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The effects of introducing a single open-ended contract in the Spanish labour market*

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Abstract

This paper quantifies the effects of introducing a single open-ended contract for new hires, with increasing severance payments 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 in this economy is the intensive use of temporary contracts. The main driving force behind firm behaviour is the large gap in severance payments between temporary and permanent contracts (8 vs. 45 days of wages per year of seniority). We use a search and matching type model of job creation and destruction that is able to generate the main properties of a segmented labour market like the Spanish one. We use this model to simulate the effects of introducing this new design in severance payments. Our results show that this contract decreases unemployment (by 21%) and job destruction (which is almost halved in contracts with a tenure of fewer than four years) and tempers both the probability of being fired and tenure distribution as severance payments are reduced. Almost 15% more workers have a tenure of more than 3 years, and there are 23% fewer one-year contracts. The transition shows that the single open-ended contract would be highly beneficial for a majority of workers (only 8% would be jeopardised) because job stability would substantially increase. Firms, would also benefit from a reduction in their expected severance costs by about 9%.

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

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1 Introduction

Up until only recently, the Spanish labour market was one of the most dynamic in the European Union. Almost one third of total job creation in Europe was created in Spain, and yet this is also the European labour market that has destroyed the most jobs during the recent crisis. The poor allocation of production factors during the lengthy period leading up to the recession, the specialization in low human capital sectors and the labour market segmentation between temporary and permanent workers are the main factors explaining this hugely volatile employment scenario. In fact, the gap between the severance payments of workers with permanent contracts (45 days of wages per year of seniority (p.y.o.s) for unfair dismissal) and temporary ones (8 days of wages p.y.o.s) accounts for almost half the job destruction over the past three years, when temporary contracts (TCs) have been used as the basic adjustment mechanism (see Bentolilla, Cahuc, Dolado and Le Barbanchon, 2010).[1]

In order to reduce this volatility and the excessively high use of TCs in Spain, governments have lunched several labour market reforms over the past twenty years.[2] In addition to introducing Permanent Employment Promotion Contracts (PEPCs) with lower severance costs (33 days of wages p.y.o.s. against the 45 days of wages p.y.o.s. 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 in social security contributions. In fact, Spain is one of the European countries that devotes 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 account for a sizable part of the increase in job reallocation among permanent workers. That is, the PEPCs that qualify for social security rebates record a much higher job destruction rate than ordinary PCs.

Due to the failure of these reforms, and because it may even be inefficient that temporary and unemployed workers cannot achieve a status of greater job stability and better future perspectives,[3] it seems convenient to close the gap between the severance payments of PCs and TCs.

In the document "Propuesta para la Reactivación Laboral en España", signed by the top one hundred Spanish economists in 2009, they argue that severance payments should increase in a steadier way in order to prevent

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

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

[3] According to García-Pérez (2010), five years of seniority and more than seven contracts were required on average until the year 2008 to earn a PC. Furthermore, almost 40% of the workers who have a temporary job aged 20 still have one at the age of 40.

massive redundancies before the deadline when a TC has to be converted into a PC (between the second and the third year in Spain, depending on the contract type). They propose replacing the existing system of TCs and PCs by a single open-ended contract (SC) for new hires with severance payments increasing with seniority. In particular, they suggest that compensation should be higher than at present in TCs and grow at a moderate rate (two or three additional days p.y.o.s) until it reaches a value similar to the mean European indemnity.

This paper quantifies the effects of this proposal. Accordingly, 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), which differ in the maximum length of the contract and in the associated severance costs; (ii) endogenous job conversion of TCs into PCs; (iii) severance costs modeled as a transfer from the firm to the worker, and as a function of seniority; and (iv) downward wage rigidities, so that severance costs have real effects.[4] In this labour market, firms will be heterogeneous agents and 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 we can generate the main labour market statistics. We then use the model to quantify the effects of introducing a SC with increasing severance payments. We first perform a steady-state comparison, and then the transition in order to compute the welfare cost of the policy and see who wins and who loses with the implementation of this policy. Our results show that the SC decreases unemployment (by 21%) and job destruction (which is almost halved in contracts with a tenure of fewer than four years) and tempers both the probability of being fired and tenure distribution, as severance payments are reduced. Almost 15% more workers have a tenure of more than 3 years and there are 23% fewer one-year contracts. The transition shows that the single open-ended contract would be greatly beneficial for a majority of workers (only 8% would be jeopardised) because job stability would substantially increase. Firms would also benefit from a reduction in their expected severance costs by about 9% because the probability of dismissals would be much lower than

[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.

under current legislation.

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, namely, the stochastic endogenous job creation and destruction model by Mortensen and Pissarides (1994), and introduce firing costs.[5]

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.[6]

More recently, Bentolilla, Cahuc, Dolado and 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 by 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, to large job losses during the financial crisis. They are inspired by 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. The main difference between our model and theirs is the introduction of seniority as part of the state space, which is an essential ingredient to properly match the duality in the Spanish labour market. In addition, severance payments are modeled as transfer instead of a purely wasted tax.

The closest paper to ours is Costain, Jimeno and Thomas (2010), where they study the extent to which the coexistence of permanent and temporary jobs accounts for the volatility of employment. For that purpose, they compare this dual structure to the one that would prevail with the introduc-

[5]The most relevant in this tradition are Garibaldi (1998), Cahuc and Zylberberg (1999), Mortensen and Pissarides (1999), and Garibaldi and Violante (2002). Others, such as Hopenhayn and Rogerson (1993), Díaz and-Galdón (1999), and Alvarez and Veracierto (2001), use *real business cycle* models to the same end.

[6]See, for instance, the *matching* models of Wasmer (1999), the *collective bargaining* models of Bentolila and Dolado (1994) and Jimeno and Toharia (1993), the *efficiency wage* models of Güell (2000), the *dynamic partial equilibrium demand* models of Bentolila and Saint-Paul (1992), Cabrales and Hopenhayn (1997), and Aguirre and Alonso (1999), and the *general equilibrium* models of Alonso, Fernández and Galdón (2002).

tion of a SC, concluding that the SC must be coupled with a reduction in mean compensation so that both 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, perform the transition and focus on the effects on job seniority. In addition, our model is much more structural, which makes it suitable for realistically mapping the aspects we consider essential, it is consistent with the established theoretical implications and provides many statistics of interest that others models are unable to provide.[7] Finally, the detailed manner in which the calibration exercise is performed allows us to use the model to perform quantitative policy evaluations.

The outline of the paper is as follows. In Section 2, we present the model. In Section 3, we discuss its calibration. In Section 4, we perform the exercise of introducing a single open-ended contract with increasing severance payments. Finally, Section 5 draws some conclusions.

2 The model

2.1 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.[8] Unemployed workers look for employment opportunities; employed workers produce and do not search for jobs. 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.

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.

2.2 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,

[7] 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.

[8] We do not consider other labour market states outside the labour force.

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.

2.3 Technologies

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

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 each 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, $\{\epsilon_c\}$, which firms will endogenously determine.

2.4 Equilibrium

The concept of equilibrium used is recursive equilibrium. Before showing the problems that agents solve, it is convenient to explain the timing and agents' decisions. At the beginning of the period, firms' idiosyncratic shocks

are revealed. Firms and workers then renegotiate wages. Given these wages, firms choose between two options: i) to continue producing with the actual match, or ii) to terminate the match and dismiss the worker.[9] The nature of the problem depends on whether the firm has a PC or a TC. PCs entail high severance costs that depend on the quality of the match and on the duration of the contract, while severance costs for TCs are, in comparison, very low. In addition, the problem is not the same for all firms with a TC. Let d denote the duration of the contract. We will assume that a temporary contract cannot last 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 severance 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 during 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. There follows a formal description of the problems of firms and workers.

2.4.1 Firms' Problems

The problem 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 row), or whether to fire the worker and look for a new one (second row). This problem can be written as

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

where $J^p(\epsilon, d)$ and $J^p(\epsilon\prime, d\prime)$ are, respectively, the firm's value function for this period and the next period, $w(\epsilon, d)$ is the wage previously determined in a bilateral negotiation or fixed by the minimum wage, $\Gamma(\epsilon\prime|\epsilon)$ is the conditional transition probability for the quality of the match, $s^p(\epsilon, d-1)$ is the severance cost, 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.[10] If it is more profitable to continue

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

[10] 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.

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 severance cost, $s^p(\epsilon, d-1)$, plus the vacancy cost and, with probability $q(\nu)$ 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 problem 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 severance costs are given by $s^t(\epsilon, d-1)$ in this case.

The problem of this firm can be written as[11]

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

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

The problem of firms with TCs

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) and severance costs are given by $s^t(\epsilon, d-1)$. The problem of this firm is

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

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, $g^t(\epsilon, d) = 0$.

2.4.2 Workers' Problems

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

[11] 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.

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

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 severance cost and the worker becomes unemployed.

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

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

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 $\alpha(\nu)$, the worker will find a job and, with probability 1-$\alpha(\nu)$, the worker will remain unemployed.

2.4.3 Wage determination

Wages are the result of bilateral bargaining between the worker and the firm, unless the legally imposed minimum wage is binding.[12] Bargaining is dynamic, i.e. wages are revised each 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

$$S^p(\epsilon,d) = [J^p(\epsilon,d)-(J^0-s^p(\epsilon,d-1))]+[V^p(\epsilon,d)-(V^0+s^p(\epsilon,d-1))]$$

[12]The downward wage rigidity is modelled here 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.

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

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

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

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

By making the appropriate substitutions of firms' and workers' value functions, the wage can be computed as[13]

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

Similar conditions hold in TCs. Note that, as in Osuna (2005), wages in first-period PCs will be lower than those prevailing in the following periods because high severance 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.[14]

2.4.4 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[15]

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.

[13] 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 severance costs increase wages.

[14] Using data from the Spanish Data Set "Muestra Continua de Vidas Laborales", the ratio of wages in permanent and temporary contracts turned out to be 14.3% for the period 2006-08.

[15] 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.

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

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

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

4. *Rational Expectations*

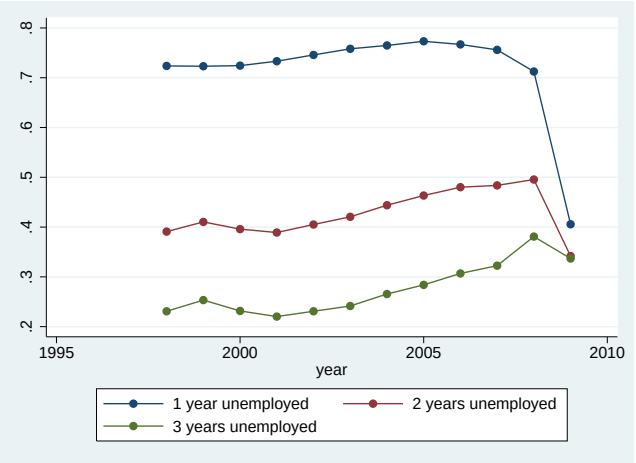
3 Calibration

In this section, we explain the procedure for assigning values to the model's parameters 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.

3.1 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). 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 unemployed, 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 rate from unemployment to temporary employment, by unemployment duration

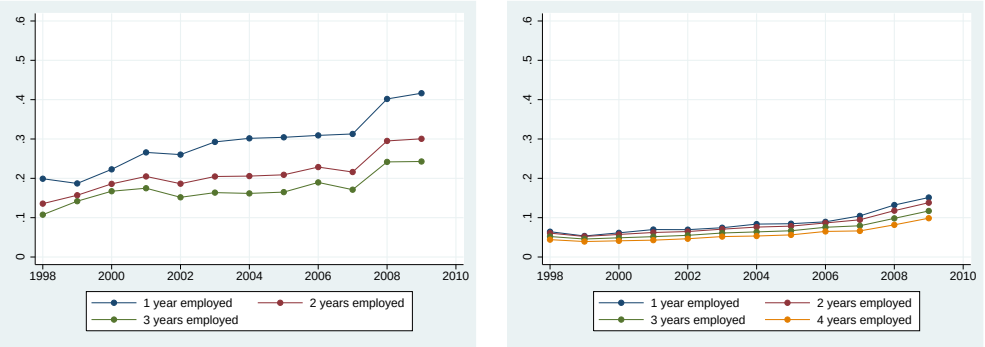


For each worker, we have the date when each job begins and ends. This provides us with quite detailed information about employment duration. Periods of unemployment can also be identified from the dates when the firm ceases to pay Social Security contributions for the worker. Furthermore, we also have information about the type of contract, so we will be able to differentiate between workers with a TC or a PC 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 1998-2009. Each of these workers may have both 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 temporary employment. As usually found in the literature, this hazard rate is highly decreasing with unemployment duration. It is also highly impressive how the exit from unemployment has decreased at the beginning of the current economic crisis, that is, in 2008.

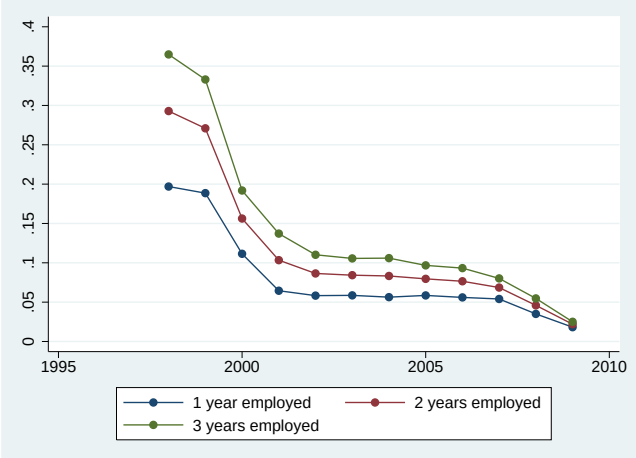
Figure 2 shows the exit from employment to unemployment for both temporary and permanent workers. The exit from a TC is much higher for any employment duration than the one from a PC. These hazard rates have substantially increased in 2008, as a clear signal of the increasing firing risk in the current 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 TC to a PC, 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 TC, and only for the period 1997-1999, when both hazards are roughly comparable. For all the other years, this direct transition is always below 10%.

Figure 3: Empirical hazard rates of the direct transition from a TC to a PC, by employment duration



3.2 Model period

The job creation and destruction statistics have been computed using the data on working histories 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 these data and because it is reasonable from a computational point of view.

3.3 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%.

3.4 Production technology

The production function is assumed to be linear in the idiosyncratic shock, $y(\epsilon) = \epsilon$. The idiosyncratic shock is modeled 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 coincides, $\Gamma[(\epsilon_1)|(\epsilon_2)] = \Gamma[(\epsilon_2)|(\epsilon_1)]$, we need only to estimate 15 transition probabilities. Given that we do not have direct information on the quality of the match, we use Tauchen's procedure[16] 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 one additional assumption. We assume that temporary workers and first period permanent workers are less productive than ordinary permanent workers.[17] The parameter y_{gap} is used to introduce this feature.

3.5 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 discuss 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 b can then be easily measured and related to real numbers.[18] However, instead of fixing the value of b, we fix the ratio of average unemployment

[16] See Tauchen (1986).

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

[18] 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 the difficulty of calibrating the model grows exponentially as we add more parameters.

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.[19]

3.6 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 value 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.[20] The five remaining parameters: the scale parameter in the matching function A, unemployment benefits b, the minimum wage w_{min}, the productivity gap y_{gap} and the cost of posting a vacancy c are calibrated using the method of simulated moments.[21] We need to impose five conditions to set these five parameters. These conditions are:

1. The permanent job destruction rate, $JDp = 6.19\%$.
2. The temporary job destruction rate, $JDt = 23.95\%$.
3. The ratio b/w_{min} is 35.11%.
4. The wage share, w/y, is 70%.
5. Unemployment duration, u_{dur}, is 10.38 months.

[19] These three numbers are, respectively, 764 euros, 26.2% and 570 euros. The sources of these data are the Bulletin of Labour Statistics edited by the Ministry of Labour and Social Affairs, the Spanish Labour Force Survey (EPA), and the National Employment Office (INEM).

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

[21] The method of simulated moments is explained in the following part. Starting with certain initial values, the optimization routine calls for a subroutine that computes the equilibrium, runs the simulation and computes the statistics. If, according to certain 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 once again calls up 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}
.97	0.3	0.75	0.11	0.1	0.3	0.5	0.51	0.05	0.3	0.17

3.7 Severance costs

To compute the equilibrium, we need a severance cost function that stands for the severance costs in Spain in the period under study. We use the following pieces of information to estimate the severance cost function in PCs: legal compensation in fair dismissals (20 days of wages p.y.o.s. with a maximum of 12 monthly wages) and unfair ones (45 days of wages p.y.o.s. with a maximum of 42 monthly wages),[22] procedural wages of around two monthly wages, and the fact that, on average, 73.2% of all severance 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% finally involved litigation.[23] Using those observations, the severance cost function in PCs is $s^p = 0.12 * w * (d-1) + 0.05 * w$, where d and w stand for a worker's seniority and the daily wage, respectively. Note that legal severance costs depend on the wage. Since making the severance cost function depend on wages is computationally very difficult to manage, we take the quality of the match as an approximation of the wage.

Finally, TCs entail a severance cost of 8 days of wages p.y.o.s. Therefore, the severance cost function in TCs is $s^t = 0.02 * w * (d-1)$.

4 Main Findings

In this section we report the answers to the questions posed. In Section 4.1, we report the results of the calibration exercise to test whether the baseline model is a good starting point to make counterfactual experiments. In Sec-

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

[23]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 (Law 45/2002) abolished a 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.

Table 2: **Calibration results**

Statistics	Simulated Model	Spanish Data
JDp	5.58	6.19
JDt	23.03	23.95
b/w_{min}	33.33	35.11
w/y	74.78	70.0
u_{dur}	10.64	10.38

tion 4.2, we show the steady-state effects of introducing a single open-ended contract with increasing severance payments. In Section 4.3 we perform the transition. Finally, in Section 4.4 we show the steady-state effects of the "2010 Labour Market Reform" and compare these results with those of implementing the single open-ended contract.

4.1 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 ratio of unemployment benefits to the minimum wage b/w_{min}, the wage share w/y, and unemployment duration u_{dur}.[24]

On the other hand, the set of statistics in which we are interested are: unemployment rate u, aggregate job destruction rate JD and tenure distribution.[25] We focus on JD rates instead of JC rates for two reasons. First, in a steady-state they should be the same; second, in our model permanent job creation is possible only via job conversion.

Table 2 shows that the baseline model is a good starting point to ask

[24]Due to the CRS of the matching function, the job finding rate is greater than one. This means that in a year every unemployed person finds a job. However, unemployment duration, defined as one over the job finding rate is less than a year. One way to resolve this inconsistency is to use the procedure in den Hann et. al (2000) to delimit the job finding rate between zero and one. Another way is to make workers go to the job market a couple of times while they are unemployed and accumulate. This is the alternative we choose.

[25]To compute the statistics, we have generated a series of unemployment, job creation and destruction rates (aggregate and disaggregate by type of contract), as well as 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 3: **Simulation results**

Statistics	Simulated Model	Spanish Data
JD	13.72	10.51
u	14.54	11.0
$Av.tenure <= 6$	1.95	1.91
$Av.tenure <= 10$	3.79	2.81

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 with the actual data. Regarding tenure distribution, the model reproduces the average tenure for those with a tenure of fewer than 6 years reasonably well.

4.2 The single open-ended contract

In this section, we use the model to quantify the steady–state effects of introducing a single open-ended contract with compensation growing with seniority. We simulate the effects of the so-called "12-36 Single-Contract" (12-36 SC)[26], where the compensation starts being 12 days of wages p.y.o.s. and, with an increase of two days for each additional year worked, reaches a final level of 36 days p.y.o.s., after twelve years working within the same firm.[27] We compare this steady–state with the one prevailing under the actual situation "the dual labor market" (Dual L.M.). We are particularly interested in the effects on the unemployment rate, job destruction, tenure distribution and mean indemnity.[28]

Table 4 shows that both unemployment and job destruction rates decrease substantially with the introduction of the single open-ended contract. What is very interesting is the change in the job destruction rate in contracts with a tenure equal to or below four. In the dual labor market, the temporary job destruction rate was very high because the large gap between the severance costs of TCs and PCs induces massive firings at the beginning of period $d = 4$ in order to prevent the high future severance costs of PCs

[26]We have also simulated other specifications, such as the SC proposed in Bentolila, Dolado and Jimeno (2008) and the results are very similar to the ones presented here.

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

[28]To facilitate comparisons, Table 4 includes the percentage change for each relevant variable ($\%var$), as well as the percentage change relative to the average severance cost percentage change ($\frac{\%var}{\%s}$).

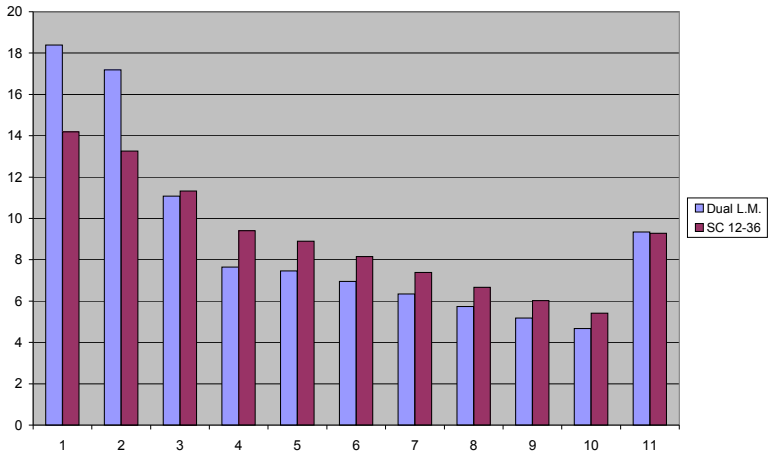
Table 4: **The single open-ended contract**

Statistics	$DualL.M.$	$S.C.$	$\%var$	$\frac{\%var}{\%s}$
u	14.54	11.42	-21.46	+2.35
JD	13.72	9.79	-28.64	+3.14
$JD_{d<=4}$	23.03	12.34	-46.42	+5.08
$JD_{d>4}$	5.58	8.19	+46.77	-5.12
$Av.Tenure_{d<=6}$	1.95	2.06	+5.64	-0.62
$Av.Tenure_{d<=10}$	3.79	4.19	+10.55	-1.16

in the event of job conversion. Under the single open-ended contract, the probability of being fired in contracts with a tenure equal to or below four is almost halved because firms are less reluctant than before to destroy jobs since they are costlier (12 days p.y.o.s against 8 p.y.o.s in TCs) and because the jump in severance payments (from 8 days p.y.o.s. to 45 days p.y.o.s.) has been substituted by a smoother increase in severance payments. In other words, the pervasive incentives to destroy jobs at the beginning of period $d = 4$ largely diminish. The opposite happens, however, for the probability of being fired for workers with a tenure of more than four years ($JD_{d>4}$). Under the single open-ended contract, this probability is almost doubled, 8.2% vs. 5.6%. Hence we can conclude that as the severance payment is smoothed, so are job destruction rates.

These changes in job destruction rates have a substantial impact on tenure distribution. The average seniority for workers with six or fewer years of tenure and ten or fewer years of tenure increases by 5.6% and 10.6%, respectively. Moreover, the number of workers with a tenure equal to or below one year is 23% lower and the number of workers with a tenure of more than three years is 15% higher under the SC. These changes are very important in terms of human capital accumulation and experience.

Figure 4: Tenure Distribution



4.3 The transition

In this section, we analyze the transition from the Dual labour market to the one with the Single Contract. We take a sub-sample of workers from the MCVL data set previously described that differ in several dimensions: whether they are employed or unemployed, the type of contract, tenure on the contract and their productivity level (proxied by qualification), and we follow them for 12 years.

We compare the resulting labor market careers under two different scenarios: the status quo and the transition. In both scenarios they are subject to the same shocks, but their employment histories will be different because the policy rules are different. Under the status quo, the policy rules are those prevailing in the dual labor market. In the transition scenario, the policy rules will be those that prevail under the single contract for those that start as unemployed. However, those that start in a temporary or permanent job will be subject to the policy rules prevailing in the dual labor market until they lose their jobs and go through unemployment. Once they re-enter the labor market they will be hired under the single contract and the policy rules will be the appropriate ones.

Figure 5: The transition I

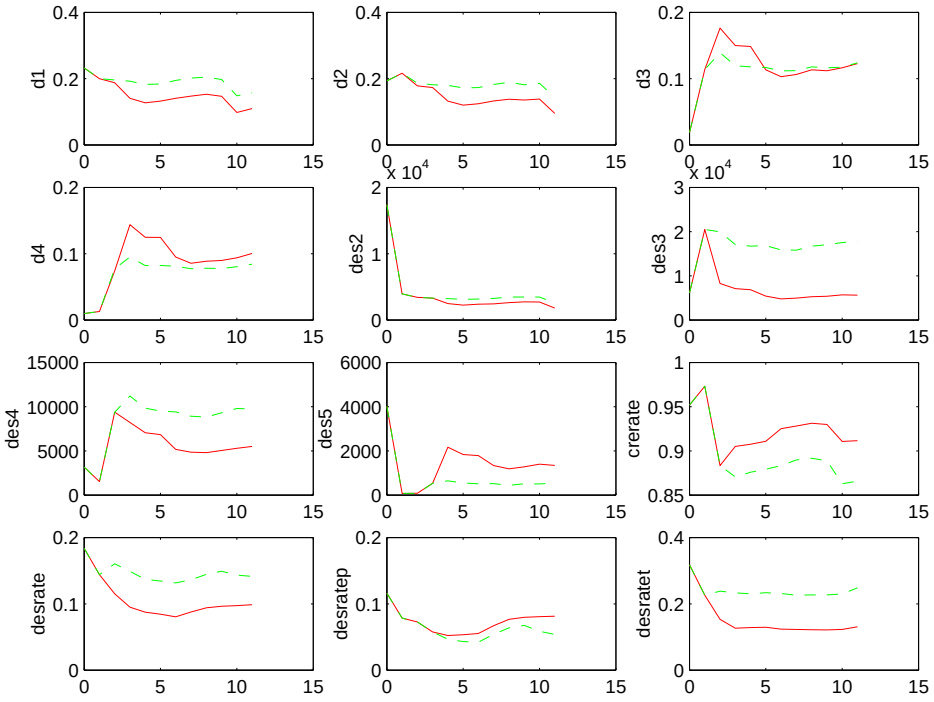


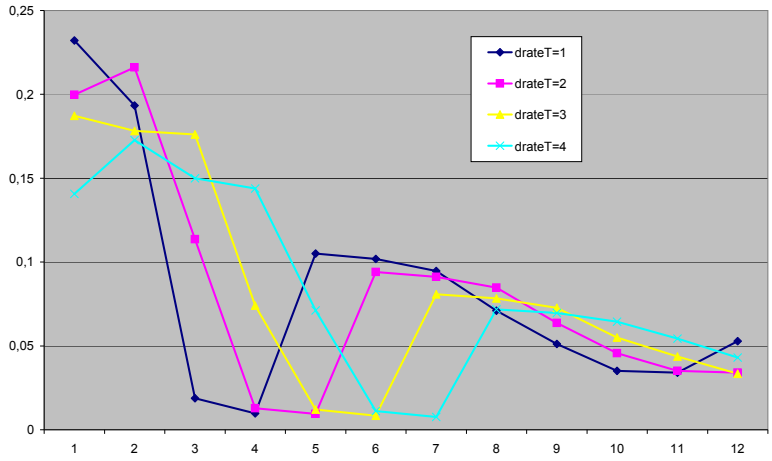
Figure 5 shows the evolution of several labor market variables related to tenure distribution and job creation and destruction under these two scenarios. As the transition evolves, every variable moves towards its steady state value. In the first four panels, we show the evolution of the percentage of people in the first four durations (d1, d2, d3 and d4) over the twelve-year span. The percentage of people in the first two durations decreases in the transition, with the opposite occurring for the percentage of people in the remaining durations. These changes are due to the change in the structure of severance costs; that is, to the smoother increase in severance payments of workers holding a single contract that tend to alter the incentives to destroy jobs, especially in durations d3 and d4, allowing people to have longer tenure. The following four panels show job destruction in durations 2, 3, 4 and 5. For the same reason pointed out before, job destruction in durations d3 and d4 decreases considerably, while job destruction in the following durations increases.[29]

Finally, the job creation rate (crerate) and the job destruction rates, aggregated and disaggregated by type of contract (desrate, desratet, desratep) are also shown. The job creation rate is greater under the transition, while the opposite is true for the aggregate job destruction rate. This result might seem somewhat surprising if one takes into account the well–known result

[29]We have shown only the percentage of people and job destruction for the durations where most action takes place.

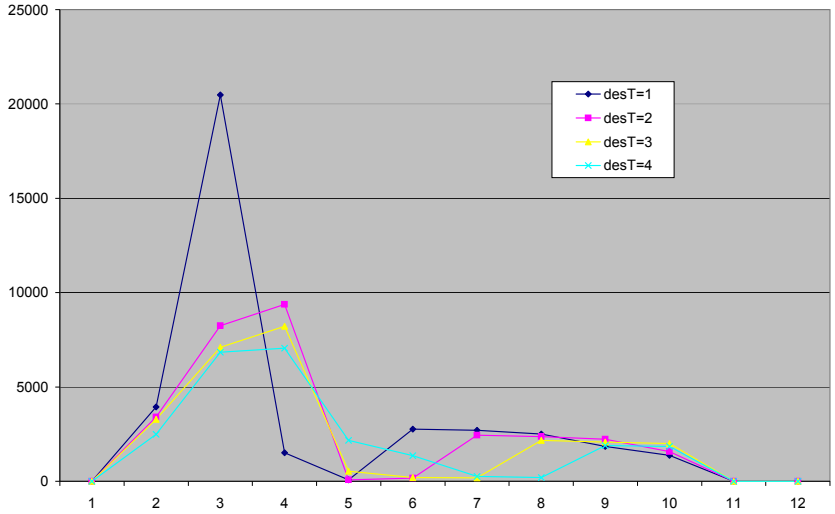
whereby a decrease in severance costs (implied here by the introduction of the single contract) should increase not only job creation but also job destruction (see, for instance, Bentolila and Bertola (1990)). Here, this is true for job creation but not for aggregate job destruction because there is a composition effect. The job destruction rate in durations equal to or below four years (the so-called "temporary job destruction" rate in the dual labor market), $JD_{d<=4}$, decreases sharply in the transition, while the opposite occurs for the job destruction rate in durations above four, $JD_{d>4}$, (the so-called "permanent job destruction" rate in the dual labor market). Again, these effects have to do with the smoothing effect of severance payments under the single contract. A different way of looking at the same picture is to show the evolutions of tenure distribution (Figure 6) and job destruction (Figure 7) as time goes by (for periods T=1, 2, 3 and 4). As the transition evolves, the percentage of people and job destruction in the first durations decreases and the distributions move towards their steady–state values.[30]

Figure 6: Evolution of tenure distribution



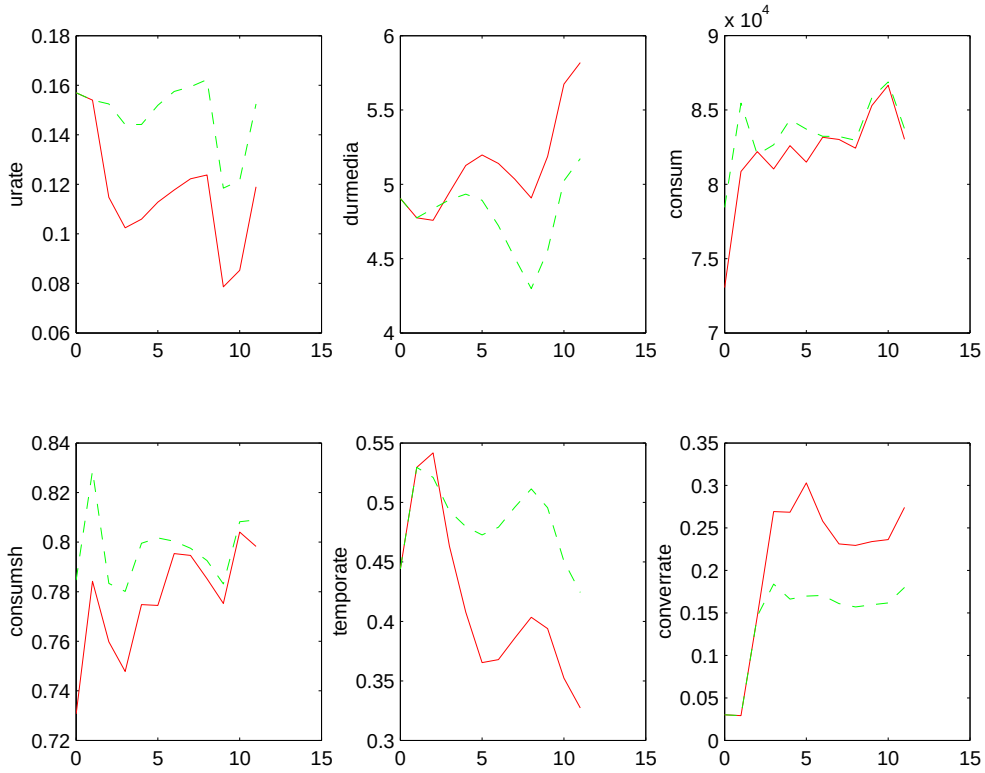
[30]Note that durations in Figures 6 and 7 are displayed on the x-axis.

Figure 7: Evolution of job destruction



Finally, Figure 8 shows the evolution of the remaining variables of interest. As expected, the unemployment rate and the percentage of people in the first four durations under the transition (the so-called "temporary employment rate" in the dual labor market) decrease, while average tenure and the percentage of people that transit from d3 to d4 (the so-called "job conversion rate" in the dual labor market") increase. Note that both consumption (consum) and the consumption share (consumsh) decrease slightly under the single contract so by using this criteria we can say that this policy would decrease welfare, at least during the first 6-7 years in the transition to the new equilibrium.

Figure 8: The transition II



In order to see who actually gains and loses from the implementation of this policy, we compute the severance payments and average tenure once the transition has been completed for each worker in the sample, and compare them to the ones that would have been obtained under the status quo. Tables 5 and 6 show that in the transition scenario more than 60% of the workers are better off (or the same) in both dimensions: 15.55% are strictly better off and only 1.92% are worse off in both dimensions. The unemployed group of workers is where more people improve (21.12%) and this is also the group where fewer people are worse off (0.09% against 3.81% in the case of temporary workers).

Table 7 shows that the unemployed are the ones that gain more in terms of the percentage of people whose severance payments increase (38%) and in terms of the average increase in the number of days of wages p.y.o.s (67.5). They are also the ones that lose more: almost 40% record a decrease in severance payments, with the decrease being substantial (on average 113.3 days of wages p.y.o.s.).

However, it is problematic to consider the compensation workers finally receive as a criteria for measuring how well they perform because the indemnity can be higher, both because tenure is higher and because the worker

Table 5: **Winners and losers I**

tr v. sq	All	Permanent	Temporary	Unemployed
$s>, t>$	15.55%	14.92%	12.80%	21.12%
$s>, t=$	12.09%	13.66%	9.16%	11.84%
$s>, t<$	6.07%	5.64%	7.68%	5.02%
$s=, t>$	0.01%	0.00%	0.00%	0.03%
$s=, t=$	34.03%	34.74%	41.00%	22.31%
$s=, t<$	0.00%	0.00%	0.00%	0.00%
$s<, t>$	23.07%	23.32%	19.13%	27.90%
$s<, t=$	7.26%	6.09%	6.42%	11.70%
$s<, t<$	1.92%	1.62%	3.81%	0.09%

Table 6: **Winners and losers II**

	All	Permanent	Temporary	Unemployed
Greater s	33.71%	34.22%	29.64%	37.98%
Same s	34.04%	34.74%	41.0%	22.34%
Lower s	32.25%	31.03%	29.36%	39.69%
Greater s	38.63%	38.24%	31.93%	49.05%
Same t	53.38%	54.49%	56.58%	45.85%
Lower t	7.99%	7.26%	11.49%	5.11%
Greater s and t	15.55%	14.92%	12.8%	21.12%
Lower s and t	1.92%	1.62%	3.81%	0.09%
Same s and t	34.03%	34.74%	41.0%	22.31%
Greater s and/or t	61.68%	63.33%	62.96%	55.29%
Lower s and/or t	38.32%	36.67%	37.04%	44.71%

Table 7: **Winners and losers III**

	All %	All	Perm %	Perm	Temp %	TemP	Unem %	Unem
Greater s	33.71%	39.0	34.22%	27.7	29.64%	38.6	37.98%	67.5
Lower s	32.25%	85.9	31.03%	69.02	29.36%	94.8	39.69%	113.3
Greater t	38.63%	2.60	38.24%	2.53	31.93%	2.44	49.05%	2.81
Lower t	7.99%	2.80	7.26%	0.08	11.49%	0.09	5.11%	3.72

Columns 3,5,7 and 9 in the first 2 rows show the increase/decrease in the number of days of wages p.y.o.s.
In the last 2 rows, columns 3,5,7 and 9 show the increase/decrease in seniority (in years).

has been fired more times. If we concentrate on tenure, Table 6 shows that 38.63% have a higher tenure (92% have the same or higher) and only 8% are worse off in this dimension.

Again, Table 7 shows that the unemployed are the ones that gain more in terms of the percentage of people whose tenure increases (49%), as well as in terms of the increase in the number of years of seniority (2.81). They are also the group of workers losing less in terms of the percentage of people negatively affected by the reform (only 5% of them experienced a decrease in tenure as opposed to 11.5% in the case of temporary workers), but those affected record the highest decrease in tenure (on average 3.72 years). The reason temporary workers do not perform that well in the transition has to do with the fact that they already had a temporary contract when the transition started. Under the status quo some of these temporary workers will end up having higher tenure because once their TCs have been converted into PCs their probability of being fired is much lower than under the single contract.

We can conclude that this exercise contradicts the perception whereby this type of contract, with lower severance payments than in the current system, would increase the precariousness of the Spanish labour market. Only 32.25% will experience a decrease in severance payments of around 13.47% on average, basically as a result of the decrease in the firing probability, and less than 8% will end up having a lower tenure. In fact, the reform would have a sizable impact on expected employment durations: on average, tenure would be 14.54% higher. Note also that the proportion of people that would not be affected by the reform is very high: 34.03% would end up with the same severance payments and tenure.

4.4 2010 Labor Market Reform

The purpose of this final subsection is to use the same model as before to quantify the steady–state effects of the changes in the structure of severance costs introduced in the last labor market reform made by the Spanish Government in June, 2010, and compare it with the results obtained in

Section 4.2. The 2010 reform extended the use of PEPCs with severance payments equal to 33 days of wages p.y.o.s. to almost all workers and increased the severance costs in TCs from 8 to 12 days of wages p.y.o.s. The purpose of this measure was to decrease the gap between the severance cost of PCs and TCs (see Figure 9).

Figure 9: 2010 Labour Market Reform vs. Status Quo

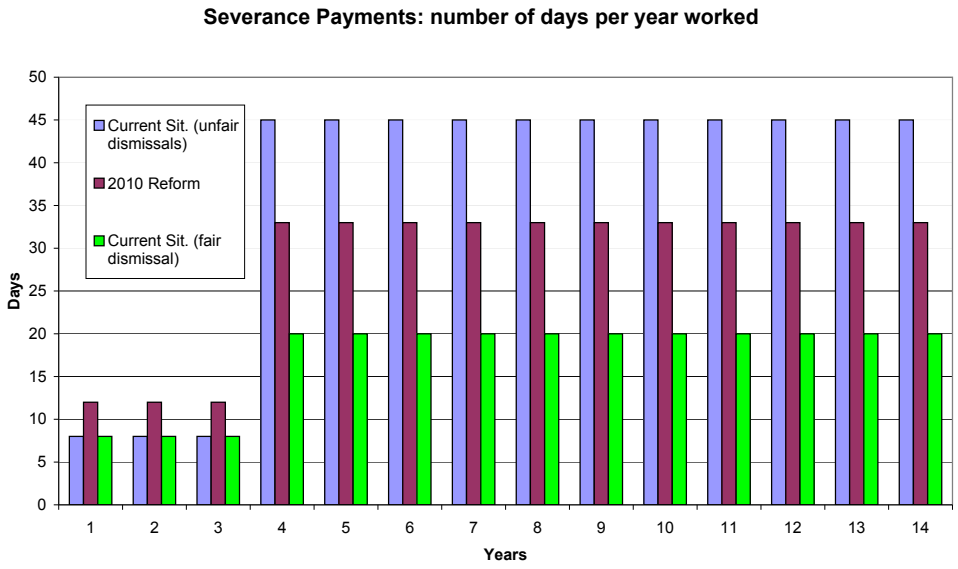


Table 7 shows that the effects of the 2010 Reform fall between those in the dual labor market and in the single open-ended contract studied previously. In short, it seems this new labour market reform has become another lost opportunity for reducing labour market segmentation in Spain.

Table 7: The Effects of the 2010 Reform

Statistics	*Dual L.M.*	2010 *Reform*	*S.C.*
u	14.54	13.10	11.42
JD	13.72	11.90	9.79
$JD_{d<=3}$	23.03	18.20	12.34
$JD_{d>3}$	5.58	6.80	8.19
$Av.Tenure_{d<=6}$	1.95	2.00	2.06
$Av.Tenure_{d<=10}$	3.79	3.99	4.19

5 Conclusions

The great recession has once again revealed the poor performance of dual labor markets. In this paper we have argued that countries with dual labor markets should strive to extend job protection to a wider share of the population. In our opinion, the best option is through the introduction of a single open-ended contract for all new hirings. To provide an idea of the quantitative effects of such a measure, we have computed the steady-state and the transition effects of a particular example of a single open-ended contract in a model economy that matches the Spanish data reasonable well.

We have shown that the single open-ended contract decreases steady-state unemployment and job destruction and smoothes both the probability of being fired and tenure distribution, as severance payments are smoothed. In fact, job destruction in contracts with a tenure of fewer than four years is almost halved, with the opposite happening in contracts with a tenure of more than four years. Moreover, the number of workers with a tenure equal to or less than a year is 23% lower, and the number of workers with a tenure of more than three years is 15% higher.

In addition, our transition exercise shows that the single open-ended contract would be highly beneficial for a majority of workers, especially for the unemployed, because job stability would increase. According to our calculations, fewer than 8% would be jeopardised (in terms of reduced tenure) by the reform and 34% would not be affected, ending up with the same severance payments and tenure as if the system remained unchanged. For firms, this contract would not necessarily increase the average expected severance cost because job destruction is lower than under current legislation. In fact, the average compensation, weighted by the job destruction rate for any duration, decreases by 9.13%. Another advantage from the firms' point of view would be the reduction in the degree of uncertainty due to the simple computation of the dismissal cost. However, for this to be true, it would

also be necessary to redefine the legal reasons for firing so that uncertainty over the type of firing and over the official decision on its fairness would be reduced.

Obviously, the introduction of the single open-ended contract would not be enough to improve the general performance of the Spanish labour market. This measure should be complemented with reforms in certain other areas, such as for example collective bargaining, unemployment benefits, active labour market policies, labour intermediation and the educational system. Yet it will surely encourage the creation of new firms and enhance the performance of existing ones due to the greater incentives to invest in human capital and accumulate experience. Moreover, given the lower job turnover rates and greater job security, this reform could increase youth emancipation and birth rates and even improve the sustainability of the pension system.

The 2010 labour market reform was not a step in the wrong direction, but a further one needs to be taken. If governments turn a deaf ear again, once the economy recovers, we will repeat the same mistake, simply creating temporary jobs and condemning more than four million unemployed people to the same pernicious cycle of unemployment and temporality of the other almost four million people working on a temporary basis. For all these reasons, the differences in the design of permanent and temporary contracts should disappear.

References

[1] Abowd, J.M. and T. Lemieux, 1993. "The Effects of Product Market Competition on Collective Bargaining Agreements: The Case of Foreign Competition in Canada," *The Quarterly Journal of Economics*, 108(4), 983-1014.

[2] Aguirregaribia, V., and C. Alonso-Borrego (1999): "Labor Contracts and Flexibility: Evidence from a Labor Market Reform in Spain", Working Paper Universidad Carlos III de Madrid.

[3] Alonso-Borrego, C., J. Fernández-Villaverde, and J. Galdón-Sánchez (2002): "Evaluating Labor Market Reforms: A General Equilibrium Approach" Working Paper.

[4] Alvarez, F., and M. Veracierto (2001): "Severance Payments in an Economy with Frictions", *Journal of Monetary Economics*, 47, 477-498.

[5] Bentolila, S. and G. Bertola (1990): "Firing Costs and Labour Demand: How Bad Is Eurosclerosis?," *Review of Economic Studies*, Wiley Blackwell, vol. 57(3), 381–402, July.

[6] Bentolila, S., and J. Dolado (1994): "Labour Flexibility and Wages: Lessons from Spain", *Economic Policy*, 18, 55-99.

[7] Bentolila, S., Dolado, J., Cahuc P. and T. Le Barbanchon (2010): "Two-Tier Labor Markets in the Great Recession: France vs. Spain", CEPR Discussion Paper 8152.

[8] Bentolila, Dolado and Jimeno (2008): "Two-Tier Employment Protection Reforms: the Spanish Experience", CESifo DICE Report 4/2008.

[9] Bentolila, S., and G. Saint-Paul (1992): "The Macroeconomic Impact of Labor Contracts, with an Application to Spain", *European Economic Review*, 36, 1013-1053.

[10] Blanchard, O., and A. Landier (2002): "The Perverse Effects of Partial Labour Market Reform: Fixed-Term Contracts in France", *Economic Journal*, 112, 215-243.

[11] Cabrales, A., and H. Hopenhayn (1997): "Labor market flexibility and aggregate employment volatility", Carnegie-Rochester Conference Series on Public Policy, 46, 189-228.

[12] Cahuc, P., and F. Postel-Vinay (2002): "Temporary jobs, employment protection and labour market performance", *Labor Economics*, 9, 63-91.

[13] Cahuc, P., and A. Zylberberg (1999): "Job Protection, Minimum Wage and Unemployment", Discussion Paper 95, IZA.

[14] Cole, H., and R. Rogerson (1999): "Can the Mortensen-Pissarides Matching Model Match the Business-Cycle Facts?", *International Economic Review*, 40, 933-959.

[15] Costain, J. Jimeno, J and C. Thomas (2010): "Employment fluctuations in a dual labor market", Documento de trabajo 1013, Banco de España.

[16] den Haan, W.J., Ramey, G. and J. Watson (2000): "Job Destruction and Propagation of Shocks," *American Economic Review*, American Economic Association, vol. 90(3), 482–498.

[17] Díaz-Moreno C. and J. Galdón-Sánchez (1999): "How important is firm behavior to understand employment? Evidence from Spain", *Investigaciones Económicas*, 23, 203-224.

[18] García-Pérez and Rebollo (2009): "The use of permanent contracts across Spanish regions: do regional wage subsides work?", Investigaciones Económicas, XXXIII, 97–130.

[19] García-Pérez J.I. (2010): "¿Qué efectos tendría un contrato único sobre la protección del empleo?", in J. Dolado and F. Felgueroso (eds.), Propuesta de Reactivación Laboral en España, FEDEA, Madrid.

[20] García-Pérez and Rebollo (2011): "Lifetime Income values and labor turnover in Spain: how important are the entry conditions?", MIMEO.

[21] Garibaldi, P. (1998): "Job Flow Dynamics and Firing Restrictions", *European Economic Review*, Elsevier, vol. 42(2), pages 245–275, February.

[22] Garibaldi, P. and G. Violante (2002): "Firing Tax and Severance Payments in Search Economies: a comparison", Discussion Paper 3636, CEPR.

[23] Güell, M. (1999): "Employment protection and unemployment in an efficiency wage model", Working Paper 432, Princeton University.

[24] Güell, M. (2000): "Fixed-term contracts and unemployment: an efficiency wage analysis", Working Paper 433, Princeton University.

[25] Hopenhayn, H., and R. Rogerson (1993): "Job Turnover and Policy Evaluation: a General Equilibrium Analysis", *Journal of Political Economy*, 101, 915-938.

[26] Jimeno, J., and L. Toharia (1993): "The Effects of Fixed-term Employment on Wages: Theory and Evidence from Spain", *Investigaciones Económicas*, 27, 475-494.

[27] Lazear, E. (1990): "Job Security Provisions and Employment", *Quarterly Journal of Economics*, 105, 699-726.

[28] Ljungqvist, L. (2002): "Job Security Provisions and Employment", *Economic Journal*, 112, 829-853.

[29] Mortensen, D., and C. Pissarides (1994): "Job Creation and Job Destruction in the Theory of Unemployment", *Review of Economic Studies*, 61, 397- 415.

[30] Mortensen, D., and C. Pissarides (1999a): "Job Reallocation, Employment Fluctuations and Unemployment", in: Handbook of Macroeconomics, ed. by J. Taylor, and M. WoodfordT., chap. 18. Amsterdam: North-Holland, Amsterdam.

[31] Mortensen, D., and C. Pissarides (1999b): "New Developments in Models of Search in the Labour Market", in: Handbook of Labor Economics, ed. by O. Ashenfelter, and D. Card, chap. 39. Amsterdam: North-Holland, Amsterdam.

[32] Osuna (2005): "The Effects of Reducing Firing Costs in Spain", *Contributions to Macroeconomics*, The B.E. Journal of Macroeconomics, Berkeley Electronic Press, vol. 0(1).

[33] Saint-Paul, G. (1996): Dual Labor Markets. The MIT Pres.

[34] Wasmer, E. (1999): "Competition for Jobs in a Growing Economy and the Emergence of Dualism", *Economic Journal*, 109, 349-371.

[35] Tauchen (1986): "Statistical Properties of Generalized Method-of-Moments Estimators of Structural Parameters Obtained from Financial Market Data", *Journal of Business and Economic Statistics*, American Statistical Association, vol. 4(4), 397–416, October.