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FINANCING UNEMPLOYMENT BENEFITS BY GOODS MARKET COMPETITION: FISCAL POLICY AND REGULATION WITH MARKET IMPERFECTIONS

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Financing unemployment benefits by goods market competition: fiscal policy and regulation with market imperfections

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Abstract

We consider a model with labor market frictions and monopolistic competition in the goods market. We introduce proportional income taxation and unemployment benefits with Government balanced budget constraint. We evaluate the effects of both more competition and higher unemployment benefits. We show that more competition has a positive effect on employment and the Government budget. Higher unemployment benefits can be financed both by higher tax rate and by increasing competition. Liberalization policies could permit: a) to avoid an increase in unemployment if we allow some rise in the tax rate; b) to decrease unemployment keeping the tax rate unchanged.

JEL classifications: H20, J64, J65

Keywords: Matching Models, Monopolistic Competition, Fiscal Policy, Unemployment Insurance

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1 Introduction

The Nineties were characterized by a number of labor market reforms in the major European countries. The introduction of "non-standard" labor contracts allowed for easier access to the labor market for some categories of workers (mainly young people looking for first job), but it also determined an increase in the flows in and out of unemployment.

With respect to some EU countries this process was not accompanied by the introduction of unemployment benefits programmes able to give support to the unemployed workers in the transition period from one job to another. This is also due to the difficulty of drawing upon resources to finance these kinds of programs given the public budget constraints imposed by the EMU.

At the same time, the last few years have seen the emergence of a new political determination to introduce measures to increase the degree of competition in some strategic sectors, such as the services and public utilities. In particular, pushes towards liberalizations policies come both from European Commission and from consumers.

Such is the context of the subject matter of this paper which aims to study the interactions between wage taxation, unemployment benefits, and product market liberalization policies, in a theoretical framework where the labor market is characterized by search frictions (Pissarides (2000)) and there is monopolistic competition in the goods market (Dixit and Stiglitz (1977)).

The issue is important since greater competition can help to free resources which may serve to reduce taxation or to channel the public surplus generated by liberalization towards some forms of social expenditure.

By the term competition policy we mean the set of measures that aim to widen the area of the market economy, with interventions in different areas:

a) liberalization and simplification, in order to remove the public constraints on the free behavior of economic agents; *b*) privatization, to eliminate the constraints of implicit control over entrepreneurship by the Government; *c*) regulation to introduce new rules, mainly market-oriented; *d*) specific guarantee interventions, within application of antitrust legislation.

There are several empirical studies that show the positive effects of a higher level of competition. First of all, it is reasonable to suppose that greater competition determines a positive effect on per capita income, which can be considered a convenient measure of welfare. Nicoletti and Scarpetta (2003) have pointed out the positive effect on productivity, through an improvement in the allocation of resources and as an incentive for managers to increase productive efficiency. Positive effects of competition on innovation and on the diffusion of technology have been underlined by Aghion, Harris, Howitt, and Vickers (2001) and Gust and Marquez (2002). Alesina, Ardagna, Nicoletti, Schiantarelli, and Nicoletti (2003) have empirically shown how greater competition can have a positive effect on the level of fixed investments, at least for certain types of industries.

Moreover, there are many contributions that show how a higher level of competition (especially with the removal of entry barriers) can have positive effects on employment[1], from both the theoretical (Pissarides (2001); Saint-Paul (2002); Blanchard and Giavazzi (2003); Ebell and Haefke (2003); Fiori, Nicoletti, Scarpetta, and Schiantarelli (2007)) and the empirical point of view (Boeri, Nicoletti, and Scarpetta (2000); Nicoletti, Haffner, Nickell, Scarpetta, and Zoega (2001); Kugler and Pica (2006); Nicoletti and Scarpetta (2004)). In fact, greater competition reduces the firms' rents in the

[1] With the exception of Amable and Gatti (2004), that, in a efficiency wage framework, show the negative effects of more competition on job security (by the reduction of hiring and separation rate), and the consequential real wages increase to the point that more competition may produce employment losses rather than gains.

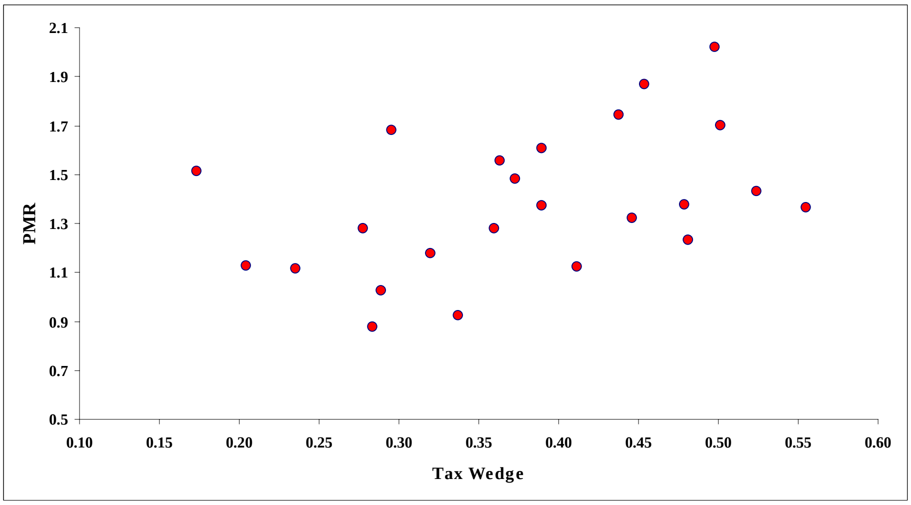
goods market, determining an increase of the production activity and therefore of employment. Moreover, the more competitive the product market is, the more negative will a rigid labor market prove for the growth rate of the economy.

The empirical evidence suggests a positive relationship between reforms in the goods market and reforms in the labor market in the $OECD$ countries, underlining how the latter is generally preceded by the former (Brandt, Burniaux, and Duval (2005)). Blanchard and Giavazzi (2003) show that reforms in the goods market, reducing the firms' rent, are also able to reduce the workers' incentive to appropriate such rents (by maintaining or increasing their bargaining power), thus reducing in resistance to labor market reforms. Koeniger and Vindigni (2003) argue that resistance to labor market reforms (in particular with regard to employment protection) can be reduced with liberalization policies if they are able to determine an increase in job opportunities.

Blanchard and Giavazzi (2003) show how product market regulation and bargaining power of workers determine the size and distribution of rents and the macroeconomic equilibrium. Among others, they find that more competition, by decreasing rents, reduces the incentives for workers to appropriate a part of these rents, facilitating labor market deregulation.

Following Ziesemer (2005), we extend the Blanchard and Giavazzi (2003) model introducing frictions in the labor market. Moreover, we add to this framework proportional income taxation and a more realistic setting of unemployment benefits. Using this model, we evaluate the potential room that more competition can leave to fiscal policy, not only in terms of public revenue (proportional taxation) but also of public expenditure (to finance unemployment benefits). In this framework, we show that more competi-

FIGURE 1
Correlation between tax wedge and PMR in OECD countries - 2003



tion in the goods market has a positive effect on the Government budget and on equilibrium unemployment. The public budget surplus can finance either higher unemployment benefits or tax reduction. In the former case, the cost is represented by a lower increase in aggregate employment than in the latter case.

The fact that a higher degree of competition is often associated with a lower level of taxation seems to be confirmed, at a very preliminary stage, by the positive correlation between the $OECD$ Product Market Regulation Index[2] and the tax wedge (see figure 1).

The paper is organized as follows. The next section describes the model, while section 3 focus on equilibrium, comparative statics and some policy considerations. Section 4 concludes.

[2] The indicators of the degree of competition in the goods market are calculated through the *OECD International Regulation Database*, which contains all the information for calculation of the Product Market Regulation (PMR) Index. This index was first introduced by the $OECD$ in 1998 and subsequently updated in 2003. It is built considering a set of norms and regulations that are potentially able to reduce the degree of competition in particular sectors of the goods market, where the technology and the market conditions can determine relevant benefits for the whole economy.

2 The model

2.1 Frictions in the labor market

Consider an economy with risk-neutral workers and firms which discount future at constant rate r. The labor force is given and normalized to one. Job-worker pairs are destroyed at the exogenous Poisson rate s. Unemployed workers and vacancies randomly match according to a Poisson process. If the unemployed workers are the only job seekers and they search with fixed intensity of one unit each, and firms also search with fixed intensity of one unit for each job vacancy, the matching function gives $h = h(u, v)$ where h denotes the flow of new matches, u is the unemployment rate and v is the vacancy rate.

The matching function is assumed to be increasing in each argument and to have constant return to scale overall.[3] Furthermore, it is assumed to be continuous and differentiable, with positive first partial derivatives and negative second derivatives.

By means of the properties of the matching function, we can define the average rate at which vacancies meet potential partners by the following "intensive" representation of the matching function:

$$\frac{h(u,v)}{v} = m(\theta) \tag{1}$$

with $m'(\theta) < 0$. θ is the ratio between vacancies and unemployed workers $\frac{v}{u}$ and can be interpreted as a convenient measure of labor market tightness.

Similarly, $\frac{h(u,v)}{u}$ is the probability for an unemployed worker to find a job. Simple algebra shows that:

[3] On the ground of empirical plausibility, see Petrolongo and Pissarides (2001) for a survey.

$$\frac{h(u,v)}{u} = \frac{h(u,v)}{v}\frac{v}{u} = \theta m(\theta) \tag{2}$$

The linear homogeneity of the matching function implies that $\theta m(\theta)$ is increasing with θ. The dependence of the two transition probabilities, $m(\theta)$ and $\theta m(\theta)$, on the relative number of traders implies the existence of a trading externality (Diamond (1982)). Increasing vacancies cause congestion for other firms, as increasing unemployed job searchers cause congestion for other workers.

The measure of workers who enter unemployment is $s(1-u)$, while the measure of workers who leave unemployment is $\theta m(\theta) u$. The dynamics of unemployment is given by the difference between inflows and outflows: $\dot{u} = s(1-u) - \theta m(\theta) u$. This differential equation defines dynamics converging to the unique steady state:

$$u = \frac{s}{s + \theta m(\theta)} \tag{3}$$

showing that θ uniquely determines the unemployment rate. The properties of the matching function ensure that the equation (3) is decreasing and convex.

Taking into account that there is proportional income taxation, consider now the "value" E of being an employed worker. This is defined by the following equation:

$$rE = w(1-t) + s(U-E) \tag{4}$$

An employed worker earns net wage $w(1-t)$, but loses his job with flow probability s. In the latter case, his utility plunges to that of an unemployed worker. The value U of being an unemployed worker is given by:

$$rU = b + \rho w(1-t) + \theta m(\theta)(E-U) \tag{5}$$

The unemployed worker earns flow utility b, representing the value of leisure, plus the unemployment benefit as a fixed proportion ρ (replacement ratio) of the net wage $w(1-t)$. Then, with probability $\theta m(\theta)$, she finds employment.

2.2 Monopolistic competition in the goods market

We assume that households have love-of-variety preferences that can be expressed by the following constant elasticity of substitution type:

$$y_i = \left[n^{-\frac{1}{\sigma}} \int_0^n y_{ij}^{\frac{\sigma-1}{\sigma}} di \right]^{\frac{\sigma}{\sigma-1}} \tag{6}$$

where y_{ij} is the household j's consumption of good i and $\sigma > 1$ is the elasticity of substitution among n differentiated goods.

In continuos time, the problem of representative household j is to choose the value of consumption y_{ij} that maximizes $\int_0^\infty e^{-\delta t} \left[n^{-\frac{1}{\sigma}} \int_0^n y_{ij}^{\frac{\sigma-1}{\sigma}} di \right]^{\frac{\sigma}{\sigma-1}} dt$, subject to the budget constraint $\dot{A}_j = rA_j + I - \int_0^n p_i y_{ij} di$ and $A_j(0) = \bar{A} \geq 0$. δ is the subjective discount rate, A_j is the current wealth and p_i is the price of good i. I can be defined as the average of the workers income when employed or unemployed, weighted with the probability to be in the two states: $I = (1-u)w(1-t) + u[b + \rho w(1-t)]$.

The Hamiltonian current value of the intertemporal optimization problem is given by:

$$H=\left[n^{-\frac{1}{\sigma}}\int\limits_{0}^{n}y_{ij}^{\frac{\sigma-1}{\sigma}}di\right]^{\frac{\sigma}{\sigma-1}}+\lambda\left[rA_j+(1-u)\,w(1-t)+u\left[b+\rho w\,(1-t)\right]-\int_0^n p_i y_{ij}di\right] \tag{7}$$

The FOCs are:

$$\left[n^{-\frac{1}{\sigma}}\int\limits_{i=0}^{n}y_{ij}^{\frac{\sigma-1}{\sigma}}di\right]^{\frac{1}{\sigma-1}}n^{-\frac{1}{\sigma}}y_{ij}^{-\frac{1}{\sigma}}=\lambda p_i \tag{8}$$

$$\dot{\lambda}-\delta\lambda=-r\lambda \tag{9}$$

From equation (8) we can derive the following relationship for every couple of goods i and k:

$$\frac{y_{ij}}{y_{kj}}=\left(\frac{p_i}{p_k}\right)^{-\sigma} \tag{10}$$

Equation (10) shows that the relative demand for goods is independent of the income earned by employed or unemployed.

In steady state, condition (9) gives $r=\delta$. Solving (8) for y_{ij} yields:

$$y_{ij}=(\lambda p_i)^{-\sigma}\,\frac{y_j}{n} \tag{11}$$

Substituting into (6) we obtain:

$$\lambda=\left(n^{\frac{\sigma-1}{\sigma}}\int_0^n p_i^{1-\sigma}di\right)^{\frac{1}{\sigma-1}}=\frac{1}{p}$$

That is, λ is the inverse of the price index p. Substituting the latter equation into (11) we obtain the aggregate demand for good i:

$$y_i = \left(\frac{p_i}{p}\right)^{-\sigma} \frac{Y}{n} \tag{12}$$

where Y is the aggregate level of consumption and σ is the constant elasticity of the demand function.

2.3 Profit maximization

There is a large number of multiple-worker firms and no single firm is able to affect labor market tightness θ. Monopolistic competition in the goods market implies that each firm produces only one of the n goods that appear in the utility function. Technology is defined by the production function $y_i = l_i - f$, where l_i is the number of workers involved in production of good i, and the marginal labor productivity is assumed to be equal to 1. Futhermore, this production function exhibits internal economy of scale because of the fixed cost component f.

The firm maximizes the present discounted value of expected profits $\int_0^\infty e^{-rt} \left[\frac{p_i(y_i)}{p} y_i - w_i y_i - c v_i\right] dt$, subject to the law of motion of quantity $\dot{y}_i = m(\theta) v_i - s y_i$, where $p_i(y_i)$ is the inverse demand function faced by the firm producing good i, w_i is the real wage, and c is the cost of keeping a vacancy open.

Solving the maximization programme, we get the standard price setting rule under imperfect competition:

$$\frac{p_i(y_i)}{p} = (1 + \mu)\left(w_i + \frac{(r+s)c}{m(\theta)}\right) \tag{13}$$

where $\mu = \frac{1}{\sigma - 1}$ is the mark-up on marginal costs, given by the state of technology and the expected recruiting cost.

Finally, solving equation (13) for w_i, and considering symmetric equilibrium ($\frac{p_i(y_i)}{p} = 1$) we get the job creation condition as a relationship between real wage and labor market tightness:

$$w = \frac{1}{1+\mu} - \frac{(r+s)\,c}{m(\theta)} \tag{14}$$

that represents the level of wage that firms are willing to pay. The worker receives a wage lower than productivity because of both the finite value of the demand elasticity of product ($\frac{1}{1+\mu} = \frac{\sigma-1}{\sigma} < 1$), and the expected search cost $\frac{(r+s)c}{m(\theta)}$.

2.4 Wage setting

Since firms are multiple-workers, their outside option is to produce with one worker less. Consider a firm with an open vacancy and $l_i - 1$ workers and define its value by $V(l_i - 1)$. Thus the stock price of this firm, $V(l_i - 1)$ must satisfy:

$$rV(l_i - 1) = -c + m(\theta)\left[J(l_i) - V(l_i - 1)\right] \tag{15}$$

With a flow probability $m(\theta)$ the firm fills the vacancy and its value jumps from $V(l_i - 1)$ to $J(l_i)$. Free entry implies that the value of a firm with an open vacancy cannot exceed the value of an inactive firm, i.e. zero. Thus, as long as some vacancies are held open at t, $V(l_i - 1) = 0$. Hence, equation (15) plus free-entry implies that:

$$J(l_i) = \frac{c}{m(\theta)} \tag{16}$$

Equation (16) states that the value of a filled job must be equal to the maintenance cost by the expected duration of a vacancy. Since a filled job can be destroyed with probability s, the current value of the expected value of a filled job is $(r+s)\,J\,(l_i) = \frac{(r+s)c}{m(\theta)}$. The labor cost per worker then equals $w + \frac{(r+s)c}{m(\theta)}$.

When a searching firm and a searching worker meet, there is a potential gain from trade. The wage contract is the instrument to split this surplus. Firms and workers are assumed to bargain over the wage and conditions under which separation occurs. Each party can force renegotiation whenever it wishes, and in particular when new information arrives (or, equivalently, the parties bargain continuously as long as they remain matched).

We assume that the sharing rule stems from the following Nash bargaining problem:

$$w = \arg\max\,[E-U]^{\beta}\,[J\,(l_i) - V\,(l_i-1)]^{1-\beta} \tag{17}$$

The solution of this maximization programme yields the following sharing rule:

$$E - U = \frac{\beta\,(1-t)}{1-\beta}\,[J\,(l_i) - V\,(l_i-1)] \tag{18}$$

which states that the worker obtains a fraction β of the total surplus produced by the economic activity.

Making use of the free entry condition and of equations (4), (5) and noting that $J\,(l_i) = \frac{c}{m(\theta)} = \frac{\frac{1}{1+\mu}-w}{r+s}$, we get:

$$w = \frac{(1-\beta)\,b}{(1-t)\,[1-(1-\beta)\,\rho]} + \frac{\beta}{1-(1-\beta)\,\rho}\left[\frac{1}{1+\mu} + c\theta\right] \tag{19}$$

This condition is known as the wage equation, and it is a positively sloped relationship between the wage and the labor market tightness. Note that, since cv is the total recruiting cost in the economy, $c\theta$ is the recruiting cost per unemployed worker. When θ is high (tight labor market) the expected recruiting cost faced by firms is high, while, conversely, the cost for workers to wait for the next job offer is low. This implies that workers can bargain for better wages. Monopoly power in the goods market reduces the level of bargained wage. Moreover, the wage bargained by the workers increases in the value of their outside option, b, in the worker's bargaining power β, in the level of productivity and in the cost of recruiting unemployed workers c.

2.5 Government budget constraint

No public deficits are allowed, hence the Government faces the following budget constraint:

$$t\left[(1-u)w + u\rho w\right] = u\rho w \tag{20}$$

Looking at equation (20), on the left side we put the public revenue, on the right public expenditure. Public revenues come from taxation t on gross wage bulk $(1-u)w$ and on unemployment benefit $u\rho w$, while public expenditure is the unemployment benefit ρw paid to unemployed workers u.

Making use of the equation (3) and taking into account that $1 - u = \frac{\theta m(\theta)}{s+\theta m(\theta)}$, we can express the budget constraint as:

$$t = \frac{s\rho}{s\rho + \theta m\left(\theta\right)} \tag{21}$$

As $\theta m\left(\theta\right)$ is an increasing function of θ, equation (21) states a decreasing relationship between tax rate t and labor market tightness (the PB curve in figure 2), since rising θ brings the unemployment rate down; as a consequence we have a reduction of expenditure for unemployment benefits and, given t, an increase of the public revenue. Hence, the public budget balance requires a lower level of t.

3 Results

In this Section, we characterize the macroeconomic equilibrium and analyze the effects and interactions of product market regulation and labor market intervention. In particular, we begin by considering a reduction in mark-up μ as the final result of deregulation policies.[4] We will then assess the effect of an increase in the replacement ratio ρ. Finally, in the Discussion we will propose more general policy considerations in the light of previous comparative statics exercises.

3.1 Equilibrium

The steady state equilibrium is defined as a vector (w, θ, u, t) that solves the system of equations (14), (19), (3) and (21).

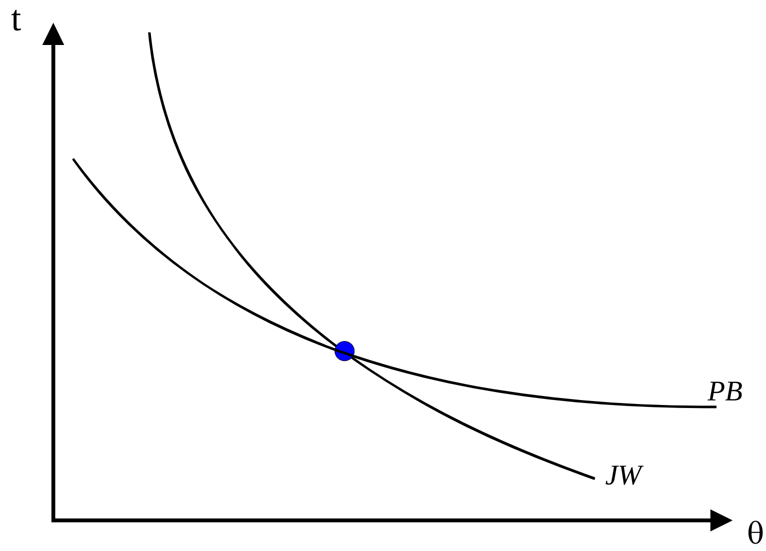
Equating equation (14) with equation (19) we obtain the following relationship:

$$\frac{1}{1+\mu} - \frac{(r+s)\,c}{m(\theta)} = \frac{(1-\beta)\,b}{(1-t)\,[1-(1-\beta)\,\rho]} + \frac{\beta}{1-(1-\beta)\,\rho}\left[\frac{1}{1+\mu} + c\theta\right] \tag{22}$$

which gives the pairs (t, θ) such that the labor market is in equilibrium. Equation (22) states a decreasing relationship between tax rate t and labor market tightness θ (the JW curve in figure 2). To see this, let us start from an initial situation where the labor market is in equilibrium for a given value

[4] Since in our model, the mark-up depends only on demand elasticity σ (i.e. a preference parameter), this procedure could be questionable. However, our results could also be obtained introducing entry costs, assuming demand elasticity as an increasing function of the number of firms (i.e. in a Hotelling fashion) and making comparative statics directly on entry costs. In the latter case, the variation of the mark-up is obtained indirectly from the variation of the entry costs, which affect the equilibrium number of firms and, as a further step, the demand elasticity. This is the way followed by Blanchard and Giavazzi (2003).

FIGURE 2



of the tax rate t. Higher t increases the worker's option value (by reduction of the net wage) leading firms to reduce the number of vacancies and, in this way, diminishing the equilibrium value of θ.

Equation (21) and (22) are a self contained block that gives the pairs (t, θ) such that the labor market is in equilibrium and the Government budget is in balance (see figure 2).[5] Then, by equations (3) we can derive the equilibrium value of the unemployment rate u. Finally, substituting the equilibrium value of θ either into the job creation condition (14) or into the wage equation (19), we get the equilibrium value of the gross wage.

To close the model, we need to determine the equilibrium size of the firm and the number of active firms.

To do this, we have to impose the zero profit condition. Given the instantaneous profit $\frac{p_i(y_i)}{p}y_i - w_i y_i - cv_i$ in symmetric equilibrium, equating it to zero and using the production function $y_i = l_i - f$ we get:

[5] In principle, the PB curve could be steeper or flatter than the JW curve. We focus on the latter situation since it guarantees a stable equilibrium.

$$y - w\,(f + y) - cv = 0 \tag{23}$$

Let us consider the law of motion of the firm's output given by $\dot{y} = m\,(\theta)\,v - s\,(f + y)$; solving for v in steady state equilibrium ($\dot{y} = 0$) we have:

$$v = \frac{s\,(f + y)}{m\,(\theta)} \tag{24}$$

Substituting the latter equation into zero profit condition (23) and solving by y we obtain the equilibrium firm size:

$$y = \frac{f\,[m\,(\theta)\,w^{*} + sc]}{(1 - w^{*})\,m\,(\theta) - sc} \tag{25}$$

where w^{*} is the equilibrium wage.

We can now determine the equilibrium number of active firms in symmetric equilibrium. Total labor requirement is nl, where n is the number of firms. Equating this to the employment $1 - u$ and solving for n we get:

$$n = \frac{1 - u}{l} \tag{26}$$

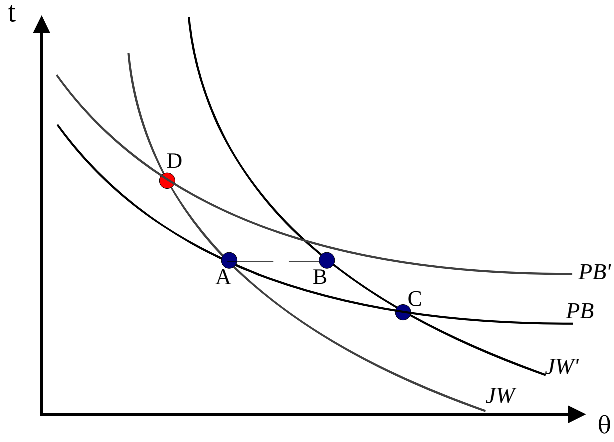
Making use of equation (3), the production function and equation (25), we obtain that the firms' equilibrium number n must satisfy the following condition:

$$n = \frac{\theta\,[(1 - w^{*})\,m\,(\theta) - sc]}{f\,(2 - w^{*})\,[s + \theta m\,(\theta)]} \tag{27}$$

3.2 Comparative statics

In this Section we perform some comparative statics analysis, in order to assess the effects of changes in mark-up μ and replacement ratio ρ.

FIGURE 3



Let us consider the effect of a decrease in the mark-up μ. Looking at figure 3, we see that the JW curve moves up to the right. Given t, we have that both the wage that firms are willing to pay (*via* the job creation condition) and the wage required by the workers (*via* the wage equation) increase; however, the latter increase is proportionally lower than the former. As a consequence, firms will open a higher number of vacancies, which in turn implies higher θ and lower unemployment rate u. In terms of figure 3, this implies a shift from equilibrium A to B, where the labor market is in equilibrium (point B is on the JW curve) but the public budget is in surplus (because of the lower level of unemployment). Given ρ, lower tax rate t is required in order to balance the Government budget. The tax rate reduction produces a feedback on the bargained wage because the workers will perceive a higher net wage and will claim a lower gross wage, with a further positive effect on θ (given the wage offered by the firm). The final result of this process will be a higher equilibrium value of θ and a lower equilibrium value of t (point C in figure 3).

Consider an increase in the replacement ratio ρ, assuming as starting point the equilibrium C in figure 3. This implies a shift down to the left of the JW curve (from JW' to JW) and up to the right of the PB curve (from PB to PB'). The former effect stems from the fact that, given t, an increase in ρ enhances the option value of the worker who will claim a higher gross wage. Consequently, given the negative effect on profit, the firms reduce vacancies. This leads to a higher level of wage w and a lower level of tightness θ. The shift of the PB curve is due to the fact that, given θ, an increase in ρ requires a higher tax rate t in order to balance the public budget. A corresponding process with respect to the one discussed above with regard to a reduction in μ, leads to a lower equilibrium value of θ and a higher equilibrium tax rate t. Looking at figure 3, we move from equilibrium C to equilibrium D.

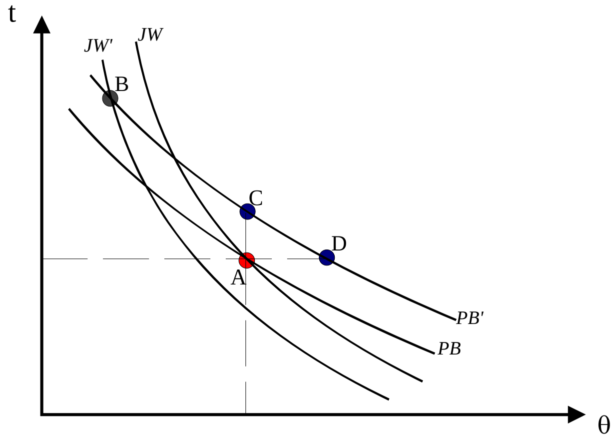
3.3 Discussion

Our framework suggests interesting implications for policy. Looking at the experience of some European countries (especially Italy and Spain), the late Nineties were the years of increasing labor market flexibility, with the introduction of atypical labor contracts and change in employment relationships.

Labor market flexibility brings about social costs related to the higher turnover. In the particular case of Italy this has raised a policy debate on the possibility of introducing some support for unemployed workers, in a country where the replacement ratio is low when compared with the other $OECD$ countries. The results of our model show that an increase in the replacement ratio can be conveniently joined with liberalization policies able to increase competition in goods markets sector.

Let us sketching this argument using our diagram. Suppose that subsequent to the labor market flexibilization policies of the Nineties the economy

FIGURE 4



reached equilibrium A in figure 4. Our finding is that if we increased the replacement ratio (i.e. per-capita unemployment benefits) letting the tax rate adjust freely, we would get equilibrium B, which is characterized by higher unemployment and tax rate. However, if combining the increase in unemployment benefits with liberalization policies, we could possibly reach equilibrium C, with the same equilibrium unemployment rate as in equilibrium A and with a tax rate slightly higher. Alternatively, we could reach equilibrium D with lower unemployment rate and keeping the tax rate constant.

4 Conclusions

In this paper we have analyzed the policy implications in a model with frictions in the labor market and monopolistic competition in the goods market, when the Government has a balanced budget constraint. We have made comparative statics analyzing the effects on equilibrium of a change in the degree of product market competition and a change in the replacement ratio.

It is found that: *a*) more competition in the goods market leads to a lower equilibrium unemployment and, given the replacement ratio, a lower tax rate; *b*) higher unemployment benefits make the labor market tighter with a negative effect on equilibrium unemployment and require a higher tax rate in order to balance the public budget; *c*) wrapping up results a and b, increasing competition in the goods market has a positive effect on the Government budget and on equilibrium unemployment; the public budget surplus can finance either higher unemployment benefits or tax reduction. In the former case, the cost is represented by a lower increase in aggregate employment than in the latter case.

We do not tackle some interesting issues that could be an object for future research. It would be interesting to evaluate the redistributive effects deriving from comparative static analysis. The issue could be treated in two respects: the redistributive effects between labor and entrepreneurs' income and, introducing heterogeneity, the redistributive effects among different types of agents. Furthermore, modelling progressive taxation could be able to enrich the model.

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