Endogenous Job Destructions and the Distribution of Wages

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Abstract

In this paper, we argue that firing decisions of firms can help explain the shape of the wage distribution. To emphasize this result, we consider a matching model with both idiosyncratic productivity shocks that hit jobs and heterogeneity of workers according to *ex ante* unobservable abilities. Computation experiments show that the model can generate a hump-shaped wage distribution despite assuming a uniform distribution of shocks and a Pareto distribution of abilities.

1   Introduction

The theory of equilibrium unemployment with matching and endogenous job destructions (Mortensen and Pissarides (1994)) has become an extensively-used framework both to address empirical facts of the labor market dynamics and to provide important insights into the design of the labor market policy. Despite recent debates about the empirical relevance of the Nash-bargaining of wages (see Shimer (2005a) and Hall (2005a)), this framework undoubtedly helps in explaining stylized facts characterizing labor market flows (Cole and Rogerson (1999)), unemployment dynamics (Pissarides (2009)) and real business cycle features (Andolfatto (1996), Merz (1995) or Chéron and Langot (2004)). This framework is also well-suited to show how employment

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protection, hiring subsidies or labor taxes can be used to improve welfare (see among many others Millard (1996), Mortensen and Pissarides (1999), Pissarides (2000) or more recently Chéron, Hairault and Langot (2008b)).

From the end of the 90s, another strand of the search-matching literature has focused on wage dispersion considering on-the-job search rather than endogenous firing decisions. Burdett and Mortensen (1998) stressed the role of search frictions within an on-the-job search background to generate wage dispersion despite homogenous workers and firms. Subsequent works by Bontemps, Robin and van der Berg (1999), Bontemps, Robin and van der Berg (2000), Postel-Vinay and Robin (2002) or Cahuc, Postel-Vinay and Robin (2006) mainly emphasized the effect of market frictions in combination with heterogenous productivities of both jobs and workers' abilities, as a way to fit the distribution of wages. The goal of our paper is to point out that lessons can be learnt from endogenous job destruction decisions to understand wage dispersion as well.

The starting point of our contribution is also an empirical one. An investigation into the French Labor Force survey (*Enquête Emploi*) shows not only a log-normal aggregate distribution of wages but also a strongly negative correlation between the employment to unemployment transition rate and the wage interval workers belong to (figure 1)[1]. Figure 2 shows the same statistics by skill groups. Of course, there are strong differences both in earnings and in employment exit rates according to skill level. But the log-normal property of the wage distribution is robust. This is also roughly true for the decreasing shape of the employment exit rate with wages, except for high-skilled workers for whom we do not observe any significant trend (neither negative nor positive). More precisely, considering wages below the 5th decile, a significant negative slope can be found for unskilled, low-skilled and medium-skilled workers. Above the median wage, this slope is virtually zero for these groups.

This paper aims at showing that a model which generates this negative correlation produces new insights to understand the shape of the wage distribution. We consider a job creation-job destruction model in line with Mortensen and Pissarides (1994) extended to account for heterogenous workers. So, there are both kinds of heterogeneity into the model: (i) each firm-job pair is hit by idiosyncratic productivity shocks, (ii) each worker differs ac-

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[1]Detailed description of the data set and computed statistics could be found in appendix. For now, merely note that we consider nine deciles and therefore ten wage intervals. We compute the average transition rate from employment to unemployment within each interval.

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Figure 1: Wage dispersion and employment to unemployment transition rates in French LFS (aggregate level)
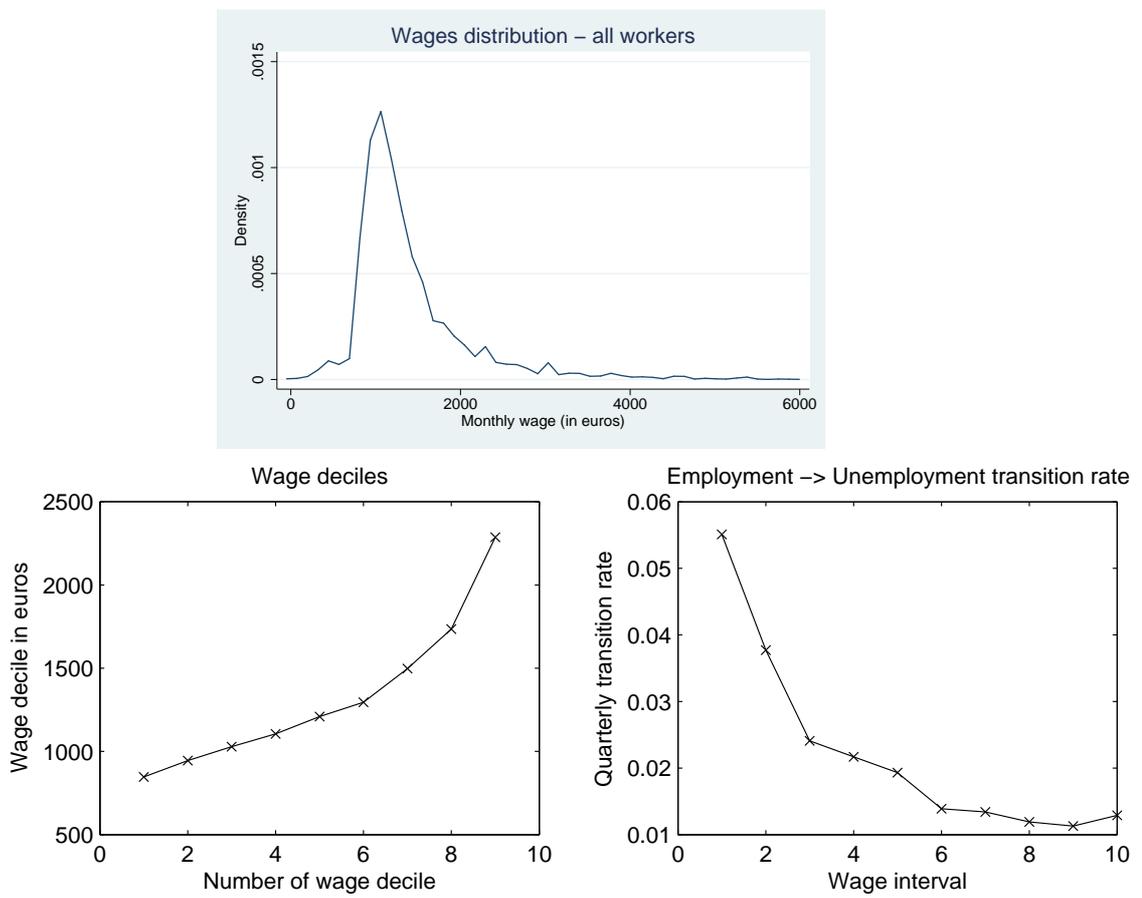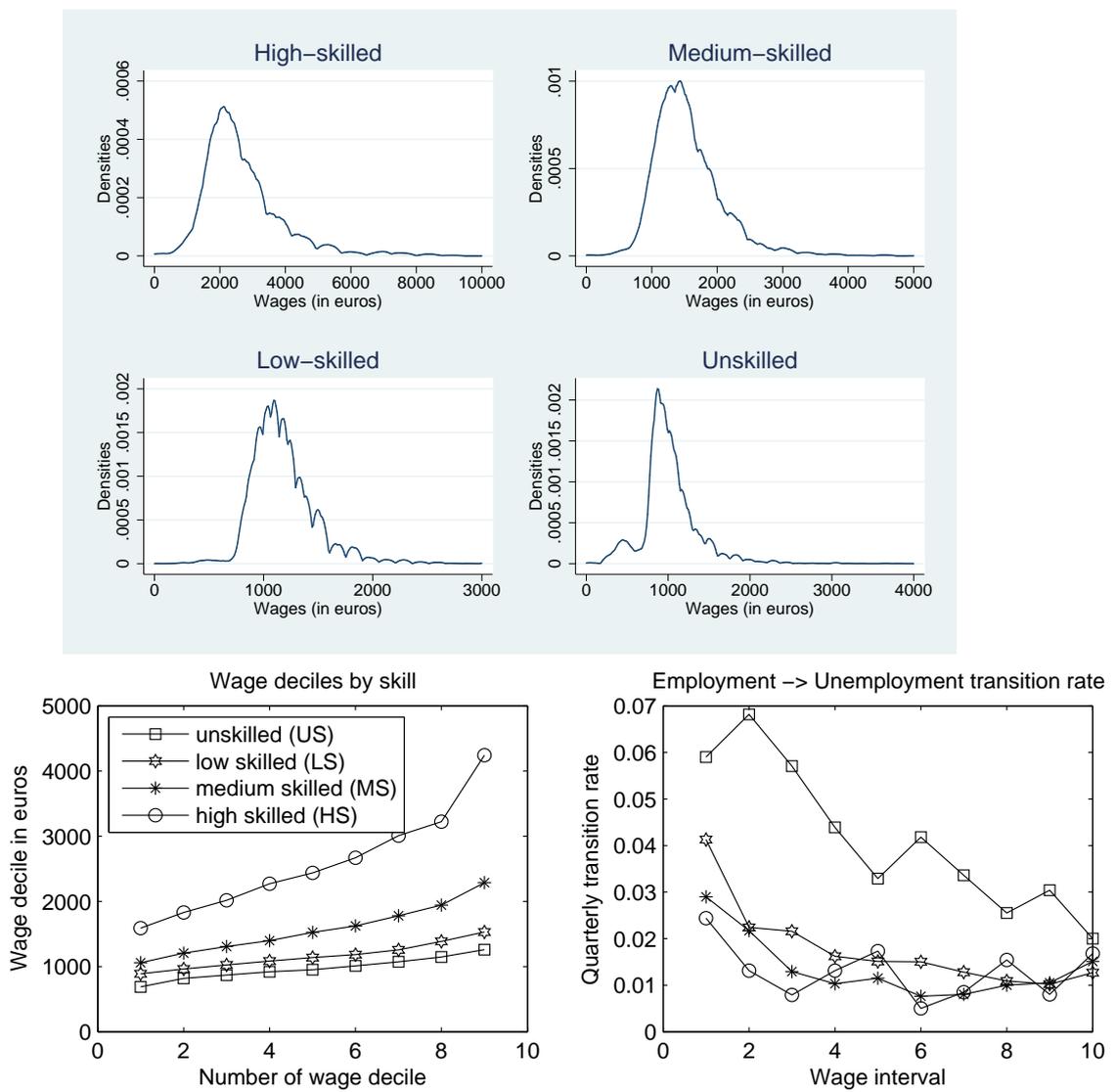
Figure 2: Wage dispersion and employment to unemployment transition rates in French LFS (by skills)

cording to its ability. As the latter is assumed to be *ex ante* unobservable by firms, we consider non-directed search.[2] Quantitative model properties are then compared with statistics computed within skill group. In particular, our computation experiments reveal that the model can generate a decreasing relation between the job destruction rate and the wage decile, which in turn implies consistent model properties with an hump-shaped wage distribution. Interestingly, this outcome is obtained despite the uniform distribution of productivity shocks usually assumed and the Pareto distribution of workers' abilities.

Two arguments the model contribute to yield a hump-shaped wage distribution in spite of the Pareto distribution of abilities:

- As low-ability workers (who earn on average low wages) face higher exit rates, their proportion in the employed population is reduced.

- As firms agree to keep high-ability workers hit by bad shocks, the share of middle-wage workers is increased.

The remaining of the paper is organized as follows. A first section presents the framework. A second one deals with computation experiments. The last section concludes.

2 Model

2.1 Assumptions and labor market flows

We consider a continuous-time matching model at steady state with endogenous job creations and destructions. Workers are heterogenous due to unobservable ability a among the interval $[\underline{a}, \overline{a}]$, with $F(a)$ the exogenous cumulative distribution function of abilities. When a firm opens a job vacancy she knows the distribution function of abilities but does not *ex ante* observe the ability of the contacted worker. This ability is revealed once the worker has been hired.

Each firm has one job. The productivity of the job/firm depends not only on the ability of the worked hired, but also on a random component

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[2]It is obvious that the introduction of workers heterogeneity in a matching model with non-directed search raises also some (in)efficiency issues, *i.e.* the Hosios condition no longer achieves efficiency. Such theoretical issues have been examined by Shimer and Smith (2001), Albrecht and Vroman (2002), Blažquez and Jansen (2008) or Chéron, Hairault and Langot (2008a) for instance. Yet, as our model does not add any new interesting insights about that point, and because our focus is above all empirical, efficiency issues are beyond the scope of this paper.

which is job specific. We denote ε the firm's productivity shock which occurs at Poisson rate λ, and where the cdf is $G(\varepsilon)$, $\forall$ $\varepsilon \in [0,1]$. The overall productivity of the job is then given by $\varepsilon + a$.[3]

A job destruction then arises when the random component falls below an endogenous threshold which depends on worker's ability. We denote this threshold $R(a)$ so that the job destruction rate is given by $\lambda G(R(a))$.

Assuming that firms cannot *ex ante* direct their search according to (unobservable) workers' ability, an aggregate matching function $M(v, u)$ gives the number of hirings, where v and u respectively denote the number of vacancies and unemployed workers.[4] Accordingly, contact rate for each worker is given by $\theta q(\theta) \equiv \frac{M(v,u)}{u}$, where $q(\theta) \equiv \frac{M(v,u)}{v}$, and $\theta \equiv \frac{v}{u}$ denotes the labor market tightness. In addition, we consider that at the time of opening a job vacancy, *ie.* before worker and firm meet, the random component of productivity is not known. In our framework, this implies that $R(a)$ also gives the threshold productivity value for job creation[5], and the transition rate from unemployment to employment for a worker with ability a is given by $\theta q(\theta)[1 - G(R(a))]$.

Lastly, denoting $u(a)$ the number of unemployed workers with ability a and defining $f(a) \equiv F'(a)$, equilibrium labor market flows at steady state imply:

$$u(a)\theta q(\theta) = \lambda G(R(a))\left[f(a) - u(a)\right] \quad \forall a \in [\underline{a}, \overline{a}]$$

The overall unemployment rate is then given by $u = \int_{\underline{a}}^{\overline{a}} u(a)da$.

2.2 Hiring and firing behaviors

The recruiting policy is determined by the expected average value of the job once filled. But as firms cannot *ex ante* target hirings among heterogenous workers, it depends on productivity draws, hence on the distribution of idiosyncratic shocks.

The value of a vacancy is therefore defined as follows:

$$rV = -c + q(\theta) \int_{\underline{a}}^{\overline{a}} \left(\frac{u(a)}{u}\right) \left\{ \int_{R(a)}^{1} [J(a, \varepsilon) - V] \, dG(\varepsilon) \right\} da$$

with r the interest rate, $c \geq 0$ the flow cost of recruiting a worker and where the value of a filled job is given by:

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[3]Note that this technology of production implies that the size of the shock does not depend on the *ex post* worker's ability.

[4]It is increasing and concave in both arguments.

[5]This is due to the fact that we do not consider neither hiring nor firing costs.

$$rJ(a,\varepsilon) = a + \varepsilon - w(a,\varepsilon) + \lambda \int_{R(a)}^{1} J(a,x)dG(x) - \lambda J(a,\varepsilon)$$

where $w(a,\varepsilon)$ stands for the wage.

A standard free entry condition then determines the labor market tightness θ, *ie.* the value of vacancies vanishes in equilibrium, which implies that:

$$\frac{c}{q(\theta)} = \int_{\underline{a}}^{\overline{a}} \left(\frac{u(a)}{u} \right) \left\{ \int_{R(a)}^{1} J(a,\varepsilon)dG(\varepsilon) \right\} da \qquad (1)$$

Job destruction occurs if the value of the job turns out to be negative, $J(a,\varepsilon) \leq 0$. The job destruction policy rule can therefore be characterized by a threshold value for productivity, $R(a)$ satisfying $J(a,R(a)) = 0$. Since we do not consider any hiring nor firing cost, this threshold also gives the minimum value for productivity from which a match is formed. This leads to:

$$R(a) = -a + w(a,R(a)) - \lambda \int_{R(a)}^{1} J(a,x)dG(x) \qquad (2)$$

On one hand, the higher the wage, the higher the reservation productivity $R(a)$, hence the higher (lower) the job destructions (creations). On the other hand, the higher the option value of filled jobs (expected gains in the future), the weaker the job destructions and the greater the job creations.

2.3 The wage setting

We consider the conventional Nash-bargaining of wages assumption.[6] Firms and workers share the global surplus generated by a job according to their respective bargaining power. Let's denote this surplus $S(a,\varepsilon) = J(a,\varepsilon) + W(a,\varepsilon) - U(a)$, with the worker's value of unemployment and employment

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[6]Since Shimer (2005a) and Hall and Milgrom (2008) this is somewhat a disputed assumption, at least from an empirical perspective. Hall and Milgrom (2008) point out that rigidity of wages helps to explain the observed volatility of unemployment over the business cycle. Nevertheless, Pissarides (2009) recently rehabilitates the Nash-bargaining showing that the failure of the Mortensen-Pissarides' framework rather relies on the size of labor turnover costs typically understated.

are respectively given by:

$$
rU(a) = z + \theta q(\theta) \int_{R(a)}^{1} \big[W(a,x) - U(a)\big] dG(x)
$$

$$
rW(a,\varepsilon) = w(a,\varepsilon) + \lambda \int_{R(a)}^{1} W(a,x) dG(x) + \lambda G(R(a))U(a) - \lambda W(a,\varepsilon)
$$

The Nash-sharing rule writes:

$$
W(a,\varepsilon) - U(a) = \gamma S(a,\varepsilon)
$$

where γ stands for the bargaining power of workers. It is then straightforward to derive the following expression for the wage:

$$
w(a,\varepsilon) = (1-\gamma)z + \gamma(a+\varepsilon) + \gamma \theta q(\theta) \int_{R(a)}^{1} J(a,x) dG(x) \tag{3}
$$

Making use of equation (1) and defining $\tau(a) = \frac{\int_{R(a)}^{1} J(a,x)dG(x)}{\int_{\underline{a}}^{\overline{a}} \left(\frac{u(a)}{u}\right) \int_{R(a)}^{1} J(a,x)dG(x)da}$, this wage expression can be rewritten as:[7]

$$
w(a,\varepsilon) = \gamma\left[a + \varepsilon + c\theta\tau(a)\right] + (1-\gamma)z
$$

Despite the assumption of non-directed search, the way search costs enters the wage equation is ability specific, through the variable $\tau(a)$. The latter gives the *ex post* value for a job filled by a worker with ability a, relative to the *ex ante* expected average value of job creation defined over the pool of unemployed workers likely to be hired. Workers with the highest abilities are characterized by $\tau(a) > 1$, which contributes together with productivity a to increase their wage. High-ability workers are then rewarded for more than the saving of the average search costs ($c\theta$). Conversely, workers with low abilities also earn low wages due to lower imputed value of search costs.[8]

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[7]Such a wage expression has been formerly proposed by Chéron A., Hairault J.-O. and Langot F. (2008a) who consider age-differentiated workers.

[8]Depending on productivity draws, wage earnings can increase or decrease at each period. In France, around 40% of workers experience of fall in their real wages from one year to another.

2.4 Equilibrium definition

At this stage, we can define the conditions that determine simultaneously the labor market tightness θ, the set of productivity thresholds $R(a)$ and unemployment levels by ability, $u(a), \quad \forall a \in [\underline{a}, \overline{a}]$.[9]

Proposition 1. *The labor market equilibrium is defined by the following set of equations:*[10]

$$\frac{c}{q(\theta)} = \left(\frac{1-\gamma}{r+\lambda}\right) \int_{\underline{a}}^{\overline{a}} \left(\frac{u(a)}{u}\right) \int_{R(a)}^{1} [1 - G(\varepsilon)] \, d\varepsilon da$$

$$R(a) = -a + z - \left(\frac{\lambda - \gamma\theta q(\theta)}{r+\lambda}\right) \int_{R(a)}^{1} [1 - G(\varepsilon)] \, d\varepsilon$$

$$u(a) = f(a)\frac{\lambda G(R(a))}{\theta q(\theta) + \lambda G(R(a))} \quad ; \quad u = \int_{\underline{a}}^{\overline{a}} u(a) da$$

Proof. First, we make use of the fact that $(r+\lambda)J(a, \varepsilon) - (r+\lambda)J(a, R(a)) = \varepsilon - R(a) - w(a, \varepsilon) + w(a, R(a))$. From $J(a, R(a)) = 0$ and the wage expression (3), it follows $(r+\lambda)J(a, \varepsilon) = (1-\gamma)[\varepsilon - R(a)]$. Second, integrating by parts we find also that $\int_{R(a)}^{1} [\varepsilon - R(a)] \, dG(\varepsilon) = \int_{R(a)}^{1} [1 - G(\varepsilon)] \, d\varepsilon$ □

Property 1. *The labor market equilibrium is characterized by $R'(a) < 0$.*

Proof. The proof is straightforward by noticing that $dR = -da + \left(\frac{\lambda - \gamma\theta q(\theta)}{r+\lambda}\right) [1 - G(R)] \, dR$ which implies that $\frac{dR}{da} \equiv R'(a) = -\frac{1}{1 - \left(\frac{\lambda - \gamma\theta q(\theta)}{r+\lambda}\right)[1 - G(R)]} < 0 \quad \forall \lambda, \gamma$. □

According to this property, the higher the worker's ability, the lower the productivity threshold below which the job is destroyed. This suggests therefore that high-ability workers may keep their jobs even though bad productivity shocks hit them.

3 Simulations of the equilibrium wage distribution

An important implication of our model is that the distribution of wages depends on the endogenous job destruction decision. In particular, the shape

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[9]A discussion of wage distribution determination is provided in the next section.

[10]The non-directed search assumption implies that the labor market tightness depends on the distribution of abilities among the unemployment pool, which itself depends on tightness. Consequently, we cannot provide a formal statement of existence and uniqueness.

of wage dispersion can not be not the same as the one we assumed for the distribution of workers' abilities due to these endogenous job destructions. This section aims at enlightening the potential empirical relevance of endogenous job destructions as a way to explain the distribution of wages. We briefly present the model calibration, discuss the computation of wage distribution and then examine some numerical experiments.

3.1 Calibration

We consider a quarterly calibration of the model. A first set of parameters is based on external information, while a second aims at replicating some stylized facts characterizing the French low-skilled workers data set.

As a preliminary step, specifications of functional forms for the matching function and the distributions of idiosyncratic shocks and abilities are required. As it is usually assumed, we consider a uniform distribution of shocks $G(x) = x \quad \forall x \in [0,1]$ and a Cobb-Douglas matching function $M(v,u) = v^\psi u^{1-\psi}$. The dispersion of abilities is assumed to be defined by a Pareto distribution[11] which satisfies $F(a) = 1 - (\frac{1}{a})^\beta \ \forall a \in [1, \overline{a}]$.

These specifications imply that the equilibrium conditions collapse to:

$$c\theta^{1-\psi} = \left(\frac{1-\gamma}{r+\lambda}\right) \int_1^{\overline{a}} \left(\frac{u(a)}{u}\right) \frac{1}{2} \left[1 - R(a)\right]^2 da \tag{4}$$

$$R(a) = -a + z - \left(\frac{\lambda - \gamma\theta^\psi}{r+\lambda}\right) \frac{1}{2} \left[1 - R(a)\right]^2 \tag{5}$$

$$u(a) = f(a)\frac{\lambda R(a)}{\theta^\psi + \lambda R(a)} \ ; \ u = \int_1^{\overline{a}} u(a)da \tag{6}$$

The first set of parameters $\{r, \lambda, \psi, \gamma\}$ is actually taken from Mortensen and Pissarides (1999). Values are reported in Table 1.[12]

Table 1: Parameters

r	λ	ψ	γ	$\overline{a}$	β	z	c
0.01	0.1	0.5	0.5	2	1	1.5	0.044

[11]For instance, Mortensen D. (2003) makes this assumption to characterize heterogeneity of productivities.

[12]Keep in mind that in our framework the Hosios condition $\gamma = \psi$ no longer achieves efficiency due to externalities in the matching process.

The second set of parameters includes $\{\bar{a}, \beta, z, c\}$. Therefore we choose four targets: the unemployment rate of 8%, an average unemployment spell of 5 quarters, the ratio of the mean wage over the median one, 1.04, and the average job destruction rate for the 5th wage decile. In particular, this calibration implies that home production is equal to 1.5 for all workers' types, while market production goes from 1 to 2 for workers with the lowest ability ($a = 1$) and from 2 to 3 for workers with the highest ability ($a = 2$).

3.2 Computation of wage distribution

To determine the distribution of wages, first keep in mind that, in our benchmark, the wage earning of a worker is not only related to her ability but also to idiosyncratic shocks that hit the job. Formally, this results in $w = w(a, \varepsilon)$.

On the other hand, without any shock, there are no endogenous job destructions. The distribution of wages could be then directly derive from abilities'one as the wage expression would only depend on ability a. More precisely, substituting $\lambda G(R(a))$ with an exogenous job destruction rate s, the density function of wages denoted $\phi(w)$ would be given by:

$$
\begin{aligned}
\phi(w) = \phi(w(a)) &= f(a) - u(a) \\
&= f(a) \left(\frac{\theta^{\psi}}{s + \theta^{\psi}} \right)
\end{aligned}
$$

Therefore, from the Pareto distribution, we would get $f(a) \equiv F'(a) = \beta a^{-\beta-1}$, leading to $f'(a) < 0$. This would unambiguously imply $\phi'(w) < 0$. Such a strictly decreasing shape of the wage density function is obviously at odds with empirical findings.

But considering idiosyncratic shocks first imply that heterogenous workers may earn the same wage. To compute the density of wages, we then need to account for the endogenous job destruction decision as well. For instance, some high-ability workers may earn low wages at a certain point because their productivity threshold is low. Beyond this intuitive statement, we can derive the density of wages as follows:

$$
\phi(w) = \int_1^{\bar{a}} \Psi(w, a) da \quad \text{with} \quad \begin{cases} \Psi(w, a) = 0 & \forall w < w(a, R(a)) \\ \Psi(w, a) = f(a) - u(a) & \forall w \geq w(a, R(a)) \end{cases}
$$

where we make use of the fact that the uniform distribution of shocks implies that the density of each productivity draw is unchanged all across the support of shocks.

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3.3 Numerical experiments

This quantitative analysis aims at examining whether our model is able to produce realistic properties concerning separation rates and wage dispersion.

Figure 3 shows the model properties. Figure 4 compares some statistics calculated from the simulated data of the model with the same statistics based upon empirical data for the French low-skilled workers segment. First of all, the model implies a decreasing relationship between the job destruction rate of the worker and her ability: it starts with a quarterly rate of 5% and falls to zero for workers whose ability is 1.55 times higher than the lowest one. Without further foundation for employment exit than idiosyncratic shock, this implies that the unemployment risk is null for those workers. Given the equilibrium distribution of abilities, around 20% of workers do not experience any employment to unemployment transitions.

Figure 3: Model properties
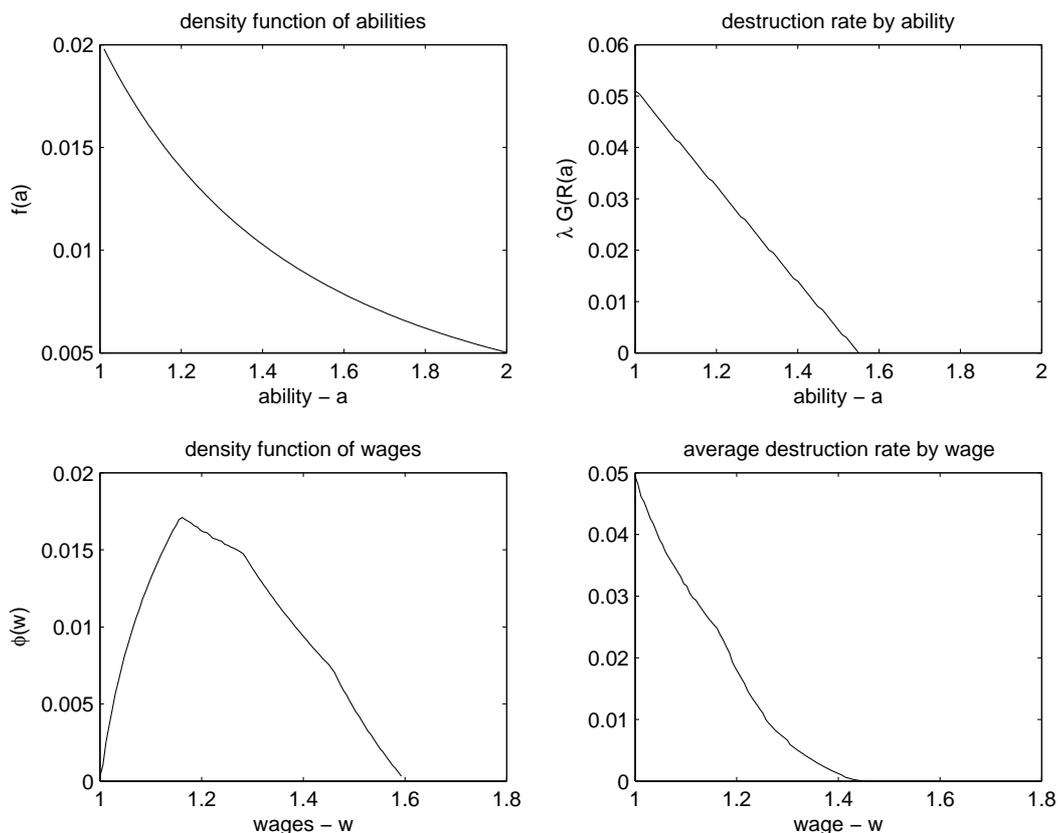
The distribution of wages is then a combination of the exogenous distribution of abilities and the endogenous job destruction rates. First, the highest wage is 1.6 times greater than the lowest while the highest ability is two times greater than the lowest one. So, there is wage compression. But the most striking feature is that the model is able to generate an hump-shaped distribution. This shape is the outcome of both mechanisms related to endogenous job destructions. On one hand, while the proportion of low-ability workers among the employed is assumed to be high given the Pareto distribution, it is actually reduced as those workers run higher separation rates. On the other hand, workers with the highest (lowest) abilities move right (left) in the wage distribution. In turn, a high-ability worker may earn a low wage: despite a very bad productivity shock (which implies a low wage), a firm may accept to not close down the job because of high expected gains in the future, once the bad temporary shock over. It would not be the case if the worker had a low level of ability.

Figure 4: Model assessment
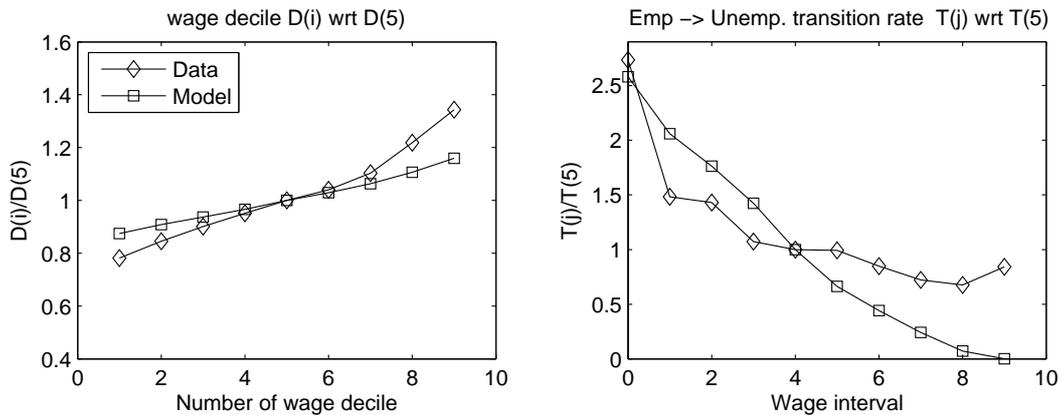
We then compare model implications with the statistics calculated from the group of low-skilled workers in France. Figure 4 reports two kinds of statistics: (i) the panel on the left gives the value of each wage decile with respect to the median wage[13] (ii) the panel on the right gives the average job destruction rate according to the wage interval workers belong to, over the one calculated for those in the 5th wage interval[14]. The model seems to

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[13]Keep in mind that our model is calibrated so as to reproduce the value of the median wage over the mean wage. By definition, this statistic is equal to one for the 5th decile, both in the data and the model.

[14]The 5th wage interval includes wages between the 4th and the 5th decile.

be performing pretty well although we slightly understate the size of wage dispersion, both on the right and on the left of the distribution. Another interesting performance of the model concerns the average job destruction rate: until the median wage the model allows for a very good fit of job destruction rates. Indeed, the employment to unemployment transition rate of workers in the first wage interval, over the one of workers belonging to the 5th, is more than 2.5 times lower than the transition rate of workers belonging to the 5th wage interval, as found in data. However, above, the model implies that the job destruction rate decreases up to zero whereas it should become stable.

Overall, although the performance of the model is obviously far from perfect, we think that these numerical experiments highlight the potential role of endogenous job destructions in the wage dispersion analysis. In this way, our framework puts emphasis on a mechanism that can generate hump-shaped wage distributions, as found in the data.

4   Conclusion

This paper mainly stressed the potential role of endogenous job destructions in the wage dispersion discussion. We have developed a matching model with endogenous job destructions in combination with heterogenous workers to generate a negative correlation between the employment to unemployment transition rate and the wage interval workers belong to. The point is that this combination produces in addition new insights to understand the shape of the wage distribution. This contrasts with the existing search-matching literature which rather considers from now on-the-job search. We think therefore that both on-the-job search and endogenous firing decision should be considered at the same time in order to provide a good description of wage inequalities. Considering matching and non-directed search with heterogenous workers which is known to raise (in)efficiency issues, it is obvious that our work also leaves open another research avenue dealing with optimal labor market policy.

References

Albrecht J. and Vroman S., "A matching model with endogenous skill requirements," *International Economic Review*, 2002, *43* (1), 283–305.

Andolfatto D., "Business cycles and labor market search," *American Economic Review*, 1996, *86* (1), 112–132.

Blàquez M. and Jansen M., "Search, mismatch and unemployment," *European Economic Review*, 2008, *52* (3), 498–526.

Bontemps C., Robin J.M., and van den Berg G., "An empirical equilibrium job search model with search on the job and heterogeneous workers and firms," *International Economic Review*, 1999, *40* (4), 1039–1074.

___ , ___ , and ___ , "Equilibrium search with continuous productivity dispersion: Theory and nonparametric estimation," *International Economic Review*, 2000, *41* (2), 305–358.

Burdett K. and Mortensen D., "Wage differentials, employer size, and unemployment,," *International Economic Review,*, 1998, *2* (39), 257–273.

Cahuc P., Postel-Vinay F., and Robin J.M., "Wage Bargaining with On-the-Job Search: Theory and Evidence," *Econometrica*, 2006, *74* (2), 323–364.

Chéron A. and Langot F., "Labor market search and real business cycles: reconciling Nash-bargaining with real aage dynamics," *Review of Economic Dynamics*, 2004, *7* (2), 476–493.

___ , **Hairault J.-O., and Langot F.**, "Life-cycle equilibrium unemployment," March 2008. IZA Discussion Paper No 3396.

___ , ___ , and ___ , "A quantitative evaluation of payroll tax subsidies for low-wage workers: An equilibrium search approach," *Journal of Public Economics*, 2008, *92* (3-4), 817–843.

Cole H. and Rogerson R., "Can the Mortensen-Pissarides matching model match the Business Cycle facts," *International Economic Review*, 1999, *40* (4), 933–959.

Hall R.E., "Employment fluctuations with equilibrium wage stickiness," *American Economic Review*, 2005a, *95* (1), 50–65.

___ **and Milgrom P.**, "The limited influence of unemployment on the wage bargain," *American Economic Review*, 2008, *98* (4), 1653–1674.

Merz M., "Search in the labor market and the Real Business cycle," *Journal of Monetary Economics*, 1995, *36* (2), 269–300.

Millard S., "The cyclial effects of labour market policy," in P.Y. Hénin, ed., *Advanced Business Cycle Theory*, Springler Verlaag, 1996.

Mortensen D., *Wage Dispersion: Why are Similar People Paid Differently*, The MIT Press, 2003.

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

___ **and** ___ , "New developments in models of search in the labor market," in O. Ashenfelter and D. Card, eds., *Handbook of Labor Economics*, 1st ed., Vol. 3, Elsevier, 1999, chapter 39, pp. 2567–2627.

Pissarides C., *Equilibrium unemployment theory*, 2nd ed., Vol. 1, The MIT Press, 2000.

___ , "The unemployment volatility puzzle: Is wage stickiness the answer?," *Econometrica*, 2009, *77* (5), 1339–1369.

Postel-Vinay F. and Robin J.M., "Equilibrium wage dispersion with worker and employer heterogeneity," *Econometrica*, 2002, *70* (6), 2295–2350.

Shimer R., "The cyclial behavior of equilibrium unemployment and vacancies," *The American economic Review*, 2005a, *95* (1), 25–49.

___ **and Smith L.**, "Matching, search, and heterogeneity," *The B.E. Journal of Macroeconomics)*, 2001, *0* (1).

Appendix: The data set

To assess statistically the correlation between the employment to unemployment transition rates and wages, we used the French Labor Force survey (*Enquête Emploi*) over the 1992-2002 period. This is a rotating panel since exactly one-third of the sample is dropped from the sample each year and is replaced with a new, comparable sample drawn from the current population. The size of each Labor Force survey is about 135000 individuals who are interviewed annually (in March) about their situation on the labor market. It provides detailed characteristics on both individuals and jobs.

We defined our sample in the following way. We focused on the population of respondents who were working in March of year 1 and considered their situation on the labor market in March of the next year (year 2). We chose to select the subsample of male workers aged from 18 and 60, working full-time or part-time jobs and employed by the private sector. We exclude farmers and self-employed. We also deleted the few observations with missing values, mainly because of missing wages. These different selections left us with a sample including about 10600 observations each year. Lastly, workers were sorted according to their socioeconomic status. More precisely, we defined four groups of workers by skill level: high-skilled workers (including executive, managers, professional people), medium-skilled workers, low-skilled and unskilled workers[15].

We focused on the two following variables of interest. The first one was about transitions from employment to unemployment. Therefore, we defined a dummy variable which was equal to one when the worker has experienced a transition from employment to unemployment between year 1 and year 2. The second outcome was the monthly wage level, expressed in euros. Wages were divided into ten intervals computed from nine wage deciles. For each skill level, workers were then sorted according to the wage interval they belong to. We computed then annual employment-unemployment transition rates both by skill level and wage interval. Finally, from the latter, we constructed a mean transition rate over the whole period, again both by skill level and wage interval.

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[15]According to the French categorization of the workforce (*"CSP"* - *Catégorie-socioprofessionelle*), high-skilled workers refer to *"Cadres"*, medium-skilled to *"Professions Intermédiaires"*, low-skilled to *"Ouvriers Qualifiés"* and unskilled workers to *"Ouvriers Non-Qualifiés"* or *"Employés"*

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