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MULTIPLE EQUILIBRIA IN A FIRING GAME WITH IMPARTIAL JUSTICE

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Multiple Equilibria in a Firing Game With Impartial Justice

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ABSTRACT :

In many European countries, a majority of employees are hired under very protective labor contracts that restrict the ability of the employer to dismiss them. In particular, employees can take to courts the firm's layoff motive. This paper analyses the interaction between firms, employees and the labor judicial system specific to South European countries. If judges' error margin increases when the judicial system is subject to congestion, the game presents multiple equilibria which differ in the frequency of workers abusively fired for personal motives. Policy implications can be inferred.

Key-Words:

- EPL
- Labor judges
- Firing costs
- Layoff motive
- Multiple equilibria

RESUME :

Dans de nombreux pays d'Europe, les employés sont couverts par des contrats de travail qui encadrent de manière stricte la possibilité de licenciement. Par ailleurs, les employés licenciés peuvent contester en justice le motif du licenciement. L'article étudie l'interaction entre entreprises, employés et système juridique, dans le contexte spécifique aux pays du Sud de l'Europe. Si la marge d'erreur des juges augmente avec le nombre de cas à traiter, nous montrons que le jeu présente des équilibres multiples qui diffèrent dans la fréquence de travailleurs virés de manière abusive pour motif personnel.

Mots-clés :

- Protection légale de l'emploi
- Juges du travail
- Coût de licenciement
- Motif de licenciement
- Equilibres multiples

JEL classification : K31, J32, J53.

MULTIPLE EQUILIBRIA IN A FIRING GAME

WITH IMPARTIAL JUSTICE

Damien Besancenot* and Radu Vranceanu[†]

Abstract

In many European countries, a majority of employees are hired under very protective labor contracts that restrict the ability of the employer to dismiss them. In particular, employees can take to courts the firm's layoff motive. This paper analyses the interaction between firms, employees and the labor judicial system within this specific institutional framework. If judges' error margin increases when the judicial system is subject to congestion, the game presents multiple equilibria which differ in the frequency of workers abusively fired for personal motives. In order to boost employment, the European Commission is urging governments to increase labor market flexibility, interpreted as an undifferentiated reduction in firing costs. Such a policy recommendation might be qualified in order to take into account the impact of various firing costs on the frequency of workers abusively fired for personal motives.

Keywords: EPL, Labor judges, Firing costs, Layoff motive, Multiple equilibria.

JEL Classification Index: K31, J32, J53.

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1 Introduction

Building on the basic principle according to which labour market institutions have a substantial impact on the labor market performance (Blanchard and Wolfers, 2000; Phelps and Zoega, 2001), in the recent years economists begun to pay special attention to the relationship between the employment performance of a given economy and the strictness of its employment protection legislation (EPL). EPL can be defined as the set of rules that govern the hiring and firing of employees, rules that include regulation on temporary contracts, specific requirements for collective dismissal and protection of regular workers against individual dismissal (OECD, 2006; Cahuc and Koeniger, 2007). While in the past strict employment protection legislation against economic dismissal was seen by some European governments as a way to deliver high job security, over time it turned out that strict EPL not only reduces the number of dismissals, but also adversely affects the entry rate from unemployment into work. As a consequence, strict EPL appears to be a quite ineffective mean to contain high unemployment.¹ The going position of the European Commission is to support “flexicurity”, a catch-all concept for joint actions towards increasing the flexibility of labour markets and strengthening the support provided to the unemployed, both in terms of income and facilities to find a job and get trained (European Commission, 2006, 2007). One important dimension of this recommended enhanced flexibility is the reduction in expected firing costs.

In all the industrialized world the law protects employees against discriminatory behavior on behalf of the employer (because of gender, age, race and so on). Yet many South European countries took workers’ rights one step further and ruled that fired workers can take the employer’s decision to courts even if the motive of the dismissal involves no discriminatory practice. Bertola et al. (2000) have emphasized that, in 1995, in France, Germany or Spain, more than 0.5% of the employees brought a case before the courts, as compared with less than 0.1% in Austria or Denmark. They claim that “rather vague legal definitions of unfair dismissal, which give the courts

¹ See OECD (2006), European Commission (2006) or the June special issue of the *Economic Journal* (Cahuc and Koeniger, 2007) for a review of recent empirical findings. See Ljungqvist (2002) or Cahuc and Zylberberg (2004) for a survey of the main models, including pionnering work by Bentolila and Bertola (1990) and Bertola (1990).

broad discretion in interpreting regulations, may indeed be an important reason for the impressive case loads of the French, German and Spanish courts" (Bertola et al., 2000, p. 68). In general, a firm can decide to separate from an employee if at one moment in time the optimal organization of the production process requires less labor or because the worker does not fulfill his tasks in an adequate manner. The former set gathers what we call "economic or objective" motives and the latter contains "personal, disciplinary or subjective" motives. Depending on the country, when the firm opts for the economic motive, it must pay the worker a severance payment, which, in general, is quite substantial.² When the worker's behavior on the workplace is at stake, the personal motive may be invoked and the firm can fire the worker by paying him a small compensation; no compensation is due if the worker made a serious professional fault. Fired workers can take to courts their case and challenge the motive of the dismissal. Judges – specialized in labor cases or civil law – have thus legal competence in deciding whether the motive of a dismissal is "valid" or "just". In some countries only personal motives can be investigated while in other countries economic motives can also be taken to courts. Judges can impose substantial fines on the firm found guilty of abusive dismissal. In this context, as pointed out by Bertola et al. 2000, when trying to assess the overall strictness of the EPL system, judicial enforcement of a given set of rules and judges' behavior matter as much as the rules themselves.

France provides for an interesting case study. In this country, 90% of the employed persons are hired under a well-defined "open-ended labor contract".³ In general, the firm that fires a worker hired under a such an open-ended contract must pay a severance indemnity, depending on the motive of the dismissal. The French law distinguishes between *economic motives*, where separation occurs basically because the firm must reduce its workforce in order to maintain its competitive edge, and *personal motives*, because the worker's capabilities (or behavior) do not match the firm's needs (or values); one particular personal motive is the "serious professional

² For instance, in Spain the severance payment for economic dismissal amounts to 33 (45 for older contracts) days of salary per year of employment. Large severance payments apply to Portugal, Italy and Germany for large firms. In France the official severance payment is relatively lower, but the legally accepted motives fall in a very narrow range. Hence, in this country, the true severance payment is the amount paid to the employee to make him resign.

³ The other 10% are hired under various forms of temporary contracts that imply a much lighter EPL.

misdemeanor”, where the worker commits a serious abuse. The law (*Code du Travail*) defines in a rather precise way those situations where the firm can resort to the economic motive. To the opposite, the law provides no formal definition for the personal motive (the law only states that the cause must be “real and serious”), and what can be accepted or not as a valid motive emerged from judicial practice over time (Blanchard and Tirole, 2004; Pighi and Zucchi, 2003; Cahuc and Kramarz, 2004). When the employer fires a worker for personal motives it must pay him a relatively small severance payment, between 1/10th to 1/6th of the monthly wage per year of experience (no payment is due when the “serious professional fault” is invoked). The employer must pay the worker twice as much if the economic motive is invoked. This is not the end of the story: if the fired employee takes the decision to a court, the labour judge can rule that the motive is not valid; in this case, he can ask the firm to pay to the worker a large indemnity (for unfair dismissal) of at least six months of salary. In some cases, the judge can even ask the firm to reintegrate the employee; the firm must then pay the fine and the wage over the whole not worked period. While the legislation and jurisprudence on firing for personal motives has been quite stable since 1973, in the last few years it became more and more difficult to fire someone for economic motives, not least because courts tend to give a very narrow interpretation of the valid motives (Blanchard and Tirole, 2004; Lagrenne and Le Roux, 2006). Figure 1 shows the evolution of the rate of annual dismissals for personal and economic motives between 1997 and 2007. Not only in 2007 the personal motive was invoked four times as much the economic motive, but the ratio has increased over time. Cahuc and Kramarz (2004) surmise that firms probably tend to invoke faked personal motives, while the true motive is economic.

In 2004, 26% of the workers fired for a personal motive went to courts (in general, they dispute the motive of the dismissal). In 64.5% of the cases, the outcome of the trial was favorable to the employees (Munoz-Perez and Severin, 2005).

This paper provides a theoretical analysis of the judicial strategies of firing firms and dismissed workers within an institutional setup specific to South European countries, mainly France. Its original contribution to existing EPL literature is to show that their existing labor - justice interaction is consistent with multiple equilibria. Hence, policies aiming at improving the employment

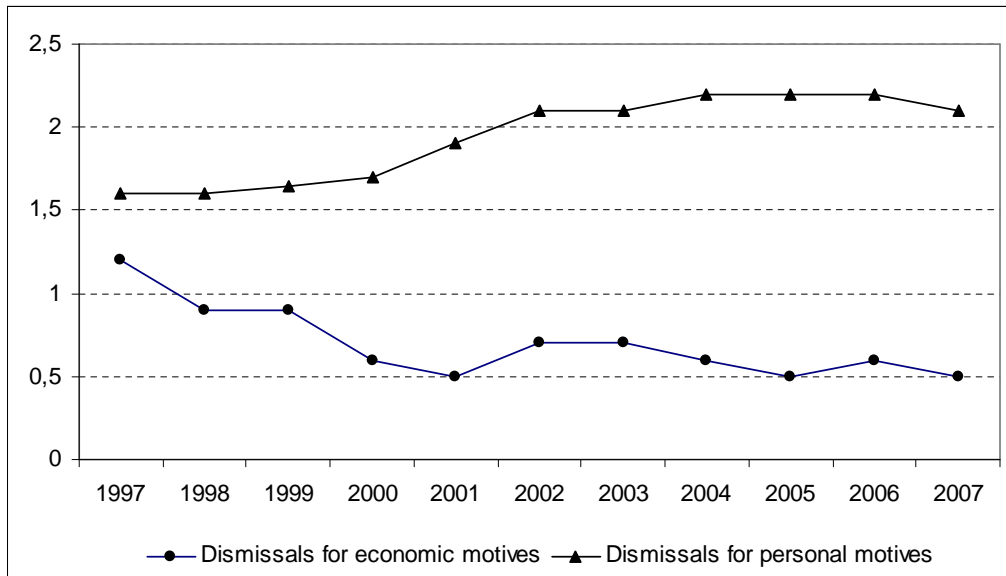


Figure 1: Annual dismissals for 100 employees at the beginning of the year. Private sector, firms with more than 10 employees. Source: DARES, Ministère du travail. See also DARES, Premières Informations, 16, 3, April 2008.

performance of a given economy should pay due consideration not only to the impact of small variations in legal firing costs, but also to the possibility to shift from one equilibrium to another.

The model is cast as a game between firms – that must fire a predetermined number of workers, workers – who can sue their former employers, and judges – who must shed light on the case. At the outset of the game, the firm must decide on the optimal layoff policy. If the firm decides to fire a worker for “economic motives”, it must pay him a substantial compensation, whose amount is exogenously given. In this case, the worker takes the money and agrees to leave without taking to courts the firm’s decision. If the firm wants to spare this cost, it may invoke a “personal motive” where the decision to fire the worker puts forward his inadequacy with the job. In this case, we assume that the firm pays him nothing (actually, it may pay him a small benefit). While for some workers such a claim is sensible since they do not behave well, for the majority of workers such a motive is unfair and, should the judge be able to unveil the abuse, the firm will be fined. Why then a firm would take the risk to follow this policy? Because judges, as any human being, can make errors. In particular, the more files a judge must process, the larger should be the risk of taking a wrong decision. We show that this simple but plausible set-up is consistent with multiple

equilibria that can be ranked according to a social welfare criterion. If firms fire for personal motives only those workers who really qualify for such decision, these workers have little incentive to take to courts the decision given that judges, who have little cases to analyze, can shed full light on the file. But if firms fire all workers for personal motives, their strategy may be optimal too, since judges must process too many files and, with an equilibrium probability, might sit with the firm even if the latter had committed an abuse. In between these polar cases, some hybrid equilibria can be unveiled, where players play mixed Nash strategies. In the pooling and hybrid equilibria there are good workers fired for personal motives and who get no decent compensation; the judicial system is crowded with files and overworked judges take the wrong decision with a positive probability. In particular, when in the hybrid equilibrium good employees are unduly fired for personal motives, the judges' error margin edges up, which in turn validates the "unfitted" workers' decision to go to courts. But because these unfitted workers go to courts, firms can be tempted to fire a good worker for a personal motive.

Theoretical analyses of the complex relationship between firms' firing strategies and the judicial system are rather scarce.⁴ Our work can best be related to two existing studies. The paper by Ichino et al. (2003) takes stock of the Italian experience, to analyze the relationship between aggregate labor market conditions and courts' decisions. They provide a model of the judge's behavior, who must decide on whether a given misconduct is sufficient for firing someone. Judges sit with the worker if his misconduct is milder than the "representative" misconduct, and vice versa. In turn the representative misconduct depends on the average misconduct of all fired persons. When many workers are fired, the average misconduct is softer, so judges tend to sit with workers more often. Hence firing costs are counter-cyclical. Galdón-Sánchez and Güell (2000, 2003) develop a variant of the Shapiro and Stiglitz (1984) shirking model, where shirkers can take their case to courts, knowing that judges make errors with an exogenously given probability. In this case, in case of a downturn, firms may resort to "disciplinary" firing (we call it "personal" motive). One main conclusion of their model, substantiated with empirical evidence, is that

⁴ Following the pioneering work of Posner (1993), there were several empirical attempts to estimate variables that have a bearing on the quality of a judge decision. Most of these studies point out that the workload is an important explanatory variable (Taha, 2004). A theoretical model describing the judge's behavior in a judicial framework with imperfect information and judges' career concerns was worked out by Levy (2005).

workers' chances to win in courts are inversely related to the gap between the severance pay for fair and unfair dismissal.

At difference with the paper by Ichino et al. (2003) where the incidence of firing is endogenous, in our setup the firm's decision is not about whether to fire a worker, but how. This problem has already been raised by Galdón-Sánchez and Güell (2000, 2003), but in their paper the judge's error margin is exogenous. In our paper, the error margin is endogenous: it depends on the frequency of cases brought to courts within an invariant macroeconomic environment: in keeping with the principle of unbiased justice, the probability that the judge gives a verdict favorable to the worker should match the frequency of good workers in total population of suing workers. For sure, any more sophisticated model should fulfill this criterion, if else justice appears to be biased in favor of workers or firms. In a different set-up, Emons and Fluet (2007) also assumed that when the judge has not full information about the claimants rights (because costs of testimony exceed benefits in their model), he will adjudicate according to his prior beliefs. The latter "are shaped from information publicly available at the beginning of the proceedings."

The assumption of an invariant macroeconomic environment is one limitation of our model and represents an essential contribution of the analysis by Ichino et al (2003). A more powerful model would include both macroeconomic and judicial parameters in the judge's decisions. Another limitation of the model is the assumption of a fixed trial duration. In practice, courts' congestion translates not necessarily into a higher error probability, but in a longer rating time. Yet this problem would not reach substantially different conclusions from ours, given that a longer duration is tantamount for firms and workers who sue abusively to a lower sanction provided that a discount factor applies. Finally, it should be mentioned that conclusions from a repeated game may differ from ours. In a repeated game, at least companies, if not employees can build some reputation. For instance, the firm that systematically fires workers for an alleged personal motives will get a bad reputation, and judges will upgrade accordingly the probability that this firm commits an abuse. This should provide substantial incentive for agents to behave properly, and the separating equilibrium would probably prevail.

The paper is organized as following. The next section introduces the main assumptions and

strategies. Section 3 puts forward the equilibria of the game, starting with pure strategy equilibria and continuing with mixed strategy ones. The last section presents our conclusions.

2 The model

2.1 Main assumptions

The productive sector is represented by a single firm that must dismiss a unit mass of workers.⁵

There are two types of workers, the b -type worker (for “bad”), who behaves “improperly” and the g -type worker (for “good”), who “behaves well”. From a legal point of view, the former can be fired for a “personal motive”, while the latter should be fired only for an “economic motive”. Denoting by i the worker’s type, we have $i \in \{b, g\}$. The frequency of g -type workers in the total population of persons to be fired is denoted by α , with $\alpha < 1$.

When the firm fires a worker for an economic motives it must pay him the compensation N . In this case the worker takes the money and leaves the firm without opposing the firm’s decision. When the firm fires the worker for a personal motive, it pays him nothing. If the firm fires a g -type worker for a personal motive, it clearly commits an abuse, given that, in the eyes of the law, this type of worker would qualify for the economic motive.

All workers dismissed for personal motives can take to courts the manager’s decision. Going to courts involve a trial sunk cost k , that will be charged to the part found guilty. If a worker gets a favorable verdict, the firm must pay him a fine y . If the verdict is favorable to the firm, the worker has no other penalty than the trial cost k .

To simplify mathematical expressions, we also assume that the compensation paid when firing a worker for economic motives can be written as a multiple of the justice costs: $N = nk$, with $n > 1$. We must also have $N < y + k$, if else the firm would never fire someone for an economic motive and the problem would become trivial.

The model can be cast as a sequential game featuring three rational players: the firm’s manager – who decides how to dismiss a worker, the worker – who can sue the firm, the and the judge –

⁵ The assumption of a single large firm is not crucial. If the economy is made up of many small firms, the Nash mixed equilibrium strategy of the large firm can be interpreted as frequency of firms that randomize between the pure strategies.

who rules whether the firm or the worker is right. The typical sequence of decisions goes like this (Figure 1 presents the decision tree):

At time $t = 0$, Nature chooses the type i of the worker who is to be fired.

At time $t = 1$, the firm's manager, who knows the type of the worker, can fire him for a personal motive without compensation (action F) or can fire him for an economic motive (action \bar{F}); in this later case it must pay him a compensation N ; the worker takes the money and leaves without protest: the game is over.

At time $t = 2$, a worker fired for a personal motive decides whether to sue the firm for abusive dismissal (action S) or not (action \bar{S}). If he does not sue the firm, the game is over. If else, the case is taken before the judge.

At time $t = 3$, the judge can either provide the high effort needed to shed light on this case (action C , for control) or not (action \bar{C}). If the judge plays C , he can unambiguously determine the true type of the worker: the game is over.

At time $t = 4$, the judge who has previously followed \bar{C} (did not provide the high effort), will rule that the worker's claim is right (play action I) with probability $\Pr[I|S, \bar{C}]$ or wrong with probability $1 - \Pr[I|S, \bar{C}]$. (These probabilities are endogenous). The game is over.

We can introduce now the players' strategies.

2.2 Players' strategies

As shown in Figure 1, firm's managers and workers can take an action from their feasible set, $\{F, \bar{F}\}$ and respectively $\{S, \bar{S}\}$.

a) The strategy of the firm's manager (called player f) can be written as a function of the worker's type:

$$s^f(i) = \begin{cases} \lambda F + (1 - \lambda)\bar{F} & \text{if } i = b \\ lF + (1 - l)\bar{F} & \text{if } i = g \end{cases}, \quad (1)$$

where $\lambda \in [0, 1]$ and $l \in [0, 1]$ are the worker specific probabilities that the firm plays action F (fire the worker for a personal motive).

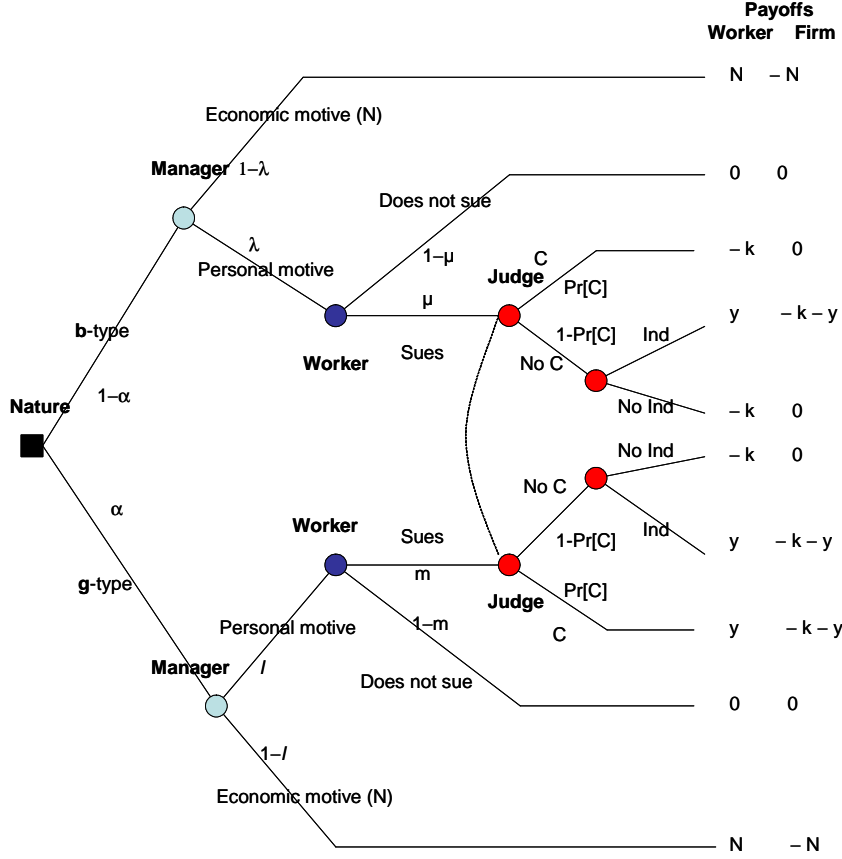


Figure 2: Decision Tree

b) The strategy of a fired worker (player w) is:

$$s^w(i) = \begin{cases} \mu S + (1 - \mu)\bar{S} & \text{if } i = b \\ mS + (1 - m)\bar{S} & \text{if } i = g \end{cases}, \quad (2)$$

where $\mu \in [0, 1]$ and $m \in [0, 1]$ are the worker specific probabilities to play action S (sue the firm).

c) In order to represent the judicial process in the most simple way, we assume that the representative judge who benefits of a supportive environment can investigate cases carefully and can determine the type of the worker with unitary probability; he plays action C (for control). The environment includes all that help the judge to take a good decision, such as time to study a file, the number and quality of auxiliary staff, access to data, special training, and so on. The judge who does not dispose of a supportive environment is in a situation of imperfect information and cannot implement systematically the control strategy: he thus plays action "control" with a probability $\Pr[C]$ and action "no control" (\bar{C}) with probability $1 - \Pr[C]$. Hence, denoting by

$P[S]$ the overall number of cases a judge *must* analyze every period and by θ the number of cases a judge *can* analyze every period (this parameter can be interpreted as a proxy for the technical efficiency of the judicial system), the probability that the judge will analyze a given case is:

$$\Pr[C] = \min \left\{ \frac{\theta}{P[S]}, 1 \right\}, \text{ with } P[S] = \alpha lm + (1 - \alpha)\lambda\mu. \quad (3)$$

The interesting case is θ is rather small: this means that when they are subject to a large number of cases of brought by unknown types of workers, judges get overloaded, i.e. $\Pr[C] < 1$. In the following we will develop our arguments for the non trivial case where θ is positive but close to zero (with $\theta = 0$ being a special case). If θ is large enough, there is no incentive for firms to fire for personal motives any good worker, since judges can detect the abuse without error.

In this framework, the judge's rationality can be introduced in the most straightforward way by stating that, in the no-control case, the frequency of decisions favorable to workers should match the frequency of g -type workers in the total population of dismissed workers who sue their firm. Indeed, any gap between the two measures would involve a systematic bias in favour of either workers or firms, which is not consistent with the principle of an *impartial justice*. Formally, we denoted by $\Pr[I|S, \bar{C}]$ the probability that in the situation of imperfect information the judge will give a verdict favorable to the worker. Let $\Pr[g|F, S, \bar{C}]$ be the number of good workers that sue relative to the total number of suing workers, more precisely:

$$\Pr[g|F, S, \bar{C}] = \frac{\alpha lm(1 - \Pr[C])}{[\alpha lm + (1 - \alpha)\lambda\mu](1 - \Pr[C])} = \frac{\alpha lm}{\alpha lm + (1 - \alpha)\lambda\mu}. \quad (4)$$

Then, the "judge's rationality condition" (JRC) can be stated as:

$$\Pr[I|S, \bar{C}] = \Pr[g|F, S, \bar{C}] \quad (5)$$

In this setup, a good worker that sues the firm when the majority of workers who sue are of the bad type has little chance to win, and a bad worker who sues the firm when the majority of cases is brought by good workers, has good chances to win.

Finally, the judge's strategy can be written in a compact way as:

$$s^j = \begin{cases} \text{plays } C, \text{ with } \Pr[C] \\ \text{plays } \bar{C}, \text{ with } 1 - \Pr[C], \text{ then} \end{cases} \begin{cases} \text{sit with the worker, with } \Pr[I|S, \bar{C}] \\ \text{sit with the firm, with } 1 - \Pr[I|S, \bar{C}] \end{cases} \quad (6)$$

Given the judge's strategy and a worker's type, workers' probability to win the case and get the compensation y is:

$$\Pr[I|S, g] = \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}], \text{ for the } g\text{-type worker} \quad (7)$$

$$\Pr[I|S, b] = (1 - \Pr[C]) \Pr[I|S, \bar{C}], \text{ for the } b\text{-type worker.} \quad (8)$$

A quick eye to these formula point to a sensible consequence of our rationality assumption: the ex ante probability that a good worker wins the case is bigger than the ex ante probability to win for a bad worker.

2.3 Optimal strategies

2.3.1 The worker

The expected payoff of a fired b -type worker who sues is:

$$\begin{aligned} E[U^w|S, F, b] &= \Pr[C](-k) + (1 - \Pr[C])\{\Pr[I|S, \bar{C}]y + (1 - \Pr[I|S, \bar{C}])(-k)\} \\ &= (-k) \{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])\} + (1 - \Pr[C]) \Pr[I|S, \bar{C}]y. \end{aligned} \quad (9)$$

Thus, the b -worker sues (plays S) if $E[U^w|S, F, b] > 0 \Leftrightarrow y > kX_1$ with

$$X_1 \equiv \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]}. \quad (10)$$

The expected payoff of a fired g -type worker who sues is:

$$\begin{aligned} E[U^w|S, F, g] &= \Pr[C](y) + (1 - \Pr[C])\{(1 - \Pr[I|S, \bar{C}])(-k) + \Pr[I|S, \bar{C}]y\} \\ &= y \{\Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}]\} + (-k)(1 - \Pr[C])(1 - \Pr[I|S, \bar{C}]). \end{aligned} \quad (11)$$

Thus, the g -worker goes to court (plays S) if $E[U^w|S, F, g] > 0 \Leftrightarrow y > kX_2$ with :

$$X_2 \equiv \frac{(1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{\Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}]}. \quad (12)$$

We can easily check that $X_1 > X_2$. Therefore, according to y , either all workers sue, or all workers do not sue, or the good workers sue while the bad ones do not. The case where the b -type workers sue and the g -type workers do not can never happen.

2.3.2 The firm

The expected payoff of the firm when it fires a b -type worker for personal motives (F) is:

$$\begin{aligned} E[U^f|F, b] &= \mu \{ [\Pr[C] + (1 - \Pr[C]) (1 - \Pr[I|S, \bar{C}])] 0 + (-y - k)(1 - \Pr[C]) \Pr[I|S, \bar{C}] \} \\ &= \mu(-y - k)(1 - \Pr[C]) \Pr[I|S, \bar{C}]. \end{aligned} \quad (13)$$

The expected payoff of the firm that fires the b -type worker for economic motives (\bar{F}) is

$$E[U^f|\bar{F}, b] = -nk. \quad (14)$$

Hence, the firm's optimal strategy is to fire the b -type worker for personal motives if $E[U^f|F, b] > E[U^f|\bar{F}, b] \Leftrightarrow y < kY_1$, with:

$$Y_1 \equiv \frac{n - \mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]}{\mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]} \quad (15)$$

The expected payoff of the firm that fires a g -type worker for personal motives (F) is:

$$E[U^f|F, g] = -(y + k)m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \} \quad (16)$$

and the expected payoff of the firm that fires the g -type worker for economic motives (\bar{F}) is:

$$E[U^f|\bar{F}, g] = -nk.$$

The optimal strategy is to fire a g -type worker if: $E[U^f|F, g] > E[U^f|\bar{F}, g] \Leftrightarrow y < kY_2$, with:

$$Y_2 \equiv \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} \quad (17)$$

We can check firstly that $Y_1 > Y_2$ if $(m - \mu) \geq 0$. Indeed,

$$\begin{aligned} Y_1 &= \frac{n - \mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]}{\mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]} > \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} = Y_2 \\ &\Leftrightarrow m \Pr[C] + (m - \mu)(1 - \Pr[C]) \Pr[I|S, \bar{C}] > 0. \end{aligned}$$

But $(m - \mu) \geq 0$ for $X_1 > X_2$ such as it has been shown before. For $X_1 > X_2$ either $m = 1$ and $\mu \in [0, 1]$, or $m \in [0, 1]$ and $\mu = 0$. It turns out that $Y_1 > Y_2$.

3 Equilibria of the game

A Nash equilibrium is defined here as a situation where employees and the firm follow their optimal strategy while they expect that the other player carries out his own optimal strategy; furthermore, the judge's behavior is impartial. The equilibrium can therefore be represented by the vector of optimal strategies, $[l^*, \lambda^*, m^*, \mu^*]$.

In solving the model for the various equilibria, our methodology consists in considering all possible logical ordering of X_1 , X_2 , Y_1 and Y_2 and checking what could be an equilibrium and whether it exists. Appendix 1 show why some equilibria cannot exist whatever the values of the parameters. In the core text we present only feasible equilibria.

At this point of our demonstration we cannot order Y_2 and Y_1 with respect to X_1 and X_2 (recall that these are endogenous variables). We should distinguish between two significant situations, $Y_2 < X_1$ or $Y_2 \geq X_1$. We study first the case $Y_2 < X_1$.

3.1 The case $Y_2 < X_1$: a separating equilibrium

A *separating equilibrium* is a situation where the firm's strategy is specific to the type of worker, and workers have specific judicial strategies. Hence, judges can infer the type of the worker from his decision to sue or not the firm, that is, they can make a decision as if they were in a situation of perfect information.

It is easy to see that a possible separating equilibrium occurs if all b -type workers and only them are fired for personal motives and they do not sue the firm. Since judges have almost no case to analyze, they can detect the type of worker without error if one case arrives on their desk. In this context, a b -type worker has no individual incentive to sue. Moreover, the firm will never fire a g -worker for a personal motive, if else the person will sue and win the large indemnity y . Hence the firm prefers the economic motive, which costs it "only" N . By eliminating all the other logical occurrences, Appendix 1 shows that this is the *only* equilibrium possible in the case $Y_2 < X_2$. We show now formally that this equilibrium exists whatever the value of the parameters.

The two conditions of existence of this equilibrium are:

Condition (a): $kY_2 < y < kY_1$: all b -type workers and only them are fired for personal motives

Condition (b): $kX_2 < y < kX_1$: b -type workers fired for personal motives do not sue the firm.

(If a g -type worker is fired for personal motives, he would sue the firm.)

In this equilibrium, we have $\lambda = 1$ and $l = 0$. The manager's strategy becomes:

$$s^f(i) = \begin{cases} F & \text{if } i = b \\ \bar{F} & \text{if } i = g \end{cases}. \quad (18)$$

Let us study first condition (b). We show that the case where some b -type workers fired for personal motives sue the firm ($\mu > 0$) is impossible. Indeed, given that $l = 0$, for $\mu > 0$ we have $\Pr[g|F, S, \bar{C}] = 0$ according to Eq.(4). In turn, the judge's rationality condition (condition 5) implies that $\Pr[I|S, \bar{C}] = 0$. But the b -worker sues the firm (plays S) if:

$$E[U^w|S, F, b] \geq 0 \Leftrightarrow y \geq kX_1 = k \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]} \quad (19)$$

yet here $\lim_{\Pr[I|S, \bar{C}] \rightarrow 0} X_1 = \infty$, so $y \geq kX_1$ is impossible.

Let us consider the opposite case, $\mu = 0$. If no worker sues the firm ($P[S] \rightarrow 0$), should one worker deviate and choose to take his case to courts, judges can detect without error his type:

$$\Pr[C] = \min \left\{ \frac{\theta}{P[S]}, 1 \right\} = \min \left\{ \frac{\theta}{\alpha l m + (1 - \alpha) \lambda \mu}, 1 \right\} = 1. \quad (20)$$

Hence,

$$\lim_{\Pr[C] \rightarrow 1} X_1 = \lim_{\Pr[C] \rightarrow 1} \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]} = \infty \quad (21)$$

so condition $y < kX_1$ is always fulfilled. In particular, $X_2 = \frac{(1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{\Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}]}$ so, in equilibrium, we have:

$$X_2 = 0. \quad (22)$$

Given that $kX_2 < y$, it turns out that a g -type worker would systematically sue the firm if he is fired for a personal motive (i.e., $m = 1$).

We turn now to condition (a). According to definition (15), we have:

$$Y_1 = \frac{n - \mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]}{\mu(1 - \Pr[C]) \Pr[I|S, \bar{C}]} \quad (23)$$

with $\lim_{\Pr[I|S, \bar{C}] \rightarrow 0} Y_1 = \infty$. Therefore $y < kY_1$, b -type workers are always fired for personal motives (i.e., $\lambda = 1$).

Then, we have:

$$Y_2 = \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} = \frac{n - m}{m}. \quad (24)$$

Condition $y < kY_2$ where g -workers are also fired for personal motives would imply: $y < kY_2 \Leftrightarrow y + k < N$. But the largest cost that the firm should pay if it is taken to courts ($y + k$) cannot be smaller than N , if else the problem becomes trivial (no worker would be fired for economic motives).

So $Y_2 < y < kY_1$ and $kX_2 < y < kX_1$ whatever the parameters of the problem: *the separating equilibrium is always possible*. Such an equilibrium is appealing from a fairness perspective, given that no worker is fired for an invented motive. In particular, workers who are entitled to the large severance payment for economic motives, will get it.

3.2 The case $X_1 < Y_2$. A pooling equilibrium: all workers fired for personal motives, all sue the firm

We study now the case where $X_1 < Y_2$. Appendix 1 shows that the only feasible equilibrium in pure strategies can occur if $kX_2 < kX_1 < y < kY_2 < kY_1$. If these conditions jointly hold, all workers are fired for personal motives and all sue the firm, what we refer to as a *pooling equilibrium*, to emphasize that judges cannot infer a worker's type from his judicial strategy. The intuition behind this situation is easy to grasp: if all workers are fired and all sue, judges are subject to a huge flow of cases (of mass one), and they will sit with the workers with a probability $\alpha < 1$. But because judges can make errors, firms do fire good workers for a personal motive, and bad workers do sue the firm.

Formally, for $\lambda = 1$ and $l = 1$ the manager's strategy is $s^f(i) = F, \forall i \in \{b, g\}$ and, with $\mu = 1$ and $m = 1$, the workers' strategy becomes $s^w(i) = S, \forall i \in \{b, g\}$.

On the judge's side, for $P[S] = 1$, the probability of control is:

$$\Pr[C] = \min \left\{ \frac{\theta}{P[S]}, 1 \right\} = \theta. \quad (25)$$

Given that $\Pr[g|F, S, \bar{C}] = \frac{\alpha m (1 - \Pr[C])}{[\alpha m + (1 - \alpha)\mu\lambda] (1 - \Pr[C])} = \frac{\alpha m}{\alpha m + (1 - \alpha)\lambda\mu} = \alpha$, the judge's rationality condition (Eq. 5) becomes:

$$\Pr[I|S, \bar{C}] = \alpha. \quad (26)$$

Furthermore, as $X_2 < X_1$ and $Y_2 < Y_1$, a sufficient condition for this equilibrium to exist is:

$$kX_1 < y < kY_2. \quad (27)$$

$$\begin{aligned} \text{with } X_1 &= \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]} = \frac{\theta + (1 - \theta)(1 - \alpha)}{\alpha(1 - \theta)} \\ \text{and } Y_2 &= \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} = \frac{n - \{ \theta + (1 - \theta)\alpha \}}{\theta + (1 - \theta)\alpha}. \end{aligned}$$

This condition can be fulfilled at least for some parameter values if the three following conditions hold together:

Condition (a):

$$X_1 < Y_2 \Leftrightarrow \theta < \frac{\alpha(n - 1)}{1 + \alpha(n - 1)}. \quad (28)$$

As $n > 1$, this condition can be fulfilled for a small enough θ . In particular, it is fulfilled for $\theta = 0$.

Condition (b), both b -workers and g -workers sue:

$$kX_1 < y \Leftrightarrow \theta < \frac{\alpha(y + k) - k}{\alpha(y + k)}. \quad (29)$$

This condition can be fulfilled for a small θ provided that $\alpha(y + k) - k > 0 \Leftrightarrow \alpha > \left(\frac{k}{y + k} \right)$.

Condition (c), both b -workers and g -workers are fired for personal motives:

$$y < kY_2 \Leftrightarrow \theta < \frac{\tau - \alpha}{1 - \alpha}. \quad (30)$$

where $\tau < 1$ stands for $\frac{nk}{y + k}$. This condition can be fulfilled for a very small θ provided that $\alpha < \tau$.

Thus, in general, conditions (b) and (c) are jointly fulfilled if $\theta < \min \left\{ \frac{\alpha(y + k) - k}{\alpha(y + k)}, \frac{\tau - \alpha}{1 - \alpha} \right\}$. Therefore, a necessary condition for the pooling equilibrium to exist is $\min \left\{ \frac{\alpha(y + k) - k}{\alpha(y + k)}, \frac{\tau - \alpha}{1 - \alpha} \right\} > 0$.⁶

As shown in Appendix 1, for $X_1 < Y_2$ the game also presents two hybrid equilibria, defined as a situation where at least one player plays a mixed equilibrium strategy.

3.3 Hybrid equilibrium A: all b workers and some g ones are fired for personal motives, they all sue

For given parameter values, the model presents a hybrid equilibrium where not only all b workers are fired for personal motives, but so are some g -workers; they all go to courts. With the former

⁶ In turn, this condition imposes some restrictions on α with respect to the relative payoffs. We will comment more on these restrictions in the next sections, which present the hybrid equilibria.

notation, in this equilibrium we have $\lambda = \mu = m = 1$ and $l \in]0, 1[$. The firm's strategy becomes:

$$s^f(i) = \begin{cases} F & \text{if } i = b \\ lF + (1-l)\bar{F} & \text{if } i = g \end{cases} \quad (31)$$

and the workers' strategy is $s^w(i) = S, \forall i \in \{b, g\}$.

On the judge's side, the control probability can be written:

$$\Pr[C] = \min \left\{ \frac{\theta}{P[S]}, 1 \right\} = \min \left\{ \frac{\theta}{\alpha l + (1-\alpha)}, 1 \right\}. \quad (32)$$

In order to focus on a non trivial case, we admit that $\Pr[C] = \frac{\theta}{\alpha l + (1-\alpha)} < 1 \Leftrightarrow \theta < \alpha l + (1-\alpha)$.

Given that $\Pr[g|F, S, \bar{C}] = \frac{\alpha l}{\alpha l + (1-\alpha)}$, the judge's rationality condition (condition 5) is:

$$\Pr[I|S, \bar{C}] = \frac{\alpha l}{\alpha l + (1-\alpha)}. \quad (33)$$

The probability that a worker will win its case is an increasing function in l , the frequency of good workers fired for a faked personal motive. Let us study the equilibrium conditions.

Condition (a): All the fired workers sue the firm ($\mu = m = 1$) if $kX_1 < y$. In turn, this requires that the number of judges is small enough:

$$\begin{aligned} \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]} &< \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} \\ \Leftrightarrow \theta &< \frac{\alpha l (n - 1)(1 - \alpha + \alpha l)}{1 - \alpha + n \alpha l}. \end{aligned} \quad (34)$$

We will show later that the condition is fulfilled for $\theta \rightarrow 0$.

Condition (b): The firm is indifferent between firing a g -type worker for economic or personal motive if $y = kY_2$. We develop the indifference condition such as to set the emphasis on l , the frequency of workers fired for a personal motive:

$$\begin{aligned} y &= kY_2 \\ \Leftrightarrow y &= k \frac{n - m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}}{m \{ \Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}] \}} \\ \Leftrightarrow (\alpha l)^2 \left(1 - \frac{N}{y + k} \right) + (\alpha l) (1 - \alpha) \left(1 - \frac{2N}{y + k} \right) + \theta(1 - \alpha) - \frac{N}{y + k} (1 - \alpha)^2 &= 0. \end{aligned} \quad (35)$$

We have here a second degree equation in l , whose root in the interval $[0, 1]$ is the equilibrium frequency of fired workers. As we have denoted $\frac{N}{y + k}$ by $\tau < 1$, equation (35) can be written:

$$(\alpha l)^2 (1 - \tau) + (1 - \alpha) (1 - 2\tau) (\alpha l) + \theta(1 - \alpha) - \tau(1 - \alpha)^2 = 0. \quad (36)$$

Its roots are:

$$l_{1,2} = \frac{(1-\alpha)(2\tau-1) \pm \sqrt{1-4\theta(1-\tau)/(1-\alpha)}}{2\alpha(1-\tau)}. \quad (37)$$

We notice that for $\theta < \tau(1-\alpha)$, one root is negative and the other is positive: $l_1 l_2 = \frac{\theta(1-\alpha) - \tau(1-\alpha)^2}{\alpha^2(1-\tau)} < 0$.⁷

As we focus on the case where θ is small enough, we can assume that this condition is fulfilled.

Let l^+ denote the positive solution, with:

$$l^+ = \frac{(1-\alpha)(2\tau-1) + \sqrt{1-4\theta(1-\tau)/(1-\alpha)}}{2\alpha(1-\tau)}. \quad (38)$$

We notice that l^+ is a monotonic decreasing function in θ , with $l^+ < 1$ if $\theta > \frac{\tau-\alpha}{1-\alpha}$ and $l^+ > 0$ if $\theta < \tau(1-\alpha)$. The hybrid equilibrium A exists if there is a non empty set for θ such that $l^+ \in]0, 1[$.

This requires that $\frac{\tau-\alpha}{1-\alpha} < \tau(1-\alpha)$, or, in an equivalent way:

$$\frac{\tau-\alpha}{1-\alpha} < \tau(1-\alpha) \Leftrightarrow \alpha > 2 - \frac{y+k}{N}. \quad (39)$$

Ceteris paribus, chances to have this condition fulfilled increase if α is large. If α is too small, chances that the judge sits with the workers are small (they are proportional to the number of good workers that sue), so bad workers would not take their case to courts. They will do so only if there are relatively many good workers that sue, hence they can fond into a mass of good workers.

On the other hand, condition $\theta > \frac{\tau-\alpha}{1-\alpha} \Leftrightarrow l^+ < 1$ is the opposite of condition (30) for which the pooling equilibrium can exist. It turns out that the pooling and the hybrid equilibrium A mutually exclude. Hence, the hybrid equilibrium can exist for a small θ ($\theta \rightarrow 0$), only if $\alpha > \tau$, if else firms will fire all the g -workers because their chances to win in courts (when all workers sue) are weak.

Turning now to the properties of this equilibrium, we can show that the equilibrium value of l^+ (the frequency of good workers fired abusively) is an increasing function in $\tau = \frac{N}{y+k}$. Writing the differential of Eq. (36) with respect to l and τ :

$$2l(\alpha)^2(1-\tau)dl - (\alpha l)^2 d\tau - 2(1-\alpha)(\alpha l)d\tau + \alpha(1-\alpha)(1-2\tau)dl - (1-\alpha)^2 d\tau = 0, \quad (40)$$

⁷ The condition $l_1 l_2 < 0$ is a sufficient condition for the existence of the roots.

we get the derivative:

$$\frac{dl}{d\tau} = \frac{[(1-\alpha) + \alpha l]^2}{2l\alpha^2(1-\tau) + \alpha(1-\alpha)(1-2\tau)}. \quad (41)$$

The sign of the derivative $\frac{dl}{d\tau}$ is given by the sign of $2l\alpha^2(1-\tau) + \alpha(1-\alpha)(1-2\tau)$. It can be checked that for $l = l^+$ this sign is positive. As expected, the frequency of good workers fired abusively increases with N (the severance payment due for separation for an economic motive) and decreases with $y + k$ (the fine for abusive dismissal and the judicial costs). We can see that an undifferentiated proportional reduction in firing costs (i.e. reduce N by $x\%$ and reduce $y + k$ by $x\%$) would have zero impact on τ and l . So, if a reduction in firing costs can help supporting employment, we should keep in mind that, in this equilibrium, reducing $y + k$ would push up abusive dismissals.

This pattern is consistent with evidence provided by Galdón-Sánchez and Güel (2000) who analyzed the court outcome of dismissal conflicts for several European countries (Germany, Italy, France and the UK) as well as the United States in the 1990s. They show that workers' chances to win in courts are larger the smaller the gap between the fair (N in our model) and the unfair (y) dismissal compensation. In our model, $N < y + k$, so, for given k , an increase in τ is tantamount of a reduction in the gap. According to Eq. (41) when the gap declines the frequency of good workers dismissed for personal motives increases, and so does the fraction of cases won by the workers (Eq 33).

Finally, we argued that the equilibrium value of l^+ is a monotonic decreasing function in θ . For $\theta = 0$ we get the largest positive root $l_{\theta=0}^+ = \frac{(1-\alpha)}{\alpha} \frac{\tau}{(1-\tau)} > 0$. We can check that condition (34) holds for $\theta \rightarrow 0$.

3.4 Hybrid equilibrium B. All workers are fired for personal motives, all g workers and some b workers sue

The game presents a second hybrid equilibrium, where all workers are fired for personal motives, and where all g workers and a fraction $\mu \in]0, 1[$ of the b workers sue.

With $\lambda = 1$, and $l = 1$ the firm's strategy is $s^f(i) = F, \forall i \in \{b, g\}$. The g -workers always sue

($m = 1$) and so do some b -workers ($\mu \in]0, 1[$). Hence workers' strategy can be written:

$$s^w(i) = \begin{cases} \mu S + (1 - \mu)\bar{S} & \text{if } i = b \\ S & \text{if } i = g \end{cases}. \quad (42)$$

Turning to the judge's behavior, the control probability is:

$$\Pr[C] = \frac{\theta}{\alpha + (1 - \alpha)\mu} < 1.$$

The judge's rationality condition becomes:

$$\Pr[I|S, \bar{C}] = \Pr[g|S, \bar{C}] = \frac{\alpha l m (1 - \Pr[C])}{[\alpha l m + (1 - \alpha)\lambda\mu] (1 - \Pr[C])} = \frac{\alpha}{\alpha + (1 - \alpha)\mu}. \quad (43)$$

The probability that a worker wins in courts is a decreasing function in the frequency of bad workers who sue.

There are two equilibrium conditions.

Condition (a): All workers are fired for personal motives if $y < kY_2$, that is, if:

$$\begin{aligned} y &< k \frac{n - \{\Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}]\}}{\Pr[C] + (1 - \Pr[C]) \Pr[I|S, \bar{C}]} \Leftrightarrow \theta < \frac{\tau [\alpha + (1 - \alpha)\mu]^2 - [\alpha + (1 - \alpha)\mu] \alpha}{(1 - \alpha)\mu} \\ \theta &< \frac{[\alpha + (1 - \alpha)\mu] [\alpha(\tau - 1) + (1 - \alpha)\tau\mu]}{(1 - \alpha)\mu}. \end{aligned} \quad (44)$$

We will show later on that for $\theta \rightarrow 0$ this condition is fulfilled.

Condition (b): b -workers are indifferent between suing the firm or not if $y = kX_1$. We determine the value of X_1 in this special case:

$$X_1 = \frac{\Pr[C] + (1 - \Pr[C])(1 - \Pr[I|S, \bar{C}])}{(1 - \Pr[C]) \Pr[I|S, \bar{C}]} = \frac{\alpha\theta + \mu(1 - \alpha)[\alpha + (1 - \alpha)\mu]}{\alpha[\alpha + (1 - \alpha)\mu - \theta]}. \quad (45)$$

The indifference condition leads to a second degree equation in μ :

$$(1 - \alpha)^2 k \mu^2 - \alpha(y - k)(1 - \alpha)\mu - \alpha[y\alpha - \theta(y + k)] = 0. \quad (46)$$

Its roots are:

$$\mu_{1,2} = \frac{\alpha(y - k) \pm \sqrt{\alpha^2(y + k)^2 - 4\alpha k\theta(y + k)}}{2(1 - \alpha)k}. \quad (47)$$

There is one positive and one negative real root if $\theta < \frac{\alpha y}{y + k}$. In the following, we admit that θ is small enough to fulfill this condition and denote the positive solution by:

$$\mu^+ = \frac{\alpha(y - k) + \sqrt{\alpha^2(y + k)^2 - 4\alpha k\theta(y + k)}}{2(1 - \alpha)k}. \quad (48)$$

The hybrid equilibrium exists for $\mu^+ \in]0, 1[$. The first condition, $\mu^+ > 0$, is tantamount to $\theta < \frac{\alpha y}{y+k}$. The second condition, $\mu^+ < 1$, requires that $\theta > \frac{\alpha(y+k)-k}{\alpha(y+k)}$. It turns out that this equilibrium exists if the set $\left[\frac{\alpha(y+k)-k}{\alpha(y+k)}, \frac{\alpha y}{y+k} \right]$ is not empty. This requires that:

$$\frac{\alpha(y+k)-k}{\alpha(y+k)} < \frac{\alpha y}{y+k} \Leftrightarrow \alpha < \frac{k}{y}. \quad (49)$$

Chances that this condition holds get better for a small y : indeed, in this case the firm has all the incentives to fire all workers for a personal motive. All the g -workers sue, but if the frequency of good workers is low (α is small), so are chances to win for both good and bad workers.

Remark that condition $\mu^+ < 1 \Leftrightarrow \theta > \frac{\alpha(y+k)-k}{\alpha(y+k)}$ is the opposite of condition (29), one of the existence conditions of the pooling equilibrium. Hence the pooling and the hybrid equilibrium B mutually exclude. Thus, for $\theta \rightarrow 0$, this hybrid equilibrium can exit only if $\alpha < \frac{k}{y+k}$, if else chances of the b -workers to win are high and they would all go to courts.

The differential of Eq. (46) with respect to y and μ :

$$2(1-\alpha)^2 \mu k d\mu - \alpha(y-k)(1-\alpha)d\mu - \alpha(1-\alpha)\mu dy - \alpha(\alpha-\theta)dy = 0 \quad (50)$$

leads to the derivative:

$$\frac{d\mu}{dy} = \alpha \frac{\mu(1-\alpha) + (\alpha-\theta)}{2(1-\alpha)^2 \mu k - \alpha(y-k)(1-\alpha)}. \quad (51)$$

Since we are concerned with the case where $\theta < \frac{\alpha y}{y+k}$ (and $\frac{\alpha y}{y+k} < \alpha$), the sign of the derivative is the sign of $2(1-\alpha)^2 \mu k - \alpha(y-k)(1-\alpha)$. It can be easily shown that for $\mu = \mu^+$ the sign is positive. If this equilibrium prevails, when increasing the fine for the firm that abusively fires good workers for personal motives more bad workers would be tempted to sue, in order to get this larger compensation.

This is also consistent with Galdón-Sánchez and Güel (2000) findings: an increase in y is equivalent to an increase in the gap between the compensation for fair and unfair dismissal. But when the gap increases, more bad workers are fired for personal motives and the overall chances of a worker to win in courts decline (Eq. 43).

The positive root μ^+ is a monotonic decreasing function in θ . For $\theta = 0$ we get its largest value, $\mu_{\theta=0}^+ = \frac{y}{k} \frac{\alpha}{(1-\alpha)}$. It can be checked that for $\mu = \mu_{\theta=0}^+$ condition (44) holds.⁸

⁸ Hybrid equilibrium A can occur if $\alpha > 2 - (1/\tau)$ (with $\tau = N/(y+k) < 1$) while Hybrid equilibrium B

4 Conclusion

The specific contribution of this paper to existing EPL literature is to emphasize that when firms' hiring and firing policies are subject to legal control by external judges, the economy presents a built-in propensity for multiple equilibria. Thus expected firing costs and workers' expected payoffs can change dramatically should the equilibrium change.

In our basic framework, firms must layoff a given number of employees, given that, in a perfect information setup, only some of them would qualify for what labor judges acknowledge to be a valid personal motive. Such a motive involves some form of inadequacy of the worker with the firm's values. The model builds on the idea according to which, judges, like any human beings, can make errors when they have to process a large number of files. While the paper does not describe in a detailed way the judges' decision making process, the error probability was brought into the picture in an endogenous way.

There is one separating equilibrium that can prevail whatever the parameters of the problem, where firms fire for personal motives only those workers who really qualify for such a motive, fired workers do not sue the firm, and judges can detect without error the type of the worker should a worker sue the firm. Good workers are fired for economic motives, and get the generous legal compensation they are entitled to. While in this world there is no excessive frustration – each employee gets a fair deal and firms behave according to the law – one may ask what judges are good for. Indeed, they may seem to have too much spare time since no worker takes to courts the firm's decision. However, this stressless environment is an indication that judges perform well their role of dissuading deviant behavior.

The game presents other equilibria, that can occur for a broad range of parameter values and which are all characterized by an overwhelming flow of cases in the justice's hands. The logic behind these more sophisticated situations is explicit: the fact that overworked judges can make errors creates the incentive for firms to abusively fire good workers for faked personal motives, and also for bad workers to abusively sue firms. The more of the latter go to courts, the higher their

requires that $\alpha < k/y$. Hence, if $k/y > 2 - (y + k)/N$, there are α values for which hybrid equilibria A and B do not mutually exclude.

chances to win, and the higher the risk for a good worker to lose his case. In turn, this situation validates the decision of the firm to fire for personal motives the good workers. As expected, the proportion of good workers subject to abusive dismissal is decreasing with the justice cost and the fine for firms that perpetrate such abuses.

Contemporary trends Continental European countries where job protection relies heavily on judges' control over the firing motives seem to indicate a shift of the balance from the separating to some form of socially dominated hybrid equilibrium. In particular in France, many observers point out that labor courts are overcrowded and that firms tend to abusively fire good people for personal motives. In order to oppose this inefficient outcome, one may consider several solutions. A trivial one would be an increase in the overall effectiveness of the judicial system (for instance, by hiring more judges). However, such a solution may be hard to implement in a context where governments must reduce public deficits and debts. One may alternatively consider an increase in the fines for abusive dismissal up to the point where only the separating equilibrium can prevail. Yet such a heavy sanction may provide a too strong disincentive for entrepreneurs, in a context where European governments strive to boost employment.

In the last few years, the Economic Commission (2006, 2007), the OECD (2006) and several economists (Cahuc and Kramarz, 2004; Blanchard and Tirole, 2004) advocated the de-judicialisation of the employer-employee relationship in Southern-European countries. In their view, the right to challenge the dismissal motive in courts should be replaced by a severance indemnity, to be paid whatever the reason of the separation. Such a system, at work in several developed countries (Austria, Denmark, United States), might jointly suppress substantial justice costs and large personal losses for those good employee fired for undue motives, to the expense of those job-unfitted workers who are winning cases under the going system. Without pushing the logic of the argument so far, our analysis supports to this idea: a reduction in the gap between the compensation for personal and economic motives should increase the chances of good workers to win their case.

A Appendix 1

We know that $X_1 > X_2$ and $Y_1 > Y_2$. Two polar cases can be imagined:

- $Y_2 > X_1$, i.e.: $Y_1 > Y_2 > X_1 > X_2$ or
- $Y_2 < X_1$

We firstly consider the pure strategy equilibria, then turn to mixed strategy ones.

A.1 Pure strategy equilibria: the case $Y_2 > X_1$

- Case 1: $kX_1 < kY_2 < kY_1 < y$, all workers sue, no one is fired. Since no one is fired, no one must sue. If someone is fired and sue, the control probability is equal to one. We can check that $\lim_{\Pr[\bar{c}] \rightarrow 1} X_1 = \infty$, hence the case $y > kX_1$ is impossible.
- Case 2: $kX_1 < kY_2 < y < kY_1$, all workers sue, only the bad workers are fired. Since only b workers are fired, only b workers sue. The probability that the judges sit with the worker is zero, hence $\lim_{\Pr[I|S, \bar{C}] \rightarrow 0} X_1 = \infty$. The case $y > kX_1$ is impossible.
- Case 3: $kX_2 < kX_1 < y < kY_2 < kY_1$, all workers are fired, they all sue. This is the "pooling equilibrium" analyzed in the core of the paper.
- Case 4: $kX_2 < y < kX_1 < kY_2 < kY_1$, all workers are fired, only the g type sue. If only g workers sue, judges should sit with them systematically, $\Pr[I|S, \bar{C}] = 1$. In this case, $Y_2 = n - 1$. But $y < kY_2 \Rightarrow y < k(n - 1)$ or $y + k < N$ which is impossible (if else the dismissal for economic motives would never be an option).
- Case 5: $y < kX_2 < kX_1 < kY_2 < kY_1$, all workers are fired, no one is suing. Since no one is suing, if one good worker deviates, the control probability is equal to one, and judges must sit with him. Formally $X_2 = 0$ which goes again $y < kX_2$. This equilibrium is impossible.

A.2 Pure strategy equilibria: the case $Y_2 < X_1$

A.2.1 Sub-case: $y < kY_2 < kX_1$: all workers are fired

There are two possibilities:

- Case 1: $kX_2 < y < kY_2 < kX_1$ all workers are fired ($y < kY_2$), but only good ones sue ($kX_2 < y < kX_1$). Then judges must sit with the workers $\Pr[I|S, \bar{C}] = 1$. We check that $Y_2 = n - 1$ and $y < kY_2 \Rightarrow y + k < N$, which is impossible.
- Case 2: All workers are fired ($y < kY_2$) and no one is suing ($y < kX_2 < kX_1$). With a unit control probability, good workers must sue, so this equilibrium is impossible.

A.2.2 Sub-case: $kY_2 < kX_1 < y$: all the fired workers sue

- Case 3: $kY_2 < y < kY_1$, only bad workers are fired. In this case, the probability that the judge sits with the worker is zero, so no bad worker has an incentive to sue. This refutes the assumption that all workers sue. The equilibrium is impossible.
- Case 4: $kY_2 < kY_1 < y$, no one is fired. The control probability is equal to one. So

$$\lim_{\Pr[C] \rightarrow 1} X_1 = \infty \text{ thus } kX_1 < y \text{ is impossible}$$

A.2.3 Sub-case: $kY_2 < y < kX_1$

- Case 5: $kY_2 < kY_1 < y$ no one is fired. Then the control probability is equal to one. We have $\lim_{\Pr[C] \rightarrow 1} Y_1 = \infty$ so $kY_1 < y$ is impossible.
- Case 6: $kY_2 < y < kY_1$ only bad workers are fired and $y < kX_2$ no worker sues. then the control probability is equal to one and $X_2 = 0$. We must have $y > kX_2$ which goes against the initial assumption.
- Case 7: $kY_2 < y < kY_1$ only bad workers are fired and $kX_2 < y < kX_1$ only good workers would sue (if fired), while fired b workers do not sue. This is the "separating equilibrium" analyzed in the core of the paper.

A.3 Hybrid equilibria: the case $Y_2 < X_1$

It can be shown that in this case, hybrid equilibria either do not exist or require very restrictive conditions.

A.3.1 Hybrid equilibrium 1: $kY_2 = y < kX_1$ all bad and some good workers are fired, only good ones sue

If only good ones sue, the probability that the judge sits with workers is equal to one. We can check that $Y_2 = n - 1$. Then condition $kY_2 = y$ requires $N = y + k$: the firm is indifferent between firing a good worker for economic motives (and paying N) or firing him for personal motives and having to pay after the trial $y + N$ with certitude. On the other hand, b workers wont sue only if the control probability is strong enough. Since $X_1 = \frac{\Pr[C]}{1-\Pr[C]}$, this very special case requires that $N = y + k$ and $y < k \frac{\Pr[C]}{1-\Pr[C]}$.

A.3.2 Hybrid equilibrium 2: $kY_2 < y = kX_1$ only the b workers are fired, all the g-type and a few b workers sue

Since only workers are fired, the judge neve sits with the workers. We have $\lim_{\Pr[I|S,\bar{C}] \rightarrow 0} X_1 \rightarrow \infty$ so condition $y = kX_1$ is impossible.

A.3.3 Hybrid equilibria when $X_1 < Y_2$

Two equilibria, which occur for $y = kX_1$ and $y = kY_2$, are possible. We study them in the core of the paper.

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