The political viability of policies to decrease unemployment (Preliminary)

Jo Seldeslachts[1]
International Doctorate in Economic Analysis,
Universitat Autonoma de Barcelona

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Abstract

Since the unemployment problem is very important, especially in Europe, governments are trying to design labour policies in order to increase employment. However, these policies face very often political opposition from the employed workers, because it can reduce their wages. Most of the papers that look at this issue, take as assumption perfect competition in the product market, so there is no real interaction between the product market and the labour market. This paper links the structure of the labour market with firms' competitiveness in the product market. We find that it is easier to get political approval for labour policies, when there is more competition in the product market. More importantly, when *combining* policies in both the product market and labour market, the opposition for more employment decreases considerably. When there is still room for improvement in both the labour and product markets, a combination of labour and competition policies can be in favour of the employed *and* the firms. This is because the two policies are complementary and the gains in total welfare from more competition and more employment can be more evenly distributed over the interest groups. the necessity to have room for improvement in both markets, implies as well that when both markets are reformed at the same pace, there are less chances to encounter rigidities.

1 Introduction

Unemployment is an important problem, especially in Europe, and governments are trying to design labour policies[1] in order to reduce unemployment. This receives a lot of attention in the labour economics literature (see e.g. Snower & de la DeHesa [2], and both researchers and politicians are looking for ways to decrease unemployment. But why is it so difficult to decrease unemployment? In several economies the functioning of the labour market is influenced by a set of regulations like employment protection legislation, taxes, minimum wages, etc. While these regulations are necessary in a welfare state, they can give raise to *rigidities*, i.e. it is hard to change them. Why are economies rigid? The main reason, Saint-Paul [10] says, is that many reforms of the labour market have proved difficult to implement because they face fierce opposition by large or powerful sectors of society. So, it may be possible that the economy will be locked in an undesirable situation from the point of view of total welfare, because one group blocks reforms. Who will have the power to block a labour market reform? Lindbeck & Snower [6] showed that when there are microeconomic frictions in the labour market, employed workers ("insiders") increase their bargaining power and are often the decisive group in the labour market, even when they are not able to form a labour union. Why do employed people often oppose labour policies that increase employment? Microeconomic frictions, such as imperfect observability of effort at the firm level, or costly search and recruiting, give rise to *rents*. A rent is the difference between the welfare of an employed worker and an unemployed one and tells us how far wages are from market clearing and explains why involuntary unemployment exists. Now, legal restrictions often magnify these microeconomic frictions, for example a firing restriction would increase the cost of replacing a worker, which means he can extract bigger part of the surplus. Because a rent reduces employment, it reduces as well the job finding rate and may increase the job loss rate, which harms the employed workers, so that if some of them gain, it must be because they have greater wages. So, labour policies that try to decrease legal restrictions are opposed by employed when these restrictions give them greater wages. Saint-Paul [9] has identified how approval depends on the structure of the labour market.

However, most of the papers written on labour policies from a political point of view take only into account the workers that are present in the labour market. The influence of the product market is not taken into account, in other words, the price in the product market

[1] Labour policies are defined as changes in the labour market structure that increase employment. Examples are active support of long term unemployed workers, less restrictive firing laws, lower minmum wages etc.

is taken as given. So, firms compete in perfect competition and are passive players. The consequence of this way of modelling is twofold. First, it is not possible to see how conditions in the product market influence the equilibrium in the labour market. Second, one cannot take into account the interest of firms, since firms are always making zero profits they are indifferent to any change. The only work we found that in the political process of deciding labour policies takes the firm into account, is in Fredriksson [3]. He looks at programs to incorporate the long term unemployed back into employment, taking into account the firm as a possible interest group. In macroeconomics, product markets are often taken into account (see e.g. Lindbeck & Snower [7]), but these papers are not written from a political point of view.

We think it is interesting to incorporate a product market, where firms have market power and decide actively how much they want to produce and how much labour they need. Hence, the degree of competition in the product market (the number of firms directly competing in the product market), has an influence on the demand for labour. In the first part of the paper, we will look at how the equilibrium employment and equilibrium wage in the labour market are influenced by the degree of competition in the product market.

Second, the degree of competition in the product market may have an influence on the *effect* of labour policies. Since employed workers oppose a labour policy when it decreases their welfare, we analyse whether conditions in the product market change the opposition of the employed workers for a labour policy. We compare our results with other models that investigate the factors that influence their approval.

Third, and most importantly, our way of modelling opens the way for *combined* policies. A government can not only try to change conditions in the labour market, but also in the product market. The effect of labour policies and competition policies[2] are reasonably well understood in their respective markets. For example, Coe & Snower [1] show that comprehensive policies in the labour market leads to less unemployment because of complementarities. But what if a government uses both policies in the labour market and product market at the same time to fight unemployment? Combining the two policies normally increases the possibility of approval from the employed workers. Of course, now it seems reasonable to take into account as well the welfare of firms, since they are directly affected by competition policies and will try to

[2]By competition policies we mean altering the competition laws to increase the competition in the product market.

block reforms. So, we assume that both the employed workers and firms have seperately the possibility to block reforms when it disfavours them. The policies are complements, labour policy may hurt the employed, but can favor the firms. Competition policy normally increases welfare of employed people, but can be bad for firms. The use of a combination of both opens the possibility to distribute the losses and gains of more employment. We will look whether this can result in a less rigid economy.

In the second section, we characterise the equilibrium in the labour market in function of the labour supply and competition in the product market. In the third section, we search for politically viable policies to increase employment. These can be labour policies or combined policies. The last section concludes.

2 Equilibrium in the labour market

We develop a labour supply based on the efficiency wage model from Shapiro & Stiglitz [11]. The labour demand comes from firms that are competing in the product market á la Cournot. The equilibrium in the labour market coincides with the intersection of labour demand and supply and depends, all other parameters equal, on the degree of competition in the product market.

As in Shapiro & Stiglitz, a worker's effort is not perfectly observable and there is a detection technology that catches shirking workers with some probability q (where $q < 1$). Each firm finds it optimal to fire shirkers, since the only other punishment, a wage reduction, would simply induce the disciplined worker to shirk again.[3] Hence, in Shapiro & Stiglitz each firm fires the worker with probability 1 when a worker is detected shirking. However, often the labour laws put some constraint on the circumstances in which a firm can fire a worker. We introduce a parameter s that reflects the legal framework in the labour market. The parameter s can be understood as a measure of flexibility of the labour market and is set legally by the government.[4] The probability of getting fired when caught shirking becomes now $sq \in [0, 1]$. Workers also have an exogenous probability b of being separated from the due to relocation, recession, etc. In the next section we describe the labour supply in more detail.

[3]Since q is associated with the monitoring technology, it can safely be assumed that firms do not want to fire people if they are not shirking. This is because other (exogenous) reasons of loosing a job are accounted by b in the model.

[4] For example, it is more difficult to fire a worker on Belgium than in the US, so flexibility s is lower in Belgium.

On the demand side of the labour market, firms decide how much labour they want as a function of the wage they have to pay. In the literature of the political economy of labour market reforms the demand side of the labour market is assumed to be the marginal product of labour, which must be equal to the wage in equilibrium, $w = p\frac{\partial F(x)}{\partial x}$, where p is the given price of the output in the product market, x is the total number of labour used and $F(x)$ is the total production of the firms present in the labour market. As stated in the introduction, we model a product market where firms compete à la Cournot and where the degree of competition, i.e. the number of firms that are competing in the same product market, varies. The fact that we can distinguish between different degrees of competition in the product market, means that we can not only analyse how the equilibrium in both labour markets and product markets changes, but that we can model as well the effect of competition policies on employment. We assume that firms have power in the product market, but are wage takers in the labour market.

2.1 Labour Supply

Our supply in the labour market is based on the efficiency wage theory, developed by Shapiro & Stiglitz, where the wage is set to motivate the worker to expend optimal effort on the job. The critical assumption in the efficiency wage theory is that workers' effort on the job cannot be perfectly observed. In order to have information, a monitoring technology has to be used. An employer wants to fire any worker found shirking, but the monitoring technology is imperfect and there is always a possibility that a worker shirking is not detected. And even when caught shirking, there is the possibility that workers cannot be fired because of legal restrictions. Workers will offer effort by comparing expected gain of keeping the job and expected loss of getting caught and fired when shirking. To put incentive in order that a worker does not shirk, the employer pays the "efficiency wage" that equates the expected loss in future income if caught shirking and fired to the value of leisure enjoyed while shirking. In equilibrium, all firms will offer the same wage, so a worker would find the same wage in another firm and the incentive to expend effort would disappear. But if the labour market does not work infinitely fast, a fired worker will not immediately obtain another job and involuntary unemployment results. This involuntary unemployment works as an incentive device for the worker not to shirk. With unemployment, even if all firms pay the same wages, a worker has an incentive not to shirk. This gives an explanation why wages do not fall to clear the markets and therefore why involuntary unemployment appears to be persistent in many labour markets. We now formalise this model.

There exists a total number of identical workers n and each worker is at any point of time either employed or unemployed. A worker is assumed to be risk neutral and his instantaneous utility function is separable in wage and effort: $U(y, E) = y - E$, where y is the payment a worker gets at each instant and E his effort. We suppose that an unemployed individual receives no unemployment benefit $y = 0$ and does not supply any effort ($E = 0$), which means that his instantaneous utility is $U_u(y, E) = 0$. An employed worker receives a wage $y = w$ and decides to shirk ($E = 0$) or to provide some fixed positive level of effort $E = e > 0$. There are only two possible levels of effort which means that the selection of an effort level is a discrete choice in the model. A shirker has an instantaneous utility $U_e^s(y, E) = w$ and a non-shirker has a utility $U_e^{ns}(y, E) = w - e$. The only choice an employed worker makes is the selection of effort. If the worker supplies effort for his job, only exogenous factors can cause a separation. This exogenous separation rate is due to relocation, recession, etc. and is a probability per unit of time $b \in [0, 1]$. If an employed worker shirks, there is again the possibility b that he will loose his job, but there has to be added a probability $sq \in [0, 1]$ per unit of time that he will be fired when discovered shirking, where q is the probability being caught and s the probability being fired when caught shirking. For $s = 1$, this would give us the original condition from Shapiro & Stiglitz.

The worker selects an effort level to maximise his discounted utility stream. This involves a comparison of the (expected) utility from shirking with the (expected) utility from not shirking, to which we now turn. We define Ve^s as the expected lifetime utility of an employed worker who shirks, Ve^{ns} the expected lifetime utility of an employed nonshirker and V_u as expected lifetime utility of an unemployed individual. The asset value equation for a nonshirker is given by

$$rVe^{ns} = w - e + b(Vu - Ve^{ns}), \tag{1}$$

while for a shirker, it is

$$rVe^s = w + (b + sq)(Vu - Ve^s). \tag{2}$$

Each of these two equations is of the form "interest rate r times asset value equals flow benefits".[5] The difference between the two valuations is that a non-shirker has a lower instantaneous utility $(w-e)$, because he supplies effort , but a shirker has a higher probability to loose his job $(b+sq)$. Hence, the risk of getting unemployed is proportional to the probability of getting caught q *and*

[5]We only consider the steady state and do not take into account differences of V_e and V_u over time. See Kimball [5] for a dynamic version of the effciciency wage model.

to the flexibility of the labour market s. If the labour market is more regulated, the lower will be s, and the less the cost of shirking.

The no-shirking condition is $Ve^{ns} \geq Ve^{s}$. The employer will pay the minimum allowable wage in order to meet the no-shirking condition , which means that in equilibrium $Ve^{s} = Ve^{ns} = Ve$. Substracting the asset value of the shirker (2) from the asset value of the non-shirker (1), and using that in equilibrium they will be the same yields:

$$Ve = Vu + \frac{e}{sq}. \tag{3}$$

Using the relation between the value of the unemployed and employed workers (3), we find the asset value for an unemployed person:

$$\begin{aligned} rVu &= a(Ve - Vu) \\ &= a\frac{e}{sq}, \end{aligned} \tag{4}$$

where a is the probability of obtaining a job per unit of time.

Because in equilibrium the no-shirking condition will hold with equality and using the relation between the values for the employed workers and unemployed workers (3), we can rewrite the no-shirking condition as

$$w = e + (r + b + a)\frac{e}{sq}. \tag{5}$$

The rate a itself can be related to more fundamental parameters of the model. The flow into the unemployment pool is bx, where x is aggregate employment and b the exogenous separation rate. The flow out of the unemployment pool is $a(n - x)$, where n is the total workforce. In the steady state, these must be equal , so $bx = a(n - x)$, or

$$a = \frac{bx}{n - x}. \tag{6}$$

Therefore the no-shirking condition (5) can be written as

$$\begin{aligned} w &= e + (r + \frac{bn}{n - x})\frac{e}{sq} \\ &= rV_u + e + \frac{e}{sq}(r + b). \end{aligned} \tag{7}$$

If the firm pays this wage, workers will not shirk. In this wage equation, we can distinguish between the reservation wage $rV_u + e$ and the rent linked to the incentive problem $\frac{e}{sq}(r + b)$. It is easy to see that the higher the flexibility of the labour market s, the lower the efficiency wage.

Hence, rents arise because of microeconomic frictions and are magnified by legal restrictions in the labour market.

Equation (7) is the labour supply curve for *one* firm. If we suppose that there are N firms demanding unskilled labour in the labour market, and that the total labour force consists of Nn workers (we replicate the economy N times), we can write the total labour supply as

$$w = e + (r + \frac{bNn}{Nn - \sum^N x_i})\frac{e}{sq}, \tag{8}$$

where x_i is the number of workers employed by firm i and $\sum^N x_i$ is the total number of employed workers in the labour market. Since firms are wage takers in the labour market, N is assumed to be a large natural number.

2.2 Labour Demand

On the demand side of the labour market, firms decide how much labour they want as a function of the wage they have to pay. The firm's production function is

$$f(x, y) = x^{\alpha},$$

and we are implicitly assuming that the firm's other production factors (capital or skilled labour) are fixed and at full capacity. In labour economics on the micro-level, the demand side of the labour market is often determined by the marginal product of labour which must be equal to the wage in equilibrium,

$$w = p\frac{\partial F(x)}{\partial x}, \tag{9}$$

where p is the given price of the output in the product market, x is the number of labour used and $F(x)$ is the total production of the firms present in the labour market.

However, firms are usually not facing perfect competition in the product market, but have some market power. We introduce a product market, where firms are competing á la Cournot, taking the wage in the labour market as given. In equilibrium, the wage will again be equal to the marginal product of labour, but the marginal product of labour will now not only depend on the production function of the firms, but as well on the demand and the degree of competition in the product market. A firm again equates wage to marginal product of labour in the optimum, but now the price in the product market will vary when a firm changes its production $f(x)$, $\frac{\partial p}{\partial f(x)} \neq 0$ and the demand for labour from a firm is now

$$w = \frac{P(F(x))}{\partial f(x)} \frac{\partial f(x)}{\partial x}. \tag{10}$$

Clearly, the marginal productivity of unskilled labour depends on the degree of competition, because $P(F(x))$ is dependent on the number of firms present in the product market. So, given the wage, each firm makes the optimal decision about its production depending on the competition it faces.

In order to isolate the influence of the competition in the product market, we want to keep the size of the product market and the number of firms present in the labour market constant. To accomplish this, we model the product market as a special version of a replica economy. If we suppose that total production is separable in individual productions, $F(x,y) = \sum f(x,y)$ and total size of the product market is equal to d, then we can write inverse demand in the product market as

$$\begin{aligned} p &= d - \frac{\sum^m f(x)}{m} \\ &= d - \frac{\sum^m x_i^\alpha}{m}, \end{aligned} \tag{11}$$

where m indicates the degree of competition in the product market. For example, $m = 1$ means that all firms are monopolies in the product market and $m \to \infty$ means that there is perfect competition in the product market. We construct a simple example to give the intuition of how to construct this replica economy..

Example 1 *Suppose that we have two firms in the labour market* $(N = 2)$ *and that we want to compare a monopoly* $(m = 1)$ *and duopoly competition structure* $(m = 2)$ *in the product market. Because we have a constant number of firms in the labour market, we in fact compare two monopolies, operating at the same time, with one duopoly. Suppose that we have two monopolies, each facing an inverse demand* $p = d - x^\alpha$ *and* $p = d - y^\alpha$*, where* x^α *and* y^α *the production of the two firms. So, when competition is modeled as a monopoly, the price is determined by* $p = d - x^\alpha$ *if we suppose both firms to be symmetric. If we want to model the competition as a duopoly, we sum up the productions. Productions are* $x^\alpha = (d - p)$ *and* $y^\alpha = (d-p)$*. So* $x^\alpha + y^\alpha = 2(d-p)$ *and inverse demand will be* $p = d - \frac{x^\alpha + y^\alpha}{2}$*. Hence, if we model different degrees of competition with a constant total demand, we can write inverse demand as* $p = d - \frac{\sum^m x_i^\alpha}{m}$*, where* x_i^α *is the production of each firm and m the degree of competition. (Remark that the number of firms in the labour market, N, has no influence on the price formation in the product market).*

We can now find the marginal production of labour. The profit of each firm is

$$\pi_i = (d - \frac{\sum^m x_i^\alpha}{m})x_i^\alpha - wx_i,$$

where w is the wage of the unskilled workers. Taking derivatives with respect to labour x_i, we find the marginal product of labour for each firm,

$$w = (d - \frac{x_i^\alpha + \sum^m x_i^\alpha}{m})\alpha x_i^{\alpha-1}.$$

In order to sum up the demand for all the firms present in the labour market, we need to have a labour demand separable in x_i. If we limit ourselves to the case where $\alpha = 1$, and for N firms present in the labour market, we can write the total labour demand as

$$w = (d - \frac{(m+1)\sum^N x_i}{mN}). \tag{12}$$

While $\alpha = 1$ is a serious restriction, it needs to be pointed out that when the price in the product market is not exogenous, we still have a nicely behaving labour demand, $\frac{\partial w}{\partial x_i} < 0$. For a given price in the product market, this assumption would lead to a horizontal labour demand, $\frac{\partial w}{\partial x_i} = 0$, which means that constant returns to scale cannot be assumed in these models. So, since we add a product market where price depends negatively on production, we do not encounter problems when assuming constant returns to scale. But, we are aware that we need to rethink this issue and need to allow for $\alpha \in [0, 1]$ for more generality.

2.3 Equilibrium in the markets

We are now able to characterise the equilibria in the labour market and in the product market and analyse how it depends on the degree of competition in the product market. Since the labour demand is derived from profit maximisation in the product market, the equilibrium in the labour market determines at the same time the optimal production in the product market.

Lemma 2 *(i) When N identical firms are present in the labour market and the total number of workers is Nn, the intersection of demand and supply is unique and is not dependent on N: $d - \frac{m+1}{m}x^* = e + (r + b + \frac{bx^*}{n-x^*})\frac{e}{sq}$, where x^* is the equilibrium employment per firm.*

(ii) Equilibrium employment increases when competition in the product market is fiercer, $\frac{\partial x^*}{\partial m} > 0$, but the marginal effect decreases, $\frac{\partial^2 x^*}{\partial m^2} < 0$.

(iii) Equilibrium wage increases when competition in the product market is fiercer, $\frac{\partial w^*}{\partial m} > 0$, but the marginal effect decreases, $\frac{\partial^2 w^*}{\partial m^2} < 0$.

(iv) The equilibrium price in the product market is $p^* = d - x^*$. The more competition in the product market, the lower the equilibrium price, $\frac{\partial p^*}{\partial m} = -\frac{\partial x^*}{\partial m} < 0$.

Proof. See Appendix. ■

Part (i) of lemma 1 shows that the equilibrium is unique and that it is not dependent on the number of firms that are present in the labour market. Therefore, as intended, our equilibrium and comparative statics will only be dependent on the competition structure of the product market and not on the number of firms in the labour market. This allows us as well to let $N \to \infty$, which justifies our assumption that firms are wage takers in the labour market.

When the competition in the product market increases, the demand for labour becomes more elastic. For a given labour supply, the equilibrium wage and employment will therefore increase. However, the marginal effect decreases. The slope of the labour demand is $-\frac{m+1}{m}$, so for a large m, the slope will not change much when competition increases, and hence the equilibrium wage and employment will not change much neither.

Since the price depends on the m firms present in the product market, the equilibrium price is $p^* = d - \frac{\sum^m x^*}{m} = d - x^*$, because all firms are symmetric. The equilibrium price in the product market decreases when there is more competition in the product market, as shown in part (iv) of Lemma 2.

Remark that $\frac{\partial p^*}{\partial x^*}$ is not the slope of the inverse demand, but how the *equilibrium* price changes when the equilibrium production changes. The slope of the demand is $\frac{\partial p}{\partial x} = -\frac{1}{m}$. This is explained in more detail in the Appendix..

It is interesting to see what happens in the case of perfect competition in the product market, since this has as consequence that the firm is both a price taker in the product market and a wage taker in the labour market.

Corollary 3

When there is perfect competition in the product market, $m \to \infty$, and firms are wage takers in the labour market, the wage in the labour market is the same as the price in the product market, $w^* \to p^*$.

If firms face perfect competition, both in the product market and in the labour market, they have no power in both markets and therefore cannot make any profits, $\pi = 0$. The average revenue, which is the price of the product, equals the average cost, which is the wage of the employed workers. This means that all the gains from production will go to the employed workers.[6]

This case is in fact the link between our model and to the wage formation used in most micro-economic models of labour econmics. Remember from equation (9) that the equilibrium in the labour market is determined by $w = p\frac{\partial F(x)}{\partial x}$, hence there is perfect competition in the product market and $\frac{\partial p}{\partial x} = 0$. To have a downward sloping labour demand, it is then assumed that $\frac{\partial F(x)}{\partial x} < 1$. We assume constant returns to scale w.r.t. unskilled labour $\frac{\partial F(x)}{\partial x} = 1$, but have $\frac{\partial p}{\partial x} < 0$. Hence, if we have in both models $\frac{\partial p}{\partial x} = 0$ and $\frac{\partial F(x)}{\partial x} = 1$, we get the same equilibrium $w = p$.

3 Government policies and their political support

We look at policies that reduce unemployment. Unemployment is costly for society in terms of unemployment benefits, forgoing of taxes, waste of talents and production factors etc. and is a serious problem in Europe in a way that it even calls into question the European social model as a whole. As stated in the introduction, many orthodox reforms of the labour market have proved difficult to implement because they faced fierce opposition by large or powerful sectors in society. Power is often concentrated in the hands of employed workers (political insider mechanism) and it may be impossible to implement labour market policies when they decrease their rent.

We assess the probability of approval, conditional on the competition in the product market. A labour policy in our model is defined as making the firing laws more flexible.

However, a labour policy changes the elasticity of the labour supply and given that the employed worker is the pivotal voter, it will always be difficult to implement a labour policy, which can be seen from the current intents to change the labour laws in Europe.

But a government has as well the possibility to intervene in the product markets. When changing the competition laws and allowing for more competition, a government can affect the labour demand. Under normal circumstances, the employed will favour competition policies, since they increase labour demand and therefore wages. However, here again we may encounter problems to implement competition policies, since this time it is the firm that will oppose a

[6] Remember that we assume constant returns to scale and full use of other production factors. Else, some of the gains would go as well to the other production factors.

competition policy. But, combining both policies may open the way for approval of both interest groups seperately. We will look under which conditions governments can both increase employment and competition and get at approval from firms and employed workers.

We will only analyse cross-steady states. By cross-steady state is meant the comparison of different steady states without taking into account the dynamics between two different steady states. It is the case where no adjustment costs prevent employment x from jumping by a discrete amount directly to the new steady at the time the exogenous parameters change. Saint-Paul [9] finds that transitional dynamics only account for a small fraction of the variation of each groups welfare, suggesting that the cross steady state comparison is a good approximation.

3.1 Welfare measures

We concentrate on the welfare of firms and employed workers.[7] We develop as well a measure of total welfare to show that a society always will benefit from more employment.

3.1.1 Employed

From equation (3), we know that the welfare per unit of time for unemployed workers is

$$rVe = rVu + \frac{re}{sq} = (r+a)\frac{e}{sq}. \tag{13}$$

In comparison with unemployed workers, employed workers enjoy a rent because of the asymmetric information. This means that an increase in labour market flexibility s will hurt them more, and can lead to opposition for more labour market flexibility. Competition policy will increase a,the probability of obtaining a job per unit of time and always increases the welfare of the employed. Whether they will approve a labour market policy, depends how this policy affects a. Remark that the labour policy has a direct effect on the wage of employed workers. Other policies, like programs that try to incorporate long term unemployed back into the workforce do not have this direct effect, because it is usually assumed that long term unemployed do not influence directly the wages. While this implies that they have a higher chance to get approved, we also think that it is more difficult to obtain good results. A more flexible labour market just changes the incentives of firms to hire more workers, while the success of programs for the unemployed depends on more things as well (these programs are of course also necessary in a good functioning welfare state and should be used in combination of other policies).

[7] Unemployed workers always approve a policy that is designed to decrease unemployment and that is approved by the employed workers.

3.1.2 Firms

The welfare per unit of time for firms is $\pi = (p - w)x$.[8] Using the results from Lemma 2, in equilibrium the profit can be written as

$$\pi = \frac{x^{*2}}{m}. \tag{14}$$

Firms will favour any labour policy that increases the labour market flexibility s, since this will increase equilibrium production x^*. However, a competition policy that increases the degree of competition in the product market m, will be often opposed by the firms, depending on $\frac{\partial x^*}{\partial m}$.

3.1.3 Total Welfare

It is important to know if the equilibrium allocation is Pareto efficient or not. A social planner maximises aggregate welfare per unit of time in equilibrium is equal to

$$\begin{aligned} W &= N(\pi + rV_e x^* + rVu(n - x^*)) \\ &= N((p^* - w^*)x^* + (a^* + r)\frac{e}{sq}x^* + a^*\frac{e}{sq}(n - x^*)). \end{aligned}$$

where π is the profit of a firm, $rV_e x^*$ the welfare of an employed worker times the number of workers that one firm employs, $rVu(n - x^*)$ the welfare of an unemployed times the number of unemployed proportional to one firm and N the number of firms present in the labour market. This can be rewritten as

$$W = Nx^*(p^* - e). \tag{15}$$

That is, total output times the social cost of production $(p^* - e)$. If the output price would be constant, the social planner would always be concerned about more employment (Guell [4]). Since in our model the output price is not taken as given, we have to check whether this still holds. When taking derivatives w.r.t. equilibrium employment, $\frac{\partial W}{\partial x^*} = N((p^* - e) + x^*(\frac{\partial p^*}{\partial x^*}))$. From Lemma 2, we know that $p^* = d - x^*$, so $\frac{\partial W}{\partial x^*} = N((d - 2x^* - e)$. If the competition structure is such that $m = 1$, the equilibrium wage will be $w^* = d - 2x^*$, and $\frac{\partial W}{\partial x^*} = w^* - e$ since $w^* > e$,

$$\frac{\partial W}{\partial x^*} > 0.$$

[8]It may seem strange that for the firms the interest rate does not play a role. However, if we write the flow equation for firms in discrete time, we have $\pi = (p - w)x - \frac{b}{1+r}\pi x + \frac{a}{1+r}\pi(n - x)$ and since $a = \frac{bx}{n-x}$, we see immediately that the profit per unit of time is $\pi = (p - w)x$. The same reasoning holds for continous time.

If $m > 1$, the wage will be higher than $d - 2x^*$, so the inequality holds for all degrees of competition. Hence, we can safely assume that also in our model welfare is increased when employment increases.

3.2 Labour policies, given a competition structure in the product market

When controlling for employment,[9] we look at how competition structure in the product market influences the support of the employed workers for a more flexible labour market to increase employment. The employed workers will favor more an increase in labour flexibility the greater their welfare change, $\frac{\partial(rVe)}{\partial s}$.

Lemma 4 *The more competition in the product market, the less employed workers will oppose an increase in labour marker flexibility,* $\frac{\partial^2(rVe)}{\partial s \partial m} > 0$.

Proof. See Appendix. ■

A higher degree of competition in the product market makes the labour demand more elastic. When the labour demand is more elastic, an increase in labour market flexibility increases employment more, so a, the probability of obtaining a job per unit of time goes up more. In other words, an increase in s makes the labour supply more elastic, and decreases the equilibrium wage. However, if the labour demand is more elastic, this decrease of equilibrium wage is less and employed workers will less oppose an increase in s.

This result is similar to what Saint-Paul ([9]) finds. He states that an 'adverse policy selection' is more likely when the elasticity of labour demand is low, hence the more inelastic the labour demand, the more employed will favour a *less* flexible labour market. So, we get to the same conclusion, but the elasticity of demand in our model is determined by the competition in the product market and is not taken as given.

It is sure that even when there is a high degree of competition in the product market, employed workers will still often block a more flexible labour market, which means that it is worth looking at other solutions.

[9] If we change competition structure, the employment changes as well. More competition means higher equilibrium employment. But this would mean that we have different bases of comparison. So suppose for a moment that the initial equilibrium employment is the same for different degrees of competition. This allows us to use the same base of comparison.

3.3 Labour and Competition policies combined

If a government would rewrite competition laws to change the product market into a more competitive one, the employed would all applaud this. Other things equal, this would increase their wages. So, a competition policy would increase employment, and it would always be approved by employed workers. However, here we face the problem that competition policies may badly hurt the firms and hence may be fiercely opposed by them. Now, if a government can combine both policies in the labour market and the product market, it would still be easier to convince employed workers than when only trying to implement a labour policy. It might get approval from firms as well, since a labour policy lowers their costs. Proposition 5 states in which conditions combined policies may work.

Proposition 5 *(i) By combining labour policies and competition policies, the possibilities to find political support from employed workers is considerably easier than when only a labour policy is used,* $\frac{\partial(rVe)}{\partial s}+\frac{\partial(rVe)}{\partial m}\geq\frac{\partial(rVe)}{\partial s}$, *since always* $\frac{\partial(rVe)}{\partial m}>0$. *When* $\frac{\partial(rVe)}{\partial s}<0$ *and initial competition is already very high, it might not be possible, because* $\frac{\partial^2(rVe)}{\partial m^2}<0$.

(ii) Political support from firms is granted when $\frac{\partial(\pi)}{\partial m}+\frac{\partial(\pi)}{\partial s}\geq 0$. *When* $\frac{\partial(\pi)}{\partial m}<0$ *and initial labour market flexibility is already very high, it might not be possible, since* $\frac{\partial^2(\pi)}{\partial s^2}<0$.

(iii) When either the initial labour market flexibility or initial product competition are very high, a combined policy will likely be opposed by either the firms or the employed workers. In other cases, a combined policy will find overall political support.

Proof. See Appendix. ■

Part (i) of the proposition proves what was already intuitively clear. Employed workers will more likely favour a combined policy than only a labour policy, since competition policy increaeses their wages. Only when they are negatively affected by a labour policy, which is when the intitial flexibility of the labour market is very low, and when the competition in the product market is initially intense, it is still possible that a combined policy might not find approval. When initial labour flexibility is low, the rent of the employed workers is high (see equation (7)) and any change in the labour market will hurt them more. The greater the rent (the less competitive the labour market), the more likely that reducing firing costs will be opposed by the employed.[10] When initial competition is high, an increase in competition will not induce a large change in the elasticity of labour demand and the change in wages will be small, as proved in

[10]Saint-Paul [8] found this as well.

Lemma 2. So, a competition policy can not compensate the employed workers for the negative impact of the labour policy and their overall welfare will not increase.

Firms will normally not favour more competition. However, when more competition is compensated with lower costs, because of a more flexible labour market, they still might agree upon a combined policy. But again, if more competition hurts the firm and it can not be enough compensated by a more flexible labour market, because the labour market is already flexible, firms may oppose a combined policy.

The conclusions to be made are twofold. First, a combination of policies is politically more viable than the use of only one policy, both in the product and labour market. It is more easy to raise welfare by increasing employment and competition when the gains and losses can be better distributed. A policy generates positive and negative externalities, but for different interest groups. If a labour policy is used alone, the positive externalities for firms are 'wasted'. If it is used in combination with a competition policy, the positive externality of the labour policy can be used to implement a competition policy. In the same way, a competition policy generates positive externalities for the employed workers and can be used to implement a labor policy at the same time. Hence, comprehensive policies are more likely to solve the problem of rigid economies.

Second, it is also more advisable to combine both policies *at the same pace* in order not to 'get stuck' in one market. If for example a government decides to open the product market for competition but neglects to reform the labour market, it might well be possible that when it later tries change the labour market, this results very difficult, since the positive externalities of competition policies are too small to compensate the employed workers. So governments should not only look at how to implement comprehensive policies, but should as well be carefull about the timing of them.

4 Conclusion

Labour policies that try to increase employment are difficult to implement. When there are microeconomic frictions in the labour market, employed workers ("insiders") increase their bargaining power and are often the decisive group in the labour market. Then any labour market policy will be opposed by employed workers when it decreases the rent they receive, which is often the case.

However, the influence of the product market and the firms is often neglected when models are constructed that look at labour policies from a political point of view. When including a product market, we can analyse how the degree of competition in the product market influences the labour market. The higher the competition in the product market, the less employed will oppose a labour policy, since a higher degree of competition results in a more elastic labour demand. This means that when the labour market is made more flexible, the wage can still decrease, but will surely decrease *less.* Moreover, firms will want to hire relatively more workers, so the probability to find a job increases more. This increases as well the welfare of the employed and makes their opposition to more employment smaller. Still, often it is impossible to get the employed to agree on a labour policy, when initial labour market flexibility is very low. A restrictive labour market increases the rent for the employed workers and increases rigidity. Now employed have more to loose from a labour policy and will be stronger against it.

But a government has more instruments at its disposition. One solution is to combine policies in the labour market. But apart from the labour market policies, it can as well design product market policies. A more competitive product market decreases unemployment and undoubtly favors the employed since it will increase their wages because of a higher labour demand. Unfortunately, this policy will often be opposed by the firms and may again not be possible to implement. However, when a government *combines* policies, both in the labour market and product market, it can be that firms and employed workers, both groups seperately, will not block the reforms in their markets. How can this happen? Both policies are complementary. A more flexible labour market can hurt the employed, but creates positive externalities for the firms. More competition in the product market normally lowers the profit of the firms, but creates postive externalities for the employed by increasing their wages. So, a combination of these two policies at the same time can lead to approval of both the employed and the firms because the bad effect of one policy can be compensated by the good effect of the other. When the losses and gains can be evenly distributed over employed workers and firms, policies that favor more employment have a lot more chance not to be opposed and a raise in total welfare can be more easily accomplished. Only when the initial labour market flexibility and initial degree or competition in the production market are already high, policies might encounter opposition, because in either one of these cases, one interest group will not be compensated enough anymore and will block reforms. This implies as well that it is better to reform in both markets at the same pace, else there exists the danger that in one market there are no policies possible because in the other market there is no room for improvement anymore.

5 Appendix

PROOF OF LEMMA 2

(i) Equating total labour supply (8) and total labour demand (12), gives us

$$(d - \frac{(m+1)\sum^N x_i}{mN}) = e + (r + \frac{bNn}{Nn - \sum^N x_i})\frac{e}{sq}.$$

When we assume that all firms are identical, $x_i = x$, the equilibrium can be rewritten as

$$(d - \frac{(m+1)Nx}{mN}) = e + (r + \frac{bNn}{Nn - Nx})\frac{e}{sq},$$

and N cancels out. Let $(d - (e + (r+b)\frac{e}{sq}) = F$ and $B = \frac{be}{sq}$. Then the equilibrium can be written as

$$F - \frac{Bn}{n - x^*} - \frac{(m+1)}{m}x^* = 0. \tag{16}$$

This equation can be rearranged as $(F - \frac{(m+1)}{m}x^*)(n - x^*) = Bn$. Solving for equilibrium employment x, the equation gives us two possible solutions. But it is clear that one solution will always be bigger than n, what is impossible in our model, since employment per firm x cannot be more than the total labour force per firm, n.

(ii) Taking derivatives of implicit function (16), $\frac{\partial x^*}{\partial m} = \frac{\frac{x^*}{m^2}}{\frac{m+1}{m} + \frac{Bn}{(n-x^*)^2}} > 0$ always since $n > x^*$ and $\frac{\partial^2 x^*}{\partial m^2} = \frac{\frac{(1-2(m+1))x^*}{m^4} - 2\frac{x^*}{m^3}\frac{Bn}{(n-x^*)^2}}{(\frac{m+1}{m} + \frac{Bn}{(n-x^*)^2})^2} < 0$ since $2(m+1) > 1$. (remember that $m \in [1, \infty]$).

(iii) The equilibrium can also be rewritten as the system of two equations:

$$\begin{cases} w^* - d + \frac{m+1}{m}x^* = 0 \\ w^* - e - \frac{re}{sq} - \frac{Bn}{n-x^*} = 0, \end{cases}$$

where w^* is the equilibrium wage and x^* the equilibrium employment per firm. This system allows us to take derivatives of the wage w^* with respect to the degree of competition m, $\frac{\partial w^*}{\partial m} = \frac{\frac{Bn}{(n-x^*)^2}\frac{x^*}{m^2}}{\frac{m+1}{m} + \frac{Bn}{(n-x^*)^2}} = \frac{Bn}{(n-x^*)^2}\frac{\partial x^*}{\partial m} > 0$ and $\frac{\partial^2 w^*}{\partial m^2} = \frac{Bn}{(n-x^*)^2}\frac{\partial^2 x^*}{\partial m^2} < 0$.

(iv) From equation (11) and given $\alpha = 1$, we know that $p = d - \frac{\sum^m x_i}{m}$. Since we assume that all firms are symmetric, we have $p^* = d - \frac{\sum^m x_i^*}{m} = d - \frac{\sum^m x^*}{m} = d - \frac{mx^*}{m} = d - x^*$. Hence, $\frac{\partial p^*}{\partial m} = \frac{\partial p^*}{\partial x^*}\frac{\partial x^*}{\partial m} = -\frac{\partial x^*}{\partial m} < 0$. Why is $\frac{\partial p^*}{\partial x^*} = -1$ and $\frac{\partial p}{\partial x} = -\frac{1}{m}$? When the conditions in the labour market change, all firms will react in the same way: $\frac{\partial x_i^*}{\partial m} = \frac{\partial x_j^*}{\partial m}$ for all firms i, j because all firms are present in the same labour market and are symmetric. The change of the equilibrium price is $\frac{\partial p^*}{\partial m^*} = \frac{\partial p^*}{\partial x^*}\frac{\partial x^*}{\partial m^*} = \sum^m \frac{\partial p}{\partial x^*}\frac{\partial x^*}{\partial m^*} = \sum^m -\frac{1}{m}\frac{\partial x^*}{\partial m^*} = -\frac{m}{m}\frac{\partial x^*}{\partial m^*} = -\frac{\partial x^*}{\partial m^*}$ and $\frac{\partial p^*}{\partial x^*} = -1$. QED.

Proof of Lemma 4

From equation (13), we know that the welfare per unit of time of employed workers in equilibrium is $rVe = (r + a^*)\frac{e}{sq}$. Taking derivatives w.r.t. s, we get $\frac{\partial (rVe)}{\partial s} = \frac{e}{sq}(\frac{\partial a^*}{\partial x^*}\frac{\partial x^*}{\partial s} - (r + a^*)\frac{1}{s})$. Since we assume for different degrees of competition the same equilibrium employment x^* in order to have the same base for comparison, the only derivative that changes for different degrees of competition is $\frac{\partial x^*}{\partial s}$. Using equation (16), we find $\frac{\partial x^*}{\partial s} = \frac{(r+\frac{bn}{(n-x^*)})\frac{e}{qs^2}}{\frac{m+1}{m}+\frac{Bn}{(n-x^*)^2}}$ and for a given x^*, $\frac{\partial^2 x^*}{\partial s \partial m} = \frac{(r+\frac{bn}{(n-x^*)})\frac{e}{qs^2}\frac{1}{m^2}}{(\frac{m+1}{m}+\frac{Bn}{(n-x^*)^2})^2} > 0$, which implies that $\frac{\partial^2 (rVe)}{\partial s \partial m} > 0$. When will employed workers fully favour a labour policy? This is when $\frac{\partial (rVe)}{\partial s} \geq 0$. Rewriting this expression, gives us the condition

$$\frac{\partial (rVe)}{\partial s} \geq 0 \Leftrightarrow \varepsilon_{x,s} \geq (\frac{r}{a^*} + 1)\frac{n}{n - x^*},$$

where $\varepsilon_{x^*,s}$ is the elasticity of equilibrium employment w.r.t. labour market flexibility s. For a given equilibrium employment x^*, the right hand side does not change for different degrees of competition and $\frac{\partial^2 \varepsilon_{x,s}}{\partial s \partial m} = \frac{(r+\frac{bn}{(n-x^*)})\frac{e}{qs}\frac{x}{m^2}}{(\frac{m+1}{m}+\frac{Bn}{(n-x^*)^2})^2} > 0$. Hence a labour policy will have more change to be approved when the competition in the production market is higher. QED.

Proof of Proposition 5

There are different ways to check whether combined policies are viable. Since we are combining two policies, we first have to make the choice which policy we apply first. Suppose we will first look how a competition policy changes the equilibrium employment from x_1^* to x_2^*. So we first look at how the change in competition in the product market influences the welfare of employed workers and firms. Then, starting from equilibrium employment x_2^*, we look how a labour policy changes again the equilibrium employment. The sum of these two policies should be approved by both the firms and the employed workers:

(i) Approval by employed workers: Taking derivatives of the welfare of employed workers (equation (13)), first w.r.t. m and then w.r.t. s, gives us $\left.\frac{\partial (rVe)}{\partial m}\right|_{x_1^*} + \left.\frac{\partial (rVe)}{\partial s}\right|_{x_2^*} = \frac{\partial a_1^*}{\partial x_1^*}\frac{\partial x_1^*}{\partial m}\frac{e}{sq} + \frac{e}{sq}(\frac{\partial a_2^*}{\partial x_2^*}\frac{\partial x_2^*}{\partial s} - \frac{1}{s}(r + a_2^*))$. Since $\frac{\partial a_1^*}{\partial x_1^*} = \frac{bn}{(n-x_1^*)^2} > 0$ and $\frac{\partial x_1^*}{\partial m} > 0$, $\left.\frac{\partial (rVe)}{\partial m}\right|_{x_1^*} = \frac{\partial a_1^*}{\partial x_1^*}\frac{\partial x_1^*}{\partial m}\frac{e}{sq} > 0$ always. We omit now for part of the proof the indexes x_1^* and x_2^* to ease notation. We see that

$\frac{\partial(rVe)}{\partial m} + \frac{\partial(rVe)}{\partial s} > \frac{\partial(rVe)}{\partial s}$. When will even a combined policy not be approved? This is when $\frac{\partial(rVe)}{\partial s} < 0$ and $\frac{\partial(rVe)}{\partial m} < \left|\frac{\partial(rVe)}{\partial s}\right|$. Since $\frac{\partial(w^*)}{\partial s} = -\frac{\frac{e}{sq}(\frac{m+1}{m}(\frac{\partial a^*}{\partial x^*}\frac{\partial x^*}{\partial s} - \frac{e}{sq}(r+\frac{bn}{(n-x^*)})) + \frac{\partial a^*}{\partial x^*}\frac{\partial x^*}{\partial s})}{\frac{m+1}{m} + \frac{Bn}{(n-x^*)^2}} < 0$ and $\frac{\partial^2(w^*)}{\partial s^2} < 0$, this has most chance to happen when initial flexibility is low. We know that

$$\frac{\partial^2(rVe)}{\partial m^2} = \frac{\partial a^*}{\partial x^*}\frac{\partial^2 x^*}{\partial m^2}\frac{e}{sq} < 0 \tag{17}$$

because $\frac{\partial^2 x^*}{\partial m^2} < 0$ as proved in Lemma 2. Now,

$$\frac{\partial^2(rVe)}{\partial s \partial m} = \frac{e}{sq}\frac{\partial a^*}{\partial x^*}(\frac{\partial^2 x^*}{\partial s \partial m} - \frac{1}{s}(\frac{\partial x^*}{\partial m})) \tag{18}$$

and by substituting $\frac{\partial^2 x^*}{\partial m^2}$ and $\frac{\partial^2 x^*}{\partial s \partial m}$ in (17) and (18), we see that $\left|\frac{\partial^2(rVe)}{\partial m^2}\right| > \frac{\partial^2(rVe)}{\partial s \partial m}$which means that the positive effect of the competition policy goes down faster than the negative effect of a labour policy softens, so the possibility to have an increase in welfare when combining the two policies decreases when the initial m is high.

(ii) Approval by the firms happens when $\frac{\partial(\pi)}{\partial m} + \frac{\partial(\pi)}{\partial s} \geq 0$. A combined policy will not be approved when $\frac{\partial(\pi)}{\partial m} < 0$ and $\frac{\partial(\pi)}{\partial s} < \left|\frac{\partial(\pi)}{\partial m}\right|$. The derivative of profit w.r.t. degree of competition $\frac{\partial(\pi)}{\partial m} = 2x^*\frac{\partial x^*}{\partial m}\frac{1}{m} - \frac{x^{*2}}{m^2}$ and $\frac{\partial^2(\pi)}{\partial m \partial s} = 2x^*\frac{\partial^2 x^*}{\partial m \partial s}\frac{1}{m} - 2\frac{x^*}{m^2}\frac{\partial x^*}{\partial s}$. The derivative of profit w.r.t. labour market flexibility is $\frac{\partial(\pi)}{\partial s} = 2x^*\frac{1}{m}\frac{\partial x^*}{\partial s}$ and $\frac{\partial^2(\pi)}{\partial s^2} = 2x^*\frac{1}{m}\frac{\partial^2 x^*}{\partial s^2}$. When substituting $\frac{\partial^2 x^*}{\partial m \partial s}$ and $\frac{\partial^2 x^*}{\partial s^2}$ in both equations, we see that $\left|\frac{\partial^2(\pi)}{\partial s^2}\right| < \frac{\partial^2(\pi)}{\partial m \partial s}$ and the positive effect of a more flexible labour market goes down faster than the negative effect of more competition softens, so the possibility to have an increase in welfare for the firms decreases when the labour market is initially more flexible.

(iii) Part three follows from part (i) and (iii), but we can as well prove this directly. If a policy is to be approved by both groups, their welfare change has to be at least zero:

$$\begin{cases} \left.\frac{\partial(rVe)}{\partial m}\right|_{x_1^*} + \left.\frac{\partial(rVe)}{\partial s}\right|_{x_2^*} \geq 0 \\ \left.\frac{\partial(\pi)}{\partial m}\right|_{x_1^*} + \left.\frac{\partial(\pi)}{\partial s}\right|_{x_2^*} \geq 0, \end{cases}$$

which leads us to conditions

$$\begin{cases} \frac{\partial a_1^*}{\partial x_1^*}\frac{\partial x_1^*}{\partial m} + \frac{\partial x_2^*}{\partial s}(\frac{\partial a_2^*}{\partial x_2^*} - \frac{1}{s}(r + a_2^*)) \geq 0 \\ 2x_1^*\frac{\partial x_1^*}{\partial m}\frac{1}{m1} - \frac{x_1^{*2}}{m_1^2} + 2x_2^*\frac{1}{m_2}\frac{\partial x_2^*}{\partial s} \geq 0. \end{cases}$$

Suppose the employed approve a combined policy, so the positive effect of the competition has to be high enough to compensate for the possible negative effect of a labour policy, $\frac{\partial x_1^*}{\partial m} = \frac{\frac{\partial x_2^*}{\partial s}(\frac{1}{s}(r+a_2^*) - \frac{\partial a_2^*}{\partial x_2^*})}{\frac{\partial a_1^*}{\partial x_1^*}}$. So, we write the condition for the firms as $2x_1^*\frac{\frac{\partial x_2^*}{\partial s}(\frac{1}{s}(r+a_2^*) - \frac{\partial a_2^*}{\partial x_2^*})}{\frac{\partial a_1^*}{\partial x_1^*}}\frac{1}{m1} - \frac{x_1^{*2}}{m_1^2} +$

$2x_2^*\frac{1}{m_2}\frac{\partial x_2^*}{\partial s} \geq 0$, which has less possibility to be postive the bigger initial labour market flexiblity s, which implies as well a smaller $\frac{\partial x_2^*}{\partial s}$. We can see as well that when the initial degree of competition is high, it needs a higher compensation for the employed workers and then it will be more difficult to satisfy the condition for the firms, $\frac{x*_1}{m_1}$ and $\frac{x*_2}{m_2}$ will be small. In the same way, when the firm approve a combined policy, the positive effect of more competition has to be high enough, $\frac{\partial x_2^*}{\partial s} = \frac{\frac{x_1^{*2}}{m_1^2} - 2x_1^*\frac{\partial x_1^*}{\partial m}\frac{1}{m1}}{2x_2^*\frac{1}{m_2}}$ and the welfare of the employed has to be $\frac{\partial a_1^*}{\partial x_1^*}\frac{\partial x_1^*}{\partial m} + \frac{\frac{x_1^{*2}}{m_1^2} - 2x_1^*\frac{\partial x_1^*}{\partial m}\frac{1}{m1}}{2x_2^*\frac{1}{m_2}}(\frac{\partial a_2^*}{\partial x_2^*} - \frac{1}{s}(r + a_2^*)) \geq 0$. If he initial competition is high, $\frac{\partial x_1^*}{\partial m}$, $\frac{m_2}{m_1}$ and $\frac{x_1^{*2}}{m_1^2}$ decrease, and the possibililty to have a positive change of welfare decreases. QED.

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