



# Job matching when employment contracts suffer from moral hazard<sup>☆</sup>

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## ABSTRACT

We consider a job matching model where the relationships between firms and wealth-constrained workers suffer from moral hazard. Specifically, effort on the job is non-contractible so that parties that are matched negotiate a bonus contract. Higher unemployment benefits affect the workers' outside option. The latter is improved for low-skilled workers. Hence they receive a larger share of the surplus, which strengthens their effort incentives and increases productivity. Effects are reversed for high-skilled workers. Moreover, raising benefit payments affects the proportion of successful matches, which induces some firms to exit the economy and causes unemployment to increase.

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## 1. Introduction

Nowadays a substantial proportion of jobs include a performance pay component, and this share has been increasing over the last decades. For example, Lemieux et al. (2009) find for the U.S. labor market that the fraction of workers on performance pay jobs ranges from 30% for craftsmen to 78% for sales workers. The overall incidence of jobs that include a performance pay component has increased from about 38% in the late 1970s to around 45% in the 1990s.<sup>1</sup> Often, advances in information and communication technologies that have reduced the costs of monitoring workers are cited as an explanation for this development.

This paper integrates performance pay into a job matching model and analyzes the effect of unemployment benefit payments on worker productivity and unemployment levels. Specifically, we consider a stochastic job matching environment with a continuum of workers who differ in their skill level so that they are of heterogeneous productivity (see, e.g. Pissarides, 2000). This productivity is revealed to a firm at the moment it is matched with an unemployed worker, e.g. through assessment centers, job interviews or credentials. Hence labor contracts will depend on productivity, while a

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<sup>1</sup> Similar results are reported by Green (2004) for Great Britain and by Kurdelbusch (2002) for major corporations in Germany.

worker's effort during an employment relation is non-contractible, leading to moral hazard. In addition, their wages must include a positive fixed component due to the existence of minimum wages or due to wealth constraints that lead to limited liability.

Each firm-worker match bargains over the design of a bonus contract.<sup>2</sup> At the negotiation stage a firm's disagreement point is given by its exit option; hence assuming perfect competition it is zero. In contrast, a worker's threat point depends on his type, on unemployment benefits and on the unemployment level. In particular, at the contracting stage a higher level of unemployment benefits directly improves the workers' disagreement point. Hence, for successful matches the respective worker's share of the total surplus from an employment relationship rises.<sup>3</sup> Keeping in mind that moral hazard usually leads to inefficiently low effort levels, raising the worker's share of surplus induces the negotiating parties to increase the incentive component of the wage contract; hence raising effort efficiency and, thereby, the overall surplus.

There are, however, two countervailing effects associated with higher unemployment benefits. First, a firm-worker match which was initially indifferent between agreeing to a contract or breaking up negotiation now prefers the improved outside option. Second, by lowering profits of firms the economy's labor market equilibrium is affected. In particular, some firms are induced to exit the economy. Both effects work to increase unemployment. This creates a negative indirect effect on the outside option of workers because it takes longer to find a new job. Whether the positive direct effect of raising unemployment benefits or the negative indirect effect dominates depends on the productivity of a worker. In particular, the forgone wage during spells of unemployment is larger for high productivity workers so that their outside option is more affected by the indirect effect. Accordingly, if the effort enhancing direct effect of unemployment benefits dominates, then moral hazard on the job may provide an argument for raising their level.

The effects of minimum wages differ substantially from those of unemployment benefits. Minimum wages do not affect a worker's outside option if negotiations fail and, therefore, leave bargaining power unchanged. However, they impose a lower limit for the fixed component of the wage. Hence, at the contracting level minimum wages tend to reduce bonuses, lowering the power of incentive contracts and, thus, decreasing the level of effort negotiated. This reduces the firms' expected profit and induces some of them to exit, thus also raising unemployment. Accordingly, we conclude that minimum wages are never welfare enhancing in the context of our model.

Obviously, bonus contracts are just one out of several instruments that are used to incentivize workers. Other examples include piece rates, promotions, subjective performance evaluations and deferred compensation (see [Prendergast, 1999](#)). Reflecting this variety in a single analytical model is not feasible. We have chosen to focus on bonus contracts because they capture the main idea which drives our results: that higher wages are often associated with higher effort incentives. Furthermore, bonus contracts appear as a suitable modelling device because they are used for different segments of the labor force, ranging from waitresses at the Oktoberfest in Munich to CEOs.<sup>4</sup>

Our paper contributes to the rich literature on the incentive effects of unemployment benefits (see [Holmlund, 1998](#) and [Fredriksson and Holmlund, 2006](#) for surveys). A part of this literature also finds that benefit payments may raise productivity and unemployment levels. However, the mechanism by which this result occurs is a different one, and many of our modelling choices are driven by the intention to isolate those effects that are original to our paper. For example, while there is a substantial literature that focuses on moral hazard in the search effort of unemployed agents, we analyze effects of moral hazard during an employment relationship. In this respect, the two approaches complement each other.

[Acemoglu and Shimer \(1999, 2000\)](#) consider a search model with risk-averse workers. Unemployment insurance encourages workers to take the risk of applying for high wage jobs, and firms respond by creating more capital-intensive, high productivity jobs. Thereby, output is raised, but also the risk of becoming unemployed. Moreover, due to moral hazard workers may respond to higher benefit payments by reducing their search effort. These effects are absent in our paper because workers are risk-neutral, bear no search costs and their productivity does not depend on the firms with which they are matched; hence there is no reason to search for a better match.<sup>5</sup> [Mortensen \(1977\)](#) emphasizes the entitlement effect which arises since unemployed people are often not eligible for benefit payments (see also [Fredriksson and Holmlund, 2001](#)). Therefore, high unemployment benefits provide an additional incentive to seek employment so as to become entitled to them in the case of a future job loss.

Our paper is also related to the literature on efficiency wages since both focus on endogenous work effort. In the standard efficiency wage model, workers that are convicted shirking lose their job. Higher unemployment benefits reduce the associated costs and, therefore, effort incentives ([Shapiro and Stiglitz, 1984](#)).<sup>6</sup> In our model, jobs are terminated at an exogenous rate that is

<sup>2</sup> Bargaining over incentive contracts is also analyzed in [Pitchford \(1998\)](#) and [Demougin and Helm \(2006\)](#).

<sup>3</sup> See [van der Horst \(2003\)](#) for empirical evidence that an increase in the replacement rate (the proportion of in-work income that is maintained for somebody becoming unemployed) enables workers to negotiate a higher wage rate. Similarly, there exists evidence for a positive relationship between unemployment benefits and reemployment earnings (e.g. [Burgess and Kingston, 1976](#)).

<sup>4</sup> Ray Rees from the University of Munich reports that waitresses at the Oktoberfest receive no fixed wage, but 9 percent of the revenue on the beer they sell; hence they have probably the most high-powered incentive contract one can find anywhere (Royal Economic Society Newsletter, Issue 142, 2008).

<sup>5</sup> [Marimon and Zilibotti \(1999\)](#) as well as [Diamond \(1981\)](#) also stress the role of unemployment benefits as a "search subsidy" that allows the unemployed to take the time necessary to find a suitable job.

<sup>6</sup> However, the opposite result arises when the regulator can pay lower unemployment benefits to agents that have been shirking, as compared to agents that have lost their job for other reasons. In this case, the spread between the utility from shirking and non-shirking increases, which strengthens effort incentives ([Goerke, 2000](#)).

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