Youth Unemployment, Labor Market Flows and the Labor Market Integration

Anne Bucher [1]

June 2008

1 Introduction

The poor performance of youth and senior labor markets in many OECD countries has lead to a growing concern about life-cycle issues (Chéron, A., Hairault, J-O. and Langot, F. (2007)). This paper departs from the existing empirical literature which focuses on school-to work transitions, (Gangl, M. and Müller, W. (2003), Ryan, P. (2001), Quintini, G., Martin J.P. and Martin S. (2007), OECD (1996a)). Surprisingly enough, few theoretical papers investigate the integration of young workers into the labor market, (Neal D. (1999)). It is well known that young people face difficulties trying to integrate into the labor market and experiencing several short-lived jobs before settling into more stable employment.
Younger workers display higher unemployment rates and higher turnover whatever the country considered (Figure 1 to 3). High youth unemployment rates are mainly due to high frequency of entry to unemployment rather than lower employment prospects. In the U.S, "approximatively 80 % of all worker turnover is accounted by separations that occur within the two first years of a match" (Pries, M. and Rogerson, R. (2005)), and the probability of being in the same employer five years later is higher for prime-aged workers than for youth, (OECD (1994)). Furthermore, youth employment is mainly composed by low-paid jobs relatively to prime-aged employment.

The basic matching model *à la* Pissarides in which the labor force is growing is able to reproduce unemployment rates decreasing with age. This is due to a queue

[1]GAINS, Université du Maine, Faculté de Droit et de Sciences Économiques, Avenue Olivier Messiaen, 72085 Le Mans Cedex 9 - tél: 02.43.83.31.34 - e-mail: anne.bucher.etu@univ-lemans.fr

phenomenon: new entrants are starting their working life as unemployed. However, this framework fails in accounting for the features of labor market flows and for the differences in labor costs.

This paper aims at filling this gap. We incorporate life-cycle features into a simplified version of the framework developed by Pries, M. and Rogerson, R. (2005) to account for the labor market entry process. The authors combined the matching model and the learning model (Jovanovic, B. (1979)) to investigate differences in workers turnover between the U.S and Europe. Learning models are well know to provide an explanation for separations. By introducing life-cycle features, we show that the learning process on match's quality is source of higher destruction rates and lower wages at the beginning of the working life. Further, the paper integrates labor market institutions and argue that features of the Unemployment Insurance system can account for higher employment probabilities at the entry on the labor market.

As in Pries, M. and Rogerson, R. (2005), we introduce stochastic accumulation of information about match's quality. Firms and workers have limited information at the time of meeting. They infer the true output of the match only by engaging in production. As the observed output is the sum of two unobserved components, the match's quality and a noisy component, the learning process is time-consuming. All jobs can be hit by an idiosyncratic shock that render them unproductive. If not, matches revealed to produce a lower output are dissolved whereas matches revealed to be good are retained. The model allows us to distinguish outsiders (unemployed and employed searching for a good match) from insiders (workers employed in a productive match).
We show that hiring practices depend on the learning process and on its outcome. The higher is the probability for the match to be productive or the smoother is the learning process, the higher are the vacancies posted by firms. Outsiders are paid according to an expected average output based on the signal of match's quality and then receive a lower wage until the match's quality is revealed.
In order to take into account typical age-specific unemployment rates, we consider two age groups. Then, we expect the youth (adult) labor force to be mainly composed by outsiders (insiders) relatively to the adult (youth) labor force. The learning process on match's quality is a source of additional job destructions particularly relevant at the beginning of the working life: youth tend to change job more frequently while searching for the best match. Our model should be able to account for higher destruction rates and lower wages at the beginning of the working life.

Further, we introduce features of the Unemployment Insurance system. The outside option of new entrants is particularly low as they do not benefit from any insurance income. Then, lower wages induced by this "eligibility effect" are source of higher hiring rates at the entry on the labor market.

The next section presents the framework. Sections 3 describes the labor market equilibrium without and with consideration for the unemployment benefit system. We present some numerical exercises in section 4.

2 The Model

2.1 The environment

Basics:
The basic environment borrows from the traditional matching model *à la* Pissarides. We consider an economy in which the population is growing at the constant rate $\delta > 0$, with new workers entering the labor force at each period. We assume that only a fraction of the new entrants, δ_u, starts their working-life as unemployed. It allows us to consider labor market flows from school to work. As we focus on the labor market entry process, we assume an infinite life horizon[2]. Workers and firms are forward-looking, risk-neutral and have a common exogenous discount rate of β. Time is discrete and the model is developed in a general equilibrium setting.
Workers are either employed specialized in production or unemployed specialized in job search.

The labor market entry process:
The paper integrates a signal extraction problem about match's quality. Both parties have limited information at the time of meeting. A match can be either of high quality (y_h) with probability[3] ψ, or of low quality (y_l) with probability $(1-\psi)$.
We incorporate stochastic accumulation of information in the manner of Pries, M. and Rogerson, R. (2005). When a worker and a firm form a match, they attempt to infer the quality of the match from the observed output flow:

$$\tilde{y}_t = y + \mu_t \qquad with \qquad y = \{y_l, y_h\}$$

[2]Adopting a model with constant labor force and exit from the labor market would permit to replicate the main features of Chéron, A. et al. (2007) without modifying the results drawn by the analysis.

[3]The probability ψ represents in average the proportion of good matches in the economy.

The observed output at time t is the sum of two unobserved components: the true match quality, y, and a noisy component, μ, which ensures that match's quality is imperfectly observed. We assume that μ is a mean zero *iid* random variable, uniformly[4] distributed on $[-\bar{\mu}, \bar{\mu}]$.

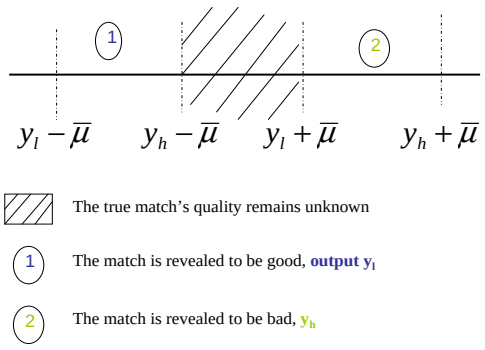
Learning takes a "all-or-nothing" form, (figure 1). If the observed output is less than $y_h - \bar{\mu}$, the match is revealed to be bad, whereas if it is observed to be higher than $y_l + \bar{\mu}$, the match is revealed to be good. However, if $y \in [y_h - \bar{\mu}, y_l + \bar{\mu}]$, firms cannot learn anything about match's quality. Then, employers use additional observation to determine the true output at the end of the next period.

We define the probability that the match's quality is revealed at the end of the period as:

$$\alpha = \frac{y_h - y_l}{2\bar{\mu}}$$

We assume that the quality of a match is persistent. Then, good matches remain good and a match revealed to be bad is dissolved.

Figure 1: The learning process



[4]The learning process takes a "all or nothing" form. Removing this assumption will greatly complicate the state space relevant for the workers' and firms' decision problems.

The model allows us to distinguish *outsiders* from *insiders* according to the learning process on match's quality. The outsider labor force is then composed workers who are searching for a good match (unemployed and employed), whereas the insider labor force is only composed by workers who are employed in a good match.

Match formation and match dissolution:
The labor market is affected by search frictions. Job creation flows are driven by a constant return to scale matching function, $m(u, v)$ where u and v denote respectively the unemployment and vacancy rate of the economy. Assume that jobless individuals are hired once matched with a firm, the matching function relates the flow of new hires in each period and $\theta = \frac{v}{u}$ represents the tightness of the labor market.
The probability to fill a vacancy is defined as $q(\theta)$ and the probability for unemployed workers to find a job as $p(\theta)$. From the properties of the matching function, we have $q'(\theta) < 0$ and $p'(\theta) > 0$.

All matches have a common exogenous separation probability of s per period. Job destruction flows of insider employment are only driven by the exogenous separation process, whereas destructions of outsider employment result both from the learning process on match's quality and from exogenous separations.

Forward-looking decisions and wage bargaining:
Firms and workers are forward-looking. They maximize their payoffs under rational expectations, given the processes that lead to match formation and match dissolution. As the quality of a match is unknown before the formation of the match, decisions are based on the expected output (Recall that μ has mean zero):

$$E(\tilde{y}_t) = E(y) = \psi y_h + (1 - \psi) y_l$$

which will be denoted by y_0. Then, $y_l < y_0 < y_h$.

Once a job is filled, the firm and the worker bargain over wages to share the total match surplus. As is standard, wages are determined according to the Nash bargaining solution in which the worker's threat point is the value of being unemployed and the entrepreneur's threat point is the value of a vacancy. The wage of an outsider is denoted by w_0. Once the information on match's quality is revealed, wages are renegotiated and insiders receive w_h.

Time events:
The assumptions about timing are the following: a match formed in t becomes pro-

ductive in $t+1$. At the end of the period, the quality of the match is revealed with probability α. Matches revealed to be bad and jobs hit by idiosyncratic shocks that render them unproductive are destructed.

2.2 Labor market flows

L_t denotes the population at period t, which is growing at rate δ, so that:

$$L_{t+1} = (1+\delta)L_t$$

Then, we have:

$$u_t + n_{0,t} + n_{h,t} = 1$$

where:

- u denotes the proportion unemployed workers in the economy,
- n_0 denotes the proportion of workers employed in a match which quality has not been yet revealed.
- n_h denotes the proportion of insiders in the economy: workers employed in a match revealed to be good.

We incorporate life-cycle features and assume that the population can be divided into 2 age groups, denoted by C_k for k=1,2. In order to take into account typical age-specific unemployment rates, we consider the following age groups: the youth population, workers of C_1, is composed by 20-24 years old individuals starting working, and the adult population, workers of C_2, are between 25 and 54 years old. The probability for a worker of remaining in C_k the next period is λ_k. A young becomes adult with probability $(1-\lambda_1)$ whereas an adult remains adult: $\lambda_2 = 1$.
Then we distinguish the youth and the adult labor force: u^k, n_0^k and n_h^k.

The labor market flows are given by the following equations:

$$u_{t+1}^1(1+\delta) = \delta\delta_u + \lambda_1[1-p(\theta)]u_t^1 + \lambda_1\Big[\alpha(1-\psi) + \alpha\psi s + (1-\alpha)s\Big]n_{0,t}^1 \tag{1}$$

$$u_{t+1}^2(1+\delta) = [1-p(\theta)]\Big\{(1-\lambda_1)u_t^1 + u_t^2\Big\} + \Big[\alpha(1-\psi) + \alpha\psi s + (1-\alpha)s\Big]\Big\{(1-\lambda_1)n_{0,t}^1 + n_{0,t}^2\Big\} \tag{2}$$

$$n^1_{0,t+1}(1+\delta) = \delta(1-\delta_u) + \lambda_1\Big\{p(\theta)u^1_t + (1-\alpha)(1-s)n^1_{0,t}\Big\} \tag{3}$$

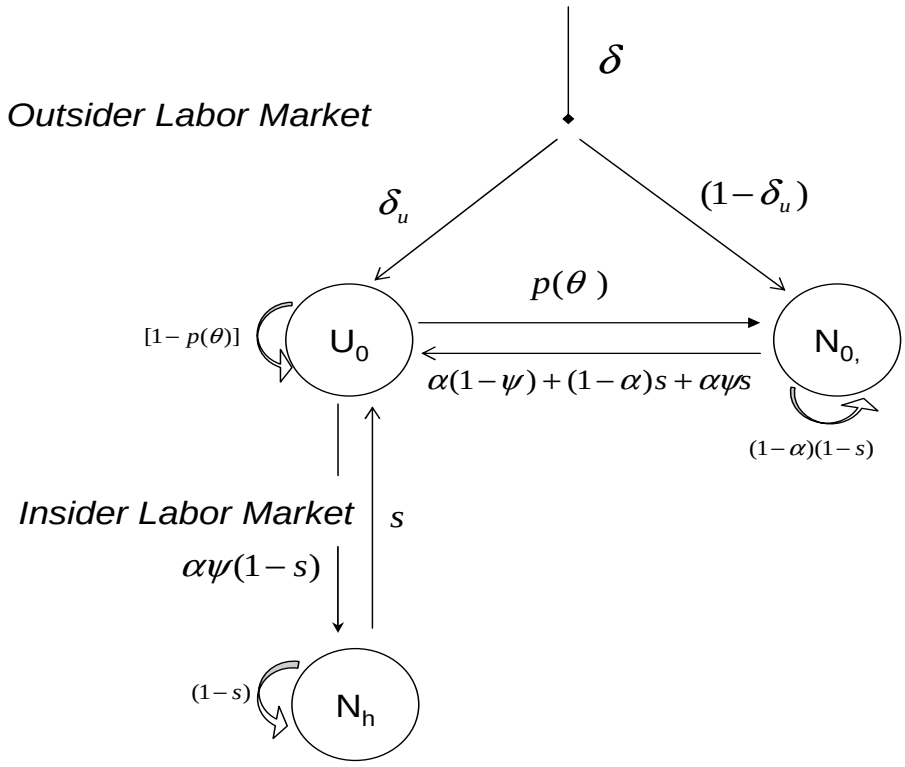
$$n^2_{0,t+1}(1+\delta) = p(\theta)\Big\{(1-\lambda_1)u^1_t + u^2_t\Big\} + (1-\alpha)(1-s)\Big\{(1-\lambda_1)n^1_{0,t} + n^2_{0,t}\Big\} \tag{4}$$

$$n^1_{h,t+1}(1+\delta) = \lambda_1\big\{\alpha\psi(1-s)n^1_{0,t} + (1-s)n^1_{h,t}\big\} \tag{5}$$

$$n^2_{h,t+1}(1+\delta) = \alpha\psi(1-s)\Big\{(1-\lambda_1)n^1_{0,t} + n^2_{0,t}\Big\} + (1-s)\Big[(1-\lambda_1)n^1_{h,t} + n^2_{h,t}\Big] \tag{6}$$

Basically, the stock of unemployment is composed by unemployed who have not find a job, and by workers who were separated from their job either because of the bad quality of the match, either because of idiosyncratic shocks. Outsider employment is composed by hirings and by retained matches which have not yet been revealed. Workers revealed to be employed in a good match with probability $\alpha\psi$ enter the insider segment if the job is not destructed, with probability $(1-s)$. In each period, $\delta\delta_u$ and $\delta(1-\delta_u)$ young workers enter the labor market respectively as unemployed and as employed.

Figure 2: The Labor market



3 Equilibrium

We define and characterize the steady-state equilibrium of the model.

3.1 Hiring decisions

We assume a continuum of identical firms who can create unfilled employment position at one-time cost of c. Let Π^v be the value to the firm of a vacancy, and Π_i be the value of being in a match of unknown quality ($i = 0$) and of good quality ($i = h$). These values satisfy the following equations:

$$\Pi^v = -c + \beta\big\{q(\theta)\Pi_0 + [1 - q(\theta)]\Pi^v\big\} \qquad (7)$$

$$\Pi_h = y_h - w_h + \beta\big\{s\Pi^v + (1 - s)\Pi_h\big\} \qquad (8)$$

$$\Pi_0 = y_0 - w_0 + \beta(1 - \alpha)\big\{s\Pi^v + (1 - s)\Pi_0\big\} + \beta\alpha\psi\big\{s\Pi^v + (1 - s)\Pi_h\big\} + \beta\alpha(1 - \psi)\Pi^v \qquad (9)$$

The interpretation of equation (7) and (8) is quite straightforward. On each segment, firms and workers form a match with probability $q(\theta)$ which yields expected value Π_0. Otherwise, the employment position remains unfilled. The value of a job is composed by expected current period profits, (output minus labor cost), and expected discounted profits. A match revealed to be good is destructed at rate s and the firm gets Π^v.
Consider the interpretation of equation (9). As stated previously, when matched with a new worker decisions are based on an expected output, $y_0 = \psi y_h + (1 - \psi)y_l$. The employment position remains productive with probability $(1 - s)$. With probability $\alpha\psi$ the match is revealed to be good, in which case the value of expected discounted profits equals to Π_h. Matches revealed to be bad are dissolved and the firm search for a new worker. Finally, the firm continues with the value Π_0 until the true output is revealed.

Therefore, the free entry condition, $\Pi^v = 0$, implies that:

$$\frac{c}{q(\theta)} = \beta\Pi_0 \qquad (10)$$

The labor market tightness is such that the average hiring cost equals the expected and discounted value of a new job.

3.2 Wage determination

Let V^u and V_i denote respectively the expected value of unemployment and employment for $i = 0, h$. During search, workers enjoy some real return b. These values must satisfy:

$$V^u = b + \beta\big\{p(\theta)V_0 + [1 - p(\theta)]V^u\big\} \qquad (11)$$

$$V_h = w_h + \beta\big\{sV^u + (1 - s)V_h\big\} \qquad (12)$$

$$V_0 = w_0 + \beta(1 - \alpha)\big\{sV^u + (1 - s)V_0\big\} + \beta\alpha\psi\big\{sV^u + (1 - s)V_h\big\} + \beta\alpha(1 - \psi)V^u \qquad (13)$$

Once a job is filled, the firm and the worker bargain over wages to share the total match surplus. We assume that the equilibrium wages of this game equal to the Nash-bargaining solution and solve:

$$w_i = argmax\big[V_i - V^u\big]^{\gamma}\big[\Pi_i - \Pi^v\big]^{(1-\gamma)} \qquad (14)$$

where γ is the worker's relative bargaining power coefficient.
We derive the following wage equations for $i = 0, h$:

$$w_i = \gamma y_i + (1 - \gamma)(1 - \beta)V^u \qquad (15)$$

Workers receive a fraction γ of the output they produce and a fraction $(1 - \gamma)$ of their reservation wage. Workers whose match has not been revealed to be good are paid according to an expected output $y_0 < y_h$. Then: $w_0 < w_h$.

3.3 The Labor market equilibrium

Definition 1 *A steady-state equilibrium is a list u, n_i, θ and w_i, that satisfies the flow equilibrium conditions*[5]*, the job creation conditions and the wages curves for $i = 0, h$.*

[5]The labor market flows are derived in the previous section. At steady-state, $u^k_{t+1} = u^k_t$

The vector $\{\theta, w_i\}$ is then given by the following equilibrium conditions:

$$\begin{cases} \frac{c}{\beta q(\theta)} = \frac{\left[1-\beta(1-s)\right](y_0-w_0)+\beta\alpha\psi(1-s)(y_h-w_h)}{\left[1-\beta(1-s)\right]\left[1-\beta(1-\alpha)(1-s)\right]} & JC \\ \\ w_i = \gamma(y_i + c\theta) + (1-\gamma)b & WC_i \end{cases}$$

An increase in the bargained wage w_i induces firms to post less vacancies as it reduces the expected current profit of the job. It allows us to draw the job creation conditions as downward-sloping curves in the θ - w_i space. Similarly, an increase in the tightness θ will raise the saving of the average hiring cost per unemployed, $c\theta$, the firm enjoys when a match is formed. The wage is then negotiated up. It allows us to draw the wage curves as upward-sloping curves in the θ - w_i space.

As the information about the quality of a match is not perfectly known when firms and workers meet, new workers are paid according to a lower wage. Then the labor cost of labor market entrants who never worked is lower. Similarly, former insiders experience a reduction in the wage after an unemployment spell. The wage of an outsider worker increases with the probability to be employed in a good match but decreases with the output of a bad match, y_l.
Both wages affect the tightness of the labor market by increasing labor costs. The way the insider wage affects job creations depends however on the learning process. The higher is the probability to reveal the quality of a match, the more the firm will value the expected profit of a good match, which is weighted by the probability ψ.

Given the learning process on match's quality, we expect the proportion of insiders to be relatively higher among adults than among youth. Unemployment risks and therefore the unemployment rate should be higher for the youth population. In this framework, the hiring rate, $p(\theta)$, is constant over the life-cycle but, given the queue phenomenon and given the fact that young workers tend to change jobs more frequently, they should represent a higher proportion of new hires.

3.4 The role of the Unemployment Benefit System

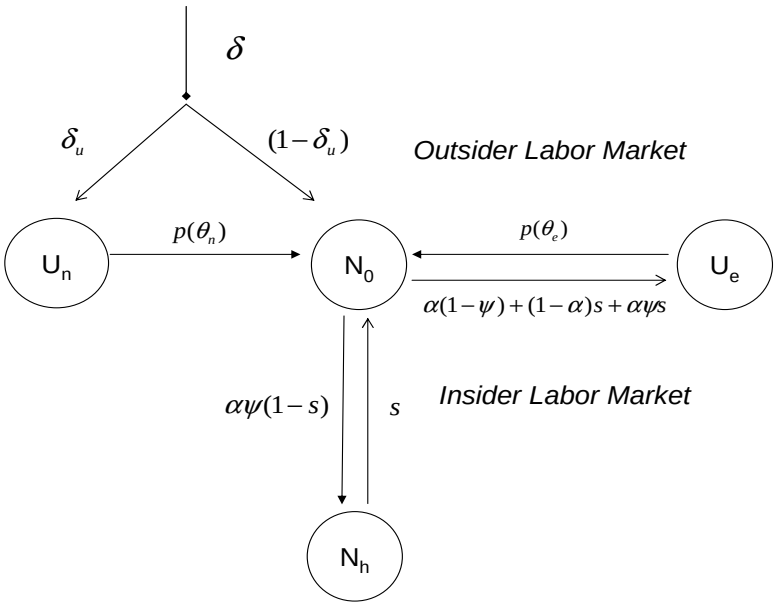
Our conjecture is that features of the Unemployment Benefit system can account for higher hirings at the entry on the labor market. New workers enter the labor market as unemployed and initially do not benefit from unemployment insurance. Not being insured creates an incentive for workers to accept jobs in order to become entitled. This has important feedback effects on the labor market that our model intents to capture through the wage bargaining process.

We assume that new entrants become entitled to unemployment benefits after one period of employment. Their eligibility cannot be exhausted so that job seekers are insured whatever their job duration[6]. Then, non-insured unemployment is only composed by new workers who enter the labor market and never worked. These assumptions allow us to distinguish the initial wage of a labor market entrant from the wages of workers who have already occupied a job.

The labor market is henceforth represented as follows:

[6]Even if eligibility to unemployment benefits can be exhausted, workers are entitled to unemployment insurance as the RMI (minimum income) in France whereas new entrants are not.

Figure 3: The Labor market with UB system



The labor demand for new entrants and the labor supply from job seekers define a new segment of the economy. The matching technology is given by: $M(U_j, V_j)$ where $j = n, e$ denotes the state of eligibility of unemployed.

The labor market flows on the outsider segment are given by the following equations:

$$u^1_{n,t+1}(1+\delta) = \delta\delta_u + \lambda_1[1-p(\theta_n)]u^1_{n,t} \qquad (16)$$

$$u^2_{n,t+1}(1+\delta) = \big\{(1-\lambda_1)u^1_{n,t} + u^2_{n,t}\big\}[1-p(\theta_n)] \qquad (17)$$

$$u^1_{e,t+1}(1+\delta) = \lambda_1[1-p(\theta_e)]u^1_{e,t} + \lambda_1\big\{\alpha(1-\psi) + (1-\alpha)s + \alpha\psi s\big\}n^1_{0,t} \qquad (18)$$

$$\begin{aligned} u^2_{e,t+1}(1+\delta) = {} & [1-p(\theta_e)]\big\{(1-\lambda_1)u^1_{e,t} + u^2_{e,t}\big\} \\ & + \big\{\alpha(1-\psi) + (1-\alpha)s + \alpha\psi s\big\}\big\{(1-\lambda_1)n^1_{0,t} + n^2_{0,t}\big\} \end{aligned} \qquad (19)$$

$$n^1_{0,t+1}(1+\delta) = \delta(1-\delta_u) + \lambda_1\big\{p(\theta_n)u^1_{n,t} + p(\theta_e)u^1_{e,t} + (1-\alpha)(1-s)n^1_{0,t}\big\} \qquad (20)$$

$$\begin{aligned} n^2_{0,t+1}(1+\delta) = {} & p(\theta_n)\big\{(1-\lambda_1)u^1_{n,t} + u^2_{n,t}\big\} + p(\theta_e)\big\{(1-\lambda_1)u^1_{e,t} + u^2_{e,t}\big\} \\ & + (1-\alpha)(1-s)\big\{(1-\lambda_1)n^1_{0,t} + n^2_{0,t}\big\} \end{aligned} \qquad (21)$$

3.4.1 Wage bargaining

The expected values of unemployment are now given by:

$$V^u_n = b + \beta\big\{p(\theta_n)V_{0,n} + [1-p(\theta_n)]V^u_n\big\} \qquad (22)$$

$$V^u_e = b + \rho w_{0,e} + \beta\big\{p(\theta_e)V_{0,e} + [1-p(\theta_e)]V^u_e\big\} \qquad (23)$$

The expected value of new entrants starting their working life as unemployed is denoted by V^u_n. For a sake of simplicity we assume that all unemployed workers entitled to unemployment benefits receive $\rho w_{0,e}$, where ρ is the replacement rate of the economy. Assuming that unemployed workers who were employed in a good match receive ρw_h or that workers who were separated after one period of employment receive $\rho w_{0,n}$ would complicate the model without removing the results.

During their first period of employment, workers are not entitled to the Unemployment Benefit system, so they get $V_{0,n}$, which differs from $V_{0,e}$ only by the bargained wage:

$$V_{0,n} = w_{0,n} + \beta(1-\alpha)\big[sV_e^u + (1-s)V_{0,e}\big] + \beta\alpha\Big\{\psi\big[sV_e^u + (1-s)V_h\big] + (1-\psi)V_e^u\Big\} \tag{24}$$

Similarly we define the expected profit for a firm of a new job occupied by a labor market entrant and in his first period of employment as:

$$\begin{aligned}\Pi_{0,n} = y_0 - w_{0,n} + \beta(1-\alpha)\big\{s\max_j \Pi_j^v + (1-s)\Pi_{0,e}\big\} \\ + \beta\alpha\psi\big\{s\max_j \Pi_j^v + (1-s)\Pi_h\big\} + \beta\alpha(1-\psi)\max_j \Pi_j^v\end{aligned} \tag{25}$$

According to the Nash-bargaining solution, the wage of a labor market entrant satisfies:

$$w_{0,n} = \gamma y_0 + (1-\gamma)\Big\{(1-\beta)V_n^u - \beta[V_e^u - V_n^u]\Big\} \tag{26}$$

This expression is quite similar to equation (14). However, workers integrate the gain from their new eligibility's state to unemployment benefits. If they are hired and then separated from their job, they will benefit from insurance. This **"eligibility effect"** is captured by the term $\beta(1-\alpha)[V_e^u - V_n^u]$, depends on the learning process, and reduces the wage of new entrants (we expect intuitively $V_e^u > V_n^u$).

3.4.2 The labor market equilibrium

Definition 2 *A steady-state equilibrium is a list u_j, n_i, θ_j and $w_{i,j}$, that satisfies the flow equilibrium conditions, the job creation conditions and the wages curves for workers' type $i = 0, h$ and for eligibility's state of unemployed $j = n, e$.*

$$\begin{cases} \frac{c}{\beta q(\theta_e)} = \frac{(y_0 - w_{0,e}) + \frac{\beta\alpha\psi(1-s)}{1-\beta(1-s)}(y_h - w_h)}{\left[1-\beta(1-\alpha)(1-s)\right]} & JC_e \\ w_{0,e} = \frac{\gamma(y_0 + c\theta_e) + (1-\gamma)b}{1-\gamma(1-\rho)} & WC_e \\ w_h = \gamma(y_h + c\theta_e) + (1-\gamma)(b + \rho w_{0,e}) & WC_h \\ \frac{c}{\beta q(\theta_n)} = \frac{(y_0 - w_{0,n}) + \frac{\beta\alpha\psi(1-s)}{1-\beta(1-s)}(y_h - w_h)}{\left[1-\beta(1-\alpha)(1-s)\right]} & JC_n \\ w_{0,n} = \gamma(y_0 + c\theta_n) + (1-\gamma)\left\{b - \frac{\beta}{1-\beta}\left[\rho w_{0,e} + \frac{\gamma}{1-\gamma}(c\theta_e - c\theta_n)\right]\right\} & WC_n \end{cases}$$

Property 1 *In the wage posting case,* $\theta_n > \theta_e$
For $\gamma = 0$, $w_e - w_n = \frac{\beta}{1-\beta}\rho b > 0$.

When wages are negotiated, $\gamma > 0$, workers are rewarded for the saving of hiring costs that the firm enjoys when a job is formed, which reduces the difference between both labor costs. However, we expect intuitively that hirings directed to labor market entrants are higher than hirings directed to indemnized outsiders or insiders. This "eligibility effect" will push up hirings on the youth labor market and may account for observed labor market flows. However, we have to rely on simulations to test the robustness of our model.

References

Chéron, A., Hairault, J-O., and Langot, F., "Job Creation and Job Destruction over the Life Cycle: The older workers in the Spotlight," *IZA discussion paper*, 2007, (2597).

Gangl, M. and Müller, W., *Transitions from Education to Work in Europe: The Integration of Youth into EU Labour Markets* 2003.

Jovanovic, B., "Job Matching and the Theory of Turnover," *Journal of Political Economy*, 1979, *87*, 972–90.

Neal D., "The Complexity of Job Mobility among Young Men," *Journal of Labor Economics*, 1999, *17* (2), 237–261.

OECD, *Employment outlook*, 1994.

OECD, "Transition from School to Work," *Education at a Glance: Analysis. Paris: OECD*, 1996a, pp. 14–53.

Pries, M. and Rogerson, R., "Hiring policies, labor market institutions, and labor market flows," *Journal of Political Economy*, 2005, *113* (4), 811–839.

Quintini, G., Martin J.P., and Martin S., "The Changing Nature of the School-to-Work Transition Process in OECD Countries," *IZA Discussion Paper*, 2007, (2582).

Ryan, P., "The School-to-Work Transition: A Cross-National Perspective," *Journal of Economic Literature*, 2001, *39* (1), 34–92.

Appendixes

A OECD stylized facts

Figure 4: Unemployment rates (%), OECD 2005

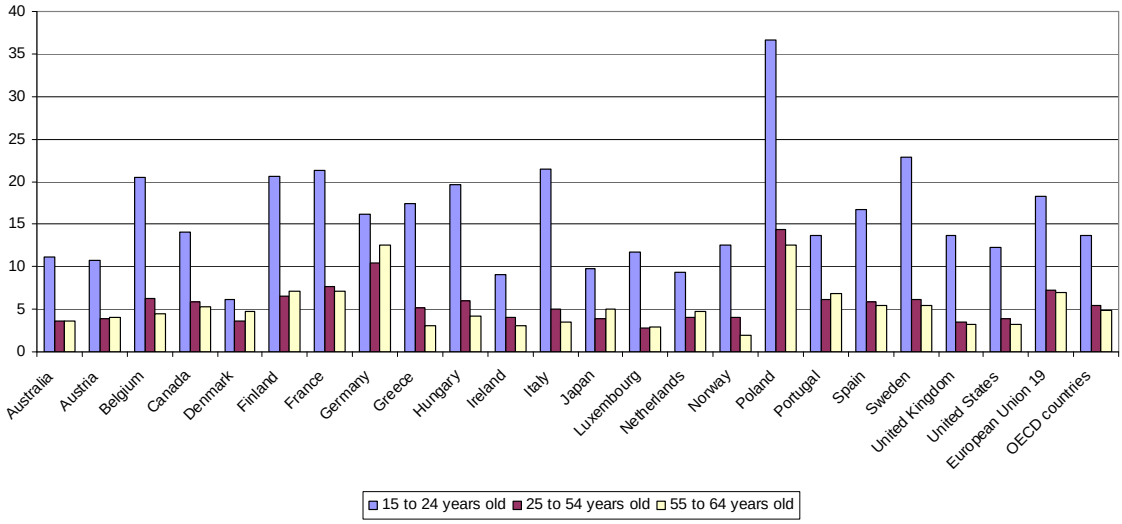
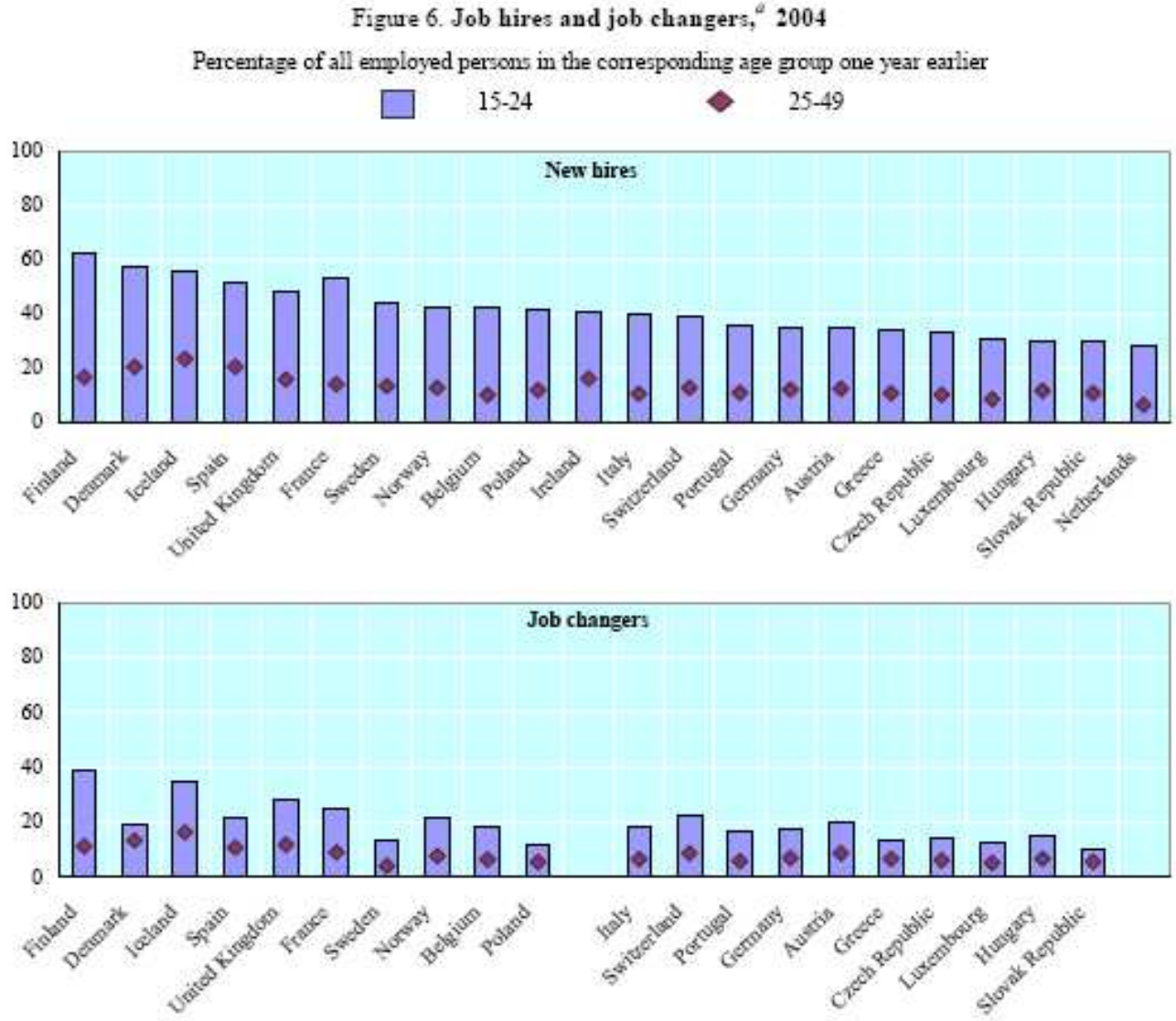
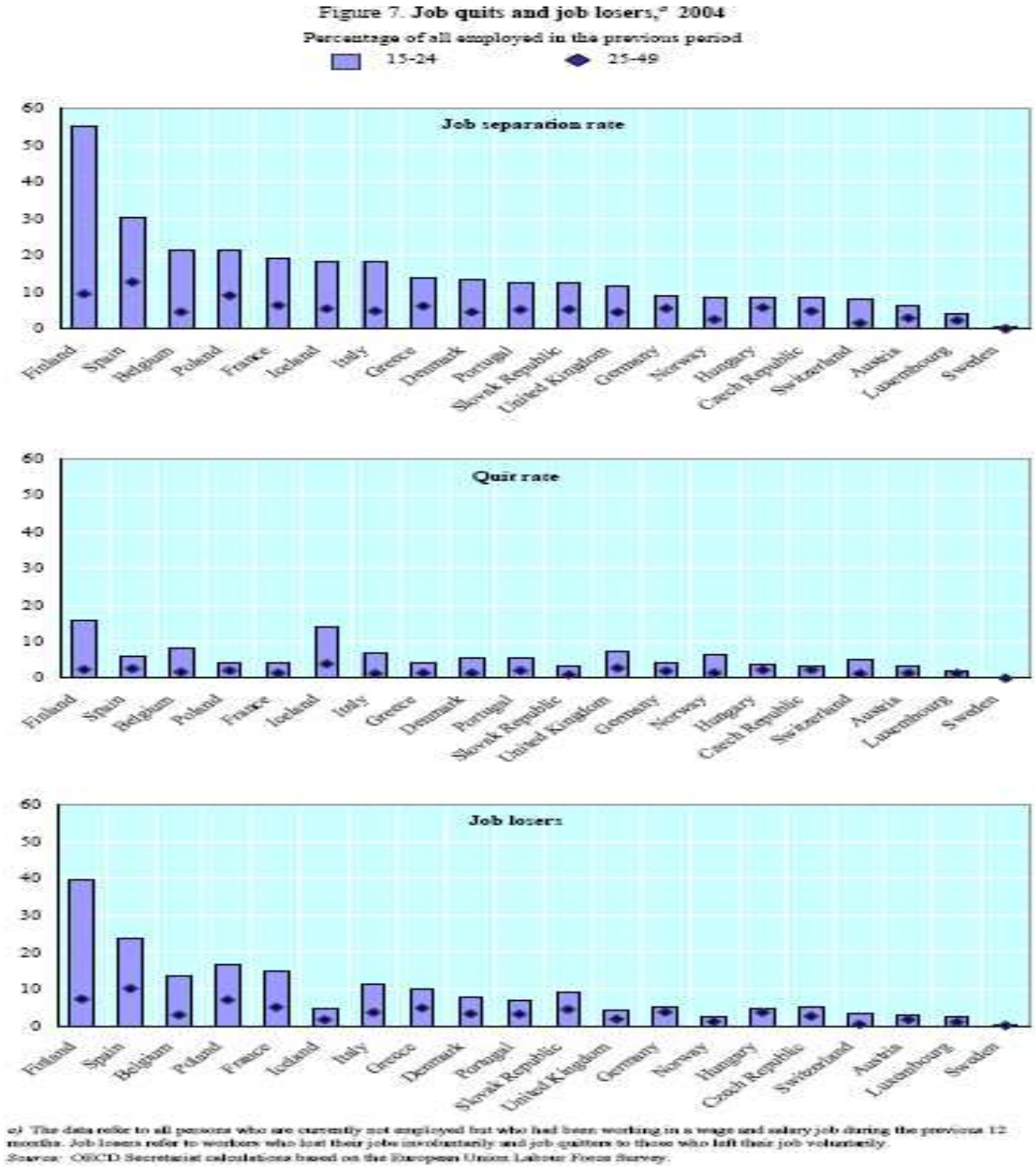


Figure 5: Job hires and job changers, OECD 2004



source: Quintini, G. et al. (2007)

Figure 6: Job quits and Job losers, OECD 2004



a) The data refer to all persons who are currently not employed but who had been working in a wage and salary job during the previous 12 months. Job losers refer to workers who lost their jobs involuntarily and job quitters to those who left their job voluntarily.
Source: OECD Secretariat calculations based on the European Union Labour Force Survey.

source: Quintini, G. et al. (2007)