Union strategy and optimal direct taxation[*]

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Abstract

Restrictions on working hours are more important in countries with a large welfare state. We show that this empirical observation is consistent with the strategic effects of such restrictions in a welfare state in the context of optimal direct taxation in the tradition of Mirrlees (1971). Our results also apply to non-welfarist states that have income redistribution, but not in purely extortionary states.

Keywords: optimal income taxation, labor unions, work hours

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1 Introduction

Restrictions on working effort or limits on working hours are well known union demands and are included in the labor market regulations in many European welfare states. They are less common in more libertarian market

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economies where the welfare state is not so important. In European welfare states, such as the Nordic countries, the Netherlands or Germany, usual weekly hours and paid annual leave are collectively agreed and these collective agreements cover the vast majority of the workforce.[1] The average collectively agreed weekly working time in 2003 was restricted to 37 hours in the Netherlands and Denmark, to 37.5 in Finland and Norway and to 37.7 hours in Germany. Average collectively agreed annual paid leave was 33 days in Sweden, 31.3 days in the Netherlands, 30 days in Denmark, and 29.1 days in Germany (EIRO 2003a). Overtime work exceeding these limits is also heavily regulated and requires the employer to pay substantial overtime premia (EIRO 2003b). In more libertarian market economies, such as the US, Canada, the UK or Ireland, such agreements are less common and the percentage of workers covered by collective agreements is much lower. Where such restrictions exist, they are typically much less restrictive. For the European countries, for which comparable information is available, figure 1 shows that a reduction in collectively agreed annual hours is positively related with the government share in GDP, where the latter variable is regarded as a proxy for the extent of the welfare state. Furthermore, the relationship between the existence of restrictions on working time and the extent of the welfare state becomes even more pronounced if non-European countries such as Japan, the US or Canada are considered.

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[1]There are also important statutory regulations in the European welfare states regarding working time. However, these are typically not binding as the collectively agreed working time regulations are much stricter. France is an exception among the European welfare states to this rule, where the statutory regulations such as the 35 hours week are actually binding. Union coverage rates (as a percentage of workers with the legal right to bargain) in the continental European welfare states range from 69% in Denmark to 99% in Austria. This compares to 37% in the UK, 36% in Canada, 18% in Japan and 16 % in the US, Golden at al. (1998), data for 1996 (last available).
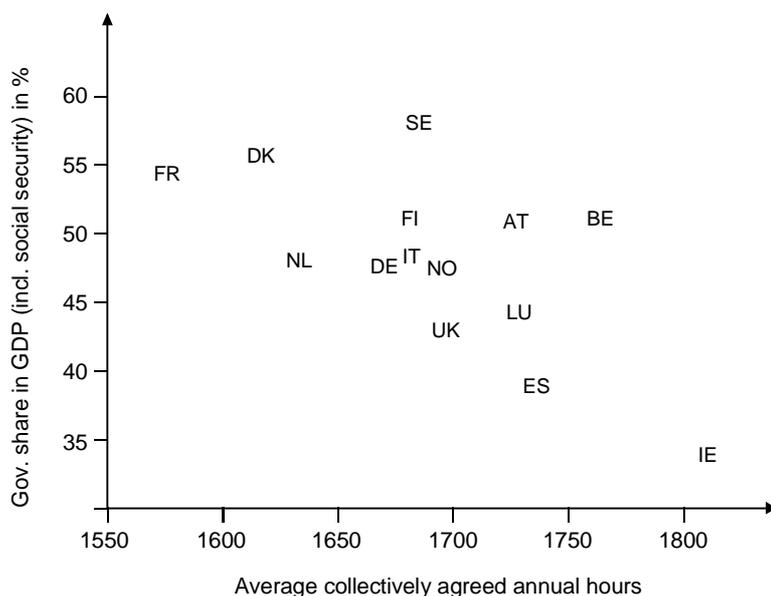
Figure 1: Average collectively agreed annual hours and redistribution (Government share in GDP) in 2003. Source: OECD and Eiro (2003a)

The theory of limits on working hours mostly concentrates on libertarian market economies. Among these theories is the standard argument that such limits increase the relative scarcity of the type of labor represented by a union. Further, restrictions on working time may result from what may be called firm-worker externalities which arise from some form of contracting problem between workers and firms, i.e. agency models such as Lazear (1981) or specific capital models, Mincer (1974) and Becker (1971). Alternatively, limits on working hours can also be an instrument to correct for externalities between workers, for example, those arising in promotion tournaments within firms, Landers, Rebitzer, and Taylor (1996). None of these theories explain why such restrictions are particularly pronounced in welfare states, and none of them address the interaction between these restrictions and redistributive taxation in a welfare state.[2]

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[2]On the contrary, high tax levels will attenuate existing firm-worker externalities or worker-worker externalities. In the former case, the necessity for limits on working hours

A part of the explanation of the empirical correlation between working time restrictions and the amount of redistribution through the welfare state may be found in reduced collective labor supply in response to higher marginal tax rates. However, it is not clear why hours should be fixed collectively and why the decision of how much to work should not be left to the individual workers and their preferences.

This paper provides a possible explanation for the empirical correlation. Welfare states redistribute from high-income earners to low-income earners and weigh this redistribution with its efficiency cost. Labor unions will anticipate the government's redistribution choice, and how it will respond to changes in the constraints. The union can affect the redistribution choice directly by setting the gross income of the low-skilled, or indirectly by institutional arrangements that effectively limit maximum working hours. This policy can benefit the low-skilled workers the unions represent if the redistributive tax system maximizes social welfare and attributes positive weight to workers in all income groups. This argument applies generally if the government policy enacts a redistribution programme regardless of whether this is driven by welfarist redistributional preferences or, more generally, by a political process.

The optimal redistributive income taxation that is pursued by a welfarist government under some informational constraint as analysed in the classic papers on optimal taxation (Mirrlees 1971, Stiglitz 1982, Atkinson 1973) can be seen as a policy that maximizes the expected utility of each of a set of ex ante identical individuals who face some uncertainty about their future

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results from the net wage exceeding a workers marginal revenue product over some span of the firm worker match. As higher taxes reduce the net wage, this problem is reduced in welfare states. Higher taxes will also reduce socially wasteful competition between workers, since effort becomes more costly and also the net rewards from being promoted are reduced.

productivity type,[3] and we adopt this view. However, the specific weights of the utilities of the different groups in the government's objective function are not crucial for the result, and neither are the motivation nor the forces, that lead to this objective function of the government. We take the redistributional governmental objective as given and consider how union policy affects the actual redistribution outcome.[4] From this we draw conclusions about the unions' incentives with respect to reducing working hours as a way of fixing gross incomes of the low skilled.

Our analysis parallels the approaches by Andersson (1996), Boadway, Marceau and Marchand (1996), Dillén and Lundholm (1996), and Konrad (2001) who highlight several other strategic aspects related to governmental redistributional policy. Our paper is also related to a new line of research in optimal direct taxation that gives this an important role and empirical relevance. Bourguignon and Spadaro (2002) consider the different income tax regimes in several countries and identify the welfare functions that would make the respective observed country specific tax system an optimal tax schedule for this welfare function. If the political process determines the weights of different interest groups in a country's welfare function and the tax policy outcome is an efficient implementation of the resulting optimal redistribution programme, we can interpret our result differently and see it as giving the labor unions the first move that can create an additional

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[3] See, e.g., Atkinson (1973) for discussion. The uncertainty about future income and productivity creates an insurance demand and this is the standard justification for redistributive optimal income taxation. Varian (1980) and Sinn (1995) have made this argument very clear. Agell and Lommerud (1992) take a similar point of view when considering wage compression as an insurance mechanism.

[4] In the theory of optimal direct taxation workers actually differ with respect to their types. This results in a major difference between this approach and economies with dual labor markets. For redistribution in these contexts, see, e.g., Lommerud, Sandvik and Straume (2003).

constraint for this policy formation of the tax programme.[5]

The strategic incentives that show up in our analysis are related to what has been discussed as the Samaritan's dilemma (Buchanan 1975, Bruce and Waldman 1990) or the "strategic advantage of being poor" (Konrad 1994) in different contexts. Unlike this literature, however, the mechanics are more indirect here, as they work via the effect of union policy on the individual incentive compatibility constraints.

2   The model

Consider a static two type optimal direct taxation model, similar to Stiglitz (1982). Let there be a continuum $[0, 1]$ of workers who are employed in an industry in which their gross income equals their output that is perfectly observable and equal to m_i for individual i. Gross income m_i is made up of two components, individual effort, or, working hours l_i, and the wage w_i, $m_i = w_i l_i$. Neither w_i nor l_i is observable by the government, but gross income m_i is observable. Generating gross earnings brings a disutility of effort $\varphi(l_i)$, with derivatives $\varphi'(l_i) > 0$, $\varphi''(l_i) > 0$, and $\varphi'''(l_i) \geq 0$. The marginal disutility of effort is positive, increasing in effort, and convex. Furthermore, 'Nature' decides about each individual's productivity and there are two productivity types. Individuals who have low productivity earn a wage w_L per unit of effort, and individuals who have high productivity earn w_H per unit of effort and $w_H > w_L$. A share h of individuals is highly productive, the other share has low productivity. Individuals know their own productivity when

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making choices in the labor market, and the size of h is common knowledge. Since we will consider a direct mechanism in which the government offers contracts specifying gross and net incomes, we define the disutility in terms of gross incomes

$$\psi_H(m) \equiv \varphi(\frac{m}{w_H}) \text{ and } \psi_L(m) \equiv \varphi(\frac{m}{w_L}). \tag{1}$$

Once the workers know their own productivities, the union sets gross income for the low productivity workers $\bar{m}_L$. In the next stage, the government solves an optimal taxation problem that is the standard textbook two-types problem as in Stiglitz (1982), except that $\bar{m}_L$ has been set by the union. The government maximizes a welfare function subject to some constraints which will be considered below. In the case with two types, optimal taxation consists of a menu of two pairs of gross income and net income, (m_H, x_H) and (m_L, x_L). The difference between gross and net income is the tax or subsidy for an individual of type i. The sum of taxes just covers the sum of subsidies, and this defines the government's budget constraint.

Individuals i care about their own consumption that equals their net income x_i and about their disutility of working. We adopt the convention usual in optimal taxation that all individuals have the same utility function $u(x_i), i = H, L$. For clarity and ease of exposition, we consider the case where consumption utility and disutility of gross income enter the utility function additively. With the share of highly productive workers given by h, the benevolent government's utilitarian welfare function is

$$W = h\left[u(x_H) - \psi_H(m_H)\right] + (1-h)\left[u(x_L) - \psi_L(m_L)\right]. \tag{2}$$

The government maximizes (2) subject to the following constraints:

$$u(x_H) - \psi_H(m_L) \geq u(x_L) - \psi_H(m_L) \tag{2A}$$

$$u(x_L) - \psi_L(m_L) \geq u(x_H) - \psi_L(m_H) \tag{2B}$$

$$h\left[m_H - x_H\right] + (1-h)\left[m_L - x_L\right] = 0 \qquad (2C)$$

$$m_L = \bar{m}_L \qquad (2D)$$

Constraint (2A) requires that an individual with high productivity prefers to generate (high) income m_H and consume x_H rather than (low) income m_L and consume x_L. An individual with high productivity prefers (m_H, x_H) to (m_L, x_L), and chooses (m_H, x_H) when making a choice between the two. Inequality (2B) is an analogous constraint for individuals with low productivity. Constraint (2C) is the government's budget constraint. Constraint (2D) is the additional constraint that is chosen by the union in the state prior to the choice of tax policy. The union may choose m_L directly, or indirectly by an upper limit on working hours. The government must choose a tax policy that is in line with these regulations.

The union by assumption represents the low productivity group. Accordingly, its objective function is identical with the objective function of a worker with low productivity

$$W_L = u\left(x_L\right) - \psi_L\left(m_L\right). \qquad (3)$$

Summarizing, the time structure of the game will be as follows. In STAGE 1, individuals $i \in [0,1]$ learn about their individual productivity. In STAGE 2, the union fixes the low productivity workers' gross income. In STAGE 3 the government implements the Mirrlees (1971) optimal tax policy for a given distribution of productivities under the maximum effort constraint. This tax policy is an income tax (or subsidy) as a function of observed gross income, and, possibly, as a function of productivity, if the government can observe individual productivity. In STAGE 4 each individual chooses his or her actual gross income and pays taxes or receives subsidies accordingly.

We state our main result in the following proposition:

Proposition 1 *The union has an incentive to induce effort for low productivity workers lower than in the standard optimal income tax problem. The*

resulting equilibrium (i) benefits low productivity workers, (ii) harms high productivity workers and (iii) reduces welfare.

To prove (i)-(iii), consider the standard problem, without the additional constraint (2D), as in Stern (1982) and Stiglitz (1982). The welfarist government chooses a pair of admissible combinations of gross and net earnings, (m_L, x_L) and (m_H, x_H), that maximize (2) subject to the constraints (2A), (2B), and (2C). As is well known, (2A) will be binding, whereas (2B) is not. The Lagrangian representing the maximization problem using (2C) to substitute for x_H is

$$\mathcal{L} = W + \lambda \left[u \left(\frac{1-h}{h} (m_L - x_L) + m_H \right) - \psi_H (m_H) - u(x_L) + \psi_H (m_L) \right].$$
(4)

The first-order conditions with respect to m_H, m_L and x_L are

$$(h + \lambda) \left[u'(x_H) - \psi'_H (m_H) \right] = 0$$
(5)

$$(1 - h)[u'(x_H) - \psi'_L (m_L)] + \lambda[\frac{1-h}{h} u'(x_H) + \psi'_H (m_L)] = 0, \text{ and}$$
(6)

$$(1 - h) \left[u'(x_L) - u'(x_H) \right] - \lambda[\frac{1-h}{h} u'(x_H) + u'(x_L)] = 0.$$
(7)

These conditions have standard interpretations. For instance, (5) is the usual "no distortion at the top" property of the solution. Conditions (6) and (7) describe the equity-efficiency trade-off. By eliminating the Lagrange multiplier, these can be rearranged describing this tradeoff as

$$u'(x_L) - \psi'_L (m_L) - \frac{u'(x_L) - \psi'_H (m_L)}{\frac{1-h}{h} u'(x_H) + u'(x_L)} \left[u'(x_L) - u'(x_H) \right] = 0,$$
(8)

which says that the low skilled's working decision should be distorted. The marginal increase in the distortion, $u'(x_L) - \psi'_L (m_L)$, should be equal to the increase in transfers made possible by the induced slack in the incentive compatibility constraint, which is given by the fraction $\frac{u'(x_L) - \psi'_H (m_L)}{\frac{1-h}{h} u'(x_H) + u'(x_L)}$, and

this marginal transfer increase is evaluated by the difference in marginal utilities. We denote the solution to this problem as $(\hat{m}_H, \hat{x}_H)$, $(\hat{m}_L, \hat{x}_L)$, and assume that $\hat{m}_L > 0$.

The union has an incentive to choose a low binding gross income if the utility of the low income employees increases at $\bar{m}_L = \hat{m}_L$ for a marginal reduction in $\bar{m}_L$, i.e., if

$$\left.\frac{\partial W_L}{\partial \bar{m}_L}\right|_{\bar{m}_L = \hat{m}_L} = u'(\hat{x}_L) \left.\frac{\partial x_L}{\partial \bar{m}_L}\right|_{\bar{m}_L = \hat{m}_L} - \psi'_L(\hat{m}_L) < 0. \qquad (9)$$

In the solution of the restricted problem, the remaining endogenous variables m_H, x_L and λ are implicitly defined by the system of (5), (7) and (2A). Calculating the general equilibrium effect from this system of equations and evaluating at the unrestricted optimum we get

$$\left.\frac{\partial x_L}{\partial \bar{m}_L}\right|_{\bar{m}_L = \hat{m}_L} = \frac{\frac{1-h}{h} u'(\hat{x}_L) + \psi'_H(\hat{m}_L)}{u'(\hat{x}_L) + \frac{1-h}{h} u'(\hat{x}_H)}. \qquad (10)$$

Substituting this in (9), adding and substracting $u'(\hat{x}_L)$ and rearranging gives

$$\left.\frac{\partial W_L}{\partial \bar{m}_L}\right|_{\bar{m}_L = \hat{m}_L} = u'(\hat{x}_L) - \psi'_L(\hat{m}_L) - \frac{u'(\hat{x}_L) - \psi'_H(\hat{m}_L)}{u'(\hat{x}_L) + \frac{1-h}{h} u'(\hat{x}_H)} u'(\hat{x}_L) < 0. \qquad (11)$$

Comparing (11) to (8) shows that it is smaller than zero. This proves (i). Further, W in (2) is reduced, since the resulting allocation is a feasible choice for the government in the standard problem without the additional constraint as well, and it was not optimal in this problem. This confirms (iii). Since the low productivity types' utility is increased, but total welfare is decreased, high productivity types' utility must be reduced, confirming (ii).□

The intuition for the result is as follows. If the union reduces the gross income of the low productivity types, it loosens the incentive compatibility constraint the government is facing in its redistribution optimization problem. It becomes less rewarding for a high productivity individual to behave

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like the low productivity individuals. This makes it possible for the government to increase the transfers to the low productivity types. This increase in transfers benefits the low productivity types and makes the high productivity types worse off. In the unrestricted solution, the utilitarian government reduces m_L until the welfare loss from the distortion of the L types is just offset by the welfare gain from an increase in the transfer from H types to L types. The transfer is weighted by the difference in marginal utilities. The union instead weighs the increased scope for an additional transfer dollar with the marginal utility of the L types only, resulting in a greater distortion of the low productivity types.

The effect is related to the Samaritan's dilemma (Buchanan 1975, Bruce and Waldman 1990) or the "strategic advantage of being poor" (Konrad 1994) in different contexts. The L types induce more redistribution from the H types to their group by restricting their own gross income. Unlike in this literature, however, the mechanics are more indirect here, as they work via the effect of these restrictions on the incentive compatibility constraint.

With exogenous productivity, the natural way for unions to fix the gross incomes of the low income group at a low level is by restricting working hours, and this is in line with the strong empirical correlation between work hours restrictions and the size of the welfare state that stimulated our analysis. Alternatively, labor regulations that reduce productivity of the low productivity types could have similar effects, but they are typically less efficient as they will increase marginal disutility of working on all hours worked.

3   Discussion

Many economists dismiss the view that governments are welfarist. We do not take a strong point of view on this matter here as it only partially affects the results in the paper. For the strategic role of working hour restrictions in the

low income sector, the question of whether the redistributional policy of the government is welfarist or is guided by other factors is mostly irrelevant. If unions fix low productivity workers' gross incomes, this will generally change the government's optimization problem for any given objective function and, hence, will have an impact for the actual redistributional policy that will be implemented.

For instance, if the process of voting, coalition formation and lobbying leads to a particular objective function that may, but need not, resemble the objective function of a welfarist government, the advocates of the low income groups may still consider it advantageous to influence this process and the type of redistribution that is implemented if they can introduce restrictions that influence effort choices in an early stage of this process. An analysis of this problem will be less straightforward, as the political process needs to be specified, and it will generally interact with the union policy. As long as the political process leads to an incentive to redistribute from high income earners to low income earners, our basic argument applies: the low income group can typically increase the amount it receives from the high income group by restricting its own gross income.

The basic argument breaks down if the political process is mapped by a government's objective function that does not display redistributional preferences, as, for instance, with an extortionary government: a reduction in the gross income of low productivity types will not induce higher redistribution to them, but will harm both the extortionary government and the high productivity type.

As has been pointed out in the context of tax competition, globalization, and the increase in mobility that could be implied by it, may reduce the scope for income redistribution. This may affect union policy in our context in several ways. If, for instance, the productive workers become fully mobile, this will eliminate the scope for welfarist redistribution completely. However,

redistribution was the reason that made hours restrictions desirable from the perspective of unions. This will not be analysed more rigorously here, but there is a strong intuition that a reduction in the amount of redistribution that is feasible may make it advantageous for the unions to give up a policy of constraints on total working hours.

Summarizing, restrictions on working hours and effort are more prominent and important in countries with a large welfare state. We show that this observation is consistent with the strategic effects of such restrictions in a state in which the government redistributes from the high income group to the low income group. Intuitively, the constraints reduce both the pre-tax income and the effort of members in the low income group, but induces additional transfers of income from the high income group to the low-income group. We studied this problem in the context of optimal direct taxation in the tradition of Mirrlees (1971). However, the effect is more general and our results hold qualitatively if determinants other than the considerations of a welfarist government govern the redistribution of income.

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