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Hiring, firing, and relocation under employment protection ☆

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ABSTRACT

We analyze how hiring and firing costs as well as firing regulatory delays affect firms' hiring, firing, and relocation policy with a stochastic control model. These frictions are substantial; e.g. the firing delay can be almost a year. In the model hiring and firing costs depend on the firm size and the number of people hired or fired. Based on our simulations, hiring and firing elasticities without relocation are highest with respect to demand and productivity volatility and the hiring and firing variable costs. The elasticity of firing due to relocation is highest with respect to the firm-sized firing cost.

1. Introduction

Governments pass employment regulations with the aim of keeping people employed. However, the employment protection legislation is risky in a sense that it might have unintended consequences; due to the employment protection, companies might have lower incentive to hire new workers and higher incentive to relocate its operations to other states or countries. For instance, the employment protection legislation is frequently pointed out when comparing the 'Anglo-Saxon' economies of the United States and the United Kingdom which have low levels of employment protection and low unemployment rates with the continental European economies of France, Germany, Italy and Belgium which have high levels of labor protection and nearly twice as high unemployment rates.[1] In this paper, we study the effects of hiring and firing costs as well as firing regulatory delays

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[1] See e.g. Siebert (1997); Tiplady, Rachel 'Job Security Ignites Debate in France', Bloomberg Businessweek, March 20, 2006; Brat, Ilan and Zampano, Giada, 'In Europe, Job Protections for Older Generation Are Barriers for Younger Workers', Wall Street Journal, June 25, 2014.

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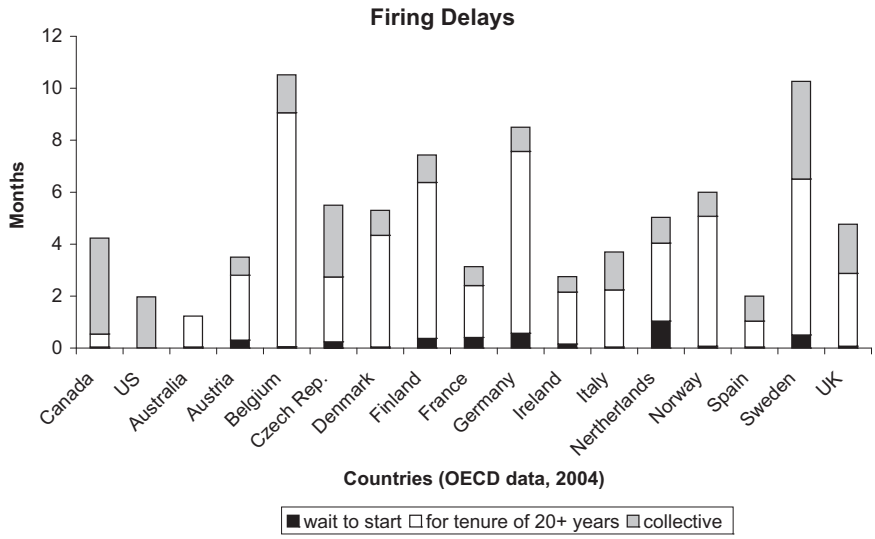

Fig. 1. Delay length for three types of dismissals in various OECD countries (OECD, 2004).

on firms' hiring, firing, and relocation policies. Specifically, we study which kind of firms are most affected by the labor market frictions and how much, and when do these firms relocate to other countries or states.

Firms need to respond to changes in consumer demand. One way to do this is to change the number of workers in the firm and this way the output. However, hiring and firing workers do not happen instantly and without costs. There are substantial hiring and training costs for new workers, and severance and layoff costs for firing workers. Additionally, union contracts, regulatory constraints and processes create a delay from few days to almost a year when firms decide to fire workers. The length of the delay depends on the country, time employed in the job, if the firing is individual or collective, and if the worker is permanent employee or temporary. As an example, Fig. 1 shows the minimum regulatory delay length for various OECD countries in 2004. In this paper, we model a firm's optimal workforce decisions in response to changing consumer demand for its product and uncertainty in the workers' productivity under costs and delays in changing its workforce. Further, we analyze how an option to relocate the firm's operations affects the hiring and firing policy under different hiring and firing frictions. To do this we use a stochastic control model where the objective is to maximize the present value of the firm's expected cash flows. In this framework the labor level is a risk management decision; workers have a holding cost but they hedge against future demand and productivity uncertainties. For instance, the firm may hold fewer workers to hedge against downturns in demand, especially when it is costly and time-consuming to layoff workers.

We first derive Hamilton–Jacobi–Bellman (HJB) equation for the value of the firm under hiring and firing costs and a firing delay, and then we solve the equation numerically.[2] Since the length of the firing delay is substantial in some countries, it is important to include the delay in the HJB equation. Delays have been modeled in other contexts such as bank recapitalization (e.g. Peura and Keppo, 2006), power generation (e.g. Blankenship and Menaldi, 1984), real options (e.g. Alvarez and Keppo, 2002), and in a theoretical stochastic control framework (e.g. Robin, 1977). We utilize these models in the HJB equation; however, our model is more complicated (e.g. two impulse controls) and, thus, these papers cannot be applied directly to our problem. We also introduce "firm-sized" hiring and firing costs that are proportional to the number of employees. This cost is motivated by some regulations that apply only for large companies (e.g. Table 2.A.9 in OECD, 1999). For instance, the definition of collective dismissal, which triggers various regulations, depends on the size of the firm and the number of fired workers in several OECD countries. We show that the firm-sized costs postpone hiring and firing but raise the hiring and firing quantities, especially for large companies. This is consistent with Davis et al. (2006) who report lumpy labor adjustments with about two-thirds of job creation and destruction occurring at places where labor changes by more than 10% per quarter.

By a realistic range of parameter estimates calculated from Bloom (2009), we simulate the optimal hiring, firing, and relocation policy and estimate hiring and firing elasticities. The firing delay lowers the profitability and changes substantially the hiring and firing policy of companies that have high demand or productivity uncertainty.[3] When the uncertainty is high, firing falls in the delay because the delay raises uncertainty in the firing value; hiring also falls because firing is more difficult and this decreases the value of employees. For instance, when the demand and productivity volatility is twice our baseline case then doubling the firing delay decreases hiring by 6% and firing by 10%. We find even stronger effects with the hiring and firing costs. In our model the hiring and firing costs depend on the firm size and the number of

[2] We solve the model numerically since the firm value cannot be solved analytically due to the firing delay and fixed costs. However, we derive some analytical comparative statics.

[3] As in Cunat and Melitz (2012), our model indicates that due to the lower profitability the fraction of companies with high demand or productivity uncertainty is lower in countries and states with high labor market frictions.