Research in Economics 65 (2011) 209–220

Contents lists available at ScienceDirect

Research in Economics

journal homepage: www.elsevier.com/locate/rie

# The influence of labour market institutions on job complexity

Samir Amine [a,b,*], Pedro Lages Dos Santos [c]

[a] University of Quebec en Outaouais, Pavillon Alexandre-Taché, 283 boulevard Alexandre Taché, bureau C-3805, Case postale 1250, Gatineau, Québec, Canada, J8X 3X7

[b] The Interuniversity Centre of Research, Liaison, and Transfer of Knowledge on The Analysis of Organizations (CIRANO), 2020, University St., 25th Floor, Montreal, Quebec, Canada, H3A 2A5

[c] Université du Havre, Faculté des Affaires Internationales, 25 rue Philippe Lebon, BP.420, 76057 Le Havre Cedex, France

ARTICLE INFO

*Article history:*
Received 1 November 2009
Accepted 2 October 2010

*Keywords:*
Productivity
Participation and complexity

ABSTRACT

This article aims to understand how public policies affect the behavior of agents in terms of selectivity. In other words, we explain how the state of the labour market and, in particular the qualification level of workers, affects the technological choices of firms. Using a matching model in which workers are vertically differentiated and where the nature of jobs is endogenous, we show that an increase in unemployment benefits or in minimum wage can enhance the recruiting of skilled workers by making firms more selective and jobs more complex.



## 1. Introduction

The deteriorating labour market situation of the less qualified over the past twenty years has characterized most developed countries. This has led many experts and international organizations, including the OECD, to focus on the lack of the labour market's flexibility in European countries (Krugman, 1993; Manacorda and Petrongolo, 1999) and to recommend that these countries should soften their legislation. Labour market legislation which varies from one country to another would, according to the OECD, be an important explanation for the observed differences between European and American unemployment and wages inequalities. In particular, the OECD emphasizes the relatively high costs of layoffs, minimum wage and the role of trade unions.

In theory, the minimum wage contributes to reduce the disparities. However, the numerous empirical studies to evaluate the effect of such an instrument on employment did not bring net confirmation to the theoretical arguments. Using American data (Brown, on 1999; Lee, on 1999) and the methodology of natural experiences, Card and Krueger (1994, 1995) shows that an increase in minimum wage can lead to a rise of employment when the initial level of this minimum is low. Their study was made on fast food in New Jersey in 1992 and in California in 1988 (Kennan, 1995; Neumark and Wascher, 2000). In a French study, Kramarz and Philippon (2001) bring to an increase in employment returns of unskilled workers when the cost of the minimum wage falls following an extension of reduced charges on low salaries (Gafsi et al., 2004).

Several arguments have been presented to explain the rising inequality between skilled and unskilled worker earnings, namely technical progress and international trade. However, the theoretical and empirical literature (Acemoglu, 2002, 2003; Aghion and Howitt, 2002) have considered the first as the most crucial.

In the literature, biased technical progress is generally regarded as a exogenous parameter which determines the state of the labour market (Gautier and Teulings, 2004; Nickell, 2004). In this context, Acemoglu (1999), Albrecht and Vroman (2002)

* Corresponding author at: University of Quebec en Outaouais, Pavillon Alexandre-Taché, 283 boulevard Alexandre Taché, bureau C-3805, Case postale 1250, Gatineau, Québec, Canada, J8X 3X7.
*E-mail addresses:* samir.amine@uqo.ca, samir.amine@cirano.qc.ca (S. Amine), pedro.lages@univ-lehavre.fr (P. Lages Dos Santos).

1090-9443/$ – see front matter © 2011 University of Venice. Published by Elsevier Ltd. All rights reserved.
doi:10.1016/j.rie.2010.10.001

and Gautier (1999) have constructed models in which firm qualification needs are endogenous. These authors have focused on vertical differentiation of workers and therefore on the question of job complexity. However, in these models worker heterogeneity is binary (qualified/not qualified) and the firms' choice discrete. This framework is thus rather restrictive and conditions the results of these models since the productivity of a skilled job filled by a qualified worker does not depend on the state of the labour market. In other words, job complexity remains essentially exogenous.

The main contribution and originality of this paper come from, first the way we study the interactions between technological choices of firms and labour market policies, second, the dynamic of the model and third, the continuity of skill distribution

The existing literature treats productivity inequalities as given and tries to find the most effective policies to reduce the gaps between workers (Marimon and Zilibotti, 1999). We consider that firms react to public policies by changing their technological choices according to the qualification level of workers. The perspective is thus reversed. Instruments like unemployment benefits and minimum wage not only affect labour market performance, but also firms' technological choices. Theses choices are at the very source of the inequalities these instruments are supposed to reduce.

We use a dynamic matching model (Pissarides, 2000) in which heterogeneous workers are vertically differentiated by their qualification level (Strand, 2000, 2002). On the other hand, firms are supposed identical and offer a single homogeneous job. The hiring process between the two agents is formalized by a constant returns function.

Workers productivity depends both on their qualification level and on the degree of job complexity. In accordance to intuition, we suppose that only qualified workers take advantage of job complexity. In other words, we account for the complementarity between complexity and qualification level. In this context, only workers with a sufficient qualification level will participate in the labour market. The continuous distribution of skills, and not binary as in the above-noted models, allows then the definition of an ability threshold more relevant and closer to the labour market's reality. All workers whose qualification level is lower than this threshold are considered *not employable* and are excluded from the labour market. We will show that this threshold plays a key role in the determination of job complexity.

In this framework, we study the effects of unemployment benefits and of minimum wage on productivity and on labour market participation. We show that an increase in minimum wage would make firms more selective by requiring a higher ability threshold for recruiting workers.

With the minimum wage, all workers whose productivity is low will be excluded from the labour market because firms refuse to recruit them. As a result, an increase in the minimum wage leads to a decrease in labour market participation. Considering that the recruitment of qualified workers becomes easier, firms in this economy respond to this increased selectivity by creating more complex jobs. The characteristics of the created jobs will be adapted for higher skill workers, leading to an improvement in matching quality, and thus productivity. In this context, the minimum wage can be presented as a public policy instrument for regulating job assignment.

Comparative statistics also suggests that an increase in unemployment benefits makes firms and *employable* workers more selective by requiring a higher ability threshold. As a result, firms choose to increase job complexity, which has a positive effect on productivity. However, and in spite of matching quality improvements, the labour market's participation decreases, while the unemployment rate rises.

The rest of paper is organized as follows. The model and the market structure are presented in Section 2. Then, solving of the model and the definition of its equilibrium are discussed in Section 3. We define and study the comparative statics properties of the model in Section 4. Finally, the paper concludes in Section 5.

## 2. The model

Consider an economy populated by a large exogenous number of workers and a large endogenous number of firms. Each firm offers a single job. Firms and workers are risk neutral and have the same rate of time preference denoted by $r$.

Workers are vertically differentiated by their qualification level and have an infinite horizon. Each worker's ability $z$ is a constant, implying that productivity differences are purely general. Among the worker population, $z$ is distributed according to a continuous distribution, $G(z)$, with support $z \in [z_{\min}, Z]$. The density of $G(z)$ is denoted by $g(z)$.

On the other hand, firms in this economy are identical. The exogenous job destruction rate is $s$. Nevertheless, we assume firm free-entry in order to maintain a fixed number of firms at the stationary state.

### 2.1. Job complexity and productivity

Each firm-$i$ of this economy requires a minimal ability (qualification level), called $\hat{z}_i$, for her future worker. Indeed, all workers with an ability below $\hat{z}_i$ are excluded from the labour market and will be considered *not employable*.

In addition, a firm that enters the labour market with a vacant job, must define the degree of complexity of this job in order to maximize its value. This endogenous determination of production technology based on the market labour conditions is a key point of our analysis.

In this context, we assume that the productivity of a job-$i$ depends both on the degree of complexity and on the ability (i.e. qualification level) of the worker who is occupying it. Formally, the productivity of a job-$i$, noted $y_i(a_i, z)$, is considered as a linear and increasing function of ability $z$:

$$y_i(a_i, z) = A(a_i) + a_i z. \tag{1}$$