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Voting over selfishly optimal nonlinear income tax schedules

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ABSTRACT

Majority voting over selfishly optimal nonlinear income tax schedules proposed by a continuum of individuals who have quasilinear-in-consumption preferences is considered. Röell (2012) has shown that individual preferences over these schedules are single-peaked. In this article, a complete characterization of selfishly optimal schedules is provided. Each selfishly optimal schedule has a bunching region in a neighborhood of the proposer's skill type, coincides with the maxi-max schedule below this region, and coincides with the maxi-min schedule above it. Using techniques introduced by Vincent and Mason (1967), the bunching region is identified by solving an unconstrained optimization problem. Information about the optimal schedules is used to provide a relatively simple proof of single-peakedness. The Condorcet-winning tax schedule features marginal tax rates that are negative (resp. positive) on the maxi-max (resp. maxi-min) part of the schedule except at the endpoints of the skill distribution where they are zero.

1. Introduction

An alternative is a Condorcet winner if it does as well as any other alternative under consideration in a pairwise majority vote. Black's Median Voter Theorem (Black, 1948) shows that if individuals have single-peaked preferences, then any most-preferred alternative of a voter with a median preference peak is a Condorcet winner.[1] See, for example, Austen-Smith and Banks (1999) and Persson and Tabellini (2000). A problem that arises when applying Black's Median Voter Theorem to redistributive income tax policy is that individual preferences over feasible tax schedules may fail to be single peaked. For example, Itsumi (1974) and Romer (1975) show that even if the tax schedules are restricted to be linear and to satisfy the government's budget constraint, quite restrictive assumptions on the preferences and skill distribution are needed to ensure single-peakedness.

Using a finite type version of the Mirrlees (1971) model of nonlinear income taxation as in Guesnerie and Seade (1982), Röell (2012) proves that single-peakedness obtains if voting is restricted to the feasible tax schedules that are selfishly optimal for some individual when preferences are quasilinear in consumption.[2] Thus, when voting is restricted in this way, the tax schedule proposed by an individual with the median skill level is the Condorcet winner. Röell also identifies some of the qualitative properties of the selfishly optimal tax schedules without requiring quasilinearity.

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[1] When we refer to preferences as being single peaked, we employ the weak definition of single-peakedness of Austen-Smith and Banks (1999, p. 98). In this definition, an individual may have more than one most-preferred alternative (a plateau) and preferences need only be weakly decreasing as one moves farther from this plateau in either direction.

[2] An earlier version of Röell's article was written in 1996.

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While Röell has identified some of the properties of the selfishly optimal tax schedules, she has not provided a complete characterization of them. Using a continuum-of-types version of her problem, we show that it is possible to provide a *complete* characterization of these tax schedules in the quasilinear case and that this characterization can be used to provide a relatively simple proof that individuals have single-peaked preferences over them. Specifically, we show that each of the selfishly optimal schedules (i) has a region of bunching in a neighborhood of the proposer's skill type, (ii) coincides with the maxi-max schedule below this region, and (ii) coincides with the maxi-min schedule above it. Moreover, using techniques introduced by Vincent and Mason (1967, 1968), we show that the endpoints of this bunching region can be identified by solving a simple unconstrained optimization problem.

As in Röell (2012), we also show that in the majority rule equilibrium, marginal tax rates are negative on the maxi-max part of the schedule and positive on the maxi-min part except at the endpoints of the skill distribution where they are zero. This finding provides support for Director's Law (see Stigler, 1970), which identifies a tendency for democratic governments to redistribute from both the poor and the rich toward the middle class. It also provides some support for why effective marginal tax rates in the United States are negative for low incomes and positive for higher incomes (Congressional Budget Office, 2012).

The extensive literature on redistributive income taxation that builds on the seminal work of Mirrlees (1971) has primarily been normative. In the Mirrlees model, everybody has the same preferences for consumption and labor supply, but they differ in skill levels (their "types") as measured by their labor productivities. While the distribution of these productivities is common knowledge, the value of any individual's productivity is only known to himself. The government chooses a nonlinear income tax schedule to maximize a social welfare function subject to the constraints that (i) each individual optimally chooses his consumption and labor supply given the tax schedule and (ii) the resulting allocation satisfies the government's budget constraint.

In addition to replacing Mirrlees' welfare-maximizing approach with one based on voting, Röell (2012) supplements his two constraints with an additional constraint that guarantees each person a minimum utility. Imposing the minimal-utility constraint limits the degree to which an individual's selfishly optimal tax schedule can exploit low-skilled individuals in order to further his own interests.[3] In the absence of this constraint, it is optimal for any individual to chose a tax schedule for which the adjacent upward incentive constraints bind for all individuals with lower skill levels than his own. In order to show that individual preferences over the selfishly optimal tax schedules are single-peaked when the minimal-utility constraint is also accounted for, Röell assumes that this constraint is slack enough so that this pattern of binding incentive constraints is optimal. As a consequence, the minimum-utility constraint plays a limited role in her analysis. In fact, the qualitative properties of the selfishly optimal tax schedules are the same regardless of whether this constraint is considered. The inclusion of the minimum-utility constraint greatly complicates the analysis, so in order to present our results as simply as possible, we do not impose it. In Brett and Weymark (2016), we show how the selfishly optimal tax schedules must be modified if the minimum-utility constraint is also taken into account. This way of proceeding allows us to precisely identify the role that is played by the minimum-utility constraint.

Single-peakedness of the individual preferences over the set of income tax schedules being voted on is a sufficient condition for the existence of a Condorcet winner; it is not necessary. Provided that individual preferences for consumption and income satisfy the standard single-crossing property introduced by Mirrlees (1971), Gans and Smart (1996) show that if any two of the tax schedules under consideration only cross once, then pairwise majority voting generates a quasitransitive "social" preference on the set of these tax schedules.[4] When there are a finite number of tax schedules being voted on, quasitransitivity is sufficient for the existence of a Condorcet winner.[5] Because there is a continuum of tax schedules in our problem, demonstrating that the tax schedules satisfy the Gans–Smart single-crossing condition would not be sufficient to establish the existence of a Condorcet winner.

A different kind of single-crossing property has been used by Bohn and Stuart (2013).[6] Using a continuum version of the Röell model in which preferences are not required to be quasilinear, they have investigated voting over selfishly optimal income tax schedules and shown that the schedule proposed by the median skill type is a Condorcet winner when the minimum-utility constraint is satisfied. They do not appeal to Black's Median Voter Theorem. Associated with each selfishly optimal income tax schedule is a utility curve that specifies the utility obtained with that schedule as a function of skill type. Bonn and Stuart show that any pair of these utility curves cross only once, which is a single-crossing

[3] Consumption must be nonnegative, so even the low-skilled individuals can afford to pay their income taxes. Even with a positive revenue requirement, a minimal-utility constraint simply limits the amount of redistribution that can take place.

[4] A weak preference relation is quasitransitive if the strict preferences are transitive.

[5] The Gans–Smart result generalizes related results in Roberts (1977) for linear income taxes. The single-crossing property of linear income tax schedules is illustrated in Austen-Smith and Banks (1999, pp. 113–115) and Persson and Tabellini (2000, pp. 118–121) using specific functional forms. As Gans and Smart (1996) note, the single-crossing tax schedule condition is equivalent to the schedules being completely ordered in terms of their progressivity and to the requirement that the individuals choose incomes that are nondecreasing in the skill level regardless of what tax schedule they face, a property that Roberts (1977) calls Hierarchical Adherence. Berliant and Gouveia (2001) have developed sufficient conditions for single-crossing income tax schedules in a model in which the set of skill types is a finite sample from a known distribution, the government's revenue requirement depends on the realized distribution, and voting takes place before the voters know what distribution is realized.

[6] Bohn and Stuart (2013) is a revised version of Bohn and Stuart (2002), and so both their analysis and that of Röell predate this article by many years.

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