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ON THE EFFICIENCY OF JOB AND INCOME PROTECTION IN THE DYNAMIC LABOUR MARKETS

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Abstract: This paper investigates the efficiency implications of two kinds of worker protection, job security and income protection. Both of them have important aggregate efficiency effects in the dynamic labor markets, where worker mobility is costly. In the absense of firing costs, income security has ambiguous effect on production efficiency. If mobility costs are very high, dynamic costs associated to reallocation outweighs a gain from static productive efficiency as more jobs are created into high productivity sector, but need to be reallocated always when the sector is hit by a negative productivity shock. On the contrary, if mobility costs are low, a static efficiency outweighs the dynamic costs associated to reallocation. Employment protection is also more costly in the terms of productive efficiency, more it involves wasted admistrative and red-tape costs for the firms. When both job security and income protection are high, it makes labor markets more rigid and in general reduces the productive efficiency.

Key words: labour markets, firing costs, income protection

JEL: J65

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Tiivistelmä: Tässä paperissa tarkastellaan irtisanomissuojan sekä työttömyysturvan tehokkuusvaikutuksia dynaamisilla työmarkkinoilla, joissa työntekijöiden uudelleen allokoinnista aiheutuu kustannuksia. Työttömyysturvan tehokkuusvaikutukset riippuvat olennaisesti työntekijöiden uudelleen allokointikustannusten suuruudesta. Korkea työttömyysturva voi johtaa työpaikkojen kasaantumiseen korkean tuottavuuden aloille ja siten lisätä tehokkuutta. Kuitenkin, jos työntekijöiden uudelleen allokointikustannukset ovat korkeat, eksogeenisista tuottavuusshokeista johtuvat dynaamiset kustannukset ylittävät staattiset hyödyt jotka syntyvät työpaikkojen lisääntymisestä korkean tuottavuuden sektorilla. Korkeasta irtisanomissuojasta koituvat tehokkuustappiot sen sijaan ovat sitä suuremmat mitä enemmän niihin liittyy hallinnollisia kustannuksia. Lopuksi, samanaikaisesti korkea irtisanomissuoja sekä korkea työttömyysturva jäykistävät työmarkkinoita ja johtavat yleensä tehokkuustappioihin.

Asiasanat: työmarkkinat, irtisanomiskustannukset, työttömyysturva

1 Introduction

Stage 3 of Economic and Monetary Union restraints both monetary and fiscal policy and generates a pressure on further deregulation of the labour markets. The Single European act has promoted the trade and labour mobility by removing "artificial" barriers from mobility and industry re-location. However, due to the heterogeneity of the European societies in general, several natural and institutional barriers hinder the European economies adjustment potential in the face of business fluctuations. Due to the common monetary policy and single currency, exogenous aggregate shocks can no more be dampened by the inflation differentials and exchange rate realignments, that has been used to generate relative-wage differentials in many European countries in the past. Inflation differentials and symmetric demand fluctuations are likely to propagate in different ways under different institutional settings of the European economies, labour markets especially.

The stability pact restraints a usage of fiscal policy as an effective stabilization instrument and current inter-regional fiscal transfers are modest when compared to most federal systems, such as the U.S. This creates even more pressure towards liberalization and restructuring of the labour markets. While a common monetary policy together with the single European act (and with a wider range of issues related to social security and size of the public sectors) will most likely play an important role in enforcing institutional changes of the common European labour markets, a great deal political good-will be needed to remove institutional rigidities.

The so called flexibility versus rigidity debate of the labour markets highlights the important role of institutional, legal and sociopolitical safety net institutions which protect workers from "unfair" firing and large income fluctuations. Stringency of employment protection legislation and relatively generous social protection programs in many Europe countries are usually contrasted to the U.S. flexible labour markets. As argued in this literature, both rigidity and flexibility offer advantages and disadvantages in the dynamic labour market environment. While rigidity stabilizes employment and labour incomes, it prevents adjustment to exogenous business fluctuations. Flexibility allows a quick and efficient adjustment of the product markets to unanticipated changes in business conditions, but it increases the volatility of worker´s wages and the risk of becoming unemployed (Bertola and Ichino (1995)).

Indeed, many societies prefer to protect workers from such undesirable effects of flexibility, but of course, society´s intervention into otherwise well functioning forward looking markets is costly and generates side-effects. European labour markets have been claimed to suffer from "Eurosclerosis", where rigidity contributes into long-term unemployment and inefficient allocation of labour between declining and rising sectors. Widespread social and income protection programs, combined with generous unemployment benefits and employment protection legislation have effectively reduced inequality, but may have contributed to declining employment

[0]I thank seminar participants at the Government Institute for Economic Policy and at the meeting of the Finnish Economic Society for many useful comments.Remaining errors are under my responsibility. The views expressed in this paper are those of the author and do not necessarily reflect the views of the Government Institute for Economic Research.

rates of low-paid jobs and inefficiency of the labour markets in general.

Eventual welfare gains or losses for the firms, workers and for the society as a whole are difficult to assess, but formal analytical model can be used to illustrate some important static and dynamic trade-offs. This paper uses relatively simple and stylized dynamic labour market model to study the effects of job and income protection on the productive efficiency of the labour markets. The model builds on the dynamic labour market models of Lucas and Prescott (1974) and Mortensen and Pissaridies (1994) and further developed by Bertola and Rogerson (1997).

Private agents in the model are risk-neutral workers who´s labour income fluctuations are subject to exogenous shocks, due to the fluctuations in the firm´s productivity. Workers can undertake costly mobility towards better paying jobs or to choose to consume alternative pay, when the firms decide to fire. Workers mobility costs are exogenous to the model and it will be assumed that the workers must finance their mobility by their consumption flows.

The wage offers are made by competitive risk neutral firms, who´s productivity fluctuations are determined exogenously by a two-state Markov chain. In the case of firing, moving to a job which currently offers a higher wage level is optimal only if a wage differential between the sectors offsets exogenous mobility costs and makes fired workers indifferent between moving and staying. A higher alternative pay makes staying more attractive option, ceteris paribus, and reduces workers willingness to move. Due to the right-to-manage assumption, a income protection does not increase the average wage level of the economy, but makes wages more compressed. Depending on the level of firing costs and income protection, wage compression can lead into misallocation of labour between high and low productivity sectors.

The risk neutral firms must pay a constant exogenous firing cost per unit of employment decrease relative to the previous period. This firing cost can be related to redundancy payment or to the shadow administrative costs of firing. Due to firing costs, labour turnover becomes costly for employers and will be taken into account in the firms dynamic decision to hire and fire. For simplicity, the model neglects the hiring costs.

Rest of the paper is organized as follows. Sections 2-4 discuss stylized facts of the European labour markets and potential economic effects of employment protection and income protection. Fifth section introduces the basic model and Sixth section extends the model and analyses specifically efficiency costs of employment and income protection. Finally, the last section concludes.

2 European labour markets

Overall increase in the European unemployment rates since the first oil shock has led many economists to conclude that there has been a change in the natural rate of unemployment, not in its cyclical component. European labour markets are indeed characterized by high persistence of unemployment. Typically a large adverse aggregate shock has very long lasting effects on unemployment in many European countries. Remarkably, increase in the European unemployment rates with regard to non-European countries during the 1990s occurred just in three years in 1992-94. European unemployment rates were also consistently higher during the disinflation period of the European Exchange Rate Mechanism (ERM) in 1982-1990, while until then, the difference has been only marginally positive.

One of the fundamental causes of persistent unemployment has been seen to be attributed to insider dominated wage setting and extensive unemployment benefits. High welfare benefits has been suggested to discourage search and slow down job creation by driving up wage rates of low-paid jobs. Employment protection, in turn, reduces job destruction by increasing implicit firing costs, but due to the forward looking decisions of the firms, reduces also firms incentives to create new jobs as firms do not want to get stuck with unwanted employees. Blanchard and Wolfers (1999) provide evidence that countries with higher employment protection and more generous unemployment benefits experience higher unemployment rates, as a respond to aggregate shocks. They suggest that institutions determine the relevance of the unemployed to wage-setting, thereby determining the evolution of equilibrium unemployment rates following a shock.

Although economic activity is still less regionally specialized in Europe when compared with the U.S., further integration of the product markets and common monetary policy are likely to foster specialization. Fatas (1997) suggests that economic shocks are increasingly less national and more regional in nature.

Idiosyncratic employment fluctuations interact importantly with the development of aggregate economy and institutional differences across labour markets can importantly steer aggregate movements of employment through their effects on adjustment of different sectors on idiosyncratic shocks. Empirical evidence has in many cases confirmed the existence of a significant *Lilien effect* on unemployment, that is, a high employment variability has been associated with low unemployment. Theoretical literature, dating back to Lucas and Prescott (1974), Barro (1977) and Lilien (1982) suggests that aggregate demand shocks work through different sectors, explaining in part the relationship between unemployment and employment variability.

One of the most promising explanations of Lilien effect is that frictions and barriers in the labour market prevent an exact and instantaneous matching between employment losses in contracting firms and gains in expanding firms. For instance, in Italy, highly protected sectors (trade-sector and manufacturing) have smaller cyclical responsiveness of employment variability compared to others. Davis et. al. (1997) suggests that in Italy part of the persistence of high unemployment rates is attributed to sectorial shifts.

Decressin and Fatás (1994) note that in Europe region-specific shocks in the demand for labour is reflected in changes in regional participation rates, while unemployment rates react to a small extent during the first three years. Migration seems to play a substantial role in the adjustment process only after three years. Also, region specific shocks are much more pronounced and asymmetric in Europe, when compared with the U.S. Remarkably, aggregate shocks in Europe tend to lead high persistence of changes in unemployment in contrast to significantly lower persistence of regional unemployment on region specific shocks. Changes in labour demand are to a large extent met by people moving in and out of the labour force. One of the reason seems to be that in Europe firms use an early retirement to adjust the size of the workforce in their firms, rather than rely on firing.[1]Moreover, typically the firms extend the work-week by using overtime-pay.

Indeed, due to the rigid wages in many European countries, employment and capital investment seem to mostly absorb idiosyncratic (regional) shocks, while wages respond only to aggregate shocks. The cyclical volatility of employment seems to be more pronounced in the countries such as U.S. and Canada than in the countries with more stringent job-security provision, such as Italy and France. On the contrary, volatility of the aggregate production is fairly similar across countries.[2]

[1]See for instance Burda and Wyplosz (1990), Emerson (1988).
[2]See for instance Bertola and Ichino (1995).

3 Employment and income protection

3.1 Firing costs

Job security provisions, such as firing costs are designed to protect workers from exogenous labour demand shocks by protecting workers from "unfair" firing and large income fluctuations. Firing costs have two dimensions. The first, severance pay, is a transfer for the firm to the worker it wants to layoff. The second is a set of administrative restrictions and procedures that the firm has to obey if it wants to layoff a worker.

Typically in the dynamic labour market models these job security provisions reduce labour demand by rising the costs of labour, because forward looking firms take into account the expected costs of hiring new workers. As job-security provisions reduce forward-looking hiring decisions and job creation, employment growth is smoothed in upturns and downturns, while unemployed at any point of time are less likely to be employed in upturns and therefore experience longer unemployment spell (Bertola (1998)). Bentolila and Bertola (1990) simulate the impact of firing costs on average employment and find it insignificant but, if anything, positive. Bentolila and Saint-Paul (1994) show that the impact of firing costs on employment level crucially depends upon the structure of the demand shocks paid by the firms. Bertola and Ichino (1995) suggest that such rigidities per se need not have adverse effects on employment, while some of the empirical evidence suggest that effects of job security provision on the average levels of employment is negative (see Lazear (1990), OECD (1994)).

Job security provisions seems to be more crucial for labour market flows, labour allocation processes and quality of unemployment than stocks. In the theoretical models, firing costs can reduce job turnover and therefore also a range of employment fluctuations for given wage and labour demand process. If the firing costs make it more costly to replace an insider with an outsider, the effect of job protection on unemployment duration is positive. Symmetrically, when the firms´optimal hiring and firing decisions trade dynamic costs against flows arising from differences between marginal productivity and wages, higher firing costs tend to lengthen tenure lengths (Bertola (1998)). Indeed, the recent empirical evidence indicate that more stringent job security provisions tend to lead smoother employment fluctuations in the short and medium run. On the contrary, empirical evidence on the effect of job security provisions on gross labour turnover is mixed and current evidence suggests that job security provisions are surprisingly loosely linked to labour turnover. Bertola and Rogerson (1997) argue that albeit more stringent job security should lead to lower gross labour turnover, labour market institutions differ across countries also by other institutional features, which may have opposing effect on gross labour turnover.

Bertola and Rogerson (1997) suggest that in Europe centralized wage negotiations tend to lead into more compressed wages across employment establishments[3]. Institutionally compressed wage settlements limit the relative wages to respond cycli-

[3]OECD (1997) finds evidence that more centralised wage negotiations lead into more equal distribution of income in the OECD countries.

cal business conditions. In the absence of stringent job protection, such as firing costs, institutional wage rigidity imply more intense labour shedding and hiring, when compared to economy where wages respond more flexibly to business conditions. Consequently, wage compression tend to increase an intensity of firm-initiated labour turnover.

While wage compression tends to intensify the firms´labour reallocation, high mobility costs or equivalently, high search costs lead job losers to face increasing variability of earnings. It is possible that highly compressed wages makes it impossible for high mobility costs or high search cost to be offset in expectation by higher future wage offers in the hiring firms. Consequently, to offset this negative effect of wage compression, workers agree on restricting firing of the firms. In other words, wage compression policies tend to reinforce a need to establish stringent job protection. This develops a vicious cycle, that may prove difficult to end. Indeed, empirical evidence indicates that overall wage inequality is lower in the same countries that tend to have more stringent job protection legislation (Bertola and Rogerson (1997)).

Saint-Paul (1995) suggest that adverse employment shocks make job security provisions binding and may lead an economy to "high unemployment trap". Firing costs can also generate high job-to-job turnover, but very low unemployment-to-job turnover. One reason for this can be that when the worker is fired, high firing costs strengthen the signal effect of worker quality. This is evident from the empirical findings from France, where an unemployed hired in a new job earns 8 per cent less when compared with previous job. OECD (1996) reports that there are striking differences in the share of long-term unemployment in total unemployment. In the European Community, more than 40 per cent of the unemployed had been out of work for 12 months or more in 1992, compared with only 11 per cent in North America. The high incidence of long-term unemployment in most of the European countries is associated with low inflow rates into unemployment. This points to the problem of hiring in the European rigid labour markets. The risk of becoming unemployed is moderate, but once unemployed, a worker has a little chance of quickly finding another job. In the countries with more flexible labour markets, a worker has a greater risk of becoming unemployed, but unemployed person has a better chance of being rehired. Subsequently, labour turnover is larger in magnitude. Of course, as suggested by implicit contract arguments, firms implicitly guarantee employment stability for a longer periods of time when the firing costs are high and therefore, workers might be more willing to agree to shoulder the costly mobility.

On the one hand, if firing costs increase tenure lengths and decrease a possibility of rehiring unemployed, then the most job changes are not mediated by unemployment. This reduces the economy´s ability to relocate jobs. While job-to-job search can be a good method finding a job in the same region or sector, it is less appropriate for finding a job in another sector or region. The prevalence of job-to-job mobility, then, does not hamper mobility in response to idiosyncratic, firm specific shocks, but in the long-run a labour reallocation towards new sectors and regions may slow down. If the growth potential of the economy is in those new sectors and regions, firing costs may then have effects on long-term productivity growth. When the firms

face high firing costs, they may also be less willing to start new risky potentially innovative projects. This likely hampers the economy´s innovation capacity and an efficient use of human capital in the growth process.

Recent empirical evidence, however, seems to point out that the overall impact of employment protection on unemployment and growth appears to be very limited and if anything, counterfactual. Despite of employment protection, unprofitable jobs are closed down and profitable ones anyhow started at reasonable rate. Some of the empirical evidence suggest that job security itself help to enhance productivity performance in many sectors if it is associated with other measures taken by firms to enhance the substantive participation of the workforce (Layard and Nickell (1997)).

3.2 Social security and income inequality

Widening wage differentials have been associated with actual falls of real wages for low-skilled workers in non-European countries (Australia, Canada, the United States). The United Kingdom has experienced both a sharp increase in earnings inequality and increases in real wages of the low-skilled, because of rapid growth of wages in general during the 1980s. The other European countries, at least until the beginning of 1990s, have not experienced any sharp changes in income inequality, but if anything, the trend is towards widening inequality. Importantly, however, all the European countries have experienced a shift in demand away from unskilled jobs (low-paid) towards more highly skilled jobs (high-paid). The countries where wage flexibility has been higher (Australia, United States, Canada, Australia) both the relative employment and unemployment rates of unskilled changed little during the 1980s, while in Europe, both relative employment and unemployment rates of low-paid jobs deteriorated (OECD (1997)).

One of the possible causes of this can be related to excessive unemployment benefits. At least in part, willingness to accept a low-paid job depends on the relative generosity of income support, minimum wages and possible alternative sources of income. Indeed, unemployment benefit rates relative to average earnings - the replacement rate- are generally higher in Europe than in the other OECD countries. Moreover, in most countries the replacement rate rose during the 1970s and 1980s, with substantial rises in several smaller European countries (Denmark, Norway, Finland, Portugal, Spain, Ireland, Sweden) (OECD (1994)).[4]

Minimum wage provisions limit the range of wage rates, while unemployment benefits and other welfare payments tend to truncate the lower end of wage distributions. At the same time, generous non-employment income flows reduce incentives for workers to accept low wage offers when searching for jobs. Minimum wage provisions tend also to lead higher average wage rates and consequently lower aggregate employment levels. In more general, extensive social protection programs may also be reflected in moderate internal migration flows in different European countries.

[4]However, many of these countries have lowered unemployment benefits in the 1990s.

3.3 Labour mobility

If the costs of living were the same across regions and geographic mobility costless, identical workers should earn the same wages from similar jobs, because migration towards high-wage areas should proceed until earnings are equalized. Free trade should also equalize the price of tradable goods in an integrated economic area. Although wage differentials reflect the different prices of non-traded goods, in the short and medium run, labour mobility costs are certainly an important determinant of observed wage differentiation. In the face of idiosyncratic business fluctuations, workers are ready to move only if wages and job finding prospects compensate mobility costs. Regional and industrial data in the European countries reveal only moderate differences in wages across sectors for homogenous labour. These moderate wage differentials across sectors in Europe reflect more likely the institutional rigidity of wages per se, than efficient functioning of the factor markets. This is evident from the fact the regional unemployment rates are dispersed. Also unemployment differentials across sectors are fairly persistent in many European countries.

Moreover, when internal migration flows in European countries are compared to those of the U.S, European countries exhibit bigger variation across regions migration flows between the countries than between the corresponding states in the U.S. Internal migration flows in Europe are also on average somewhat smaller and have been declining since 1970s (OECD (1991)). Differences in internal migration flows between the European countries reflect cultural and institutional heterogeneity of the Europe in general[5], but might also characterize more systematic differences in wage and employment policies specifically. Indeed, declining and moderate migration flows has been associated to rise and high level of absolute unemployment rates as well as to increasing rigidity of the labour markets in many countries. High and persistent unemployment rates are likely to be related to generous non-employment income subsidies in many countries.

Unemployment, when accompanied with a flexible wage process, is thought to provide perhaps the most powerful incentive for labour mobility. It has been argued that in Europe, real wages unresponsiveness to regional labour demand fluctuations and wage compression policies has hindered the functioning of this mechanism. In many European countries, especially in Italy and Spain, the differences in unemployment rates are not closely associated with differences in real wages or unit labour costs and in Italy, the internal migration flows have also been well below average of the OECD countries (Mauro et.al. (1999)). The recent evidence from migration studies shows that unemployed are indeed more likely to move. At the same time a lack of open vacancies in the country or region of destination has significant negative effect on migration. Blanchard and Katz (1992) suggest that in the U.S. geographic mobility is the most important mechanism bringing unemployment back to its long-term equilibrium level. Moreover, they suggest that workers are more

[5]One of the reasons for the modest level of mobility flows between the European countries is that mobility is subject rather to natural barriers of moving, than a lack of potential incentives to move. These natural barriers of moving, then, most likely require even larger expected income differentials than when compared to more homogeneous societies, such as the U.S.

inclined to move as a response to higher unemployment, rather than as a response to fall in wages in the States that suffer adverse shocks. Eichengreen (1993) suggest also that the elasticity of migration with respect to wage differentials is at least five times greater in the U.S. than in the Great Britain or Italy.

The view that increasing rigidity of the labour market institutions since 1970s has enforced labour immobility in many European countries seems well established. However, Scandinavian countries which have historically been associated to countries with centralized wage setting, compressed and inflexible wages, show surprisingly high internal migration flows in international standards. Sweden´s internal migration flows has been continuously higher than those of the U.S since 1970s and in Norway similar to those of the U.S. In Finland, internal migration flows has been closely similar to Canada and clearly higher than those of Germany, Italy and the United Kingdom (OECD (1991)). At the same time, the Scandinavian countries have had very high replacement ratios in international standards.

Part of the high internal migration flows in the Scandinavian countries when compared to the U.S. can be explained by relatively short moving distances when compared to the U.S, however. As suggested by Fischer (1999) migration propensities are inversely related to the distance of the move involved. Fischer estimates that in Sweden, the regional internal emigration propensity decreases approximately linearly with doubling of the distance involved. In the face of this evidence, the direct cross-country comparisons of migration flows and attempt to related them in any specific way to labour market institutions can be seriously flawed.[6]Therefore, it is perhaps more advisable to use the time series evidence of single country´s internal migration flows and relate observed patterns to incidence of specific labour market reforms directly.

[6]I am indebted to Peter A. Fischer for pointing me out this fact.

3.4 Discussion

As already argued, firing cost and generous welfare benefits have been used extensively to secure steady and relatively high income flows for the workers in Europe. These two prominent sources of rigidity interact importantly in wage, labour demand and supply processes and both institutions exist simultaneously in most of the European countries. Figure 1 illustrates the relationship between employment and income protection in OECD countries. If anything, the figure reveals that employment and income protection go hand-in-hand in most of the OECD countries, with the exception of Italy and Denmark. We will next introduce a dynamic labour market model and analyse the efficiency efficiency effects of different combinations of security programs.

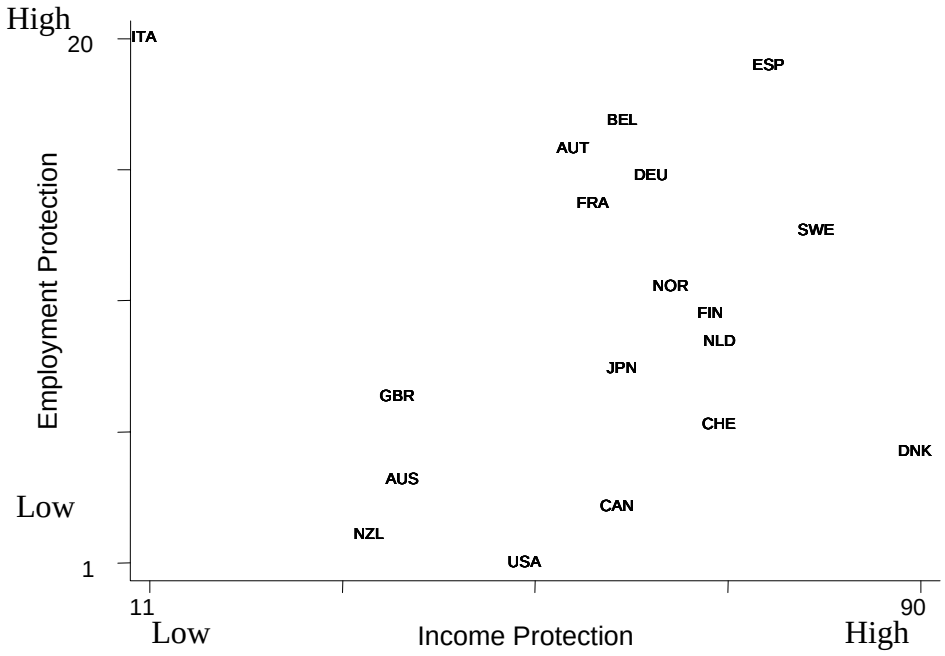

Figure 1: *Employment and Income Protection in some OECD Countries*
Source: Data is from Blanchard and Wolfers (1999). Vertical axis measures stringency of employment protection and horisontal axis is gross replacement ratio. Gross replacement ratio is calculated as average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and the three durations of unemployment. The data refers to average figures during the period of 1970-1999.

4 The basic model

4.1 Technology

The basic setup of the model builds primarily on Bertola and Rogerson (1997). Labour markets consist of indivisible labour who seek for employment at a continuum of production sites or firms indexed by i. The marginal revenue product of labour at firm i is denoted by $\pi(l_t^i, \alpha_t^i)$ and it decreases in current employment l_t^i, due to decreasing returns and increases in an index of productivity and demand conditions, denoted by α_t^i. This exogenous "productivity shock" follows the simplest possible stochastic process: a two-state, discrete-time Markov chain of the form

$$\alpha_{t+1}^i = \begin{cases} \alpha^G, \text{ prob } p \text{ if } \alpha_t^i = \alpha^B, \text{ prob } (1-p) \text{ if } \alpha_t^i = \alpha^G \\ \alpha^B, \text{ prob } (1-p) \text{ if } \alpha_t^i = \alpha^B, \text{ prob } p \text{ if } \alpha_t^i = \alpha^G \end{cases} \tag{1}$$

At time t firms are either "Good" (G) or "Bad" (B). Within each group all firms are identical but the identity of good and bad changes over time according to (1). For simplicity, the marginal revenue product of labour is assumed to be linear

$$\pi_t(l^i, \alpha^i) = \alpha_t^i - \beta l_t^i, \ i = G, B \tag{2}$$

These dynamically heterogeneous firms may also be interpreted as different industries, different geographical locations or different occupations, which reallocate homogeneous labour according to exogenous productivity fluctuations. When the uncertainty described by (1) is assumed to be purely idiosyncratic and firms form a continuum, a simple symmetric Markov structure of the productivity shocks secures that in the steady state half of the fixed measure of existing firms are good and the remaining half bad. Similarly, in the steady state a fraction of p previously bad firms experience a positive productivity shock. The simple linear form of (2) implies that a cross-sectional mean of labour´s marginal productivity is independent on the relative allocation of labour between good and bad sector. In our specific parameterization of the model, misallocation of labour affects aggregate production more strongly than labour´s mean marginal product.[7]

4.2 Firing costs

In each period a risk neutral firm i must pay a constant exogenous firing cost F per unit of employment decrease relative to the previous period. This firing cost can be thought of as a fixed redundancy payment or as a shadow administrative costs of firing the workers. Due to these firing costs, labour turnover becomes costly for employers and will be taken into account in the firms´dynamic decision to hire and fire.

[7] See Gouge and King (1997) for the seach model with aggregate and idiosyncratic uncertainty.

Each firm is assumed to maximize the expected present discounted value of profits net of firing (labour turnover) costs, using constant interest rate r, which they take as given. If the wage and the interest rate are fixed at w^i and r then the expected present value of marginal revenue product minus the wage follows a two-state Markov process, when the shock follows the two-state Markov process. Its values V^G and V^B at a risk neutral good (bad) firm, by definition, satisfy relationships

$$V^G = \pi(l^G, \alpha^G) - w^G + \frac{1}{1+r}[(1-p)\,V^G + pV^B] \tag{3}$$

$$V^B = \pi(l^B, \alpha^B) - w^B + \frac{1}{1+r}[pV^G + (1-p)\,V^B] \tag{4}$$

At the margin, competitive profit maximization implies that the shadow loss of net revenues from dismissing workers equals the actual costs of firing them $V^B = -F$ and that $V^G = 0$. The equations above can then be solved for

$$\pi(l^G, \alpha^G) = w^G + \frac{p}{1+r}F \tag{5}$$

$$\pi(l^B, \alpha^B) = w^B - \frac{r+p}{1+r}F \tag{6}$$

A good firm pays its employees less than their marginal product, because with probability p it might need to dismiss the marginal worker in the next period and bear the unit firing cost F. A bad firm pays its employees more than their marginal product, because the expense of firing them would be regretted if labour demand increases and new workers are rehired.

When the labour demand is linear, the mean productivity of labour is independent on the allocation of labour between goods and bads and average level of employment depends upon the relative size of the wedges introduced by turnover cost between state-contingent wages and labour marginal product.

Using (2) in (6) and (5), denoting averages with conventional notation and letting $\beta = 1$, average employment level reads

$$\overline{l} = \overline{\alpha} - \overline{w} - \frac{r}{1+r}\frac{F}{2} \tag{7}$$

Immediate firing costs tend to decrease average level of employment only because of discounted firing costs, but this effect is very small for the realistic values of discount rate r.

In every period a proportion of p of the firms experience a change in productivity and $p\left(l^G - l^B\right)$ units of labour are relocated from formerly good to newly good firms. Due to the symmetric Markov chain, the cross-sectional distribution remains stable and hence also aggregate employment is given by the average of high and low labour demand functions. Using (2), letting $\beta = 1$, and normalising total employment to unity, gross job turnover $\left(\mathcal{M} \equiv p\frac{\Delta l}{l^G + l^B}\right)$ becomes

$$\mathcal{M} = p\left((\alpha_t^G - \alpha_t^B) - \left(w^G - w^B\right) - \frac{2p+r}{1+r}F\right) \tag{8}$$

While labour turnover should be related negatively to high firing costs, at the same time, wage rigidity leads into higher labour turnover. If wages adjust fully to productivity fluctuations ($(\alpha_t^G - \alpha_t^B) = \left(w^G - w^B\right)$) and firing costs were zero, employment level in both good and bad sector would be kept constant and gross labour turnover would be zero. However, in reality long-term wage contracts and other wage provisions do not allow wages to fully adjust to productivity fluctuations. If wages were exogenous, wage rigidity in the model could be characterised by the situation where wage fluctuations are less than productivity fluctuations. This simple formulae would then suggest that in the countries with more wage rigidity and/or less stringent employment protection, employment fluctuations should be more pronounced. Moreover, when wages are rigid and firing costs are positive but not large enough to completely offset reallocation, firms incur costs $p\Delta l_t F$ in each period. Clearly, higher the firing costs are, the more wage flexibility the firms would prefer.

4.3 Labour and mobility

Instead of letting wages to be completely exogenous in the model, we assume next that wages are determined by moving decisions of homogeneous labour. In the following simplest benchmark-setup, risk neutral homogeneous labour seeks for employment opportunities in production sites across sectors. Let it cost k units of the model´s numeraire good to move a unit of labour between production sites and assume that workers have no outside option.

As above, arbitrage equation can be used to characterize workers "moving" decisions in different steady states. Worker j decisions can be based on the maximization of expected present discounted value of labour income, net of mobility costs. Let W^i denote this value at a certain state and let $i = G, B$. Assuming that workers are "wage takers", we find that a value of staying in a good firm for risk neutral worker is

$$W^G = w^G + \frac{1}{1+\rho}[(1-p)\,W^G + pW^B] \tag{9}$$

where ρ is a subjective discount factor. If the worker finds herself in the bad sector she has 2 choices; stay or move into good sector and bear mobility costs (k). Therefore, value of staying or moving out from the bad sector becomes

$$\begin{aligned} W^B &= \max\{w^B + \frac{1}{1+\rho}[pW^G + (1-p)W^B], && (10)\\ &\quad w^G - k + \frac{1}{1+\rho}[(1-p)W^G + pW^B]\} && (11) \end{aligned}$$

Assuming that $\rho = r$, the equations above characterize the risk-neutral workers mobility choices who have access to perfect financial markets at fixed interest rate r. The assumption of risk neutrality (or the existence of complete state-contingent financial markets) is perhaps unrealistic, but convenient.

Consider first a worker who is hit by a bad shock. If equilibrium entails positive employment at each firm type and positive turnover $\left(l^G > l^B > 0\right)$ and workers take wages as given, a mobility supporting wage differential can be determined from considering the workers´mobility decisions. If mobility does take place in equilibrium and some workers remain at firms with "bad" states, then there must equality between (10) and (11). This equality implies that workers are indifferent between moving and staying. Equating, then, yields

$$w^G - w^B = k - \frac{1-2p}{1+r}(W^G - W^B) \tag{12}$$

Because it is never optimal to move out from a good state it must be that in equilibrium

$$W^G - W^B = k \tag{13}$$

This yields moving condition,

$$w^G - w^B = \frac{r+2p}{1+r}k \tag{14}$$

Moving costs (k) drive a wedge between wages in the good sector and the bad sector. If productivity shock has a positive persistence $\left(p < \frac{1}{2}\right)$ then accepted wage offers by any given job are serially correlated. Increasing persistence, or in other words, less frequent productivity fluctuations makes it more likely that the firms currently in bad state will be in the bad state also in the next period. This increases a net benefit from mobility.

Using (8) and assuming that (14) holds, we find that gross labour turnover becomes

$$\mathcal{M} = \frac{p}{\beta}\left((\alpha_t^G - \alpha_t^B) - \frac{(2p+r)}{1+r}(k+F)\right) \tag{15}$$

When both workers and firm owners are risk neutral and share the same discount factor, labour turnover entails symmetric costs for both workers and firm owners.

4.4 Labour market efficiency and employment protection

In order to analyse aggregate productive efficiency of the economy under different levels of firing costs, we can write a total flow of production net of firing costs and mobility cost as

$$\mathcal{E} = \int_o^{l^G} (\alpha^G - \beta l)dl + \int_o^{l^B} (\alpha^B - \beta l)dl - p(l^G - l^B)(F+k) \tag{16}$$

This can be seen as a right measure of "dead-weight labour market´s efficiency" if both firms and workers, in fact, maximize the average expected net flows of profit and labour-income flows.

Moreover, in order to make analysis closer to the real world employment protection assume that firing costs F consists of two elements: Severance pay and red-tape or administrative costs that present a pure dead-weight loss to the economy. Severance pay can be presented by a direct transfer which reduces moving costs of the workers from laissez-faire, similarly to Bertola (1999). Suppose that employment protection is presented by the following constraint

$$k_r + \theta F = k \tag{17}$$

where a fixed portion $\theta \leq 1$ of the firing costs offsets workers mobility costs and the rest $(1-\theta)$ is simply wasted. k is laissez-faire level of mobility costs and k_r severance pay adjusted mobility costs. Using the constraint (17) in (16) productive efficiency can be written as

$$\mathcal{E} = \int_o^{l^G} (\alpha^G - \beta l)dl + \int_o^{l^B} (\alpha^B - \beta l)dl - p(l^G - l^B)\left(k + (1-\theta)F\right) \tag{18}$$

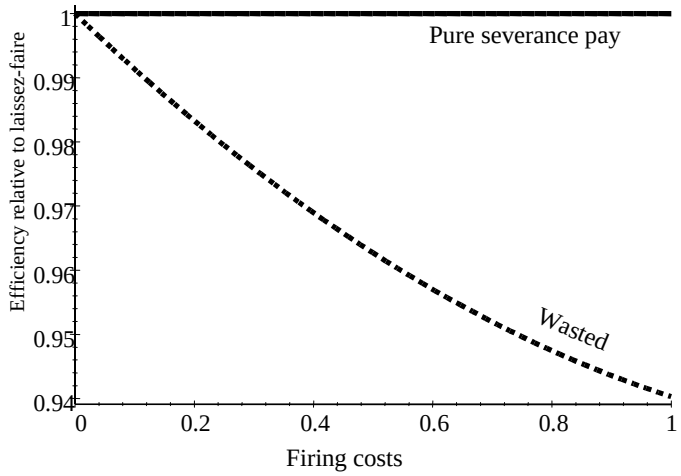

Figure 2: *Pure Severance Pay and Wasteful Job Security*
Notes: In this picture, we have assumed that $\beta = 1, \alpha^G = 2, \alpha^B = 1$ and $k = 1$.

Figure 2 illustrates the situation in two extreme cases. If all the firing costs are paid back to workers, firing costs has no effect on the labour market efficiency since wages adjust endogenously and completely offset the effect of firing costs on labour allocation. On the contrary, if all firing costs are wasted, higher firing costs decrease efficiency. In the situations where only part of the firing costs are paid back to

workers firing costs still reduce efficiency and efficiency loss depends on the size of the wasted portion of the firing costs and technological parameters of the model.

It is also easy to see that in the model´s equilibrium where mobility condition holds, workers are better off when firing costs represent a pure severance pay ($\theta = 1$) or when at least part of the employment protection consist of severance pay paid directly to the workers. However, regardless on the wastefulness of firings costs, firms production flows are always decreasing as firing costs increase.

5 Extension

5.1 Option to wait

In this section we consider a variant of the model where workers have outside option. Workers can either to choose to move out to good sector or choose to stay in the bad sector and face an exogenous probability of being laid-off . Workers are willing to stay and face a positive probability of lay-off because their income is secured by an alternative, non-employment income (w_u) in the case of firing. Workers who decide to stay in the sector which has been hit by a bad shock do not need to bear a mobility cost k. Therefore, alternative pay, or any similar alternative source of income, provides a "safety net" against income fluctuations. Although in the risk neutral world, income fluctuations as such has no effect on worker´s welfare in the decentralised equilibrium, income protection may entail efficiency costs for the economy.

In more general, this alternative pay can be thought of as a social protection which replaces the lost market income due to unemployment. Indeed, even the European countries differ substantially in the amount of social protection they offered for working families at the beginning of 1980s and the changes in expenditures on these programs. For instance, the Netherlands, Denmark, Finland and Sweden all spent 10% or more of the GDP on social protection and increased their expenditures between 1980 and 1990. Generous long-term unemployment benefits, notably in Scandinavian countries and in Canada, significantly dampened the effect of higher unemployment on disposable income inequality. (Gottschalk(1997)). Empirical evidence seems to point out also that the level of social protection appears negatively correlated with changes in income inequality. The Nordic and north-European countries, which has had the lowest levels of inequality and also the smallest increases in income inequality, were also the countries with the greatest social protection.

We will concentrate here purely on the allocative efficiency of the labour markets and abstract from unemployment. In this model, alternative pay leads into more compressed wages but the firms keep average employment level in the economy constant by lowering the wages in the good sector as a respond to higher alternative pay. On the contrary, alternative pay increases the wage in the bad sector. This relationship between income protection and wage distribution mimics the real world phenomenon where more jobs are created in the high-paid sector as a respond to income protection policies that tend to truncate lower end of the wage distribution.

The workers' mobility choices generate two important constraints that determine a behavior of wages and employment in the model. We call them *moving constraint and activity constraint.* In the market equilibrium, wage in the good sector is determined by the equilibrium condition which states that in the case of firing, moving to good sector or waiting in the bad sector and consuming unemployment benefit gives the same utility for the workers. Wage in the good sector, therefore, depends upon both alternative income (w_u) as well as moving costs. Wage, or rather a wage floor, in the bad sector is determined by "activity" constraint. This constraints simply states that the wage in the bad sector has to be greater than or equal so

that to make employment at least as preferable as always dropping out from the employment scheme when the firm is hit by the bad shock. In this simple setup employment status has no effect on wage offers or probability of becoming employed and therefore in the market equilibrium alternative pay has to be equal to wage in the bad sector.

Formally, consider that the state value of finding oneself employed by a good firm satisfies a recursion

$$W^G = w^G + \frac{1}{1+r}[(1-p)\,W^G + pW^{B_u}] \tag{19}$$

where W^{B_u} measures a welfare of the workers whose employer has experienced a negative productivity shock. If the worker is laid off, she has consequently two choices. Either to bear mobility costs (k) and move into good sector or stay and consume an unemployment benefit (w_u). If the worker is not laid-off she gets a wage offer from the bad firm and earn wage $\left(w^B\right)$. We assume, perhaps unrealistically so, that the employment status has no effect on probability of finding a new job. Match is therefore perfectly random. This assumption implies that in the market equilibrium where activity constraint holds, wage in the bad sector need to be equal to alternative wage. In contrast to the model analyzed in the previous section, we assume that once the worker has been offered a wage $\left(w^B\right)$, moving option becomes irrelevant. Therefore, our model assumes that the moving decision is relevant only for those who become fired.

Subsequently, in the "bad firm" a value function for the randomly chosen individual worker can be written as

$$\begin{aligned} W^{B_u} &= (1-z)\left(w^B + \frac{1}{1+r}\left(pW^G + (1-p)\,W^B\right)\right) \\ &\quad +z\max\{w^G - k + \frac{1}{1+r}\left((1-p)\,W^G + pW^{B_u}\right)), \\ &\quad w_u + \frac{1}{1+r}(pW^G + (1-p)W^{B_u})\} \end{aligned} \tag{20}$$

where w_u is unemployment benefit/alternative non-employment income, z is probability of being laid-off and $(1-z)$ is a probability of being hired by a firm which has experienced a negative shock. In the steady state equilibrium where indefinitely many firms experience idiosyncratic productivity shocks and a large number of workers are continuously reallocated across them, in every period a proportion of p of the firms experience a change in productivity from bad to good. Consequently $p\frac{l^G - l^B}{l^G + l^B}$ units of labour are rehired from formerly good to newly good firms. When the formerly good firm experience a downward shift in demand at every point of time probability that randomly chosen individual becomes laid-off is $\frac{l^G - l^B}{l^G}$. A probability of being rehired, in turn, is $\frac{l^B}{l^G}$. W^B is welfare of the workers employed in bad firm and defined as earlier

$$W^B = w^B + \frac{1}{1+\rho}[pW^G + (1-p)W^B]$$

5.2 Market equilibrium

The difference between the wage in the good sector and alternative income w_u is determined by the condition which states that workers who have been laid-off, must be indifferent between staying in the bad sector and moving. Equality of the two terms inside the max operator of (20) implies that

$$w^G - w_u = k + \frac{2p-1}{1+r}\left(W^G - W^{B_u}\right) \tag{21}$$

In order to secure a positive level of employment in the bad sector, a wage in the bad sector (w^B) must be high enough such that the worker does not decide to choose inactivity and drop-out always when the firm is hit by a bad shock. This *activity constraint simply states* that

$$W^B = W^u$$

where

$$W^u = w_u + \frac{1}{1+r}[pW^G + (1-p)W^{B_u}]$$

Therefore

$$\begin{aligned} W^B &= W^u \\ &\iff \qquad (22) \\ w^B &= w_u \qquad (23) \end{aligned}$$

Under the assumption that moving constraint holds with equality, we can solve W^{B_u} and W^G and W^B from the system of 3 equations

$$\begin{aligned} W^G &= w^G + \frac{1}{1+r}\left((1-p)\,W^G + pW^{B_u}\right) && (24) \\ W^{B_u} &= (1-z)\left(w^B + \frac{1}{1+r}\left(pW^G + (1-p)\,W^B\right)\right) \\ &\quad +z(w^G - k + \frac{1}{1+r}\left((1-p)\,W^G + pW^{B_u}\right)) && (25) \\ W^B &= w^B + \frac{1}{1+r}\left(pW^G + (1-p)W^B\right) && (26) \end{aligned}$$

After some simplifications, solution yields

$$w^G - w^B = \frac{r + p\,(2 - z)}{r + 1 - z\,(1 - p)} \left(w_u - w^B\right) + \frac{2p + r}{1 + r} k \tag{27}$$

If $w_u > w^B$ all the fired workers would choose inactivity, resulting *voluntary or waiting time unemployment*. In the model´s equilibrium, this would imply that bad firms had to choose inactivity and close down always when the firm was hit by a bad shock. In the model´s equilibrium, then, $l^B = 0$ and the probability of lay-off would be equal to unity ($z = 1$). Workers would be indifferent between moving and waiting in the unemployment pool as long as

$$w^G = w_u + \frac{2p + r}{1 + r} k$$

Waiting time unemployment would be simply $u = 1 - l^G$ and it would be increasing in both alternative pay and discounted mobility costs.

However, in order to secure positive level of employment in the bad sector, wage in the bad sector must be greater than or equal to alternative income w_u. If this activity condition holds with equality some workers choose to work and some workers choose to wait in unemployment pool always when the firm where they are employed is hit by a bad shock. If strict inequality holds ($w^B > w_u$), all the employed workers in the bad sector would choose to work and possible unemployment would be involuntary.

As long as moving and activity constraints hold with equality, dismissed workers are not any worse off than those employed at firm with low productivity. Moreover, dismissed workers are also indifferent between moving or consuming alternative income. When both activity and moving constraint hold exactly and wages are let to adjust endogenous on changes in alternative pay, productive efficiency is decreasing in alternative pay. It is not difficult to see why. Higher alternative pay increases wage both in the bad sector and good sector, leading firms to employ less labour. At the same time, costs of reallocation remain the same.

5.3 Involuntary mobility

In reality, however, these constraint may not hold and it may not be possible for wages to fulfill both moving and activity constraints. As discussed earlier, European labour markets are typically characterised wage provisions that limit the flexible adjustment of wages to business fluctuations. As already argued, w_u in the model could be thought of as a safety net against large income variations when the firm is hit by a bad shock and worker is laid-off, while F protects workers directly from jobloss. In this model´s equilibrium, alternative pay w_u has one-to-one effect on the wage in the bad sector through the activity constraint. Therefore an alternative pay directly effects the allocation of labour between the sectors, as the firms employ labour according to dynamic labour demand equations derived earlier.

In this section we consider the implications of too high alternative pay on production efficiency. We depart from the general equilibrium and assume that mobility

is involuntary for the workers. In order to make the model somewhat closer to the real world wage provisions, we assume that alternative pay w_u depends upon average labour income of the workers. Moreover, we assume that while alternative pay determines the wage in the bad sector and therefore is no more market determined, the wage in the good sector will be determined endogenously.

Formally, let

$$w^B = w_u \tag{28}$$

and assume that there is a simple linear relationship between average wage ($\overline{w}$) and alternative pay w_u, such that

$$w_u = \kappa\overline{w} = \kappa\frac{w^G + w^B}{2}$$

where $\kappa \leq 1$ can be interpreted as a gross replacement ratio. Given (28) w_u can now be expressed as a function of good wage and replacement ratio (κ), such that

$$w_u = \frac{\kappa}{2-\kappa}w^G \tag{29}$$

We make also a crucial assumption that firms have right-to-manage such that they always remain in their turnover adjusted labour demand functions. We assume, therefore, that good sector wages adjusts endogenously such that to keep average level of employment constant in the model. This allows us to abstract conveniently from unemployment. Due to the assumption that employment level is kept constant, workers "buy" higher income protection by accepting lower income in the high wage sector. Implicitly, therefore, there is a redistribution of constant labour income from high wage sector to low wage sector. Due to the assumption of risk neutrality, this will have only indirect effect on the worker´s welfare. In more realistic setup with risk averse workers, higher income protection would entail a direct welfare gain due to the less volatile labour income.

This right-to-manage assumption generates an important compositional effect, similar to Acemoglu (1999a), and is crucial for the results that follow. First, when replacement ratio (κ) increases and firing costs are sufficiently low, higher replacement ratio effectively allocates more labour into high productivity sector and therefore increases total production flow for the firms. If the firing costs are set to zero, higher replacement ratio allocates more labour to the good sector. As replament ratio approaches 1, all the workers are allocated in the good sector and gross labour turnover is at its maximum. This is illustrated in the figure 3 below.

Acemoglu (1999b) provides some empirical evidence on this. He studies how legislated changes in state level replacement ratios for low wage workers affect the industrial and occupational composition of jobs among non-college graduates in the U.S. states. It appears that the state that increases its replacement ratio experiences an increase in unemployment rate, but also a relative increase in the number

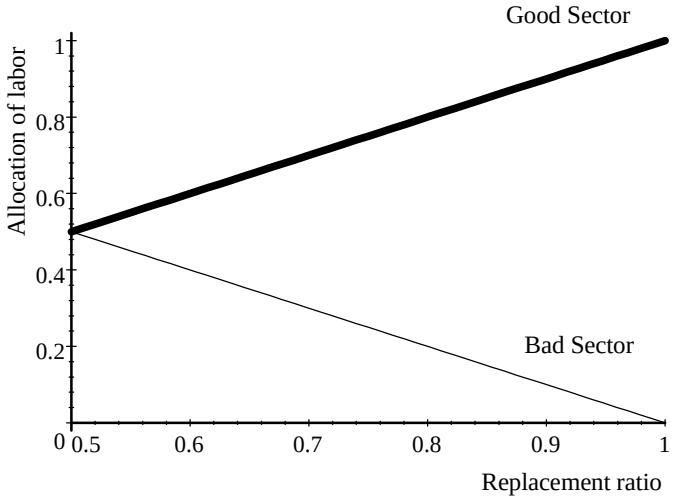

Figure 3: *Allocation of Labor and Income Security*

of workers in high wage occupations and industries, and both higher labour productivity and higher labour productivity growth. Higher labour productivity in case of occupations seems to result from an increase in the number of high wage jobs, despite the decline in overall employment. This suggests that unemployment insurance may have an important effect on the types of jobs that are created.

5.4 Labour market efficiency and income protection

Pure efficiency effects of income protection in the absence of firing costs depend upon technological mobility costs.[8] If the costs associated with mobility are small, income protection actually increases productive efficiency, due to the fact that more labour is allocated into high productivity sector and costs of reallocation are small. On the contrary as the technological mobility costs become large, dynamic costs associated with reallocation outweigh a static gain from increasing number of high productivity jobs. This is illustrated in the figure 4.

Naturally, if the productivity fluctuations are less persistent (higher p), dynamic costs associated with reallocation at given level of mobility costs are larger. The trade-off between static and dynamic costs, therefore, depends crucially on the frequency of the productivity fluctuations. More frequent productivity fluctuations increase dynamic costs associated to reallocation. Consequently, from the point of view of pure productive efficiency, income security that leads into wage compression becomes less desirable.

[8]In these simulations we have assumed that labor demand shocks occur every five periods on average ($p = 0.2$). Laissez-faire is the situations where mobility costs are equal to one period´s average labor productivity ($k = 1$) and firing costs are absent. Discount rate is set equal to 2%.

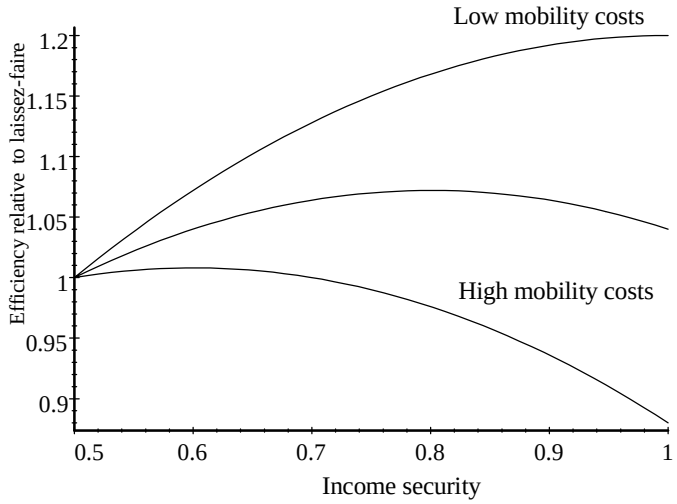

Figure 4: *Productive Efficiency and Income Security in the absence of Employment Protection*

5.5 Rigidity and efficiency

In practice, and as already argued, both employment and income protection institutions exist simultaneously. Figure 5 illustrates the situation where alternative pay and firing costs increase from laissez-faire towards full rigidity. Although higher replacement ratio makes wages more compressed, firing costs have been let to increase so fast as to eliminate costly labour mobility. In this parameterisation of the model, rigidity now misallocates labour relative to laissez-faire, since firing cost more than outweigh the firm's initiated labour reallocation due to more compressed wages. Although reallocation costs become smaller for the workers, net production flows of the firms also decrease due to misallocation of labour and high firing costs.

Figure 6 then illustrates the effect of higher rigidity on the labour market's productive efficiency at one parameterisation of the model and when all firing costs are wasted. Initially, as rigidity increases, smaller dividends and lower efficiency makes labour markets more inefficient. However, as rigidity increases and higher firing costs reduce labour mobility allocating labour more equally between the two sectors labour market efficiency increases slightly, but remains always below its laissez-faire value.

If part of the firing costs are returned back to workers in the form of severance pay, efficiency losses of higher rigidity are naturally less than in the situation where all the firing costs are wasted. However, rigidity always entail a degree of efficiency loss for the economy, if rigidity implies that jobs are destroyed from high productivity sector and technological mobility costs remain sufficiently high. If productivity fluctuations were more frequent and therefore reallocation costs higher, rigidity would naturally entail smaller efficiency losses. In an extreme where productivity fluctu-

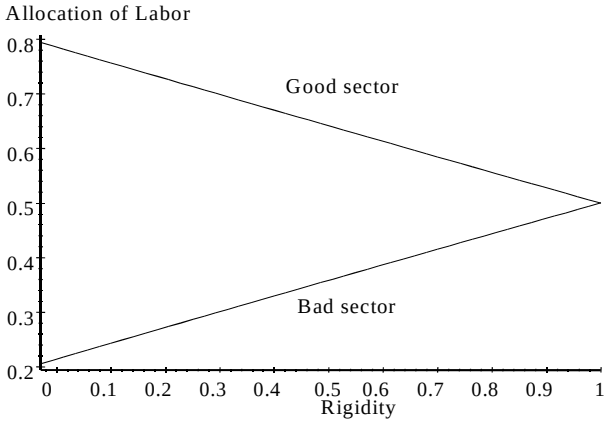

Figure 5: *Rigidity and Allocation of Labor*

ation are purely random, rigidity would have no effect on labour market efficiency. Similarly, higher mobility costs also imply that rigidity has smaller costs in terms of simple productive efficiency.

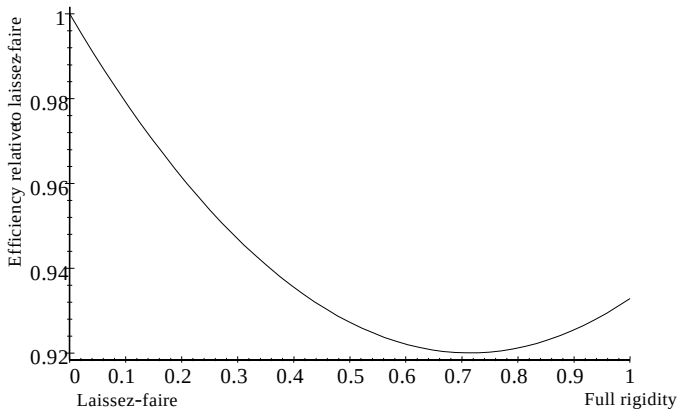

Figure 6: *Dead-Weight Labor Market Efficiency and Rigidity*

Notes: Labor market efficiency is measured relative to laissez-faire where mobility condition holds. Full rigidity is a situation where replacement rate is 1 and firing costs are so high as to absorb all the mobility.

6 Conclusions

This paper has discussed the flexibility of European labour markets and outlined a relatively simple dynamic labour market model to analyze implications of employment protection and income protection on labour market efficiency.

Formal analytical model shows that in the absence of firing costs, higher income protection leads into more compressed wage distribution. When the wages in the high productivity sector are let to adjust endogenously, more jobs are created in the high productivity sector. If the mobility costs are very high, dynamic costs associated to reallocation and too compressed wages outweigh the gain from static productive efficiency as more labour works in the high productivity sector, but need to be reallocated always when the firm is hit by a negative productivity shock. On the contrary, if mobility costs are low the static gain from increasing number of jobs in the high productivity sector may actually improve productive efficiency. The model shows also that if all the firing costs are returned back to workers in the form of severance pay and wages adjust endogenously, they have no efficiency effects. Naturally, employment protection is more costly in terms of productive efficiency, more it involves wasted administrative and red-tape costs for the firms.

In reality, both employment and income protection institutions exist simultaneously increasing rigidity of the labour markets. That is why the paper analyses also the effects of rigidity on the productive efficiency of the labour markets. Rigidity in the model is interpreted as employment and income security institutions, which make wages more rigid, but where high employment protection reduces firms' initiated reallocation. In full rigidity situation, wages do not respond to productivity fluctuations at all and high firing costs absorb all the mobility. As rigidity increases and all the firing costs are wasted, smaller production flows make labour markets more inefficient. Initially, as employment and income protection moves an economy away from laissez-faire, static loss from smaller dividend flows ouweigh the dynamic gain from reduce reallocation. As rigidity increases towards full rigidity, and economy allocates labour more equally between the two sectors, labour reallocation entails smaller costs for both workers and firms. Labour market efficiency increases slightly, but remains always below its laissez-faire value.

Due to the fact that model´s agents are risk neutral, the model ignores important welfare gains of social protection that arise in more realistic models with risk averse workers and imperfect asset-markets. Indeed, in many European countries real-life asset-markets are still fairly underdeveloped in providing instruments for workers to hedge efficiently across income variations and uncertainty. If the labour demand fluctuations require considerably labour mobility and intensive search, employment and income protection can have an important role also in insuring individual workers against idiosyncratic uncertainty[9]. For instance, Acemoglu and Shimer (1998) suggests that moderate unemployment insurance undo the distortions introduced by uninsured risk. When agents are risk-averse, unemployment benefit can make workers more willing to take the job loss risk and therefore intensify, say, mobility

[9] See also Bertola (1999) and Acemoglu and Shimer (1998)

when the workers face uncertainty. This paper´s risk neutral framework has allowed us to study only the simple efficiency effects of employment and income protection at the aggregate level.

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