

Job Creation in Spain: Productivity Growth, Labour Market Reforms or Both?*

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Abstract

The benefits implied by changing the growth model are in the center of the political and economic debate in Spain. Addressing the labour force to the more innovative sectors and increasing productivity standards in the traditional ones is defended as the panacea for most of the ills afflicting the Spanish economy. In this paper we use a DSGE model with price rigidities, and a labour market behaving a la Mortensen-Pissarides, to assess the benefits of the change in the growth model on unemployment. To do that, we substitute a demand shift, as the one supposed to have driven the Spanish growth in the near past, by a productivity shock, more consistent with the new growth model. We show that the time span required for reducing unemployment rate to European average levels increases. We then propose four points for a reform of the labour market, and evaluate the interaction between the labour reform and the new growth model. We conclude that any point of the proposal works in the correct direction, in terms of unemployment reduction, and that the reform acts, de facto, as a mechanism of worksharing, reducing hours per worker for a lower unemployment rate.

Keywords: productivity, labour market, general equilibrium.

JEL Classification: E24, E27, E65.

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1. Introduction

The Spanish economy has witnessed from 1994 to 2007 a prolonged expansive period, which has made possible increasing employment to an extent that the economy never reached in its recent history. Employment used to fluctuate around more or less 13 million people since the sixties, and there was a ceiling to job creation that made many economic agents believe that the Spanish economy could not be ever able to break this limit. However, from 1994 to 2007 the labour market was capable of increasing employment from 13,3 to 20,6 million workers. The great moderation period brought to the Spanish economy historically low interest rates and an expansion of credit facilities, that contributed to sustain a vigorous and prolonged path of both private consumption and investment growth. Spain managed also to reduce public debt to unknown levels around 30% and turned endemic public deficits into surpluses that reached 2 percentage points of GDP in 2007. All along this expansionary process the labour force increased considerably due to a sustained process of immigration flows that, nevertheless, was compatible with the unemployment rate converging to average European levels. In this sense, the rate of unemployment reduced from around 20% in the mid nineties to a level of 8% in 2007, which the Spanish economy didn't know since the time before the first oil crisis.

Although the picture drawn in the previous paragraph seems an idyllic one, there were also some symptoms that pointed out to a not so healthy economy. The Spanish economy was growing more than most of the countries in Europe, but productivity growth was almost zero. Also competitiveness was deteriorating steadily, among other reasons because of persistent positive inflation differentials with traditional and new trade partners. In fact, the Spanish economy accumulated an impressive current account deficit that reached 10% of GDP in 2007, and whose quantitative amount was the second biggest in the world (after the US). Also the sector composition of production was heavily biased to relatively low productivity sectors (mainly real estate construction and services), that experienced the bulk of employment creation. Since the beginning of the century the Spanish economy suffered also a bubble in real state prices that contributed heavily to increase the levels of indebtedness of many households engaged in the mortgage market and also in consumption credits.

As a result of these disequilibria when the financial crisis beat the world, the Spanish economy suffered the most among advanced countries in its job market performance. Unemployment rates rose heavily coming back to represent 18% of the labour force by the mid 2009. Thus, although the fall in economic activity was not as big as in other advanced countries, the destruction of employment was the highest among these countries. Real estate construction stopped suddenly, with an important effect on employment, but also other sectors in the economy (industry and services) destroyed employment at a high pace.

What are the reasons behind this poor performance of the labour market in Spain? Some analysts argue that labour market institutions function reasonably well in Spain and, thus, the reasons behind employment destruction have mainly to do with the growth model of the Spanish economy. The impressive job creation process from the mid nineties to 2007 was based on poor productivity sectors, mainly building and services, and workers entering employment were of low skill levels. As a result the crisis has destroyed firms and employment of low quality, and these are difficult to recover in the near future where it is not foreseeable that the building sector or the service sector becomes again the growth engine of the Spanish economy. Thus, economists sharing this view think that the solution consists in changing the growth model, encouraging activities with high value added and an intensive use of technology. However, another strand of the economics profession thinks that this is only a quite partial and limited vision of the problem. These analysts opine that labour market institutions are an important and not isolated part of the growth model of the economy. They argue that these institutions need to be reformed to make it possible recovering employment more rapidly when the growth model changes and the economy begins to grow again. For example, they advocate for a deep reform of labour contracts, given that a key fact of the evolution of the labour market, since the reform of 1984, has been the pre-eminence of temporary contracts in job creation (see Aguirregabiria and Alonso-Borrego, 2009). This has created a dual labour market in Spain, with highly protected workers and high dismissal costs, along with workers with very low protection and low or nil dismissal costs.

In this paper we will defend this second thesis. In a wide study using 21 OECD economies since 1980 Garibaldi and Mauro (2002) find evidence that labour market institutions such as unemployment benefits, trade union coverage, level of taxation, and employment protection influence the rate of growth of employment. However, these authors also find support that the sector composition of employment plays a minor role. Regarding the influence of the level of taxation, the relationship between taxes and employment for the case of Spain is studied in Boscá, Doménech and Ferri (2009). In this paper, following the results of Garibaldi and Mauro (2002), we focus in potential reforms in the labour market, our thesis being that the main problems of the rapid increasing unemployment in Spain are essentially related to the behaviour of the labour market and not too much with the growth model, i.e. the sector distribution of production and employment.

Thus, section 2 is devoted to provide some stylized facts about the growth model in Spain. In particular, we provide evidence of how the relationship between production growth and change in unemployment (Okun's law) has changed over time. In section 3 we construct an European average benchmark for a new growth model and perform an accounting exercise to analyze the effects of changing the growth model in Spain. In

section 4 we discuss a framework for a reform in the labour market in Spain. and use the dynamic general equilibrium framework provided by REMS to evaluate the benefits of the labour market reform. Finally, section 5 concludes.

2. The Spanish growth model

Given that changing the growth model seems central to the present economic policy debate in Spain, we focus in this section in presenting evidence comparing some of the characteristics of the Spanish production system with other developed countries. In particular, we document medium-run differences in aggregate employment and productivity growth, taking into account the sectoral composition. We will also uncover the relationship between output growth and unemployment changes (the Okun's law), both in Spain and the European Union.

The Spanish economy has been a reference in employment creation across Europe from the second half of the nineties on, as shown in Figure 1. During the 1994-2007 period, annual rates of growth of employment have been persistently well above that of the United States, Germany, or an aggregate of ten European countries¹. Concretely, annual employment growth in Spain averaged 3.15 percentage points from 1994 to 2007, while this figure was only 0.41%, 0.80% and 1.33% in the cases of Germany, EU-10 and the US, respectively. This evolution of employment had a reflection in the impressive decline of the Spanish unemployment rate (see Figure 2) that reduced from almost 20% in 1994 to average European levels of around 8% in 2007.

Is the described performance of employment in Spain result of a labour market functioning better than in previous decades? Two facts should be noticed. First, during the economic boom experienced in Spain from 1985 to 1991 the economy was also able to manage reducing the unemployment rate from 18% to 13%. However, the economic crisis that came afterwards turned the unemployment rate from 13% in 1991 to almost 20% in 1994. Thus, looking at the 1992-94 episode and also to the recent evolution of unemployment during 2008-09, it seems clear that Spain is capable of destroying employment during the downturns at a higher pace than the rest of Europe or the United States, as well as it is able to create it more rapidly during expansions. The conclusion is that during at least the last two decades employment and unemployment have been much more volatile along the business cycle in Spain than in other developed countries. Second, high employment growth during economic booms does not necessarily mean creating "quality" jobs, that

¹ Countries building the aggregate of ten European countries (EU-10) are: Germany, Belgium, Denmark, France, Austria, Italia, The Netherlands, Norway, Portugal and Sweden. These are the only ten countries belonging to the European Union, for which there are available data (for a sufficient time span) on sectoral production and employment.



Figure 1: Employment growth

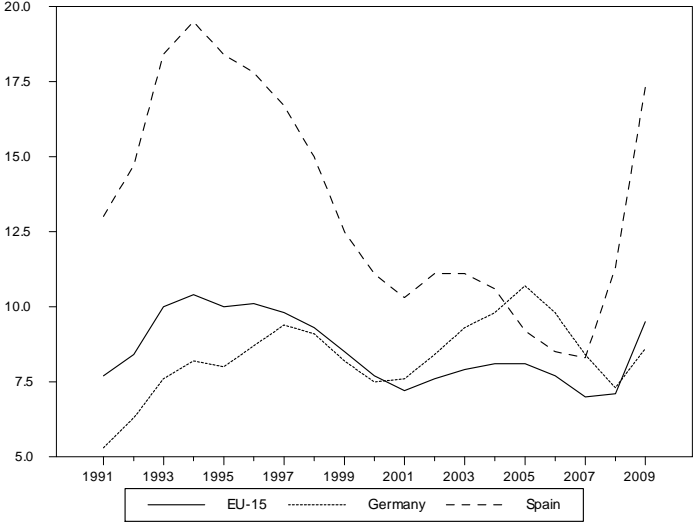


Figure 2: Unemployment rate

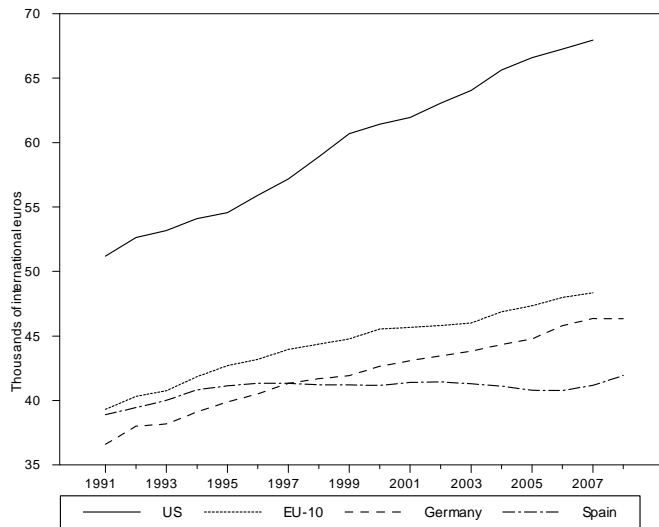


Figure 3: Productivity evolution.

is, jobs that come along with high wages and high productivity records. Indeed, Figures 3 and 4 show how the happy years of high employment creation have been in fact the sad years of productivity stagnation. Some simple figures illustrate this fact. Productivity growth averaged an annual rate of 0.2% in Spain between 1994 and 2007, while German productivity growth amounted to 1.4 points per year (1.8 and 1.2 points the US and EU-10, respectively). For this reason, while productivity in purchasing power standards was almost identical in 1991 in Spain and the EU-10, in 2007 it is 15% lower in Spain (see Figure 3).

Several authors have documented the negative (positive) tradeoff between employment (unemployment) and productivity growth that has occurred in Western Europe since the seventies (see Rezai and Semmler, 2007, Dew-Becker and Gordon, 2008, and Enflo, 2009, for some recent references). An initial simple reason for this negative relationship between productivity and employment can be attributed to positive shocks in labour force participation. The movement in the labour supply schedule, given the negative slope of the demand curve, implies a new equilibrium at a point with more employment and lower marginal (and average) productivity. However, as stated by Gordon (1995), being that true in the short run, there are many structural shocks that can instead cause a positive relationship between productivity and employment in a dynamic framework. Thus, in the medium-run capital accumulation may increase productivity (shifting the labour demand curve to the right) and eliminating the negative tradeoff. In fact, Ball and Mankiw (2002) uncover a positive correlation between productivity growth and structural employment

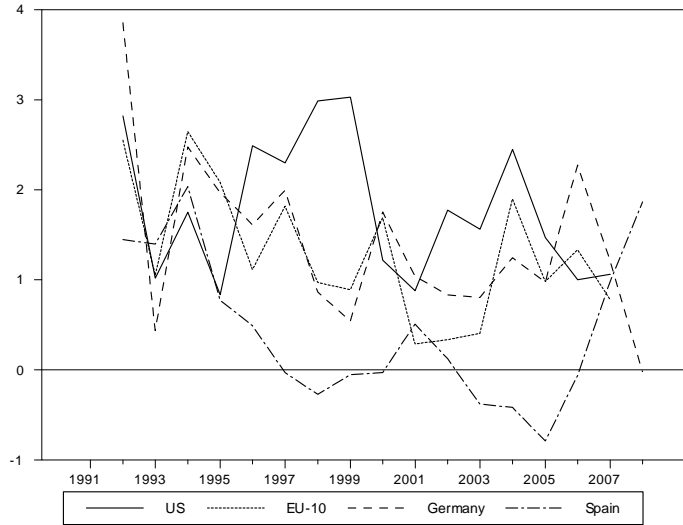


Figure 4: Growth rate of productivity.

in the United States. Thus, understanding the factors that provoke the tradeoff to persist in Spain overtime is crucial in order to assess the effectiveness of alternative policies designed to reduce unemployment (or increase employment) in the economy. Or, in Gordon’s words, we should be able to identify the policies that shift the unemployment-productivity tradeoff in the right direction. The nexus of productivity and unemployment (or employment) can be established through the study of Okun’s law. Given that the growth rate of output is the sum of productivity growth and employment growth, we can start from an aggregate production function to obtain the Okun’s relationship and analyze the possible sources of variations in the tradeoff between unemployment changes and production growth. More specifically, let us consider the following production function with disembodied technology, in per capita terms:

$$Y = A \left(\frac{cK}{L} \right)^{1-\alpha} \left(\frac{N}{L} H \right)^\alpha$$

where Y stands for production, K for the capital stock, c for the capital capacity utilization rate, N for employed workers, H for hours per worker, A for total factor productivity and L for total population in the economy. This expression can be written in terms of the per capita capital stock, k , the labour force, S , and the level of unemployment, U , as:

$$Y = A (ck)^{1-\alpha} \left(\frac{S-U}{L} H \right)^\alpha$$

or,

$$Y = A (ck)^{1-\alpha} \left(\frac{S}{L} - \frac{U}{L} \right)^\alpha H^\alpha L = A (ck)^{1-\alpha} \left(\frac{S}{L} - \frac{U}{S} \frac{S}{L} \right)^\alpha H^\alpha L = A (ck)^{1-\alpha} (s(1-u))^\alpha H^\alpha L$$

where s is the activity rate and u the unemployment rate. Taking logs and deriving with respect to time we can obtain the equivalent expression in terms of the rate of growth of the variables².

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \frac{\dot{L}}{L} + (1-\alpha) \left(\frac{\dot{k}}{k} + \frac{\dot{c}}{c} \right) + \alpha \frac{\dot{s}}{s} + \alpha \frac{\dot{H}}{H} - \frac{\alpha \dot{u}}{e}$$

where e stands for the employment rate and \dot{u} is the change in the unemployment rate. Equivalently,

$$\dot{u} = \frac{e}{\alpha} \left[\frac{\dot{A}}{A} + \frac{\dot{L}}{L} + (1-\alpha) \left(\frac{\dot{k}}{k} + \frac{\dot{c}}{c} \right) + \alpha \frac{\dot{s}}{s} + \alpha \frac{\dot{H}}{H} \right] - \frac{e}{\alpha} \frac{\dot{Y}}{Y} \quad (1)$$

Let now assume that total factor productivity, population (through higher immigration), capital utilization, labour force participation and average working hours are procyclical. Then, we may establish the following structural linear relationships with all parameters positive,

$$\frac{\dot{A}}{A} = \beta_1 \frac{\dot{Y}}{Y}, \frac{\dot{L}}{L} = \beta_2 \frac{\dot{Y}}{Y}, \frac{\dot{c}}{c} = \beta_3 \frac{\dot{Y}}{Y}, \frac{\dot{s}}{s} = \beta_4 \frac{\dot{Y}}{Y}, \frac{\dot{H}}{H} = \beta_5 \frac{\dot{Y}}{Y}$$

Plugging these relationships into equation (1) allows us to obtain the following reduced form for the Okun's law

$$\dot{u} = \delta(t) - \beta(t) \frac{\dot{Y}}{Y} \quad (2)$$

where $\delta(t) = \frac{e(t)(1-\alpha)}{\alpha} \frac{\dot{k}}{k}(t)$ and $\beta(t) = -\frac{e(t)}{\alpha} \left(1 - \beta_1(t) - \beta_2(t) - (1-\alpha)\beta_3(t) - \alpha\beta_4(t) - \alpha\beta_5(t) \right)$. We have included time dependence in the parameters to account for the fact that unemployment-growth link is time-varying (see Huang and Lin, 2008, for econometric evidence). Notice that a reduction in any of the betas, which will indicate a lower degree of covariance

² Okun (1962) suggested two alternative approaches for estimating the tradeoff between unemployment and production: a "first difference" and a "gap" model (output as deviations from the potential level). Here we follow Knoester (1986), Lee (2000) and Huang and Lin (2008) in using the first difference approximation.

between the variable and output, makes the slope of the Okun's curve steeper. At the same time, variations in the employment rate or in the capital accumulation growth rate will shift the parameter δ . Therefore, changes in technology, including skill biased technological change; government regulations in the labour market; immigration policies; taxes; sectoral distribution; labour market tightness; input prices, *etc*; would contribute to modify the Okun's schedule over time, by changing the structural relations behind the reduced form parameters in equation (2).

To illustrate this fact, Figure 5 represents three different Okun's curves, i.e. three negative linear relationships between the rates of growth of production and the variations of the unemployment rate³. To simplify interpretation, we focus only in the region where the growth rate of production is positive. Consider first the continuous line passing through the points AB . For this economy, when output growth is zero, the unemployment rate is changing at a rate $A = \delta(t)$. On the other hand, $B = \frac{\delta(t)}{\beta(t)}$ is the rate of growth of production necessary to maintain the unemployment rate constant over time. Obviously, in order to see a reduction in the unemployment rate output should grow at a higher rate than B .

Any event that causes the schedule to move up and to the right can be considered a short run "unfavorable shift" for unemployment, because although a given change in the unemployment rate is associated with a higher change in production, for a given rate of growth of production the performance of unemployment is worse. Conversely, any change affecting the Okun's curve downwards and to the left is a short run "favorable shift" for unemployment. Therefore the schedule represented in the figure by the dashed line DE is more favorable to employment creation and to unemployment reduction than the initial curve. This means that for a given rate of growth of production, the performance of the labour market is better if the economy is located in this second schedule. Coming back to equation (2), a reduction (increase) in $\delta(t)$ due, for instance, to a lower (higher) employment rate, or to an unskill-biased (skilled-biased) technological change that leads to lower (higher) capital growth, would change the Okun schedule to the left (right), improving (worsening) the capability of the economy to reduce the unemployment rate for a given growth rate of production.

Think now in the dotted line FE that crosses the initial AB line at point C . The different location of this Okun's curve with respect to the initial one is consequence of two facts: an increase in $\delta(t)$, which produces an unfavorable shift that pushes the schedule to the right, and an increase in the slope captured by the term $\beta(t)$. This change in the slope turns the curve towards the right over the point E . With respect to the initial schedule AB ,

³ Notice that the linear schedule is a simplification, because equation (2) shows that the relationship is in fact no linear.

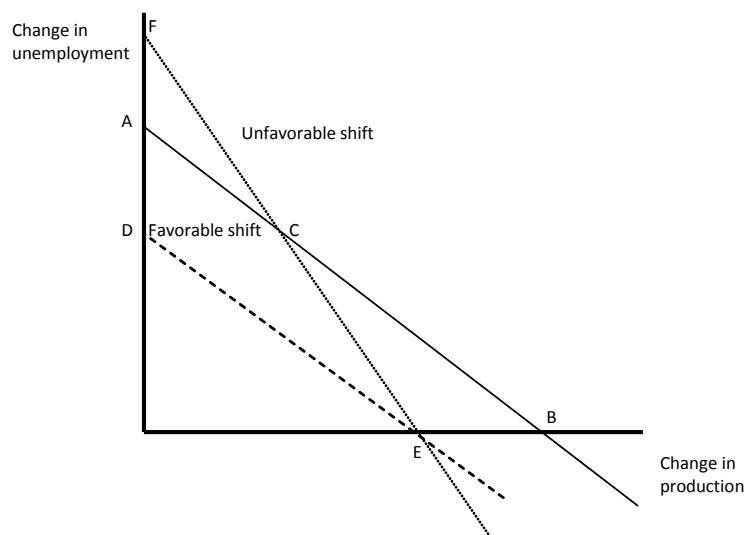


Figure 5: *The Okun's law.*

the new schedule FE has a better (worse) performance of the unemployment rate for any growth rate of production higher (lower) than C . That is, an economy characterized by the curve FE reduces faster the unemployment rate, than an economy represented by the curve AB , when the rate of growth of production is strong, but it destroys more jobs and increases faster the unemployment rate when the rate of growth of production is weak. In other words, the economy with Okun's law FE has a more volatile labour market than the economy characterized by the AB schedule.

Looking at the previous analysis about the Okun's relationship, how can we interpret the high volatility of the Spanish labour market we documented in previous paragraphs? First of all, the high volatility may be consequence of structural characteristics of the economy not associated with the business cycle. What are, thus, the main drivers of the structural properties behind this performance of unemployment along the last two decades in Spain? Probably there is not a single explanation, but the combination of different drivers. With respect to parameter $\delta(t)$, one possible explanation is that Spain has experienced high investment levels that have caused capital accumulation to take place at large rates. In fact, Spain has sustained a high investment rate in the years previous to the actual crisis, given that it was able to attract foreign savings quite easily. Regarding $\beta(t)$ a weak relation between hours and output growth (β_5), or between total factor productivity and output (β_1) due, for instance, to unskilled-biased technological change, are also candidates to explain the high volatility of unemployment in Spain.

What do observed data tell us about the Okun's curve for Spain? To answer this

question we adjust linearly the percentage point variation in the unemployment rate and the rate of growth of output in two different periods. Figure 6 represents the shift in the Okun's curve for Spain between the period 1961-1983 and 1984-2008, along with the Okun's law for the aggregate EU-15 in the first period. Figure 7 displays the same information for Spain, but using the EU-15 Okun's law for the period 1984-2008 as the basis for comparison. We use the year 1984 as a threshold, because Spain undertook this year a deep labour market reform, which allowed a widespread use of fixed-term contracts and reduced significantly dismissal costs of temporary workers.

Some conclusions arise from the study of both figures. First, the Spanish Okun's curve has been located in what we defined previously as an unfavorable place with respect to the European curve, in both the first and the second period. This means that Spain has been forced, given its structural characteristics, to grow more than the rest of European countries in order to reduce the unemployment rate by the same amount. Second, whereas the EU-15 curve has moved in the right direction over time, the Spanish schedule has experienced a pronounced change in the slope, that has very much increased the volatility of the labour market with respect to the first period, and also with respect to the average EU-15. As compared with Europe, Spain needs very high rates of output growth in order to reduce significantly unemployment rates⁴. For instance, according to the most recent Okun's curves, a 2 percent growth rate of GDP leaves unemployment rates unchanged in Europe, but increases the unemployment rate by around 1 point in Spain. However, the positive consequence of the steeper slope in Spain is that for a high GDP growth rate (more than 3.5%) the unemployment rate in Spain decreases faster than in the EU-15.

The analysis in previous paragraphs about the tradeoff between productivity and employment (or unemployment) has an aggregate nature, where it is not distinguished across the different sectors in the economy. However, given that productivity is unevenly distributed across sectors, one may think that the sectoral composition of production can play a role in explaining employment or unemployment links with production growth. Figures 8 and 9 offer a first glance of the different sectoral distribution of productivity⁵ and employment in Spain and in the EU-10. With the exception of the agricultural sector, where productivity is almost the same in both economies, Spain displays lower labour productivity levels at the end of the sample period (average of the 2003-07 period) in all sectors. Productivity differentials are especially pronounced in the case of the industry sector. Furthermore, according to Figure 9 Spain is an economy with a high specialization (relative abundance of employment) in sectors of relative low productivity, as building

⁴ This phenomenon is known as jobless growth (see Khemraj et al, 2006 for a recent study)

⁵ Levels of productivity are again measured in purchasing power standards (international euros).

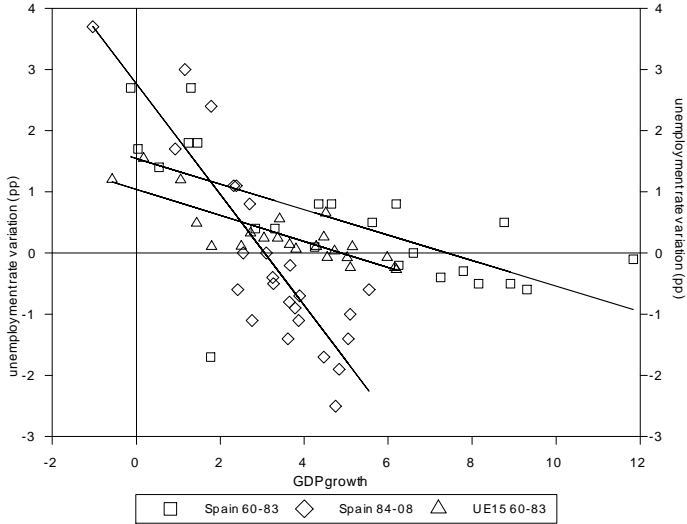


Figure 6: Okun's law in Spain and first period EU-15

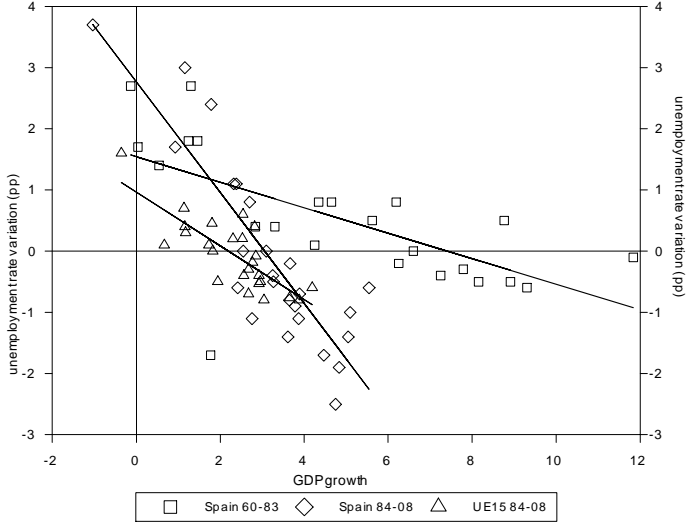


Figure 7: Okun's law in Spain and second period EU-15

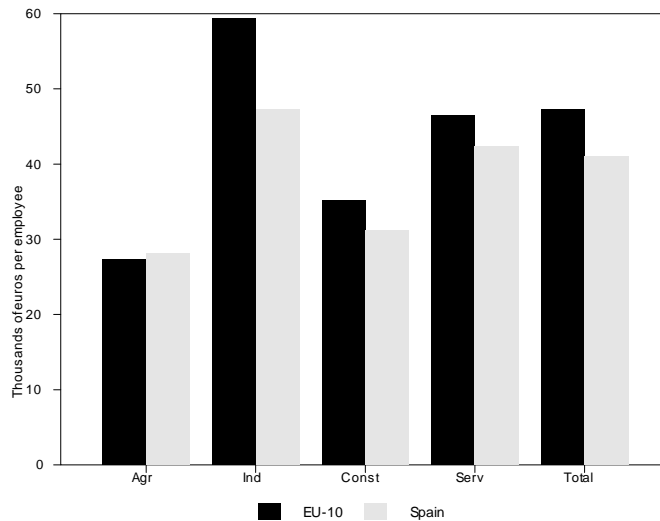


Figure 8: *Productivity across sectors (mean 2003-07)*

or agriculture⁶. One of the claims of proponents of the change in the growth model in Spain is to create the necessary incentives to shift the sectoral distribution of production and employment, to make the Spanish economy more similar to those countries with a better performance in terms of unemployment variations. The ongoing debate poses the emphasis in how effective the change of the sectoral composition of production will be in terms of, first, reducing unemployment rapidly and, second, making it less volatile in the future. There is evidence in the literature that challenges the view that making the growth model more alike the European leaders will lead to a positive answer to both questions. For example, as supported by the work of Groshen and Potter (2003), that studies the 2001 recession in the US, a change in the growth model does not come without cost. The reallocation of workers and capital among industries creates job losses that are permanent. So, we could expect a long lag before employment reboundes. In addition, we should take into account the effects that a sectoral shift can provoke on the Okun's curve, and its consequences on unemployment in a foreseeable context of weaker aggregate demand. The next two sections of this paper are devoted to deepen in these issues.

3. Towards a new growth model: the example of EU-10

From the speech of the President of the Spanish Government in the Parliamentary Debate

⁶ Spain is also specialized in other relatively low productivity activities as commerce and hospitality inside the services sector (not shown in the figure).

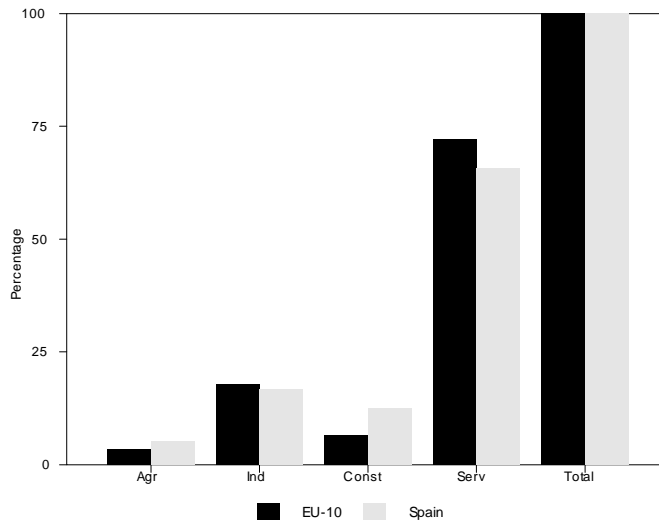


Figure 9: Distribution of employment across sectors

on the State of the Economy (12th May, 2009) lets highlight the following ideas:

- "Transforming the growth model is the key to take up again the path of a sustainable prosperity".
- "To develop this new model we should do three things: first, create an environment to stimulate economic activities of high added value, productivity and dynamism; second, reduce activity and volume of our building sector; third, identify and foster those productive sectors with a high capacity of wealth and employment generation".

It is worthy to note the absence all along the speech of any reference to policies or reforms aimed to produce changes in the Spanish labour market. For this reason, in this section we will perform some simple counterfactual exercises, to evaluate the capacity of the so-called new growth model in creating new employment possibilities. We will take as benchmark of the new growth model, the EU-10 aggregate of European countries we have used in the descriptive analysis performed in previous sections. As figures 8 and 9 show, this EU-10 aggregate of countries was 14.9 per cent (in PPSs) more productive than the Spanish economy in 2007. Also, it displayed higher productivity levels in the Industry, Building and Services sectors. In addition, the EU-10 presents lower weights of employment in low productivity sectors (the weight of the Building sector in employment was 6.6 per cent in EU-10 versus 13.1 per cent in Spain) and a higher weight in high productivity sectors (Services, that includes Financial Institutions, captured 72.7 per cent of employment in the EU-10 versus 66,8 per cent in Spain, and Industry represented 17.3

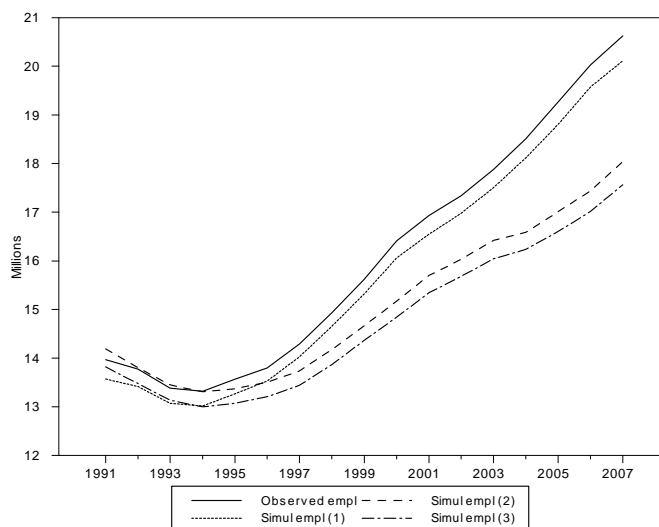


Figure 10: Simulated employment (levels)

per cent of total employment in the EU-10 and a 15.6 per cent in Spain).

As a first approach to investigate the employment effects of the new growth model in Spain, let us consider three simple counterfactual exercises that are in the essence of the Government proposal:

1. Spain preserves its present sectoral productivity levels but shifts the sectoral employment distribution towards converging to the sectoral employment weights of the EU-10 (this would imply an increase in labour productivity of 2.4 points for the whole Spanish economy).
2. Spain keeps its present sectoral employment weights, but increases productivity across sectors to the levels of the EU-10 (in this case labour productivity would increase 12.5 points).
3. Spain converges to the sectoral distribution of employment and productivity of the EU-10 (in this case labour productivity would increase 14.9 points).

Our purpose in doing these counterfactual exercises is to answer the following question: how much employment would have required the Spanish economy to generate observed output with the sectoral distribution of employment and the productivity levels of the EU-10 aggregate? To this extent, we start by decomposing observed total labour productivity of the Spanish economy $\left(\frac{Y_t}{N_t}\right)_s$, into the sum of each sector's observed labour

productivity $\left(\frac{Y_{jt}}{N_{jt}}\right)_s$ weighted by its employment share $\left(\frac{N_{jt}}{N_t}\right)_s$:

$$\text{output tot} \left(Y_t\right)_s = \left(\begin{matrix} \text{product sect 1} & \text{weight empl sect 1} \\ \left(\frac{Y_{1t}}{N_{1t}}\right)_s & \left(\frac{N_{1t}}{N_t}\right)_s \end{matrix} + \dots + \begin{matrix} \text{product sect j} & \text{weight empl sect j} \\ \left(\frac{Y_{jt}}{N_{jt}}\right)_s & \left(\frac{N_{jt}}{N_t}\right)_s \end{matrix} \right) \left(N_t\right)_{s0} \quad (3)$$

Our first exercise consists in changing $\left(\frac{N_{jt}}{N_t}\right)_s$ by the equivalent ratios for the EU-10 $\left(\frac{N_{jt}}{N_t}\right)_E$:

$$\text{output tot} \left(Y_t\right)_s = \left(\begin{matrix} \text{product sect 1} & \text{weight empl sect 1} \\ \left(\frac{Y_{1t}}{N_{1t}}\right)_s & \left(\frac{N_{1t}}{N_t}\right)_E \end{matrix} + \dots + \begin{matrix} \text{product sect j} & \text{weight empl sect j} \\ \left(\frac{Y_{jt}}{N_{jt}}\right)_s & \left(\frac{N_{jt}}{N_t}\right)_E \end{matrix} \right) \left(N_t\right)_{s1} \quad (4)$$

where $\left(N_t\right)_{s1}$ represents the employment required to generate the observed production in the past, had Spain had the same sectoral productivity but the employment shares of the EU-10.

In the same way, to establish the effects on aggregate employment in exercise 2, we use the following expression

$$\text{output tot} \left(Y_t\right)_s = \left(\begin{matrix} \text{product sect 1} & \text{weight empl sect 1} \\ \left(\frac{Y_{1t}}{N_{1t}}\right)_E & \left(\frac{N_{1t}}{N_t}\right)_s \end{matrix} + \dots + \begin{matrix} \text{product sect j} & \text{weight empl sect j} \\ \left(\frac{Y_{jt}}{N_{jt}}\right)_E & \left(\frac{N_{jt}}{N_t}\right)_s \end{matrix} \right) \left(N_t\right)_{s2} \quad (5)$$

where we substitute $\left(\frac{Y_{jt}}{N_{jt}}\right)_s$ by the equivalent ratios for the EU-10 $\left(\frac{Y_{jt}}{N_{jt}}\right)_E$. Thus, $\left(N_t\right)_{s2}$ stands for the simulated employment in Spain under the second scenario.

Finally, exercise 3 mixes the two previous hypothesis in the following equation

$$\text{output tot} \left(Y_t\right)_s = \left(\begin{matrix} \text{product sect 1} & \text{weight empl sect 1} \\ \left(\frac{Y_{1t}}{N_{1t}}\right)_E & \left(\frac{N_{1t}}{N_t}\right)_E \end{matrix} + \dots + \begin{matrix} \text{product sect j} & \text{weight empl sect j} \\ \left(\frac{Y_{jt}}{N_{jt}}\right)_E & \left(\frac{N_{jt}}{N_t}\right)_E \end{matrix} \right) \left(N_t\right)_{s3} \quad (6)$$

where $\left(N_t\right)_{s3}$ represents simulated employment had Spain had the sectoral distribution of employment and the productivity levels of the EU-10 aggregate.

Figure 10 displays the evolution in thousands of workers of observed employment in Spain (continuous blue line) and simulated employment under each of the three scenarios. Figure 11, reproduces similar information, but fixing an index 100 for the level of employment in 1991. There are two straightforward messages that emerge looking at these graphs.

First, if Spain have had the same sectoral distribution of employment than the EU-10, but preserving the sectoral productivities observed in the economy, it would have

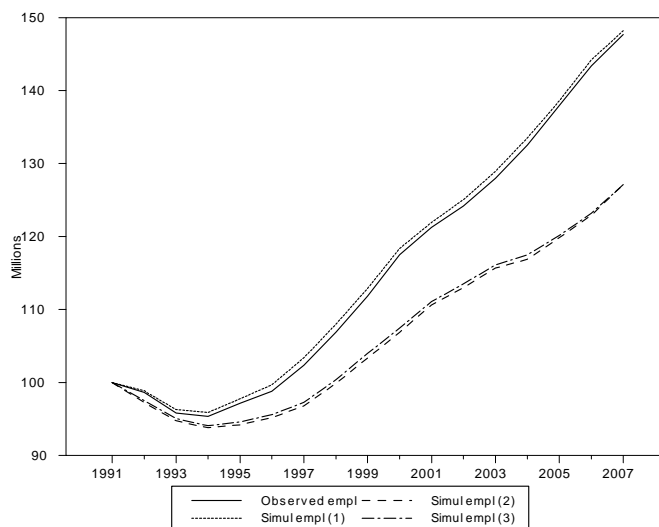


Figure 11: *Simulated employment (index)*

reached in 2007 an amount of 148 jobs for each 100 jobs existing in 1991 (see Figure 11). Thus, reallocating workers across sectors, but maintaining the same sectoral productivities would have not affected the process of job creation in Spain⁷, where we observe exactly 148 jobs in 2007 for each 100 jobs in 1991.

Second, if the counterfactual exercise consists in assigning the EU-10 sectoral productivities to the Spanish employment distribution across sectors, we observe in both Figures that this would have led to a much weaker job creation in Spain. More specifically, under this scenario Spain would have ended in 2007 with 18.0 million employments, instead of the actual 20.1 million (in index numbers employment would have evolved from 100 to only 127). Although previous results have to be taken very cautiously, given the nature of these counterfactual exercises, they point out to some tentative conclusions. It seems that shifting employment across sectors to have a growth model that resembles in its sectoral shares that of the more advanced economies in Europe, will not have much impact on job creation in the future. In addition, if Spain succeeds in correcting its productivity differentials with the EU-10 this is not going to be the panacea for increasing employment and reducing unemployment.

Notice that the previous analysis is based on the assumption that production is given across sectors, so that one could argue that reaching the European sectoral composi-

⁷ Notice that looking at Figure 10, under this scenario, Spain would have had approximately 0,5 million less jobs all along the sample period. Thus employment would have been 13,6 million workers in 1991 (instead of the real 14,0 million) and 20,1 million in 2007 (instead of observed 20,6 million).



Figure 12: Simulated growth of value added

tion and productivity levels would lead to higher output and, thus, to higher requirements of jobs. However, we can also perform a different set of exercises to evaluate the extent of this possibility. To do this, we can reverse the endogenous variable in equations (4) to (6), to solve for the levels of output compatible with observed employment in Spain. Results are presented in figure 12, where we have depicted the simulated rate of growth of value added (under the different scenarios), together with the real one. According to these results, convergence of Spain to the productivity levels and the sectoral distribution of employment of the EU-10 countries, would have produced a rate of growth of output one point higher per year all along the 1991-2007 period, given observed employment. Notice that value added grew in Spain at an annual average rate of 2.8%, while our exercise shows that given observed employment it would have grown at an 3.8% per annum. This is a rate of growth of output along 16 years, that seems hard to believe in developed economies.

4. General equilibrium evaluation of job creation with the new growth model

In the previous section we have carried out a kind of partial equilibrium analysis, similar in spirit to the shift-share analysis of Garibaldi and Mauro (2002), to establish the sectoral contribution to employment growth. We have seen that the results of this counterfactual analysis on employment (or output) rely on our assumption of taking output (or employment) as given. However, both employment and production are variables that in-

teract between them and with other economic variables. In other words, employment and production should not be taken as given, but should be treated as endogenous variables. Therefore, in this section, we switch our focus to a general equilibrium analysis using the REMS model (see Boscá *et al*, 2009). The idea is to evaluate in a general equilibrium framework the effects of the claimed shift in the Spanish growth model, in a way where we can take into account endogenous relations among the basic macroeconomic aggregates, and also have a look at the behaviour of other key labour market variables, as wages or hours worked. In this vein, we initially calibrate REMS to reproduce the following stylised facts observed in the Spanish economic in the period between the first half of the nineties and 2007:

1. A yearly GDP growth rate of 3 per cent reduces the unemployment rate by 1 percentage point (this means that it takes 10 years growing at an average 3 per cent to reduce the unemployment rate by 10 points).
2. Labour productivity keeps stagnant over time.

Growth in this economy is generated by introducing a positive preference shock on consumption. Notice that this is an indirect way of capturing what has occurred in Spain in the last decade, where households experienced a sharp increase in credit facilities, motivated by the historically low interest rates and the easy acces of the economy to international indebtedness. In technical terms, our approach consists in intruducing a shock, η_t in the utility function of households,

$$E_t \sum_{t=0}^{\infty} \beta^t \left[\eta_t \ln (c_t^o - h^o c_{t-1}^o) + n_t^o \phi_1 \frac{(T - l_{1t})^{1-\eta}}{1-\eta} + (1 - n_t^o) \phi_2 \frac{(T - l_{2t})^{1-\eta}}{1-\eta} + \chi_m \ln (m_t^o) \right]$$

In the rest of the paper, we will call to the economy calibrated in this way the "*old growth model*". Our baseline simulation results are shown in the first row of table 1. The next step consists in making the Spanish economy more productive by means of a positive shift, μ_t , on labour utilization. This makes labour productivity to increase one percentage point with respect to the old growth model. Again, technically the production function is rewritten to capture this shock as,

$$y_{it} = z_{it} \left\{ \left[a k_{it}^{-\rho} + (1-a) e_{it}^{-\rho} \right]^{-\frac{1}{\rho}} \right\}^{1-\alpha} (\mu_t n_{it} l_{i1t})^\alpha (k_{it}^p)^\zeta$$

The economy simulated in this way will be called the "*new growth model*". However, in the case of the new growth model, we will assume two scenarios, depending on the assumption we take for the demand shock. In the first scenario, we reduce the demand shock in order to obtain the same rate of growth of output. Thus, we have a more pro-

ductive economy, with a lower preference parameter for consumption, but with the same rate of growth (3 per cent). This economy corresponds with the simulations presented in the second row of table 1. The second approach to the new growth model consists in increasing productivity, but leaving the same demand shock. As a result output growth will be higher than in the old model baseline simulation. The results corresponding to this simulation can be found in the third row of the table.

As results in table 1 show, changing the growth model, i.e. making the economy more productive, expands the number of years required to reduce the unemployment rate. Whereas in the old growth model it takes ten years to fulfill the objective of reducing ten points the unemployment rate, in the first scenario with the new growth model the time needed is doubled to twenty years. In the case of the second experiment with the new model it lasts about fourteen years, even with a higher rate of growth of production. Which of the two scenarios for the new model seems more realistic? We consider the first scenario more feasible for the near future in Spain, given that the main stimuli that have driven aggregate demand in the near past (low interest rates, easy access to international financial markets, high rate of growth of residential investment) are hardly to believe to continue in the near future. Therefore, in the following experiments we will adjust the demand shock to a rate of growth of output of 3 per cent and, thus, use our first scenario as the basis for comparison.

Until now, our simulations of a change in the growth model in Spain produce rather disappointing results. A new growth model, that gives more weight to some sectors and less to others and increases uniformly labour productivity, seems not enough to ensure a rapid reduction in the unemployment rate. In other words, our results suggest that the proposed change in the growth model makes the slope of the Okun's curve flatter, because it probably tends to increase the structural parameters β_1 and β_3 . Notice that an Okun's curve that becomes flatter is really bad news in terms of the potential of the economy for reducing unemployment, when the country is located in a situation characterised by high unemployment rates and low output growth, as, for example, point *F* in figure 5. Does this mean that Spain is condemned to suffer from high unemployment during very long periods? Probably the answer is yes, if we are not able to manage implementing some structural reforms that shifts the Okun's curve to the origin. Below we present a proposal for reforming the labour market in Spain, that is intended to shape the perverse effects of the new growth model in the unemployment rate, in line with the original idea of Blanchard and Wolfers (2000). Later we will simulate these reforms to look at the effects in terms of unemployment reduction.

4.1 A proposal for reforming the labour market in Spain

Many studies have addressed the incidence of labour market institutions and reforms on

unemployment (see Arpaia and Mourre, 2005 and Eichhorst et al., 2008, for two recent surveys). For the Spanish case, Aguirregabiria and Alonso-Borrego (2009) evaluate the last sound labour market reform carried out in Spain in 1984. They conclude that the introduction of temporary contracts in 1984 had important effects on employment and job turnover, but very modest effects on productivity. The objective of the simulations we will present next in this section is to throw light on the foreseeable consequences, in terms of unemployment, of a reform that takes into account the main problems of the Spanish labour market. We will do it in a scenario where productivity will be growing in accordance with the expected change in the growth model of the economy. The specific aspects of the reform we will simulate are based in a proposal for restarting the Spanish labour market commanded by FEDEA (see FEDEA, 2009)⁸. In order to summarize the main aspects of the proposed reform, we will concentrate around the four basic proposals:

1. To finish with the existing duality in the labor market, a *single* permanent labor contract should be introduced for all new hires, with severance payments increasing with seniority.
2. To improve protection of the unemployed, expenditure on unemployment benefits should keep on growing while the crisis persists and it will be probably advisable to increase benefit duration. However, taking a *medium-term perspective*, protection of the unemployed should be designed in a way that it does not discourage job search. This can be best achieved by raising benefits in the first months of unemployment spells, than by increasing the benefit duration.
3. In order to modernize collective bargaining, it should be allowed that firm-level agreements, reached by workers and employers, prevail upon agreements at a higher negotiation level.
4. To increase efficiency of active labor market policies, these should be reoriented towards certain groups and managed in an improved way: rigorous evaluation of this type of activities should become routine. Evaluation should help to improve the design of active policies and to inform the allocation of funds towards those programs, agencies, and public employees that show the best results. The supply of these active programs should be expanded, allowing appropriately licensed labor intermediation companies and private agencies to cooperate with public agencies in their provision and management and, thus, offering workers a wider choice.

Before proceeding with the presentation of the simulation results, we need to estab-

⁸ FEDEA is a research centre which was set up to produce quality, objective and independent economic analysis. The proposal was promoted by a group of 13 economists and received support from a group of 100 economists coming from different universities and economic institutions from Spain and abroad.

Table 1 –Evaluation of the new growth model

	Labour productivity (growth wrt old model)	GDP growth	Unemployment rate (pp variation)	Real wage (growth wrt old model)	Hours per worker (growth wrt old model)	Years to reduce 10 points unemployment rate
growth model						
Old model (1984-2008)	–	3.00	-1.00	–	–	10.00
New model (scenario 1)	1.07	3.00	-0.49	0.18	-0.47	20.45
New model (scenario 2)	1.00	3.71	-0.72	0	-0.25	13.88

lish a link between the theoretical premises of the proposal and the empirical exogenous variables or parameters of REMS. This is done in table 2. The first point of the proposal is related to the different degrees of employment protection between temporary and regular workers. This creates a segmentation in the separation rates, so separation rates for temporary workers are much more higher than for permanent workers. In fact, Sala and Silva (2009) in a DSGE model with heterogeneous workers, calibrate the job tenure of temporary and permanent workers at 6 months and 10 years, respectively. These numbers imply separation rates of 0.5 and 0.025, respectively. For this reason, in our model we will consider that the establishment of a single permanent labor contract will reduce the separation rate, σ . In particular, we will simulate a 5 percent reduction in the separation rate⁹. With respect to unemployment benefits, the idea of the proposal is to reduce the negative job search incentives of the actual labour market passive policies. Thus, we will simulate a 1 per cent increase in job search intensity, that in the REMS model is captured by the parameter \bar{l}_2 . Regarding the proposal of decentralizing bargaining at the enterprise level, the rationale is that wage adjustment will be a more flexible process that will be more dependent on firm's economic conditions. Therefore, we translate this proposal to a 5 per cent reduction of the Nash bargaining parameter, λ^w , in the efficient wage bargaining equation of the model. The fourth point of the proposal, that deals with enhancing the design of active labour market policies, is intended to facilitate a better matching between unemployed workers and vacancies through placement support. Also, it aims to improve human capital endowments of unemployed through tight monitoring, increasing competition in the labour market and decreasing the degree of market tightness to avoid bottlenecks. We translate this proposal to parameters through a 10 per cent reduction in the cost of vacancies, κ_v , and a 5 per cent increase in the efficiency parameter of the matching function, χ_1 .

Table 3 summarizes the effects of the different proposals of labour market reform.

⁹ The exact variation in the parameters of the model is set more or less arbitrarily, as we are mainly interested in the direction of the results. In any case, we will keep the changes in the parameters at modest figures.

Table 2 –Correspondence between reforms and rems

Proposal of labour market reforms	Related REMS parameter
A single permanent labor contract	A 5 per cent reduction in σ
Raise unemp. benefits at the beginning and reduce duration	A 1 per cent increase in \bar{l}_2
Modernize collective bargaining	A 5 per cent reduction of the nash parameter λ^w
Increase the efficiency of active labor market policy	A 10 per cent reduction in the cost of vacancies, κ_v
	A 5 per cent increase in the efficiency of matching, χ_1

For the sake of comparison, in the first rows of the table we conserve the results we presented in Table 1 for the bare change of the growth model. As can be seen looking at the last column, all the proposals go in the right direction, reducing the time span required to reduce unemployment. In fact, the joint effect of the pack summarized in table 2 is quite impressive, implying a very significant shortening of the time required to reduce the unemployment rate by 10 points (concretely, to 6.5 years). Interestingly, real wages will increase with all the proposals, whereas the change in productivity is very modest. For the whole labour market reform, real wages increase at an annual rate of 0.4 per cent, that is, real wages will be 2.6 percentage points higher after the 6.5 years needed for reducing the unemployment rate 10 points. Another important dimension of the labour market is the intensive margin. As shown in the results, hours per worker would unequivocally fall no matter which concrete reform proposal we consider, both with respect to the old model and to the new model without labour market reforms. In some cases, the reduction in the number of hours per worker can be important after some years. For instance, the reduction of 10 points in the unemployment rate, would imply after the 6.5 years needed a fall of approximately 19.3 per cent in the intensive margin. That is, *ex-post*, the reform acts as a *worksharing* mechanism. This worksharing device probably weakens the procyclicality of hours, reducing the parameter β_5 of the Okun's curve slope, thus making the Okun's curve steeper through the point F , which is the right movement for reducing unemployment faster, when the unemployment rate is high.

5. Conclusions

(To be completed)

Table 3 – Evaluation of labour market reforms

	Labour productivity (growth wrt old model)	GDP growth	Unemployment rate (pp variation)	Real wage (growth wrt old model)	Hours per worker (growth wrt old model)	Years to reduce 10 points unemployment rate
growth model						
Old model (1984-2008)	–	3.00	-1.00	–	–	10.00
New model (scenario 1)	1.07	3.00	-0.49	0.18	-0.47	20.45
New model (scenario 2)	1.00	3.71	-0.72	0	-0.25	13.88
Labour market reforms						
5% reduction in Nash parameter	1.06	3.00	-0.66	0.16	-0.87	15.06
5% reduction in separation rate	1.11	3.00	-0.68	0.25	-0.95	14.73
5% increase in matching efficiency	1.11	3.00	-0.70	0.27	-1.01	14.27
10% reduction in the cost of vacancies	1.11	3.00	-0.75	0.29	-1.13	13.33
1% increase in search intensity	1.07	3.00	-0.72	0.17	-1.00	13.96
All proposals together	1.17	3.00	-1.54	0.40	-2.97	6.50

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