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Working-Week Flexibility: Implications for Employment and Productivity

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Abstract
This paper evaluates the effects for the Spanish case of allowing greater flexibility regarding the weekly hours worked on the working week, employment and productivity. A baseline model economy is calibrated to reproduce the cross-sectional distribution of workweeks across plants, as well as certain features of the Spanish economy. The author compares the steady-state status quo, where a forty-hour workweek is imposed and no flexibility is allowed, and the steady-state of economies with a higher degree of flexibility in weekly hours. The 2012 reform is found to preserve employment and generate a 1.72% increase in productivity. In the work-sharing scenario, the increase in employment (1.86%) comes at the expense of a lower increase in productivity (1.31%). Finally, the full flexibility scenario preserves employment and generates a substantial increase in productivity (2.6%).

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Keywords Workweek; wages; employment; productivity

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1 Introduction

What is now being referred to as the "Great Recession" has revealed the poor performance of certain labor markets across Europe, with the most striking case involving Spain. Until only recently, the Spanish labor market was one of the most dynamic in the European Area (EA). During the decade preceding the current crisis, and according to the European Union Labor Force Survey, Spain accounted for almost one-third of all the jobs created in the EA. However, during the current crisis, Spain has recorded the highest rate of job destruction, thus leading to a huge jump in unemployment from 8% in 2007 to 25% in 2012.

Given the increase in the unemployment rate, and driven by the notion of "flexicurity" (see Boeri et al. (2012) for a discussion), the present government has resorted to Executive Order 3/2012 of February 2012 to launch a far-reaching labor market reform (the 2012 reform).[1] This reform has introduced major changes in both external and internal flexibility by bringing the procedures involved closer to the modus operandi throughout the rest of Europe. Regarding internal flexibility, the 2012 reform allows for an internal devaluation by facilitating the adjustment of hours and wages to changes in a firm's economic conditions as an alternative to job destruction. For the first time, a firm may unilaterally modify working conditions, such us hours worked and wages paid, when subject to negative shocks.[2] Moreover, the reform introduces important changes in the system of collective wage bargaining agreements: first, priority has been given to firms' own collective agreements; second, opt-out clauses have been introduced for firms experiencing economic difficulties; and third, the automatic extension of collective agreements once they expire has been reduced to one year. These changes will improve the way firms adapt to changing economic conditions, thereby preserving their specific investment in human capital.

The objective of this paper is to evaluate the effects for the Spanish case of allowing greater flexibility regarding the weekly hours worked on the working

[1] The Executive Order 3/2012 has been followed by the Law 3/2012, July the sixth, of Urgent Measures to Reform the Labor Market.

[2] The Law 3/2012 establishes a maximum working week of 40 hours but allows a firm to unilaterally redistribute 10% of weekly hours on a yearly basis.

week, employment, output, productivity and wages.[3] Accordingly, application is made of a business-cycle model, developed in Osuna and Ríos-Rull (2003), where plants face idiosyncratic shocks and, consequently, the workweek varies across plants. In this model, the workweek and employment are imperfect substitutes for the following two reasons: *(i)* coordination needs (team work) or fatigue; and *(ii)* adjustments costs, modeled as congestion based commuting costs.

Teamwork in this case means that a plant can be operated only when all its workers are present, and hence the length of the workweek is common to every worker in the plant. Consequently, when a plant changes its workweek, the amount of capital available to each worker does not vary. On the other hand, when a plant changes the size of its labor force, the amount of capital available to each worker also varies. This implies that workweek length and employment are imperfect substitutes, inducing a form of decreasing returns to employment that does not apply to the workweek.

On the other hand, congestion-based commuting costs are used to impose further restrictions on the substitutability of hours and employment. Commuting implies that workers have to invest a certain amount of time before they can provide any labor services.[4] Furthermore, it is assumed here that commuting generates an externality, and that commuting costs are therefore increasing in employment.[5] The imperfect substitutability between employment and hours per worker introduces a non-convexity in the choice set considered here, following Hansen (1985) and Rogerson (1988), by assuming that agents have access to employment lotteries.

Apart from these two features, the model is a standard business cycle model, except for the inclusion of a tax on deviations above the legal workweek. A baseline model economy is calibrated to reproduce the cross-sectional distribution of workweeks across plants and households, as well as certain features of the

[3] García-Pérez and Osuna (2012) evaluate the effects of the 2012 reform concerning external flexibility.

[4] Commuting costs should not be taken literally. They stand in for all the frictions that limit the substitutability between the workweek and employment. The advantage over alternative mechanisms, such as the existence of adjustment costs to move in and out of the labor force, are the serious technical difficulties that these other frictions pose that prevent their use in models that aggregate nicely into the representative agent construct.

[5] See Osuna and Ríos-Rull (2003) for a discussion of why these further restrictions are so important to calibrate the model to the right degree of substitutability between the workweek and employment.

Spanish economy. In addition to standard steady-state properties, a further target is the relative volatility of employment and hours per worker (a business cycle statistic) to obtain a precise measurement of the parameters that govern the friction. A comparison is then made between the steady-state status quo, where a forty-hour workweek is imposed and no flexibility is allowed, and the steady-state of economies with a higher degree of flexibility in weekly hours worked: the 2012 reform, work-sharing and full flexibility scenarios. The 2012 reform is found to preserve employment and generate a 1.72% increase in productivity. In the work-sharing scenario, the increase in employment (1.86%) comes at the expense of a lower increase in productivity (1.31%) and a 4% decrease in weekly hours worked. Finally, the full flexibility scenario preserves employment and generates a substantial increase in productivity (2.6%) by allowing firms to fully adapt to changing economic conditions, by expanding or contracting the working week. As a robustness check, similar exercises are also performed for economies characterized by different degrees of teamwork and adjustment costs.

One might be concerned by the fact that the model may fail to represent the Spanish institutional setting sufficiently well because the domestic labor market was dominated by collective bargaining until the 2012 reform. In order to address this issue, a robustness test is performed on the way wages are determined by introducing some rigidity. This robustness exercise shows that the fact firms cannot pay the marginal productivity of labor, as in a perfectly competitive labor market, does not change the results substantially. Another concern involves the fact that equilibrium employment may be inefficiently high because of the commuting externality. A section is therefore devoted here to showing what the efficient allocation is and the tax on employment that could be implemented for the competitive equilibrium to be rendered efficient.

The outline of the paper is as follows. Section 2 briefly describes the baseline model without idiosyncratic shocks and then expands the model to include idiosyncratic shocks.[6] Section 3 discusses the calibration. Section 4 reports the results for the model where plants face idiosyncratic output shocks. Section 5 shows the results of the efficiency analysis. Finally, Section 6 offers some concluding remarks.

[6] A more formal description can be found in Osuna and Ríos-Rull (2003).

2 The Model

Section 2.1 describes households and preferences and Section 2.2 the technology. Sections 2.3-2.4 describe the problems firms and households solve. Section 2.5 defines equilibrium recursively in a way that is suited for computation. Sections 2.6 expands the economy to include overtime taxes. Finally, Section 2.7 extends the economy to have shocks to firm specific productivity.

2.1 Households and Preferences

There is a continuum of *ex-ante* identical agents of measure one, with preferences given by

$$E\left\{\sum_{t=0}^{\infty} \beta^t \; u(c_t, \ell_t)\right\} \tag{1}$$

where c_t is consumption and ℓ_t is leisure in period t. The instantaneous utility function is strictly concave and satisfies the Inada conditions. Finally, $\beta \in (0,1)$ is the subjective time discount factor.

An individual's time endowment in each period is one. The amount of time that can be allocated to work is $1-\ell-\eta(N)$, where $\eta(N)>0$ measures the amount of time required for commuting to work every period that the individual is employed, and where N is aggregate employment. It is assumed that there is congestion which creates a negative externality in employment. In particular, it is assumed that $\eta(N)>0$, and $\eta'(N)>0$. Notice that $\ell(h,N)$ is not a continuous function since if hours worked are zero, no commuting is needed. This introduces a non-convexity.

2.2 Plant's Technology

Production takes place in plants of which there may be a large number. Moreover, new plants can be opened at zero costs. Plants are operated during a number of hours that is the same for all workers. Plants also use capital and they are restricted to have one shift.[7] The plant's production function f can be written as

$$f(z,h,k,n) = zh^{\xi}\, k^{1-\theta}\, n^{\theta} \tag{2}$$

[7] This technology is chosen to capture the effect of pick demands on firm's labor demand.

where h denotes the workweek, n employment and k the amount of capital. Variable z represents total factor productivity and is used to incorporate shocks to productivity that are assumed to follow a first order Markov process. Capital depreciates geometrically at rate δ.

2.3 The Firms' Problem

The problem of a firm with an h hour workweek is the following

$$\max_{k,n} \; z h^{\xi} k^{1-\theta} n^{\theta} - k(r+\delta) - n\, w_h \tag{3}$$

where r is the rental rate of capital (the interest rate) and w_h the salary paid to a worker who works for h hours. Note that given the workweek, plants are subject to constant returns to scale. This implies that the size of a firm can be normalized to have one employee working h hours. For any given r, the following equation can be solved

$$\max_{k} \; z h^{\xi} k^{1-\theta} - k(r+\delta) - w_h \tag{4}$$

with solution given by $k(z,h,r)$. Given free entry, the zero profit condition requires that the salary for workweek w_h satisfies

$$0 = z h^{\xi} \left[k(z,h,r)\right]^{1-\theta} - k(z,h,r)(r+\delta) - w_h \tag{5}$$

2.4 Households Choices

Households choose probabilities over a per-period consumption possibility, C, that is indexed by aggregate employment in the period.[8]

$$\begin{aligned} X(N) = \{ \quad & x \text{ is a probability, } i.e.\, x \geq 0, \text{ and } x(C) = 1, \\ & \text{If } h \in (0,1], \text{ and } x([0,\bar{c}],[h,1]) > 0, \text{ then } h \leq 1-\eta(N)\}. \end{aligned} \tag{6}$$

[8] In this economy with non-convexities, there are efficiency gains from the introduction of lotteries. See Hansen (1985), Rogerson (1988) and Prescott and Ríos-Rull (1992) for earlier applications of lotteries to labor contracts.

A household that chooses x has indirect instantaneous utility function given by

$$U(x,N) = \int_C u[c,\ell(h,N)]\ dx. \tag{7}$$

The budget constraint is

$$\int_C c\, x(dc,[0,1])\ + a' = (1+r)\ a + \int_C w_h\, x([0,\bar{c}],dh) \tag{8}$$

where a denotes households assets and a' savings. Since working does not have dynamic implications (a period later agents with wealth a' are identical regardless of what was the labor situation today) all agents with the same assets choose the same savings independently of the outcome of the lottery.

For computational reasons, it is convenient to define an indirect current return function R that takes as given the saving behavior of the household and solves for the optimal x. This static household problem given the saving behavior is

$$R(a,N,w_h,r,a') = \max_{x \in X(N)} \qquad U(x,N) \tag{9}$$

$$\text{s.t.} \qquad \int_C c\, x(dc,[0,1])\ + a' = (1+r)\ a + \int_C w_h\, x([0,\bar{c}],dh)$$

where $x(a,N,w_h,r,a')$ is the optimal choice for a household with a assets, that saves a', when aggregate employment is N, and prices are given by function w_h and by r. An important property of $x(a,N,w_h,r,a')$ is that it has positive mass in at most two points[9], one of which is $\{c,0\}$ where $c \in [0,\bar{c}]$. Let $h(a,N,w_h,r,a')$ denote the point with positive mass in $h > 0$ and let $n(a,N,w_h,r,a')$ denote the mass at that point.

[9] This is a property derived from a standard result in linear programming (see Hornstein and Prescott (1993) for the details).

2.5 The Recursive Problem

Equilibrium is defined recursively. The aggregate state variables are total factor productivity z and aggregate capital K. The household's individual asset level a is also part of the individual state vector. Households use functions $\{\phi_r, \phi_{w_h}, G_K, G_N\}$ to compute the values for $\{r, w_h, K', N\}$ needed to solve their maximization problems. The value function is

$$v(z,K,a;\phi,G) = \max_{a'} R(a,N,w_h,r,a') + \beta\ E\left\{v(z',k',a';\phi,G)|z\right\}$$

$$\begin{aligned} &\text{s.t.} \\ r &= \phi_r(z,K) \\ w_h &= \phi_w(z,K,h) \\ K' &= G_K(z,K) \\ N &= G_N(z,K) \\ H &= G_H(z,K) \end{aligned}$$

Let $a' = g_a(z,K,a;\phi,G)$ denote the solution to this problem. Substitution of this solution in Equation (9) yields $x(z,K,a;\phi,G)$, and given that the solution to this problem has mass in at most two points, it also yields $h = g_h(z,K,a;\phi,G)$ and $n = g_n(z,K,a;\phi,G)$.

Definition 1 *A recursive competitive equilibrium is a set of decision rules for households $\{g_a, g_h, g_n\}$, a value function v, functions for aggregate variables $\{G_K, G_H, G_N\}$, for the interest rate $\phi_r(z,K)$, a wage schedule function $\phi_w(z,K,h)$, a measure of firms $\Psi(z,K)$, and a capital renting policy of the plants $k(z,r,h)$ such that* i) *the decision rules and value function satisfy $v(z,K,a;\phi,G)$,* ii) *the agent is representative, i.e. $g_a(z,K,K;\phi,G) = G_K(z,K)$, $g_h(z,K,K;\phi,G) = G_H(z,K)$ and $g_n(z,K,K;\phi,G) = G_N(z,K)$,* iii) *plants choose capital optimally and have zero profits,* i.e. *they solve Equations (4) and (5),* iv) *the labor market clears,* i.e., Ψ *has mass in only one point with positive hours worked which is given by $G_H(z,K)$ and $\Psi[z,K,G_H(z,K)] = G_N(z,K)$, and* v) *the market for capital clears, $K = \Psi[z,K,G_H(z,K)]\ = \dot{k}[z,\phi_r(z,K),G_H(z,K)]$.*

A steady-state for a deterministic version of this economy (a fixed value of total factor productivity $\bar{z}$) is a just a number K^* such that, when substituted in the above general definition of recursive equilibrium, satisfies

$$K^* = G_K(\bar{z}, K^*), \tag{10}$$

in addition to all the requirements above.

2.6 The Economy with Overtime Taxation

An overtime tax is a policy $\tau(\bar{h}, h)$ such that if $h > \bar{h}$ then firms have to pay $\tau(\bar{h}, h) \cdot \hat{w}_h$ to the government, where $\hat{w}_h$ is the total payment that the firm has to make, $\hat{w}_h = w_h + \tau(\bar{h}, h) \cdot \hat{w}_h$. Equation (3) becomes

$$\max_{k,n} \; z h^{\xi} k^{1-\theta} n^{\theta} - k(r+\delta) - n[\, w_h + \tau(\bar{h}, h) \cdot \hat{w}_h] \tag{11}$$

Equations (4) and (5) also change in a similar fashion. An important feature of the computational procedure is that all the relevant objects that an agent face are differentiable. Therefore, the first derivatives can be used to help characterize the solution. In particular, note that function τ is differentiable at $h = \bar{h}$. The properties of this function are that $\tau(\bar{h}, h) = 0$ if $h \leq \bar{h}$, $\tau(\bar{h}, h) > 0$ if $h > \bar{h}$, $\lim_{h \to 1} = \bar{\tau}$, $\frac{\partial \tau(\bar{h}, h)}{\partial h}$ is non decreasing.[10] Finally, it is assumed that all the proceeds of the overtime tax are redistributed lump sum to the households. In addition to the changes in the profit function of firms and in the budget constraint of the household, the following balanced budget condition for the government has to be added to the definition of equilibrium

$$T(z, K) = \tau[\bar{h}, G_H(z, K)]. \tag{12}$$

2.7 The Heterogeneous Workweek Model

This section extends the baseline economy by adding shocks to firm's specific productivity to show the importance of having plant level flexibility regarding the number of hours worked. It is assumed that plants are subject to transitory shocks

[10] See Appendix B and Fig. B1 in Osuna and Ríos-Rull (2003) for the tax function's details.

to plant level productivity, revealed after the workers have been hired but before production takes place, and independent from the economy wide productivity shock.[11] Consequently, the only margin that can be used to exploit this additional productivity change is to vary the plant's workweek, inducing cross-sectional variation of workweeks across plants. In this framework penalizing deviations from the legal workweek adversely affects the flexibility of firms to adjust their labor input to temporary changes in productivity (or demand).

The new plant level production function is given by

$$z s h^{\xi} k^{1-\theta} n^{\theta} \tag{13}$$

where all variables are as before except for the plant specific shock, s. The shock takes only finitely many values $s \in \{s_1, \cdots, s_{m_s}\}$ and is drawn from probability distribution γ_s. This extension requires the indexation of agents' choices by the possible realizations of the shock, and also the firm's problem has to be rewritten as

$$\max_k \; z k^{1-\theta} \sum_s \gamma_s \; s \; h(s)^{\xi} - k(r+\delta) - w_{\{h(s)\}} \tag{14}$$

with solution given by $k(z, \{h(s)\}, r)$.

The zero profit condition requires that for each vector $\{h(s)\}$, the salary $w_{\{h(s)\}}$ satisfies

$$0 = z\,[k(z, \{h(s)\}, r)]^{1-\theta} \sum_s \gamma_s \; s \; h(s)^{\xi} - k(z, \{h(s)\}, r)(r+\delta) - w_{\{h(s)\}} \tag{15}$$

The rest of the changes to adapt the model to the case with idiosyncratic shocks to firms is a tedious minor variation of the equations described above and are omitted for brevity.

3 Calibration

The model without idiosyncratic shocks is standard in all dimensions except for the existence of team work, the externality based commuting costs and the overtime tax.

[11] This shock could be interpreted as a demand shock, but it is simpler to specify it as a plant specific productivity shock.

Team work is described by the parameter ξ. When the team work parameter is equal to the labor share, $\xi = \theta$, the technology is the standard Cobb-Douglas case where hours and employment are perfect substitutes. When $\xi = 1$, the technology is linear: an increase in the workers' workweek results in an increase of output of the same proportion. This last case can be interpreted as an extreme case of team production or a case where workers are not subject to fatigue.

Regarding the externality based commuting cost, it is assumed here that time spent in commuting is described by function $\eta(N) = A_N N^{\lambda}$, with properties $\eta(N) > 0$, and $\eta'(N) > 0$.

With regard to the rest of the model, the time period is chosen to be a quarter and household preferences are the standard Cobb-Douglas function in consumption and leisure

$$U(c_t, \ell_t) = \frac{\left[c_t^{\alpha}\, \ell_t^{1-\alpha}\right]^{1-\sigma} - 1}{1-\sigma} \tag{16}$$

where $0 < \alpha < 1$ and $\sigma > 0$.

Therefore, the model without idiosyncratic shocks has ten parameters (see Table 1). Two of those parameters characterize the process for the Solow residual, the auto-regressive coefficient ρ and the variance of the shock σ_{ε}, whose values are taken from Ortega (1998). The baseline model has eight additional parameters: ξ, θ, δ, β, α, σ, A_N and λ that are calibrated imposing the following conditions:

1. The Spanish labor share: 63%.

2. The Spanish steady-state yearly real interest rate of 1% .

3. The Spanish steady-state consumption to output ratio: 0.75.

4. The Spanish steady-state fraction of the working-age population who work: 62% in the period 2000–2011.[12]

5. A 40 hour workweek.[13] It is assumed that out of the 168 hours each week, 68 are devoted to sleep or personal care. This implies that workers work 40% of their time.

[12] The source of this data is the Spanish Labor Force Survey 2005–2011 (see http://www.ine.es).
[13] The source of this data is the Spanish Labor Force Survey 2005–2011.

Table 1: Baseline Economy Parameters

rho	σ_ε	ξ	A_N	λ	α	σ	δ	θ	β
0.95	0.007	.85	1.2	6.75	.3	1.5	.025	.63	.99

6. The percentage variation of usual workweek hours and standard hours amounts to 2.57%.[14]
7. The Spanish relative volatility of hours and employment is 0.6 (see Ortega (1998).[15]
8. Average commuting time of 6 hours a week (40 minutes each way).[16]

3.1 Calibration of the Heterogeneous Workweek Economy

The calibration of the heterogeneous workweek version of the model involves the use of the cross-sectional distribution of workweeks of individuals, as reported by the Spanish Labor Force Survey over the 2005–2011 period, with use made of effective weekly hours: those hours that individuals report having worked in the reference week (see Table 2). The underlying assumption is that the cross-sectional distribution of workweeks in the data should provide an indication of the desired degree of flexibility regarding the workweek. That is, it is assumed in the data that

[14] The source of this data is the Spanish Labor Force Survey 2005–2011.

[15] A natural question in this context is to what extent can business cyles variation be informative about the substitutability between hours and employment, and how does it relate to alternative measurement procedures that draw on microeconomic observations to calibrate. See Osuna and Ríos-Rull (2003) for a justification of the validity of this calibration strategy.

[16] The source of this data is the Time Use Survey conducted by the National Statistics Institute.

Table 2: Weekly Hours Given $h_{legal} = 40$

$h_{legal} = 40$	h_{eff}	$\%obs$	h_{us}	$\%obs$
$\bar{h}_{h<40}$	29.4	7.4%	34.7	0.6%
$\bar{h}_{h=40}$	40	79.2%	40	87.6%
$\bar{h}_{h>40}$	47.4	13.4%	47.3	11.8%

$\bar{h}_{h<40}$: average working week conditional upon working less than 40 hours and upon having a 40-hour legal workweek; h_{eff} and h_{us}: effective and usual working week.

firms are free to set a particular working week, but once this working week has been chosen, deviations are not allowed under the status quo.[17]

Table 2 shows average effective and usual workweek hours for those that worked less than, equal to, and more than forty hours a week, conditional upon having a forty-hour legal workweek. Table 2 shows that 7.4% declared working almost 30 hours in the reference week, although their usual hours were almost 35. A tabulation of the reasons for working less than the prescriptive hours in the reference week reveals that almost 70% of the cases are due to holidays. Moreover, 19% report having those differences because of "summer working time and flexible working time arrangements or similar". Since these two reasons are combined in the same item, it is not possible to know how much of the difference can be accounted for by flexible working time arrangements. In fact, there is an item in the questionnaire considering reductions in the working week due to technical or economic reasons, and only 0.07% report working less because of this. Based on this evidence, it can be concluded that firms might be institutionally very constrained when reducing the number of hours in response to shocks to productivity or demand. The fact that only 0.6% of the workers experienced differences between their usual and legal hours reinforces this conclusion.

[17] The fact that the Spanish labor market was strictly regulated during the period 2005–2011 does not mean that hours could not be freely chosen when the match between the firm and the worker was formed, but that once these hours were stipulated in a contract, they could not be easily changed.

Regarding the degree of flexibility above the legal workweek, the evidence is slightly different. Table 2 shows that 13.4% reported working 47.4 weekly hours in the reference week, conditional upon having a forty-hour legal workweek. The numbers are very similar if we look at usual hours and the percentage of people that reported normally working more than the legal workweek. This indicates that overtime seems to be the usual way of adjusting to changes in economic conditions. If we now look at the reasons for working more, 85% reported having done so as overtime.

In order to calibrate the model, a computation is made of the average effective weekly hours for those who work less than, equal to, and more than forty hours a week, as well as the percentage of workers in each one of these groups (see Table 3). These percentages are used as the weights for a three-valued idiosyncratic process. The values of the three shocks are determined so that the model replicates the percentage deviation of each one of the previously computed workweek averages with respect to the average for the whole sample in a scenario where firms are free to change the working week when hit by a productivity shock. The calibrated cross-sectional distribution of hours is such that 21% work 1.16 mean hours, 63% work 0.99 mean hours and 16% work 0.79 mean hours.

An alternative strategy would be to use the same degree of flexibility found for the USA in Osuna and Ríos-Rull (2003), assuming that the US economy better represents the desired degree of flexibility regarding the workweek. In fact, the workweek distribution for the USA turns out to be very similar (30.6, 39.2 and 45.7 hours) to the calibrated cross-sectional hour distribution found for the Spanish case (32, 40, and 48 hours).

The difference, though, is in the weights. For the US case, the sample has been divided into three equally sized groups, and then the average working week in each group has been computed, along with the deviations from the legal workweek as explained above. If the same procedure is followed (dividing the sample into three equally sized groups) using the Spanish data, the variability of the cross-sectional distribution is largely reduced, from 32–40–48 hours to 36–40–46 hours. Based on the evidence provided here, the resulting cross-sectional distribution is not consistent with the actual degree of desired flexibility, which is why this alternative strategy is not used.

Table 3: Workweek Distribution

	h_{eff}	$\%obs$	$\frac{h_{eff}}{\bar{h}}$	h_{model}	$\frac{h_{model}}{\bar{h}}$
$\bar{h}_{h<40}$	32	16%	0.67	31.8	0.79
$\bar{h}_{h=40}$	40	63%	0.98	40	0.99
$\bar{h}_{h>40}$	47	21%	1.17	46.5	1.16
$\bar{h}$	40.2	–	–	40.1	–

$\bar{h}_{h<40}$: average workweek conditional upon working less than 40 hours;
h_{model}: calibrated workweek distribution; $\bar{h}$: weighted average working week;

It should be noted that the strategy followed implies that good and bad shocks have less weight in the simulations than the alternative strategy because these weights are related to the proportion of people with hours above and below the forty-hour working week. This is consistent with the Spanish data because the strategy reproduces the cross-sectional workweek distribution and, at the same time, reflects a lower degree of flexibility than in the US case because of the lower weights attached to good and bad shocks.

4 Main Findings

This section reports on the steady-state implications that allowing greater flexibility regarding the weekly hours worked have on the workweek, employment, output, productivity, and wages for the heterogeneous workweek model economy. Three scenarios are presented, along the steady-state of the pre-reform economy, the status quo (SQ), where a forty-hour workweek is imposed ($\bar{h} = 40$) and no flexibility is allowed. In the first case, the 2012 reform scenario, firms are allowed to deviate by 10% from the established working week. In the second case, the work-sharing scenario, the degree of flexibility is restricted solely by penalizing long workweeks through overtime taxes. Finally, in the third case, the full flexibility scenario, total flexibility is permitted in the weekly hours worked. As part of the robustness tests, similar exercises are also performed for economies characterized by different degrees of teamwork, adjustment costs and wage rigidity.

4.1 Baseline Steady-State Findings

The middle panel in Table 4 shows the results of the above mentioned scenarios for the baseline economy. In the 2012 reform scenario, a minimum of 36 weekly hours is imposed, and the tax is sought so that the weekly hours worked are no more than 44 hours, whereby the average weekly hours are the prescriptive ones (40), and do not deviate by more than 10% from the established working week. The tax on overtime is 8%. The reform does not affect aggregate employment because average weekly hours do not change. Capital and, therefore, output and average consumption increase (by 1.53%) because the flexibility to adapt to the changing economic conditions induced by the reform allows a firm to allocate hours in a more productive way: that is, increasing hours when hit by a positive shock and decreasing hours in the opposite case. Given the increase in output and the constancy of hours and employment, both productivity and wages increase by the same amount, 1.72%.

As regards the work-sharing scenario, the minimum threshold for weekly hours worked is removed, thereby allowing for complete downward flexibility, while at the same time, deviations above 44 hours are penalized through overtime taxes. This situation is referred to as the work-sharing scenario because the increase in employment (1.86%) comes at the expense of a lower increase in productivity (1.31%) compared to the 2012 reform scenario. It also implies a decrease in average weekly hours (by 4%), capital, and output (by 0.82%) because firms take advantage of the full downward flexibility by reducing the weekly hours worked (by 23.8%) when they are less productive, but do not significantly increase hours (9.3%) when hit by a positive shock, surrendering the gains in productivity of an increase in hours worked when they are more productive because overtime is penalized. On the other hand, wages and average consumption fall due to the decrease in output and the increase in employment. Clearly, the higher the tax, the greater the intensity of the work-sharing policy.

In the full flexibility scenario, the liberalization of hours worked induces households to decrease the number of weekly hours worked by 1.47% (from 40 to

Table 4: S-S Effects - Team Work

$\xi = .82$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	37.5	-6.34	37.8	-5.67
h^h	40.0	44.0	9.52	43.9	9.56	44.7	11.04
h^m	40.0	40.0	0	38.4	-4.09	38.5	-3.94
h^l	40.0	36.0	-10.5	30.2	-27.9	30.3	-27.7
N	62.7	62.6	-0.20	64.6	3.05	64.4	2.66
H	25.1	25.0	-0.20	24.3	-3.29	24.3	-3.01
Y	1.00	1.01	1.45	0.98	-2.30	0.98	-1.72
Y/H	1.00	1.02	1.65	1.01	0.99	1.01	1.29
w_h	0.76	0.78	1.65	0.72	-5.36	0.73	-4.38
$\xi = .85$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	38.4	-4.00	39.4	-1.47
h^h	40.0	44.0	9.52	43.9	9.34	46.4	14.9
h^m	40.0	40.0	0	39.9	-0.27	40.1	0.32
h^l	40.0	36.0	-10.5	31.5	-23.8	31.7	-23.3
N	62.7	62.6	-0.20	63.9	1.86	62.8	0.24
H	25.1	25.0	-0.20	24.5	-2.13	24.8	-1.23
Y	1.00	1.02	1.53	0.99	-0.82	1.01	1.36
Y/H	1.00	1.02	1.72	1.01	1.31	1.03	2.59
w_h	0.73	0.74	1.72	0.71	-2.73	0.74	1.12
$\xi = .88$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	39.4	-1.48	41.1	2.68
h^h	40.0	44.0	9.52	44.0	9.52	48.3	18.7
h^m	40.0	40.0	0	41.4	3.49	41.8	4.51
h^l	40.0	36.0	-10.5	32.8	-19.7	33.2	-18.7
N	62.7	62.6	-0.20	63.0	0.46	61.1	-2.48
H	25.1	25.0	-0.20	24.8	-1.02	25.1	0.20
Y	1.00	1.02	1.60	1.00	0.89	1.05	4.46
Y/H	1.00	1.02	1.80	1.02	1.92	1.04	4.26
w_h	0.70	0.71	1.80	0.70	0.35	0.75	6.94

$\bar{h}$:average working week; h^h,h^m,h^l: working week in the high, medium and low productivity state; H: total hours worked; Y: output; Y/H: productivity; N: employment; w_h: wages.

39.4) because firms find it optimal, on the one hand, to reduce the hours worked by 23% when hit by a negative shock and, on the other, increase the hours worked by 15% when the opposite happens. Capital, output and average consumption increase by 1.36% because the flexibility induced by the policy allows a firm to allocate hours so as to maximize productivity. As a consequence, wages and productivity increase by 1.12% and 2.59%, respectively. This scenario can be viewed as one that preserves employment and generates an important increase in productivity by allowing firms to fully adapt to changing economic conditions (expanding or contracting the working week). Compared to previous scenarios, this is the best option in terms of increased productivity (and the second best in terms of employment), albeit at the expense of increasing inequality, measured as the standard deviation of consumption, 2.71%.

4.2 Robustness

Degree of Teamwork

The role of the teamwork parameter in shaping the findings is explored here by considering two additional economies, one with a lower ξ and another with a higher ξ, whose results are also shown in Table 4. The $\xi = .82$ economy might involve sectors where jobs are subject to a high degree of fatigue (or to a low need to coordinate activities) and, consequently, where it is better to increase employment instead of making the workers work for longer hours. When this is the case, both the work-sharing and full flexibility scenarios record a higher increase in employment, 3.05% and 2.66%, respectively, and a bigger decrease in weekly hours, 6.34% and 5.67%, respectively.[18]

For instance, the liberalization of weekly hours (full flexibility scenario) implies larger reductions in the number of hours worked when the firm is hit by an adverse idiosyncratic shock, 27.7%, as opposed to 23.3% in the baseline, and 18.7% in the high ξ economy, and higher employment gains of 2.66%. In fact, in the full flexibility scenario, employment decreases for a sufficiently high ξ, and weekly hours increase as firms exploit the possibility of making people work longer

[18] Recall that in the first scenario, employment does not vary because weekly hours must average to 40 hours on a yearly basis.

hours when hit by a positive shock (or by peak demands) because hours are very productive relative to employment, and also because an increase in hours is not penalized by overtime taxes. However, in the work-sharing scenario, weekly hours do not increase even for a high ξ because overtime taxes prevent a substantial increase in hours, and downward adjustment is flexible.

Regarding other variables of interest, output increases in both the first and third scenarios for ξ above the baseline value (in the second scenario only for a sufficiently high ξ). The increase in output is greater as ξ is higher, because hours are more productive relative to employment, and this effect tends to increase capital and, therefore, output, wages and average consumption. For a sufficiently low ξ in both the second and third scenarios, the opposite is true: capital and average weekly hours worked decrease, and employment does not compensate for this because adjustment costs prevent employment from growing faster, so output, wages and average consumption decrease.

Finally, productivity increases in every scenario and for any ξ, but at a lower rate the lower the ξ is. It should be noted that productivity in the full flexibility scenario for the high ξ economy increases despite the rise in total hours because output increases substantially.

The policy implication of this analysis is that policies of this kind, designed to increase productivity, could reduce employment if the degree of teamwork is sufficiently high. In other words, the higher the difference between the labor share (θ) and degree of teamwork (ξ), the more attractive it is to raise labor input by increasing the workweek instead of employment.

Degree of Adjustment Costs

To explore the role of the adjustment costs parameter, Table 5 shows the results for two additional economies, one with a larger degree of adjustment costs ($\lambda = 6$), and another with a lower one ($\lambda = 7.5$).

The quantitative effects of varying λ in the 2012 reform scenario are exactly the same as those in the pre-reform case because weekly average hours and employment do not change, so adjustment costs have no role to play. The key difference,

Table 5: S-S Effects - Adjustment Costs

$\lambda = 6$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	38.8	-3.11	39.8	-0.40
h^h	40.0	44.0	9.52	44.0	9.63	46.8	15.6
h^m	40.0	40.0	0	40.3	0.68	40.5	1.36
h^l	40.0	36.0	-10.5	32.0	-22.2	32.2	-21.6
N	60.8	60.7	-0.19	61.6	1.34	60.6	-0.38
H	24.3	24.3	-0.19	23.9	-1.78	24.1	-0.78
Y	1.00	1.02	1.53	1.00	-0.25	1.02	2.18
Y/N	1.00	1.02	1.72	1.02	1.52	1.03	2.96
w_h	0.73	0.74	1.72	0.72	-1.65	0.75	2.55
$\lambda = 6.75$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	38.4	-4.00	39.4	-1.47
h^h	40.0	44.0	9.52	44.0	9.34	46.4	14.9
h^m	40.0	40.0	0	39.9	-0.27	40.1	0.32
h^l	40.0	36.0	-10.5	31.5	-23.8	31.7	-23.3
N	62.7	62.6	-0.20	63.9	1.86	62.8	0.24
H	25.1	25.0	-0.20	24.5	-2.13	24.8	-1.23
Y	1.00	1.02	1.53	0.99	-0.82	1.01	1.36
Y/N	1.00	1.02	1.72	1.01	1.31	1.03	2.59
w_h	0.73	0.74	1.72	0.71	-2.68	0.74	1.12
$\lambda = 7.5$	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	38.2	-4.68	39.1	-2.40
h^h	40.0	44.0	9.52	43.9	9.34	46.2	14.3
h^m	40.0	40.0	0	39.6	-1.13	39.8	-0.59
h^l	40.0	36.0	-10.5	31.0	-25.2	31.2	-24.7
N	64.3	64.2	-0.20	65.8	2.28	64.8	0.81
H	25.7	25.7	-0.22	25.1	-2.42	25.3	-1.61
Y	1.00	1.02	1.52	0.99	-1.22	1.01	0.74
Y/N	1.00	1.02	1.72	1.01	1.18	1.02	2.33
w_h	0.73	0.74	1.72	0.70	-3.55	0.73	-0.07

however, is the initial level of employment. The lower the value of λ, the greater the adjustment costs and, therefore, the lower the initial employment level.

The qualitative effects of varying λ in the work-sharing scenario are the same for all the variables of interest. The higher the value of λ, the lower the productivity gains and the greater the increase in employment and the decrease in weekly hours, total hours, output, productivity and wages. The reason is that lower adjustment costs make the hour adjustment margin relatively more expensive, entailing less adjustment in hours when firms are subject to changes in economic conditions. Finally, output and productivity increase in the full flexibility scenario, whereas weekly and total hours decrease both for the low and high λ economies. These changes are greater in step with higher adjustment costs (the lower the value of λ), as hours are then cheaper relative to employment, and firms take advantage of the flexibility in allocating hours, as well as of the corresponding productivity gains.[19] Employment may therefore decrease for a sufficiently low λ.

Wage Rigidity

One could argue that even after the 2012 reform the Spanish labor market is still quite regulated, and a long way from a competitive labor market with respect to the determination of wages. In order to address this issue, a robustness exercise is performed by introducing some rigidity in the way wages are determined. In particular, firms are forced to pay the same wage no matter what the idiosyncratic shock is. Table 6 shows the results of the baseline model for an economy with rigid wages (see the lower panel). To facilitate the comparison, the upper panel in Table 6 reproduces the results for the baseline economy, with flexible wages shown in Table 4.

This robustness exercise shows that the fact firms cannot pay the marginal productivity of labor, as in a perfectly competitive labor market, does not change the allocation of hours. The burden of the adjustment is placed on employment. Both employment and output are lower when wages are rigid; however, the change

[19] The result of a higher productivity increase for lower values of λ (higher adjustment costs) might not follow if both a dual labor market with permanent and temporary contracts differing in severance costs and firm's specific investment is modeled (see García-Pérez and Osuna (2012) for a discussion.)

Table 6: Flexible vs. Rigid Wages

Flexible wages	SQ	Ref.2012	%var	Worksh.	%var	Full flex.	%var
$\bar{h}$	40.0	40.0	0	38.4	-4.00	39.4	-1.47
h^h	40.0	44.0	9.52	43.9	9.34	46.4	14.9
h^m	40.0	40.0	0	39.9	-0.27	40.1	0.32
h^l	40.0	36.0	-10.5	31.5	-23.8	31.7	-23.3
N	62.7	62.6	-0.20	63.9	1.86	62.8	0.24
H	25.1	25.0	-0.20	24.5	-2.13	24.8	-1.23
Y	1.00	1.02	1.53	0.99	-0.82	1.01	1.36
Y/H	1.00	1.02	1.72	1.01	1.31	1.03	2.59
w_h	0.73	0.74	1.72	0.71	-2.73	0.74	1.12
Rigid Wages	**SQ**	**Ref.2012**	**%var**	**Worksh.**	**%var**	**Full flex.**	**%var**
$\bar{h}$	40.0	40.0	0	38.4	-4.00	39.4	-1.47
h^h	40.0	44.0	9.52	43.9	9.34	46.4	14.9
h^m	40.0	40.0	0	39.9	-0.27	40.1	0.32
h^l	40.0	36.0	-10.5	31.5	-23.8	31.7	-23.3
N	62.7	61.4	-2.01	63.0	0.59	61.7	-1.51
H	25.1	24.6	-2.01	24.2	-3.41	24.3	-2.95
Y	1.00	1.00	-0.30	0.98	-2.12	1.00	-0.37
Y/H	1.00	1.02	1.72	1.01	1.31	1.03	2.60
w_h	0.73	0.74	1.71	0.71	-2.70	0.74	1.14

with respect to the baseline case implies that the model's results are fairly robust to the way wages are determined.

On the other hand, the fact that the model abstracts from collective bargaining does not play a major role for the following reason: in the status quo, hours are not allowed to deviate. In that sense, the market is "strictly regulated", and the fact that wages are determined in a competitive way matters little because hours are fixed and the employment rate is calibrated. The lack of this element might matter more in exercises where hours can be adjusted, which could be interpreted as a relaxation of these "strict regulations". Nonetheless, as argued in the introduction, the 2012 reform has introduced substantial changes in the system of collective wage bargaining agreements. In fact, the reform has allowed an internal devaluation by facilitating the adjustment of hours and wages to changes in a firm's economic conditions as an alternative to job destruction. For the first time, a firm is able to unilaterally modify working conditions, such us hours worked and wages paid, when subject to negative shocks. These changes more closely resemble a competitive labor market than one with very powerful unions. In fact, since the 2012 reform was put in place wages are more responsive to the cycle. This was not the case at the beginning of the crisis, when wages followed a countercyclical pattern (see Figure 1).

5 Efficiency Analysis

As explained in Section 2.1, the amount of time that can be allocated to work is $1 - l - \eta(N)$, where l is leisure time and $\eta(N) = A_N N^{\lambda}$ is time spent in commuting. The fact that the latter depends on the number of workers implies there is a negative externality and the equilibrium allocation is inefficient. Since all workers take N as given, in equilibrium the number of workers is larger than the efficient number and, consequently, the workweek is shorter. This section specifies the efficient allocation and the tax on employment that could be implemented for the competitive equilibrium to be efficient. This exercise is performed solely for the full flexibility scenario, since the others are inefficient for further reasons: the

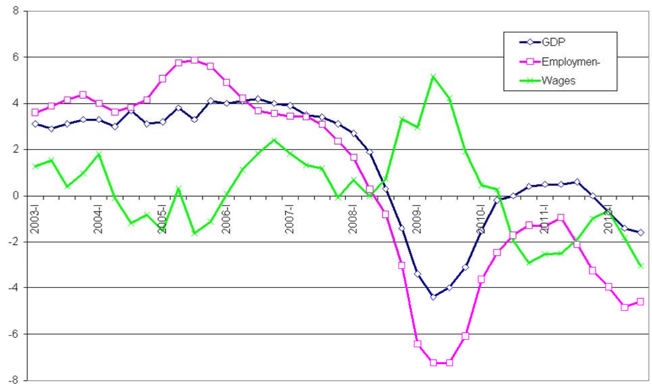

Figure 1: Employment and Real Wages

status quo is inefficient since hours are not allowed to change, and the 2012 reform and the work-sharing scenario are inefficient because of the tax on overtime.[20]

In order to compute the efficient allocation, the externality needs to be internalized. This implies that function η needs to be altered in the following way: $\eta(n) = A_N n^{\lambda}$, where aggregate employment N has been substituted by individual employment n. Table 7 shows the changes in employment and the distribution of hours once the externality has been internalized. As expected, employment decreases, and the distribution of hours shifts upward because agents no longer take employment as given.

In order to implement this efficient solution in the original model (the one with the externality), a tax on employment needs to be imposed. A tax proportional to employment is a policy $n\kappa$, whereby firms pay κ to the government for every worker they hire, where $n(w_h + \kappa)$ is the total payment the firm has to incur.

[20] The author thanks an anonymous referee for this suggestion.

Table 7: Efficiency Analysis

$\xi = .82$	With externality $\eta(n) = A_N N^{\lambda}$	Without externality $\eta(n) = A_N n^{\lambda}$	With externality $\kappa = .13$
$\bar{h}$	37.8	50.3	45.1
h^h	44.7	56.6	51.9
h^m	38.5	51.0	45.8
h^l	30.3	43.3	37.6
N	64.4	50.4	50.2
Y/H	1.00	1.08	1.05
$\xi = .85$	$\eta(n) = A_N N^{\lambda}$	$\eta(n) = A_N n^{\lambda}$	$\kappa = .115$
$\bar{h}$	39.4	51.0	46.3
h^h	46.4	57.4	53.1
h^m	40.1	51.7	47.0
h^l	31.7	43.9	38.7
N	62.8	49.5	49.5
Y/H	1.00	1.09	1.06

Equation (3) becomes

$$\max_{k,n} \; z h^{\xi} k^{1-\theta} n^{\theta} - k(r+\delta) - n(w_h + \kappa) \tag{17}$$

Equations (4) and (5) also change in a similar fashion. Given that $x(z,K,a;\phi,G)$ has positive mass in at most two points, for convenience the static household problem is rewritten in a simpler way

$$\max_{c0,c1,n} \; nU(c1, 1-h-\eta) + (1-n)U(c0,1) \tag{18}$$

$$\text{s.t. } nc1 + (1-n)c0 + a' = (1+r)a + w_h n + N\kappa \tag{19}$$

where $N\kappa$ stands for a lumpsum subsidy, since the proceeds from the tax on employment are assumed to be redistributed in a lump sum way to the households.

Table 7 shows that the efficiency of the competitive equilibrium requires κ to be set at .115, which implies a 13% tax on the total payment that a firm has to incur. It should be noted that in the scenario where the externality is not internalized because the average number of hours is lower and employment is higher, productivity is lower than in the scenarios where either there is no externality or the externality is internalized by means of the employment tax.

Clearly, the magnitude of the differences in productivity depends largely on the extent of teamwork, measured by parameter ξ. The higher the difference between the labor share θ and the degree of team work ξ, the more attractive it is to increase the labor input by extending the workweek instead of increasing employment, with the differences in productivity between the scenario with the externality and the other two being greater. For the same reason, the employment tax needed to implement the efficient solution will be higher as ξ is lower. Finally, there is an important element that is missing from the model, and which could be relevant for efficiency considerations, namely, the effect of unemployment on a worker's human capital.[21] The consideration of this effect is beyond the scope of this paper, whose main focus is on quantifying the trade-offs between employment and productivity, but it would of course provide a rationale for implementing policies that generate an inefficiently high employment rate .

6 Conclusion

This paper has looked at the implications for the working week, employment, output, productivity and wages of a policy that promotes internal flexibility by allowing firms to adapt the workweek and wages to changes in economic conditions. As the Law 3/2012 on Urgent Measures for Reforming the Spanish Labor Market makes explicit in its preamble, the objective is to promote a firm's internal flexibility as an alternative to job destruction.

The imperfect substitutability between hours per worker and employment has been modeled by means of teamwork and an externality-based commuting cost. As argued in Osuna and Ríos-Rull (2003), it is important to have a correct measurement of this degree of substitutability in the model to give an accurate assessment of the implications of these policies.

[21] The author thanks an anonymous referee for this comment.

The model economy has been calibrated so that it reproduces the cross-sectional distribution of workweeks and certain features of the Spanish economy. A comparison has then been made between the steady-state status quo, where a forty-hour workweek is imposed and no flexibility is allowed, and the steady-state of economies with a higher degree of flexibility in weekly hours worked: the 2012 reform, and the work-sharing and full flexibility scenarios. This paper finds that the 2012 reform preserves employment and generates a 1.72% increase in productivity. In the work-sharing scenario, the increase in employment (1.86%) comes at the expense of a lower rise in productivity (1.31%) compared to the 2012 reform scenario, and a 4% decrease in weekly hours worked. Finally, the full flexibility scenario preserves employment and generates a substantial increase in productivity (2.6%) by allowing firms to fully adapt to changing economic conditions (by expanding or contracting the working week). Compared with previous scenarios, this option is the best in terms of the higher productivity (and the second best in terms of employment), but at the expense of increasing inequality, measured as the standard deviation of consumption, recording a figure of 2.71%.

A further policy implication of this analysis is that policies of this kind, which are designed to increase productivity, could have the unintended effect of a decrease in employment. This occurs when the degree of teamwork and adjustment costs are sufficiently high, as in this case hours are cheaper relative to employment, and firms take advantage of both the flexibility in allocating hours and the corresponding productivity gains.

There are a number of caveats to the paper's findings. Two have already been extensively discussed in Osuna and Ríos-Rull (2003). The first one arises from the use of commuting costs subject to congestion as the friction that stands in for a variety of adjustment costs that are difficult to model appropriately. The second has to do with the use of business-cycle properties to calibrate the extent of the frictions that determine the relative substitutability between hours per worker and employment. There is no doubt that the findings here are affected by these assumptions, even though this paper (and also Osuna and Ríos-Rull (2003)) has explored a variety of alternative assumptions to explain the range of possible values for the main variables of interest. The answers encountered under these alternative assumptions do not appear to be very different from those that arise in the baseline economy.

A third caveat involves the fact that this model does not account for the segmentation of the Spanish labor market due to the huge differences in severance costs between workers in permanent contracts (PCs) and those in temporary ones (TCs). In fact, the gap between the severance payments of workers with PCs (45 days of wages per year of seniority (p.y.o.s) for unfair dismissal) and temporary workers (8 days of wages p.y.o.s) accounts for almost one-half of the job destruction over the past four years, when TCs have been used as the basic adjustment mechanism because modifying hours and wages was virtually impossible (see Bentolila et al. (2012) for a discussion). As noted by Bentolila and Jansen (2012), the 2012 reform introduces interesting complementarities between internal and external flexibility. These complementarities are beyond the scope of this paper, although they are part of this author's ongoing research agenda. Hence, the author considers the role of this paper to be a first step in the formal discussion about the possible implications of introducing more internal flexibility in the Spanish labor market.

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References

Bentolila, S., Dolado, J., Cahuc P., and Le Barbanchon, T. (2012). Two-Tier Labour Markets in the Great Recession: France vs. Spain. *Economic Journal*, 122, F155–F187. http://onlinelibrary.wiley.com/doi/10.1111/j.1468-0297.2012.02534.x/abstract

Bentolila, S., and Jansen, M. (2012). La reforma laboral de 2012: Una primera evaluación. *Apuntes FEDEA-Laboral*, 14. http://www.fedea.net/apuntes/apuntes/laboral/apunte_laboral14_reforma_laboral_2012.pdf

Boeri, T., Conde-Ruiz, J.I., and Galasso, V. (2012). The Political Economy of Flexicurity. *Journal of the European Economic Association*, 10(4), 684–715. http://ideas.repec.org/a/bla/jeurec/v10y2012i4p684-715.html

García-Pérez, J.I., and Osuna, V. (2012). Dual Labour Markets and Tenure Distribution: Reducing Severance Costs or Introducing a Single Contract. *FEDEA WP 2012-09*. http://www.flexworkresearch.org/uploaded_files/publications/dt2012-09.pdf

Hansen, R. (1985). Indivisible Labor and the Business Cycle. *Journal of Monetary Economics*, 16, 309–327. http://ideas.repec.org/a/eee/moneco/v16y1985i3p309-327.html

Hornstein, A., and Prescott, E.C. (1993). The Firm and the Plant in General Equilibrium Theory. In: Becker, R., Boldrin, M., Jones, R., Thompson, W. (Eds.), *General Equilibrium, Growth and Trade II: The Legacy of Lionel McKenzie*. Academic Press, San Diego, CA.

Ortega, E. (1998). The Spanish Business Cycle and its Relationship to Europe. Banco de España Working Paper 9819. http://ideas.repec.org/p/bde/wpaper/9819.html

Osuna, V., and Ríos-Rull, J.-V. (2003). Implementing the 35 Hour Workweek by Means of Overtime Taxation. *Review of Economic Dynamics*, 6, 179–206. http://ideas.repec.org/a/red/issued/v6y2003i1p179-206.html

Prescott, E.C., and Ríos-Rull, J.-V. (1992). Classical Competitive Analysis in Economies with Islands. *Journal of Economic Theory*, 57, 73–98. http://www.sciencedirect.com/science/article/pii/S0022053105800419

Rogerson, R. (1988). Indivisible Labour Lotteries and Equilibrium. *Journal of Monetary Economics*, 21, 3–16. http://ideas.repec.org/a/eee/moneco/v21y1988i1p3-16.html

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