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Yet another reason to tax goods ☆

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ABSTRACT

Golosov et al. [2003. Optimal indirect and capital taxation. Review of Economic Studies 70 (3), 569–587] have extended Atkinson and Stiglitz's uniform tax prescription to a dynamic Mirrlees [1971. An exploration in the theory of optimal income taxation, Review of Economic Studies 38, 175–208] economy under the assumption that the government fully controls the agents' savings. When savings are not controlled by the government we show that the result is no longer valid: separability is not sufficient to guarantee that uniform taxes are optimal. If, beyond being separable, preferences over consumption bundles are quasi-homothetic, constrained efficiency of uniform taxes is restored. We also show that optimal taxes on the returns of capital are, in general, different from zero.

1. Introduction

Golosov et al. (2003) have set in motion what is now known as the new dynamic public finance literature. They have explored optimal tax policies in a dynamic Mirrlees (1971) setting where agents' skills are private information and evolve stochastically over time. Among other things, they have proved that, if the government controls the agents' savings, the uniform tax prescription of Atkinson and Stiglitz (1976)—henceforth, AS—extends to this economy. When preferences are separable between leisure and other goods, there is no need to tax goods: the income tax schedule will fully implement the constrained efficient allocation.

In this paper we revisit the problem of optimal supplementary commodity taxation in a dynamic setting. We model an economy very similar to that of Golosov et al. (2003) including an evolving information set for the agents as the crucial dynamic element. We depart from them in assuming that private savings are not directly controlled by the government.[1] This simple and compelling restriction on policy instruments is sufficient to overturn AS.

In a Mirrlees' world, and without loss—as assured by the revelation principle—a direct mechanism may be used to derive the (constrained) optimal allocations. Agents are asked their productivities and, conditional on their announcements, assigned bundles comprised of gross income, which they must produce, and net income to which they are entitled. Truthful announcement of productivities is guaranteed if incentive compatibility constraints are satisfied. Commodity taxation is useful in such a world only if it allows for relaxing the incentive compatibility constraints. This will be the case whenever

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[1] We thus follow Golosov and Tsyvinski (2006).

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the consumption pattern of an agent that announces to be of a certain type differs from that of the agent she claims to be. Consumption patterns would, in this case, signal that the agent is not telling the truth. By making demands, *conditional on expenditures,* independent of labor supply, separability between consumption and leisure rules out differences in choices for fibbers and abiders. Differential taxation is, in this case, useless.

The uniform tax prescription survives in the dynamic setting of Golosov et al. (2003) precisely because, period by period, expenditures are equal to after tax income when the government controls savings.

When the government does not control savings, however, expenditures need not equal after tax income. Therefore, agents that announce falsely need not have the same consumption pattern as the agents they impersonate. The subtlety here is that off-equilibrium announcement strategies imply different savings, hence, different expenditures conditional on the same after tax income. False announcement strategies will thus be accompanied by different consumption choices due to off-equilibrium savings. As in Atkinson and Stiglitz (1976), discouraging the consumption of goods that are relatively more demanded by those who lie helps relax incentive compatibility constraints. The only difference is that this change in consumption is now a result of different savings. Differential taxation of goods may still help separating those who announce truthfully from those who announce falsely.

So far, we have not been specific about how off-equilibrium announcements affect savings. The point is that the violation of AS only depends on recognizing that choices do differ and *not* on how they differ. Tighter prescriptions require knowledge of which deviating strategies bind at the optimum and of the structure of the demands, which depends on the specific details of the model—preferences, distributions of shocks, etc.

As for the taxation of savings, it is how off-equilibrium and equilibrium savings compare which determines whether savings ought to be taxed or subsidized. We present a simple example with only two productivity levels and ex-ante identical agents in which we show that: (i) the only relevant deviating strategy is that of always announcing to have low productivity, and; (ii) savings are always greater off-equilibrium than along the equilibrium path. Punishing deviant behavior is, as a consequence, accomplished by taxing savings. This example is interesting to isolate some of the forces at work but should not be taken as a general prescription of optimal taxation of savings. It is not always the case that savings are higher off the equilibrium path—e.g., see the very illuminating counterexample by Golosov and Tsyvinski (2006).

The rest of the paper is organized as follows. The environment is explained in Section 2. Section 3 presents the planner's problem in game form and discusses the relevant implementation concept to be used in our setting. All the results in the paper are presented in Section 4. Results of Section 4 are illustrated with numerical exercises in Section 5. Extensions, caveats and some clarifications are found in Section 6. Section 7 concludes the paper.

2. The economy

Aside from the existence of side markets for goods and risk-free bonds, the economy is very similar to that of Golosov et al. (2003).[2] The economy is populated by a continuum of agents with a unit measure. Their preferences over deterministic sequences of consumption bundles $c \in \mathbb{R}^n_+$, and effort, $l \in [0, \bar{l}]$, are identical and representable by

$$\sum_{t=1}^{T} \beta^t U(c_t, l_t),$$

where $\beta < 1$, $T \geqslant 2$ and $U(\cdot)$ is a smooth, strictly increasing and strictly concave function.

An agent's type is a vector $\theta^T \in \Theta^T$, $\Theta \equiv \{\theta(1), \ldots, \theta(N)\}$, with $\theta(1) < \theta(2) < \cdots < \theta(N)$, such that the tth component of θ^T, θ_t, is the agent's labor market productivity in period t. In period one, each agent gets an independent draw, θ^T, from the set Θ^T according to the common probability distribution $\mu(\cdot)$. Agents, however, only learn their period t productivity, θ_t, at the beginning of period t, and not before. We call $\theta^t \equiv (\theta_1, \ldots, \theta_t)$ the agent's productivity shock history up to period t. Our assumption on the arrival of information is, therefore, that the agent only knows in period t her history up to period t, θ^t. History θ^i is said to contain history θ^j with $j \leqslant i$ (we write $\theta^j \in \theta^i$ or $\theta^i \ni \theta^j$) if the first j realizations of history θ^i are θ^j. A natural restriction on the agents' actions is that decisions in period t be based only on what the agent knows up to that moment.

Asymmetric information arises in this economy due to the fact that skills are private information.

We assume that the probability distribution, $\mu(\cdot)$, is identical and independent across agents and known from the onset. We use $\mu(\theta^{t+j}|\theta^t)$ to represent the probability of history θ^{t+j} conditional on history θ^t. We also assume that the law of large numbers apply, so that period t cross-sectional distribution of types coincides with the marginal distribution $\mu_t(\theta_t)$.

The economy is divided into two sectors: (i) a production sector, where efficiency units of labor are combined with capital stock to produce consumption goods and capital, and; (ii) a consumption sector where agents costlessly trade consumption goods and a risk-free bond. Risk free bonds pay in units of the numeraire good—namely, good 1—which price we set to 1.

An agent who supplies l units of labor and has skill θ generates $y = l\theta$ efficiency units. Consumption and capital goods are produced from efficiency units and capital with a convex, constant returns to scale technology described

[2] Markets constrain government policies along the lines of Hammond (1979, 1987) and Guesnerie (1981). Our presentation follows Guesnerie (1998), with the necessary adjustments to our multi-period setting.