The effects of introducing a single employment contract in Spain*

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Abstract

In this paper we quantify the effects of introducing a single employment contract for new hires with severance payments growing with seniority as an alternative to the current situation in Spain where both temporary and permanent contracts are available. One of the reasons for the excessive job destruction found in this economy is the intensive use of temporary contracts. The main driving force of this firm's behaviour is the large gap in severance payments among temporary and permanent contracts (8 vs. 45 days of wages per year of seniority). We use a model of job creation and destruction of the search and matching type that is able to generate the main properties of a segmented labour market like the Spanish one. Using this model we simulate the effects of introducing this new design in severance payments. We are particularly interested in the effects on unemployment, job destruction and job seniority. Our results show that the single contract would be greatly beneficial for temporary and unemployed workers because both, job stability and the first periods dismissal payments they receive in case of firing, would increase under this new regime. Moreover, unemployment and job destruction will decrease.

Keywords: Single Contract; Permanent and Temporary contracts; Severance Payments; Job seniority; Tenure distribution; Job destruction; Unemployment;

JEL-Code: J23, J32, J63, J64, J65, J68

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1 Introduction

During the last ten years, the Spanish labour market has been one of the most dynamic in the European Union. Almost one third of total job creation in Europe has been created in Spain and this is also the European labour market that has destroyed most jobs during the recent crisis. The bad allocation of production factors during the long previous expansion, the specialization in low human capital sectors and the labour market segmentation between temporary and permanent workers are the main factors explaining this huge employment volatility. In fact, the gap between the severance payments of workers with permanent (45 days of wages per year of seniority (p.y.o.s), in case of an unfair dismissal) and temporary contracts (8 days of wages p.y.o.s) can account for almost half of the job destruction in the last three years when temporary contracts (TCs) have been used as the basic mechanism of adjustment (see Bentolilla, Cahuc, Dolado, Le Barbanchon, 2010).[1]

In order to reduce this volatility and the excessively high use of TCs in Spain, the governments have lunched several labour market reforms over the last twenty years.[2] In addition to introducing Permanent Employment Promotion Contracts (PEPCs) with lower firing costs (33 days of wages p.y.o.s. against the 45 days of wages usually paid in ordinary permanent contracts (PCs)), the main strategy has been to subsidize permanent job creation, either by directly hiring workers under the PEPCs or by converting TCs into PCs with substantial rebates of social security contributions. In fact, Spain is one of the European countries that devote more resources to these active labour market policies (0.4% of GDP in 2006). However, recent studies have shown that these measures have had negligible effects. Moreover, García-Pérez and Rebollo (2009) find that these subsidies can account for a sizable part of the increase in job reallocation among permanent workers. That is, the PEPCs that qualify to social security rebates display a much higher job destruction rate than the ordinary PCs.

Due to the failure of these reforms, and because it may be even inefficient that temporary and unemployed workers cannot reach a status of more job stability and better future perspectives,[3] it seems convenient to close the gap between severance payments of PCs and TCs. In the document "Propuesta para la Reactivación Laboral en España", signed by top hundred Spanish economists in 2009, they argue that severance payments should increase in a smother way in order to prevent massive firings before reaching the period when a TC has to be converted into a PC (between the second and

[1] According to the Spanish Labour Force Survey, two thirds of dismissed workers in the last three years in Spain had a TC.

[2] See Bentolila, Dolado and Jimeno (2008) for a summary of these reforms.

[3] Until 2008, five years of seniority and more than seven contracts were, on average, necessary to reach a PC.

the third year in Spain, depending on the contract type). They propose to replace the existing system of TCs and PCs by a single contract for new hires with increasing severance payments. In particular, they suggest that indemnities should start being higher than the actual ones in TCs and grow at a moderate rate (two or three additional days p.y.o.s) until they reach a value similar to the mean European indemnity.

In this paper we want to quantify the effects of this proposal. For that purpose we use an equilibrium model of job creation and destruction of the search and matching type, similar in spirit to the model proposed by Mortensen and Pissarides (1994), and introduce some elements to capture the specific features of the Spanish labour market: (i) the existence of a *Segmented Labour Market* with two types of jobs (permanent and temporary), that differ in the maximum length of the contract and in the associated firing costs; (ii) endogenous job conversion of TCs into PCs; (iii) firing costs modeled as a transfer from the firm to the worker, and being a function of seniority; and (iv) downward wage rigidities, so that firing costs have real effects.[4] In this labour market firms will be heterogeneous agents and will use these two types of contracts to endogenously adjust their employment levels when facing idiosyncratic persistent shocks. Finally, we will follow Mortensen-Pissarides (MP) by assuming one-job firms.

The model is calibrated to the Spanish economy so that it is able to generate the main labour market statistics. Then, we use the model to quantify the effects of introducing a single contract with increasing severance payments. We are particularly interested in the effects on unemployment, job destruction and job seniority. Our results show that the single contract would be greatly beneficial for temporary workers and even for the unemployed ones because both, job stability and the first periods dismissal payments they receive in case of firing, would increase. Moreover, unemployment and job destruction will decrease.

The outline of the paper is as follows. In Section 2, we review the related literature. In Section 3, we present the model. In Section 4, we discuss its calibration. In Section 5, we perform the exercise of introducing a single contract with increasing severance payments. And finally, Section 6 draws some conclusions.

[4]Lazear (1990) notes that if contracts were perfect, severance payments would be neutral. If the Government forced employers to make payments to workers in the case of a dismissal, perfect contracts would undo those transfers by specifying opposite payments from workers to employers. In order for severance payments to have any effect, some form of incompleteness has to be introduced. Most studies have avoided this problem by modeling dismissal costs as firing taxes, so that the effects cannot be undone by private arrangements.

2 Related literature

There are many theoretical papers that study the effects of employment protection legislation (EPL) on job creation and destruction and on the unemployment rate. Most of them take the seminal paper in the search and matching literature, the stochastic endogenous job creation and destruction model by Mortensen and Pissarides (1994), and introduce firing costs. The most relevant in this tradition are Garibaldi (1998), Cahuc and Zylberberg (1999a), Mortensen and Pissarides (1999), and Garibaldi and Violante (2002). Others, like Hopenhayn and Rogerson (1993), Díaz and-Galdón (1999), and Alvarez and Veracierto (2001), use *real business cycle* models for the same aim. There are also models in the *efficiency wage* tradition, such as Güell (1999) and Saint-Paul (1996). Finally, Ljungqvist (2001) explains why all those general equilibrium models with layoff costs have delivered mixed messages regarding the implications for employment.

These models with layoff costs might be appropriate for most OECD countries, but not for Spain, where one third of contracts are of a temporary nature. A complementary strand of literature focuses on the consequences of the introduction of TCs on turnover, employment, productivity and wages. Most of these studies analyze the Spanish case because of its singularity and tend to relate the existence of TCs to the dismissal costs associated with PCs. For instance, *matching* models like Wasmer (1999), *collective bargaining* models like Bentolila and Dolado (1994) and Jimeno and Toharia (1993), *efficiency wage* models like Güell (2000), *dynamic partial equilibrium demand* models like Bentolila and Saint-Paul (1992), Cabrales and Hopenhayn (1997), and Aguirre and Alonso (1999), and *general equilibrium* models like Alonso, Fernández and Galdón (2002).

The closest papers to ours are Costain, Jimeno and Thomas (2010) and Bentolilla, Cahuc, Dolado, Le Barbanchon (2010). Costain, Jimeno and Thomas study to what extent the coexistence of permanent and temporary jobs account for the the volatility of employment. For that purpose they compare this dual structure to the one that would prevail with the introduction of a single contract. They conclude that the introduction of a single contract must be coupled with a reduction in the mean indemnity so that, both the volatility and the level of unemployment decrease. The main difference with our paper is the focus. They are mainly interested in the business cycle properties of the model while we compare steady states and focus on the effects on job seniority.

On the other hand, Bentolilla, Cahuc, Dolado, Le Barbanchon (2010) explore how much of the significantly larger increase in unemployment in Spain versus France during the ongoing recession can be accounted for the difference in EPL between the two countries. They argue that the larger gap between the dismissal costs of workers with PCs and TCs in Spain as compared to France has led to huge flows of temporary workers into and out

of unemployment and, as a result, large job losses during the financial crisis. They are inspired in the previous work by Blanchard and Landier (2002) and Cahuc and Postel-Vinay (2002), who use a search and matching model that extends Mortensen and Pissarides (1994) to allow for the distinction between temporary and permanent jobs entailing different dismissal costs. They show that the current recession would have raised the unemployment rate in Spain by about 45% less had Spain adopted French EPL institutions rather than kept its own. Their model differ from ours in that temporary job destruction is endogenous in our model while it is not in theirs. In fact, they are not able to replicate the behavior of the temporary job destruction rate while we are. In an alternative version of the model, they make the firing cost depend on the mean wage in the previous phase in order to capture the dependence of firing costs on seniority, which seems paradoxical because just a few lines before they argued that red tape costs are the only relevant layoff costs. Our model does also a much better job in this sense since seniority belongs to our state space.

In terms of the relevant assumptions, the model in this paper differs from those two in the following ways. First, firing costs are modeled as a transfer from the firm to the worker instead of as a pure waste tax. Second, minimum wage constraints are introduced to avoid firing costs' neutrality. Third, this model is much more structural.[5] And finally, the detailed manner in which the calibration exercise is performed allows us to use the model to perform quantitative policy evaluations. In order to properly describe the duality in the Spanish labour market these ingredients are essential. These differences make the other models unsuitable to realistically map the aspects that we consider indispensable. Moreover, our model is consistent with the theoretical implications of those two models, has the virtue of seriously quantifying the effects, and provides many statistics of interest that the others are not able to provide.

3 The model

3.1 Population

The economy is populated by a continuum of workers with unit mass and a continuum of firms. Workers can either be employed or unemployed.[6] Unemployed workers look for employment opportunities; employed workers produce and do not search on the job. Firms post vacancies or produce. The cost of posting a vacancy is c. Posting a vacancy is not job creation, unless it is filled. Each firm is a one-job firm and the job might be occupied and producing or vacant. We assume free entry.

[5] We can keep track of contracts and compute distributions of JC and JD by type of contract, wages, seniority and employment loss by reason of separation.

[6] We do not considered other labour market states out of the labour force.

The source of heterogeneity is due to the existence of matchings with different quality levels and durations. Therefore, the state space that describes the situation of a particular worker is $S = \{\{0,1\} \times \mathcal{E} \times D\}$, where $\mathcal{E} = \{\epsilon_1, ..., \epsilon_n\}$ is a discrete set for the quality levels and $D = \{1, ..., N\}$ is also a discrete set denoting the duration of a job (worker's seniority). Each triple indicates whether the worker is unemployed (0) or employed (1) and, in that case, the quality and the duration of the match.

3.2 Preferences

Workers have identical preferences, live infinitely and maximize their utility, which is taken to be linear in consumption. We assume that they supply work inelastically, i.e. they will accept every opportunity that arises. Thus, each worker has preferences defined by $\sum_{t=1}^{\infty} \beta^t c_t$, where β, $0 \leq \beta < 1$, is the discount factor and c_t is consumption. Firms are also risk neutral.

3.3 Technologies

There are two technologies in this economy: a production and a matching technology.

Production technology

Each job is characterized by an irreversible technology and produces one unit of a differentiated product per period, whose price is $y(\epsilon_t)$, where $\{\epsilon_t\}$ is an idiosyncratic component, i.e. the quality of the match. This idiosyncratic component is modelled as a stationary and finite Markov chain. This process is the same for every matching and the realizations ϵ_{t+1} are independent and identically distributed with conditional transition probabilities $\Gamma(\epsilon'|\epsilon) = Pr\{\epsilon_{t+1}|\epsilon_t\}$, where ϵ, $\epsilon' \in \mathcal{E} = \{1, 2, ..., n_\epsilon\}$. Each new matching starts with the same entry level ϵ_e and from this initial condition the quality of the match evolves stochastically due to these idiosyncratic shocks. We assume that agents know the law of motion of the process and observe their realizations at the beginning of the period.

Matching technology

Every job is created as a temporary job. In each period, vacancies and unemployed workers are stochastically matched. We assume the existence of an homogeneous of degree one matching function $m = m(u_t, v_t)$, increasing and concave in both arguments, where v_t is the number of vacancies and u_t the number of unemployed workers, both normalized by the fixed labour force. Given the properties of the matching function, the transition rates for vacancies, q, and unemployment, α, depend only on $\nu = v/u$, a measure of tightness in the labour market. The vacancy transition rate, q, is defined as

the probability of filling a vacancy and the transition rate for unemployed workers, α, is defined as the probability of finding a job. They are given by

$$q(\nu) = \frac{m(v,u)}{v} = m\left(1, \frac{u}{v}\right) \; ; \; \alpha(\nu) = \frac{m(v,u)}{u} = m\left(\frac{v}{u}, 1\right)$$

On the other hand, job conversion leads to permanent job creation. Job conversion will take place for productivity realizations (at the end of the TC's maximum length) above a specific threshold, $\{\epsilon_c\}$, that firms will endogenously determine.

3.4 Equilibrium

The concept of equilibrium used is the recursive equilibrium. Before showing the problems that agents solve, it is convenient to explain the timing and agent's decisions. At the beginning of the period, firm's idiosyncratic shocks are revealed. Then, firms and workers renegotiate wages. Given these wages, firms decide among two options: i) to continue producing with the actual match, or ii) to terminate the match and fire the worker.[7] The nature of the problem depends on whether the firm has a PC or a TC. PCs entail positive firing costs that depend on the quality of the match and on the duration of the contract, while firing costs on TCs are assumed to be very close to zero. In addition, the problem is not the same for any firm with a TC. Let d denote the duration of the contract. I will assume that a temporary contract cannot last for more than d^t_{max} periods, so that the maximum number of renewals is $d^t_{max} - 1$. Therefore, firms whose TCs cannot be renewed anymore decide between these two options: i) to convert the TC into a PC, taking into account the consequences regarding future firing costs, or ii) to terminate the match. Once all these decisions have been made, production starts, both, in firms where workers have not been fired this period and in those that were matched with unemployed workers at the end of the last period. Finally, search decisions are made: firms post vacancies and unemployed workers apply for jobs. This search process generates new matches that will be productive in the next period. In the following part, I will formally describe the problems of firms and workers.

3.4.1 Firms' Problems

The problems of firms with existing PCs

The vector of states at the beginning of the period for a firm with a permanent job is (ϵ, d). The firm must decide whether to continue with the actual match (first raw), or whether to fire the worker and look for a new one (second raw). This problem can be written as

[7] Note that job destruction will not be efficient here, since firms will unilaterally decide on match continuation (see Mortensen and Pissarides (1999a) for discussion).

$$J^p(\epsilon,d) = max\{y(\epsilon)-w(\epsilon,d)+\beta\sum_{\epsilon\prime}\Gamma(\epsilon\prime|\epsilon)J^p(\epsilon\prime,d\prime),$$
$$-f(\epsilon,d)-c+\beta q(\nu)J^t(\epsilon_e,1)+\beta(1-q(\nu))J^0\}$$

where $J^p(\epsilon,d)$ and $J^p(\epsilon\prime,d\prime)$ are, respectively, this period and the next period firm's value function, $w(\epsilon,d)$ is the wage previously determined in a bilateral negotiation or fixed by the minimum wage, β is the discount factor, $\Gamma(\epsilon\prime|\epsilon)$ is the conditional transition probability, $f(\epsilon,d)$ is the firing cost, c is the cost of posting a vacancy, $q(\nu)$ is the probability of filling a vacancy, J^0 is the value of a vacant job and $J^t(\epsilon_e,1)$ is the value function of a firm with a first-period TC.[8] If it is more profitable to continue with the actual match, the decision rule will be $g^p(\epsilon,d)=1$. Otherwise, $g^p(\epsilon,d)=0$, and the firm will incur the firing cost, $f(\epsilon,d)$, plus the vacancy cost and, with probability q at the end of this period the firm will fill the vacant job with a TC that will be productive in the next period.

The problems of firms with expired TCs (or prospective PCs)

The problem is slightly different for a firm whose TC reached the maximum length allowed at the end of the previous period. If the worker is not fired at the beginning of this period, the TC will be automatically transformed into a PC. Note that $d=d^t_{max}+1$, where $d^t_{max}+1$ denotes the first period in a PC and that firing costs are very close to zero for these type of contracts.

The problem of this firm can be written as[9]

$$J^p(\epsilon,d) = max\{y(\epsilon)-w(\epsilon,d)+\beta\sum_{\epsilon\prime}\Gamma(\epsilon\prime|\epsilon)J^p(\epsilon\prime,d\prime),$$
$$-f(\epsilon,d)-c+\beta q(\nu)J^t(\epsilon_e,1)+\beta(1-q(\nu))J^0\}$$

and its decision rule is $g^p(\epsilon,d)=1$ if the firm converts the TC (first raw) or $g^p(\epsilon,d)=0$ if the firm fires the worker and looks for another one (second raw).

The problems of firms with TCs

[8]Note that the value function $J^t(\epsilon_e,1)$ has a t superscript, instead of a p superscript, to denote the value function of a firm with a TC and that in the first period the quality of the match is the entry level.

[9]This equation plays the same role as the asset pricing equation of the initial value of the match in Mortensen and Pissarides (1999a), where the initial wage is lower because termination costs are not incurred if no match is formed initially, but must be paid if an existing match is destroyed.

The vector of states of a firm with a TC, whose length at the end of the last period was less than d^t_{max}, is (ϵ, d). Note that firing costs are also very close to zero for these type of contracts. The problem of this firm is

$$\begin{aligned} J^t(\epsilon,d) &= max\{y(\epsilon) - w(\epsilon,d) + \beta \sum_{\epsilon\prime} \Gamma(\epsilon\prime|\epsilon) J^t(\epsilon\prime, d\prime), \\ &\quad -f(\epsilon,d) - c + \beta q(\nu) J^t(\epsilon_e, 1) + \beta(1-q(\nu))J^0\} \end{aligned}$$

where $J^t(\epsilon, d)$ is this period value function and $w(\epsilon, d)$ the wage, previously determined in a bilateral negotiation or fixed by a minimum wage. The firm must decide whether to continue with the match, $g^t(\epsilon, d) = 1$, or to fire the worker and look for another one, $g^t(\epsilon, d) = 0$.

3.4.2 Workers' Problems

These problems are trivial. The worker simply negotiates with the firm over the wage before the firm decides upon his continuation. The worker's problem can be written as

$$\begin{aligned} V^p(\epsilon,d) &= \tilde{\Phi}(g^p = 1)[w(\epsilon,d) + \beta \sum_{\epsilon\prime} \Gamma(\epsilon\prime|\epsilon) V^p(\epsilon\prime, d\prime)] + \\ &\quad \tilde{\Phi}(g^p = 0)[V^0 + f(\epsilon,d)] \end{aligned}$$

where $V^p(\epsilon, d)$ denotes the worker's value function, $\tilde{\Phi}(x)$ is an indicator function that takes the value 1 if the assessment is true and zero otherwise, and V^0 is the value function of an unemployed worker. If the firm decides to continue with the actual match, $\tilde{\Phi}(g^p = 1)$, the worker gets the wage; otherwise, the firm pays the worker the firing cost and the worker becomes unemployed.

The problem of a worker in a temporary job is similar. The value function of a worker in a TC is

$$V^t(\epsilon,d) = \tilde{\Phi}(g^t = 1)[w(\epsilon,d) + \beta \textstyle\sum_{\epsilon\prime} \Gamma(\epsilon\prime|\epsilon) V^t(\epsilon\prime, d\prime)] + \tilde{\Phi}(g^t = 0)[V^0 + f(\epsilon,d)]$$

Finally, unemployed workers look for employment and accept a job whenever an opportunity arises. The value function of an unemployed worker is

$$V^0 = b + \beta\alpha(\nu) V^t(\epsilon_e, 1) + \beta(1 - \alpha(\nu))V^0$$

where $V^t(\epsilon_e, 1)$ is the value function of a worker in a first-period TC. The parameter b can be interpreted as some kind of unemployment subsidy or the return to home production. An unemployed worker receives b today and, at the end of the period, with probability α the worker will find a job and, with probability 1-α the worker will remain unemployed.

3.4.3 Wage determination

Wages are the result of bilateral bargaining between the worker and the firm, unless the legally imposed minimum wage is binding.[10] Bargaining is dynamic, i.e. wages are revised every period upon occurrence of new shocks. The assumption of bilateral bargaining is reasonable due to the existence of sunk costs (search costs) once the match is produced. This creates local monopoly power and generates a surplus to be split among the participants in the match. In PCs this surplus is defined as

$$S^p(\epsilon, d) = [J^p(\epsilon, d) - (J^0 - f(\epsilon, d))] + [V^p(\epsilon, d) - (V^0 + f(\epsilon, d))]$$

Wages are the result of maximizing the following Nash product with respect to the wage

$$[J^p(\epsilon, d) - (J^0 - f(\epsilon, d))]^{1-\theta}[V^p(\epsilon, d) - (V^0 + f(\epsilon, d))]^{\theta}$$

The first order condition of this maximization is such that the surplus is split into fixed proportions according to the worker's bargaining power, θ

$$\begin{aligned}(1-\theta)S^p(\epsilon, d) &= J^p(\epsilon, d) + f(\epsilon, d)\\ \theta S^p(\epsilon, d) &= V^p(\epsilon, d) - (V^0 + f(\epsilon, d))\end{aligned}$$

By making the appropriate substitutions of firm's and worker's value functions, the wage can be computed as[11]

$$\begin{aligned}w(\epsilon, d) \;=\; & \theta y(\epsilon) + (1-\theta)V^0 + f(\epsilon, d) + \theta\beta \sum_{\epsilon\prime} \Gamma(\epsilon\prime|\epsilon) J^p(\epsilon\prime, d\prime)\\ & -\beta(1-\theta) \sum_{\epsilon\prime} \Gamma(\epsilon\prime|\epsilon) V^p(\epsilon\prime, d\prime)\end{aligned}$$

In TCs similar conditions hold. Note that, as in Osuna (2005), wages in first-period PCs will be lower than those that will prevail in the following periods because high firing costs are not incurred if no job conversion takes place but will be due in latter periods if the existing PC is destroyed in the future. Firms try to internalize higher future wages by pushing down wages in first-period PCs.

[10] The downward wage rigidity is modeled as a lower bound on the outcome of the wage negotiations. We need to impose a minimum wage in order to avoid too much internalization.

[11] As in the MP framework, some terms in the wage equation are weighted by the worker's bargaining power, θ, while others are weighted by the firm's, $(1-\theta)$. Note that firing costs increase wages.

3.4.4 Definition of Equilibrium

A recursive equilibrium is a list of value functions $J^p(\epsilon, d)$, $J^t(\epsilon, d)$, $V^p(\epsilon, d)$, $V^t(\epsilon, d)$, J^0, V^0, transition rates $q(\nu)$, $\alpha(\nu)$, prices $w(\epsilon, d)$ and decision rules $g^p(\epsilon, d)$, $g^t(\epsilon, d)$ such that[12]

1. *Optimality*: Given functions $q(\nu)$, $\alpha(\nu)$ and $w(\epsilon, d)$, the value functions $J^p(\epsilon, d)$, $J^t(\epsilon, d)$, $V^p(\epsilon, d)$ and $V^t(\epsilon, d)$ satisfy the Bellman equations.

2. *Free entry:* This condition and the profit maximization condition guarantee that, in equilibrium, the number of vacancies adjust to eliminate all rents associated with holding a vacancy; that is, $J^0 = 0$, implying $c = \beta q(\nu) J^t(\epsilon_e, 1)$.

3. *Wage bargaining:* The equilibrium conditions from maximizing the surplus in PCs are

$$(1-\theta)S^p(\epsilon, d) = J^p(\epsilon, d) + f(\epsilon, d)$$
$$\theta S^p(\epsilon, d) = V^p(\epsilon, d) - (V^0 + f(\epsilon, d))$$

   For other types of contracts similar conditions hold (see previous subsection).

4 Calibration

In this section, we explain the procedure to assign values to the parameters of the model and the selection of functional forms. In the calibration, parameters must be chosen so that the model economy maps several statistics of the real economy. There are two types of parameters. Those that have a clear counterpart in the real economy, and those that do not. For the former, we use the implied parameter values. For some of the latter, we use the values estimated in empirical studies. For the rest, we use the simulated method of moments. This optimization method involves finding the parameter values that minimize the distance between the statistics of the model economy and those of the real data.

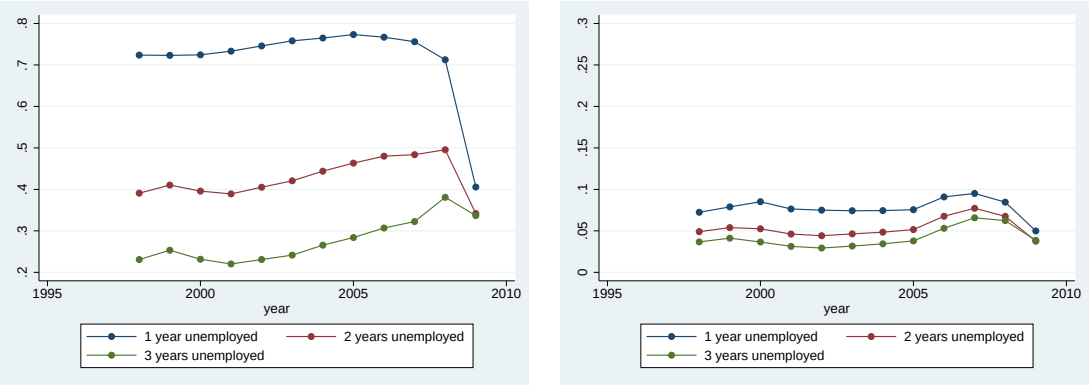
4.1 The Data Set

In order to calibrate the main parameters in our model, we will use Spanish administrative data from the *Muestra Continua de Vidas Laborales* (MCVL).

[12] Cole and Rogerson (1999) show that an equilibrium always exists where wages do not depend on the unemployment rate, only on the idiosyncratic shock. The intuition is that, given free entry, vacancies adjust to the number of unemployed and the relevant variable becomes the ratio of unemployed workers to vacancies.

This data set is based on a random draw from the Social Security archives. Each year, it provides a sample of 4% among all the affiliated workers, employed or otherwise, and pensioners in that year. The MCVL reports information for about 1.1 million people on their personal characteristics and employment and unemployment spells throughout their entire labour history. Here we use the 2009 wave, supplemented by the employment histories of workers present only in some of the previous three waves (2006-2008).

Figure 1: Empirical hazard rates from unemployment to temporary (left) and permanent (right) employment, by unemployment duration



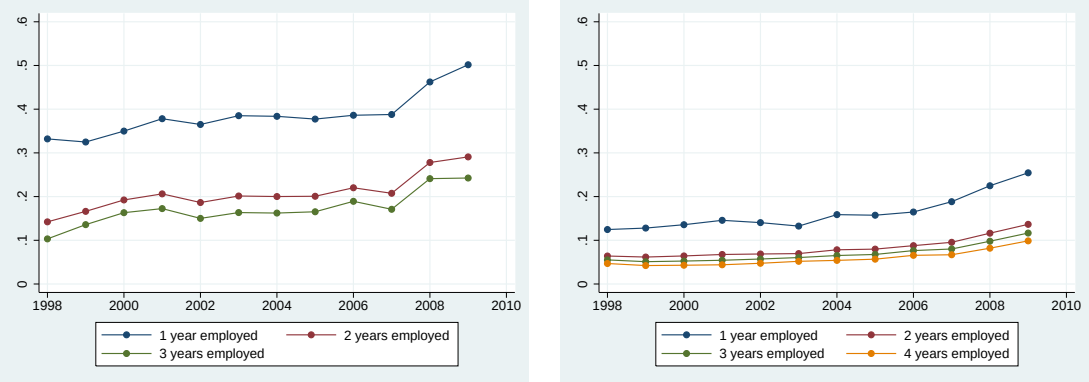
For each worker, we have the date when each job begins and ends. This provides us with quite detailed information about employment duration. Periods of unemployment can also be identified from the dates when the firm ceases to pay Social Security contributions for the worker. Furthermore, we have also information about the type of contract so we will be able to differentiate between workers with a temporary or a permanent contract in each of their employment spells.

Our calibration sample includes the complete labour career for a sample of more than 700,000 workers in the period 1997-2009. Each of these workers may have both some employment and unemployment spells. The following figures 1-3 present the main empirical hazard rates we will use in our calibration strategy. Figure 1 shows the exit from unemployment into both temporary and permanent employment. The exit from unemployment is highly decreasing on unemployment duration and much larger when the destination state is a temporary contract than when the worker exits to a permanent one. It is also highly impressive how the exit from unemployment has decreased at the beginning of the current economic crisis, that is, in 2008.

Figure 2 shows the exit from employment to unemployment for both temporary and permanent workers. The exit from a temporary contract is much larger, at any employment duration, than the one from a permanent

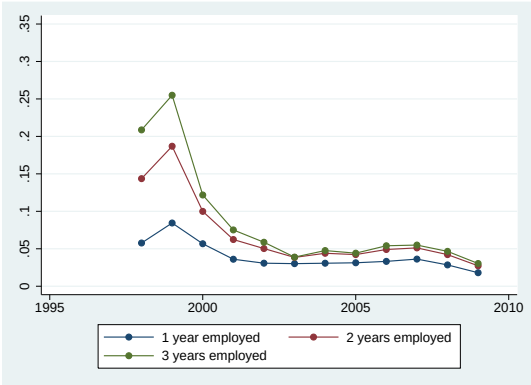
contract. These hazard rates have substantially increased in 2008, as a clear signal of the increasing firing risk in the current economic crisis.

Figure 2: Empirical hazard rates from temporary (left) and permanent (right) employment to unemployment, by employment duration



Finally, Figure 3 shows the direct transition from a temporary to a permanent contract, without going through unemployment. Compared to the previous figure, we can see that this direct transition is much lower than the exit to unemployment. It is only at the third year of the temporary contract, and only for the period 1997-1999 when both hazards are roughly comparable. For the rest of years, the direct transition to a permanent contract is always below 10%.

Figure 3: Empirical hazard rates of the direct transition from a temporary to a permanent contract, by employment duration



4.2 Model period

The job creation and destruction statistics have been computed using the data on working histories coming from the data set previously described, the MCVL. We will use all employment and unemployment spells in the sample lasting more than six months and taking place between 1997, the first year where type of contract information is available, and 2007, just before the current economic crisis began. We have chosen a year as the model period for consistency with this data and because it is reasonable from a computational point of view.

4.3 Preferences

The utility function is linear in consumption as usual in this literature. The value of the discount factor β is fixed so that it is consistent with the mean annual real interest rate in the reference period, 3%.

4.4 Production technology

The production function is assumed to be linear in the idiosyncratic shock, $y(\epsilon) = \epsilon$. The idiosyncratic shock is modelled as a Markov chain, $\Gamma[(\epsilon')|(\epsilon)]$. In addition, we assume five possible quality levels. In general, these two assumptions would imply 20 restrictions to fix the values of the conditional transition probabilities between different quality levels. Assuming that the expected duration of good and bad idiosyncratic shocks coincide, $\Gamma[(\epsilon_1)|(\epsilon_2)] = \Gamma[(\epsilon_2)|(\epsilon_1)]$, we only need to estimate 15 transition probabilities. Given that we do not have direct information on the quality of the match, we use Tauchen's procedure[13] to parameterize the five quality levels, as well as the transition probabilities. To apply this procedure we need to know the mean (μ), the standard deviation (σ_v) and the autocorrelation coefficient (ρ) of the underlying idiosyncratic process. We use quarterly GDP in the period 2000-08 to approximate that process. Finally, in order to properly match the statistics of interest we need to make two additional assumptions. First, we assume that temporary workers and first period permanent workers are less productive than ordinary permanent workers.[14] Second, we assume a positive experience effect on the productivity of permanent workers.[15] Parameters y_{gap} and exp are used to introduce these two features.

[13] See Tauchen (1986).

[14] Bentolila and Dolado (1994) offer empirical evidence supporting this assumption.

[15] Garcia Perez and Rebollo (2011) show that wages are increasing with experience in PCs specially when compared with workers who suffer involuntary job transitions.

4.5 Unemployment benefits

The parameter b can be understood as some kind of unemployment subsidy or the return to home production. Both interpretations have drawbacks. In order to properly talk about unemployment benefits, we should include a Government and its budget constraint. On the other hand, the fact that there are no good estimates of the value of home production makes it very difficult to properly calibrate this parameter. We chose the first interpretation because then, b can be easily measured and related to real numbers.[16] But instead of fixing the value of b, we fix the ratio of average unemployment benefits to the minimum wage, b/w_{min}. To obtain this ratio we compute the average monthly unemployment pay as the product of unemployment benefits and coverage for the period 2006-08 and divide it by the monthly minimum wage.[17]

4.6 Matching technology

We assume a Cobb-Douglas homogeneous of degree one matching function, $m = m(v, u) = A * v^{\eta}(u)^{1-\eta}$. The scale parameter A is the degree of mismatch in the economy and η is the value of the elasticity of the number of matches with respect to vacancies.

To summarize, the calibration exercise involves the assignment of values to two types of parameters. The discount rate and the parameters of the idiosyncratic process are set independently from the rest, since they have clear counterparts in the real economy. The values for the elasticity of new matches with respect to the vacancy input η and the workers' bargaining power θ have been set using the values estimated in empirical studies.[18] The six remaining parameters: the cost of opening a vacancy c, the scale parameter in the matching function A, unemployment benefits b, the minimum wage w_{min}, the productivity gap y_{gap} and the experience parameter exp are calibrated using the method of simulated moments.[19]We need to impose six

[16] An alternative strategy would be to use the second interpretation and determine b with the simulated method of moments. We did not follow this strategy because of the difficulty of calibrating the model grows exponentially as we add more parameters.

[17] The source of this data is Bulletin of Labour Statistics edited by the Ministry of Labour and Social Affairs, the Spanish Labour Force Survey (EPA), and National Employment Office (INEM) Statistics.

[18] Abowd and Lemieux (1993) estimate $\theta = 0.3$ and the value for η in empirical studies lies in the range $[0.4 - 0.6]$.

[19] The method of simulated moments is explained in the following part. Starting with some initial values, the optimization routine calls for a subroutine that computes the equilibrium, runs the simulation and computes the statistics. If, according to some tolerance criteria, the statistics generated by the model are sufficiently close to the real ones, the program ends. Otherwise, the optimization routine (non–linear solver) modifies the initial parameter values and calls again the subroutine that computes the equilibrium.

Table 1: **Baseline Economy Parameters.**

β	μ	ρ	σ_v	b	w_{min}	A	η	c	θ	y_{gap}	exp
.97	0.3	0.75	0.11	0.1	0.3	0.5	0.51	0.05	0.3	0.18	0.008

conditions to set these six parameters. These conditions are:

1. The permanent job destruction rate, $JDp = 6.19\%$.
2. The temporary job destruction rate, $JDt = 23.95\%$.
3. The distribution of permanent job destruction: $JD_{prod} = 93.36\%$ is due to productivity reasons and the rest due to retirement.
4. The ratio b/w_{min} is 35.11%.
5. The wage share, w/y, is 70%.
6. Unemployment duration, u_{dur}, is 10.38 months.

4.7 Firing costs

To compute the equilibrium we need a firing cost function that stands for the average firing cost in Spain in the period under study. We use the following pieces of information to estimate the firing cost function: legal indemnities in fair (20 days of wages p.y.o.s. with a maximum of 12 monthly wages) and unfair dismissals (45 days of wages p.y.o.s. with a maximum of 42 monthly wages),[20] procedural wages of around two monthly wages, and the fact that, on average, 73.2% of all firing processes were declared unfair in the period 2006-08. Regarding the dismissal distribution, on average 4.3% were collective dismissals, 18.7% were agreed at the Units of Mediation, 67% followed the procedure specified in the Law 45/2002 and only 10% were finally judged.[21] Using those observations, the firing cost function is

[20]The 33 days rule introduced in 1997 for the PEPCs is not used in this calculation because only a small percentage of the new permanent contracts signed in Spain in the last ten years is of this type. Moreover, it has not been clear at all, at least until the recent legislation change, whether the severance payments of these new contracts are 33 or 45 days p.y.o.s. in case of unfair dismissals.

[21]The number of days actually agreed upon is not made public (only the amounts paid), but the presumption is that they are very close to the legal limit. On the other hand, the 2001-02 reform abolished the firm's obligation to pay procedural wages when dismissed workers appeal to labour courts, as long as the firm acknowledged the dismissal as being unfair and deposited the severance pay (45 days of wages p.y.o.s.) in court within two days of the dismissal.

$f = 0.04 * (0.73 * (45 * w * d) + 0.27 * (20 * w * d)) + 0.19 * (45 * w * d + 60 * w) + 0.67 * (45 * w * d) + 0.10 * (0.73 * (45 * w * d + 60 * w) + 0.27 * (20 * w * d + 60 * w))$, where d and w stand for worker's seniority and the daily wage, respectively.

Note that legal firing costs depend on the wage. Since making the firing cost function depend on wages is computationally very difficult to manage, we take the quality of the match as an approximation of the wage.

5 Main Findings

In this section we report the answers to the questions that we posed. In Section 5.1, we report the results of the calibration exercise to test whether the baseline model is a good starting point to make counterfactual experiments. In Section 5.2, we show the effects of introducing a single contract with increasing severance payments.

5.1 Calibration results

There are two kinds of statistics: those that we use to match the economy, and those we want to ask questions about. The model has been calibrated to map the following set of statistics: the permanent job destruction rate JDp, the temporary job destruction rate JDt, the distribution of permanent job destruction JDp_{prod} by reason of separation, the ratio of unemployment benefits to the minimum wage b/w_{min}, the wage share w/y and unemployment duration u_{dur}. On the other hand, the set of statistics in which we are interested are: the unemployment rate u, the aggregate job destruction rate JD and the tenure distribution.[22] We focus on JD rates instead of JC rates for two reasons. First, in a steady-state they should be the same. And second, because in our model permanent job creation is only possible via job conversion.

Table 2 shows that the baseline model is a good starting point to ask questions about the workings of this economy because it matches real data quite well. Table 3 shows the other set of statistics. Both, aggregate job destruction and the unemployment rate are slightly higher when compared to the actual data. Except for the first year, the baseline model is able to reproduce the tenure distribution for the first six years reasonably well.

[22] To compute the statistics we have generated series of unemployment rates, job creation and destruction rates (aggregate and disaggregate by type of contract), wage shares, distributions of permanent and temporary job destruction rates by reason of separation and distributions of job seniority in TCs and PCs. Since all the variables are stationary, it is not necessary to detrend the series to make the calculations.

Table 2: **Calibration results.**

Statistics	Simulated Model	Spanish Data
JDp	5.6	6.2
JDt	23.0	24.0
JDp_{prod}	92.8	93.4
b/w_{min}	33.3	35.1
w/y	75.0	70.0
u_{dur}	10.9	10.4

Table 3: **Simulation results.**

Statistics	Simulated Model	Spanish Data
JD	13.4	10.5
u	14.4	11.0
$tenure = 1$	45.1	29.4
$tenure = 2$	14.2	17.7
$tenure = 3$	12.7	11.2
$tenure = 4$	7.9	7.8
$tenure = 5$	7.7	6.2
$tenure = 6$	7.1	5.0

5.2 The single contract

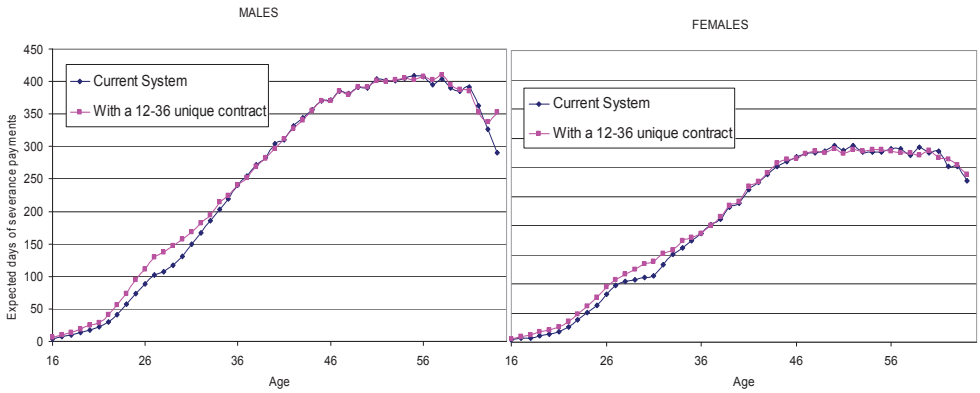
In this section we study the effects of introducing a single contract with increasing severance payments. In section 5.2.1 we use, as a first approximation, a stock-flow model of the Spanish labor market to compute expected severance payments and expected employment durations. In section 5.2.2 we perform the quantitative exercise using the model developed in this paper.

5.2.1 A first aproximation

In this section, based on García-Pérez (2010), we use a single stock-flow model of the Spanish labour market to have a first impression about the effects of introducing a single contract (for new hires) on average severance payments. We have used data about the employment history of a subsample of more than 200,000 Spanish workers based on the MCVL data set previously described. Specifically, we will compare the expected severance payments and the expected employment duration for each worker in the sample, throughout the following ten years, when we apply the current regulation with the same figures in case of applying the new "12-36 Single-Contract" for all new hirings in that ten years span. The indemnity in the "12-36 Single-Contract" starts being 12 days of wages p.y.o.s. and reaches, with an increase of two days for each additional year worked, to a final level of 36 days p.y.o.s., after twelve years working within the same firm.[23]

Figure 4: Expected severance payments by age and gender: current system vs. 12-36 single contract

[23] We have imposed a maximum indemnity of two years of wages for this new contract.


MALES
FEMALES
Current System
With a 12-36 unique contract
Expected days of severance payments
Age
0
50
100
150
200
250
300
350
400
450
16
26
36
46
56

The main results of this simulation exercise contradict the perception that this type of contract, with lower severance payments than in the current system for PCs, would increase the precariousness of the Spanish labour market. Figures 4 and 5 show that the new contract would not change much the expected severance payments of the average worker in the sample but would have a sizable impact on expected employment durations. If we look into the sample in order to see who benefits more from this change, it is the case that all unemployed workers and those who currently have a temporary contract (with a high probability of dismissal), would benefit substantially from the start of its new employment with the introduction of the single contract because severance payments are higher since the beginning and because their firing probability is much lower than under the current TCs. In fact, our simulations show that more than 50% of the workforce in 2007 would benefit from the adoption of this single contract. In addition to the aforementioned groups, young people under 35 years would greatly benefit from this change because once the worker is fired, she will surely begin a new cycle of unemployment and temporality. Of course, there would be a group of permanent workers that would be harmed because their expected severance payment will be reduced. However, we estimate that the weight of this group is less than 10%. The remaining 40% of the population would not be affected by the reform because they already have a permanent contract and a level of qualification and experience so that their dismissal probability is very low.

Figure 5: Expected employment duration by age and gender: 12-36 unique contract versus current situation

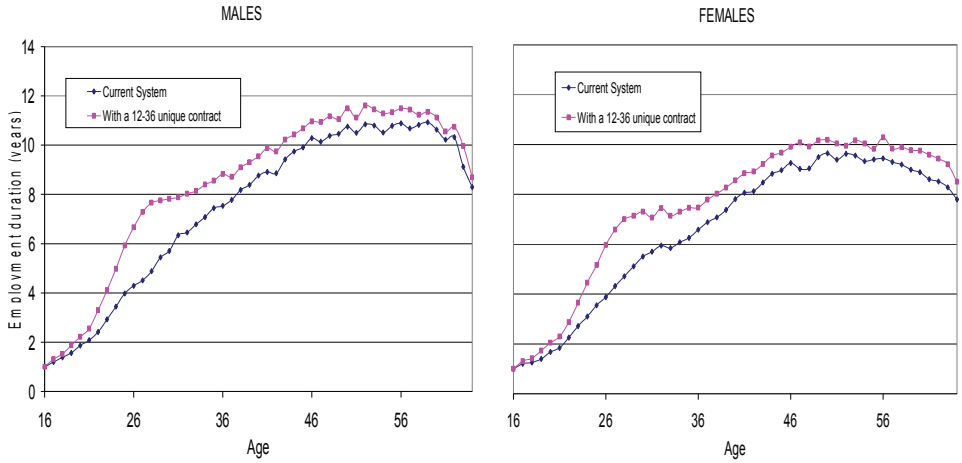


Table 4: **The single contract.**

Statistics	$DualL.M.$	$12-36-S.C.$
u	14.4	11.8
JD	10.5	9.4
$JD_{d<=3}$	23.0	12.4
$JD_{d>3}$	5.6	8.2
$tenure <= 1$	45.1	38.8
$tenure <= 2$	59.3	52.0
$tenure <= 3$	72.0	63.4
$tenure <= 4$	79.8	72.8
$tenure <= 5$	87.5	81.7
$tenure <= 6$	94.6	89.8

5.2.2 The Quantitative Exercise

In this section we use the model to quantify the effects of introducing a single contract with indemnities growing with seniority. We simulate the effects of the so-called "12-36 Single-Contract" (12-36 S.C.) and compare them to the actual situation "the dual labor market" (Dual L.M.). We are particularly interested in the effects on the unemployment rate, job destruction and the tenure distribution.

Tables 4 shows that both, the unemployment and the job destruction rate, decrease with the introduction of the single contract. In particular, the temporary job destruction rate under the current legislation doubles the probability of being fired for workers with tenure less or equal than three ($JD_{d<=3}$) years under the single contract. The opposite happens for the probability of being fired for workers with tenure higher than three years ($JD_{d>3}$). Under the single contract, this probability is much higher than the job destruction rate for durations higher than three years under the current situation, 8.2% vs 5.6%.

Regarding the tenure distribution, the changes are substantial. The number of people with more than six years of tenure doubles in the single contract economy. Moreover, the number of workers with tenure less or equal than a year is 15% lower. These changes are very important in terms of human capital accumulation and experience.

Table 5: **Tenure distribution.**

Statistics	$DualL.M.$	$12-36-S.C.$
$tenure = 1$	45.1	38.8
$tenure = 2$	14.2	13.3
$tenure = 3$	12.7	11.3
$tenure = 4$	7.9	9.4
$tenure = 5$	7.7	8.9
$tenure = 6$	7.1	8.2

6 Conclusions

The main goal of this paper is to provide an idea of the quantitative effects of introducing a single labour contract with indemnities growing with seniority in a smoothly way in a model economy that matches the Spanish data reasonable well. This measure has been proposed by top hundred Spanish economists in the recent "Propuesta para la Reactivación Laboral". However, the Government has turned a deaf to it and has lunched a new reform that try to reinforce the use of PEPCs (the permanent contract with severance payments equal to 33 days of wages p.y.o.s.). These contracts were already introduced in 1997 with quite low success in reducing the temporary employment rate. The main reason is that the gap in severance payments between temporary and permanent contracts continues being quite large. Hence, it seems that this new labour market reform will become another lost opportunity to reduce labour market segmentation in Spain.

Our simulations show that the single contract would be greatly beneficial for temporary workers and also for the unemployed because both, job stability and the first periods dismissal costs, would increase. For the firm, this contract would not necessary increase the average expected firing cost because the job destruction rate would be lower than under the current legislation. Another advantage from the point of view of the firm is the reduction in the degree of uncertainty due to the simplicity to compute the dismissal cost.

Obviously, the introduction of the single contract would not be enough to improve the general performance of the Spanish labour market. This measure should be complemented with reforms in some other aspects, as for example collective bargaining, unemployment benefits, active labour market policies, labour intermediation and the educational system. But it will surely encourage the creation of new firms and the performance of the existing ones due to the greater incentives to invest in human capital. Moreover, given

the lower job turnover rates, this reform could increase young emancipation and birthrates and could even improve the sustainability of the pension system. For all these reasons, the differences in the design of permanent and temporary contracts should disappear.

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