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Progressive taxation in a tournament economy☆

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ABSTRACT

Not enough is known about the responsiveness of individuals, in particular those who work under different incentives, to changes in marginal tax rates. We ask whether changes in tax rates are less distortionary for workers engaged in a contest. To examine this potential rationale for a more progressive tax code, we first model the effort decisions of workers faced with progressive taxation under tournaments and piece rates. Because of the difficulty identifying any distortion that may be induced by the tax code in naturally occurring data, we then report on the results of a real-effort experiment based on this model. Consistent with a behavioral approach to public finance, we find that competitive tournament workers are less sensitive and hint, in our discussion, at the possible welfare benefits of progressive taxation in tournament economies.

1. Introduction

Renewed interest in the social and economic consequences of unequal income distribution has also stimulated new discussion about the costs and benefits of progressive taxation. In most but not all contributions to the literature, taxation is the means to income redistribution, the utilitarian benefits of which are weighed against various disincentive effects, the "leaks" in Okun's (1975) proverbial bucket. Diamond and Saez's (2011) much-cited recent case for high and rising marginal tax rates for high income earners is one of hundreds, if not thousands, of examples. A second, less common, approach emphasizes the provision of public goods in an unequal world, including, but not limited to, their redistributive properties, and derives the tax schedule as a solution to the "financing problem." In either case, however, the choice of schedule turns, in part, on the responsiveness of income earners to variations in marginal tax rates. Our purpose in this paper is to draw attention to an important lacuna in the characterization of this response.

A number of recent studies have found that wage earners are less "tax sensitive" than once believed. Goolsbee 's (2000) influential paper on executive compensation, for example, finds little or no evidence that taxable income decreases in the medium run, and identifies "compensation timing" as the source of almost all short term variation. Like other contributions to the "elasticities approach" (Piketty et al., 2014; Saez, 2001), however, these are reduced form estimates and so we know much more about the magnitude of the response than its explanation.

The surprise, perhaps, is how few structural models are available to empirical researchers. Keane's (2011) authoritative review of the literature explores the empirical implications of three distinct models (static, simple life-cycle and life-cycle with human capital accumulation) but in each of these, the representative worker sells "labor time" in return for a fixed wage or time rate. Lemieux et al. (2009), however, find that more than 40% of male household heads in their PSID sample received some sort of "performance pay," a number that does not include, among others, those on promotion

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ladders whose income at each "rung" is more or less fixed. Furthermore, performance is often measured not in times of hours or weeks, but effective effort. Corroborating this, Lazear and Shaw (2007) show that the use of performance pay is not just at a high level, it is increasing. From the late 1980s through the 1990s, the share of large firms using performance pay has grown from roughly a third to two-thirds. In other words, characterizing the response of workers to changes in the tax code is likely to be incomplete if the incentives encompassed by pay-for-performance schemes, like tournaments, are ignored.

Our emphasis on tournaments reflects two considerations. First, consistent with one of Lazear and Rosen's (1981) initial motivations for their model, tournaments are often used to characterize compensation schemes that rely on bonuses or other performance-related rewards. Second, as Lazear and Oyer (2004) remind us, tournaments also capture several characteristic features of internal labor markets, in which the prizes are promotions to higher levels. Viewed from this perspective, the scope of our work is much broader than workers seeking bonuses: as Osterman and Burton (2009) observe, internal labor markets remain an important feature of the economic landscape.

Our conjecture is that tournament workers are less sensitive to changes in marginal tax rates for at least two reasons. First, when marginal rates are high, differences in prizes are smaller, and further incremental changes in the tax code should have a smaller effect. Second, tournament workers are competitive, and often find additional motivation in the "joy of winning." This encourages hard work even when incentives are blunted and further mitigates the effects of tax code changes. We posit, in short, that standard theoretical predictions about the disincentive effects of progressive taxation overstate their practical consequences for workers preoccupied with tournaments.

A more complete understanding of the incentive effects of progressive taxation in this setting therefore requires models that incorporate three basic features: alternative compensation schemes, possible behavioral influences on tax responsiveness and, in some cases, variation in effort rather than hours. The model in the next section is a first step in this direction. Building on the recent work of Persson and Sandmo (2005), we focus on the effort choices of tournament workers under different tax regimes, compared to a piece rate benchmark, with some allowance for worker competitiveness.

Because of all the standard difficulties with making inferences from observational data (e.g., selection, measurement error and endogeneity) we then turn to the experimental lab to offer a first test of our conjecture. To increase the external validity of our data, however, we conduct a real effort experiment designed to explore some of the model's implications. We compare effort choices under two tax regimes, one more progressive than the other, and under two compensation schemes, a simple piece rate and a tournament. An incidental but important feature of our design is that tax revenues are neither redistributed nor assumed to vanish into some "fiscal black hole," as in the past but are instead used to fund a public good whose benefits are salient to workers. We also collect data on individual characteristics and beliefs, including gender, competitiveness and political views.

Our main result is that while the introduction of more progressive taxes causes some distortion (effort does fall) under both compensation schemes, the difference-in-differences is negative; that is, it falls much less (indeed, in a statistical sense, almost not at all) under the tournament. In short, we find that the response of tournament workers is almost inelastic, a provocative result with profound implications for public finance. For example, if the executives Goolsbee (2000) studied were competitive tournament workers, the observation that their labor incomes are tax insensitive comes as no surprise.

We are not the first, of course, to explore the effects of tax changes in an experimental setting. It is important to note, for example, that our piece rate experiment replicates to a great extent what others have found. This increases the internal validity of our results by suggesting there is nothing idiosyncratic about our design. Sutter and Weck-Hannemann (2003), for example, find that individual effort falls as tax rates increase, but that the reduction is smaller when tax decisions are made behind the veil of ignorance. Ottone and Ponzano (2007) also find significant effort reductions but, in their case, the effect is limited to high tax rates (70%, for example). Working with a much larger sample, Levy-Garboua et al. (2009)reach a similar conclusion, and provide some evidence that it owes as much to fairness norms as the traditional logic of labor/leisure tradeoffs. No less important for our work, there is also some experimental evidence that it isn't just the effective tax rate, but the progressivity of the entire tax code, that matters. Swenson (1988), for example, increased the tax rate and, as a consequence of a budget-balancing lump sum element of the code, its progressivity, and found a significant decline in effort. In a series of experiments, Sillamaa (1999a,b,c) replicated Swenson's results and showed that a more progressive code (implemented through the construction of a Hausman equivalent code as a control) also reduced effort.

Our own design, discussed in more detail in the third section, differs from the others in at least three important dimensions. First, consistent with the previous discussion, we considered both piece rates (linking our results to the existing literature) and tournaments, our focus. Second, our treatment of taxes is more expansive: the convention has been to treat taxation as either confiscation (Levy-Garboua et al., 2009; Sutter and Weck-Hannemann, 2003) or redistribution (Ottone and Ponzano, 2007; Sillamaa, 1999a,b,c; Swenson, 1988) but in our experiment (much like Ortona et al., 2011 or Ottone and Ponzano, 2011), revenues are used to fund a proper public good, one that is optimal to provide and vulnerable to free-riding. Third, we felt it important, if somewhat less transparent, for our participants to interact with the tax code itself, and not, as in almost all previous experiments, with a schedule of after-tax wages.

2. Progressive taxation and tournament incentives

To formalize our intuition that the distortionary effects of progressive taxation can be smaller when three workers vie for a prize (e.g., a bonus or promotion), we extend the recent model of Persson and Sandmo (2005) in several directions. Given the details of our design, however – we do not induce the cost of effort or "competitiveness weights," for example, nor do we observe the noise in effort – the model is intended to motivate the logic of observed behavior. With this in mind, consider a representative firm with three workers, each of whom produces output $x_i = e_i + \epsilon_i$, where e_i is normalized effort and ϵ_i is an independent draw from a symmetric (around zero) distribution H with continuous density h.

Each worker confronts the simplest possible progressive tax schedule, in which the total tax burden τ_i is equal to $tx_i - f$ where t denotes the marginal tax rate and f a lump-sum allowance. For given f, the average tax rate increases with income, consistent with standard notions of progressivity.[1] It follows that an increase in t is both an increase in the marginal tax rate and the progressivity of the entire tax code. In contrast to Persson and Sandmo (2005), workers in our model also receive public good benefits equal to a fraction $\alpha < \frac{1}{N}$ of total tax revenues $t\left(\sum_j x_j\right) - 3f$. Workers are also assumed to be risk neutral, and to exhibit a standard quadratic cost of effort schedule, $\frac{1}{2}ke_i^2$ where k determines the slope of the marginal cost function.

[1] More specifically, where workers are paid a unit piece rate, for example, the average tax rate is just $\frac{tx_i - f}{x_i}$, which is increasing in x_i.