998, Den Butter and Van Dijk, 1998 and Gautier and Den Butter, 1995).

as a reference when evaluating the effects of several policy options. In other words, the differences in the use of promotion flows can be interpreted as variations in the institutional functioning of the labour market. Therefore, we compute two central projections of the model, the first (Model I) being a labour market with a relatively high promotion flow (in which about 1 out of 4 jobs of type *b* happen to be filled via internal recruitment of a worker occupying a job *a*) and the second version (Model II) having a lower level for the promotion flow (in which the odds to fill a type *b* job by means of the internal market turn out to be approximately 1 out of 6)[4].

The model is solved using numerical procedures from the GAUSS-programme. We stress that our calibration does not purport to yield a central projection which gives a good dynamic description of the historical time path of the endogenous variables of the flow model. The sole aim of our baseline simulation is to mimic a dynamic flow equilibrium as a reference scenario, which - to some extend - look likes the actual situation. For example, the structural parameters are calibrated such that the - endogenously determined - employment and vacancy stock is roughly equally divided between the segments (A and B). Moreover, the total stock of vacancies is calibrated to be close to its actual value of about 100-l 10,000 in the beginning of the 90's.

In our "baseline''-versions of the model, we do not estimate the matching-parameters on vacancies, unemployment and employed job seekers, but choose fixed values in line with previous empirical work for the Netherlands (a, and α_b are both set equal to OS), see e.g. Van Ours, 1991, Gorter and Van Ours, 1994. The matching efficiency parameters are calibrated in our model and are selected to be equal to 0.8.

To calibrate the model we further need to select values for the structural parameters in the "job creation"-part of the model on (i) costs of opening a job (k_a, k_b), (ii) real value of the production in the two segments (y_a, y_b) (iii) worker's/firm's share ($\beta/1-\beta$) of the match-surplus in both segments, and (iv) the discount rate (r). We take the following figures in the central projection: $y_a=0.5$, $y_b=1$, $k_a=2.5$, $k_b=6$, $\beta=0.5$ and $r=0.03$ (in Model I)/0.02 (in Model II).

Finally, parameters have to be settled that are related to the worker and job flows

[4] Empirical evidence on the actual value of the promotion flow for the Dutch labour amrket is scarcely available. Figures on the hiring and internal mobility for the Netherlands in 1990 (see Hassink, 1996) suggest that the Netherlands suggest that the average size of the promotion flow is in-between the range of 1 out of 6 - I out of 4 (Model I-Model II).

through the labour market (in addition to the matching and promotion flows): the separation flows of workers (determined by separation rates s_a and s_b), the "deskilling" flow of workers (described by the deskilling rate 6) and the flows of replacement jobs (continuation probabilities set by θ_a, θ_b). In our central projections, we have taken the following configuration of values: s_a=0.03, s_b=0.02, δ=0.20 (in Model I)/0.10 (in Model II), and θ_a=θ_b=0.5.

In Table 1, we present the numerical values of a set of (endogenous) variables of particular interest for our baseline models. In baseline I, we have the case of a relatively high promotion flow of employed workers together with a relatively high "deskilling" flow of unemployed workers, whereas in baseline IT both the promotion and the deskilling flow are substantially lower. In brief, the first model can be classified as a "high rotation" labour market (flows from type a to type ***b,*** and flows from experienced to inexperienced are higher) and model II can be referred to a "low rotation" labour market,

For both baseline-versions, we have reached our objective to get about equal shares of employment and vacancies in the two labour market segments (A and B). Unemployment among experience workers is about four times as small as unemployment among inexperienced workers (both in absolute and relative terms). The wage levels do also show close resemblance between the baseline-versions, although the wage level in type ***b*** jobs appears to be somewhat higher in the low rotation labour market. The major difference between the two reference-scenario's emerge naturally at the size of the promotion (deskilling flow)[5]: the flows in the high rotation labour market are about twice as large as in the low rotation labour market. Other deviations, but of a much smaller magnitude, arise at the probability to get a type ***a*** job (by an inexperienced worker) which is 2%-points lower in the low rotation labour market, while - at the demand side - the mean duration to hire a experienced worker is 0.2 months higher in the high rotation labour market. A final remark concerns the difference in the level of average length of the vacancy chain that is defined as the total number of replacement jobs plus the newly created jobs over the total number of newly created jobs. The length of this chain is somewhat higher in the high rotation labour market which is basically due to the higher promotion flows in that version of the central projection. Note that it is assumed to have

[5] As can be easily derived from the equilibrium conditions (see section 2), the promotion and deskilling flow should be equal in equilibrium.

each type a job refilled that is left due to an internal promotion (see also equation (21) section 2 which shows that the relevant continuation probability has been fixed at 1).

Table 1 Characteristics of equilibrium path of a baseline simulation for a (selected) set of endogenous variables

	Baseline I (high rotation)	**Baseline II** (low rotation)
Parameter values		
promotion rate (computed)	0.27	0.17
deskilling rate (fixed)	0.20	0.10
Variables		
. inexp. unemployed (% of Ea)	3 14 (10.6%)	314 (9.3%)
exp. unemployed (% of Eb)	*86* (2.5%)	86 (2.8%)
employment in type a jobs	2640	3054
employment in type ***b*** jobs	3360	2946
vacancies of type *a* jobs	46	50
vacancies of type *b* jobs	63	55
wage in type a job (% of prod. in *a*)	0.42 (84%)	0.43 (86%)
wage in type ***b*** job (% of prod. in *b*)	0.72 (72%)	0.78 (78%)
"deslsilling" flow (per month)	17	9
promotion flow (per month)	17	9
probability to get a job (type *a*)	0.31	0.29
probability to get a job (type ***b)***	0.59	0.59
vacancy duration in months (type a)	0.5	*05*
vacancy duration in months (type *b)*	1.3	11
vacancy chain	2.6	2.3

4. Impulse response analysis.

To show the labour market dynamics due to changes in the structural parameters, we present simulation exercises of our model in this section. The shocks given to the system consist of the following categories of (labour market) policies:

(i) *(De)regulation measures that lead to institutional changes in the bargaining process.*

Here, the focus will be on the impact of a change in bargaining power on - in particular - (un)employment and wage levels. What happens with the size and composition of (un)employment if for instance the employers obtain more bargaining power than their counterpart (note that in the baseline-versions, both parties have equal power). In practice, one can think for example of deregulation measures that break down the organizing power of the union and hence give rise to a shift in the balance of power towards the employers. The reverse pattern, which might reflect a trend towards centralised bargaining giving - de facto - more control to unions, will also be examined.

(ii) *Active labour market policies that aim to reduce unemployment.*

Various measures to stimulate the creation of jobs will be analyzed within this category. Specific attention will be paid to the effects of reducing the opening costs of a vacancy and increasing the efficiency of matching in each of two segments of the labour market (A and B). Moreover, we look at the consequences of a reduction in the deskilling of unemployed workers (so making the likelihood lower that experienced workers become inexperienced, i.e., loss their skills).

(iii) *Policies to increase competitiveness (employment) through a rise in productivity.*

To simulate the consequences of a general policy directed at the enhancement of technical progress and human capital, e.g. by increased investments in R&D and/or schooling, we analyze the effects of an increase in productivity for both segments in the labour market (A and B).

All simulations are conducted with both alternative dynamic equilibria as baseline, where Baseline I mimics the high rotation labour market and Baseline II the low rotation labour market, so that differences in impulse responses indicate the sensitivity of the

effects of the policy measures for differences in the dynamics (flows through) of the segmented labour market.

The dynamic simulations are based on myopic foresight of the agents. This implies that employers create new jobs in each period according to the vacancy supply relations (see equations (40) and (41)), given the disequilibrium values for stocks and flows in this period[6]. Changes in the structural parameters will thus immediately have their impact on the level of vacancies and wages. The wage levels will be affected instantaneously in two ways (see equations (35) and (36) in section 2): directly via the change in the structural parameters and indirectly via the changes in the outside options of unemployment (inexperienced Bi and experienced Be). After this initial change, the wage level in segment B will hardly be further influenced because the outside options of employment remain almost constant over time (given the new set of structural parameters, and the assumption of myopic behaviours). In contrast, the wage level in segment A is also determined by the transitions rates (related to flows in and out segment B) in the labour market which will continuously adjust over time when the labour market is moving to a new equilibrium. Therefore, the wages in type *a* jobs will show a gradual adjustment over time if the shock affects originally segment B in the labour market. This feature of our model is related to the dual nature of the labour market in which changes in segment A will **not** affect segment B, but changes in segment B do influence segment A. The latter happens because of the changes that occur in the promotion flows (from segment A to B) and "deskilling" flows (from segment B to A).[7]

A relevant question that comes forward of this functioning of the segmented labour market is whether measures to enhance employment (reducing opening costs, increasing matching efficiency, increasing productivity) are more effective (in the long-run) in segment A or B. Of course, the answer to this question will also be dependent on the degree of rotation (high or low) in the labour market. But it will definitely give suggestions to policy-makers where limited budgets on labour market policies have to be spend to achieve the maximum result.

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[6] An alternative approach could be to assume that the agents have perfect foresight and hence "jump" to the new equilibrium values for the inflow of new jobs immediately. This exercise is left for future research on this topic.

[7] The reason is that a change in Vb induces a change in Fab (see equation (4)): promotion flows are function of the number of vacancies *b* and don't depend on the number of internal applicants occupying jobs a. In the same way, flows Fueui vary only if there is a change in Ue (see equation (8)): we don't take

We present the results of the simulation exercises related to the policy measures described above in Tables 2 to 10. The tables show the effects on the set of endogenous variables included in Table 1.

Tables 2 and 3 give the effects of a change in the bargaining parameter β: in Table 2 union power is higher than employer's power in bargaining, in Table 3 the opposite is true. In case unions are able to absorb a higher share of the surplus generated in the matches, we naturally see higher wages occur in both segments of the labour market (with the largest increase in segment B). Simultaneously, unemployment rises substantially and continues to rise over time (and more strongly in the high rotation labour market in which the wage-growth is higher also). The "shadow side" of the wage growth appears to manifest itself in the high unemployment level for inexperienced workers because the dynamics in the dual labour market are largely reduced (in other words, the inexperienced workers get tied in unemployment). The reverse pattern emerges when employers can restrain wages. Jointly with wage moderation, a process of upward mobility ("climbing up the ladder") for inexperienced workers is stirred enormously due to the massive creation of type ***b*** jobs. These new jobs of type ***b*** are partly filled through promotion flows that lead to the replacements of type ***a*** jobs (i.e., the vacancy chain-effect). Apparently, our model is capable to exhibit the usual trade-off between wages and (un)employment very well (see also Figure 2). In particular, it reveals that the choice is between higher wages for a smaller group of experienced workers and more unemployment among the inexperienced or lower wages for a larger group of experienced workers and less unemployment among the inexperienced.

Next, we look at the impact of active labour market policies that attempt to reduce unemployment. First, let us consider the repercussions of a decrease in the opening cost of vacancies in segment A or B. As was addressed before, a change in opening costs in segment A has an instant effect on wages and (un)employment (see Table 4), whereas a change in opening costs of vacancies in segment B has long-run implications for both segments (see Table 5). Interestingly, it depends on the size of the promotion (and demotion) rate in the labour market whether the net effect on (un)employment is larger in case of encouraging job creation in segment A or B. The high rotation labour market gives better results - after about 15 years unemployment becomes lower, see also Figure 3

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into account the level of Ui.

- for a reduction in opening costs of type *b* jobs, while implementing this instrument in the low rotation labour market does not outperform (after 20 years) the instantaneous results of a reduction in opening cost of type ***a*** jobs. Second, an analysis is carried out in which the efficiency of matching is enlarged in one of the segments (see Table 6 and 7). The main lesson to be learned from the results for this instrument is that the emphasis should be on improving matching efficiency in segment A (with the larger pool of unutilized workers). The immediate effect on unemployment in segment A appears to be larger than the long-un effects of enhancing efficiency in segment B (see Figure 4). Improving efficiency in segment B does lead to a growing (shrinking) employment in segment B (A), but does not have positive feed-back effects on segment A via the internal labour market (the promotion flow becomes even smaller). A third alternative of an active labour market policy is to avoid that experienced unemployed workers lose their skills (for example, training and schooling-programmes could be used for this purpose). The effects of a decrease in the deskilling rate are displayed in Table 8, but appear to be quite modest. Because of the lower outflow from experienced unemployment (into inexperienced unemployment), the composition of unemployment is adjusted in favour of the inexperienced workers. Actually, the short-run effect is an increase in unemployment (and a higher wage level in type ***b*** jobs due to the improvement in the outside option of being an experienced unemployed), but in longer run the labour market recovers (see Figure 5). Employment in segment B (A) grows (shrinks) and gradually employment growth in segment B is slightly larger than the reduction in segment A. Obviously, a parallel movement in unemployment is observed.

Finally, our interest is directed towards policies targeted at productivity improvements for each type of job. In contrast to the conclusion drawn with respect to labour market efficiency, it becomes clear that affecting productivity in segment B is - after a short period of time - much more effective than doing so in segment A (see Table 9 and 10). The dynamics initiated by a stimulus of productivity in segment B are strong as can be seen from the substantial increases in the promotion flows (and the related rise in the length of the vacancy-chain). This leads to a major decrease of unemployment among inexperienced workers and a minor expansion of unemployment among experienced workers. The resulting pattern of unemployment over time is shown in Figure 6. The latter observation is however mainly due to the shift in the composition of employment.

Hence, a remarkable conclusion arises from this simulation experiment: to reduce unemployment among inexperienced workers, the most effective policy option is to increase (further) the productivity of experienced workers (instead of enhancing the productivity of the inexperienced workers themselves). In other words, job creation in segment B appears to generate a dynamic (stepping-stone) process that is more helpful for inexperienced workers than stimulating job creation directly for this type of workers. This dynamic process due to the vacancy chain mechanism (see for example Gorter and Schettkat, 1994) is sometimes referred to as "keep the chimney smoking".

5. Conclusions.

This paper develops a labour flow model with heterogeneous workers and heterogeneous jobs that allows for promotion and demotion flows. The matching of workers and vacant jobs takes place in the two segments of the external labour market. Upward worker flows occur in the internal market (via promotion), and downward or deskilling flows are transmitted through the state of unemployment (i.e., unemployed workers are losing their skills/experience).

Dynamic impulse-response analyses reveal the effects of various policy options by means of changes in the structural parameters in the flow model. The simulation experiments bring forward the familiar trade-off between wages and employment when the balance of power in the bargaining process between employers and employees (union's) is shifted. Active labour market policies can help to reduce aggregate unemployment most effectively in the short run by reducing the opening costs of vacancies or improving matching efficiency of "low level" jobs (in the secondary segment). However, the long-run impact on unemployment of similar active policies targeted at "high level" jobs (influencing initially the primary segment) will become more favourable than those affecting the secondary segment when the promotion (and demotion) flow in the labour market is sufficiently large. Institutional differences in the use of the internal market may therefore be of critical importance for the effectiveness of active labour market policies. Improving the productivity of experienced workers turns out to be more beneficial for the employment prospects of the group of inexperienced workers than enlarging the productivity of this group itself (with an equally high

percentage). The dynamic nature of the dual labour market in which the barrier between the segments are opened by means of upward mobility flows is responsible for this result.

In conclusion, the results of the exercises to evaluate labour market policies underline the importance of the incorporation of feedback-mechanism in a dynamic labour market flows model (such as the concept of the vacancy chain) that aims to shed light on the effectiveness of a variety of policy options.

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Table 2 Effects of an increase in bargaining parameter: β=0.55

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	44.7	67.7	89.4	42.1	53.8	65.4
unemployment (inexp.)	37.9	71.9	104.5	34.4	52.1	70.0
unemployment (exp.)	68.	-4.3	**-15.0**	77	16.	-4.6
employment in type *a* jobs	50	379.0	742.6	-14.3	163.1	347.1
employment in type *b* jobs	-49.7	-446.7	-832.1	-27.8	-216.9	-412.6
vacancies for type ***a*** jobs	-4.1	-0.2	3.5	-4.9	-10.1	-2.8 -13.3 -0.7
vacancies for type *b* jobs	-9.8	-16.1	-22.3	-7.0		
wage in a type ***a*** job (x100)	09.	10.	11	07	07.	08.
wage in a type *b* job (x100)	25.	25.	25.	2.1	21.	21.
wage ratio w_b/w_g (x100)	-0.8	-0.6	-0.4	-0.6	-0.5	-0.5
"deskilling" flow	13	-0.9	-3.0	-0.8	02.	-0.5
promotion flow	-2.7	-4.4	-6.1	**-1.1**	-1.6	-2.1
vacancy chain (x 100)	-10.4	-19.3	-26.7	-3.1	-5.1	-6.9

Table 3 Effects of a decrease in bargaining parameter: β=0.45

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-40.3	-64.2	-94.4	-38.1	-48.8	-61.4
unemployment (inexp.)	-34.0	-69.1	**-113.8**	-31.1	-47.3	-66.5
unemployment (exp.)	-6.3	49.	19.4	-7.0	**-1.5**	51.
employment in type *a* jobs	**-11.8**	-473.7	-1064	**10.1**	**-188.6**	**-425.8**
employment in type ***b*** jobs	52.2	537.9	1159	28.0	237.4	487.2
vacancies for type *a* jobs	11.2	21.7	35.2	52	122	17.5
vacancies for type ***b*** jobs				78		
wage in a type *a* job (x100)	-0.9	**-14.**	-2.3	**-0.7**	**-0.8**	**-0.9**
wage in a type ***b*** job (x100)	-2.6	-2.6	-2.6	-2.2	**-2.1**	**-2.1**
wage ratio w_b/w_g (x100)	08.	02.	**-1.1**	06	05.	03.
"deskilling" flow	-1.3	10.	39.	**-0.7**	**-0.1**	05.
promotion flow	30.	59.	96.	1.2	19.	27.
vacancy chain (x100)	13.6	32.9	63.9	38	66.	10.2

Table 4 **Effects of a decrease in opening costs in segment A,** k,: -10 %

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-73.1	-73.1	-73.1	-72.3	-72.3	-72.3
unemployment (inexp.)	-73.1	-73.1	-73.0	-72.3	-72.3	-72.3
unemployment (exp.)	0.0	-0.0	-0.1	0.0	0.0	-0.0
employment in type *a* jobs	73.4	75.3	77.5	72.4	72.9	73.4
employment in type *b* jobs	-0.2	-2.2	-4.4	-0.1	-0.6	-1.1
vacancies for type a jobs	16.8	16.8	16.8	17.8	17.8	17.8
vacancies for type *b* jobs	-0.0	-0.1	-0.1	-0.0	-0.0	-0.0
wage in a type *a* job (x100)	16	16.	16.	1.3	1.3	1.3
wage in a type *b* job (x100)	0.0	00.	00.	0.0	0.0	
wage ratio w_b/w_g (x100)	2.2	22.	22.	1.7	1.7	1.7
"deskilling" flow	0.0	-0.0	-0.0	0.0	0.0	-0.0
promotion flow	-0.0	-00.	-00.	-0.0	-0.0	-0.0
vacancy chain (x 100)	-1.3	-1.3	-1.3	-0.4	-0.4	-0.4

Table 5 **Effects of a decrease in opening costs in segment B,** k_b: -10 %

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-20.1	-56.7	-104.8	-14.5	-29.1	-46.8
unemployment (inexp.)	-12.1	-63.2	-130.6	-6.3	-27.4	-52.9
unemployment (exp.)	-8.0	65.	25.8	-8.2	-1.7	61.
employment in type *a* jobs	-47.1	-651.1	-1455	-18.6	-253.1	-536.7
employment in type ***b*** jobs	67.3	707.8	-1559	33.0	282.2	583.4
vacancies for type ***a*** jobs	-0.7			-0.2	-3.2	-6.8
vacancies for type ***b*** jobs	14.6	29.0	-7.7 -17.1 48.2	9.3	14.7	21.1
wage in a type a job (x100)	-0.3	-0.8	-2.6	-0.1	-0.2	-0.4
wage in a type *b* job (x100)	1.9	19.	19.	1.5	16.	16.
wage ratio w_b/w_g (x 100)	- 1.9	-2.7	-5.0	-1.2	-14.	-1.6
"deskilling" flow	-1.6	13.	52.	-0.8	-0.2	06.
promotion flow	4.0	79.	13.1	1.5	23.	33.
vacancy chain (x 100)	18.5	46.9	99.9	4.7	82.	12.7

Table 6 Effects of a increase in matching-efficiency in segment A, λ_a: +25 %

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-64.9	-65.0	-64.9	-64.2	-64.2	-64.2
unemployment (inexp.)	-65.0	-64.9	-64.8	-64.2	-64.2	-64.2
unemployment (exp.)	0.0	-00.	-01.	0.0	00.	-0.0
employment in type *a* jobs	65.1	66.9	68.8	64.2	64.7	65.2
employment in type *b* jobs	-0.2	-1.9	-3,9	-0.1	-0.5	-1.0
vacancies for type *a* jobs	-7.4	-7.4	-7,3	-8.2	-8.2	-8.2
vacancies for type *b* jobs	-0.0	-0.1	-0.1	-0.0	-0.0	-0.0
wage in a type *a* job (x100)	14	14.	14.	12	12.	12.
wage in a type *b* job (x100)	0.0	00.	00.	0.0	00.	00.
wage ratio w_b/w_g (x100)	2.0	20.	20.	15	15.	15.
"deskilling" flow	0.0	-00.	-00	0.0	00.	-0.0
promotion flow	-0.0			-0.0	-0.0	-0.0
vacancy chain (x 100)	-1.1	-1.1	-1.2	-0.4	-0.4	-0.4

Table 7 Effects of a increase in matching-efficiency in segment B, λ_b: +25 %

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-29.8	-40.2	-52.2	-23.9	-28.1	-32.8
unemployment (inexp.)	-14.0	-27.9	-44.0	-6.7	-12.4	-18.8
unemployment (exp.)	-15.8	-12.3	-8.2	-17.2	-15.7	-13.9
employment in type ***a*** jobs	-3 1	-162.1	-347.9	**-0** 2	-62.2	-132.8
employment in type ***b*** jobs	32.9	202.2	400.1	24.1	90.3	165.6
vacancies for type ***a*** jobs	-0.9	-2.8	-5.0	-0.6	-14.	-2.3
vacancies for type ***b*** jobs	-5.8	-3.0	03.	-7.**0**	-6.0	-4.8
wage in a type ***a job*** (x100)	-0.0	-0.1	-0.3	**0.0**	-0.0	-0.0
wage in a type ***b*** job (x100)	34	34.	34.	3.2	32.	32.
wage ratio w_b/w_g (x100)	-2.7	-2.8	-3.0	-2.2	-2.2	-2.3
"deskilling" flow	-3.2	-2.5	-1.6	-1.7	-1.6	-14.
promotion flow	-1.6	-0.8	00.	-1.1	-0.9	-0.7
vacancy chain (x100)	-7.8	-3.6	15.	-3.8	-3.2	-2.4

Table 8 Effects of a decrease in deskilling rate, δ : -25%

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	19	-7.1	-17.6	53	09.	-4.1
unemployment (inexp.)	-10.9	-25.1	-41.6	-5.5	-12.6	-20.7
unemployment (exp.)	12.9	18.0	23.9	10.8	13.5	16.6
employment in type *a* jobs	-10.9	-175.9	-369.2	-5.1	-83.2	-172.5
employment in type ***b jobs***	***8.9***	183.0	386.8	-0.2	82.3	176.6
vacancies for type *a* jobs	-0.8	-2.8	-5.0	-0.5	-1.5	-2.7
vacancies for type ***b*** jobs	-2.7	04.	40.	36	-2.1	-0.5
wage in a type *a* job (x100)	-0.0	-0.1	-0.3	00	-0.0	-0.0
wage in a type ***b*** job (x100)	1.9	19.	19.	1.7	17.	17.
wage ratio w_b/w_g (x100)	-1.5	-1.7	-1.9	-1.2	-1.2	-1.3
"deskilling" flow	-2.3	-1.6	-0.7	-1.3	-1.1	-0.9
promotion flow	-0.7	01.	11.	-0.6	-0.3	-0.1
vacancy chain (x 100)	-3.5	12.	70.	-1.9	-10.	-0.0

Table 9 **Effects of an increase in productivity of segment A, y_A: +10 %**

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-12.1	-12.0	-11.9	-12.7	-12.7	-12.6
unemployment (inexp.)	-12.1	-12.0	-11.8	-12.7	-12.7	-12.6
unemployment (exp.)	0.0	-0.0	-0.1	0.0	0.0	-0.0
employment in type *a* jobs	12.4	15.0	17.9	12.8	13.6	14.5
employment in type *b* jobs	-0.3	-3.0	-6.0	-0.1	-0.9	-1.8
vacancies for type a jobs	23	23	23	25	25	2.5
vacancies for type ***b*** jobs	**-0.1**	-0.1	-0.2	-0.0	-0.0	-0.1
wage in a type a job (x100)	4.7	4.7	4.7	4.7	4.7	4.7
wage in a type ***b*** job (x100)	0.0	0.0	0.0	0.0	0.0	0.0
wage ratio w_b/w_g (x100)	6.5	6.5	6.5	6.0	6.0	6.0
"deskilling" flow	0.0	**-0.0**	**-0.0**	0.0	**0.0**	**-0.0**
promotion flow	-0.0	**-0.0**	**-0.0**	-0.0	**-0.0**	**-0.0**
vacancy chain (x 100)	-0.3	-0.4	-0.4	-0.1	-0.1	-0.1

Table 10 Effects of an increase in productivity of segment B, y_b: +10%

	baseline I, after			baseline II, after		
	1 yr	10 yrs	20 yrs	1 yr	10 yrs	20 yrs
Effects on						
unemployment	-14.2	-31.8	-53.0	-10.4	-17.7	-26.1
unemployment (inexp.)	-9.9	-35.0	-65.5	-5.9	-16.7	-29.2
unemployment (exp.)	-4.3	3.2	12.4	-4.4	-0.9	31.
employment in type a jobs	-20.5	-317.2	-678.9	-6.9	-126.2	-264.8
employment in type *b* jobs	34.7	349.0	731.9	17.3	143.9	290.9
vacancies for type *a* jobs	03	-3.1	-7.2	04	-1.1	-2.8
vacancies for type *b* jobs	73	13.8	21.7	47	73.	10.2.
wage in a type a job (x100)	-0.2	-0.4	-0.9	-0.1	-0.2	-0.2
wage in a type *b* job (x100)	8.3	8.3	8.3	87	87.	87.
wage ratio w_b/w_g (x100)	-6.3	-6.6	-7.1	-5.7	-5.8	-5.9
"deskilling" flow	-0.9	06.	25.	-0.4	-0.1	-0.3
promotion flow	20.	38.	59.	07	1.1.	16.
vacancy chain (x 100)	89	20.0	35.4	23	40.	59.

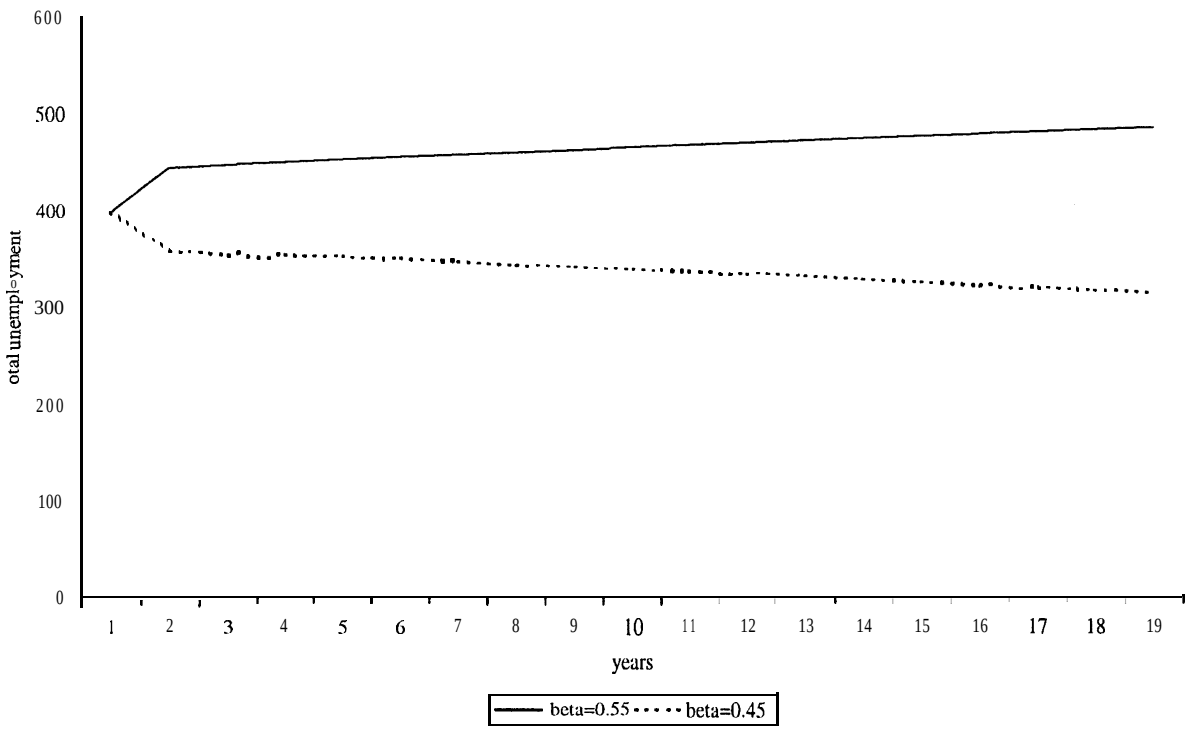

Figure 2. Effects of an increase or a decrease in bargaining parameter β on unemployment-trend.

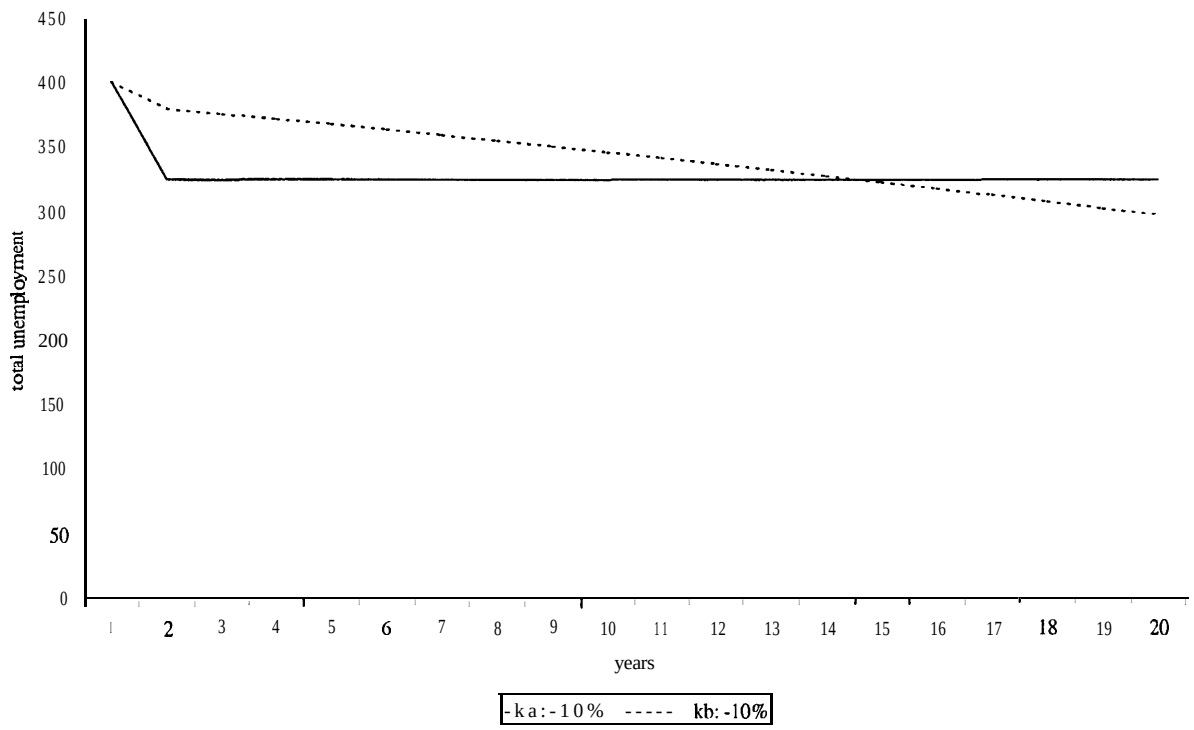

Figure 3. Effects of a decrease in opening costs k_a and k_b on unemployment-trend.

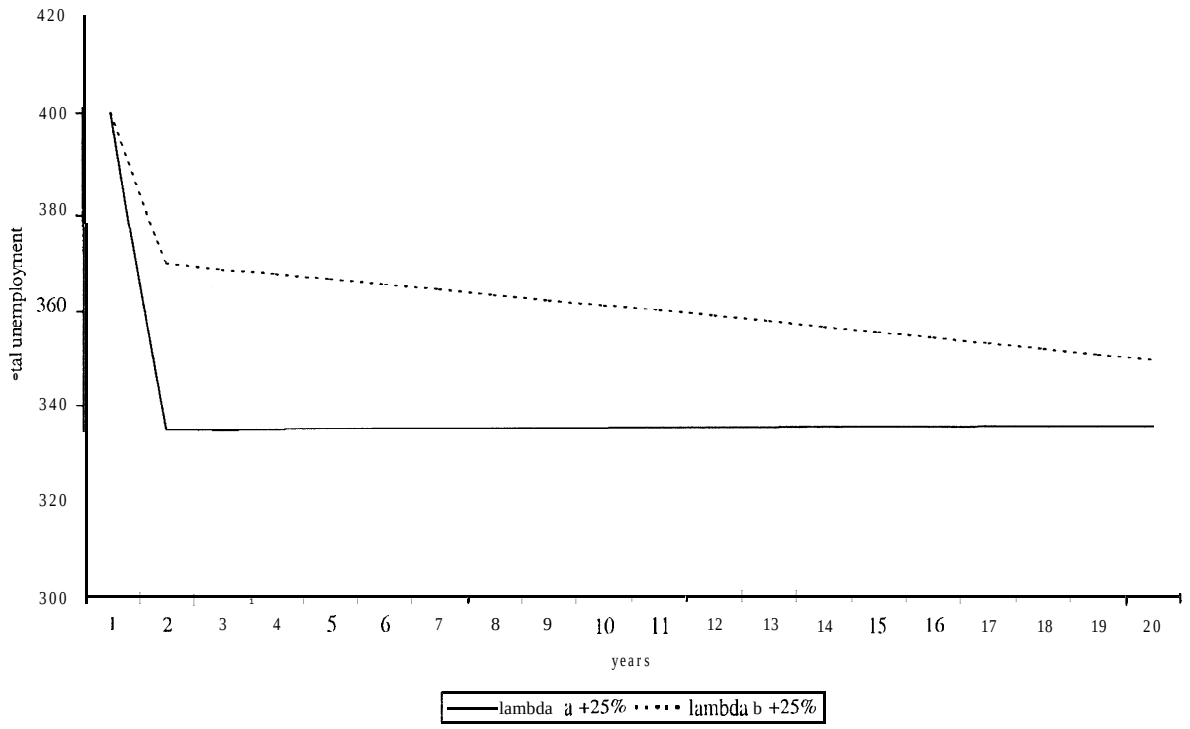

Figure 4. Effects of an increase in matching-efficiency λ_a or λ_b in segment A or B on unemployment-trend.

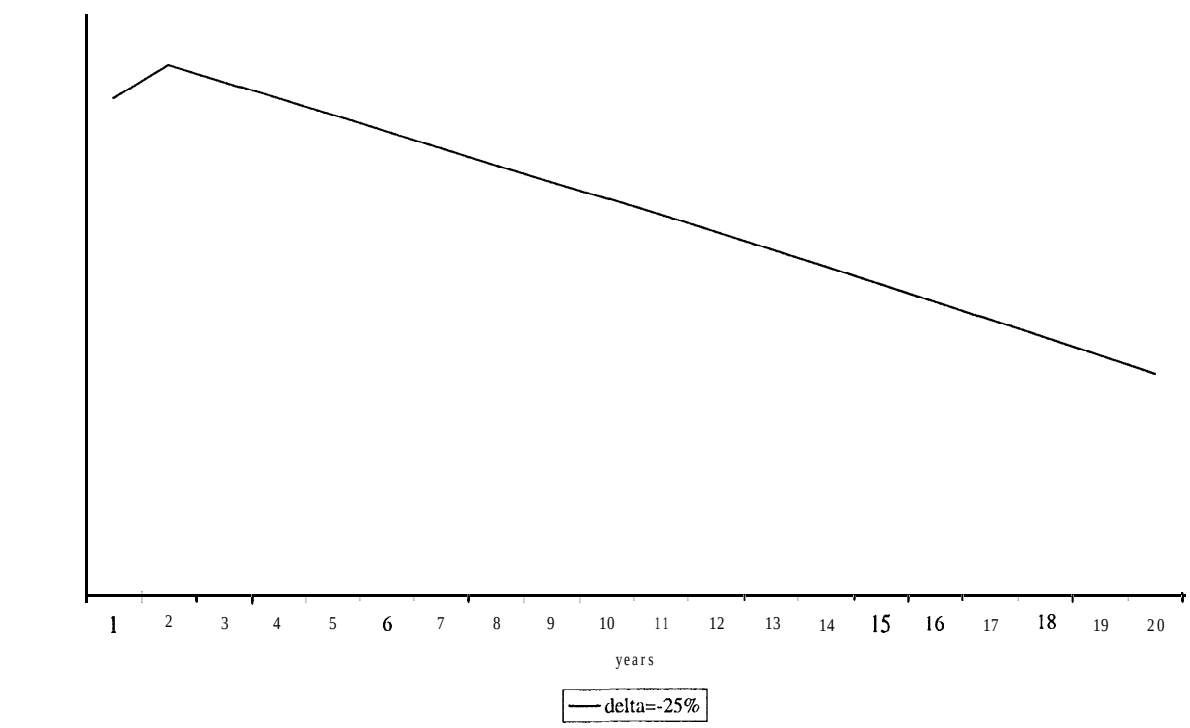

Figure 5. Effects of a decrease in deskilling rate δ on unemployment-trend.

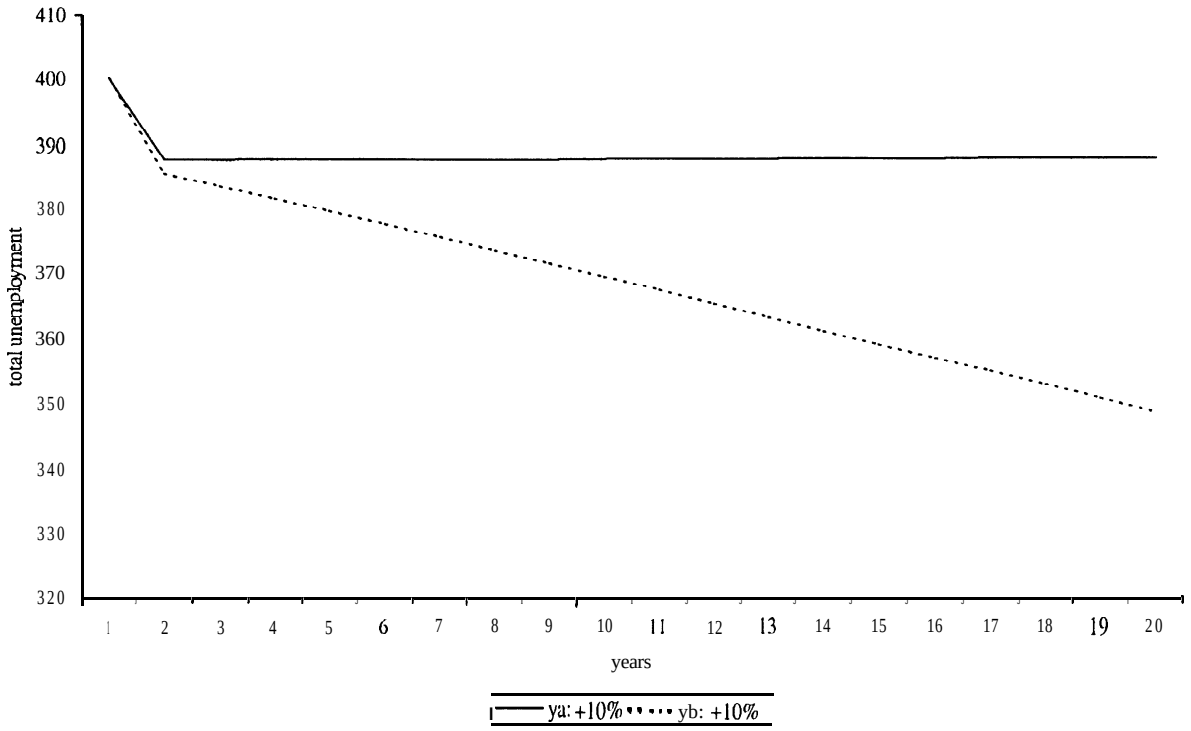

Figure 6. Effects of an increase in productivity y_a or y_b on unemployment-trend.