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Income tax deductions for losses as insurance revisited☆

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ABSTRACT

Kaplow (1992) shows that allowing income tax deductions for losses as partial insurance is undesirable in the presence of private insurance markets. This paper revisits the issue by considering a model that integrates Kaplow (1992) with Stiglitz (1982). We address the following question: Whether the income tax deduction for losses is part of an optimal income tax system. We show that introducing the income tax deduction for uninsured losses to complement an optimal nonlinear labor income tax will Pareto-improve welfare, provided that: (i) information is incomplete for the government as in the Stiglitz framework, and (ii) the premium for private insurance is unfair or moral hazard is present.

1. Introduction

In a seminal paper, Mirrlees (1971) addresses the design of income taxation in which individual ability (type) is not directly observable by the government. The Mirrlees model contains continuum types. Stiglitz (1982) explicitly formulates the problem as one of self-selection and focuses on the case of two types (low- and high- ability individuals). Perhaps due to its simplicity and intuitive appeal, the Stiglitz model has become a workhorse for the study of a variety of issues on optimal taxation.

In an important paper, Kaplow (1992) considers a model abstracting from the Mirrlees setting and asks the question: Should the government allow income tax deductions for uninsured losses as partial insurance? He shows that a tax system without the deductions Pareto dominates the tax system with the deductions. The intuition underlying Kaplow's result is that the availability of income tax deductions as partial insurance will distort and crowd out the purchase of private insurance, leading individuals to expose themselves to more risk than otherwise.

In this paper we integrate Stiglitz (1982) self-selection model with Kaplow's (1992) income-tax-deduction model in a unified framework. Our aim is to tie together these two branches of the literature to address the question: Whether the income tax deduction for uninsured losses is part of an optimal income tax system.

Most OECD countries allow some form of tax deductions for personal losses such as medical expenses and casualty losses.[1] For example, they account, for a high proportion of ISTT (income subject to taxation) in Denmark, Finland, Norway and Sweden, and a fairly high proportion in the Netherlands and France. Tax deductions for personal losses play a smaller but still significant role in USA, Belgium, Canada, and Germany (Wagstaff and Van Doorslaer, 2001). In view of this fact, it is important to know if Kaplow's negative conclusion with regard to the income tax deduction remains robust in an arguably more realistic environment.

There are papers showing situations in which the government should provide a tax deduction for personal losses. These situations include the insurer's insolvency risk problem (Huang and Tzeng, 2007), the political feasibility problem (Barbaro and Suedekum, 2009), and the insurer-sided adverse selection problem (Wu and Yang, 2012). We contribute to this line of literature by highlighting the role of adverse selection as addressed in Stiglitz (1982). Besides Kaplow's argument, objections against income tax deductions for losses as insurance can be raised from two different aspects. The first is the elasticity-of-taxable-income argument. Slemrod and Kopczuk (2002) and Kopczuk (2005) emphasize that fewer tax deductions mean a broader tax base, which results in a smaller excess burden of taxation. The intuition for the resulting smaller excess burden is that the fewer the tax deductions that individuals

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[1] See OECD (1990).

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can turn to in the face of taxation, the smaller the elasticity of taxable income will be. On the basis of this argument, allowing income tax deductions for uninsured losses seems undesirable.

The second is the precautionary-incentive argument. Low and Maldoom (2004) and Netzer and Scheuer (2007) show that social insurance can mitigate private underinsurance, but it also causes a decrease in individuals' precautionary effort or labor supply against uncertainty. On the basis of this argument, allowing income tax deductions for uninsured losses may not be desirable either.

Neither argument above is applicable in our context. The tax system without income tax deductions is designed at its optimality according to our setup. This implies that the effort or labor supply must be optimally allocated when income tax deductions are not allowed. As a result, introducing income tax deductions into this optimal tax system will not exert any first-order effect on welfare at the margin via distorting the elasticity of taxable income or labor supply. This is simply an application of the envelope theorem. We formally prove this result in the paper.

Our main finding is that introducing the income tax deduction for uninsured losses to complement an optimal nonlinear labor income tax will Pareto-improve welfare, provided that information is incomplete for the government as in the Stiglitz framework. More specifically, we show that introducing the income tax deduction for uninsured losses to complement an optimal nonlinear labor income tax will Pareto-improve welfare, provided that (i) information is incomplete for the government as in the Stiglitz framework, and (ii) the premium for private insurance is unfair (Proposition 1) or moral hazard is present (Proposition 2). In his extensions and discussion, Kaplow (1992) did address the possible impact on his finding when adverse selection or moral hazard is present. Our Propositions 1 and 2 make precise the result, which goes beyond the discussion in Kaplow (1992). Next section introduces the basic model. Section 3 characterizes the solution and Section 4 addresses the main question of the paper. Section 5 considers some extensions and Section 6 concludes.

2. Basic model

The model is an integration of Stiglitz (1982) and Kaplow (1992).

Consider an economy in which there are two types of individuals: n_1 individuals with low ability who earn the wage rate w_1, and n_2 individuals with high ability who earn the wage rate w_2 ($w_2 > w_1 > 0$). The parameter w_i is known as the type of individuals. Gross labor income is $y_i = w_i l_i$, where l_i is the labor supply ($i = 1, 2$). The government observes neither w_i nor l_i, but y_i is observable. Let (t_i, T_i) denote the nonlinear labor income tax imposed on y_i, where t_i is the marginal tax rate and T_i is the lump-sum grant.[2] This setup follows Stiglitz (1982).

Both types of individuals face the same probability $0 < p < 1$ of incurring a loss of size $d > 0$.[3] Both p and d are known by the private insurer. A type w_i individual's private insurance coverage q_i is available at the premium $p(1 + k)q_i$, where k is known as a loading factor. The premium is actuarially fair if $k = 0$, but unfair if $k > 0$. If the loss does occur, then individuals of type w_i will receive the income tax deduction $t_i\sigma(d - q_i)$, where $-q_i$ is the uninsured amount of the loss, and σ is the tax deductible rate with $\sigma \in [0,1]$. There will be no income tax deduction if $\sigma = 0$. This setup follows Kaplow (1992).

In the presence of the non-linear labor income tax, the possible loss, the available private insurance and the income tax deduction, the type w_i individual's budget constraint is given by

$$c_i^j = \begin{cases} (1-t_i)w_i l_i - T_i - (1+k)pq_i - d + q_i + t_i\sigma(d-q_i), & j = a, \text{in case of a loss}, \\ (1-t_i)w_i l_i - T_i - (1+k)pq_i, & j = na, \text{otherwise}, \end{cases}$$

where c_i^j denotes consumption of a type w_i individual in state j.

The preferences of both types are represented by the same utility function. More specifically, the type w_i individual's expected utility is given by[4]

$$pU(c_i^a) + (1-p)U(c_i^{na}) - \varphi(l_i), i = 1, 2. \tag{1}$$

The utility part $U(.)$ satisfies $U' > 0$ and $U'' < 0$, while the disutility part $\varphi(.)$ satisfies $\varphi \geq 0$, $\varphi' > 0$, $\varphi'' > 0$ and $\varphi'(0) = 0$.

The timing of the events is as follows. First, given a tax deductible rate σ, the government sets the income tax structure $\{(t_1,T_1),(t_2,T_2)\}$. Second, taking σ and the income tax structure as given, individuals simultaneously and independently choose their labor supply and purchase their private insurance.

3. Characterization of the solution

As is standard, we first solve the individual problem and then the government problem. We summarize our findings by a series of lemmas, paving the way for the proof of the main result in the next section. All our lemmas report the case where $\sigma = 0$. This is because we shall address the welfare change marginally at $\sigma = 0$.

3.1. Individuals

We consider complete and incomplete information, respectively. When information is complete, the government can identify any individual's type. By contrast, when information is incomplete, the government knows the distribution of individual types, but it cannot identify a priori who has the high ability and who has the low ability.

3.1.1. Complete information

In the case where information is complete for the government, there is no possibility for mimicking between types. Facing the income tax schedule (t_i, T_i), an individual of type w_i solves the following problem

$$\underset{q_i, l_i}{Max} \; pU(c_i^a) + (1-p)U(c_i^{na}) - \varphi(l_i), i = 1, 2. \tag{2}$$

The first-order conditions are

$$(1-t_i)w_i E[U_i'] - \varphi_i' = 0, \tag{3 – 1}$$

$$\frac{(1-p)(1+k)}{1-p(1+k)-\sigma t_i} = \frac{U'_{i,a}}{U'_{i,na}}, \tag{3 – 2}$$

where $E[U_i] \equiv (1-p)U_{i,na}' + pU_{i,a}'$ is the expected marginal utility of consumption with $U_{i,a}' \equiv \partial U/\partial c_i^a$ and $U_{i,na}' \equiv \partial U/\partial c_i^{na}$, and φ_i' is the marginal disutility of labor supply.

From Eq. (3-2), we have

Lemma 1. *Suppose that information is complete for the government and $\sigma = 0$.*

- **(i)** *If $k = 0$, then $q_i = d$ for $i = 1, 2$; that is, all individuals will fully insure.*
- **(ii)** *If $k > 0$, then $q_i < d$ for $i = 1, 2$; that is, all individuals will partially insure.*

Proof. From Eq. (3-2), when $\sigma = 0$ and $k = 0$, we can obtain $U_{i,a}' = U_{i,na}'$ and thus $q_i = d$. On the other hand, when $\sigma = 0$ and $k > 0$, we can obtain $U_{i,a}' > U_{i,na}'$ and thus $q_i < d$. Q.E.D.

[2] A non-linear income tax can be represented by a menu of individualized linear income tax; see Saez (2001).

[3] We relax this assumption when considering extensions in Section 5.

[4] This is a frequent assumption in the analysis of income tax models; for example, Kessing and Konrad (2006) and Cremer and Pestieau (2006).