



# Minimum wage, on-the-job search and employment: On the sectoral and aggregate equilibrium effect of the mandatory minimum wage<sup>☆</sup>

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## ABSTRACT

We study the impact of a minimum wage in a segmented labor market in which workers are at different stages of their careers. At the end of a learning-by-doing period, workers paid the minimum wage quit “bad jobs” for better-paying “good jobs”, following an on-the-job search process with endogenous search intensity. A rise in the minimum wage reduces “bad jobs” creation and prompts workers to keep their “bad jobs” by reducing on-the-job search intensity. The ambiguous impact on unqualified employment replicates and explains the findings of several empirical studies. However, a minimum wage rise reduces overall employment and output.

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## 1. Introduction

The purpose of this paper is to highlight the impact of a minimum wage on sectoral and overall employment in a matching model with a segmented labor market. Segmentation allows us to distinguish two sectors: a bad sector offering the minimum wage and a good sector offering bargained wages. The bad sector is composed of those newcomers who did not complete their formal education. These newcomers must go through a learning-by-doing period before becoming on-the-job seekers. The good sector is composed of the remaining newcomers as well as former on-the-job seekers from the bad sector. The quality of sectors (bad/good) does not relate to the quality of the match, but to the level of productivity in each sector. For this reason job creation in the good (bad) sector relates to the distinction between qualified (unqualified) employment. A rise in the minimum wage reduces bad job creation as well as the search intensity of on-the-job seekers. On the one hand, it becomes harder for bad-sector newcomers to obtain a bad job; on the other, on-the-

job seekers are less inclined to quit their bad job. The balance between the two effects is ambiguous; greater stability among the workers in the bad sector may therefore lead to an increase in unqualified employment. This result agrees with the findings of several empirical studies. However, this result is only sectoral. Our model shows that the macroeconomic effect of the minimum wage is consistent with standard competitive models by revealing a lowering in overall employment as well as a reduction in output.

Following the influential paper of Acemoglu (1999), labor economists have proposed different models with two types of jobs (skilled/unskilled) and two types of workers (low-skilled/high-skilled). See for instance Albrecht and Vroman (2002) and Blázquez and Jansen (2008). Gautier (2002) and Dolado et al. (2009) introduce on-the-job search in such a setting. In these models, like Pissarides (1994), on-the-job search stems from undirected search. Some high-skilled workers are mismatched (i.e. matched with an unskilled job) and then continue searching for a better job. With respect to the origins of on-the-job search, the articles of Moen and Rosén (2004) and Gavrel et al. (2010) are closer to our contribution: Search is directed, and unskilled employees begin to search for a better job as soon as their learning-by-doing process in a bad job has provided them with the required skills. But these articles which do not introduce either the minimum wage or a variable search intensity, deal with other issues. Like us, Acemoglu (2001) studies the impact of a minimum wage increase in a matching model with two types of jobs, good and bad. He obtains that this increase improves the average productivity because there is less bad jobs in the economy, but raises unemployment. However, in

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Acemoglu's model workers are homogenous, search is non oriented and on-the-job search is ruled out. These assumptions do not allow one to account for the observed facts which we focus on.

In the empirical literature dealing with the on-the-job search and job search intensity, [Holzer \(1987\)](#) provides support for the theory of search unemployment, establishing that workers' on-the-job search is less efficient than if they were to search while unemployed. Unemployed workers search more intensively, receiving and accepting more offers. Holzer's results reinforce the idea that a higher search intensity leads to better job transitions. Following Holzer, our model assume that unemployed workers, whatever their sector, with a maximal intensity unlike on-the-job seekers. Therefore only on-the-job seekers (trained workers from the bad sector) search while on the job and are permitted to modulate their search intensity.

The impact of a mandatory minimum wage is a major issue in labor market public policy. One of the major studies of the impact of the minimum wage is that of [Card and Krueger \(1995\)](#), who analyzed a set of 410 fast-food restaurants. The workers surveyed were mainly young and inexperienced, and the survey was conducted in New Jersey and Pennsylvania following the 1992 increase in New Jersey's minimum wage. Their analysis showed that restaurants already paying more than the minimum wage were unaffected, whereas employment was increased at restaurants which complied with the laws by increasing wages to the new minimum wage level. The resultant higher costs were reflected through higher prices, and not through decreased employment. Many empirical studies, such as [Neumark and Wascher \(2000\)](#), attempted to challenge this statement by reconsidering the data set. [Card and Krueger \(1995\)](#)'s results, seemingly consistent neither with standard competitive models nor entirely with monopsonistic models,<sup>1</sup> are still debated. Nevertheless, in their reply to Neumark and Wascher's challenging conclusion, [Card and Krueger \(2000\)](#) revised their study and restated that "[T]he increase in New Jersey's minimum wage probably had no effect on total employment in New Jersey's fast-food industry, and possibly had a small positive effect." (p 1419). Such a paradox has since then been the subject of extensive discussion.

Recently [Cardoso and Portugal \(2006\)](#) employed a different approach by analyzing the impact of the minimum wage on young (aged 16–18) Portuguese worker's accessions and separation flows, contrasting with the stocks studied by [Card and Krueger \(1995\)](#). Because of their age, teenagers are necessarily unqualified. These workers are thus close to those studied by [Card and Krueger \(1995\)](#).<sup>2</sup> Their aggregate analysis suggests that a sharp rise in the minimum wage does not seem to have a negative impact on employment for this specific age group. However, young workers are over-represented in firms closing down after a minimum wage rise. A rising minimum wage alters job transitions. The major effect here has been the reduction of separation rates, compensating for accession losses to new and continuing firms.

To set up a theoretical framework capable on reexamining the [Card and Krueger \(1995\)](#) results for unqualified employment, we use a matching model that segments the labor market into two interdependent sectors. The bad sector (sector 2) offers jobs to newcomers who are not sufficiently educated for direct access into the good sector, as well as to on-the-job seekers; they are paid the minimum wage. The

good sector (sector 1) offers good jobs to educated newcomers and former on-the-job seekers; these all negotiate their wages. The inflow of new workers entering the market exactly balances the outflow of departing workers. Newcomers from the bad-sector must obtain a sector-2 job and train themselves through a learning-by-doing process to be able to apply for a sector-1 job while still on the job. Searching on the job is costly. Workers modulate their search intensity depending on their career expected profits. As soon as on-the-job seekers obtain a sector-1 job, they quit their previous sector-2 job. Firms are infinitely lived which is not the case for workers. This framework allows us to examine with some precision workers' flows in unqualified employment, as well as flows in overall employment.

We consider that the empirical puzzle concerning the impact of a minimum wage on employment can be resolved by considering the search intensity of on-the-job seekers and their willingness to stay in their job when the minimum wage increases. The balance between accession and separation flows, operating in opposite directions, can generate an increase in unqualified employment, depending on workers' search intensity. An increase in the minimum wage reduces search intensity for sector-2 on-the-job seekers. The rate of turnover for bad jobs falls as applicants to sector 1 are more inclined to keep their bad job. Our main result is the following: a rise in the minimum wage increases unqualified unemployment by reducing job creation in the bad sector, but this rise also keeps experienced workers in their bad jobs by reducing their search intensity. The balance between the two effects may therefore lead to an increase in unqualified employment, depending on the sensitivity of search intensity. However, an increase in sectoral employment does not necessarily lead to an increase in the overall employment level, or to an increase in output. This sectoral analysis has to be extended to the macroeconomic level to provide a more complete answer than that given by empirical studies.

The paper is organized as follows: [Section 2](#) outlines our framework, sets the search intensity equation and describes workers' career path. We determine the labor force structure in steady state in [Section 3](#). [Section 4](#) defines a labor market equilibrium. [Section 5](#) studies the impact of an increase in the minimum wage, firstly on unqualified employment, and secondly on the overall employment level. Finally, [Section 6](#) presents some concluding comments.

## 2. The model

The labor market is segmented into a good sector (sector 1) and a bad sector (sector 2). The notation good/bad sector has nothing to do with the quality of the match. For expositional simplicity the good (bad) sector refers to a sector in which productivity is higher (lower) than that prevailing in the bad (good) sector. Jobs are indestructible which means workers either voluntary quit for another job or definitively leave the labor market at rate  $m$ . Each worker who leaves the market is replaced with a newcomer. Firms are infinitely-lived. All agents are risk-neutral and discount future payoffs at rate  $r$  ( $r \geq 0$ ). The measure of the total labor force is constant and normalized to one. Time is continuous.

Sector-1 workers bargain their wages. They acquired their skills either on the job from a learning-by-doing process in a bad job, or from their formal education. Only a part  $\phi$  ( $0 \leq \phi < 1$ ) of the newcomers have completed formal education. They belong to the pool of workers looking for a good job. Those who have not so completed formal education – component  $(1 - \phi)$  of newcomers – are insufficiently skilled to acquire a good job straight away (see the workers' flows presented in [Fig. 1](#)). They thus belong to the pool of workers looking for a bad job. They must first obtain a bad job and train themselves in order to acquire sufficient skills to compensate for their lack of education. In this sense the bad sector, offering the minimum wage to all workers, can be seen as a "qualifying" sector. Sector-1 jobs are more attractive in terms of wage; workers will therefore engage in

<sup>1</sup> Competitive models would show lower employment, lower output and higher prices whereas, in case of a low minimum wage, monopsonistic models would show higher employment, higher output and therefore lower prices ([Stigler, 1946](#)). Therefore "[Monopsonistic models] cannot explain the observed price effects. In these models industry prices should have fallen in New Jersey relative to Pennsylvania..." ([Card and Krueger, 1994, pp 790–91](#)).

<sup>2</sup> [Charner and Fraser \(1984\)](#) report that fast-food workers are younger than workers in other industries. 27% of fast-food workers are 16–17 years old and 43% 18–20 years old and only 5% of fast-food workers have completed more than a high-school degree.

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