

# Employee Discretion and the Labor-Market Environment

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## Abstract

This study is an empirical examination of the relation between the labor-market environment (unemployment rate and labor regulations) and employee discretion at work. From an efficiency-wage perspective, with higher unemployment rates or less protective labor regulations employers can afford to monitor less and tend to give more discretion. However, from a bargaining perspective, if employees place a positive value on discretion a higher unemployment rate or less stringent labor regulations reduce employees' bargaining power, thus leading to less employee discretion. I find a negative relationship between unemployment and discretion, which runs counter to the efficiency wage model. As for labor regulations, some of them have a negative relationship with discretion and others have a positive relationship with discretion.

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## **1 Introduction**

This study provides an empirical analysis of the relationship between job design and the labor market environment in which firms operate. In particular, I focus on one aspect of job design: the extent to which employees have discretion (autonomy) to organize their work. There has been considerable emphasis in the last twenty years on the importance of 'high-involvement' work practices which seek to give employees more decision rights at work. This literature has been concerned with the introduction of work practices such as team work, job rotation, or quality circles, and with the use of performance pay contracts. Within this literature, there are also some studies which focus more particularly on the extent to which employees have job discretion or autonomy. Discretion is an important characteristic of jobs because much of the re-design effort that has been conducted in the last years has aimed at giving employees more power to make decisions at work, and performance gains are largely attributed to these changes.

The diffusion of these practices is usually attributed to an increase in competition in the product markets, which has put pressure on companies to increase quality. For example, the widespread use of quality circles and total quality management among car manufacturers is largely credited to Japanese manufacturers' success, which has led to imitation by European and U.S. manufacturers. Human resource management innovations in other industries (e.g. steel or apparel) appear to

be driven by similar forces. However, in the last fifteen years there has been not only an increase in product market competition, but also a significant reduction in unemployment rates in developed countries. Is it possible that the introduction of greater worker autonomy has been partly caused by an increase in workers' bargaining power? There is actually little empirical evidence on the effect of workers' bargaining power on job design, largely because most studies take the view that, if a human resource innovation increases value, then owners, managers and workers should agree to introduce it, no matter how bargaining power is divided.

The aim of this research is to study whether employees' bargaining power influences their employers' willingness to give discretion. For this purpose, I use individual data from the third European Working Conditions Survey (EWCS) matched with regional unemployment data and with information on national labor regulations. The main advantage of using European data is that labor markets are more regulated than in the US and we can therefore use national laws to obtain comparable measures of employee bargaining power across countries. The EWCS provides measures of job discretion by employee and I use cross-country variation in labor laws and regional variation in unemployment rates within countries to estimate the effect of employees' bargaining power on discretion. Since discretion also depends on many other factors – particularly individual and job characteristics-- which are likely to vary across countries and regions, I use the EWCS data to construct individual-level controls and measures of other work practices. Since the data are cross-sectional, I cannot study whether the diffusion of new forms of work organization has been caused by changes in the labor market, but I can study the extent to which inter-regional and international differences in labor markets influences firms' HRM choices concerning discretion.

To guide the empirical analysis, I discuss two theoretical approaches, which yield different predictions. The first is a bargaining approach in which the firm negotiates the level of discretion with its employees. I hypothesize that if negotiation is costly the firm is more likely to give discretion when the party that has a preference for discretion has more bargaining power. Thus, if employee discretion is costly to employees and beneficial to the firm, the level of discretion will be higher the lower the employees' bargaining power. Conversely, if discretion is beneficial to employees and costly to the firm, it will be higher the higher the employees' bargaining power. If both the firm and the employees obtain a positive utility from an increase in employee discretion, I hypothesize that the division of bargaining power should have no influence on the level of discretion. The second approach is based on efficiency wage theory, and posits that when unemployment is smaller employees have less incentive to work hard because the cost of being unemployed is smaller. In such cases, firms will monitor more intensively and employees will enjoy less discretion. More generally, I hypothesize that when employee protection is stronger, e.g. due to higher firing costs, stronger unions or higher unemployment benefits, employees will also have less incentive to work hard and firms will react by increasing monitoring and reducing discretion.

One potential criticism to this approach is that firm-union bargaining usually focuses on wages and employment and is not really concerned about job discretion or work organization in general. However, the fact that collective agreements do not usually include explicit clauses on employees' decision rights does not imply that changes in work organization are not negotiated on an informal basis. In fact, there is evidence that a strong presence of unions is positively correlated with more employee

discretion. For example, Doellgast et al. (2010) study work practices in call centers in Europe and North America and find that strong collective bargaining institutions are associated with more opportunities for employee participation and discretion. Clark et al. (2001) study the effects of market-based healthcare reform on registered nurses in the U.S. They find that nurses who experienced job restructuring had less voice in the hospital. Moreover, nurses who reported less voice were more likely to view unions as a potential solution and to vote for unionization.

This study is most closely related to work done by Arai (1994), who estimates wage regressions using a measure of employee discretion in the right-hand side. If discretion has a positive value to employees, a compensating wage differentials approach predicts a negative effect of discretion on wages. On the other hand, from an efficiency wage perspective, discretion should have a positive coefficient because when firms pay higher salaries they can afford to monitor less. Arai (1994) finds a positive effect for private sector employees and a negative effect for public sector employees. The main difference with respect to this study is that I do not focus on the relationship between autonomy and wages: instead, I am interested in the effect of employees' bargaining power on job discretion, *controlling for wages*. For the same reason, this paper also differs from the efficiency-wage literature interested in the relationship between supervision and wages (Leonard 1987, Groshen and Krueger 1990, Neal 1993, Rebitzer 1995, Ewing and Payne 1999), which provides mixed evidence.<sup>1</sup> The effect of bargaining power is interesting on its own because it has

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<sup>1</sup> Groshen and Krueger (1990), Rebitzer (1995) and Ewing and Payne (1999) find evidence of a negative correlation between supervision and wages, whereas Leonard (1987) and Neal (1993) do not find any evidence.

hardly been studied and it can improve our understanding of employers' choices and of the effects of policy changes on human resource management (HRM) practices.

I also contribute to the literature on discretion (autonomy). Research on discretion has analyzed its effects on employee satisfaction (Karasek 1979, Parker and Wall 1998, Singh 2000, and Parker 2003) and some of the literature on "high-performance" work practices and productivity includes measures of discretion (Appelbaum, Bailey, Berg and Kalleberg 2000, Ichniowski, Shaw and Prensushi 1997, Ichniowski and Shaw 1999). The studies on employee satisfaction typically find that discretion reduces work stress, particularly when job demands are high, and the literature on productivity finds that certain work practices which imply higher levels of discretion contribute to increase performance. Other studies have analyzed the relationship with performance pay (Osterman 1994, MacLeod and Parent 1999, Nagar 2002, Foss and Laursen 2005, and Ortega 2009b), usually finding a positive relationship. Discretion regarding work schedules has also been analyzed in the context of the "work-family balance" problem (Goodstein 1994, Osterman 1995, Golden 2001, and Wood, de Menezes and Lasaosa 2003, Ortega 2009a).<sup>2</sup> However, none of these studies is interested in the effect of unemployment or labor market institutions on employers' decisions about discretion.

## **2 Theory**

Suppose a firm has to decide whether to introduce some new HRM practices which imply more employee involvement in decision making, i.e. more job autonomy or discretion. We are interested in the issue of how the relative bargaining power of

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<sup>2</sup> See also Ortega (2009a), which compares the view that employers give discretion to facilitate work-family balance with the view that discretion is mostly given to improve performance. Results are more consistent with the latter view.

employers and employees will influence the decision. I consider two theoretical views on the problem: a bargaining approach and an efficiency wage approach.

### *A bargaining approach*

The first approach is one in which firm and employees negotiate the introduction of more discretion. The firm seeks to maximize profits, employees care about both their salaries and job content, and there is no asymmetry of information between employees and employers. The main problem is to make sure that the gains from the increase in discretion are divided in such a way as that both employees and employers are willing to agree. As explained by Coase (1960) in a different context, there will be two distinctly different scenarios: with and without negotiation costs.

If there are no negotiation costs, the firm will adopt the new HRM practices as long as total benefits outweigh total costs, considering total benefits and costs as the sum across all individuals who would be affected by the changes, i.e. the Coase theorem will apply. In particular, the decision will not be affected by the relative bargaining power of employees and employers: for a given distribution of bargaining power each party will obtain a share of total surplus and, the larger the total surplus, the higher the gains for both employers and employees. The division of bargaining power will determine how the total gains are divided among the parties, but will not influence the decision to give more discretion.

A more realistic scenario is one in which negotiation costs are important. First, changes in HRM practices typically affect a large number of employees at a time, which considerably raises negotiation costs, particularly when there are asymmetries in how different employees are affected by the changes. Second and more importantly, labor

markets are usually regulated. For example, in most countries there are important restrictions to the types of contracts that can be written and the negotiation procedures are often subject to regulation (e.g. collective agreements). By contrast, the value-maximization principle according to which HRM choices would be independent of bargaining power requires that the parties have enough contracting freedom to distribute the gains –thus, the contract can make sure that the parties which are negatively affected by the changes can be “compensated” by the parties which benefit the most.

As an example, suppose the firm wants to introduce high-involvement work practices for a group of employees and suppose an increase in discretion is costly to those employees, e.g. because their work will be more stressful. An agreement between the two parties will require some compensation for the group of employees who are involved in the new HRM practices. However, certain labor market institutions can make it difficult to reach this type of solution: thus, if there is a collective agreement covering all employees in the firm and not all employees are affected by the HRM changes, the firm may have to offer the same increase in compensation to all employees covered by the same collective agreement or otherwise might have to negotiate a different treatment for the employees who are going to be involved in the new HRM practices and those who are not. In any case, it will be costly to reach an agreement. Similar problems can arise if employees place a positive value on discretion but the firm is not interested in giving more discretion: in that case, employees would have to accept a reduction in their salaries or would have to make other, non-pecuniary concessions to the firm, but such particular conditions for specific groups of employees can also be difficult to negotiate.



In those cases, I hypothesize that it will be easier reach an agreement when the party that places a positive value on discretion has more bargaining power. Thus, if the firm is interested in introducing more discretion but employees are reluctant, discretion is more likely to be increased if the firm has more bargaining power than the employees. Conversely, if employees would like to have more discretion but the firm considers that it will be too costly, discretion is more likely to be introduced if employees have more bargaining power.

#### *The efficiency wage model*

In the efficiency wage model (Shapiro and Stiglitz 1984), the firm seeks to maximize profits and the employee's utility depends upon his salary, the effort level exerted at the job, and the probability and cost of being dismissed. The employee's effort is not observable and the main problem is to provide the right incentives to exert effort. Unlike in the bargaining set-up, the two parties can agree at zero cost on a contract that divides any gains between them.

In Shapiro and Stiglitz (1984) the firm has two instruments to motivate the worker: the level of supervision and the salary. If the firm raises the level of supervision the employee's cost from shirking will be larger because the probability of being "caught" increases. On the other hand, if the firm increases the salary the cost from shirking will also be larger, because the employee will suffer a larger cost if he is dismissed and becomes unemployed. Thus, both an increase in the level of supervision and an increase in the salary can be used to elicit a higher level of effort. In equilibrium, the firm will pay a salary above the competitive level and will fire the employee if he is caught "shirking".

In the model, an exogenous reduction in the unemployment rate reduces the employee's disutility from being dismissed because in case he is fired he expects to be unemployed for a shorter period of time. Since this reduces his incentives to exert effort, the firm will have to increase the level of supervision or the salary. Both options will raise the cost of shirking because in the former case there will be a higher probability of being "caught" and in the latter case the utility loss from being fired will be higher. Therefore, controlling for the salary, we expect an exogenous reduction in the unemployment rate to raise the level of supervision and therefore reduce the employee's discretion.

For similar reasons, we can also hypothesize that labor regulations affecting the probability of being dismissed or the expected cost of being unemployed will also influence the levels of supervision. For example, an increase in unemployment benefits or in firing costs (both monetary and non-monetary) should reduce the employee's expected disutility from shirking and should lead to a reduction in employee discretion. Similarly, labor regulations which raise the power of unions or strengthen the employees' bargaining power in collective disputes will lead to more supervision and less discretion if those regulations make it more difficult for firms to fire employees. Therefore, controlling for the salaries, a more protective labor market environment should lead to more supervision and less employee discretion.<sup>3</sup>

### *Predictions*

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<sup>3</sup> One caveat is that, when bargaining power changes, the firm may choose to elicit a different level of effort, in which case the above-mentioned effects would be ambiguous. For example, consider an increase in unemployment. On the one hand, it must cause an increase in discretion because there will be more market discipline, but on the other hand the firm may want to reduce the level of effort elicited from the agent, in which case there will be a reduction in discretion. This caveat, however, applies to all the empirical literature on efficiency wages, which tests for a negative relationship between supervision and wages and does not take into account these possible ambiguities (see Allgulin and Ellingsen 2002).

Table 1 summarizes the predicted effects of the unemployment rate and employee protection on discretion. As just pointed out, efficiency wage predictions are conditional on salary levels, whereas the bargaining approach predictions are not, i.e. they are valid as long as salaries are allowed to adjust. Since the bargaining outcomes depend upon employees' and employers' preferences for discretion, Table 1 distinguishes among three possible scenarios: one in which both sides prefer to introduce more discretion, and two others in which only one of the parties has a preference for discretion. As shown in the table, the predicted effects are different in each case. On the other hand, the efficiency wage approach suggests a positive effect of unemployment and a negative effect of employee protection.

### **3 Data description**

For the purposes of this study I link data from three different sources: the third European Working Conditions Survey (EWCS), the dataset of labor regulations constructed by Botero et al. (2004), and Eurostat's Labor Force Survey (LFS). The EWCS data are at the individual (employee) level, whereas the regulation and LFS data are at the national and regional level, respectively.

The third EWCS was conducted in 2000 and 2001 by the European Foundation for the Improvement of Living and Working Conditions, a European Union (EU) government agency, and provides a cross section of employed and self-employed individuals in 27 EU member states.<sup>4</sup> The survey includes information about discretion,

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<sup>4</sup> Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

education and pay, among other variables, and covers approximately 26,000 employees in total. Individuals were interviewed in their homes and the overall response rate was 48 percent. The dataset from Botero et al. (2004) refers to 1997 and consists of a summary of national labor laws in 85 countries, and the LFS is the official source of unemployment statistics in the EU.

The variables taken from these data sources can be classified into four groups: employee discretion variables, labor-market characteristics, controls for job characteristics, and other controls. All these variables come from the EWCS except those on labor-market characteristics, which are drawn from the two other data sources.

**Employee discretion.** The EWCS contains six questions about employee discretion, which concern the extent to which employees can choose the order in which they perform tasks, the methods of work, the speed of work, the number of work hours, the times at which they take breaks, and the days in which they take their holidays (see Tables 2 and 4). Answers to all six questions are dichotomous (yes/no). Following the job design literature, and particularly the work of Hackman and Oldham (1975) on job autonomy, I distinguish two aspects of discretion: discretion to choose the methods of work and discretion to choose the timing of work.<sup>5</sup> Furthermore, factor analyses conducted in Ortega (2009b) with the same data suggest two summary measures of discretion, DiMeth and DiSched. DiMeth (discretion to choose work methods) is the average of the standardized variables on order, methods and speed,

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<sup>5</sup> Hackman and Oldham (1975) define autonomy as “the degree to which the job provides substantial freedom, independence, and discretion to the employee in scheduling the work and in determining the procedures to be used in carrying it out.”

and DiSched (discretion to choose work schedules) is the average of the standardized variables on work hours, breaks and holidays.

**Labor-market characteristics.** I use six labor-market variables, which are defined in Table 3 and summarized in Table 4. The unemployment rate is taken from the LFS and refers to 2000 or 2001 (depending on whether the corresponding country was surveyed for the EWCS in 2000 or 2001, respectively). Because labor mobility is very low in Europe, I use the *regional* rates of unemployment (for two-digit NUTS<sup>6</sup>) instead of the national rates.

The other variables are taken from Botero et al. (2004), and measure five different aspects of national labor regulations: firing costs, administrative constraints on dismissal, unemployment benefits, labor union power and employee protection during collective disputes (see Table 3 for details). The main advantage of these variables is that they are consistently defined across countries.

The Firing Costs index measures the monetary cost of dismissing 20 percent of a 250-employee firm's workforce (10 percent for redundancy and 10 percent without a cause). It is computed as the pay equivalent of the notice period plus the severance payment and any other monetary penalties linked to the dismissal decision. The Dismissal Procedures index measures the extent to which there are administrative constraints on dismissal. Specifically, it measures whether employers have to notify or need approval from a third party to dismiss employees with or without a cause; whether employers must provide training or relocation alternatives for redundant

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<sup>6</sup> The NUTS system is based on both administrative and demographic criteria. In particular, NUTS-2 units are political or administrative units with a population comprised between 0.8 and 3 million inhabitants. Since there are countries where the organization of regions does not include units in that population range, NUTS-2 units sometimes have a population larger than 3 million.

workers; and whether there are compulsory priority rules applicable to dismissals, layoffs or re-employment.

Unemployment Benefits is an index including the number of months required to qualify for unemployment benefits, the percentage of monthly salary deducted to cover unemployment benefits, the waiting period and the percentage of salary covered by the benefits in the case of a one-year unemployment spell. Finally, Labor Union Power measures union rights and collective bargaining rules and Collective Disputes measures the level of employee protection during collective disputes (see Table 3 for details). All indices are defined in such a way that a higher value of the variable means that employees have more bargaining power.

**Controls for job characteristics.** Since the aim of this study is to estimate the effect of labor market institutions on employee discretion but data are cross-sectional and encompass a great variety of employees, it is necessary to control for job characteristics which can potentially influence the choice of discretion. I classify these control variables into two groups. The first group includes job characteristics that are not tied to specific work practices, and the second group includes job characteristics that are implied by the use of certain work practices. Within the first group, I consider one measure of task dependence, three measures of job complexity, one measure of learning requirements on the job, and two measures of work interruptions (see Table 2 for definitions). The second group of variables includes measures of teamwork and job rotation, communication between employees and superiors, and performance pay.

As far as the first group is concerned, task dependence is an important control because there are cases in which the work of an employee is so tied to the work of

colleagues that there is simply little room for discretion. The measures of job complexity are based on three separate questions on whether the job is complex, monotonous and repetitive. Controlling for job complexity is necessary because according to the literature on delegation firms give more discretion when employees have more specific knowledge, and this is more likely to happen when jobs are more complex (Baker 1992, Prendergast 2002, Raith 2008). Moreover, using EWCS data Ortega (2009b) has found a positive relationship between discretion and complexity. The reason for including a measure of learning requirements is similar because jobs with stronger learning requirements are typically more complex. Finally, the two work interruptions variables capture the uncertainty that the employee is subject to. The aforementioned literature on delegation develops the idea that in jobs subject to more uncertainty the potential benefits from delegation are higher because employees tend to have a greater informational advantage over their superiors. This suggests using some measure of work uncertainty as a control variable. The two measures of uncertainty that have been chosen for this purpose are interesting because they are directly related to the job (“How often do you have to interrupt a task you are doing to take on an unforeseen task?” and: “Are those interruptions mainly due to the nature of your work?”).

The second group of job-related control variables measures to what extent the employee is involved in “innovative” forms of work organization. Team and Job Rotation are dichotomous variables equal to one when the employee works in a team or rotates (respectively). I also include two measures for whether employees communicate with superiors (“Vertical communication”) and whether such communication leads to work improvements (“Improvement”), and a dichotomous

variable equal to one when the employee receives some form of performance-related pay (“Performance pay”). These are important controls because one of the objectives of these practices is to promote greater employee involvement.

**Other control variables.** The remaining control variables are also taken from the EWCS and therefore vary across individuals. Specifically, I use the number of subordinates, establishment size, firm tenure, job tenure, firm tenure  $\times$  job tenure, age, age squared, sex, net income, industry, and occupation as control variables. The number of subordinates is defined as the number of individuals whose pay or promotion are decided by the respondent (categorized in four intervals), and establishment size is measured by the number of employees (categorized in eight intervals). Industries and occupations are measured at one-digit level according to the Classification of Economic Activities in the European Community (NACE) and the International Standard Classification of Occupations (ISCO), respectively.

As far as income is concerned, for each participating country the questionnaire provides twelve quantiles based on Eurostat’s European Earnings Structure Survey and asks respondents to choose the interval that corresponds to their net monthly income. Based on these responses I create one dichotomous variable for each quantile. This has two important implications: first, cross-country differences in income levels are not captured by the data, and second, differences in income among employees are reported with error.



#### 4 Results

Correlations among the main variables of interest (employee discretion, unemployment and labor regulations) are shown in Table 5. The unemployment rate is negatively correlated with the two measures of discretion and four (out of five) measures of labor regulations are negatively correlated with discretion over work schedules, DiSched. Moreover, the only labor law index that is not negatively correlated with DiSched does not have a significantly positive correlation. While there seems to be a clear negative correlation between labor regulations and DiSched, the correlations between labor regulations and the other measure of discretion, DiMeth, do not seem to follow a clear pattern: two indices (Firing costs and Dismissal procedures) have a positive correlation with DiMeth, two other indices (Unemployment benefits and Collectives disputes) have a negative correlation with DiMeth, and for the fifth index (Labor union power) the correlation is positive but insignificant.

Tables 6-7 report the results from different sets of seemingly unrelated regression equations with the two types of employee discretion as left-hand-side variables. Table 6 reports results of minimalist regressions in which the only right-hand-side variables are the unemployment rate, the labor law indices, and all control variables except the job characteristics. The unemployment rate, Unemployment benefits and Collective disputes have a negative relationship with both types of discretion, and Labor union power is insignificant in most cases. The two firing cost variables (Firing costs and Dismissal procedures) have a positive relationship with

discretion over methods, but their effect on discretion over schedules is different – Firing costs has a negative effect and Dismissal procedures has a positive effect. Finally, the signs and significance of the variables of interest coefficients do not change with the introduction of control variables for income.

Table 7 shows the results obtained in regressions all the right-hand-side variables used for Table 6 and all the job characteristics controls. The results are very similar to those in Table 6. In fact, except for some changes in the levels of coefficients, the only worth-noting difference is that Labor union power is positively associated with discretion over work methods. Table 7 also shows that most job-related controls have the expected effect on discretion: the job complexity proxies, Learning new things, Interruptions, Vertical communication, Improvement and Performance pay have positive coefficients and Work pace dependence has a negative coefficient. The only two controls that do not have the expected sign are teamwork and job rotation, but those are only significant in half of the cases.

I have also estimated other sets of seemingly unrelated regressions but results are generally similar to Tables 6-7, except for changes in the levels of significance (tables are omitted to save space). I have estimated separate sets of regressions for employees with a permanent contract and those with a fixed-term contract, but the signs of the coefficients do not change. There are no significant changes either when I take public administration and state-owned firms' employees out of the sample. I have also restricted the sample to employees who are involved work practices that are usually associated with more employee participation in decision making. Specifically, I estimate the seemingly unrelated regressions of Table 7 for employees who satisfy

three conditions: (i) they are involved in teamwork or in job rotation, (ii) they receive at least one type of performance-related pay, and (iii) the level of communication with their superior is above the full sample average. I find results similar to the ones in Table 7. Finally, I have also added to the Table 7 regressions three interaction terms between tenure in the firm on the one hand and Firing costs, Dismissal procedures and Unemployment benefits on the other hand, to take into account that the costs of dismissing an employee and the level of unemployment insurance usually vary with seniority. However, the results are also very similar to those in Table 7.<sup>7</sup>

## 5 Discussion and conclusions

The data analysis shows a negative relationship between the unemployment rate and both types of discretion, which is significant through all specifications. This result contradicts the efficiency wage argument that firms tend to monitor less when the employees' personal cost of becoming unemployed is larger. However, it is consistent with a set-up in which (i) employees like to have discretion; (ii) firms are reluctant to give discretion; and (iii) employees obtain more discretion the larger their bargaining power. According to this approach, the reason why employees in high unemployment regions tend to have less discretion is that in those regions firms have more bargaining power over workers than in low unemployment regions.

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<sup>7</sup> The interactions of Dismissal procedures and Unemployment benefits with firm tenure are always insignificant and all the variables of interest except Firing costs (Unemployment rate, Dismissal procedures, Unemployment benefits, Labor union power, and Collective disputes) have the same effects as in Table 7. The effect of Firing costs on discretion over methods is also the same as in Table 7. Its effect on discretion over schedules is insignificant, but the interaction term (Firing costs  $\times$  Firm tenure) has a negative coefficient. (Note that in Table 7 the effect of Firing costs on discretion over schedules is negative.)

As far as labor-market institutions are concerned, I find differences among three areas of regulation: firing costs (both monetary and non-monetary), unemployment benefits, and collective rights (power of unions and worker protection during collective disputes).

Let us begin with firing costs. The analysis shows that while non-monetary costs have a positive relationship with both aspects of discretion, monetary costs have a positive relationship with discretion over work methods and a negative relationship with discretion over schedules. Thus, the effect of firing costs on work methods runs clearly counter to the efficiency wage theory (and is consistent with the bargaining approach), but the effects on schedules are not fully consistent with any of the two theoretical frameworks. All in all, we could therefore say that the estimated coefficients for firing costs lend more support to the bargaining approach than to the efficiency wage approach, but this evidence is not unambiguous.

Another important area of labor regulation is unemployment insurance, and here the results are clearly supportive of the efficiency wage story, i.e. countries that offer higher levels of unemployment benefits tend to have lower levels of discretion. In an efficiency wage model, this result would be interpreted as evidence that when workers have higher unemployment insurance the cost of being fired is smaller and their motivation goes down. As a result, the firm needs to monitor more. This negative effect of unemployment benefits on discretion would also be consistent with a bargaining set-up in which discretion is costly to employees and beneficial to employers, but that set-up would be inconsistent with the negative effect of the unemployment rate and positive effect of firing costs on discretion.

The third type of labor regulations have to do with collective rights –the protection of workers during collective disputes and the power of labor unions. Stronger worker protection is associated with lower levels of discretion, which is consistent with efficiency wages, but labor union power is associated with more discretion over work methods (and has generally no significant relationship with discretion over schedules). Therefore the relationship between collective rights and discretion does not lend clear support to any of the two theoretical approaches.

This study has some clear limitations. First, while I benefit from great variability in unemployment across regions, the fact that data on labor institutions only vary from country to country imposes an important restriction. This may actually explain why evidence on labor regulations is sometimes inconclusive. Second, all the variation is cross-sectional and therefore I cannot control for individual or firm fixed effects and I cannot claim causality for the empirical relationships that I estimate. Note, however, that a natural experiment study would have to face the problem that it takes time for firms to re-design jobs in such a way as to increase (or reduce) discretion. Third, data on employees' net incomes are not available in monetary units and the results obtained do not change very much when I introduce the net income controls, which may be due to measurement error. Despite these limitations, I think this study makes an interesting point, namely that the extent to which firms adopt a more participative approach to work is influenced by the labor market in which they operate. Although the idea that labor regulations have great influence on firms' employment decisions is widely spread, less attention is usually given to the fact that certain labor regulations can also influence the way work is organized within firms.

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## Appendix

Table 1. Theoretical predictions

		Predicted effect on discretion	
		Unemployment rate	Employee protection
Bargaining approach	Discretion is beneficial to both parties	0	0
	Discretion is costly to employees and beneficial to the firm	+	-
	Discretion is beneficial to employees and costly to the firm	-	+
Efficiency wages		+	-



Table 2: Description of EWCS variables

Variables	Definitions / EWCS questions
Order	Are you able to choose or change your order of tasks?
Methods	--- the methods of work?
Speed	--- your speed or rate of work?
DiMeth	Average of standardized variables Order, Methods and Speed
Breaks	Can you take your break when you wish?
Hours	Are you able to influence your work hours?
Holidays	Are you free to decide when to take holidays and days off?
DiSched	Average of standardized variables Breaks, Hours and Holidays
Complex	Generally, does your main paid job involve complex tasks?
Monotonous	--- monotonous tasks?
Repetitive	--- short repetitive tasks of less than 10 minutes?
Learning new things	--- learning new things?
Interruptions	How often do you have to interrupt a task you are doing in order to take on a unforeseen task?
Interruptions due to nature of work	Are those interruptions mainly due to the nature of your work?
Work pace dependence	On the whole, is your pace of work dependent on the work done by colleagues?
Team	Does your job involve doing all or part of your work in a team?
Job rotation	Does your job involve rotating tasks between yourself and your colleagues?
Vertical communication	Do you exchange views with your superiors about your working conditions in general or about the organization of your work when changes take place?
Improvement	Do these exchanges of views lead to improvements at your own personal workplace / in your office or factory / in the organization as a whole?
Piece rates	Does your remuneration include piece rate or productivity payments?
Group performance pay	--- payments based on the overall performance of a group?
Profit sharing	--- payments based on the overall performance of the company (profit sharing) where you work?
Stock ownership	--- income from shares in the company you work for?
Performance pay	Employee receives at least one form of performance pay (piece rate, group performance pay, profit sharing or stock ownership)
Number of subordinates	How many people work under your supervision, for whom pay increases, bonuses or promotion depend directly on you?
Establishment size	How many people in total work in the local unit of the establishment where you work?
Firm tenure	How many years have you been in your company or organization? (If less than one year) How many months?
Income	Net monthly income quantile at country level, based on Eurostat's European Earnings Structure Survey 2002, adjusted for inflation (12 intervals)
Occupation	One-digit ISCO-88 occupation
Industry	One-digit NACE industry

Table 3: Description of labor market variables

Variable	Definition	Source
Unemployment rate	Unemployment rate in NUTS-2 regions	Eurostat
Firing costs	Index measuring the cost of firing 20 percent of the firm's workers (10 percent for redundancy and 10 percent without cause). The cost of firing a worker is calculated as the sum of the notice period, severance pay, and any mandatory penalties established by law or mandatory collective agreements for a worker with three years of tenure with the firm. If dismissal is illegal, the cost of firing is set equal to the annual wage. The new wage bill incorporates the normal wage of the remaining workers and the cost of firing workers. The cost of firing workers is computed as the ratio of the new wage bill to the old one.	Botero et al. (2004)
Dismissal procedures	Index measuring protection against dismissal granted by law or mandatory collective agreement. It is the average of the following seven dummy variables which equal one: (1) if the employer must notify a third party before dismissing more than one worker; (2) if the employer needs the approval of a third party prior to dismissing more than one worker; (3) if the employer must notify a third party before dismissing one redundant worker; (4) if the employer needs the approval of a third party to dismiss one redundant worker; (5) if the employer must provide relocation or retraining alternatives for redundant employees prior to dismissal; (6) if there are priority rules applying to dismissal or lay-offs; and (7) if there are priority rules applying to re-employment.	Botero et al. (2004)
Unemployment benefits	Measures the level of unemployment benefits as the average of the following four normalized variables: (1) the number of months of contributions or employment required to qualify for unemployment benefits by law; (2) the percentage of the worker's monthly salary deducted by law to cover unemployment benefits; (3) the waiting period for unemployment benefits; and (4) the percentage of the net salary covered by the net unemployment benefits in case of a one-year unemployment spell.	Botero et al. (2004)
Labor union power	Measures the statutory protection and power of unions as the average of the following seven dummy variables which equal one: (1) if employees have the right to unionize; (2) if employees have the right to collective bargaining; (3) if employees have the legal duty to bargain with unions; (4) if collective contracts are extended to third parties by law; (5) if the law allows closed shops; (6) if workers, or unions, or both have a right to appoint members to the Boards of Directors; and (7) if workers' councils are mandated by law.	Botero et al. (2004)
Collective disputes	Measures the protection of workers during collective disputes as the average of the following eight variables: (1) if wildcat, political and sympathy/solidarity/secondary strikes are legal (legal strikes); (2) if employer lockouts are illegal; (3) if workers have the right to industrial action; (4) if there is no mandatory waiting period or notification requirement before strikes can occur; (5) if striking is legal even if there is a collective agreement in force; (6) if laws do not mandate conciliation procedures before a strike; (7) if third-party arbitration during a labor dispute is mandated by law; and (8) if it is illegal to fire or replace striking workers.	Botero et al. (2004)

Table 4: Summary statistics:

Variable	Mean	SD	Min	Max	N
DiMeth	-.074	.848	-1.472	.682	26,375
DiSched	-.123	.717	-1.058	.966	26,095
Unemployment rate	9.083	5.389	2.1	26.0	227
Firing costs	0.48	0.14	0.16	0.69	26
Dismissal procedures	0.47	0.24	0.14	0.86	26
Unemployment benefits	0.80	0.07	0.66	0.96	26
Labor union power	0.52	0.17	0.00	0.71	26
Collective disputes	0.47	0.15	0.13	0.83	26

Table 5: Correlations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. DiMeth	1.000						
2. DiSched	.364 <sup>***</sup>	1.000					
3. Unemployment rate	-.077 <sup>***</sup>	-.137 <sup>***</sup>	1.000				
4. Firing costs	.022 <sup>***</sup>	-.021 <sup>***</sup>	.098 <sup>***</sup>	1.000			
5. Dismissal procedures	.032 <sup>***</sup>	.003	.059 <sup>***</sup>	.342 <sup>***</sup>	1.000		
6. Unemployment benefits	-.056 <sup>***</sup>	-.058 <sup>***</sup>	.079 <sup>***</sup>	.086 <sup>***</sup>	.303 <sup>***</sup>	1.000	
7. Labor union power	.004	-.029 <sup>***</sup>	.039 <sup>***</sup>	-.053 <sup>***</sup>	.471 <sup>***</sup>	.370 <sup>***</sup>	1.000
8. Collective disputes	-.091 <sup>***</sup>	-.050 <sup>***</sup>	.116 <sup>***</sup>	.084 <sup>***</sup>	.248 <sup>***</sup>	.243 <sup>***</sup>	.004

Note.- Levels of significance: (\*\*\*) 1 percent, (\*\*) 5 percent, (\*) 10 percent.

Table 6: Regression results, all employees

	(1)		(2)	
	DiMeth	DiSched	DiMeth	DiSched
Unemployment rate	-.010 <sup>***</sup> (.001)	-.015 <sup>***</sup> (.001)	-.009 <sup>***</sup> (.001)	-.013 <sup>***</sup> (.001)
Firing costs	.135 <sup>***</sup> (.054)	-.133 <sup>***</sup> (.039)	.086 <sup>*</sup> (.051)	-.170 <sup>***</sup> (.043)
Dismissal procedures	.270 <sup>***</sup> (.030)	.187 <sup>***</sup> (.025)	.298 <sup>***</sup> (.032)	.217 <sup>***</sup> (.027)
Unemployment benefits	-.525 <sup>***</sup> (.089)	-.314 <sup>***</sup> (.076)	-.347 <sup>**</sup> (.099)	-.172 <sup>**</sup> (.084)
Labor union power	-.006 (.037)	-.109 <sup>***</sup> (.032)	-.026 (.043)	-.046 (.037)
Collective disputes	-.441 <sup>***</sup> (.036)	-.193 <sup>***</sup> (.031)	-.502 <sup>***</sup> (.039)	-.238 <sup>***</sup> (.033)
N	22,157	22,157	17,810	17,810
R-squared	.136	.128	.150	.140

Note.- Seemingly unrelated regressions for DiMeth and DiSched. In addition to the variables in the table, I use the following explanatory variables: Column (1): three dichotomous variables for the number of subordinates, seven dichotomous variables for establishment size, firm tenure, job tenure, firm tenure  $\times$  job tenure, age, age squared, one dichotomous variable for female, two dichotomous variables for permanent contract and fixed-term contract (respectively), and fourteen and nine dichotomous variables for industry and occupation respectively. Column (2): same explanatory variables and eleven dichotomous variables for income quantiles. Standard deviations are shown in parentheses. Levels of significance: (\*\*\*) 1 percent, (\*\*) 5 percent, (\*) 10 percent.

Table 7: Regression results with controls for job characteristics, all employees

	(1)		(2)	
	DiMeth	DiSched	DiMeth	DiSched
Unemployment rate	-.004 <sup>***</sup> (.001)	-.012 <sup>***</sup> (.001)	-.003 <sup>***</sup> (.001)	-.011 <sup>***</sup> (.001)
Firing costs	.323 <sup>***</sup> (.059)	-.115 <sup>**</sup> (.054)	.294 <sup>***</sup> (.066)	-.217 <sup>***</sup> (.061)
Dismissal procedures	.064 <sup>*</sup> (.038)	.074 <sup>**</sup> (.036)	.075 <sup>*</sup> (.042)	.138 <sup>***</sup> (.038)
Unemployment benefits	-.398 <sup>***</sup> (.112)	-.162 (.103)	-.325 <sup>***</sup> (.123)	.013 (.113)
Labor union power	.126 <sup>***</sup> (.047)	-.013 (.043)	.127 <sup>**</sup> (.052)	-.017 (.048)
Collective disputes	-.219 <sup>***</sup> (.046)	-.166 <sup>***</sup> (.042)	-.245 <sup>***</sup> (.050)	-.254 <sup>***</sup> (.046)
Complex	.140 <sup>***</sup> (.016)	.030 <sup>**</sup> (.014)	.135 <sup>***</sup> (.017)	.027 <sup>*</sup> (.016)
Monotonous	-.096 <sup>***</sup> (.015)	-.056 <sup>***</sup> (.014)	-.090 <sup>***</sup> (.016)	-.065 <sup>***</sup> (.015)
Repetitive	-.074 <sup>***</sup> (.014)	-.100 <sup>***</sup> (.013)	-.059 <sup>***</sup> (.016)	-.079 <sup>***</sup> (.014)
Learning new things	.184 <sup>***</sup> (.019)	.039 <sup>**</sup> (.017)	.185 <sup>***</sup> (.020)	.029 (.019)
Interruptions	.145 <sup>***</sup> (.025)	.062 <sup>***</sup> (.023)	.134 <sup>***</sup> (.027)	.051 <sup>**</sup> (.025)
Interruptions due to nature of work	.000 (.015)	-.020 (.013)	.012 (.016)	-.011 (.015)
Work pace dependence	-.117 <sup>***</sup> (.014)	-.081 <sup>***</sup> (.013)	-.119 <sup>***</sup> (.016)	-.081 <sup>***</sup> (.014)
Team	-.032 <sup>*</sup> (.016)	-.006 (.015)	-.039 <sup>**</sup> (.018)	-.015 (.017)
Job rotation	.014 (.015)	-.035 <sup>**</sup> (.014)	.023 (.016)	-.038 <sup>**</sup> (.015)
Vertical communication	.098 <sup>***</sup> (.024)	.083 <sup>***</sup> (.022)	.094 <sup>***</sup> (.026)	.076 <sup>***</sup> (.024)
Improvement	.079 <sup>***</sup> (.009)	.085 <sup>***</sup> (.008)	.077 <sup>***</sup> (.010)	.082 <sup>***</sup> (.009)
Performance pay	.058 <sup>***</sup> (.019)	.093 <sup>***</sup> (.017)	.042 <sup>**</sup> (.020)	.086 <sup>***</sup> (.019)
N	11,245	11,245	9,234	9,234
R squared	.151	.157	.171	.161

Note.- Seemingly unrelated equations with the same controls as in Table 6. Column (1) does not include income dummies and column (2) does. Standard deviations are shown in parentheses. Levels of significance: (\*\*\*) 1 percent, (\*\*) 5 percent, (\*) 10 percent.