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Abstract

We examine a dynamic model of optimal nonlinear taxation of labor income and savings, in which there are two political parties: left-wing and right-wing. The parties differ only in their redistributive preferences, with the left-wing party having a stronger preference for redistribution. Our analysis explicitly considers the possibility that society's preference for redistribution may change, as reflected in its future voting behavior. The incumbent government respects the possibility that society's preference may change, and sets taxes to maximize expected social welfare. Our main result is that an incumbent left-wing (resp. right-wing) government will implement a regressive (resp. progressive) savings tax policy. The incumbent government implements this policy not out of self interest, but to accommodate the redistributive goals of the opposing party.

Keywords: Nonlinear Taxation; Redistribution; Normative Taxation.

JEL Classifications: H21; H24.

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1 Introduction

This paper is motivated by the following observations: an incumbent government may choose to set taxes based only on its own preference for redistribution, since it has after-all been elected and in that sense its preference for redistribution is supported by society. Therefore, the incumbent government might argue, with some justification, that it has a mandate to implement its preferred policies. However, tax policies implemented today will affect outcomes in the future; and it is possible that society's preference for redistribution may change, i.e., the incumbent government might not be re-elected. Accordingly, one could argue that when setting taxes the incumbent government should take into account the possibility that society's preference may change. We believe this latter approach is more consistent with the notion of optimal taxation, which is normative in nature in that it is concerned with how the government *should* set taxes.[1] The optimal tax literature typically assumes that the government should implement the tax system that is most preferred by society (i.e., that which maximizes social welfare). This implies that if society's preferences change, the tax system should correspondingly change as well. Our aim is to investigate optimal taxation when the incumbent government respects the possibility that society's preference for redistribution may change.

We consider a dynamic model in which there are two political parties, left-wing and right-wing, who are distinguished only by their preferences for redistribution from high-skill to low-skill individuals. The left-wing party has a stronger preference for redistribution than the right-wing party. The model economy has two periods, which can be interpreted as representing the 'present' versus the 'future'. In period 1 there is some probability that the incumbent government (which is either the left-wing or right-wing party) will be re-elected in period 2. In our model, this is equivalent to there being some probability that society's preference for redistribution may change. In period 1, the incumbent government implements optimal nonlinear (Mirrlees (1971) style) taxation on labor income and savings, while in period 2 the elected government

[1] Alternatively, positive analyses of taxation seek to understand how taxes are actually set, rather than how taxes should be set. Positive analyses therefore consider the possibility that governments may act out of self interest, or more generally may not necessarily act to maximize social welfare.

implements optimal nonlinear taxation on labor income. As period 2 is the last period, there are no savings undertaken in that period. Our assumption that the government can implement fully-general nonlinear taxation reflects the normative nature of taxation in our model.[2]

Our main result is that an incumbent left-wing government will implement a regressive savings taxation policy, in that low-skill individuals face a positive marginal tax rate on their savings, whereas high-skill individuals face a negative marginal tax rate. An incumbent right-wing government will do the opposite, i.e., it implements progressive savings taxation: low-skill individuals face a negative marginal savings tax rate, while that for high-skill individuals is positive. The intuition, explained in further detail below, follows from each government type's desire to shift the individuals' consumption between periods, in response to the possibility that it may not be in power in period 2. Importantly, however, this consumption shifting is not undertaken by the incumbent government out of self interest; it is done to accommodate the redistributive goals of the opposing party. Indeed, in the absence of such accommodation, the Atkinson and Stiglitz (1976) result that savings should not be taxed alongside nonlinear income taxation would apply.

There is a literature that examines optimal taxation when individuals have different preferences (e.g., Diamond and Spinnewijn (2011), Golosov, et al. (2013), and Krause (2014)), and when the government's preferences differ from those of individuals (e.g., Racionero (2001), Blomquist and Micheletto (2006), and O'Donoghue and Rabin (2006)). But to the best of our knowledge, this paper is the first to consider the possibility that society's preference for redistribution may change over time. The literature on the comparative statics of optimal nonlinear income taxes (e.g., Weymark (1987) and Simula (2010)) has examined the effects of changing the weights in the social welfare function, but their models are static so there are no savings. Our paper is also related to the extensive literature on the optimal taxation of capital/savings. Since Chamley (1986) and Judd (1985), the canonical result has been that capital should not be taxed

[2]By contrast, positive analyses of taxation often consider restrictions on the tax instruments that the government can implement, say due to political constraints.

in the long run, i.e., the optimal steady-state tax rate on capital is zero. Subsequently, a literature has arisen identifying exceptions to the Chamley-Judd result (see, e.g., Conesa, et al. (2009) and the references cited therein). Our paper contributes to that literature by identifying a new rationale for taxing/subsidizing savings. More recently, Scheuer and Wolitzky (2015) examine sustainable capital taxation policy, in that a policy is sustainable if it garners sufficient support in the future to prevent a reform. While interesting, their analysis is more positive than normative in nature, because a social-welfare maximizing government would almost always want to implement the reform.

The remainder of the paper is organized as follows. Section 2 presents the main features of our model, while Section 3 describes how optimal taxation is implemented. Section 4 presents and discusses our quantitative results, while Section 5 concludes. Some mathematical details regarding the derivation of optimal marginal tax rates are contained in an appendix.

2 Preliminaries

There is a unit measure of individuals, with a proportion $\phi \in (0,1)$ being high-skill workers and $(1-\phi)$ being low-skill workers. Type 1 individuals are low-skill and type 2 individuals are high-skill, with w_1 and w_2 $(0 < w_1 < w_2)$ denoting the wages of low-skill and high-skill individuals respectively. There are two political parties, left-wing (denoted L) and right-wing (denoted R), who differ only in their preference for redistribution from high-skill to low-skill individuals, with the left-wing party having a stronger preference. The economy lasts for two periods, which can be thought of as the 'present' versus the 'future'.[3] In period 1 there is an incumbent government, which is either the left-wing or right-wing party. The probability that the incumbent government, party i ($i = L$ or R), is re-elected in period 2 is $p_i \in (0,1)$, implying that $(1-p_i)$ is the probability that the opposing party is elected. This probability is completely exogenous, i.e., the incumbent

[3] As a practical matter, assuming a finite time horizon is necessary because it will be seen that the optimal tax problem must be solved by backward induction.

government cannot affect its chances of re-election.[4]

All individuals have the same preferences, which can be represented by the utility function:

$$u(c_{ki}^1) - v(l_{ki}^1) + \delta \left[u(c_{kj}^2) - v(l_{kj}^2)\right] \tag{2.1}$$

where c_{ki}^1 and l_{ki}^1 are, respectively, type k's ($k = 1$ or 2) consumption and labor in period 1 when party i ($i = L$ or R) is in government. Analogously, c_{kj}^2 and l_{kj}^2 are type k's consumption and labor in period 2 when party j ($j = L$ or R) is in government. The function $u(\cdot)$ is increasing and strictly concave, $v(\cdot)$ is increasing and strictly convex, and $\delta \in (0, 1]$ is the individuals' discount factor. Individuals may save in period 1, denoted s_{ki}^1, which raises their consumption in period 2 by $(1 + r)s_{ki}^1$, where $r > 0$ is the market interest rate. For future reference, we use m_{ki}^t to denote type k's post-tax income in period t when party i is in government, and y_{ki}^t to denote type k's pre-tax income in period t when party i is in government (where $y_{ki}^t = w_k l_{ki}^t$).

3 Optimal Taxation

As our model is dynamic, the question arises as to whether the incumbent government can implement what Gaube (2007) calls 'long-term' versus 'short-term' taxation. If the incumbent government announces its tax systems for periods 1 and 2, and if re-elected in period 2 it simply implements the tax system it promised in period 1, then the incumbent government can commit to long-term taxation. On the other hand, if the incumbent government is re-elected and it implements a tax system in period 2 independent of any announcements made in period 1, then it is using short-term taxation. That is, the re-elected government sets taxes in period 2 in the same manner as the opposing party will if it is elected. Since long-term or short-term taxation may be practised, we examine both systems.

3.1 Long-term Taxation

As the optimal tax problem is solved by backward induction, we first describe the nature

[4] To assume otherwise would be to introduce a positive element into the analysis, as the incumbent government may then set taxes to increase its chances of re-election.

of optimal taxation in period 2. Suppose party i ($i = L$ or R) was in government in period 1, but the opposing party $j \neq i$ ($j = L$ or R) is in government in period 2. It implements optimal nonlinear labor income taxation by choosing tax treatments $\langle m_{1j}^2, y_{1j}^2 \rangle$ and $\langle m_{2j}^2, y_{2j}^2 \rangle$ for the low-skill and high-skill individuals, respectively, to maximize:

$$\pi_j(1-\phi)\left\{u(m_{1j}^2 + (1+r)s_{1i}^1) - v\left(\frac{y_{1j}^2}{w_1}\right)\right\} + (1-\pi_j)\phi\left\{u(m_{2j}^2 + (1+r)s_{2i}^1) - v\left(\frac{y_{2j}^2}{w_2}\right)\right\} \tag{3.1}$$

subject to:

$$(1-\phi)\left[y_{1j}^2 - m_{1j}^2\right] + \phi\left[y_{2j}^2 - m_{2j}^2\right] \geq 0 \tag{3.2}$$

$$u(m_{2j}^2 + (1+r)s_{2i}^1) - v\left(\frac{y_{2j}^2}{w_2}\right) \geq u(m_{1j}^2 + (1+r)s_{2i}^1) - v\left(\frac{y_{1j}^2}{w_2}\right) \tag{3.3}$$

where equation (3.1) is a *weighted* utilitarian social welfare function, with $\pi_j \in (0,1)$ representing the weight that party j places on the welfare of low-skill individuals. It is assumed that $\pi_L > \pi_R$, to capture the assumption that the left-wing party has a stronger preference for redistribution than the right-wing party. Note that $c_{kj}^2 = m_{kj}^2 + (1+r)s_{ki}^1$, i.e., type k's second-period consumption equals their second-period post-tax income plus the return on savings undertaken in period 1 when party i was in government. Equation (3.2) is the government's budget constraint. For simplicity we assume that the government's revenue requirement is zero, so taxation is implemented only for redistributive purposes.[5] Equation (3.3) is the high-skill type's incentive-compatibility constraint.[6] At this point an interesting issue arises regarding the information available to the government in period 2. Based on the individuals' responses to taxation in period 1, the government in period 2 can distinguish high-skill from low-skill individuals, and therefore could use (first-best) personalized lump-sum taxes and transfers. However, our interest is in standard information-constrained (second-best) nonlinear income taxation.

[5] While it may be more realistic to assume that a left-wing government has a higher revenue requirement than a right-wing government, we would like to compare their tax policies on the same basis. Accordingly, we assume that both parties have the same revenue requirement, and for simplicity this revenue requirement is set to zero.

[6] We make the standard assumption that the redistributive goals of the government imply that high-skill individuals may want to mimic low-skill individuals, but not vice versa. Therefore, only the high-skill type's incentive-compatibility constraint will be binding. This is what Stiglitz (1982) calls the 'normal' case and what Guesnerie (1995) calls 'redistributive equilibria'.

Accordingly, we assume that the government in period 2 implements nonlinear income taxation, rather than exploit skill-type information revealed in period 1 to implement first-best taxation in the second period.[7]

The solution to the second-period optimal tax problem yields functions for the choice variables, $m^2_{1j}(\pi_j, \phi, r, s^1_{1i}, w_1, s^1_{2i}, w_2)$, $y^2_{1j}(\cdot)$, $m^2_{2j}(\cdot)$, and $y^2_{2j}(\cdot)$, as well as the value function $W^2_j(\cdot)$ which represents the level of social welfare attainable in period 2 when party j is in government.

In period 1 the incumbent government, party i, can by assumption implement long-term taxation. It therefore chooses long-term tax treatments $\langle m^1_{1i}, s^1_{1i}, y^1_{1i}, m^2_{1i}, y^2_{1i}\rangle$ and $\langle m^1_{2i}, s^1_{2i}, y^1_{2i}, m^2_{2i}, y^2_{2i}\rangle$ to maximize:

$$\pi_i(1-\phi)\left\{u(m^1_{1i}-s^1_{1i})-v\left(\frac{y^1_{1i}}{w_1}\right)\right\}+(1-\pi_i)\phi\left\{u(m^1_{2i}-s^1_{2i})-v\left(\frac{y^1_{2i}}{w_2}\right)\right\}+(1-p_i)\delta W^2_j(\cdot)$$

$$+\,p_i\delta\left[\pi_i(1-\phi)\left\{u(m^2_{1i}+(1+r)s^1_{1i})-v\left(\frac{y^2_{1i}}{w_1}\right)\right\}+(1-\pi_i)\phi\left\{u(m^2_{2i}+(1+r)s^1_{2i})-v\left(\frac{y^2_{2i}}{w_2}\right)\right\}\right] \tag{3.4}$$

subject to:

$$(1-\phi)\left[y^1_{1i}-m^1_{1i}\right]+\phi\left[y^1_{2i}-m^1_{2i}\right]\geq 0 \tag{3.5}$$

$$(1-\phi)\left[y^2_{1i}-m^2_{1i}\right]+\phi\left[y^2_{2i}-m^2_{2i}\right]\geq 0 \tag{3.6}$$

$$u(m^1_{2i}-s^1_{2i})-v\left(\frac{y^1_{2i}}{w_2}\right)+p_i\delta\left\{u(m^2_{2i}+(1+r)s^1_{2i})-v\left(\frac{y^2_{2i}}{w_2}\right)\right\}+(1-p_i)\delta V^2_{2j}(\cdot)\;\geq$$

$$u(m^1_{1i}-s^1_{1i})-v\left(\frac{y^1_{1i}}{w_2}\right)+p_i\delta\left\{u(m^2_{1i}+(1+r)s^1_{1i})-v\left(\frac{y^2_{1i}}{w_2}\right)\right\}+(1-p_i)\delta\widehat{V}^2_{2j}(\cdot) \tag{3.7}$$

where equation (3.4) is a weighted utilitarian social welfare function, with $c^1_{1i}=m^1_{1i}-s^1_{1i}$ and $c^1_{2i}=m^1_{2i}-s^1_{2i}$. The incumbent government considers the (exogenous) probability that it will be re-elected, and can therefore implement its planned tax system in period 2; but also the probability that the opposing party will be elected in period 2, and social welfare will be W^2_j. Equations (3.5) and (3.6) are, respectively, the incumbent

[7] In other words, we are assuming that the government can commit to not use skill-type information revealed by the individuals. Papers that relax the commitment assumption include Apps and Rees (2006), Berliant and Ledyard (2014), Brett and Weymark (2008a), Krause (2009), and Guo and Krause (2011, 2013, 2014, 2015a, 2015b), among others.

government's first- and second-period budget constraints.[8] Equation (3.7) is the high-skill type's incentive-compatibility constraint, where:

$$V_{2j}^2(\cdot) = u(m_{2j}^2(\cdot) + (1+r)s_{2i}^1) - v\left(\frac{y_{2j}^2(\cdot)}{w_2}\right) \tag{3.8}$$

$$\widehat{V}_{2j}^2(\cdot) = u(m_{1j}^2(\cdot) + (1+r)s_{1i}^1) - v\left(\frac{y_{1j}^2(\cdot)}{w_2}\right) \tag{3.9}$$

for $i \neq j$. In order for a high-skill individual to be willing to choose tax treatment $\langle m_{2i}^1, s_{2i}^1, y_{2i}^1, m_{2i}^2, y_{2i}^2\rangle$ rather than $\langle m_{1i}^1, s_{1i}^1, y_{1i}^1, m_{1i}^2, y_{1i}^2\rangle$, their expected utility from choosing the former must be greater than or equal to their expected utility from choosing the latter. Notice that if a high-skill individual does pretend to be low-skill by choosing $\langle m_{1i}^1, s_{1i}^1, y_{1i}^1, m_{1i}^2, y_{1i}^2\rangle$ in period 1, they must also choose the low-skill type's tax treatment in period 2 even if there is a change in government (cf. equation (3.9)). This is because the government in period 2 will know what choices the individuals made in period 1. Therefore, all individuals must choose the same type's tax treatment in period 2 as they did in period 1.

3.2 Short-term Taxation

If the incumbent government can only implement short-term taxation, then the government in period 2, whether it be the re-elected incumbent or the opposing party, will solve program (3.1) − (3.3) in period 2. In period 1 the incumbent government, party i, implements optimal nonlinear taxation on labor income and savings. It chooses tax treatments $\langle m_{1i}^1, s_{1i}^1, y_{1i}^1\rangle$ and $\langle m_{2i}^1, s_{2i}^1, y_{2i}^1\rangle$ to maximize:

$$\pi_i(1-\phi)\left\{u(m_{1i}^1 - s_{1i}^1) - v\left(\frac{y_{1i}^1}{w_1}\right)\right\} + (1-\pi_i)\phi\left\{u(m_{2i}^1 - s_{2i}^1) - v\left(\frac{y_{2i}^1}{w_2}\right)\right\} + p_i\delta W_i^2(\cdot) + (1-p_i)\delta W_j^2(\cdot) \tag{3.10}$$

subject to:

$$(1-\phi)\left[y_{1i}^1 - m_{1i}^1\right] + \phi\left[y_{2i}^1 - m_{2i}^1\right] \geq 0 \tag{3.11}$$

$$u(m_{2i}^1 - s_{2i}^1) - v\left(\frac{y_{2i}^1}{w_2}\right) + p_i\delta V_{2i}^2(\cdot) + (1-p_i)\delta V_{2j}^2(\cdot) \geq u(m_{1i}^1 - s_{1i}^1) - v\left(\frac{y_{1i}^1}{w_2}\right) + p_i\delta\widehat{V}_{2i}^2(\cdot) + (1-p_i)\delta\widehat{V}_{2j}^2(\cdot) \tag{3.12}$$

[8] For simplicity, we assume that the government cannot save or borrow.

where equation (3.10) is a weighted utilitarian social welfare function. The incumbent government considers the (exogenous) probability that it will be re-elected, and therefore can achieve a level of social welfare equal to W_i^2 in period 2, but also the probability that the opposing party will be elected in period 2, and social welfare will be W_j^2. Equation (3.11) is the incumbent government's budget constraint, and equation (3.12) is the high-skill type's incentive-compatibility constraint, where:

$$V_{2i}^2(\cdot) = u(m_{2i}^2(\cdot) + (1+r)s_{2i}^1) - v\left(\frac{y_{2i}^2(\cdot)}{w_2}\right) \tag{3.13}$$

$$\widehat{V}_{2i}^2(\cdot) = u(m_{1i}^2(\cdot) + (1+r)s_{1i}^1) - v\left(\frac{y_{1i}^2(\cdot)}{w_2}\right) \tag{3.14}$$

In order for a high-skill individual to be willing to choose tax treatment $\langle m_{2i}^1, s_{2i}^1, y_{2i}^1\rangle$ rather than $\langle m_{1i}^1, s_{1i}^1, y_{1i}^1\rangle$, the utility obtained in period 1 from choosing $\langle m_{2i}^1, s_{2i}^1, y_{2i}^1\rangle$ plus the utility they can then expect in period 2, $p_i\delta V_{2i}^2 + (1-p_i)\delta V_{2j}^2$, must be greater than or equal to their expected utility from pretending to be low-skill.

4 Model Calibration and Quantitative Results

Despite the model's simple appearance, solving it analytically is exceptionally difficult because the solution depends upon the comparative statics of a second-best optimal nonlinear income tax system. The literature on the comparative statics of optimal nonlinear income taxes has found that analytical results are obtainable only when the utility function is quasi-linear, and even then only with respect to certain parameters.[9] Accordingly, we do not attempt to derive analytical solutions, but instead use numerical methods to obtain our results. To this end, we assume that the utility function takes the form:

$$u(c_{ki}^t) - v(l_{ki}^t) = \frac{(c_{ki}^t)^{1-\sigma}}{1-\sigma} - \frac{(l_{ki}^t)^{1+\gamma}}{1+\gamma} \tag{4.1}$$

where $\sigma > 0$ is the individuals' coefficient of relative risk aversion, and $1/\gamma > 0$ is the individuals' labor supply elasticity. Based on Chetty (2006), we postulate that $\sigma = 1$

[9] See, for example, Weymark (1987), Brett and Weymark (2008b, 2011), and Simula (2010).

which implies that $u(c_{ki}^t) = \log(c_{ki}^t)$. While empirical estimates of the labor supply elasticity can vary considerably, based on Chetty, et al. (2011) we set $\gamma = 2$ which implies a labor supply elasticity of 0.5.

Across countries, approximately one-third of persons aged 25-64 years have attained tertiary level education (OECD, 2014). We assume that tertiary educated individuals are high-skill and the remainder are low-skill, i.e., $\phi = 1/3$. We normalize the low-skill type's wage to unity and set the high-skill type's wage equal to 1.6, which is based on an estimated college wage premium of 60% (see Fang (2006) and Goldin and Katz (2007)). Since there is no direct observation on the welfare weights, our benchmark parameterization arbitrarily sets $\pi_L = 0.52$ and $\pi_R = 0.48$, so that the left-wing party is slightly more redistributive than pure utilitarianism, while the right-wing party is slightly less. In addition, the probability that the incumbent government is re-elected is arbitrarily set at 0.5. We assume an annual market interest rate of 4%, which is in line with standard practice, but we take each period to be four years in length (which is roughly the length of a term in government). Therefore, $1+r = 1.17$. Finally, we assume that the individuals' discount factor, δ, is equal to $1/(1+r)$. The baseline parameter values are presented in Table 1.

Before proceeding to our results, in Table 2 we confirm that under pure utilitarianism ($\pi_L = \pi_R = 0.5$) the optimal marginal tax rate applicable to type k's savings (denoted $MTRS_k^1$) is zero.[10] This result follows from Atkinson and Stiglitz (1976), who show that commodity taxation is redundant alongside nonlinear income taxation if labor is separable from consumption in the utility function and all individuals have the same preferences. We also obtain the standard results on the optimal marginal tax rate applicable to type k's labor income in period t, denoted as $MTRL_k^t$ — the optimal marginal tax rate applicable to the high-skill type's labor income is zero, while that for low-skill individuals is positive.

4.1 Baseline Results

Tables 3 and 4 report the baseline results for long-term taxation and short-term taxation, respectively. As it turns out, the results are qualitatively the same in both cases.

[10] Derivations of expressions for the marginal tax rates are provided in the appendix.

Specifically, the optimal marginal tax rates applicable to the labor income of type k individuals in period t under a i-wing government (denoted $MTRL^t_{ki}$) are standard. That is, the optimal marginal tax rate applicable to the high-skill type's labor income is always zero, while that for low-skill individuals is always positive. What is more interesting are the optimal tax treatments of savings (denoted $MTRS^1_{ki}$), which we summarize as follows:

Result 1 *If the incumbent party is left-wing, the low-skill individuals' optimal marginal tax rate on savings is positive* ($MTRS^1_{1L} > 0$) *while that for high-skill individuals is negative* ($MTRS^1_{2L} < 0$). *If the incumbent party is right-wing, the low-skill individuals' optimal marginal tax rate on savings is negative* ($MTRS^1_{1R} < 0$) *while that for high-skill individuals is positive* ($MTRS^1_{2R} > 0$).

In sum, an incumbent left-wing government will set taxes to discourage savings by low-skill individuals and subsidize savings by high-skill individuals, while an incumbent right-wing government will do the opposite. The intuition underlying Result 1 follows from an important but somewhat overlooked feature of redistributive taxation, in that it redistributes utility, not income. Indeed, in a static setting low-skill individuals receive *less* post-tax income under a left-wing government than under a right-wing government, but higher utility owing to much lower labor supply. As a left-wing government seeks to redistribute more utility than a right-wing government, high-skill individuals have a stronger incentive to mimic under left-wing governments. Therefore, a greater reduction in the post-tax income of low-skill individuals helps a left-wing government deter mimicking behavior. To understand how this feature of redistributive taxation drives Result 1, suppose the incumbent government is right-wing. An incumbent right-wing government knows there is some probability that the left-wing party will be in power in period 2, and that the left-wing party will need to increase the difference in the post-tax incomes of high-skill and low-skill individuals to deter mimicking. By encouraging savings by low-skill individuals and discouraging savings by high-skill individuals, the incumbent right-wing government is helping the left-wing party in period 2, because the latter can raise the difference in the two type's post-tax incomes without there being a corresponding increase in consumption discrepancy. The cost of this savings tax policy is

increased utility inequality in period 1, due to lower consumption by low-skill individuals and higher consumption by high-skill individuals. But since the incumbent government is right-wing, it is more willing to tolerate this rise in inequality. A reverse argument applies if the incumbent government is left-wing. An incumbent left-wing government knows there is some probability that the right-wing party will be elected in period 2. As the right-wing party redistributes less, it has a lower need to differentiate the two type's post-tax incomes. It is therefore in a better position to inherit lower savings by low-skill individuals and higher savings by high-skill individuals. Moreover, this savings pattern implies more consumption by low-skill individuals and less consumption by high-skill individuals in period 1, which is more preferable under a left-wing government because it reduces utility inequality.

4.2 Comparative Statics

Figures $1-3$ show how the optimal marginal tax rates applicable to savings change in response to changes in the parameters that are specific to our model: the social welfare weights π_i and the probability that the incumbent government is re-elected p_i. The effects of changes in these parameters are explored, whilst holding all other parameters at their baseline levels. As the results for long-term and short-term taxation are qualitatively the same, we present only the long-term taxation results. The main findings are summarized as follows:

Result 2 *If the incumbent party is left-wing,* $\partial MTRS^1_{1L}/\partial \pi_L > 0$ *and* $\partial MTRS^1_{2L}/\partial \pi_L < 0$. *If the incumbent party is right-wing,* $\partial MTRS^1_{1R}/\partial \pi_L < 0$ *and* $\partial MTRS^1_{2R}/\partial \pi_L > 0$.

Result 3 *If the incumbent party is left-wing,* $\partial MTRS^1_{1L}/\partial \pi_R < 0$ *and* $\partial MTRS^1_{2L}/\partial \pi_R > 0$. *If the incumbent party is right-wing,* $\partial MTRS^1_{1R}/\partial \pi_R > 0$ *and* $\partial MTRS^1_{2R}/\partial \pi_R < 0$.

Result 4 *If the incumbent party is left-wing,* $\partial MTRS^1_{1L}/\partial p_L < 0$ *and* $\partial MTRS^1_{2L}/\partial p_L > 0$. *If the incumbent party is right-wing,* $\partial MTRS^1_{1R}/\partial p_R > 0$ *and* $\partial MTRS^1_{2R}/\partial p_R < 0$.

The intuition underlying Results $2-4$ is straightforward and follows that underlying Result 1. An increase in π_L implies, *ceteris paribus*, a greater difference in the redistributive preferences of left-wing and right-wing governments. Therefore, the differences in the optimal marginal tax rates applicable to the low-skill and high-skill types' savings are increased. Analogously, an increase in π_R reduces the difference in the two partys'

redistributive preferences; hence the differences in the optimal marginal tax rates on savings are reduced. An increase in the probability that the incumbent government is re-elected reduces the differences in the optimal marginal tax rates applicable to savings. If the incumbent government is more likely to be re-elected, it has less need to implement marginal savings taxation/subsidization to accommodate the redistributive goals of the opposition.

5 Summary and Conclusion

Research on tax policy from a normative perspective is ultimately concerned with making recommendations as to how the government should set taxes. It is generally thought that the government should implement the tax system that is most preferred by the society. This corresponds to choosing the tax system that maximizes social welfare, assuming that the social welfare function represents the society's preferences. As tax policies implemented in the present can affect outcomes in the future, and society's preferences may change, it follows that the incumbent government should take the possibility of such change into consideration when setting taxes.

In this paper, we have examined the case in which society's preference for redistribution may change. The incumbent government chooses the tax system that maximizes expected social welfare, thereby explicitly respecting the possibility that society's preference may change. Our main result is that an incumbent left-wing government will implement a regressive savings tax policy, while an incumbent right-wing government will do the opposite. The corresponding non-zero marginal tax rates on savings exist only to accommodate the different redistributive goals of the opposing party. If there was no chance that the opposing party may be elected — or equivalently no chance that society's redistributive preference may change — the Atkinson and Stiglitz (1976) result that savings should not be taxed alongside nonlinear income taxation would apply.

6 Appendix

Derivation of the Optimal Marginal Tax Rates

In order to derive expressions for the optimal marginal tax rates, we first describe how individuals would behave in the absence of taxation. Individual k would choose c_k^1, s_k^1, l_k^1, c_k^2, and l_k^2 to maximize:

$$\frac{(c_k^1)^{1-\sigma}}{1-\sigma} - \frac{(l_k^1)^{1+\gamma}}{1+\gamma} + \delta\left[\frac{(c_k^2)^{1-\sigma}}{1-\sigma} - \frac{(l_k^2)^{1+\gamma}}{1+\gamma}\right] \tag{A.1}$$

subject to:

$$c_k^1 + s_k^1 \leq w_k l_k^1 \tag{A.2}$$

$$c_k^2 \leq (1+r)s_k^1 + w_k l_k^2 \tag{A.3}$$

The solution to program (A.1) − (A.3) yields the marginal conditions:

$$\frac{(l_k^t)^{\gamma}}{(c_k^t)^{-\sigma} w_k} = 1 \text{ (for } t = 1, 2) \qquad \text{and} \qquad \frac{(c_k^1)^{-\sigma}}{\delta(1+r)(c_k^2)^{-\sigma}} = 1 \tag{A.4}$$

In the presence of taxation, the marginal conditions in equation (A.4) may not hold. The marginal distortions may be interpreted as implicit marginal tax rates. That is:

$$MTRL_k^t := 1 - \frac{(l_k^t)^{\gamma}}{(c_k^t)^{-\sigma} w_k} \qquad \text{and} \qquad MTRS_k^1 := 1 - \frac{(c_k^1)^{-\sigma}}{\delta(1+r)(c_k^2)^{-\sigma}} \tag{A.5}$$

where $MTRL_k^t$ denotes the marginal tax rate on labor faced by type k individuals in period t, and $MTRS_k^1$ denotes the marginal tax rate on savings faced by type k individuals in period 1. However, since the government in each period may be left-wing or right-wing, and it is not known in period 1 which party will be in power in period 2, the expressions for the marginal tax rates become:

$$MTRL_{ki}^t := 1 - \frac{(l_{ki}^t)^{\gamma}}{(c_{ki}^t)^{-\sigma} w_k} \qquad \text{and} \qquad MTRS_{ki}^1 := 1 - \frac{(c_{ki}^1)^{-\sigma}}{\delta(1+r)(E(c_k^2))^{-\sigma}} \tag{A.6}$$

where $E(c_k^2) = p_i c_{ki}^2 + (1-p_i)c_{kj}^2$ is type k's expected consumption in period 2.

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TABLE 1

Baseline Parameter Values

π_L	0.520	σ	1.000	w_1	1.000
π_R	0.480	γ	2.000	w_2	1.600
p_i	0.500	$1 + r$	1.170		
φ	0.333	δ	0.855		

TABLE 2

Pure Utilitarianism ($\pi_L = \pi_R = 0.5$)

Long-term Taxation		**Short-term Taxation**	
Period 1		*Period 1*	
$MTRS_1^1$	0.000	$MTRS_1^1$	0.000
$MTRS_2^1$	0.000	$MTRS_2^1$	0.000
$MTRL_1^1$	0.087	$MTRL_1^1$	0.087
$MTRL_2^1$	0.000	$MTRL_2^1$	0.000
Period 2		*Period 2*	
$MTRL_1^2$	0.087	$MTRL_1^2$	0.087
$MTRL_2^2$	0.000	$MTRL_2^2$	0.000

TABLE 3

Baseline Results: Long-term Taxation

Left-Wing Incumbent		**Right-Wing Incumbent**	
Period 1: Left-Wing		*Period 1: Right-Wing*	
$MTRS^1_{1L}$	0.042	$MTRS^1_{1R}$	–0.045
$MTRS^1_{2L}$	–0.034	$MTRS^1_{2R}$	0.032
$MTRL^1_{1L}$	0.096	$MTRL^1_{1R}$	0.078
$MTRL^1_{2L}$	0.000	$MTRL^1_{2R}$	0.000
Period 2: Left-Wing		*Period 2: Left-Wing*	
$MTRL^2_{1L}$	0.096	$MTRL^2_{1L}$	0.083
$MTRL^2_{2L}$	0.000	$MTRL^2_{2L}$	0.000
Period 2: Right-Wing		*Period 2: Right-Wing*	
$MTRL^2_{1R}$	0.089	$MTRL^2_{1R}$	0.078
$MTRL^2_{2R}$	0.000	$MTRL^2_{2R}$	0.000

TABLE 4

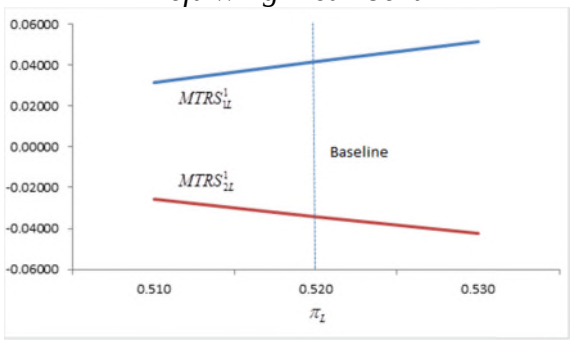
Baseline Results: Short-term Taxation

Left-Wing Incumbent		**Right-Wing Incumbent**	
Period 1: Left-Wing		*Period 1: Right-Wing*	
$MTRS^1_{1L}$	0.042	$MTRS^1_{1R}$	–0.046
$MTRS^1_{2L}$	–0.033	$MTRS^1_{2R}$	0.033
$MTRL^1_{1L}$	0.096	$MTRL^1_{1R}$	0.078
$MTRL^1_{2L}$	0.000	$MTRL^1_{2R}$	0.000
Period 2: Left-Wing		*Period 2: Left-Wing*	
$MTRL^2_{1L}$	0.113	$MTRL^2_{1L}$	0.099
$MTRL^2_{2L}$	0.000	$MTRL^2_{2L}$	0.000
Period 2: Right-Wing		*Period 2: Right-Wing*	
$MTRL^2_{1R}$	0.075	$MTRL^2_{1R}$	0.057
$MTRL^2_{2R}$	0.000	$MTRL^2_{2R}$	0.000

FIGURE 1

Long-term Taxation

Left-Wing Incumbent



Right-Wing Incumbent

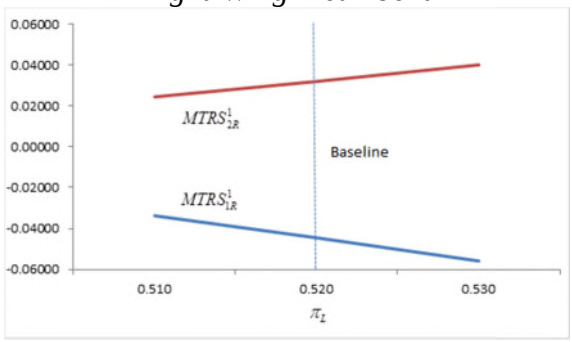
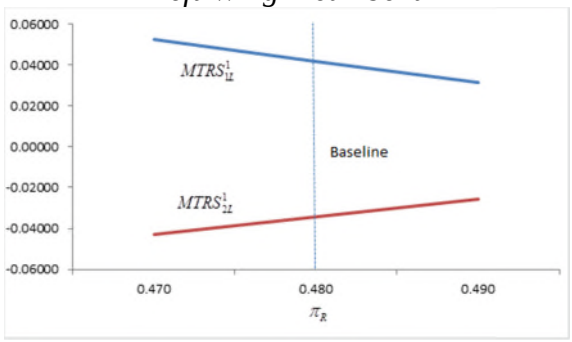


FIGURE 2

Long-term Taxation

Left-Wing Incumbent



Right-Wing Incumbent

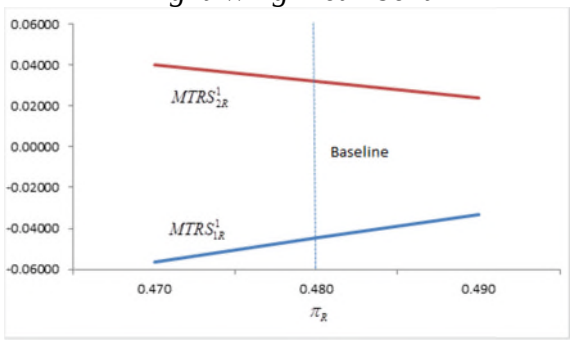
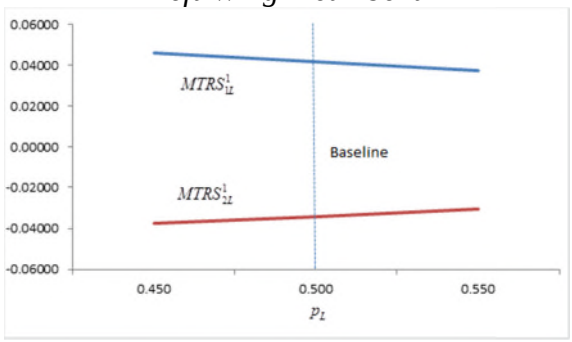


FIGURE 3

Long-term Taxation

Left-Wing Incumbent



Right-Wing Incumbent