# Wages, selectivity, and vacancies: Evaluating the short-term and long-term impact of the minimum wage on unemployment

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## ARTICLE INFO

## ABSTRACT

Using a circular matching model (Marimon R, Zilibotti F. Unemployment vs. mismatch of talents: Reconsidering unemployment benefits. Economic Journal 1999;109; 266–291), where the wage setting is similar to Weiss (Weiss A. Job queues and layoffs in labor markets with flexible wages. Journal of Political Economy 1980; 88; 526–538), we reexamine Card and Krueger's (Card, D., Krueger, A. Myth and Measurement, the New Economics of the Minimum Wage. Princeton University Press; 1995) intuition on the impact of the minimum wage on unemployment. In the short term, a rise in the minimum wage increases the employment level by making firms less selective. In the long term, numerical simulations show that, despite the reduction of job creation, introducing a minimum wage may lower unemployment as soon as workers and jobs are sufficiently differentiated. However, beyond some limit, the wage increase raises unemployment whatever the degree of differentiation is.

## 1. Introduction

Economists' viewpoint on the impact of the minimum wage has changed a lot since the mid-1990s. For a long time the inefficiency of this constraint on wage setting appeared to be clear. The pioneer article from Stigler (1946) showed that this prevailing viewpoint on wage legislation no longer applies once firms have a market power. In an oligopolistic labor market, the market wage is lower than the competitive wage. Bordering on the market wage, the labor demand exceeds the labor supply; thus the employment level is determined by the labor supply behavior. Introducing a minimum wage therefore increases the employment level. However most economists regard this result as being a mere theoretical curiosity rather than a positive proposal.

The reexamination of mandatory wages originates in recent empirical studies. Among them Card and Krueger (1994, 1995)'s works played a determinant part. Their quasi-experimental study on the fast food industry in Texas and New Jersey (Card and Krueger, 1994) grabbed attention. According to this study, the raising of the minimum wage in 1991 (Texas) and in 1992 (New Jersey) would have led to a rise in youth and unskilled employment.

Even though many econometricians are more sceptical today (see Neumark and Washer, 2007) for a detailed survey) this result appeared as a theoretical enigma which some economists[1] tried to solve. Relying on the shirking model of Shapiro and Stiglitz (1984), Rebitzer and Taylor (1995) assume that an increase in the workforce makes the effort control less efficient. A rational employer who decides to hire workers will thus need to increase the offered wage in order to extract the required level of effort. As a consequence, firms will take advantage of a mandatory increase in wages by raising the employment level. Cahuc and Zylberberg (2004) show that a minimum wage increase has two opposite effects on unemployment. On the one hand, it reduces job creation. On the other hand, it gives the unemployed workers the incentive to raise their search intensity. For low values of the minimum, the second effect dominates the first one. Jobs are fewer but filled jobs are more. On the contrary, for high values of the minimum wage, the reduction in the creation of jobs leads to an employment cut. Many papers put the emphasis on the efficiency of the labor market. Different models account for the fact that the presence of a binding minimum wage is likely to crowd out agents, firms or workers, with a low productivity (Swinnerton, 1996; Van den Berg and Ridder, 1998; Acemoglu, 2001). The minimum wage can also be used to exclude a Pareto-dominated equilibrium as in Van

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[1] As Flinn (2006) points out, cogent models consistent with those empirical results are not a lot.

den Berg (2003). Flinn (2006) [2] argues that a mandatory increase in wages improves the efficiency of the economy when the workers' share of a match surplus is too low. Gavrel and Lebon (2008) show that introducing a minimum wage may improve market efficiency by reducing the mismatch between workers and jobs.

According to and in line with the intuition of Card and Krueger (1995), our paper carries out a reexamination of the impact of the minimum wage on unemployment. According to these authors an imposed increase in the minimum wage could lead to a reduction in the unemployment level either by lowering the number of voluntary resignations and thus reducing the average duration of job vacancies or by making hiring easier. Our fundamental argument puts the stress on hiring rather than quitting. In our framework the introduction of the minimum wage necessarily reduces the employers' selectivity and therefore tends to shorten the average duration of job vacancies.

Dealing with firms' selectivity obviously implies that workers must be heterogenous. We use a horizontal representation of the differentiation of skills. Similar to Marimon and Zilibotti (1999), we transpose the circular model of Salop (1979) to the labor market. Firms and workers uniformly distribute themselves along a circle, each point represents a type of skill. The arc connecting two points thus measures the mismatch level between the skill asked by a firm and the skill offered by a worker. Logically the effort provided by a worker increases with the distance which separates her skill type from the skill asked by the firm for her job. The firms' selectivity is measured by the "rejection threshold" that is to say, the distance beyond which the firms reject job applicants because they are too far from the required skill profile.

In order to account for firms' selectivity, hiring decisions as well as the wage setting must be made by firms. Therefore contrary to Marimon and Zilibotti (1999) or Gavrel and Lebon (2008), wages are not bargained in the matching model we use. Similar to Weiss (1980) we assume that when a worker meets a firm, she instantly observes the level of effort required for the job; whereas the firm remains "blind" about the level of effort the worker will provide.[3] In this situation of asymmetrical information, firms must offer the same wage for each applicant. This wage is determined in such a way that firms only accept applicants located at a distance below the rejection threshold. Firms' selectivity behavior thus results from a trade-off between their workers' costs and the length of time required to fill the firms' vacancies. When a firm increases (decreases) its rejection threshold in order to shorten (extend) the duration of a vacancy, its employee costs will increase (decrease) as well.

Another characteristic of this model relates to the matching process between unemployed workers and job vacancies. When agents' heterogeneity is made explicit it is hard to use a matching function with no microeconomic background. That is the reason why we use a reformulation of the urn-ball model (Pissarides, 1979; Petrongolo and Pissarides, 2001) which clearly underlines the influence of the firms' selectivity on the probability of filling a job vacancy and thus on the probability of hiring an unemployed worker.

Quasi-experimental studies often capture short-term phenomena. In particular, they tend to underestimate the (negative) effect on job creation which takes a long time to become apparent. This is the reason why our study on the impact of the minimum wage distinguishes between the short-term and the long-term impact. In the short term (for a given labor demand), we show that the imposed rise of wages increases the employment level by reducing the firms' selectivity. Nevertheless this rise of wages also lowers the profitability

of filled jobs which leads to a reduction in the labor market tightness. Therefore the long-term impact of the minimum wage remains undetermined. We carry out a quantitative analysis which enables us to clarify this point. These numerical simulations show that the introduction of a minimum wage will increase the employment level as long as workers and jobs are sufficiently differentiated. However, beyond some limit, a minimum wage increase raises unemployment whatever the degree of differentiation is.

In sum, our work can be seen as reconciling the (short-term) empirical findings with the usual (long-term) view about minimum wages. A large increase in the minimum wage will lower unemployment in the short term but this effect will reverse in the long term.

This paper is organized as follows: Sections 2 and 3 present the market structure and the wage-setting mechanism. The labor market equilibrium as well as the impact of the minimum wage are the subjects of the following two sections. The labor demand is first exogenous (Section 4) and then endogenous (Section 5). The conclusion clarifies the limits of the study and draws different lines for further research (Section 6).

## 2. The model

The economy is composed of two types of agents which are risk neutral and which discount future payoffs at rate $r$ ($R=1+r$). Workers and firms are heterogenous. $M$ and $N$ are respectively the pool of firms and the pool of workers. Workers are infinitely-lived; whereas firms, which produce an homogenous good, face at each period some positive destruction rate $s$ ($0<s<1$). Each firm creates a single job. The free-entry condition determines the number of firms in the market and stabilizes the repartition of jobs by skill type.

Similar to Marimon and Zilibotti (1999), we account for workers' differentiation by applying the model of Salop (1979) to the labor market.

### 2.1. Workers' differentiation and matching

#### 2.1.1. Skills' circle

We assume that workers and firms are uniformly distributed on a circle of circumference normalized to two (see Fig. 1). The repartition of workers is supposed to be exogenous. The location of a worker on the circle represents the type of her skill.

Let us consider two points $A$ and $B$ on the skills' circle. Let $\ell$ be the distance between $A$ and $B$ ($0\leq\ell\leq1$). This distance measures the mismatch between the type of a worker located in $A$ (respectively a firm) and the type of a firm located in $B$ (respectively a worker). Thus the match is perfect when the distance $\ell$ is equal to zero while the mismatch is maximal when $\ell$ is equal to one.
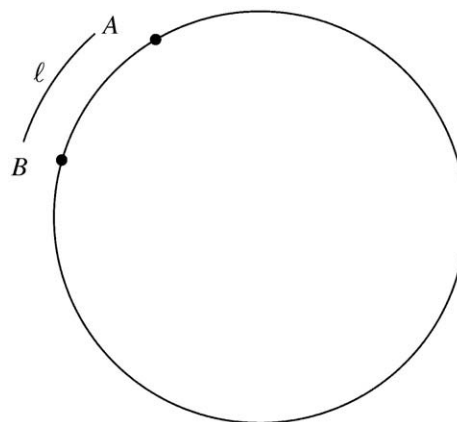


**Fig. 1.** Skills' circle.

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[2] Similar to Cahuc and Zylberberg (2004), imposing an increase in wages can lower unemployment in this model by stimulating the search activity of unemployed workers.

[3] Contrary to Weiss (1980) wage setting is not derived from an increasing (exogenous) relationship between the reservation wage of unemployed and their productivity.