



Optimal wage redistribution in the presence of adverse selection in the labor market☆☆☆



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ABSTRACT

In this paper we highlight a novel role played by the non-linear income tax in the presence of adverse selection in the labor market due to asymmetric information between workers and firms. Relying on the Rothschild and Stiglitz equilibrium concept, we show that an appropriate choice of the tax schedule enables the government to affect the wage distribution by controlling the transmission of information in the labor market. This represents an additional channel through which the government can foster the pursuit of its redistributive goals.

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1. Introduction

The modern approach to taxation emphasizes information as the fundamental constraint on public policy. The key assumption in the standard Mirrlees (1971) framework is that the government is unable to observe individual productivities (earning capacities) and hence has to redistribute based on observed levels of income. This might invite high-skilled workers to engage in “mimicking”, that is, to reproduce the earned income of a low-skilled worker, in order to benefit from a more lenient tax treatment and thereby derive a higher utility. This means that the income tax must be designed in a way which renders such

mimicking unattractive; namely, the income tax must be incentive-compatible.

A standard assumption in the optimal tax literature is that there is symmetric information between workers and firms. In a recent paper, Stantcheva (2014) relaxes this assumption by assuming that firms cannot observe the productivities of workers. Assuming in addition that high-skilled workers have a weaker taste for leisure, firms have the possibility to screen between high- and low-skilled workers by offering an increased compensation conditional on a higher labor effort. This gives rise to adverse selection where high-skilled agents work more than the efficient amount. Stantcheva (2014) shows that when the government is sufficiently egalitarian, social welfare would be higher in the presence of adverse selection than under the Mirrleesian benchmark with symmetric information. The reason for this is that under adverse selection, as labor contracts cannot be conditioned on (unobserved) labor productivity, high-skilled mimickers are not fully remunerated for their higher earning capacity. That is, they have to work longer hours than under a symmetric information regime in order to reproduce the income of the low-skilled workers. This makes less tempting for the

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high-skilled workers to mimic their low-skilled counterparts and thereby enhances redistribution.

In principle, the government can promote redistributive goals through two different channels: (i) by changing the income distribution, and/or (ii) by affecting the underlying wage distribution. In the standard *Mirrlees (1971)* setting, the production technology is assumed to be linear, which implies that the wage distribution is exogenous, thereby leaving no scope for the government to further equity goals through the wage channel. By relaxing the assumption of linearity, the subsequent literature has introduced a role for the income tax to affect the wage distribution. *Stiglitz (1982)* demonstrates that, when skill types are complements in the production technology, it is socially optimal to marginally subsidize the labor supply of high-skilled workers in order to reduce wage dispersion. This in turn renders the optimal taxes less progressive than under the standard *Mirrlees* setup with a linear production technology. More recently, *Rothschild and Scheuer (2013)* have extended the discrete *Stiglitz (1982)* framework to a continuum of types that differ along a multidimensional skill vector and have allowed for endogenous occupational choices. They show that the redistributive wage channel emphasized by *Stiglitz* carries over to the more general setting. However, the additional features associated with the occupational choice margin mitigate the general equilibrium effects and make the optimal taxes more progressive (but still less progressive than under the standard *Mirrleesian* setting).¹

In this paper we connect the analysis of *Stantcheva (2014)* with the aforementioned strand of the literature, which emphasizes the wage channel for redistribution. *Stantcheva* considers a standard linear production technology and restricts attention to separating allocations, in which each type of worker is offered a distinct consumption–labor bundle. In a separating equilibrium, when the relevant equilibrium concept is of the *Rothschild–Stiglitz (RS)* type, each worker is remunerated according to his/her marginal productivity. This implies that no redistribution is carried out through the wage channel.² Employing a similar framework, we show that the government can, by choosing an appropriate tax system, make it more difficult for firms to engage in screening, and thereby implement wage pooling.³ When designing the optimal re-

¹ The above-mentioned literature has limited attention to the role of income taxation in affecting the wage distribution by relying on the complementarity between production factors. *Cremer et al. (2011)* consider a setting with a linear production technology (that is, no complementarities) but where the government can supplement the nonlinear income tax with education policy that affects the wage distribution. They show that, for a given mean of the individual earning abilities, social welfare is a convex function of the variance of the individual earning abilities. In particular, the most unequal distribution of wages is desirable from the standpoint of social welfare maximisation when the permissible degree of wage differentiation is large. When the permissible degree of wage differentiation is small, they demonstrate that an equal-wage outcome (which obviates the redistributive role of income taxation) may be socially desirable. Notice that in their model, independently on whether redistribution is achieved through the tax or the educational policy, each worker is always paid a wage rate equal to his/her marginal productivity. In the model developed in our paper, productivities are exogenously given and the government has no instrument to affect them. Moreover, in our setting, the difference between tax-and-transfer redistribution and wage redistribution is that in the second case a wedge is created between the gross wage rate paid by firms to a given worker and the worker's marginal productivity.

² An alternative equilibrium concept developed in the literature is the so-called *Miyazaki–Wilson–Spence (MWS)* equilibrium [following *Miyazaki (1977)*, *Wilson (1977)* and *Spence (1978)*]. The crucial difference between the *RS* and *MWS* equilibrium concepts is in the degree of cross-subsidization across types that derives in a separating equilibrium given the permissible forms of contracts that can be signed between the firms and the workers. Under the *RS* equilibrium concept each contract offered in equilibrium has to break even separately (yielding zero profits); whereas, under the alternative *MWS* equilibrium concept, firms make zero profits on their overall portfolio of contracts.

³ In her contribution, *Stantcheva (2014)* mostly relies on the *MWS* equilibrium concept and confines to the online Appendix the analysis of the *RS* equilibrium. Our focus on the *RS* equilibrium is justified by our purpose of comparing income (ex-post) redistribution and wage (ex-ante) redistribution as alternative redistributive channels that can be exploited by the government through the design of an appropriate tax policy. As we will see, this comparison will be undertaken by contrasting a separating tax regime (where, due to our focus on a *RS* equilibrium concept, wage redistribution cannot exist) with a pooling tax regime.

distributive policy the government has to balance the efficiency gains from screening, associated with implementing a separating allocation, and the equity gains from wage pooling.

Considering a two-type model we show that when optimizing the tax schedule the government can implement a pooling allocation with full wage equalization. This pooling allocation turns out to be socially superior when both the differences in productivities and the differences in labor–leisure preferences are not too large. In a setting with two types we are limited to comparing the welfare effects of the separating equilibrium and the equilibrium where both types are pooled together. To gain insights into the possibility of having an equilibrium involving partial pooling of types we also consider two extensions of our benchmark model. First, in an appendix, we analyze a three-type model and provide numerical examples where the optimal policy of the government is to implement a hybrid equilibrium (where two out of three types are pooled together). Second, we show analytically that in a model with a continuum of types, full pooling is never optimal and that some redistribution through the wage channel is always desirable.

The general message of our analysis is that one can highlight a novel role played by the non-linear income tax in the presence of adverse selection in the labor market due to asymmetric information between workers and firms. Under symmetric information, firms observe workers' productivities and therefore remunerate each worker according to his/her marginal productivity in a competitive labor market. Under asymmetric information, however, the translation of differences in productivities into differences in wage rates hinges on the mechanism by which workers and firms exchange information. In line with *Stantcheva (2014)* we focus on the particular mechanism in which firms screen workers through non-linear labor contracts and work effort is used as a screening device for unobserved talent.⁴ In this case we show that the optimal nonlinear income tax is not only used to redistribute income, but also enables the government to perform redistribution through the wage channel as the nonlinear tax allows the government to affect the transmission of information (and thereby the remuneration of workers) in the labor market. Under certain circumstances, this additional role for the income tax enhances the redistributive capacity of the government.

The screening device that we focus on is empirically justified by the 'rat-races' occurring in many work places where employees are required to work long hours in order to be eligible for a high compensation. For example, *Landers et al. (1996)* report on the long working hours required by lawyers for them to become eligible as partners in law-firms. Another example is the segmentation of the labor market into career jobs and part-time jobs to allow the separation between workers who are more family oriented versus those who are more career oriented. Such screening through nonlinear labor contracts may arise if discrimination based on family status/number of children is ruled out by antidiscrimination legislation.

Clearly, a key assumption in our framework is that there exists asymmetric information in the labor market. This is the case whenever incumbent firms have more information about worker quality than other potential employers do. This is supported by *Gibbons and Katz (1991)* who found that workers who were laid off experienced a larger wage loss than workers who were displaced by plant closings. *Acemoglu and Pischke (1998)* find evidence of adverse selection in the labor market for German apprentices. More recently, *Kahn (2013)* estimates a model of employer learning using data on nationally representative sample of workers and finds strong support for asymmetric information in the labor market.

⁴ Notice that screening through nonlinear labor contracts is an example of an indirect screening mechanism which is relevant when other (direct) screening measures based on observable characteristics (such as age or gender) are rendered infeasible by anti-discrimination legislation. Another example of an indirect screening mechanism is job training programs. The screening through nonlinear labor contracts is most relevant at the stage of hiring or the early stages of employment, as later on, firms get familiarized with their workers' abilities and may choose to promote/remunerate them accordingly.

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