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Abstract

Our goal here is to explain the strikingly different response of Spanish unemployment relative to other European economies, in particular France, during the ongoing recession. The Spanish unemployment rate, which fell from 22% in 1994 to 8% in 2007, reached 19% by the end of 2009, whereas the French unemployment rate has only increased by less than 2 pp. during the crisis. We argue that labor market institutions in the two economies are rather similar, except for the larger gap between dismissal costs of workers with permanent and temporary contracts in Spain, which lead to huge flows of temporary workers out of and into unemployment. We estimate in a counterfactual scenario that more than one-half of the increase in the unemployment rate would have been avoided had Spain adopted French employment protection institutions before the recession started.

KEYWORDS: Temporary contracts, unemployment, search and matching.

JEL CODES: H29, J23, J38, J41, J64.

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1 Introduction

The goal of this paper is to explain the strikingly different response of Spanish unemployment relative to other European economies, in particular France, during the ongoing recession. We focus on a comparison with France because both countries share similar labor market institutions (employment protection legislation, unemployment benefits, wage bargaining, etc.). However, while French unemployment has remained relatively subdued during the current recession, the Spanish unemployment rate, which fell from 22% in 1994 to 8% in 2007 –when Spain was creating a large share of jobs in the European Union (EU)– has reached almost 19% by the end of 2009. Our basic conjecture is that this very different behavior is partly due to the large gap between dismissal costs of workers with permanent and temporary contracts in Spain which, together with a large reduction in real interest rates as a result of joining the euro area, fostered a huge expansion of the construction industry. This industrial specialization and the prevalence of flexible temporary contracts induced very large labor flows during the crisis.

France and Spain allow us to tell an interesting tale of two countries. Both are among those economies which most decidedly promoted fixed-term contracts. Achieving labor market flexibility, which is often seen as a requirement to reduce unemployment, is always a politically difficult task, given the resistance of protected insider workers. Creating two-tier labor market is a politically viable way to achieve this goal (see Saint-Paul, 1996 and 2000). However temporary employment is much more important in Spain, reaching around one-third of employees until recently, whereas in France the share has been slightly below 15%. Therefore it is natural to ask whether the markedly different employment impact of the recession is due to this difference, controling for other potential factors.

To explore these potential causes, we use a search and matching model inspired by previous work by Blanchard and Landier (2002) and Cahuc and Postel-Vinay (2002), who extend the seminal Mortensen-Pissarides (1994) model with endogenous job destruction to allow for the distinction between temporary and permanent (open-ended) jobs entailing different dismissal costs. In our model, firms can create both permanent and

temporary jobs and firms convert a certain share of the latter to permanent contracts at their expiration, the rest being terminated at no cost. In this context, it is now well understood that facilitating the creation of more temporary jobs promotes job creation, but it also triggers an increase in job destruction. The increase in job destruction induced by temporary jobs has a larger impact on unemployment when firing costs associated to permanent jobs are large. The intuition for this result becomes clear if one realizes that firms transform temporary jobs into permanent jobs. The higher the firing costs, the lower the share of temporary jobs transformed into permanent jobs, because large firing costs induce employers to use temporary jobs in sequence rather than converting them into long-term contracts, which are subject to the firing costs. As stated, a policy that permits the opening of more temporary jobs fosters both job creation and destruction, the latter effect being strengthened when firing costs are large. This implies that the spread of temporary jobs is more likely to raise unemployment when it happens in a labor market already regulated by stringent permanent job security provisions.

The spread of temporary jobs, which increases labor turnover, is also likely to increase labor market volatility. This phenomenon has been stressed by Bentolila and Saint-Paul (1992) and Boeri and Garibaldi (2007), who argue that two-tier labor market reforms have a transitional honeymoon, job creating effect which can be followed by reductions in employment. Sala *et al.* (2009) have studied the business cycle behavior of segmented labor markets with limitations in the use of fixed-term contracts. In particular they explore whether flexibility at the margin is the reason why labor markets with a relatively high degree of employment protection may display similar volatility as fully flexible ones. They find that flexibility at the margin provides an intermediate situation, in terms of unemployment volatility, between fully regulated and fully deregulated labor markets. Like Sala *et al.* (2009), our approach focuses on the interactions between aggregate productivity shocks and employment protection legislation, including the regulation of temporary jobs. However, in contrast with that paper, we focus on a specific event: a negative aggregate shock in France and Spain, rather than on simulations of a model

calibrated on a representative European labor market. We also pay particular attention to wage bargaining. Contrary to Sala *et al.* (2009) we do not assume that employers have to pay firing costs if they do not agree on the initial wage contract when they are matched with a worker. We assume that firing costs are paid when workers and employers separate only if a contract has already been signed. Such a difference is important to the extent that Ljungqvist (2002) has shown that assuming that firing costs are paid by the employer if there is a separation in the initial bargain –when the job starts– magnifies the impact of firing costs on unemployment. We think that our assumption is more in line with the institutions of France and Spain, where labor contracts are renegotiated by mutual agreement (Malcomson, 1999; Cahuc, Postel-Vinay, and Robin, 2006).

The paper is structured as follows. We start by documenting the relative performance of the French and Spanish labor markets in the crisis vis-à-vis the preceding period in Section 2. In Section 3 we present the main features of the regulation affecting the two labor markets, devoting special attention to fixed-term contracts. Then, in Section 4, we discuss a stylized search and matching model focusing on equilibrium behavior of firms and workers in an economy with both permanent and temporary contracts, where it is possible to transform the latter into the former. In Section 5 we show the extent to which the model can account for the change in the performance of the French and Spanish labor markets from the boom (represented by 2005-2007) to the recession (2008-2009). We simulate of our search and matching model using stylized parameters calibrated for the French and Spanish economies, matching a set of labor market variables. We use two different versions of the model which vary in the degree of flexibility of wages allowed. We follow a difference-in-differences approach in computing the share of the increase in Spanish unemployment induced by the recession due to the type of employment protection prevailing in Spain. We estimate that between 50% and 60% of the increase in the unemployment rate would have been avoided if Spain had reformed its labor institutions at the beginning of the recession to make them similar to French ones. Section 6 concludes.

2 Labor market performance before and during the crisis

As depicted in Figure 1, both France and Spain had an unemployment rate of 3.8% at the end of 1976. From then on, both rates rose in tandem, but the Spanish rate was always on top. The difference increased up until the end of 1994 and shrank thereafter. In the third quarter of 2005, the two rates seemed to have come full circle, reaching similar values around 9%.

Convergence was however a mirage. Since the onset of the worldwide great recession in mid-2007, the Spanish unemployment rate has shot up from 8% to 19%. On the other hand, French unemployment kept on falling, to 7.2%, and then has grown by two points, to 9.3%. What explains such a striking difference? Let us briefly dig deeper.

Table 1 shows a few key labor market magnitudes from 1998:1 to 2007:4, a boom period, and 2008:1-2009:2, the recession (the latter is the recession period we will use in our simulation below) . The table makes it apparent that throughout the boom period, both labor force and employment growth rates have been much higher in Spain than in France. It is the Spanish figures that are remarkable, while the French ones are typical of the Euro-area experience. In Spain the labor force received a boost from large immigration flows amounting to around 1% of the population per year –whereas the share of foreigners in the French labor force was stable– and also from a steady increase in the female labor participation rate –for natives that rate increased by 8.4 percentage points, against 2.9 points in France.[1] Focusing on private sector employees, the table shows that the employment surge in Spain came especially from construction and market services (8.1% and 6.8% per year, respectively). In France, the figures were more moderate, with a fall in manufacturing. The disparity was reinforced by the behavior of hours per employee: the implementation of the 35 hours law caused a significant drop in France, while in Spain they rose slightly.

In the downturn, France has experienced an atypical acceleration in its labor force,

[1] See Bentolila *et al.* (2008a) for a discussion of immigration flows in Spain.

while in Spain the growth rate is very high by historical standards, though it has slowed down. France has suffered a non-negligible employment fall (1.8% p.a.), which is however small compared with the Spanish free fall (6.3% p.a.). The latter stems especially from a collapse of almost one-fourth of employment in construction and a striking 10.8% drop in manufacturing.

It is very hard to explain the extreme volatility in the Spanish labor market without recourse to the type of contracts prevailing in it. As shown in Table 1, in 1998 fixed-term contracts reached almost 14% of employees in France and one-third in Spain. In both countries the vast majority of (quarterly) flows from unemployment to salaried employments are under these contracts: 78.4% in France and 87.2% in Spain. Correspondingly, they also represent the majority of employment outflows, in particular (from administrative, non-LFS sources): 88% in France and 80.1% in Spain. In the two countries more than the full brunt of job losses since the end of 2007 has been borne by temporary jobs: in France 182.000 net jobs where destroyed, but actually 362.000 temporary jobs disappeared, while the respective figures for Spain were 1.14 million and 1.25 million.

Table 1 shows that the share of temporary jobs slightly decreased –from 33% to 31%– in Spain between 1998 and 2007. One may wonder how this matches with the idea that the drop in unemployment is a result of the spread of temporary jobs over this period. We believe that there are two explanations. On the one hand, this was a very long expansion, where Spanish GDP was growing at an average annual rate of 3.7%. In line with the theoretical arguments provided by Wasmer (1999), a long expansionary phase like this induces a so-called capitalization effect whereby high growth increases future profits thus strengthening firms' incentives to increasingly offer permanent contracts so as to retain their workers.

On the other hand, the Spanish government passed a labor reform in 1997 aiming to reduce the severance pay gap between permanent and temporary contracts. They did so through two new policy measures: a new type of permanent contract with lower dismissal costs (33 days instead of 45 days), from which male aged 31-45 years old who

are unemployed for less than 6 months are excluded, and the introduction of a severance pay of 8 days (previously there was none) upon termination of fixed-term and interim contracts. The 1997 reform also included generous social security contribution rebates for the new permanent contracts. Thus, in principle, the latter became more attractive. However, all these measures induced a very small reduction of the temporary employment rate, since the 33 days do not apply to dismissals for disciplinary reasons (e.g. worker misconduct), which are the ones often employed by firms to avoid going to court (see below). Therefore, even in these contracts, most firms end up paying the 45-day severance pay. Indeed, Garcia-Perez and Rebollo-Sanz (2009) show that, in practice, most firms use this contract to pocket the subsidy, usually dismissing the employee as soon as the minimum job duration required by law is reached.

3 Labor institutions in France and Spain

In this section we briefly review the institutional setting of the French and Spanish labor markets. We focus on employment protection legislation (EPL), although we also describe institutions like unemployment benefits and wage bargaining. Our main goal is to document is that the main differences between both labor markets are in EPL rather than in the other two institutions.

3.1 Employment protection

As we have seen, France and Spain are among the countries where governments have, through their regulations, promoted more strongly fixed-term contracts to increase labor market flexibility, with the aim of reducing unemployment. Table A1 in the Appendix presents the key features of regulations concerning firing in the two countries.

Permanent contracts are subject to notice periods and severance pay.[2] It may seem

[2]In France, this includes the regular permanent contract or *contrat à durée indeterminée* (CDI) and the new employment contract (*contrat nouvelles embauches*, CNE, which has different severance pay and other conditions) introduced in 2005 for small firms (see Cahuc and Carcillo, 2006). In Spain it includes both regular permanent contracts and the subsidized *contrato permanente de fomento del empleo* In principle, the latter has lower severance pay, but in fact most dismissals incur the ordinary one.

from the table that firing permanent employees is much cheaper in France than in Spain, but this is wrong, since there are additional important components of firing costs beside severance pay. For example, in France as soon as a worker reaches a 2-year seniority the notice period doubles and the firm must propose a personalized plan to help the employee find another job. Likewise, administrative approval is required in Spain for collective dismissals (roughly those involving 10% of an establishment's staff), which is much more easily granted if workers' representatives have agreed to the dismissal in advance.

Computing overall measures of firing costs is not easy. Let us take the often used OECD (2004) index of the strictness of employment protection legislation (EPL) for 2003, which ranges from 0 to 6, with higher scores indicating stricter regulation. This indicator gives a score of 2.5 for France and 2.6 for Spain regarding protection of regular employment, 3.6 for France and 3.5 for Spain in regulation of temporary employment, and 2.1 for France and 3.1 for Spain in regulation of collective dismissals. The overall EPL score is 3.0 for France and 3.1 for Spain (where the US has the lowest value, 0.7, and Portugal and Turkey the highest, 4.3). Thus, both France and Spain are in the middle-high range, with Spain appearing only slightly more regulated than France. However, as will be argued later on in this section, there are good reasons to suspect that this EPL index, based on legal regulations and not on their implementation, is misleading with regard to Spain. De facto EPL of temporary jobs is much weaker in Spain than in France, whereas the opposite happens with the EPL for permanent jobs.

Moreover, economic theory tells us that what matters for employment is not severance pay per se, which is a transfer from the firm to the worker and may therefore be compensated for in the wage bargain. Rather, since the probability that workers will contest dismissals is very high, what matter are other costs which are not appropriated by firms and workers but are generated by third agents, such as labor courts and labor authorities. In France, severance pay offered by firms in exchange for a quick resolution of dismissals is typically much higher than statutory severance or that agreed in collective bargains. In Spain, since firms that go to court lose in 3 out of 4 cases on average, even if

entrepreneurs think a dismissal to be justified on economic grounds they typically find it more profitable to claim disciplinary reasons. Proceeding in this way, they do not need to satisfy the notice period and, upon immediately acknowledging the dismissal to be unfair, they avoid going to court by paying upfront the correspondingly higher severance pay.[3] In applying our theoretical model to the two countries we will use estimated red-tape costs.

The use of fixed-term contracts is more limited in France than in Spain.[4] In France they can only be used in nine specific cases: for replacing an employee who is absent or temporarily working part time, to transitorily replace an employee whose job is either going to be suppressed or filled by another permanent worker, and for temporary increases in the firm's activity, seasonal activities, and jobs in certain sectors (forestry, naval, entertainment, teaching, survey-making, professional sports, etc.). It is apparent, however, that the alleged reasons for hiring on a temporary basis are often misrepresented. On the other hand, in Spain, temporary contracts may be used for objective reasons (specific work, accumulation of tasks, replacement, etc.), for training, to hire disabled workers, and to cover the part of the working day left uncovered by an employee close to retirement. De facto, however, there are no restrictions: employers are never monitored by authorities to ensure that they comply with the causes for hiring under temporary contracts.

In both countries the maximum duration of fixed-term contracts is 24 months, although in Spain there is again little monitoring by authorities and uncertain-completion jobs (e.g. construction) may lawfully last for an indeterminate period.

In sum, despite the similarity of both countries in terms of OECD rankings, the overall impression is that de facto EPL for permanent contracts is fairly more stringent in Spain than in France, whereas the opposite is true for temporary contracts. For more details on the level and structure of firing costs in France see Cahuc and Postel-Vinay (2002) and

[3] This option has been available to firms in Spain since Law 45/2002 and it implies severance payments of 45 days wage per year of sevices with a maximum of 42 months wages.

[4] We use the terms fixed-term and temporary interchangeably. We focus on the former, captured by the *contrat a duration determinée* (CDD) in France and the *contrato temporal* in Spain. There are several types of fixed-term contracts in Spain. And other non-permanent jobs exist in France, such as temporary jobs (*emploi interimaire* or *emploi temporaire*). Moreover, in both countries there are jobs intermediated by temporary work agencies and most apprenticeship contracts are also temporary. Empirically we shall consider all of these as fixed-term contracts.

Cahuc and Carcillo (2006), and Bentolila and Jimeno (2006) and Bentolila *et al.* (2008b) for Spain.

3.2 Unemployment benefits

Unemployment insurance in France features a gross replacement ratio of 57.4% of the preceding year's wage.[5] In Spain, the replacement ratio decreases over time: it is 70% for the first 6 months and drops to 60% for another 18 months. Thus, at least at the beginning of unemployment spells, the Spanish system looks more generous than the French one. In comparing benefits it is however crucial both to take into account personal characteristics and to consider replacement rates net of taxes. Thus, according to the OECD Benefits and Wages database (March 2006 update), in 2004 the net replacement rate for an average production worker who was married, whose partner did not work, and had no children was equal to 69% in both countries. At the same time, if the same worker was married with a working partner and had two children the replacement rate was 84% in France and 87% in Spain.

In France, the length of benefits is the same as the worker's contribution period, with a maximum duration of 23 months (and higher for workers older than 50 years old). In Spain benefit length increases in steps that imply durations going from 22% to one-third of the contribution period, which has to be of at least 12 months, with a maximum duration of 24 months. In computing a measure of unemployment benefits for our simulations we take into account statutory benefits and coverage, which is affected by duration rules.

Workers who exhaust unemployment insurance or are not eligible for it, are entitled to so-called "minimum integration income" (*Revenu Minimum d'Insertion*, RMI), amounting to €454.63 (which represents about 16% of average gross earnings) and €681.9 for a couple (plus child benefits).[6] In Spain the assistance benefit is equal to 80% of the so-called "Multi-Purpose Public Income Indicator", which in 2008 amounted to €413.5 (around

[5] Or, if it is higher, 40.4% of the wage plus a fixed amount (currently around 330 euros per month).

[6] There is also another scheme equivalent to the RMI (open to those above 25 years old who never worked) for those who have worked before and are not eligible anymore: the *Allocation de Solidarité Specifique* (ASS), with an amount equivalent to the RMI.

23% of gross earnings in the private non-agricultural sector), with higher benefits for workers with family responsibilities. It is means-tested at the level of the benefit. In Spain additional welfare benefits are available in some regions (for example in Madrid they amounts to €370) but coverage is typically low.

3.3 Wage bargaining

Collective wage bargaining is similar in the two countries. It can be argued that this is the result of Spain copying French regulations in the early 1980s, when the post-dictatorship Spanish system of collective bargaining was established. In both countries most workers are covered by collective bargaining, above 90% in France above 80% in Spain. Bargaining takes place mostly at the industry level and there is geographical fragmentation (i.e. through industry-department agreements in France and industry-province agreements in Spain). Conditions set in above firm-level agreements are extended to all firms and workers in the relevant industry or geographical area; extension is discretionary in France and automatic in Spain.

In Spain, workers are represented by worker delegates in firms with less than 50 employees and by worker committees in firms with more than 50 employees, reflecting French practice. Unions obtain representation from firm-level elections, where voters need not be unionized. Thus, there is little incentive for workers to unionize, so that union density is very low but largely irrelevant. Both countries have among the highest gaps between the coverage of collective bargaining and union density (the latter is 10% in France and 15% in Spain).[7] One difference, though, is that whereas in Spain there are only two nationally representative unions (CCOO and UGT), in France there is a multiplicity of unions (8). Nonetheless, they are not equally powerful and, like in Spain, two unions are especially influential particularly in the public sector (CGT and CDFT).

In sum, we believe that the two countries are not too different in their wage setting institutions (and therefore we do not explore any potential differences in wage setting across countries in the simulations below).

[7] For more details regarding Spain see Bentolila and Jimeno (2006).

4 Model

This section presents an outline of the search and matching model we employ in the simulation section. It is inspired by previous work by Blanchard and Landier (2002) and Cahuc and Postel-Vinay (2002), who extend the seminal Mortensen-Pissarides (1994) model with endogenous job destruction to allow for the distinction between temporary and permanent jobs entailing different dismissal costs.

4.1 Model setup

We now describe the main features of the model and discuss its properties using graphs (full algebraic details can be found in the companion paper by Bentolila *et al.*, 2010).

There is a continuum of infinitely-lived risk-neutral workers and firms, with a common discount rate $r > 0$. The measure of workers is normalized to 1.

Job matches have an idiosyncratic productivity distribution $F(\varepsilon)$, drawn over the support $[\underline{\varepsilon}, \overline{\varepsilon}]$. The idiosyncratic productivity shocks follow a Poisson distribution with incidence rate μ. All new jobs start with productivity $\overline{\varepsilon}$.

There are two types of jobs: temporary and permanent (open-ended) jobs, both endowed with the same productivity distribution. It is assumed that wages in temporary jobs are allowed to be not renegotiated, whereas wages in permanent jobs can be. Unemployed workers may have access to temporary jobs with probability p, exogenously set as EPL policy, or to initial permanent jobs with probability $1 - p$. These probabilities are exogenously set to reflect the need of flexible contracts due, for example, to industry specialization in the economy (e.g. the weight of residential construction is higher in Spain). Temporary jobs are terminated with per unit of time probability λ, at which point firms can either convert them to permanent jobs or destroy them at no cost. A new value of productivity is drawn when the conversion takes place. Permanent jobs have red-tape firing costs f. Unemployment benefits are denoted by b. Both magnitudes are fractions of the average wage, $\overline{w}$, though to save notation they will simply be referred to in the sequel as f and b.

There is a Cobb-Douglas matching function $m(u,v) = m_0 u^{\alpha} v^{1-\alpha}$ à la Pissarides (2000), with matching rates $q(\theta) = m/v$ for vacancies and $\theta q(\theta) = m/u$ for the unemployed, where labor market tightness is given by $\theta = v/u$, with v denoting vacancies and u denoting unemployment, and the degree of mismatch is captured by the shifter m_0. There is a cost of keeping jobs vacant equal to $h > 0$ per unit of time.

We distinguish between a temporary job, a new permanent job –not yet subject to firing costs–, and a continuing permanent job –subject to the firing cost. Firms and workers compute the optimal values of holding these jobs, as well as of a opening a vacancy (firms) and of being unemployed (workers). Once the contact takes place the employer-employee pair sign a temporary contract with probability p or a new permanent contract with probability $1-p$, both created at the maximal productivity level, $\overline{\varepsilon}$. If a temporary contract is signed, the employer obtains a flow profit and, after the productivity shock takes place at rate μ, this type of job necessarily continues with an unchanged wage until the date at which it can be destroyed arrives. These assumptions are adopted to reflect the fact that temporary workers typically do not renegotiate their contracts and that employers are not allowed to layoff workers on temporary contracts before they expire.

As mentioned earlier, when a temporary contract is terminated at rate λ, the corresponding job can be either destroyed or converted into a permanent job. At the date of the termination of the temporary contract, a new value of the productivity is drawn. Since temporary jobs initially enjoy the highest productivity level $\overline{\varepsilon}$, the new productivity cannot be higher, reflecting available evidence which indicates that higher employment protection hinders productivity.[8] A new permanent job is filled either by an unemployed worker or by a worker on a temporary contract. Once a productivity shock arrives, either it becomes a continuing one or the match is dissolved, which will cost the employer the firing cost f. If the employer-worker pair stay together, the worker now can use the firing cost as an additional threat in the wage bargain.

[8] Ichino and Riphahn (2005) have shown that the number of days of absence per week increases significantly once employment protection is granted at the end of probation periods and Bassanini *et al.* (2009) find that higher EPL for permanent contracts reduces productivity growth.

An unemployed worker enjoys a flow earning b and comes in contact with a vacancy at rate $\theta q(\theta)$, either of a temporary job or of a new permanent job, with probabilities p and $1-p$, respectively.

4.2 Surplus sharing

The surplus is shared according to Nash-bargaining in which workers have bargaining power $\beta \in [0,1]$. In steady state and with free-entry, it can be shown that the surplus from a continuing permanent job is larger than the surplus from a new permanent job by the amount of the firing cost that the employer has to pay once the worker has been confirmed in the job. This is so because, at the time of the first encounter between the worker and the employer, a disagreement does not entail any firing cost since the contract is not yet signed.

4.3 Job creation and job destruction

From the preceding setup, we can compute the productivity thresholds, respectively denoted as ε^c and ε^d, that the firms use in their decisions to create (PJC) and destroy permanent jobs (PJD). Notice that, from our previous assumptions, ε^c also corresponds to the productivity level below which a temporary job will be destroyed and above which it is be converted into a permanent job. These thresholds are tied by the relationship: $\varepsilon^c = \varepsilon^d + (\mu + r)f$, which implies that $\varepsilon^c > \varepsilon^d$ when $f > 0$, that is, temporary jobs are destroyed more frequently than continuing permanent jobs, because they are exempt from firing costs.

The threshold productivity ε^d is an increasing function of labor market tightness, θ, and a decreasing function of the firing cost, f. The intuition for the first relationship is that a tighter labor market, by improving the value of unemployment, reduces the surplus, thus making the employer-worker pair more exacting on how productive the matching must be to compensate them for their outside options. Thus, the PJD locus is increasing in the (θ, ε) space. As regards the second relationship, it is consistent with the goal of firing costs of reducing the propensity to destroy jobs, implying that less productive jobs

remain operative. Since $\varepsilon^c = \varepsilon^d + (\mu + r)f$, the PJC locus will also be an increasing function in the (θ, ε) space, parallel to and above the PJD locus since $\varepsilon^c > \varepsilon^d$, for a given value of θ. Moreover, it can be shown that ε^c is an increasing function of f reflecting the fact that, in the presence of higher firing costs, firms and workers require a higher productivity of the match in order to proceed with the conversion of a temporary job into a permanent one.

On the other hand, the free entry condition provides an overall job creation equation (JC). Along the JC locus, labour tightness θ is a decreasing function of the reservation productivity ε^d. In other words, the lower the destruction threshold ε^d, the longer jobs last on average, which leads to a higher creation of vacancies. Hence, the JC locus turns out to be decreasing in the (θ, ε) space. Conversely, for a given value of ε^d, a higher firing cost f reduces the expected present value of jobs and therefore hinders job creation.

In sum, the three unknowns θ, ε^c, and ε^d are defined by the JC, PJC, and PJD conditions. A graphical representation of the equilibrium values is depicted in Figure 2, where the crossing of the JC and PJD loci in the (θ, ε^d) space determines the equilibrium values of these two variables, whereas PJC determines the equilibrium value of ε^c. In Figure 3 we consider the effect of a larger difference in firing costs between permanent and temporary workers, relative to a situation where this gap is smaller. This is captured by a rise in f, which shifts upwards the PJC locus and downwards the PJD and JC schedules. As argued earlier, firms unambiguously become less exacting in firing permanent workers (lower ε^d) and more exacting in transforming temporary contracts into permanent ones (higher ε^c). In principle, although the effect on θ, and thus on unemployment, is ambiguous, it can be shown that the lower the conversion rate is (induced by higher f) the more likely it is that unemployment will rise due to excessive turnover of temporary workers, as Blanchard and Landier (2002), and Cahuc and Postel-Vinay (2002) have pointed out before. Figure 4, in turn, shows the effect of a reduction in p that, as mentioned earlier, we consider in part as an approximation to the burst of the real estate bubble in Spain, since this sector was one of the driving engines behind the high demand of temporary work in this

economy. Now, the PJC and PJD loci remain unaffected whereas the JC schedule shifts downwards, since job creation is hindered by the recession. As a result, the equilibrium value of θ unambiguously decreases and the unemployment rate goes up. Lastly, using the same argument as in a decline of p, it is straightforward to check that either a rise of λ (i.e., a higher frequency in the termination of temporary jobs) or a reduction of m_0 (i.e., an increase in mismatch) lead to lower on θ and higher unemployment.

The last step is to compute steady-state unemployment and employment levels for each type of contract, and the average wage.

5 Accounting for the impact of the crisis

In this section we first show how we calibrate a number of parameters in the model and then discuss the results from an empirical exercise in which we try to ascertain the extent to which the difference in EPL regulation between Spain and France can account for the striking difference in the evolution of their respective unemployment rates.

5.1 Calibration of the model

To use our theoretical framework to shed light on the Spanish experience, we set the period of the model to one quarter. Some of the values of the model's parameters can be found directly from data, but others need to be endogenously calculated to fit a set of variables. The actual reference period used for variables is the latter part of the boom, namely 2005:1-2007:4. Parameter values are shown in Table 2.

The interest rate r is set at 1% per quarter. The matching function is Cobb-Douglas where α denotes the elasticity of the matching function with respect to unemployment. As in most of the literature, we choose $\alpha = \beta = 0.5$.[9]

For the unemployment benefit indicator b we use statutory replacement rates corrected for benefit coverage, setting it to 55% for France and 58% for Spain. Indicators f and p are chosen to represent each country's EPL. As regards f, it is chosen to fit red-tape

[9] See, e.g., Petrongolo and Pissarides (2001).

firing costs. Kramarz and Michaud (2008) calculate the average firing cost for permanent workers in France to be around one year's wages, with red-tape costs accounting for one third of it (i.e. 1.33 quarters). For Spain, we compute it as the difference between statutory (20 days of wages per year of service) and actually paid severance (45 days in either individual or collective dismissals), which is induced by labor courts and authorities, which using observed employment tenures yields a value of 2 quarters. Regarding the parameters p and λ, we choose them to be larger for Spain, trying to capture the much higher weight of employment in the construction sector, which has been an important source of hiring of temporary workers in this country. Parameter p represents the proportion of newly created contracts that are temporary, which is around 71% in France and 91% in Spain. Parameter λ represents the probability that a temporary contract is either transformed into a permanent one or terminated, which is around 13.5% in France and 21.3% in Spain.[10]

The distribution function for the idiosyncratic productivity is taken to be uniform to simplify calculus. As for its upper bound, $\overline{\varepsilon}$, it can be chosen arbitrarily, since all the other monetary values will be relative to $\overline{\varepsilon}$. We set $\bar{\varepsilon} = 1$. However, the standard deviation of the idiosyncratic productivity has to be calibrated, which in effect means choosing the lower bound of the support of the shock, $\underline{\varepsilon}$, under the previous assumption. There are other three parameters left: h, m_0, and μ. They are chosen to reflect labor market magnitudes in the good state since, between 2005 and 2007, the unemployment rates of France and Spain were close to each other and we are seeking to explain why unemployment has recently risen so fast in Spain as compared to France. We should therefore let the model explain the unemployment rate in the bad state (after the crisis) relative to the good state (before the crisis). However, the values reflected in either state should ideally be steady-state instead of point-in-time values, which is not assured, especially in Spain where the unemployment rate shows clear signs of high persistence and volatility.

[10] An alternative that we also pursued without achieving convergence in the simulation was to allow two types of productivity shocks, idiosyncratic and aggregrate, where the latter are governed by a Markov transition matrix among the different states of the economy; cfr. L'Haridon and Malherbet (2006).

To uncover the values of $\underline{\varepsilon}$, h, m_0, and μ, we use four equations defining four key variables in the labor market which are computed using the French and Spanish Labor Force Surveys (see Bentolila *et al.*, 2010, for details). Lastly, the results derived from above-mentioned model are complemented in the simulation exercises with an alternative specification. We consider the case where the average wage $\overline{w}$ applied to f and b during the recession corresponds to past wages, namely the wage holding in the good state, rather than the current average wage during the recession. This mimics the fact that both unemployment benefits and severance pay are linked to workers' tenure and experience, respectively. For notational convenience, in what follows these alternative models will be labeled as the "flexible wage" and "semi-flexible wage".

5.2 Simulation results

In this section we report the results of several simulation exercises. We present targets (actual data) and outcomes (simulated data) for the two economies in both the expansionary and recessionary periods, using the two models just described above though, for brevity, we will mainly focus on the results of the semi-flexible wage model, which we see as more realistic. Table 3 presents the data (target values) for the four above-mentioned variables and the outcomes from the simulations. For the expansion –based on data for 2005-2007– we are able to match both the French and Spanish magnitudes fairly well, especially the unemployment and temporary employment rates, where the match is almost perfect.

The next step is to match the data during the recession. Since the slump is still in progress, target values are aimed at data observed in the latest available four-quarter period at the time of writing this paper, namely 2008:3-2009:2. We consider a simulation where the only degree of freedom in matching targets during the slump are parameters controling the severity of the shock through shifts in its distribution. We assume that the shock distribution is changed through a mix of additive and multiplicative factors, namely ε is assumed to be uniformly distributed with support $\gamma[\underline{\varepsilon} - \delta, \overline{\varepsilon} - \delta]$, such that γ and δ are chosen to match the required moments in the bad state.

The results are presented in Table 3, where our estimates for γ and δ in the semi-flexible wage model is γ=0.88 and δ=0 for France, and γ=1 and δ=0.192 for Spain. As can be seen, we are able to match the French targets in the recession remarkably well. As regards Spain, we also match the unemployment rate well, but fail to capture the fall in the rate of temporary work. Indeed, the simulation gives rise to a sharp rise in this rate, from 34% in the boom to 45% in the bust, in sharp contrast to the opposite move observed in the data (i.e. from 33% to 27%).

According to the model, unemployment goes up by 7.8 percentage points in Spain and by 1.3 pp. in France, yielding an almost perfect match with the unemployment targets. Hence, once the model behaves well in both the good and bad states, we can use these simulations to gauge the share of the increase in unemployment induced by the recession in Spain that can be attributed to differences in its employment protection and sectoral composition vis-à-vis France. We do it by computing what would have been the increase in unemployment had Spain had French EPL and a lower weight of real estate employment. Both effects are captured jointly by the firing cost, f, the share of hires on temporary jobs, p, and the destruction rate of temporary jobs, λ. The main idea behind bundling these three parameters together is that the strong specialization of the Spanish economy in construction is closely related to the existence of a dual labor market. The rigid permanent contracts were inadequate for specializing in more innovative sectors since accommodating the higher degree of uncertainty typically associated with higher-value added goods would require higher labor flexibility (Saint-Paul, 1997).

In other words, though p and λ are assumed to be parameters of the model and therefore independent of the value of f, in practice it is very likely that lowering f would lead to a smaller share of temporary contracts in hiring (i.e., a reduction in p) and possibly also to a fall in the duration of temporary contracts, since they could be more easily converted into permanent ones (i.e., a reduction in λ).

The results of the simulations are presented in Table 4. We follow a difference-in-differences approach, in the counterfactual scenario of the case where Spain had imple-

mented a labor reform at the beginning of the recession (at the end of 2007, say) to establish French-like labor market institutions.

Starting with the beginning of recession reform, for the semi-flexible version of model, the second row shows the result of subtracting from the overall change in unemployment, 7.8 pp., the change predicted had Spain had the French parameters, namely, 2.8 pp. The implication is remarkable: the recession would have raised the unemployment rate in Spain by 5 pp. less if Spain had those French labor market characteristics rather than its own. In other words, EPL/industry composition accounts for 64% of the increase in the unemployment rate during the recession. In the flexible model, since wages can adjust downward weakening the effect of firing costs, the contribution of EPL to the increase in unemployment is slightly lower, namely 4 pp. or 52% of the observed rise in unemployment.

6 Conclusions

In this paper we explore how much of the significantly larger increase in unemployment in Spain vis-à-vis France during the current recession can be accounted for the difference in the employment protection legislation between the two countries. In particular, we wish to examine the impact of the larger gap between the dismissal costs of workers with permanent and temporary contracts in Spain as compared to France. This gap has apparently led to huge flows of temporary workers into and out of unemployment and, in the recession, to large job losses.

To undertake this task we have used a search and matching model inspired by previous work by Cahuc and Postel-Vinay (2002) that extends the Mortensen-Pissarides (1994) model to allow for the distinction between temporary and permanent jobs entailing different dismissal costs. After calibrating the parameters with data for the two economies, we simulate the model to replicate a few key labor market magnitudes for the expansion (2005-2007) and recession periods (2008:3-2009:2).

Subsequently we carry out a counterfactual exercise involving the key parameters

capturing employment protection and industry composition, which we interpret to be closely related in the model. Imputing French-economy levels of these parameters for the Spanish economy at the beginning of the current recession yields a striking result, namely that the unemployment rate would have increased by about 4 to 5 pp. less than the observed rise (about 8 pp.). It should be stressed that these results should be taken with a grain of salt, because we have not been able to match the fall in the temporary employment rate during the recession. We think that this phenomenon may be related to an increase in mismatch due to the difficulty in reallocating workers from construction to other higher-productivity industries. Preliminary results, however, indicate that the role of EPL in explaining the surge in Spanish unemployment remains sizeable.

Recently there have been several policy initiatives in Europe defending the idea of a single labor contract. Among the proposals are those of Blanchard and Tirole (2003) and Cahuc and Kramarz (2004) for France, Boeri and Garibaldi (2008) and Ichino (2009) for Italy, and a manifesto signed by 100 academic economists, see Andrés *et al.* (2008), for Spain. While not identical in their details, all these proposals highlight the negative effects induced by the permanent-temporary contract divide. As a result, they all advocate the elimination of temporary contracts and the introduction of a single labor contract with severance pay that is increasing with seniority in the job.[11] The results in this paper, by quantifying the impact of temporary contracts on the rise in unemployment in the crisis, provide some support for the idea of the single contract.

[11] For a specific proposal of a single contract for Spain and its consequences in terms of expected protection and job stability, see Garcia-Perez (2009).

Appendix

Table A1. Employment protection legislation in France and Spain

	Permanent contracts	Fixed-term contracts
France		
* Notice period	1 month if 6<seniority (mos.)< 24 2 months if seniority (mos.)> 24	
* Severance pay		
1. Economic reasons	6 days of wages pyos. (20% of wage) +0.08 days' wages pyos.>10 yrs (1/15 of monthly wage)	3 days of wages pyos.
2. Personal reasons (before July 2008)	Minimum seniority: 1 year 3 days of wages pyos. (10% of wage) +0.04 days' wages pyos.>10 yrs	
Observations	Personalized plan for up to 12 months	Max. duration: 24 months Restricted to 9 cases (see text)
Spain		
* Notice period	1 month	
* Severance pay		
1. Economic reasons	20 days of wages pyos. Max. seniority cov.: 12 months	8 days of wages pyos. (0 days in some cases, see text)
Observations	Collective dismissal requires administrative approval	Max. duration: 24 months Unrestricted
2. Unfair dismissal	45 days of wages pyos. Max. seniority cov.: 42 months	

Note: "pyos." means per year of service.

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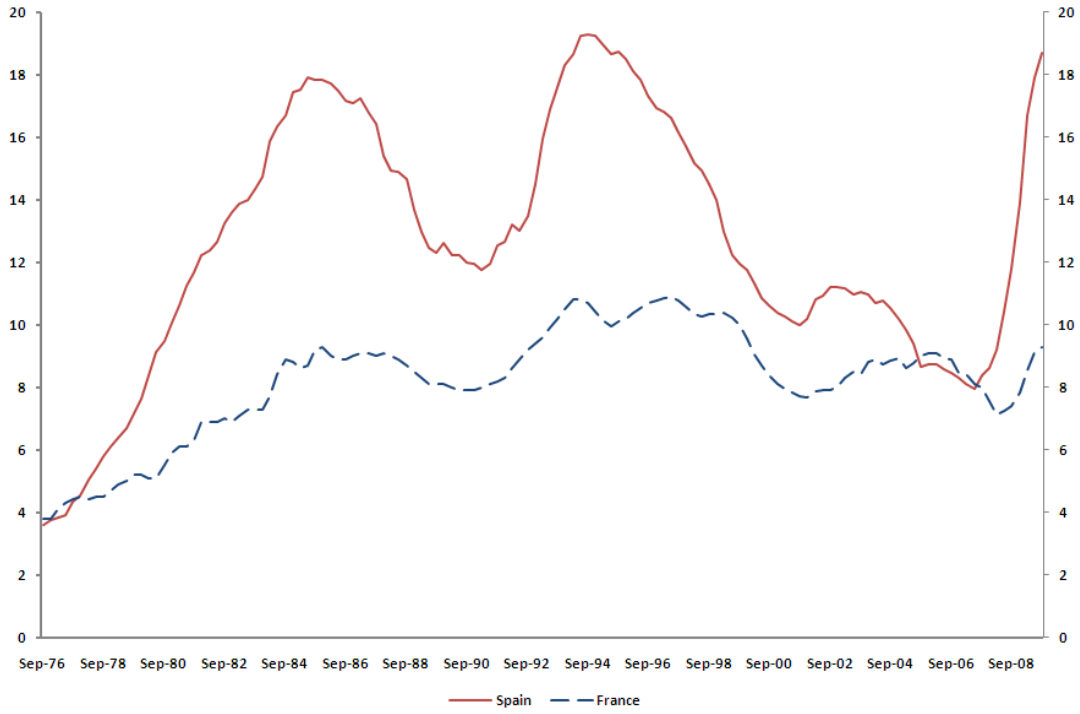

Figure 1: Unemployment rate in France and Spain, 1976:3-2009:3

Table 1: Labor market evolutions in France and Spain

Levels (%)		1998:1	2007:4	2009:2
1. Unemployment	France	10.3	7.4	9.2
	Spain	15.2	8.6	18.0
2. Fixed-term employment[1]	France	13.8	14.3	12.8
	Spain	33.3	30.9	25.4
3. Hours of work[2]	France	40.7	37.7	37.7
	Spain	38.8	39.0	39.7
Annual growth rates (%)			**1998:1-2007:4**	**2008:1-2009:2**
4. Gross Domestic Product	France		2.3	-2.2
	Spain		3.7	-2.7
5. Labor force	France		0.8	1.0
	Spain		3.3	1.8
6. Employment	France		1.1	-0.4
	Spain		4.2	-5.3
7. Private non-agricultural employees:				
(a) Total	France		1.5	-1.8
	Spain		5.6	-6.3
(b) Construction	France		2.4	-0.7
	Spain		8.1	-23.3
(c) Manufacturing	France		-0.7	-3.4
	Spain		2.0	-10.8
(d) Market services	France		2.2	-1.4
	Spain		6.8	-0.9
8. Real hourly earnings[3]	France		1.3	0.5
	Spain		0.3	1.4
9. Hiring on temporary contracts	France		71.3	n.a.
	Spain		84.7	89.1

Notes: [1] As a share of employees. [2] Full-time employees. The last period is 2008:4. [3] Deflated by GDP Deflator, seasonally adjusted.
Sources: (1),(4)-(6), OECD Economic Outlook Database (www.oecd.org); (2),(3) Eurostat Statistics Database (epp.eurostat.ec.europa.eu); (7), INSEE BDM Macroeconomic Database (www.bdm.insee.fr) for France and INE, Encuesta de Población Activa (www.ine.es) for Spain; (8) OECD Main Economic Indicators Database (www.oecd.org), (9) Dares DMMO-EMMO (www.dmmo.travail.gouv.fr) for France and Ministerio de Trabajo e Inmigración, Boletín de Estadísticas Laborales (www.mtin.es).

Table 2: Calibrated and estimated parameters[1]

		France	Spain
Standard parameters:			
Interest rate	r	0.010	0.010
Matching function elasticity	α	0.500	0.500
Worker bargaining power	β	0.500	0.500
Institutional parameters:			
Unemployment benefit replacemente rate	b	0.550	0.580
Severance pay for permanent employees	f	1.330	2.000
Dual labor market flow rates:			
Probability of hiring into a temporary job	p	0.710	0.910
Probability of temporary contract ending	λ	0.135	0.213
Parameters estimated by indirect inference:			
Cost of keeping jobs vacant	h	0.600	0.900
Matching efficiency level	m_0	0.350	1.200
Incidence rate of productivity shocks	μ	0.020	0.090
Lower bound of productivity shock	$\underline{\varepsilon}$	0.500	0.500
Shock multiplicative shift factor in recession	γ	0.900	1.000
Shock additive shift factor in recession	δ	0.000	0.192[2]

[1] Reference period: 2005:1-2007:4. [2] Equal to 0.438 in the flexible wage model.

Table 3: Simulation results

	Unemployment rate	Perm. jobs destruction rate	Temporary employment rate	Transition temp. to permanent
France - Expansion				
Data	0.085	0.015	0.126	0.047
Semi-Flexible Model	0.080	0.013	0.125	0.037
France - Recession				
Data	0.098	0.013	0.125	0.037
Semi-Flexible Model	0.094	0.013	0.126	0.037
Spain - Expansion				
Data	0.103	0.008	0.333	0.100
Semi-Flexible Model	0.100	0.038	0.338	0.053
Spain - Recession				
Data	0.177	0.016	0.270	0.075
Semi-Flexible Model	0.177	0.045	0.449	0.035

Table 4: Differential increase in unemployment in Spain induced by the recession explained by differences with France (percentage points). French labor market parameters imputed to Spain: f, p, and λ.

	Δu_{SP}	$\Delta u_{SP}(FR)$	$\Delta u_{SP}-$ $\Delta u_{SP}(FR)$
Flexible Model	7.8	3.8	4.0
Semi-Flexible Model	7.8	2.8	5.0

Note: Δu_{SP} denotes the change in unemployment explained by the model simulated for the Spanish economy and $\Delta u_{SP}(FR)$ the change in unemployment explained by the model simulated for the Spanish economy with the indicated set of parameter values corresponding to the simulated French economy.

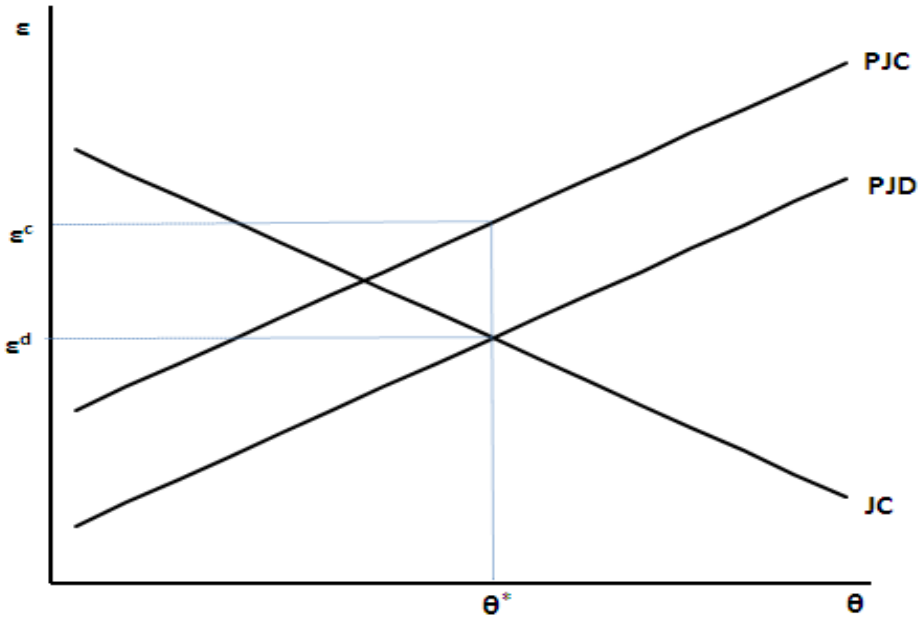

Figure 2: Labor market equilibrium

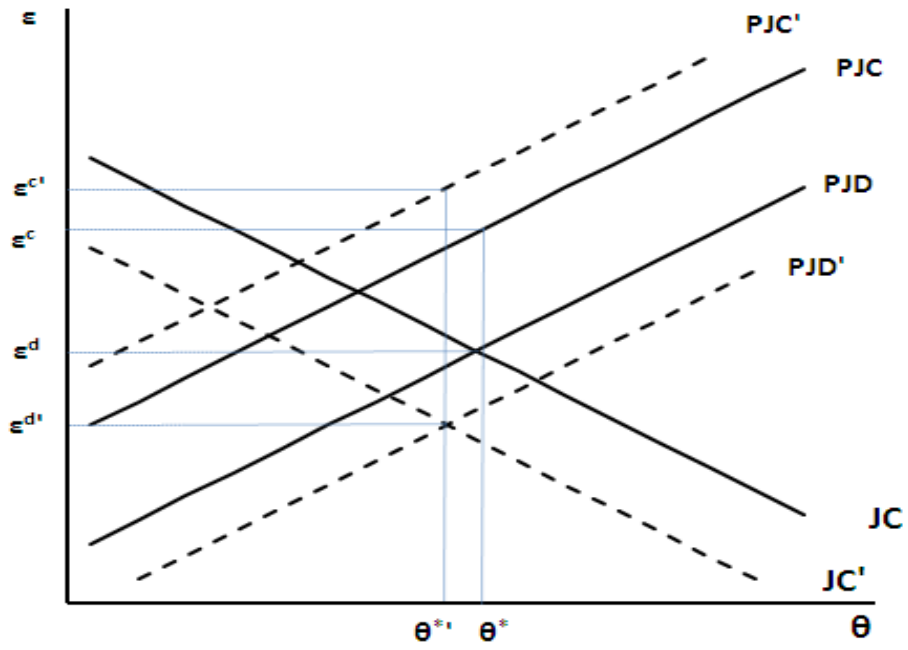

Figure 3: Effects of an increase in the firing cost (f)

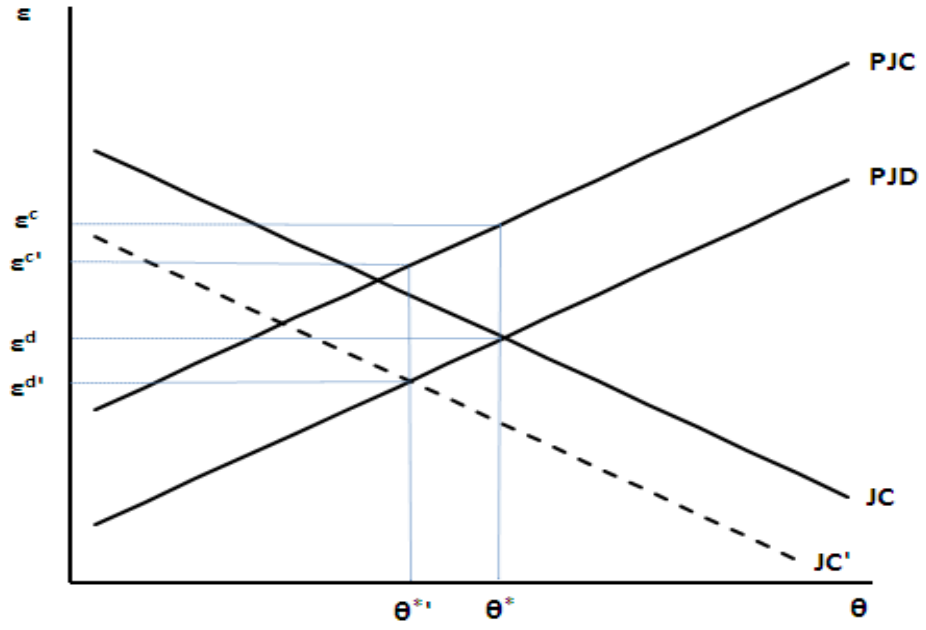

Figure 4: Effects of a reduction in the proportion hires on temporary contracts (p)

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