Layoff Taxes and Minimum Wage. Two complementary public policies.

Frédéric Gavrel* Isabelle Lebon† Thérèse Rebière ‡

CERENE, University of Le Havre

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Abstract

In a matching model in which the job destruction rate and the output are endogenous, we show that the presence of a binding minimum wage prompts firms to choose too risky jobs. Introducing layoff taxes therefore reduces unemployment and improves market efficiency.

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*CERENE, Department of Economics, University of Le Havre, 25 rue Philippe Lebon, BP420, 76057 Le Havre cedex; frederic.gavrel@univ-lehavre.fr

†CERENE, Department of Economics, University of Le Havre, 25 rue Philippe Lebon, BP420, 76057 Le Havre cedex; isabelle.lebon@univ-lehavre.fr

‡Corresponding author; CERENE, Department of Economics, University of Le Havre, 25 rue Philippe Lebon, BP420, 76057 Le Havre cedex; phone: (33)2 32 74 41 21; fax: (33)2 32 74 40 86; therese.rebiere@univ-lehavre.fr

1 Introduction

The literature about employment protection emphasizes that layoff taxes can improve labor market efficiency by making firms internalize the budgetary consequences of their dismissal behavior (see for example Blanchard and Tirole (2004) and Gavrel and Lebon (2008)). Here, we argue that introducing layoff taxes reduces unemployment and improves market efficiency as soon as wage setting is constrained by a mandatory minimum wage. In other words, minimum wage and layoff taxes appear to be complementary policy instruments. These instruments are considered as complementary in the sense that layoff taxes allow to compensate for the negative impact of the minimum wage. Countries with a minimum wage should thus also have layoff taxes.

Our framework is a matching model (Pissarides (2000)) in which the output and the job destruction rate are endogenous. Similarly to Wang and Williamson (2002), the higher the output, the higher the risk of job destruction[1]. Firms decide on these two variables by maximizing the asset value of jobs. In the presence of a binding minimum wage, firms are *the full residual claimant* of an increase in the output. They thus have an incentive to choose too risky jobs; which explains why layoff taxes are desirable.

2 Market structure

We study the interactions between the minimum wage and an employment protection tax in the following simplified environment.

Frictions in the labor market stop the instantaneous matching of jobs with workers. All agents are homogeneous, risk-neutral and discount future payoffs at rate r.

Workers are infinitely lived. When holding a job, workers are assumed to receive the minimum wage m. To make sense, this assumption imposes that the minimum wage is greater than the market wage. Our benchmark is a static Nash bargaining where β ($0 < \beta < 1$) denotes the workers' bargaining strength.

A firm offers a single job when entering the market. The cost per period of keeping a vacancy open is c. A filled job yields some positive output y. When an idiosyncratic shock occurs at rate s, the output is permanently reduced to zero. Therefore, the firm necessarily dismiss its employee and pays the layoff tax f. Layoff taxes are used to subsidy employment. Firms with a filled job receive the subsidy σ per period. In stationary state, the balanced budget constraint of the government implies that $\sigma = sf$.

We assume that more productive jobs are riskier[2]. The endogenous destruction rate s is an increasing and convex function of the output y such as $s = s(y)$ with $s'(y) > 0$, $s''(y) > 0$. Firms irreversibly decide on the pair (s, y) by maximizing the value of a vacancy.

[1] Our main results also hold when job destruction is modelled as Mortensen and Pissarides (1994). Our modelling of dismissals is simpler and looks realistic.

[2] An equivalent assumption is that firms can reduce the risk of destruction by raising their job retention effort (see Wang and Williamson (2002)).

Market frictions are summarized in a increasing and concave matching function. The ratio of vacancies to unemployment, denoted by θ, is the labor market tightness. Assuming C.R.S., the arrival rate of unemployed workers to vacancies is a decreasing function, $q = q(\theta)$, and the arrival rate of jobs to unemployed workers is an increasing function, $p = p(\theta) = \theta q(\theta)$.

Let $J(y)$ be the asset value of a filled job and $V(y)$ that of a vacancy. In stationary state, we have:

$$rJ(y) = y - m + \sigma - s(y)[J(y) - V(y) + f] \tag{1}$$

$$rV(y) = -c + q[J(y) - V(y)] \tag{2}$$

Let $W(y)$ be the (expected) lifetime utility of employed workers and U that of unemployed workers, we have:

$$rW(y) = m - s(y)[W(y) - U] \tag{3}$$

$$rU = d + p[W(y) - U] \tag{4}$$

with d being the utility of leisure.

Job creation results from the free-entry assumption. The optimal value of vacancies is therefore reduced to zero:

$$V = \max_y V(y) = 0 \tag{5}$$

3 Optimal job destruction, equilibrium and efficiency

As already mentioned, firms decide on the pair (s, y) by maximizing the value of a vacancy, which is equivalent to maximize (1). As firms are very small, they consider the subsidy σ as an exogenous variable. Taking (5) into account, we obtain the following first order condition[3]:

$$1 - s'(y)\left[\frac{y - m}{r + s(y)} + f\right] = 0 \tag{6}$$

Using the convexity of the function $s(.)$, one can show from the differentiation of (6) that an increase in the minimum wage prompts firms to raise the destruction rate. A minimum wage increase lowers the value of occupied jobs, hence the loss that their destruction generates.

Equation (6) determines the pair (y, s). Market tightness θ is obtained by combining (1) and (5). When the government budget constraint is satisfied, the job creation formula is:

$$-c + q(\theta)\frac{y - m}{r + s(y)} = 0 \tag{7}$$

As y maximizes $J(y)$, differentiating equation (7) shows that an increase in the minimum wage reduces job creation (the variable θ falls). The rise of the destruction rate therefore leads to an increase in the unemployment rate u, where $u = s(y)/[s(y)+p(\theta)]$ is a function of y and θ, deduced from the condition for flow equilibrium.

[3]The convexity of $s(.)$ ensures that the seconder order condition is fulfilled.

To make sense, the relations we stated beyond impose that the minimum wage is binding. The bargained wage must be lower than the minimum m. In other words, the minimum wage must generate a higher workers' surplus $(W-U)$[4] than Nash bargaining, that is to say when $W-U>\beta S$. The total private surplus of a match S is obtained by combining equations (1), (3), (4) and (5). Using the (3) and (4), the condition for the minimum wage to be binding is therefore:

$$m > d + \beta \frac{r+s(y)+p(\theta)}{r+s(y)+\beta p(\theta)}(y-d) \tag{8}$$

An equilibrium of the labor market can be defined as follows:

Definition. *An equilibrium of the labor market is a pair (θ, y) which jointly satisfies equations (6) and (7) as well as condition (8).*

4 Layoff taxes, unemployment and efficiency

We now study the effects of implementing a layoff tax on unemployment and on market efficiency in the neighborhood of an equilibrium with employment at will ($f=\sigma=0$).

To that aim, we first analyze the efficiency of the decentralized equilibrium. The efficiency criterion is the social surplus per head (see Hosios (1990) and Pissarides (2000)), denoted by cs:

$$cs = (1-u)y + ud - \theta uc \tag{9}$$

For expositional simplicity, we restrict to the case where $r=0$[5]. Under this assumption, the welfare analysis amounts to compare steady states according to criterion cs. We state the following proposition:

Proposition 1. *In a decentralized equilibrium with employment at will, job destruction is too high in the presence of a binding minimum wage.*

Proof. The derivative of cs with respect to y satisfies:

$$\frac{(s+p)^2}{s}\frac{\partial cs}{\partial y} = -s'(y)(y-m) - s'(y)(m-d) + s + p - s'(y)\theta c$$

For $f=\sigma=0$, (6) and (7) give:

$$s'(y)(y-m) = s$$

and

$$p - s'(y)\theta c = 0$$

Substitution into the derivative of cs yields:

$$\frac{(s+p)^2}{s}\frac{\partial cs}{\partial y} = -s'(y)(m-d) < 0$$

□

[4] At this stage, the argument y can be dropped out with no ambiguity.

[5] The results extend to a positive interest rate. The proofs are available from the authors upon request.

One can show that with a bargained wage, firms decide on job destruction by maximizing the total private surplus of a match (S). Consequently, in this case, employment at will is optimal under the Hosios condition. So, the inefficiency of the firms' choice does result from the presence of a minimum wage. The reason for this is that a binding minimum wage discretely changes firms' dismissal behavior[6]. With a minimum wage, an increase in the output raises the profit flow $(y - m)$ by the same amount. In other words, firms are the *full residual claimant.* On the contrary, with Nash bargaining, part of the output increase goes to the workers. So the presence of a minimum wage prompts firms to raise the output of jobs, hence their destruction rate (see Acemoglu and Pischke (1999) for a similar argument in the context of training). This also explains why job destruction is too high whether job creation (θ) is too high or too low.

About the effects of introducing a layoff tax in the presence of a minimum wage, we state the following proposition:

Proposition 2. *In the presence of a binding minimum wage, introducing a layoff tax reduces unemployment and improves the labor market efficiency.*

Proof. We study the impact of an increase in f on θ and y in the neighborhood of employment at will ($f = 0$). As y maximizes $J(y)$ for a given σ, the differential of (1) satisfies:

$$(r + s(y))dJ(y) = [1 - s'(y)(J(y) + f)]dy + d\sigma - s(y)df = d\sigma - s(y)df$$

Differentiating (8) gives:

$$(r + s(y))dJ(y) = d\sigma - s(y)df = s'(y)f dy$$

The first order effect of f on $J(y)$, hence on tightness θ is then equal to zero in the neighborhood of $f = 0$. The effect on y is obtained from (6). Starting from $f = 0$, we obtain:

$$s''(y)[J(y) + f]dy = -s'(y)[dJ(y) + df] = -s'(y)df$$

The first order effect of f on y and s is therefore negative in the neighborhood of $f = 0$.

Introducing a layoff tax reduces the unemployment rate. As y (and s) are too high with employment at will, their decrease raises the social surplus. □

For obvious reasons, introducing a layoff tax lowers the output and the job destruction rate. As these taxes finance subsidies to (occupied) jobs, the decrease of the value of occupied jobs, hence of market tightness, is very small (compared with the output cut). Therefore, whether job creation is too low or too high, introducing a layoff tax raises the social surplus.

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[6]Notice that the binding condition (8) is not used in the demonstration of Proposition 1. This also comes from the switch in firms' behavior.

5 Conclusion

In this paper, we have shown that a binding minimum wage causes a switch in firms' dismissal behavior which motivates for introducing layoff taxes.

One could lament that our analysis does not say anything about the size of the tax that should be implemented. However, this objection is irrelevant in countries (as southern Europe countries) which already combine a mandatory minimum wage with high administrative firing costs. By substituting layoff taxes for administrative procedures, those countries have nothing to lose but something to gain.

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