Selective Reductions in Labor Taxation
Labour Market Adjustments and Macroeconomic Performance*

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Abstract

We use a calibrated general equilibrium model with heterogeneous labor and search to evaluate the quantitative effects of various labor tax cut scenarios. The focus is on skill heterogeneity combined with downward wage rigidities at the low end of the skill ladder. Workers can take jobs for which they are overeducated. We compare targeted and non-targeted tax cuts, both with or without over-education effects. Introducing over-education changes substantially the employment, productivity and welfare effects of a tax cut, although tax cuts targeted on the least skilled workers always have larger effects.

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Keywords: Minimum Wage, Job Creation, Job Destruction, Job Competition, Search Unemployment, Taxation, Computable General Equilibrium Models

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1 Introduction

Many European countries, including the largest ones, are characterized by high labor taxes and high unemployment rates (Nickell (2004)). Although the causal relationship between labor taxes and unemployment remains a much debated issue, there are strong social and political pressures favorable to payroll tax cuts. The aim of this paper is to evaluate the quantitative effects of various labor tax cut scenarios on employment, productivity and welfare. To that end, we develop a calibrated general equilibrium model with heterogeneous labor and search.

The main implications of a labor tax cut in a standard aggregate model are well-known. With an inelastic labor supply curve (or wage-setting curve in an imperfect competition setup), tax cuts lead to higher net wages and have little impact on employment. By definition, such aggregate models fail to take into account the heterogeneity observed on actual labor markets. Accounting for this heterogeneity may be crucial, especially if payroll tax cuts are targeted on specific groups of workers. We focus in this paper on skill heterogeneity. This choice is motivated by the fact that the unemployment rise has been especially strong for low-skill workers. Several mechanisms may have contributed to this outcome. One possible mechanism is the rigidity of relative wages resulting, for instance, from minimum wage regulations in the face of asymmetric productivity shocks (see Greenaway and Winchester (2007)) who emphasize the role of embodied technological change and capital-skill complementarities). Tax cuts targeted on low-skill workers may in this context be seen as a means to decrease their relative wage cost and stimulate low-skill employment without changing relative net wages. An alternative mechanism has also attracted attention. Low-skill unemployment can be the result of job competition between high-and low-skill workers in a depressed labor market. If high-skill job seekers react to a demand slack by searching on both the high- and the low-skill segments of the labor market and by accepting jobs for which they are over-qualified, they will "crowd out" some low-skill workers. If wages are downwards rigid at the bottom of the skill ladder, this crowding-out effect will lead to more low-skill unemployment. Dolado et al. (2000) examine Spanish labor market and find symptoms of over-education. Similar conclusions are drawn for instance by Mavromaras et al. (2007) for Britain and Australia.

To examine the implications of payroll tax cuts in such contexts, we set up a general equilibrium model including the government budget constraint and a representation of the labor market à la Mortensen and Pissarides (1994), with job competition effects as in Albrecht and Vroman (2002) and Blazquez and Jansen (2008), and on-the-job search as in Dolado et al. (2002) and Gautier (2002). We distinguish three types of jobs and three types of workers. We first neglect job competition effects and evaluate the implications of targeted and non-targeted tax cuts. We next re-examine the same tax cut scenarios when there is job competition and overeducated workers hold low-skill jobs. The model is calibrated on Belgian data, but the comparisons across scenarios are valid for other countries sharing similar features in terms of low-skill unemployment and downward wage rigidities at the low end of the skill ladder. Our paper is closest to Pierrard (2005). This paper distinguishes only two types of jobs and workers but has an endogenous job destruction rate. It suggests, by comparison with previous general equilibrium models, that the effects of a tax cut targeted on minimum wages can be very large and come through the job destruction rather than the job creation channel[1]. This result is in line with the empirical results obtained for instance by Laroque and Salanié (2000), Crépon and Desplatz (2001, 2002) and Kramarz and Philippon (2001) on French data. The relative importance of the job destruction channel (as opposed to the job creation channel) may however be overemphasized in the Pierrard (2005) setup as, by construction, the direct impact of minimum wage changes is on the job destruction rate. In our paper, we reintroduce a direct link between job creation and minimum wages by distinguishing three categories of jobs and workers. The third and lowest-skill group is defined as workers on low-skill jobs, paid the minimum wage. With three skill categories, we can also refine the analysis of job competition effects. For computational reasons, we compensate these additional complexities by assuming an exogenous job destruction rate. We know of course from Pierrard (2005) to what extent the endogenizing of the destruction rate would reinforce our results. Agénor et al. (2007) also investigate the effects of payroll tax cuts targeted on low-skill workers, in the context of developing countries with internal and external migrations.

Our main policy conclusions can be summarized as follows. Absent job competition effects, narrow targeting at minimum wages is crucial for the success of a tax cut policy: employment effects are large enough to render the measure self-financing and beneficial for all categories of workers. This confirms Pierrard's results, despite the fact that we neglect the job destruction channel. Introducing job competition does not reverse the main conclusion: tax cuts targeted on minimum wage jobs have sizeable effects on low-skill unemployment. The cost per job created is however severely increased, which sharply reduces the welfare gains for workers with higher skill levels. This suggest that, in the face of job competition and in order to reverse the ladder effect to some extent, one should prefer a scheme combining large tax rebates for low-skill jobs, substantially smaller rebates for medium-skill jobs and no tax rebate at all for high-skill jobs.

2 The Model

We consider four categories of agents: (i) final good firms, (ii) intermediate good firms, (iii) workers and (iv) the government (including social security). We further distinguish three types of intermediate firms, indexed $j \in \{1,2,3\}$ according to the degree of sophistication of the technology in use and complexity of the tasks to be fulfilled by the workers. Similarly we distinguish three categories of workers, indexed by their skill level $i \in \{1,2,3\}$. The more sophisticated the technology, the higher the required skill level. Over-education and job competition/de-skilling effects are introduced by allowing workers to take jobs for which they are one skill level overqualified. We assume that the three skill categories constitute constant fractions α_i of the total (constant) population.

[1] Mortensen and Pissarides (1998) also emphasize the role of the job destruction channel, in a setup with linear production functions (rather than Cobb-Douglas), no minimum wage regulation and no job competition effects.

2.1 Labor market flows

Workers of a given skill category *i* can be either unemployed or employed. If employed, they can have a job corresponding to their skill level (a "normal" job) or one for which they are overeducated (a "de-skilling" job):

$$U_{i,t} + N_{i,t} + \tilde{N}_{i,t} = \alpha_i, \tag{1}$$

where the tilde indicates a deskilling job. All variables are normalized so that $\sum i\ \alpha i = 1$. Unemployed workers allocate all their available time to search, either on their own job market (a fraction $e_{i,t}$ of their time) or (when relevant) on the job market for which they are overeducated (a fraction $\tilde{e}_{i,t} = 1 - e_{i,t}$ of their time). Search intensities are increasing and concave functions of the fraction of time devoted to search: $s_{i,t} = s_i(e_{i,t})$ and $\tilde{s}_{i,t} = \tilde{s}_i(\tilde{e}_{i,t})$ respectively. Workers on de-skilling jobs can continue to search for jobs corresponding to their skill level. Their on-the-job search efficiency is an increasing and concave function of the fraction of their spare time devoted to search: $s_{oi}(e_{oi,t})$. We keep in mind that workers at the bottom of the skill ladder (*i*=1) cannot be in a situation of de-skilling ($e_{1,t}$=1, $e_{o1,t}$=0 and $\tilde{N}_{1,t}$=0). Similarly, in the most skill-demanding segment (*j*=3), there are no overeducated workers.

Let $M_{j,t}$ denote new matches in sector *j*. We assume a constant-returns-to-scale matching function $M_{j,t} = m_j\, M(V_{j,t}, \boldsymbol{\Omega}_{j,t})$, where m_j is an efficiency parameter, V_j is the number of vacancies and $\boldsymbol{\Omega}_j$ is the number of job seekers weighted by their respective search efficiencies. On a given job market *j* there can be at most three types of job seekers: workers with the adequate skill level *j*, either unemployed ($U_{j,t}$) or employed on a de-skilling job ($\tilde{N}_{j,t}$), plus unemployed workers with excessive skill level ($U_{j+1,t}$). Adjusting for search efficiencies, we obtain:

$$\boldsymbol{\Omega}_{j,t} = s_{j,t}\, U_{j,t} + s_{oj,t}\, \tilde{N}_{j,t} + \tilde{s}_{j+1,t}\, U_{j+1,t}\ , \qquad j \in \{1,2,3\} \tag{2}$$

Defining the local market tightness as $\theta_j = V_j/\boldsymbol{\Omega}_j$, the probability for any eligible candidate to find a job in market *j* becomes $p_{j,t} = m_j\ \varphi(\theta_{j,t})$, where φ is increasing in tightness. The probability to fill a vacancy in a given sector becomes $q_{j,t} = m_j\ \psi(\theta_{j,t})$, where ψ is decreasing in tightness. Let $\omega_{j,t}$ denote the fraction (in efficiency units) of job seekers with the right skill level *i=j*. The probability to hire a worker with adequate (resp. excessive) skill level is $\omega_{j,t}\, q_{j,t}$ (reps. $(1 - \omega_{j,t})\, q_{j,t}$). In the top segment, all applicants have the right qualification level.

Assume that a fraction χ_j of existing jobs is destroyed each period. The number of workers employed on a job corresponding to their skill level evolves according to:

$$N_{j,t+1} = (1-\chi_j)\, N_{j,t} + \omega_{j,t}\, q_{j,t}\, V_{j,t}, \tag{3.a}$$

$$= (1-\chi_j)\, N_{j,t} + \omega_{j,t}\, p_{j,t}\, \boldsymbol{\Omega}_{j,t}\ , \quad \text{for } j \in \{1,2,3\}, \tag{3.b}$$

while the number of overeducated workers (those with an extra degree of skill, *i*=*j*+1) evolves according to:

$$\tilde{N}_{j+1,t+1} = (1-\chi_j)\, \tilde{N}_{j+1,t} + (1-\omega_{j,t})\, q_{j,t}\, V_{j,t}\ , \tag{4.a}$$

$$= (1-\chi_j)\, \tilde{N}_{j+1,t} + (1-\omega_{j,t})\, p_{j,t}\, \boldsymbol{\Omega}_{j,t}\ , \qquad \text{for } j \in \{1,2,3\}. \tag{4.b}$$

Total employment in sector *j* is equal to the sum ($N_{j,t} + \tilde{N}_{j+1,t}$). In the specific case with perfect segmentation (no job competition/de-skilling effects, no on-the-job search), all workers would remain on their own market ($e_{i,t}$=1 for all *i*'s). Firms would always hire workers with the most adequate skill level (ω_j = 1 for all *j*'s).

2.2 Intermediate firms

An intermediate firm in sector *j* is a one-worker entity with labor productivity y_j, whether the worker is overeducated or not. Because of frictions and job competition, a vacancy may be filled by a worker with the demanded skill level or by an overeducated worker. In the former case, the value of a job is given by :

$$J_{j,t} = \rho_{j,t}\, y_j - (1 + \tau)\, w_{j,t} + (1 - \chi_k)\, E_t [\, J_{j,t+1} /(1 + r_{t+1})\,], \qquad (5)$$

where $\rho_{j,t}$ is the competitive output price, τ is the payroll tax, $w_{j,t}$ is the gross wage and r_t is the rate of interest. Similarly with an overeducated worker, we have:

$$\tilde{J}_{j,t} = \rho_{j,t}\, y_j - (1 + \tau)\, \tilde{w}_{j,t} + (1 - \chi_k - s_{oi,t}\, p_{j,t})\, E_t [\tilde{J}_{j,t+1} / (1 + r_{t+1})\,], \qquad (6)$$

where $\tilde{w}_{j,t}$ is the gross wage paid to an overeducated worker (ie, with skill level *i*=*j*+1). The two wage rates can differ (see below, section on wage bargaining). Both equations (5) and (6) take implicitly into account the free entry condition, which makes the value of a vacant job equal to zero. The value of a vacancy is defined as follows:

$$\Lambda_{j,t} = - a_j + E_t\, \{[\omega_{j,t}\, q_{j,t}\, J_{j,t+1} + (1-\omega_{j,t})\, q_{j,t}\, \tilde{J}_{j,t+1} + (1-q_{j,t})\, \Lambda_{j,t+1}]/ (1 + r_{t+1})\}, \quad j \in \{1,2,3\} \qquad (7)$$

where a_j is a per-period recruitment cost, $q_{j,t}$ the probability to meet a worker, and $\omega_{j,t}$ the probability that the latter has the demanded skill level. With no job competition, $\omega_{j,t}$ is equal to one, which makes (6) irrelevant and considerably simplifies (7). Firms post vacancies until all profit opportunities are exploited, i.e. the value of a vacancy is zero:

$$\Lambda_{j,t} = 0\, , \qquad j \in \{1,2,3\}\, . \qquad (8)$$

2.3 Representative final good firm

The final goods market is perfectly competitive. The production function is represented by $Y_t = F(K_t\, , Q_t)$ where K_t stands for capital and $Q_t = (Q_{1,t}, Q_{2t}, Q_{3,t})$ is the vector of intermediate inputs. The production function satisfies the usual concavity assumptions: F'> 0 and F"< 0. The representative final goods firm chooses the optimal levels of capital K_t and intermediate inputs $Q_{j,t}$ so as to maximize the value of the firm. With the final good as numeraire, the optimization program can be written as follows:

$$\max_{K_t,\, Q_{j,t}} \quad \Pi_t = F(K_t, Q_t) - \textstyle\sum_j \rho_{j,t}\, Q_{j,t} - (r_t + \delta)\, K_t + E_t\, [\Pi_{t+1} / (1 + r_{t+1})], \qquad (9)$$

where δ is the depreciation rate of capital and $Q_{j,t}$ the quantity of intermediate goods *j*. Equilibrium on the intermediate goods market further imposes:

$$Q_{j,t} = y_j\, (N_{j,t} + \tilde{N}_{j+1,t}) \qquad (10)$$

2.4 Households

We distinguish three categories of households, corresponding each to a given skill group. The low-skill household (*i*=1) has only access to the low-skill segment of the labor market. We further assume that it has no access to capital markets, so that its consumption is always equal to its disposable income[2]. The skilled and high-skilled households (*i*=2, 3) have access to capital markets and own the firms; they also have

[2] This assumption seems reasonable enough, if one keeps in mind that it corresponds to workers paid at the minimum wage.

access to two types of jobs, those corresponding to their own skill level ("normal" jobs) and those for which they are overeducated ("de-skilling" jobs). They choose in every period the amount of investment ($I_{i,t}$) and search effort ($e_{i,t}$ and $e_{oi,t}$) that maximize their intertemporal welfare, measured by:

$$W_{i,t} = \Gamma(C_{i,t}) - D(N_{i,t}, \tilde{N}_{i,t}) + \beta\, E_t\, [W_{i,t+1}], \qquad i \in \{2, 3\} \qquad (11)$$

where β is a subjective discount factor, $\Gamma(.)$ is instantaneous consumption utility, $D(.)$ is the disutility associated to the two types of jobs. The flow budget constraint is:

$$C_{i,t} = (1-\tau_i)\, w_{i,t}\, N_{i,t} + (1-\tau_{i-1})\, \tilde{w}_{i-1,t}\, \tilde{N}_{i,t} + b_{i,t}\, U_{i,t} + (r_t + \delta)\, K_{i,t} + \pi_{i,t} - I_{i,t} - T_{i,t} \qquad (12)$$

where τ_i and τ_{i-1} are the rates of personal taxation on wage incomes for both types of jobs, $b_{i,t}$ is the unemployment benefit, $T_{i,t}$ is a lump sum government tax. The household receives a share π_i of intermediate firms' profits. Investment $I_{i,t}$ determines the future value of the capital stock:

$$I_{i,t} = K_{i,t+1} - (1 - \delta)K_{i,t}\ . \qquad (13)$$

The aggregate capital stock is given by

$$K_t = \textstyle\sum_i K_{i,t}\, . \qquad (14)$$

The household's optimization program amounts to maximizing (11) in $C_{i,t}$, $e_{i,t}$, $e_{oi,t}$, subject to the budget constraint (12), the accumulation equation (13) and the labor flow equations (2), (3.b) and (4.b).

2.5 Wage formation

We assume continuous Nash bargaining[3] in the two sectors with higher skill levels (*j*=2,3). The wage paid on a "normal" job in sector *j* is obtained from:

$$w_{j,t} = \text{argmax}_{\,w_{j,t}}\ \{W_{N_{j,t}} / \Gamma_{C_{j,t}}\}^{\eta}\ \{J_{j,t}\}^{(1-\eta)}\ . \qquad (15.a)$$

where η is the bargaining power of a worker and $W_{N_{j,t}} \equiv \partial W_{j,t}/\partial N_{j,t}$ is the utility value of an additional "normal" job for a household of skill level *i*=*j*. The wage paid to an overeducated worker (with skill level *i*=*j*+1) is obtained in a similar way:

$$\tilde{w}_{j,t} = \text{argmax}_{\,\tilde{w}_{j,t}}\ \{W_{\tilde{N}_{j+1,t}} / \Gamma_{C_{j+1,t}}\}^{\eta}\ \{J_{j,t}\}^{(1-\eta)}\ . \qquad (15.b)$$

The two wages can differ because the value of the job can be different both for the worker (due to different marginal utilities, for instance) and for the firm (due to different expected job durations). We assume that in the lowest skill segment of the labor market (*j*=1), low-skill workers are paid the minimum wage. In the recent decades, the ratio of the lowest to the highest wages has remained stable in Europe (OECD (1996)). We therefore assume that minimum wages are indexed on wages in the high-tech sector (*j*=3).

2.6 Government

In each period, government spending equals the revenues from labor and taxes:

$$G_t + \textstyle\sum_i b_{i,t}\, U_{i,t} = \sum_i\ (\tau + \tau_i)\, w_{i,t}\, N_{i,t} + \sum_{i=2,3} (\tau + \tau_i)\, \tilde{w}_{i-1,t}\, \tilde{N}_{i,t} + \sum_i T_{i,t}, \qquad (16)$$

[3] Assuming continuous job bargaining without any possibility of commitment to future wages, our on-the-job search model does not generate the non-convexity problem discussed in Shimer (2006), where the wage remains fixed until separation.

where G_t stands for public consumption. The unemployment benefit $b_{i,t}$ is proportional to the average gross wage in skill group *i*.

2.7 General equilibrium

A dynamic general equilibrium is a sequence of prices $\{r_t, \rho_{jt}, w_{jt}, \tilde{w}_{jt}\}_{t=0 \to \infty}$ and quantities $\{Y_t, K_t, Q_{jt}, N_{it}, \tilde{N}_{it}\}_{t=0 \to \infty}$ such that each category of agents carries out its optimization program (respectively (8), (9), (11) and (15)), and market clearing conditions and budget constraints are satisfied (respectively (10), (14) and (16))).

3 Quantitative Evaluations of Selective Reductions in Labor Taxes

We use our model to obtain quantitative evaluations of different tax cut policies. We first calibrate the model and next use numerical simulations to evaluate the long run effects of four specific scenarios, both with and without job competition effects.

3.1 Calibration

We follow most of the literature by assuming a Cobb-Douglas production and matching functions. Instantaneous utilities are logarithmic in consumption and linear in employment levels. Search efficiencies are the linear functions of the square root of time devoted to search. We calibrate the model on the Belgian economy. Our calibration is consistent with the RBC literature and with earlier studies for France, as well as Belgium. The calibrated parameters fall into three categories: (i) standard values found in all models of this type; (ii) parameters specific to this particular model for which we have empirical information; (iii) parameters specific to this model for which we do not have direct information; their values are fixed so that the model reproduces the state of the economy similar to that of the mid-nineties with respect to a number of endogenous variables such as unemployment rate, probability to find a job, probability to fill a vacancy, wage ratios and alike.

The low-skill group (*i*=1; primary school education) represents about 15% of the active population; the high-skill group (*i*=3; educational level: upper-secondary or more) about 65%. The reference unemployment rates for these two groups are 27% and 8% respectively. The models with and without job competition are calibrated so as to have the same baseline steady state, in order to assess reliably the effects induced by job competition and the so-called ladder effects. Next, we must specify the relationship between search time and efficiency. We represent search efficiency as a concave function of search time. The parameters are chosen to reproduce the percentage of overqualified workers close to that suggested by empirical studies (in the region of 10%; see for instance Hartog (2000)), and a realistic fraction of time spent on search (around 80% on the optimal segment for unemployed workers; around 10% of available time for on-the-job search). For details of calibration, see Batyra and Sneessens (2007).

3.2 Comparing different tax cut scenarios

The first scenario is a reduction in employer payroll taxes targeted at the minimum wage in sector *j*=1. The tax cut is financed by a lump sum tax on high-skilled workers (*i*=3) in such a manner that the government budget remains balanced. For comparison with other studies, the magnitude of the tax cut is such that the *ex ante* cost of the subsidy represents 1% of GDP. The other three scenarios are defined in a similar way, but the tax cut is targeted at different sectors. We discuss successively the models with perfect (no job competition/deskilling effects) and imperfect segmentation.

Without job competition/de-skilling effects

The long run effects are summarized in Table 1. With a tax cut targeted at minimum wages (scenario (a)), the total employment rise amounts to about 2% of the active population. This increase is strong enough to render the measure self-financing (less unemployment benefits, higher tax revenues). The employment effect is more than halved when sectors 1 and 2 are targeted simultaneously (scenario (b)); the cost per job created becomes (moderately) positive. This scenario is closest to the one examined in earlier studies[4]. Those studies obtain a larger increase in employment (about 1.13%, compared to 0.79% in our model), because they impose a stronger real wage rigidity: sectors 1 and 2 being pooled together, both wages $w_{1,t}$ and $w_{2,t}$ are assumed to be rigid and indexed on high-skill wages. These differences also imply a substantially larger cost per job created.

Table 1: Effects of payroll tax cut (1% GDP) without job competition effects

		The four scenarios			
		(a)	(b)	(c)	(d)
	Sector(s)	*j*=1	*j*=1 & 2	*j*=2	*j*=3
Tax cut (%)		26.7	8.5	12.5	2.7
Ex ante wage cost (% change)	*j*=1	-20.0	-6.0		
	j=2		-6.0	-9.0	
	j=3				-2.0
Ex post wage cost (% change)	*j*=1	**-18.8**	**-5.8**	0.2	1.8
	j=2	1.3	**-0.3**	**-1.2**	0.0
	j=3	1.3	0.6	1.2	**-0.2**
Employment change (in % of active population in relevant group)	*j*=1	**13.89**	**4.39**	0.00	-1.24
	j=2	0.04	**0.65**	**0.95**	0.01
	j=3	0.03	0.01	0.01	**0.10**
	Total	**2.06**	**0.79**	**0.21**	**-0.12**
Cost per job created ('000 euro per year)		-1.86	14.9	112	-
Production (% change)		1.36	0.58	0.17	-0.06
Productivity (% change)		-1.03	-0.33	-0.06	0.08
Welfare (% change)	*i*=1	**0.77**	0.29	0.05	0.52
	i=2	0.70	**0.46**	**0.30**	-0.11
	i=3	1.37	0.63	0.08	**-0.23**

[4] See for instance Pierrard and Sneessens (2008).

Policies targeted at relatively high wages (either sector j=2 or 3; scenario (c) and (d) respectively) have an employment effect that is weakly positive or even negative. This is because gross wages rise and absorb most of the benefits of the tax cut. The minimum wage, being indexed on high wages, rises as well so that the number of low-skill jobs decreases. In scenario (d), the tax cut reduces output. This is the consequence of strong congestion effects on the labor market, leading to substantially higher recruiting expenses. In all scenarios except the last one, welfare increases for all groups.

To summarize, we find, mutatis mutandis, the same result as in a general equilibrium model with endogenous job destruction and minimum wages[5]: narrow policy targeting at bottom wages (the 10% of workers paid the minimum wage) stimulates employment and the tax cut is self-financing. Still, without the job-destruction channel, the employment effect is three times weaker.

With job competition/de-skilling effects

Simulation details for a scenario with job competition and on-the-job search are displayed in Table 2. As in the case without job competition, targeting the tax cut on bottom wages increases employment by about 2%. This similarity in numbers is however misleading: because of de-skilling effects, a non-negligible fraction of the newly created jobs is taken up by overeducated workers (see column (a)), so that the impact on low-skill unemployment is reduced.

The policy is no longer self-financing. Although its cost remains low (about 2 000 euro per year per job created; less than 0.2% of GDP), the welfare of type 2 and 3 workers is reduced. Introducing the job destruction channel would of course improve the beneficial employment effects, possibly rendering the measure self-financing. As earlier, a broader targeting (scenario (b)) considerably reduces the number of jobs created. Still, the cost per job created remains reasonable. A reduction targeted at the high skill level (scenario (d)) reduces job competition and de-skilling effects, so that total employment (slightly) increases, but the cost per new job is exorbitant. All workers endure welfare losses!

The comparison between Tables 1 and 2 suggest that, in the face of job competition, a scenario combining substantial tax rebates for minimum wage workers with much smaller but positive rebates for intermediate wages (and zero rebates for high wages) would avoid part of the induced de-skilling effects and reduce inefficiencies.

[5] See Pierrard (2005) for Belgium.

Table 2: Effects of payroll tax cut (1% GDP) with job competition effects

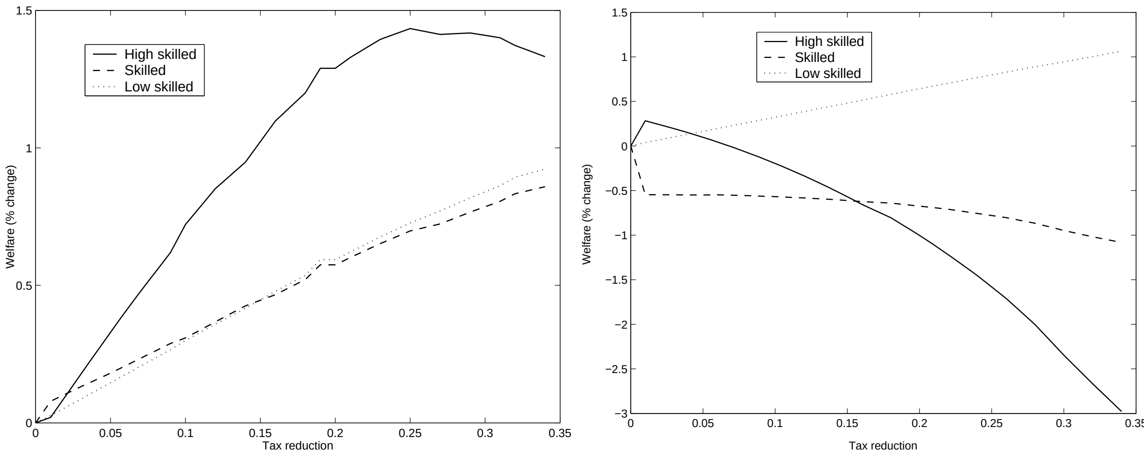
			The four scenarios			
			(a)	(b)	(c)	(d)
	Sector(s)		*j*=1	*j*=1 & 2	*j*=2	*j*=3
Tax cut (%)			26.7	8.5	12.5	2.7
Ex ante wage cost (% change)	*j*=1		-20.0	-6.0		
	j=2			-6.0	-9.0	
	j=3					-2.0
Ex post wage cost (% change)	*j*=1	*1*	**-19.0**	**-5.3**	1.1	1.6
		2	-19.0	**-5.4**	1.1	1.6
	j=2	*2*	2.8	-3.2	**-4**	1.2
		3	2.6	-3.5	-6.2	**-1.5**
	j=3	*3*	1.2	1.1	1.1	-0.4
Employment change (in % of active population in relevant group)	*j*=1	*1*	**10.87**	**5.57**	3.17	-0.31
		2	**3.91**	**-0.97**	-2.81	-0.51
	j=2	*2*	-2.42	**1.42**	**2.93**	0.63
		3	0.29	**0.59**	**0.80**	-0.49
	j=3	*3*	-0.16	-0.42	-0.59	**0.55**
	Total		**1.99**	**1.02**	**0.62**	**0.01**
Cost per job created ('000 euro per year)			2.0	9.3	25.1	1 377.6
Overqualified workers (% change)	*j*=1		4.0	-2.1	-4.9	-0.8
	j=2		1.3	1.7	2.1	-1.7
	Total		**2.5**	**0.2**	**-0.6**	**-1.3**
Production (% change)			0.99	0.64	0.4	0.21
Productivity (% change)			-1.31	-0.74	-0.32	0.19
Welfare (% change)	*i*=1		**0.84**	0.59	-0.47	-0.45
	i=2		-0.72	**-0.71**	**-0.93**	-0.94
	i=3		-1.65	-1.63	-2.02	**-2.17**

3.3 Comparing different sizes of tax cuts targeted at minimum wages

The previous tables make clear that tax cuts targeted on minimum wages are the most effective ones. So far we discussed the effects of tax cuts costing ex ante 1% of GDP. We now examine the effects of changes in the size of tax cuts targeted on minimum wages. The focus is on the effects on the welfare of each category of workers.

Without job competition, the policy is (almost) always self-financing; all workers enjoy larger welfare (see left panel of Figure 1). With job competition and de-skilling effects (right panel of the figure), tax cuts below 12% remain self-financing. These financial gains generate positive lump sum transfers to high-skill (i=3) workers and are initially large enough to make them better off. This is not true for the intermediate skill group (i=2), which by assumption does not benefit from these transfers and suffers directly from the negative externalities associated with job competition behaviors induced by blind individual utility maximization. For tax cuts above 7%, both categories 2 and 3 face progressively larger and larger welfare losses. Our results emphasize that, although tax cuts targeted at the minimum wage level may be effective in creating jobs at reasonable total cost, they also generate substantial redistribution effects which, in the case of job competition, may harm a vast majority of workers.

Figure 1: Welfare changes (%) for each category of workers as a function of the size of the tax cut targeted at the minimum wage, with (right) and without (left) job competition.



4 Conclusions and policy implications

To assess the effects of structural payroll tax cuts targeted on specific skill groups, we use a stylized inter-temporal general equilibrium with search and matching on the labor markets. This model is able to shed light on the results obtained in previous quantitative analyses. Compared to earlier studies, we use a model with a finer definition of skill groups. We find that targeting payroll tax cuts at minimum wages is crucial. In such a scenario, there is substantial job creation affecting the low-skill workers because their wages are very sensitive to tax cuts and recruitment costs are low. Furthermore, through capital accumulation and the labor productivity channel, there are positive job creation spill-overs across skill groups. Absent job competition and de-skilling effects, tax cuts targeted at the minimum wage would be largely self-financing and benefit all categories of workers. We show however that introducing job competition and de-skilling (or "ladder") modifies substantially the results. Although job creation remains large and the total cost of extra jobs remains quite reasonable in % of GDP, the negative externalities associated with job competition may quickly become large (even with realistic values of the percentage of overqualified workers) and translate into negative welfare effects for the majority of workers. This result points out to the potential importance of political economy aspects and the need to design tax cut scenarios apt to limit job competition (by combining for instance substantial tax rebates for minimum wage workers with much smaller but positive rebates for intermediate wages, and zero rebates for high wages).

In the context of the current global downturn, both European and USA economies have faced a sharp rise in unemployment rates (IMF (2009)), from 5.6% in 2007 to 9% in 2009, and going up. Our analysis has focused on structural unemployment and relative wage rigidities, as opposed to cyclical unemployment fluctuations. However, our work can shed light on some key issues related to cyclical phenomena and ensuing job competition whose negative effect shows in our quantitative study. By definition, a cyclical downturn is global and hits all sectors and skills levels simultaneously, even though job separations may be larger for low-skilled workers (e.g. because the cost of both separation and later re-hiring may be substantially lower for the low-skilled as they benefit from lower firing compensations and can be more easily substituted for one another). Furthermore, ceteris paribus, a global downturn exacerbates job competition and de-skilling effects, since skilled workers who lost their jobs have an incentive to also search for jobs below (but not too far) from their skill level, which further increases the unemployment rate of the low-skilled. Employment Outlook (OECD 2009) reports that the low-skilled were indeed particularly hit during this crisis, the sensitivity of low skilled employment to negative shocks being much higher than that of high skilled employment, and that a degree of crowding-out between skill groups has taken place and is expected to intensify when the number of unemployed increases.

Reacting to a purely cyclical phenomenon by payroll tax cuts targeted on the low-skilled may be in this context an inappropriate policy reaction, as it would further exacerbate such job competition. On the other hand, measures aiming at reducing "cyclical" job destruction should be welcome. This could be done, for instance, via temporary subsidies meant to sustain contractual relationships. Such measures have been used in several countries (e.g. short-time subsidies introduced in Ireland, Mexico, New Zealand, and extended in France, Germany, Belgium, Korea; or reductions in non-wage labor costs for all workers in Germany, Japan and Mexico). Moreover, maintaining and expanding eligibility for unemployment benefits for longer unemployment spells (as done in numerous countries) may help reduce wasteful job competition and de-skilling effects, by giving the unemployed a possibility to continue searching on their "home" market rather than taking de-skilling jobs because of financial constraints.

Our analysis also stresses the political economy aspects of selective tax cuts. Because of their redistributive implications, especially in the face of job competition, selective tax cuts may be hard to implement in normal times. The current unemployment hike may be the ideal time to do so.[6] Such a policy may also help avoid that a part of the current unemployment hike becomes structural via a negative effect of skill loss or stigma on the long-term unemployed.

[6] Edlin and Phelps (2009) implicitly rely on this argument when pleading for low-wage employer tax credits to stimulate the US economy: “the best kind of stimulus spending is spending that should have been done even if the economy were not in such peril.”

References

Agénor, P., Nabli, M., Yousef, T., and Jensen, H. (2007). Labor market reforms, growth and unemployment in labor-exporting countries in the Middle East and North Africa. *Journal of Policy Modeling*, 29:277–309.

Albrecht, J. and Vroman, S. (2002). A matching model with endogenous skill requirements. *International Economic Review*, 43:283–305.

Batyra, A. and Sneessens, R. (2007). Selective reductions in labor taxation: Labor market adjustments and macroeconomic performance, UCL, IRES DP 2007-1.

Blazquez, M. and Jansen, M. (2008). Search, mismatch and unemployment. *European Economic Review*, 53(3):498–526.

Crépon, B. and Desplatz, R. (2001). Une nouvelle évaluation des effets des allégements de charges sociales sur les bas salaires. *Economie et Statistique*, 348:1–24.

Crépon, B. and Desplatz, R. (2002). Réduction des charges et emploi: Evaluer la critique. *Revue de l'OFCE*, 82:231–245.

Dolado, J., Felgueroso, F., and Jimeno, J. (2000). Youth labor markets in Spain: Education, training and crowding-out. *European Economic Review*, 44:943–56.

Dolado, J., Jansen, M., and Jimeno, J. (2002). On the job search in a matching model with heterogeneous jobs and workers. Working Paper 886, IZA.

Gautier, P. (2002). Unemployment and search externalities in a model with heterogeneous jobs and heterogeneous workers. *Economica*, 69:21–40.

Edlin, E.A. and Phelps, E. (2009) "Getting Serious about Job Creation: Part I." *The Economists' Voice* 6.5 . Available at: http://works.bepress.com/aaron_edlin/66

Greenaway, D. and Winchester, N. (2007). Rising wage inequality and capital-skill complementarities. *Journal of Policy Modeling*, 29:41–54.

Hartog, J. (2000): "Over-education and earnings: where are we, where should we go?", *Economics of Education Review*, 19, 131-147.

IMF (2009). World Economic Outlook Database.

Kramarz, F. and Philippon, T. (2001). The impact of differential payroll tax subsidies on minimum wage employment. *Journal of Public Economics*, 82:115–146.

Laroque, G. and Salanié, B. (2000). Une décomposition du non-emploi en France. *Economie et Statistique*, 331:47–66.

Manacorda, M. and Petrongolo, B. (1999). Skill mismatch and unemployment in OECD countries. *Econometrica*, 66:181–207.

Mavromaras, K., McGuiness, S., O'Leary, N., Sloane, P., and Fok, Y. (2007). The problem of over-skilling in Australia and Britain. IZA Working Paper 3136, IZA.

Mortensen, D. and Pissarides, C. (1994). Job creation and job destruction in the theory of unemployment. *Review of Economic Studies*, 61(3):397–415.

Mortensen, D. and Pissarides, C. (1998). Technological progress, job creation and job destruction. *Review of Economic Dynamics*, 1:733–753.

Nickell, S. (2004). Employment and taxes. Working Paper 634, CEP.

OECD (1996). Employment Outlook.

OECD (2009). Employment Outlook.

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

Pierrard, O. (2005). Impacts of selective reductions in labor taxation. *Applied Economics Quarterly*, 51(1):49–82.

Pierrard, O. and H. Sneessens (2008). Biased Technological Shocks, Relative Wage Rigidities and Low-Skilled Unemployment. *Scottish Journal of Political Economy*, 55 (3) 330-352

Shimer, R. (2006). On-the-Job Search and Strategic Bargaining. *European Economic Review*, 50:811–830.