



EUROPEAN UNIVERSITY INSTITUTE
DEPARTMENT OF ECONOMICS

EUI Working Paper **ECO** No. 2004/11

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and Benefits on Labor Markets**

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Published in Italy in March 2004
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DO SOCIAL POLICIES HARM EMPLOYMENT?¹
Second-best effects of taxes and benefits on labor markets

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Abstract

In the presence of Walrasian labor markets social policies harm hours worked, employment and output. In non-Walrasian labor markets with trade unions, efficiency wages and/or costly search and mismatch progressive taxation and corporatism induce wage moderation and boost employment and output. Although unconditional unemployment benefits destroy jobs, conditional benefits spur job growth. In a second-best world the usual effects of social policies are thus overturned. In addition, the incidence of taxation and the effects of tax progression depend crucially on the specific features of the welfare state, e.g., whether benefits are indexed to after-tax wages or not and unemployed people share fully in the tax burden or not. In a full political-economic equilibrium a more equitable distribution of income and assets leads to a more affluent median voter who votes for less 'populist' policies. Hence, employment and economic growth are higher and inflation lower.

Keywords: social policies, redistribution, conditional unemployment benefits, non-Walrasian labor markets, second best, employment, growth, politics

JEL code: E6, H0, J0, O4

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¹ Presented at the CESifo Workshop 'Tax Policy and Labour Market Performance', Venice Summer Institute, San Servolo, 21-23 July 2003, the 7th Schumpeter Institute Lecture Series 'Topics on Macroeconomics and Public Finance', Humboldt University, Berlin, 17-19 December 2002 and the Sienna Summer School, XVIth Workshop on 'Inequality and Economic Integration', CRISS, 2-6 July 2003. I thank my Venice discussant, Lans Bovenberg, Peter Sørensen and an anonymous referee for their detailed comments, and Sam Bowles, Bas Jacobs and seminar participants in Berlin, Florence, Rome (Tor Gervata), Sienna and Venice for helpful comments.

1. Introduction

Many governments in Western Europe have during the eighties and nineties have rolled back the welfare state and tried to improve economic incentives. This involved trimming public spending in order to reduce tax rates in the hope of boosting employment and output. It often also involved overhauls of systems of income taxation by cutting marginal tax rates and scrapping various deductibles. The objective of lowering progression of tax systems was to improve incentives to work and boost the economy. Part of the agenda also involved downsizing the welfare state by cutting unemployment benefits or making eligibility conditions tougher. This political agenda was condoned by many economists and adopted by a large number of conservative, Christian-democratic and 'Third-Way' social-democratic political parties throughout Europe.

Social policies reduce hours worked and employment in economies with competitive, Walrasian labor markets. Real-world labor markets are far from Walrasian. They feature trade unions with sufficient power to set wages, firms who like to pay fair wages to boost morale, motivation and productivity, and mismatch between vacancies and unemployment. In such a second-best world redistributive policies may induce wage moderation and boost employment, since one distortion (a progressive tax system) partially offsets another distortion (arising from the rents in non-Walrasian labor market). Of course, such policies also induce shorter working hours for individual workers in non-competitive labor markets with endogenous labor supply.

Social policy interacts with non-tax distortions. These may arise from labor-market imperfections in economies with search frictions and commitment problems, market power of trade unions, or efficiency wages arising from problems of moral hazard and or adverse selection. Social policy may also interact with imperfections in insurance markets and political distortions. A higher ratio of unemployment benefits to wages, typically, raises the unemployment rate in competitive and non-competitive labor markets. However, benefits are neither indefinite nor unconditional. Benefits do not necessarily destroy jobs in such situations. Social policies may exacerbate non-tax distortions, since they may reduce incentives to work and invest in education and skills. Social policies may thus lower productivity and encourage tax evasion, which make it harder to finance a generous welfare state. We accept these adverse effects of social policies, but in this paper we highlight some cases where social policies alleviate non-tax distortions.

Section 2 discusses the adverse effects of a higher burden of taxation and redistributive policies in the benchmark case of competitive, Walrasian labor markets. Section 3 investigates the effects of the tax burden, a more progressive tax system and a higher ratio of unconditional

benefits to wages in non-Walrasian labor markets characterized by trade unions, efficiency wages and/or search frictions. The incidence of taxation depends crucially on the properties of the welfare state, in particular on whether benefits are indexed or not to after-tax wages, and on whether the unemployed enjoy untaxed income. If benefits are indexed to after-tax wages or, more precisely, if unemployed people share fully in the tax burden, unemployment is unaffected by changes in average income or payroll taxes. A higher tax burden pushes up unemployment if the unemployed escape part of the tax burden. More progressive tax systems induce wage moderation and boost employment in these non-Walrasian settings of the labor market. Section 3 considers other efficiency arguments in favor of progressive taxation. Section 4 applies the shirking theory of unemployment to show that higher unemployment benefits may lower the unemployment rate and raise the vacancy rate if benefits are only granted to people who become involuntarily unemployed while voluntary quits and dismissed shirkers are not entitled to unemployment benefit. Conditional unemployment benefits may thus spur job growth. Section 5 briefly discusses why bashing trade unions may harm employment unless one goes the whole way and gets rid of them completely. It also highlights the potential merits of corporatism. Section 6 discusses the political economy of redistributive policies. If the distribution of income and assets is more equal, the median voter outcome leads to less populist policies that resort less to distortionary taxes on labor income and capital and the inflation tax. In such a political-economic equilibrium a more equal distribution of income and assets induces higher labor supply, higher growth and lower inflation. Section 7 concludes.

2. The benchmark case: Walrasian labor markets

In order to assess the effects of social policies on employment and output in non-Walrasian labor markets, we first present the benchmark case of Walrasian labor markets with undifferentiated, homogenous labor and perfect competition.

Each household derives utility $U(C,V)$ from private consumption C and leisure V . We assume that the utility function is concave and homothetic. We normalize so that each household has one unit of time available, which can be used to work H hours or to enjoy leisure $V=1-H$. For simplicity, we assume that households only have wage income. Hence, their budget constraint is $C=W_A H$ where $W_A \equiv (1-T_A)W$ stands for the after-tax wage, W is the pre-tax wage and T_A denotes the average tax rate. Each household maximizes utility by setting the marginal rate of substitution between leisure and consumption equal to the marginal consumer wage, that is $U_V/U_C = (1-T_M)W$ where T_M denotes the marginal tax rate on labor income. Loglinearizing

(ignoring constants and using $\log(1-T_i) \cong -T_i$, $i=A,M$) this first-order condition and the household budget constraint yields labor supply:

$$\log(H) = \varepsilon_U \log(W) - \varepsilon_C T_M - \varepsilon_I T_A,$$

where $\varepsilon_I \equiv -V < 0$ is the income elasticity, $\varepsilon_C \equiv \sigma V > 0$ is the compensated wage elasticity, $\varepsilon_U \equiv (\sigma - 1)V = \varepsilon_C + \varepsilon_I$ is the uncompensated wage elasticity of labor supply and $\sigma \equiv -d\log(C/V)/d\log(U_C/U_V) > 0$ denotes the elasticity of substitution between leisure and consumption goods.

A higher pre-tax wage has two effects. First, it makes leisure relatively more expensive than consumption goods and thus encourages substitution away from leisure and each household to work more. Second, it makes each household richer so they consume less leisure and less consumption goods and thus work less. If the former (i.e., the substitution effect measured by ε_C) dominates the latter (the income effect measured by ε_I), i.e., if $\sigma > 1$, a higher wage increases labor supply. Otherwise, i.e., if $\sigma < 1$, the labor supply curve bends backwards.

Only the income effect is relevant for changes in the *average* tax rate, hence a higher average tax rate makes people poorer and thus makes them work harder. In contrast, only the substitution effect is relevant for changes in the marginal tax rate. A higher *marginal* tax rate thus encourages substitution towards leisure and reduces incentives to work. It is helpful for the discussion to define the following measure of the progression of the labor income tax:

$$S \equiv d\log(W_A)/d\log(W) = (1 - T_M)/(1 - T_A).$$

This measure S is the coefficient of residual income progression and gives the percentage increase in the after-tax wage resulting from a one-percent increase in the pre-tax wage. Because most tax systems are progressive and allow for many deductibles, the marginal tax rate is typically higher than the average tax rate and thus $S < 1$. A more progressive tax system for a given average tax rate corresponds to a reduction in S , which depresses labor supply:

$$\log(H) = \varepsilon_U [\log(W) - T_A] + \varepsilon_C \log(S) = \varepsilon_U \log(W_A) + \varepsilon_C \log(S).$$

where $\log(S) \approx T_A - T_M$. For a given degree of tax progression S , a higher average tax rate only raises labor supply if the income effect dominates the substitution effect. It is the after-tax wage that matters for labor supply. There are N households, so aggregate labor supply equals NH .

Firms maximize profits under perfect competition. The optimal level of employment L follows from setting the marginal productivity of labor to the product wage, that is $F'(L)=(1+T_L)W$ where $F(L)$ is a standard production function with diminishing returns to scale ($F'>0$, $F''<0$) and T_L denotes the payroll tax firms have to pay. Hence, labor demand falls if the pre-tax wage or the payroll tax rises:

$$\log(L) = -\varepsilon_D [\log(W) + T_L],$$

where $\varepsilon_D \equiv -(1+T)W/F''L > 0$ is the wage elasticity of labor demand.

In a competitive labor market the wage adjusts until labor demand L equals labor supply NH . This yields the following expressions for the producer wage and the consumer wage:

$$\log((1+T_L)W) = [\varepsilon_U (T_A+T_L) - \varepsilon_C \log(S)]/(\varepsilon_U+\varepsilon_D)$$

$$\log(W_A) = [-\varepsilon_D (T_A+T_L) - \varepsilon_C \log(S)]/(\varepsilon_U+\varepsilon_D).$$

In an economy with a competitive, Walrasian labor market it thus does not matter for employment whether taxes are imposed on firms or workers (or indeed on consumers). A higher payroll tax on firms is partially shifted to workers by lowering the wage, particularly if labor demand is relatively elastic and labor supply inelastic. In that case, the fall in employment is relatively small. A higher average tax on workers depresses the after-tax wage, but not fully, as firms have to pay a higher wage. Clearly, the burden of this tax rise is shifted to firms, especially if labor supply is relatively elastic and labor demand inelastic. The higher labor income tax rate then causes a relatively large drop in employment. In fact, micro-econometric studies of labor supply suggest that labor supply for males is very inelastic ($\varepsilon_U \approx 0$), though for females the uncompensated wage elasticity may be small and positive. This suggests that, in practice, producer wages, employment and output hardly change if the average income tax or the payroll tax changes and that the burden of taxation falls almost entirely on households. Even though labor supplies for males may be relatively inelastic on the *intensive* margin (i.e., hours worked), recent empirical work suggests that labor supply of especially low-skilled workers and single mothers may be rather elastic on the *extensive* margin (i.e., the participation decision) - see Heckman (1993), Kimmel and Kniesner (1998), Meyer (2002) and Saez (2002). Part of the burden of labor taxation is then borne by firms as well.

A more progressive tax system (lower S) pushes up wages and depresses employment. The underlying disincentives operate through the substitution effect and are particularly strong if σ is large and people are already enjoying a lot of leisure. An unconditional benefit (say, a negative income tax credit or basic income) reduces hours worked, drives up the wage and cuts employment and output. If this benefit is paid for by distortionary taxes on labor, the fall in employment and output is even greater. Unconditional benefits give people an incentive to enjoy leisure rather than to work. With competitive, Walrasian labor markets social policies such as a higher tax rate to pay for, say, education or public health or a more progressive tax system, on the one hand, push up pre-tax wages and damage employment, and, on the other hand, depress after-tax wages. However, if benefits are taxed, an increase in the tax burden may boost labour supply. In fact, sections 3 and 4 show that the employment effects of taxation in non-Walrasian labor markets also depend on whether benefits and other informal incomes are taxed or not. Part of the difference results from *untaxed* non-work income in Walrasian models (i.e., utility of leisure) and *taxed* non-work income in non-Walrasian models (i.e., unemployment benefits).

3. Progressive taxation and unemployment benefits in non-Walrasian labor markets

The competitive view of the labor market is not very realistic. Many economies experience 'real' unemployment, not leisure or holidays disguised as unemployment. Most people can buy consumption goods as long as they are prepared to pay the market price and are thus not rationed. This is generally not the case on the labor market. Many jobs are not available to outsiders who offer to work at the going wage. Jobs, in contrast to most consumption goods, are rationed. In fact, wages are typically set by trade unions, by firms or in negotiations between workers and firms rather than as the outcome of clearing labor markets. Also, macro-econometric evidence suggests that wages are not very sensitive to employment and that aggregate demand shocks induce large fluctuations in employment and output and almost no fluctuations in the real wage. This evidence in favor of real wage rigidity is at invariance with micro-econometric evidence that suggests very low wage elasticities of labor supply. More realistic views of the labor market thus stress non-Walrasian features such as real wage rigidity - e.g., Layard, Nickell and Jackman (1991) and Heijdra and van der Ploeg (2002). This yields equilibrium with involuntary unemployment where *effective* labor supply is below *notional* labor supply. In this section we examine the effects of changes in the tax burden and in the progression of the tax system on wages, employment and output within the context of non-Walrasian labor markets. In particular, we analyze the incidence of taxation and the effects of the degree of tax progression on

employment in settings with trade unions, efficiency wages and search frictions. Wages are set, respectively, by unions, by firms and jointly by firms and workers.

If the unemployed do not escape the burden of taxation, changes in the average labor tax rate do not affect the unemployment rate or the producer wage. However, if unemployment benefits are not fully indexed to after-tax wage income or the unemployed enjoy untaxed, informal income, the unemployed escape part of the burden of taxation. In that case, a higher tax rate on labor pushes up unemployment and wages. In non-Walrasian settings there is a surplus to be divided between firms and workers. Progressive taxes then tilt the balance in favour of less purchasing power and more jobs. This explains why in many econometric estimates of wage equations higher average tax rates give rise to upward wage pressure while higher marginal tax rate induce downward wage pressure - e.g., Lockwood and Manning (1994), Holmlund and Kolm (1995), and Lockwood, Sløk and Tranæs (2000). The analysis also builds on Bovenberg and van der Ploeg (1994) and Pissarides (1998). Although we do not consider insider-outsider explanations of unemployment - e.g., Lindbeck and Snower (2002), some of the results carry over to such settings. Insiders' positions are protected by rent-related labor turnover costs (mainly firing costs), and thus insiders will be able to bargain for higher wages than is necessary to recruit, retain or motivate them. Insiders also insist on seniority rules ('last in, first out'), severance pay, advance notices of dismissal and other terms of employment that diminish chances of outsiders. In a sense, the insider-outsider view explains the power of trade unions and thus a move towards more progressive taxation is likely to boost jobs in the same way.

More generally, tax incidence under imperfect competition is discussed in Fullerton and Metcalf (2002). Tax incidence in general equilibrium models with non-labor markets are discussed in Agell and Lundberg (1992) for the case of efficiency wages and in Davidson, Martin and Matusz (1987, 1988) for the case of search unemployment. Here we restrict our discussion to tax incidence (and the degree of tax progression) in partial equilibrium models of labor markets.

3.1. Trade unions

Substantial parts of the labor force are unionized. In some countries trade union agreements are legally extended to all workers, thus making the power of trade unions even stronger. A competitive, Walrasian labor market obviously does not make sense then. One must allow for the power of trade unions to influence wages and employment. We do not examine right-to-manage and Nash bargaining models of trade unions - see, for example, Booth (1995), but simply consider monopoly trade unions which have sufficient monopoly power in their sector of the

labor market to set the wage for its members given knowledge of the labor demand curve. Firms subsequently take the wage set by the monopoly union as given when maximizing profits.

Right-to-manage models allow the trade union to bargain with firms over the wage, but not the level of employment. This does not change the results very much, because the outcome still is on the labor demand curve. We assume middle-sized trade unions, which are big enough to set wages but too small to internalize the adverse effects of higher wages on prices and thus on purchasing power of their members. The unions are also too small to engage in bargaining with the government over taxation, benefits, childcare, pensions, training and other matters that may concern employees. In other words, trade unions do not internalize the government budget constraint and thus ignore the (small) effects of a rise in the wage on, say, taxes and unemployment benefits the government might set and thus indirectly on the welfare of trade union members; however, see section 5. The welfare of trade union members is captured by a utilitarian welfare function, or, equivalently, by an expected utility approach where L/N denotes the probability of being employed and $U \equiv 1 - L/N$ the probability of being unemployed.

Firms face a concave production function $Y=F(L)$, where Y denotes output and L employment. Maximization of profits implies firms set the marginal productivity of labor equal to the real producer wage, i.e., $F'(L)=(1+T_L)W$, so the demand for labor is a decreasing function of the producer wage. The monopoly trade union operates under a Rawlsian 'veil of ignorance' and maximises expected utility of its members. Alternatively, it chooses the wage to maximize the welfare of its members, $L v(W_A) + (N-L) v(B)$, subject to the labor demand curve, where $v' > 0$, $v'' < 0$ and B indicates the level of the unemployment benefit. This yields the following union wage mark-up:

$$[v(W_A) - v(B)]/[W_A v'(W_A)] = S/\varepsilon_D.$$

The left-hand side gives the difference in utility of an employed and an unemployed trade union member, converted from utility units into production units, and expressed as a fraction of the after-tax wage. The right-hand side indicates that, given the level of the unemployment benefit, this union wage mark-up is particularly large and thus unemployment is high if the wage elasticity of labor demand ε_D is low. Also, given the level of the unemployment benefit, the union wage mark-up falls and employment rises if the tax system becomes more progressive (lower S). This result contrasts with that under competitive, Walrasian labor markets. If the coefficient of relative aversion is unity, the union wage mark-up yields $W_A = \exp(S/\varepsilon_D) B$. The unemployment

benefit sets a 'floor' in the after-tax wage, so that a rise in the benefit immediately translates into a rise in the wage and a fall in employment. For a given degree of tax progression, a higher average tax rate on labor income T_A leaves the after-tax wage unaffected and thus the pre-tax wage rises. The after-tax wage displays real wage rigidity in the face of this shock, hence the whole burden of the labor income tax is borne by firms. An increase in the payroll tax to be paid by firms also leaves the after-tax wage unaffected, so labor costs rise and employment falls. Firms not workers carry the burden of taxation.

So far, we assumed that an unemployed trade union member is unable to find a job elsewhere in the economy and has to rely on unemployment benefit. It is realistic, especially for middle-sized trade unions, to assume that unemployed members have probability $1-U$ of finding a job and probability U of being on the dole, where U denotes the unemployment rate. In that case, expected outside income, i.e., $W_0=(1-U)W_A+U(B+I)$ is the relevant alternative income and not the benefit B , where I stands for (utility of leisure or) untaxed income from the informal sector. Since $W_A-W_0=U(W_A-B-I)$, the income differential of a union job increases if the differential between the after-tax wage and the benefit plus informal income is high and if the chance of falling back on the dole is high (i.e., if the unemployment rate is high). With risk-neutral preferences (linear $v(\cdot)$) we obtain the equilibrium unemployment rate:

$$U = (S/\varepsilon_D) / [1 - (B/W_A) - (I/W_A)].$$

Equilibrium unemployment is high if the replacement ratios for benefits $\rho \equiv B/W_A$ and informal income are high, the tax system is not so progressive and labor demand is fairly inelastic.² If benefits are indexed to after-tax wages and informal incomes are indexed to before-tax wages, $\rho_i \equiv I/W$, the equilibrium unemployment rate $U=(S/\varepsilon_D)/[1-\rho-(\rho_i/(1-T_A))]$ rises if the replacement rates for benefits and informal incomes rise and the average tax rate rises. If benefits or informal incomes are not indexed to after-tax wages, the above gives a wage setting equation in which the wage rises with both the level of employment and the benefit. Together with the labor demand curve, one can solve simultaneously for employment and the wage. Although cuts in payroll taxes do not affect the unemployment rate if benefits are indexed to after-tax wages and informal incomes are absent, they raise the wage, boost employment and reduce the unemployment rate if

² If the coefficient of relative risk aversion is one, one finds $U = [1 - \exp(-S/\varepsilon_D)]/[1 - (B/W_A)]$. In general, more risk aversion tends to make unions moderate wages in order to avoid the risk of unemployment for its members. Consequently, the unemployment rate is lower if union members are risk averse.

benefits are not indexed - cf. Bovenberg and van der Ploeg (1994) and Pissarides (1998). Hence, if benefits are not indexed to after-tax wages or the unemployed enjoy untaxed, informal income, the wage setting equation is flatter and payroll taxes boost employment by cutting the replacement rate and increasing the incentive to work - see Figure 1. Another way of putting it is that the effects of a higher average labor tax depend on whether unemployment benefits are taxed (rather than indexed) or, more precisely, the unemployed escape the burden of taxation. There is no increase in unemployment if the unemployed share fully in the higher tax burden, i.e., if the outside option is fully taxed and the net replacement rate is not increased. Of course, it is then debatable whether this is a social policy and presumably the answer depends on time perspective and liquidity constraints. In practice, it is unlikely that the unemployed share fully in the tax burden. Unemployed people enjoy untaxed leisure and income in the informal economy, so that a higher average tax rate on labor destroys jobs.

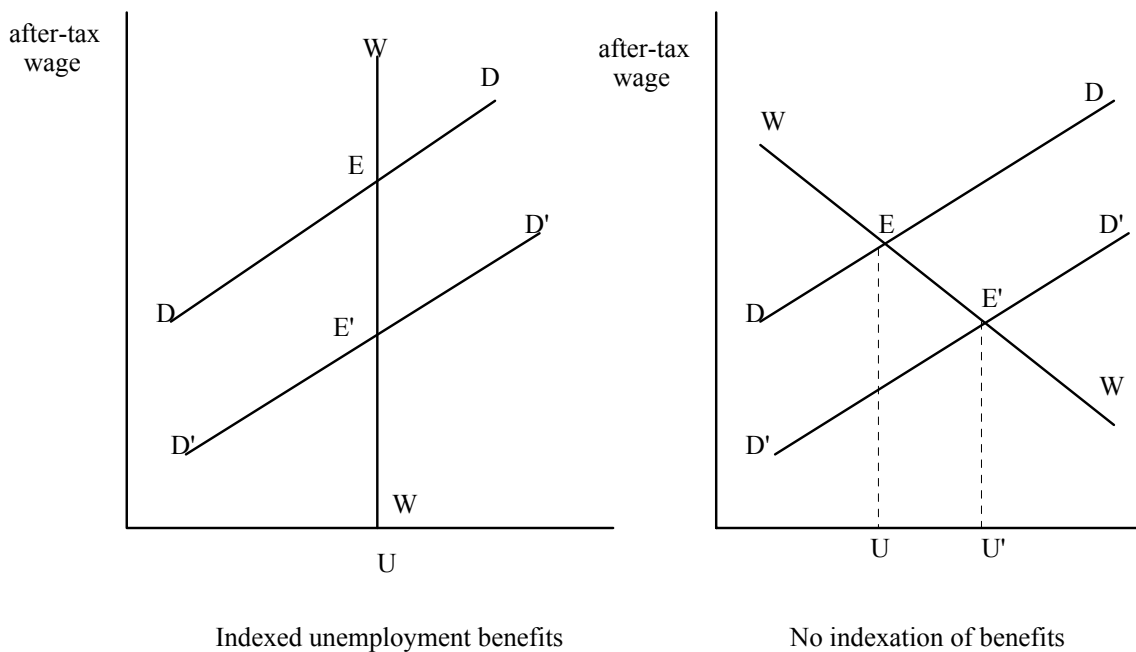


Figure 1: Indexation of benefits and incidence of taxes in non-competitive labor markets

The result that with a fixed after-tax replacement rate a more progressive tax system moderates wages and boosts employment and output also holds in a 'right-to-manage' model where the wage follows from a Nash bargain between trade unions and firms and employment is subsequently set by firms. The ratio of the wage bargaining outcome to outside income is again high if labor demand is fairly inelastic and the degree of tax progression is small. In addition, the wage is high

if the 'ability to pay' (as measured by the share of profits relative to that of wages) is high and the bargaining power of firms relative to that of unions is relatively weak. Also, imperfect competition in product markets lowers the wage elasticity of labor demand and bolsters the power of trade unions. Koskela and Vilmunen (2002) also show that more tax progression lowers wages and raises employment under efficient Nash bargaining between firms and unions. Aronsson, Löfgren and Sjögren (2002) argue that tax progression boosts the wage and *does* harm employment within the context of a Ramsey growth sector with monopolistic households setting the wage as well as choosing consumption and saving subject to a labor demand schedule. However, their result does not allow for real unemployment and a union setting wages for its members behind a Rawlsian 'veil of ignorance'. Their result does not really differ from under perfect competition except that wages are set above the marginal rate of substitution between leisure and consumption. Tax progression simply implies that people demand more leisure and work less. This causes more underemployment, not more unemployment.

If unemployment benefits are indexed to after-tax wages and unemployed people share fully in the tax burden, changes in labor taxes do not affect unemployment and are fully borne by workers. However, Graafland and Huizinga (1999) give evidence for the Netherlands that the tax rate adversely affects unemployment even after correcting for the effects of changes in the net replacement rate. Also, Daveri and Tabellini (2000) provide empirical evidence that suggests that changes in labor taxes are strongly correlated with changes in unemployment rates, particularly for those European countries with substantial unionization and less so for the Nordic European countries with centralized trade unions. One reason is that unemployed people also enjoy untaxed incomes from the informal sector and enjoy utility of untaxed leisure. In that case, the *true* replacement rate is not constant and a higher tax wedge can boost unemployment even if productivity growth must be consistent with stationary unemployment - see above and Bovenberg and van der Ploeg (1994, 1998), Sørensen (1997) and Bovenberg (2003). Altenburg and Straub (2002) combine efficiency wages and shirking when firms choose both employment and the minimum performance level required of their employees with right-to-manage bargaining and demonstrate that a higher tax rate on labor *does* increase unemployment even if benefits are indexed to after-tax wages and informal incomes are absent.

These insights also hold for an open economy with international capital mobility and constant returns to scale in production. With interest rates determined on world markets the producer wage is pinned down by the factor price frontier. A higher replacement rate or a less progressive tax system then reduces the demand for capital from abroad and the demand for labor

but leaves the producer wage unaffected. The end result is the same: more unemployment.

3.2. Efficiency wages

With efficiency wages firms pay relatively high wages to recruit, retain and motivate workers. Abilities and effort of workers are hard to monitor for a firm. However, by paying a bit more than elsewhere, firms counteract adverse selection by improving the average quality of the workforce. Paying a 'fair' wage also reduces work disruption and raises morale and work effort.

We assume that effort by workers in firm i depends on differences in indirect utility if one works and if one is without a job, so that effort depends on relative wages:

$$E_i = [v(W_{Ai}) - v(W_O)]^\varepsilon \quad \text{with} \quad W_O \equiv U(B+I) + (1-U) W_A = \{1 - [1-(B+I)/W_A] U\} W_A$$

where $\varepsilon > 0$, W_{Ai} is the after-tax wage of a worker in firm i . Outside income of workers in firm i is with probability $(1-U)$ the after-tax wage elsewhere W_A and with probability U unemployment benefit B plus informal income I . Effort increases if the chance of unemployment and a large drop in income is high, that is if the unemployment rate U is high and replacement rates are low.

Firm i has a linear production function, $Y_i = E_i L_i$. Output increases with efficiency and volume of labor. Firm i sets its wage to maximize profits, $[E_i - (1+T_L) W_i] L_i$. This yields:

$$[v(W_{Ai}) - v(W_O)]/[W_{Ai} v'(W_{Ai})] = \varepsilon S.$$

Firm i sets relatively high wages if the efficiency wage or leapfrogging effect ε is strong and the tax system is not very progressive. Less risk-averse workers require firms to pay more to recruit, retain and motivate workers. Again, more tax progression reduces the wage mark-up. Firms have in the margin less incentive to offer higher wages if the government grabs a bigger slice of the wage rise. With risk-neutral preferences we obtain in symmetric equilibrium:³

$$U = \varepsilon S/[1 - \rho - \rho_I/(1-T_A)].$$

$\rho \equiv B/W_A$ and $\rho_I \equiv I/W$. More leapfrogging (higher ε), a higher replacement rate, a less progressive

³ If workers have a unit coefficient of relative risk aversion, one obtains $U = [1 - \exp(-\varepsilon S)]/[1/(B/W_A)]$. In general, risk averse workers can be paid less in order to lower chances of layoffs and thus in equilibrium unemployment is lower than with risk-neutral workers.

tax system (higher S) and, with untaxed informal income, a higher average labor tax rate all induce a higher unemployment rate. More risk aversion among workers also lowers unemployment. More tax progression boosts employment and output and reduces unemployment, since it is less attractive to pay high wages and to leapfrog other firms and for workers to do their best. Hence, labor productivity and the pre-tax wage fall. This contrasts with competitive, Walrasian labor markets, where more progressive taxes destroy incentives to work more hours and lower employment and output. Indeed, if we allow for optimal choice of hours worked and efficiency wages, a more progressive tax system lowers labor supply per household (i.e., reduces hours worked per job) which generates upward wage pressure. Total demand for labor will not rise as much and may even fall. The number of jobs will rise albeit that each job has shorter working hours. This may be what some advocates of social policies have in mind, but the size of the national income need not necessarily rise.

If unemployment benefits are indexed to after-tax wages (ρ fixed) and informal income is absent, a higher average income tax rate T_A or payroll tax T_L does *not* affect unemployment - cf., section 3.1. However, if benefits or informal incomes are not indexed to after-tax wages, the unemployment rate decreases as after-tax wages rise and one needs

$$\log(W) = [1/(1-\varepsilon)] [\varepsilon \{\log(S) - T_A\} - T_L] \quad \text{and} \quad \log(W_A) = [1/(1-\varepsilon)] [\varepsilon \log(S) - T_A - T_L].$$

to assess the incidence of taxes and the effects on unemployment. A rise in taxation keeping the degree of tax progression unchanged, raises the marginal and average tax rates together and lowers the pre-tax wage. After-tax wages fall by more than 100 per cent and thus workers bear more than 100 per cent of the tax burden. These results differ from under a monopoly union, since there firms rather than workers carried the burden of labor income taxation as now firms rather than unions set wages. If unemployed benefits are not indexed to after-wages or the unemployed enjoy untaxed income, a higher average labor income or payroll tax depresses after-tax wages more than 100 per cent, raises the replacement rate and thus increases the unemployment rate. The beneficial effects of a more progressive tax system, i.e., wage moderation and a lower unemployment rate, are less if benefits are not indexed to after-tax wages, because then the replacement rate is pushed up by the fall in after-tax wages. Clearly, the welfare state components can not be seen in isolation.

3.3. Search and matching frictions

It is costly and takes time to match preferences, skill and needs, hence unemployment results. We consider an economy with search frictions and no on-the-job-search based on Pissarides (1990). Let N denote the number of workers, U the unemployment rate, V the vacancy rate and X the matching rate. The constant-returns-to-scale and concave function $G(\cdot)$ gives the number of matches: $XN=G(UN,VN)$. The probability of a job being filled is $q\equiv XN/VN=G(U/V,1)\equiv q(\theta)$ where $\theta\equiv V/U$ stands for labor-market tightness and $0<\theta q'/q<1$. Equilibrium demands that expected inflow $s(1-U)N$, where s is the exogenous job separation rate, equals expected outflow of the pool of unemployed $q(\theta)VN$. Using $V=\theta U$, we obtain the Beveridge curve:

$$U = s/[s + \theta q(\theta)].$$

A lower separation rate s and a tighter labor market (higher θ) lower unemployment. Output is given by the production function $F(K,1)$, where K is one firm's capital stock. Free entry and exit of firms drives the value of a vacant job to zero. This yields the zero-profit condition:

$$[F_L(K,1) - (1+T_L) W_A/(1-T_A)]/(R+s) = \gamma/q(\theta),$$

where R denotes the interest rate and the constant γ indicates search costs per unit of time. The value of an occupied job is the present value of rents of a job, as long as it is expected to last. This must in equilibrium equal expected value of search costs, i.e., search costs γ times expected duration of a vacancy $1/q(\theta)$. The demand for capital follows from $F_K(K,1)=R+\delta$ where δ is the depreciation rate of the capital stock.

The wage follows from maximizing the Nash product, $\beta\log(V_E-V_U)+(1-\beta)\log(V_O-V_V)$, where V_E , V_U , $V_O=[F_L-(1+T)W_L]/(R+s)$ and $V_V=0$ denote, respectively, the value of an employed worker, the value of an unemployed worker, the value of an occupied job and the value of a vacant job. The weight β denotes relative bargaining strength of the worker and $1-\beta$ that of the firm. The annuity value of an employed worker equals $RV_E=W_A-s(V_E-V_U)$, i.e., the after-tax wage minus the expected loss in value if the job is lost. Since $V_E-V_U=(W_A-RV_U)/(R+s)$, the optimal rent-sharing condition is:

$$(1-\beta) (1+T_L) (V_E - V_U) = \beta (1-T_M) (V_O - V_V).$$

If we abstract from informal incomes, the value of an unemployed worker is given by:

$$R V_U = B + \theta q(\theta) (V_E - V_U),$$

so that the reservation wage is the benefit plus expected increase in value if a job match occurs. Substitution of the expressions for the various value functions into the rent-sharing condition yields the Nash bargaining outcome for the wage:

$$W_A = [(1-\beta) B + \beta S \{F_L(K,1) + \theta \gamma\} (1-T_A)/(1+T_L)]/[1 - \beta (1-S)].$$

The worker gets an average of the unemployment benefit and the surplus, where the surplus is the sum of the marginal productivity of labor and the expected search/hiring costs that are saved if the deal is struck. If the worker is strong (β close to one), the worker extracts most of the surplus. If the firm is strong (β close to zero), the worker gets a wage close to the benefit.

First solve for K from $F_K=R+\delta$, then solve for W and θ from the zero-profit and Nash-bargaining conditions, and finally compute U and V from the Beveridge curve. A higher unemployment benefit or stronger worker pushes up the wage, but does not shift the zero-profit condition or the Beveridge curve. The new wage bargain diminishes labor-market tightness, reduces the vacancy rate and increases the unemployment rate - see Figure 2. A fall in the job destruction rate s or tougher firing regulations, cf., Saint-Paul (1996), shifts out the Beveridge curve in $V-U$ space *and* shifts out the zero-profit condition in $W_A-\theta$ space. This raises power of workers and pushes up after-tax wages, makes the labor market tighter, raises the vacancy rate and increases the unemployment rate. In this particular model the fall in the firing rate is thus outweighed by the fall in the hiring rate. If it is more difficult to fire workers, firms react by hiring fewer workers. Conversely, more labor market flexibility lowers the unemployment rate.

Indexing unemployment benefits yields a steeper wage-bargaining locus (albeit not vertical as in sections 3.1 and 3.2). Hence, the adverse effects of, say, tougher firing regulations on the equilibrium unemployment rate are weakened. A lower job destruction rate thus yields a bigger increase in after-tax wages of those lucky enough to keep their job.

With a more progressive tax system (lower S for given T_A) pushing for higher wages is punished more severely. Consequently, the wage is pushed up less and the labor market becomes more tight. This raises the vacancy rate and lowers the unemployment rate - see Figure 2. If unemployment benefits are not indexed to after-tax wages (or the unemployed enjoy untaxed income), a higher average tax rate on labor income T_A and a higher payroll tax T_L shift down the

wage equation as higher taxes lower after-tax wages. They also shift back the zero-profit locus, since they reduce the ability to pay a high wage. The net effect is a fall in the after-tax wage and a less tight labor market with a lower vacancy rate and a higher unemployment rate.

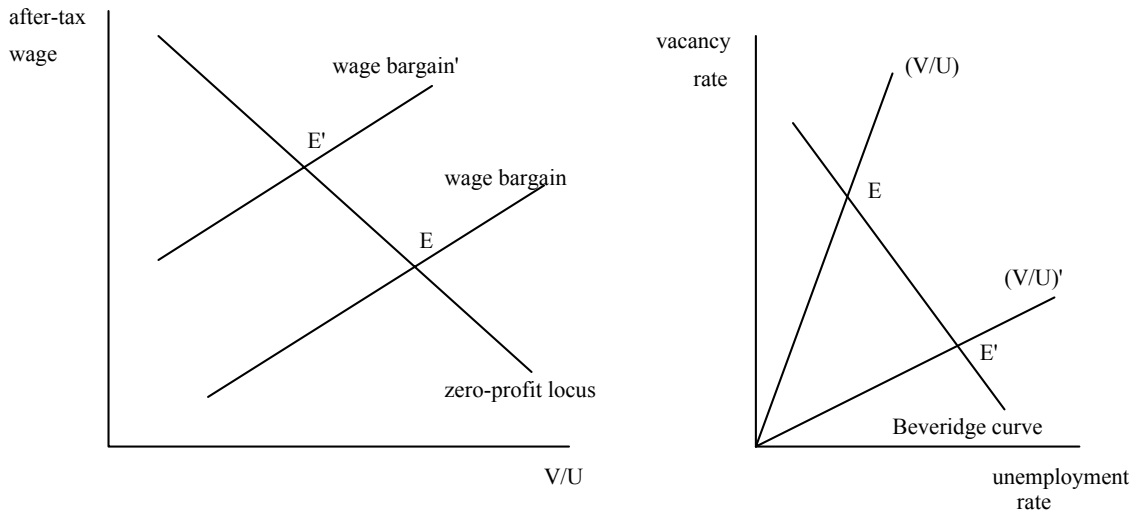


Figure 2: Effects of higher unemployment benefits, greater bargaining strength of workers or less progressive taxation in labor markets with search and matching

Bovenberg and van der Ploeg (1994) and Bovenberg (2003) discuss the employment effects of tax changes with trade unions, efficiency wages or search frictions when benefits are indexed to producer prices, consumer prices and market wages. They also discuss the effects of changes in consumer taxes and productivity shocks.

There is a case for conditioning unemployment benefits on imperfectly observed search efforts, see Boone et al. (2001). In particular, it is optimal to monitor search effort and to sanction workers who do not search sufficiently. The sanction could be to reduce the income from unemployment benefit (insurance) to welfare (assistance). Risk aversion is necessary to get this result. Otherwise, if monitoring is costly, it is optimal to raise the sanction indefinitely and reduce the monitoring rate to an arbitrarily small number. Shavell and Weiss (1979) and Fredriksson and Holmlund (2001) argue that the optimal benefit should fall with the duration of the unemployment spell in order to stimulate search activities. However, Cahuc and Lehmann (2000) show that this pushes wages up and strengthens insider power and thus diminishes the case for a declining unemployment benefit. Also, Hopenhayn and Nicolini (1997) show that the wage tax upon reemployment should rise with the duration of the unemployment spell.

3.4. Other efficiency arguments for progressive taxation

Markets may fail or disappear altogether if there are legal restrictions, institutional rigidities, high transaction costs, external effects, adverse selection and moral hazard problems arising from asymmetric information, and/or imperfect competition. In the real world prices may not equal marginal costs and labor may be paid more than its marginal product. There are rents to be shared between employers and employees. In such a second-best world reducing one distortion need not improve welfare. The distortion arising from a more progressive tax system may offset the distortion arising from an imperfectly functioning labor market. Indeed, in the presence of trade union power, efficiency wage and/or search frictions, a more progressive tax system moderates wages and boosts employment. However, a more progressive tax system typically reduces the number of hours worked per employee which harms output and makes finance of the welfare state more difficult. Sørensen (1999) shows that a union concerned with employment of its members restricts working hours below the level which the individual employed member would prefer at the going after-tax wage. Since tax progression drives an additional wedge between the marginal disutility of work and the marginal productivity of labor, hours worked per worker falls and labor supply is further distorted. Wage moderation boosts employment, i.e., the total hours of labor demanded by firms. Together with the induced shorter working week this boosts the total number of jobs in the economy. Labor supply effects thus remain important in non-Walrasian labor markets. In fact, it is a priori not clear what happens to employment. We need to closely examine evidence from micro-econometric studies, since some agents face high marginal tax rates and exhibit elastic labor supply – see Bovenberg (2003). In any case, it is better to focus on employment effects, which are more relevant for analyzing aging of the population. Cross-country comparisons of employment are also easier for statistical reasons.

Many politicians worry about the unequal distribution of labor within the family. Men typically work more hours than women, but do less shopping, childcare and other household chores. A more progressive tax system has, if the tax system is individualized, the added benefit that the partner who works most hours is stimulated to work less while the other partner is encouraged to work more hours on the labor market. Failing capital and insurance markets may also provide efficiency grounds for progressive taxation (e.g., van Ewijk, et al., 2003). Future labor income is usually not accepted by commercial banks as a guarantee for a loan, since people cannot be forced to work and pay back in future. Problems of adverse selection imply that good risks do not borrow, thus only bad risks remain. As a result, interest rates go up and credit is rationed (Stiglitz and Weiss, 1981). People thus are unable to borrow when they are young and

smooth consumption over their life cycle. Progressive taxes redistribute incomes from when people are old and earn a lot to when people are young and do not earn a lot. In this sense, a progressive tax system acts as an implicit credit market and alleviates some distortions of rationed credit markets (cf., Hubbard and Judd, 1986). Rationing of credit particularly hurts students with poor parents. This is bad for society, since the full potential of human capital remains underdeveloped. Since a progressive tax system also redistributes from rich to poor parents, it offsets some adverse effects of credit rationing on schooling (e.g., Jacobs, 2003).

Insurance markets fail to fully insure income risks of illness, disability or unemployment. People know better than insurance companies their own chances of becoming ill, disabled or unemployed. Good risks thus leave the market and insurance companies are left with bad risks. Insurance premiums rise while some insurance markets disappear altogether (Rothschild and Stiglitz, 1976). As a result, people engage in less risky jobs and activities. Since a progressive tax system also redistributes income from people with good luck to people with bad luck, it also corrects to a certain extent for failing insurance markets (cf., Sinn, 1995). Tax progression also encourages risk-averse people to invest in risky studies (e.g., Eaton and Rosen, 1980).

Increasingly, economists realize that people's happiness does not depend on money and absolute levels of consumption alone (e.g., van de Stadt, Kapteyn and van de Geer, 1985). For example, job satisfaction of British workers is only weakly correlated with absolute income, but decreases if reference wages of other comparable workers increase (e.g., Clark and Oswald, 1996). People feel better if they do better than their peers. Money can buy happiness, but the well being of people depends on relative income as well and is badly affected by unemployment and divorce (Blanchflower and Oswald, 2003). Abundance resulting from economic growth evidently makes some people unhappier and others more content. In fact, for neo-classical economics with its emphasis on selfishness it is a puzzle why abundance breeds discontent. Understanding this puzzle stresses habituation and importance of relative positions for happiness (Layard, 1980, 2003). Habituation implies that people quickly adjust to higher living standards and find it hard to adjust downwards. Improvements in material living standards make people happy for a while but the effect quickly fades off. Extra money does not necessarily make people better off either, because people compare their lot with others. If everybody works hard to get more income and spend more, they do not necessarily become happier. The extra income one earns makes other people unhappy, so this adverse externality should be corrected for by a progressive tax on labor income. Also, people tend to engage in wasteful rat races which leaves less room for leisure and provide additional grounds for progressive taxes (Akerlof, 1976). Developed societies thus have

a tendency to work too hard, consume too much and enjoy too little leisure. Efficiency can then be improved with a progressive tax system (also see section 7).

We have given several arguments why social policies and redistributive taxation alleviate non-tax distortions in second-best economies, but we stress that social policies such as progressive taxation also exacerbate non-tax distortions and reduce output. They distort markets, reduce the incentive to work and can exclude many people from the labor markets. If unemployment benefits are taxed or the unemployed enjoy untaxed, informal income, tax progression raises the *effective* net replacement rate and induces wage pressure and destroys jobs. If labor supply is endogenous, the effect of progressive taxation on employment is ambiguous. Tax progression may harm the incentive to invest in training and human capital, so that it may lower the productivity of the economy. Tax progression also encourages tax evasion, reduces working hours, reduces productivity by lowering the employers' optimal efficiency wage relative to the level of unemployment benefit, and lower the efficiency of the job matching process by reducing workers' expected marginal return to job search. Even if employment rises with more tax progression, output may fall and finance of a generous welfare state may become more difficult. Conversely, a by-product of a less progressive tax system is that some low-wage earners may face higher average and marginal tax rates. Since low-wage earners are likely to have relatively elastic labor supplies, OECD (1995) argues that the efficiency costs of taxation may increase. Sørensen (1999), Røed and Strøm (2002), and Bovenberg (2003) rightly point out that, in general, there is an optimal degree of tax progression. It is an empirical matter to find out whether the efficiency grounds for social policies dominate the costs of market distortions.

4. Unemployment benefits, shirking and the reserve army of unemployed

Atkinson (2002) stresses the importance of dealing properly with the institutional details of the welfare state. It is not realistic to model unemployment benefits as indefinite and unconditional 'income during unemployment'. Most countries require workers to have worked a certain period to qualify for benefit and do not offer benefits to people who have become unemployed after voluntary quits or misconduct. Furthermore, one is only eligible for unemployment benefit if the claimant makes a serious effort to search. Typically, one can reject job offers a number of times but eventually one must accept a job offer. The duration of unemployment benefits is often limited to a number of years. Afterwards, unemployed people may get welfare assistance, which is unrelated to the wage one once earned as an employee. In practice, low-skilled workers benefit from welfare more or less indefinitely as eligibility conditions are seldom policed, especially not

in deep recessions when the chance of finding a job is very low. If the conditions can be policed, conditional benefits and active labor market policies imply substantial administrative costs.

If we treat benefits as indefinite and unconditional income, we are bound to overestimate the adverse effects of unemployment benefits on unemployment. To understand why conditional unemployment benefits may boost employment; we modify the no-shirking theory of unemployment and moral hazard developed by Shapiro and Stiglitz (1984). Workers who have been fired for misconduct (shirking) are not entitled to an unemployment benefit while people who get laid off without fault of their own do qualify. We ignore taxes, since our focus here is on demonstrating the importance of conditional unemployment benefits and the no-shirking model is ill suited for addressing the effects of changes in the marginal tax rate. Unemployment arises, because the imprecise monitoring implies workers have a potential incentive to shirk (moral hazard). Firms avoid shirking by paying more than the market-clearing wage.

Let s be the exogenous probability of a worker leaving job without fault of its own and h the endogenous probability of an unemployed person finding a job. q is the additional probability of a worker being fired if caught shirking. We focus on the steady state, so ignore the dynamics of unemployment and abstract from capital gains in the value of non-shirking and shirking workers. Inflow into the pool of unemployed thus equals outflow, so that $s(1-U)=hU$. The unemployment rate $U=s/(s+h)$ increases in the separation rate s and decreases with the probability of finding a job h . The (expected) value of a worker who does not shirk is given by:

$$V_W = [W - d + (1-s) V_W + s V_B]/(1+R) = (W - d + s V_B)/(R+s)$$

where R stands for the interest (discount) rate and V_B is the value of an unemployed person who is entitled to a conditional benefit. The value of a worker equals the present value of his earnings W *minus* the disutility of work d *plus* his expected value next period. Next period he is employed with probability $1-s$ and value V_W and unemployed with probability s and value V_B . On the one hand, the value of a shirker V_S is higher because he does not suffer the disutility of work. On the other hand, the value of a shirker is lower as he has an additional probability q of being caught and dismissed and is then not entitled to the conditional unemployed benefit:

$$V_S = [W + (1-s-q) V_S + s V_B + q V_U]/(1+R) = (W + s V_B + q V_U)/(R+s+q)$$

where V_U denotes the value of an unemployed person who has been dismissed for misconduct

and is not entitled to a conditional benefit. To make sure that employees have on average no incentive to shirk, $V_W \geq V_S$, firms pay workers just enough to prevent them from shirking:

$$W \geq R V_U + (R+s+q) d/q - s (V_B - V_U).$$

The last term on the right-hand side does not appear in Shapiro and Stiglitz (1984). It shows that firms need to pay workers less to prevent them from shirking. Effectively, denying dismissed shirkers a conditional unemployment benefit raises the penalty of misconduct. We need the value of the two types of unemployed. The value of somebody sacked through no fault of his own is:

$$V_B = [B + v + h V_W + (1-h) V_B]/(1+R) = (B + v + h V_W)/(R+h),$$

where v is utility of leisure. This equals the present value of utility of leisure plus the benefit plus with probability h the value when he finds a job and with probability $1-h$ the value when he remains unemployed next period. The value of a dismissed shirker V_U is lower than the value of other unemployed, since he is not entitled to an unemployment benefit:

$$V_U = [v + A + h V_W + (1-h) V_U]/(1+R) = (v + A + h V_W)/(R+h) < V_B < V_S \leq V_W.$$

where A is the level of unconditional welfare assistance. We use the expressions for V_W , V_B and V_U , solve them and substitute them into the wage condition. If we also substitute $h=s(1-U)/U$ from the flow labor-market equilibrium condition, we finally obtain the no-shirking condition:

$$W \geq v + A + d + (R + s/U) d/q - s (B-A)/[R + s (1-U)/U].$$

The first three terms on the right-hand side show that the wage a firm needs to pay to prevent its workers shirking is higher if utility of leisure, welfare assistance and disutility of work are high. The fourth term shows that the firm has to pay workers more to prevent them from shirking if the job destruction rate is high, the unemployment rate is low, and the additional probability of being detected and dismissed q is small. Hence, if the chance of being caught shirking is small or the probability of finding another job is large, the firm has to pay more to discipline workers given that they dislike work. The fourth term is the main reason why the no-shirking condition (NSC) in Figure 3 slopes down. Effectively, a lower wage needs to be paid if unemployment is high.

The final term on the right-hand side is not in Shapiro and Stiglitz (1984). It shows that a firm needs to pay less to prevent its employees from shirking if the conditional unemployment benefit is high relative to the unconditional welfare payment. The unemployment benefit is given only if the worker has lost his job without fault of his own. A higher sanction for misconduct, i.e., a bigger gap between the conditional and the unconditional benefit, raises the effective penalty of shirking, so firms can afford to pay workers less. Hence, a higher level of the conditional unemployment benefit boosts employment and output. Figure 3 shows that a higher conditional benefit B shifts the no-shirking condition (NSC) down and thus reduces the wage, boosts employment and lowers unemployment (move from E to E'). In contrast, a higher welfare payment shifts up the no-shirking condition and depresses employment. Note that equilibrium wages are higher than in the competitive outcome C , where wages are driven down to the unconditional welfare payment plus utility of leisure plus disutility of work. Equilibrium unemployment is thus higher than in the competitive outcome. Unemployment here is akin to the Marxist idea of the need to have a reserve army of unemployed in order to discipline workers.

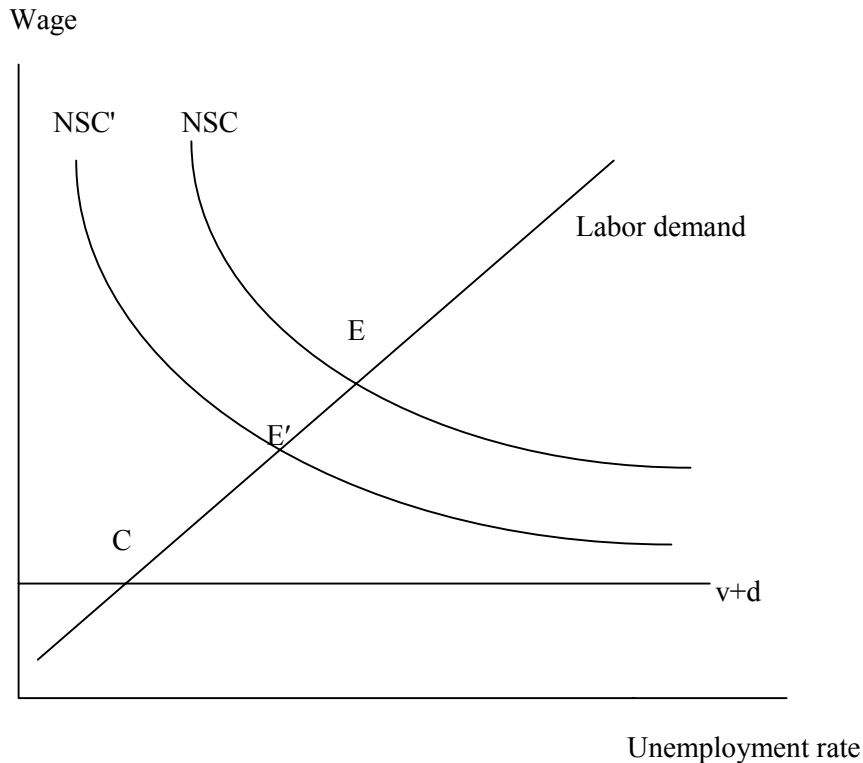


Figure 3: Higher conditional benefits B reduce shirking and boost employment

The drop in the unemployment rate is larger if there is a shift from conditional earnings-related

benefit to unconditional flat-sum welfare assistance ($dB=-dA>0$). The penalty for shirking increases for two reasons now. First, dismissed shirkers do not get the conditional benefit. Second, the unconditional welfare assistance falls and thus stimulates the incentive to work. This last incentive to work also increases for people who are unemployed without fault of their own. These extra two effects make that the fall in wages and unemployment is much greater than with a straight increase in unemployment benefit. If the unemployment benefit is financed by distortionary taxes there will be offsetting adverse effects on employment and output.

Unemployment benefits are conditional in other ways as well. They typically last for a limited period and unemployed are only eligible if available for work and actively seeking a job. A 'rough-and-ready' way to capture this is to stop with probability $p>0$ unemployment benefits. If there is no sanction for misconduct, the benefit is the same benefit irrespective of whether people have been fired for industrial misconduct or not, $B=A$. The no-shirking condition becomes:

$$W \geq [(R+h)/(R+h+p)] B + d + v + (R + s/U) d/q.$$

Since the unemployment benefit no longer lasts forever, the penalty for shirking and misconduct is *increased* and thus firms have to *pay less* to prevent workers shirking. Consequently, employment is higher and the unemployment rate lower. Alternatively, if there is a sanction and with probability $p>0$ the conditional benefit B is terminated and replaced by the ever-lasting, lump-sum welfare assistance A , the no-shirking condition becomes:

$$W \geq v + d + A + (R + s/U) d/q - s (B-A)/[R + p + s (1-U)/U].$$

Limiting the duration of a conditional benefit *reduces* the penalty for shirking and misconduct and firms must *pay more* to ensure workers' discipline, hence the unemployment rate rises.

Another modification is that dismissed workers have a smaller probability of finding a job than other unemployed. Since this raises the shirking penalty, firms pay less to prevent shirking and equilibrium unemployment is lower.

So far nobody shirks, so all unemployed receive *conditional* unemployment benefits. With a continuum of heterogeneous workers $i \in [0,1]$ that differ in their disutility of work d_i , firms set a wage high enough to attract the least 'lazy' workers and more 'lazy' workers do not work:

$$d_i \leq \{W-A-v+s(B-A)/[R+s(1-U)/U]\}/[1+(R+s/U)/q] \equiv d^*(W,v,A,B,U;Rq,s).$$

Firms set the wage to discipline just enough workers, so that $1-U=F[d^*(W,v,A,B,U;Rq,s)]$ where $F[.]$ is the cumulative probability density function of d_i . This yields a similar (NSC)-schedule as in Figure 3, so that the comparative statics are qualitatively the same. However, if workers (who are not caught shirking) enjoy protection against firing, a negative shock to labor demand after hiring has taken place induces workers with the highest disutility of work to stay on the job and shirk rather than quit. Some of them may be caught and end up on welfare rather than benefit, so the unemployment pool consists of dismissed shirkers and other unemployed who are entitled to a high benefit. A higher conditional benefit or replacement rate still reduces unemployment.

One critique is that the government is unable to monitor perfectly whether the employee has been fired for misconduct or the employer and employee are using it as an attractive way to stop their relationship. If the government runs the unemployment insurance scheme, there are additional problems of moral hazard and incentives to abuse the social insurance scheme. If the firm runs the unemployment insurance scheme itself, these problems would not arise.

The result that higher conditional benefits boost employment may carry over to other settings of non-competitive labor markets - see Atkinson (2002, Chapter 4). Also, redundancy payments in a dynamic no-shirking model induce firms to fire less. This internalizes the externality arising from foregone rents imposed by firms on fired workers - see Fella (2000). More generally, conditional benefits hurt employment less than unconditional benefits. With search frictions a higher benefit harms employment, since those who search for a job are less likely to accept lower-wage jobs. In dividing up the surplus of a job match a bigger part of it goes to the worker, so wages are higher and employment lower. However, if unemployment benefits are of limited duration, unemployed are more likely to accept a job for fear of not finding a job and having to fall back on the lower welfare payment. Similarly, the harmful effects on employment are attenuated in a search context if the unemployed who want to be eligible for a conditional benefit face a work test and can only reject a job offer a maximum of, say, two or three times. In fact, with search in both labor and product markets, a higher unemployment benefit induces firms to offer more high-wage jobs and may lower unemployment even if the benefit is unconditional in general equilibrium - see Axell and Lang (1990).

5. Corporatism

Many governments have tried to reduce the power of trade unions, because they harm the proper functioning of labor markets. Neo-liberal advocates regard unions as a public enemy, whose only

interest is to push up wages for their members at the expense of employment and chances for outsiders to get a job. They also fear that different trade unions engage in leapfrogging. The danger is that, if one trade union succeeds in getting higher wages, all others want higher wages as well. The question is whether this view of trade unions is realistic.

Big and powerful unions may become concerned with the general interest and internalize certain externalities. They may forsake wage increases in favor of investment in training the workforce, childcare facilities, etc. This may overcome free-riding problems such as workers being trained in one firm lured by another firm without a training program. Calmfors and Driffill (1988) point out a hump-shaped relationship between the degree of centralization of trade union power and the unemployment rate. Countries with competitive labor markets (US, Canada and the UK) have more wage competition and thus lower unemployment. Conversely, countries with a few big trade unions, whose power is often increased by extending coverage of the bargaining agreements to non-unionized workers (Austria, Sweden and the Netherlands), show substantial wage moderation and low unemployment. Countries with middle-sized trade unions (rest of EC) suffer from upward wage pressure and relatively high unemployment.

The reason for this hump-shape is that centralized trade unions internalize adverse effects of higher wages on aggregate prices and thus on the purchasing power of trade union members. A small union realizes that an increase in the wage for its members hardly has any effect on the aggregate price level, but a large professional union covering many industries anticipates that setting a higher wage feeds into a higher price level. Consequently, large trade unions moderate wages more than middle-sized trade unions. They also engage less in leapfrogging. Big professionally organized trade unions are more likely to internalize such adverse effects than industrially organized trade unions. Another reason for the hump-shape is that bigger trade unions are more likely to internalize the fiscal externalities implied by the government budget constraint. Not only does a union anticipate that pushing up the wage will lead to a higher *marginal* tax rate, but also will cause unemployment and increase the benefit bill for the government. If benefits are indexed to wages, the price as well as the volume of benefits goes up and thus the total cost to the government rises even more. In addition, if civil servants' salaries are indexed to market wages, the cost for the government goes up still more. Clearly, if the union pushes for a higher wage, the government has to put up *average* tax rates to balance the books (assuming that the tax base effect of a higher wage is dominated by the three other effects just discussed). A big trade union knows that pushing for higher wages raises taxes and reduces the purchasing power of its members. Hence, a big union is more likely to moderate wages and

this will keep the unemployment rate low.

Alesina and Perotti (1997) suggest a related hump-shape: in relatively centralized labor markets the distortionary effects of fiscal policy may be lower than in countries with intermediate degrees of labor market centralization. Larger trade unions are thus better able to internalize the fiscal externalities implied by the government budget constraint. Driffill and van der Ploeg (1993, 1995) show that globalization and more international product market integration reduce the power of trade unions. Effectively, opening up to international trade implies that domestic trade unions face more indirect competition from foreign trade unions and this drives wages down and spurs job growth. This suggests that countries in Europe may have moved more in the direction of less centralized trade unions. In general, deregulation and more competition on product markets reduces unemployment - cf., Blanchard and Giavazzi (2001).

Large unions may care about internalizing wage-price spirals or fiscal externalities and combating free riding. However, even smaller unions care about reputation and have a longer time horizon. This way they address commitment and hold-up problems and avoid wage pressure. Unions concerned with their reputation may also wish to internalize their impact on outsiders, and thus abstain from insider pressure. Such unions may want to combat adverse selection and attempt to provide a better insurance against human-capital risks such as disability. Corporatist unions may also help to build occupational, funded pension schemes.

6. Political economy of redistribution

The literature on modern political economy, surveyed by Persson and Tabellini (2000), also tells a tale about how social outcomes might affect the setting of economic policies and thus economic outcomes. It highlights the decisive role of the electorate on economic policy outcomes. Since the majority of the electorate decides in a democracy, attention is focused on median voter outcomes. A more unequal distribution of assets, incomes and productivities implies a poorer median voter who is more likely to vote for three kinds of 'populist' policies. First, a poorer median voter will vote for more redistributive policies with higher marginal tax rates on labor, thus depressing employment and output - see Romer (1975), Roberts (1977), and Meltzer and Richard (1981). However, sections 3 and 4 suggest that these harmful effects on employment may be smaller in non-competitive labor markets, since then the higher marginal tax rates induce wage moderation as well as reduce hours worked. Second, a poorer median voter is likely to resort to taxes on capital and to depress economic growth - see Alesina and Rodrik (1994), and Persson and Tabellini (1994). Third, a poorer median voter is likely to resort to inflation taxes

and to fuel inflation - see Beetsma and van der Ploeg (1996). Each of these 'populist' policies harms the economy and illustrates the merits of a more equal distribution of income and assets.

To illustrate how the political process endogenizes economic policy, consider the model of redistributive taxation put forward by Meltzer and Richard (1981). To keep matters simple, assume a linear technology and normalise so that the pre-tax wage is equal to unity. Also, abstract from income effects in labor supply and assume quasi-linear preferences of worker i , that is $U_i = C_i + u(V_i)$ where the concave function $u(\cdot)$ stands for utility of leisure. The budget constraint of worker i is $C_i = (1-T_M) L_i + A$ where A is the tax credit. A more distributive policy requires a higher tax credit A financed by a higher marginal tax rate T_M . Worker i has a time constraint, $L_i + V_i = 1 + \Pi_i$, so that the time available for work and leisure equals 1 plus an individual-specific productivity Π_i . Hence, workers differ in their ability to work fast and to enjoy leisure. Since the marginal utility of leisure is set to the after-tax wage, $u'(V_i) = 1 - T_M$, leisure of each worker is given by $V_i = v(T_M)$ with $v' = -1/u' > 0$. Hence, leisure increases and labor supply falls if the marginal tax rate rises, that is $L_i = 1 + \Pi_i - v(T_M)$. If Π denotes average productivity, average labor supply is $L = 1 + \Pi - v(T_M)$ and thus $L_i = L + \Pi_i - \Pi$. Labor supplies of different workers thus differ to the extent that their productivities differ. Effectively, more talented people work more hours, earn more and consume more, but enjoy the same leisure as less talented people. Tax credits A are financed by taxes on labor $T_M L$, so that indirect utility of worker-household i is:

$$U_i = (1 - T_M) (\Pi_i - \Pi) + 1 + \Pi - v(T_M) + u(v(T_M)).$$

Since this utility function is single-peaked for each worker i , the median voter theorem holds. Hence, the median voter chooses the optimal tax rate (the Condorcet winner):

$$T_M = (\Pi - \Pi_{\text{median}}) / v'(T_M).$$

The tax rate chosen in a democracy is higher if the adverse effect of the tax rate on labor supply (v') is small. This is the usual Ramsey tax rule, which says that price-inelastic activities should be taxed more than others. More interesting, for a given average productivity level Π , more inequality (proxied by a lower Π_{median}) leads in a democracy to a higher tax rate. More inequality implies that the median voter is relatively poor and thus votes for a large basic income and lots of redistribution. Hence, the marginal tax rate is high and employment and output are low. Conversely, a more equal distribution of productivities (and incomes) induces a political

outcome with a lower tax rate and higher levels of employment and output. In general, the size of general redistributive programmes reflect the preferences of the middle classes.

People also care about relative levels of consumption and income. Jealousy and keeping up with the Jones's are important features of human nature. People compete with each other in order to afford status goods and thus attempt to earn more than the other. A more realistic specification of preferences is thus $U_i = C_i - \lambda C + u(V_i)$, with $0 < \lambda < 1$ where C denotes average consumption. Hence, people feel worse off if other people consume more. Layard (2003) suggest that λ is about 0.3. Leisure is again $V_i = v(T_M)$ while utility of voter i is $U_i = (1 - T_M)(\Pi_i - \Pi) + (1 - \lambda)[1 + \Pi - v(T_M)] + u(v(T_M))$. With keeping up with the Jones's the median voter sets the tax rate to:

$$T_M = (\Pi - \Pi_{\text{median}}) / v'(T_M) + \lambda .$$

The first term is the familiar selfish redistribution term discussed above. The second term λ shows that the majority of the electorate judges progressive taxation to be good, even if talents and pre-tax incomes are equally distributed. Since people want to consume more than their neighbours do, they work too hard from a social perspective. To correct for this externality, labor is taxed progressively to make room for a society with more leisure and less consumption. The tax rate is at least 30 per cent and even higher if there is inequality in talents and pre-tax incomes. The tax rate is thus the sum of a Pigovian term to correct for the consumption race and a redistributive term to correct for talent and pre-tax income inequality.

Investing in long-term education may narrow productivity differences among workers. This leads to political outcomes with low tax rates and high levels of employment and output. It may then be more efficient to reduce inequalities ex ante through the education system than ex post through the tax system. In a dynamic setting with repeated voting over distortionary income redistribution the future constituency for redistributive taxation depends positively on current redistribution, since this affects both private investment and the future distribution of voters - see Hassler et al. (2003). The young can affect their chances of becoming successful when old by investing in human capital. In such a framework multiple equilibria are possible, ones with positive redistribution existing forever and others where voters eventually induce a collapse of the welfare state. The latter is more likely to occur if there is substantial skill-biased technical change - see also Besley and Coate (1998). The same political economy arguments can be used in other contexts as well; e.g., Boadway and Wildasin (1989) and Boldrin and Rustichini (1999) consider median-voter models of social security and Bénabou (2000) examines unequal societies

and the social contract. If there is a relatively unequal distribution of financial asset holdings among the population, the median voter is relatively poor and votes for higher taxes on capital. This depresses the rate of economic growth - see Bertola (1993), Alesina and Rodrik (1994) or Persson and Tabellini (1994). Conversely, a more equitable distribution of asset holdings goes hand in hand with less 'populist' policies and thus higher economic growth. Perotti (1996) surveys the empirical evidence for this proposition. Due to the dearth of data, the empirical evidence is ambiguous. Perotti (1996) considers marginal tax rates and spending on social security, housing and education. He finds a positive relationship between redistribution and growth. Also, Rodriquez (1999) finds empirically that pre-tax inequality negatively affects income and capital transfers. Figini (1999) even finds evidence of reverse causation, i.e., redistribution is lower if there is inequality. Saint-Paul and Verdier (1994) and Aghion and Bolton (1997) demonstrate theoretically that growth can be higher in more unequal societies, since redistribution boosts opportunities to invest in human capital formation. Haile and Meydam (2003) establish a non-monotonic relationship between growth and inequality.

There is also empirical evidence that countries with a more equitable distribution of nominal asset holdings are more likely to end up with political outcomes that support low inflation - see Beetsma and van der Ploeg (1996). With a more equal distribution the median voter is likely to be richer and thus less likely to vote for an unanticipated inflation tax that wipes out nominal asset holdings. A more equal distribution of nominal assets reduces the time inconsistency and credibility problems of a government tempted to use the unanticipated inflation tax as a mode of government finance.

A related strand of literature examines the political economy of labor market reforms - see Saint-Paul (1996, 2000). Often politicians do not implement labor market reforms recommended by economists. Why is that politicians resist reducing particular types of job protection legislation, minimum wages, extending coverage of collective wage bargaining agreements, and the extent of eligibility requirements for welfare benefits if these would boost job growth? Many of these labor market rigidities create rents for employers and employees and lead to strong lobbies of political insiders in the labor market. Typically, the lower-skilled unemployed and the employed higher-skilled workers lose out from such labor market reforms. These groups are too small and have insufficient power to create a majority for such reforms. The employed lower-skilled workers and part of the skilled workers, who dislike more redistributive conflict between skilled and unskilled workers, are a majority and block such labor market reforms. Having a large part of the labor force idle and excluding the poorest from the

labor market is an inefficient way to redistribute income through the tax system. The middle class of employed workers with intermediate skill levels is crucial. They block reforms and impose a big burden on the unemployed. Labor market rigidities thus make the middle class more cohesive. Rent-creating and rent-protecting arguments reinforce each other. The underlying complementarities give rise to a strong status-quo bias. If a country has many labor market rigidities, they create new constituencies to protect them.

Alesina and Angeletos (2003) and Bénabou and Tirole (2003) argue that the welfare states in the US and Europe may have multiple equilibria – see also Piketty (1995). In the US there is little redistribution and a small welfare state, because most Americans believe that education, effort and taking risks yield higher incomes. In Europe most people believe that poor people are poor because of bad luck, so there is a lot of redistribution and a big welfare state. It is difficult to move from the high-redistribution, bad equilibrium to the low-redistribution, good equilibrium, because of a status-quo bias and due to the difficulties in changing people's beliefs.

7. Concluding remarks

Many governments have cut taxes by trimming the public sector and reduced redistribution from the rich to the poor by weakening tax progressivity. With strong trade unions, efficiency wages, problems of adverse selection and moral hazard, costly search and mismatch, and high transaction costs progressive taxation, high conditional unemployment benefits, or facilitating corporatism induce wage moderation and boost employment and output. They also reduce working hours, thus boost the number of jobs further but not output. With an individualized tax system redistribution of income from high-earning to low-earning partners favors a more equal distribution of household duties within the family. Failing capital and insurance markets also provide efficiency grounds for progressive taxation. Progressive taxes redistribute incomes from older, richer people to younger people who do not earn a lot. Tax progression thus acts as an implicit credit market and alleviates distortions of rationed credit markets. Since a progressive tax system also redistributes from rich to poor parents, it reduces adverse effects of credit rationing on schooling for students with poor parents. Insurance markets fail to fully insure the risks of losing income if people become ill, disabled or unemployed, so people engage in less risky jobs and activities. Since tax progression also transfers income from those with good luck to those with bad luck, it can correct for failing insurance markets. A progressive tax system also encourages risk-averse people to invest in risky studies. People's happiness does not depend on money alone but also on relative incomes. Jealousy matters and abundance can breed discontent,

because people quickly adjust to higher living standards and find it hard to adjust downwards. If everybody works hard to spend more, they do not necessarily become happier. Hard work gives rise to an adverse externality, which can be corrected by a progressive tax on labor income.

Social policies also exacerbate non-tax distortions, since they distort markets, reduce incentives to work and invest in human capital and encourage tax evasion. They also reduce working hours, lower productivity by lowering the employers' optimal wage relative to the level of unemployment benefit, and lower the efficiency of the job matching process by reducing workers' expected marginal return to job search. Even though employment may rise as a result of more tax progression, output may fall making it harder to finance a generous welfare state.

If unemployed benefits are indexed to after-tax wages or the unemployed share fully in the tax burden, lowering the tax rate does not lower unemployment. Only if unemployed enjoy untaxed, informal income does a lower labor tax rate reduce jobs. If people who are fired for misconduct receive unconditional benefits, unemployment is pushed up. Eligibility conditions should thus be designed so that benefits are temporary and conditional on work experience, search efforts, and having lost a job by bad luck only. It may help to link unemployment benefits to individual saving schemes, especially for skilled workers. Large reductions in unemployment can be achieved by switching from unconditional to conditional benefits. The big question is if the government can obtain *verifiable* information about whether layoffs are voluntary or involuntary. There seems to be a case for tagging benefits, cf. Akerlof (1978).

The median voter is better off with a more equitable distribution of income and assets and votes for less 'populist' policies. Employment and growth are thus higher and inflation lower. A strong middle class of workers supports minimum wage or job protection legislation. Such policies harm the unemployed and higher-skilled employees and keep a large part of the labor force idle. There is a status quo bias and wasteful rigidities are difficult to remove.

Rodrik (1997) stresses that the maintenance of social safety nets is not a luxury but an essential ingredient of a market economy - cf., Sinn (1995). Markets produce many benefits, but they also make life riskier and more insecure for many people. Rodrik (1998) and De Grauwe and Polan (2002) show that countries that are more exposed to the risks of international trade have bigger governments, possibly because governments offer social insurance to cushion the effects of exposure to external risk. 'Laissez faire' advocates have some explaining to do, since neither theory nor empirical evidence suggests that social policies necessarily harm the economy.

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