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## Reforming a complicated income tax system: The po- litical economics perspective

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# Reforming a complicated income tax system: The political economics perspective

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## Abstract

In this paper we analyze the political economics of different strategies to implement revenue neutral reforms of a complicated income tax system ("tax-cut-cum-base-broadening"). We set up a straightforward social choice model where individuals initially have two deduction possibilities from the tax base. The government wants to cut back the tax base exemptions and it can do so symmetrically or asymmetrically. Asymmetrical approaches face the difficulty that even such individuals can vote against an isolated cut (or an abolishment) of a single tax concession who benefit below average from it. In some constellations a symmetrical cut is in fact the only politically feasible option, whereas all asymmetrical reforms would not be supported by the public.

**Keywords:** income tax reform, public choice

**JEL Classification:** D 72, D 74

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# 1 Introduction

Many continental European countries have comparatively high income tax rates, but extremely complicated rules how to determine the individual tax base (Elschner et al. (2003); OECD (2001)). There exist a number of tax exemptions and complicated rules that even specialists can hardly oversee. It is frequently argued that this is harmful for the economy, because of high information costs to understand all relevant tax laws (Aaron et al. (1999)) and because of problematic distributive effects, as typically only the rich hire specialized advisors who know all available legal possibilities to save taxes. Many economists, international organizations and policy commentators therefore prefer a simpler income tax systems, with no or only very few exemptions, a wider tax base and lower tax rates (e.g. OECD (2001)). Although some European countries have recently taken steps to implement structural reforms of their income tax systems, it seems fair to say that there is still a great reluctance to actually adopt a significant *tax-cut-cum-base-broadening*. Presumably political considerations are (at least partially) responsible for this. An elimination of a tax exemption in exchange for a general tax rate reduction will produce winners and losers, and politicians will be attracted only to tax reform concepts where the former group outnumbers the latter.

It is therefore important to analyze structural income tax reforms from a political economics perspective. A government has several options how to reform a "complicated" tax system.<sup>1</sup> It can pursue a "radical" policy and eliminate all exemptions simultaneously and completely in exchange for a tax rate reduction, it can eliminate or cut only some exemptions while leaving others unchanged, it can proportionally cut back all exemptions, or it can disproportionately reduce deduction possibilities. What tax reform strategy is politically most attractive? Some economists would argue that only symmetrical cuts of deduction possibilities are viable, because of the widely known "pressure group argument". That is, if there is an asymmetrical cut, a large group in society might be affected positively because of the general tax rate reduction. But this gain might be very small and negligible for the voting behavior of this large group. On the contrary, some small group will lose heavily and will therefore spend a great lobbying effort seeking to maintain its tax privilege.<sup>2</sup> On the other hand one could argue that a joint abolishment or cut of many deduction possibilities at once can magnify the political opposition, since it brings together all negatively affected interest groups.

It is the aim of this paper to provide a politico-economic analysis of these various strategies to implement a revenue neutral income tax reform. We present a simple social choice model with two initial tax base exemptions which the government can either proportionally or disproportionately abolish or cut, but only if the majority of voters supports the endeavor. There is some related literature, but the

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<sup>1</sup>With "complicated" we mean an income tax system with several (i.e. at least two) parallel deduction possibilities from the tax base.

<sup>2</sup>This argument is often heard in the area of trade policy, when it comes to question why tariffs keep on existing even though it is known that they (in general) reduce welfare.

issue to analyze the political feasibility of different tax reform approaches has been neglected so far. One string analyzes (tax) reforms in presence of individual uncertainty (Konrad (2003); Fernandez and Rodrik (1991)). This general approach has explained the failure of reforms by asymmetric information about whether one belongs to the winners or losers of a reform, but it has not yet been used to analyze different reform strategies. The authors that discuss the various pros and cons of a simple income tax system (e.g. Krause (2000); Aaron et al. (1999); Hall and Rabushka (1985)) are in general not concerned with the question why simple tax systems are not implemented if they seem desirable from a normative point of view. Another related string that is worth mentioning comes from a completely different field of economics. In the context of the transformation problems in Eastern Europe researchers have addressed the optimal implementation strategy (*gradualist* or *big bang*) of reforms (see Dewatripont and Roland (1992a,b), Wei (1997)) and have stressed the different welfare implications of these approaches. Also the argument of Coe and Snower (1997) is related in this respect that fundamental labor market reforms are superior to incremental ones. These papers, however, are concerned with the welfare implications of different reforms and not with an analysis of their political feasibility.

In this paper we pursue a different path. Even though the question we ask goes beyond the existing literature, our framework is still considerably simpler. It neither relies on individual uncertainty, nor on the explicit formation of pressure groups, nor on different welfare implications. Every voter in our model is fully informed about the impact of a tax reform on her personal tax payment and makes her voting decisions only based on individualistic considerations without engaging in lobbying activities. Moreover we abstract from all *efficiency* arguments in order to focus exclusively on politico-economic mechanisms.<sup>3</sup>

We establish two main results. We show that with more than one initial deduction possibility even such individuals can vote against an isolated abolishment or cut of a single tax concession who benefit below average from this particular tax exemption. An equally "paradoxical" voting behavior does not occur when a symmetrical cut is at stake. This suggests that symmetrical reforms might in fact be easier to implement than asymmetrical ones, but for reasons different from the above mentioned pressure group argument. In some constellations that we will specify below a symmetrical reform is the *only* option that gets the support by the majority of voters, whereas all asymmetrical reforms fail. But with this constellation a radical *abolishment* of all exemptions is just as feasible politically as any small symmetrical cut of tax concessions.

The rest of the paper is organized as follows: In section 2 we introduce our basic model structure and in section 3 we formalize the different tax reform scenarios. In

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<sup>3</sup>If there are no welfare gains of a tax reform, this immediately raises the question why the government wants to implement it at all. We will not analyze this issue explicitly and assume that the commitment to a tax reform exists exogenously. Our only concern is which political strategy is best for a government that wants to win the public support for a reform.

section 4 we describe the individual voting decision on asymmetrical reforms. In section 5 we analyze the voting results on different reform proposals of the voting population as a whole and characterize the special case where only symmetrical changes are feasible. Section 6 concludes.

## 2 The Model

Consider an economy consisting of  $n$  individuals, each endowed with an identical gross income  $y$ . There is a proportional income tax system and the tax revenue is used to finance a public good  $g$ . The government initially allows two deductions from the tax base, denoted by  $[a]$  and  $[c]$ . These exemptions matter differently for the single individuals. The individual-specific values of the deductible exemptions of agent  $i$  are denoted  $a^i$  and  $c^i$ . Her total tax payment  $T_1^i$  in the initial situation, that we label *scenario 1*, is given by

$$T_1^i = t_1 y^i = t_1 (y - a^i - c^i) \quad (1)$$

where  $y^i$  is the individual tax base and  $t_1$  is the proportional income tax rate. We assume that the agents can not manipulate their tax base, i.e. the two parameters  $a^i$  and  $c^i$  are exogenously given.<sup>4</sup> Moreover, we assume that every individual makes a positive tax contribution. That is, the sum of the deduction possibilities ( $a^i + c^i$ ) is strictly lower than  $y$  for each individual  $i$ . The net income  $(1 - t_1)y^i$  is used to purchase a private consumption good, for which the price is normalized to unity. Utility of agent  $i$  is assumed to be quasi-linear in order to abstract from the income effects of a tax reform.

$$U^i = y - T_1^i + h(g) = y(1 - t_1) + h(g) + t_1(a^i + c^i) \quad (2)$$

The (binding) budget constraint of the government in the initial scenario can be written as

$$\sum_i T_1^i = t_1 \left[ n y - \sum_{i=1}^n (a^i + c^i) \right] \stackrel{!}{=} v g \quad (3)$$

where  $v$  is the relative price of the public good. Using (2) and (3), the optimal supply of the public good  $g$  is determined by the usual condition  $n \cdot h'(g) = v$ . The

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<sup>4</sup>That is, the individuals can not adjust their behavior according to prevailing tax laws. The intuition for this assumption can be described best by an example: Consider e.g. that the exemptions  $a^i$  and  $c^i$  represent the tax deductability of commuting expenses and night-work respectively. By assuming that the parameters are given for any individual, we rule out the possibility that agents change their commuting behavior or their fraction of nightwork because of tax incentives (see Wrede (2000) for related issues). This assumption can be subject to a Lucas critique, but is made here to keep the model simple.

efficient quantity of the public good can be treated as a constant term  $g^*$ , and the tax rate  $t_1$  necessary to finance the budget can be computed as

$$t_1 = \frac{v g^*}{n y - \sum_i (a^i + c^i)}. \quad (4)$$

It then follows from (2) that an individual will support a reform of the tax system if it reduces her individual tax payment.

### 3 Tax Reform Scenarios

In the initial scenario 1 the government aims to implement a revenue neutral tax reform. We make the simplifying assumption that the state is the *agenda setter* and makes only one reform proposal in the time period that we are considering. This proposal either gets the support of the public (and is implemented), or the status quo prevails.<sup>5</sup>

As tax reform scenario  $x$  we denote the situation where the government aims to cut back the exemption  $[a]$  with a fraction  $0 < \gamma < 1$ , and the exemption  $[c]$  by  $0 < \delta < 1$ . The tax payment of an individual  $i$  in scenario  $x$  is thus

$$T_x^i = t_x (y - (1 - \gamma) a^i - (1 - \delta) c^i). \quad (5)$$

An individual supports this reform proposal if  $T_x^i < T_1^i$ , which can also be written as

$$a^i \left(1 - (1 - \gamma) \frac{t_x}{t_1}\right) + c^i \left(1 - (1 - \delta) \frac{t_x}{t_1}\right) < y \left(1 - \frac{t_x}{t_1}\right). \quad (6)$$

Using (3) and (4) the relative tax rate  $\frac{t_x}{t_1}$  is

$$\frac{t_x}{t_1} = \frac{n y - \sum_i (a^i + c^i)}{n y - \sum_i [(1 - \gamma) a^i + (1 - \delta) c^i]} = \frac{y - \bar{a} - \bar{c}}{y - (1 - \gamma) \bar{a} - (1 - \delta) \bar{c}} \quad (7)$$

where  $\bar{a}$  and  $\bar{c}$  denote the average deduction of  $a^i$  and respectively of  $c^i$  in the initial scenario. Substituting (7) in (6) we have

$$\gamma a^i + \delta c^i < \gamma \bar{a} + \delta \bar{c} \left( \frac{y - a^i - c^i}{y - \bar{a} - \bar{c}} \right).$$

After several straightforward substitutions we obtain the following general condition that an individual  $i$  is indifferent between the tax reform proposal  $x$  and the initial scenario 1

$$a^i = \frac{[\gamma \bar{a} + \delta \bar{c}] y - [\delta y + (\gamma - \delta) \bar{a}] c^i}{\gamma y + (\delta - \gamma) \bar{c}} \equiv \tilde{a}_x^i(c^i). \quad (8)$$

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<sup>5</sup>A justification of this assumption might be that a government realistically will make only one major tax reform proposal per legislative period, that in case of implementation will be valid at least until the next election.

She rejects proposal  $x$  if her individual value  $a^i$  lies strictly above the critical level  $\tilde{a}_x^i$  and she supports it if  $a^i < \tilde{a}_x^i$ .

Let us look at three special cases of a tax reform. The first is the *radical tax reform*, where both tax concessions are eliminated completely and simultaneously ( $\gamma = 1, \delta = 1$ ). We label this special case *scenario 2*. In this scenario all individuals pay an identical tax amount  $T_2^i = t_2 y$ . Using (8) one can show that an individual is indifferent between scenario 2 and the initial scenario 1 if

$$a^i = \bar{a} + \bar{c} - c^i \equiv \tilde{a}_2^i(c^i). \quad (9)$$

The same indifference condition (9) also holds for any other tax reform scenario with  $\gamma = \delta < 1$ . That is, an individual supports the *radical* tax reform as well as any *symmetrical* tax reform if she benefited below average from the two combined tax concessions in the initial situation.

The second special case, labelled *scenario 3*, describes the situation where only the exemption  $[c]$  is cancelled, but the other exemption  $[a]$  remains unchanged ( $\gamma = 0, \delta = 1$ ). An individual is indifferent between scenarios 3 and 1 if

$$a^i = y - \frac{y - \bar{a}}{\bar{c}} c^i \equiv \tilde{a}_3^i(c^i). \quad (10)$$

The same expression (10) is obtained for all tax reform scenarios where  $\gamma = 0$  and  $\delta > 0$ . Thus, an individual  $i$  makes the same voting decision with respect to the isolated *abolishment* of  $[c]$  as well as for any *asymmetrical cut* only of  $[c]$ . Analogously, she is indifferent between scenario 1 and scenario 4 with  $\gamma = 1, \delta = 0$ , but also between scenario 1 and any asymmetrical tax reform with  $\gamma > 0$  and  $\delta = 0$  if

$$a^i = \left( \frac{\bar{a}}{y - \bar{c}} \right) (y - c^i) \equiv \tilde{a}_4^i(c^i). \quad (11)$$

The individual indifference condition for any tax reform proposal  $x$  is a linear inequality that only depend on  $a^i, c^i$ , on the exogenous parameters  $\gamma, \delta$  and  $y$ , and on the endogenous average values  $\bar{a}$  and  $\bar{c}$ . In figure 1 we graphically illustrate the "indifference curves" for the tax reform scenarios 2 – 4 that are described in equations (9)-(11).

Voters with individual values of  $a^i$  and  $c^i$  below and to the left of the thick solid line  $[2] - [2']$  support the symmetrical reforms (i.e. voters in the areas  $B, C$  and  $D$ ). They reject them if their combination of  $a^i$  and  $c^i$  is to the northeast of this line (i.e. voters in  $A, F$  and  $E$ ). Analogous considerations apply to the support/rejection of the reforms 3 and 4, illustrated by the broken line  $[3] - [3']$  and the dotted line  $[4] - [4']$  respectively. The thick line that runs from point  $[3]$  to  $[4']$  separates the relevant parameter constellations where the individual makes a strictly positive tax contribution from those constellations where the parameter values  $a^i$  and  $c^i$  are so high that the individual would theoretically receive a subsidy via the tax declaration (a case that we have ruled out by assumption). The only tax reform scenario that is



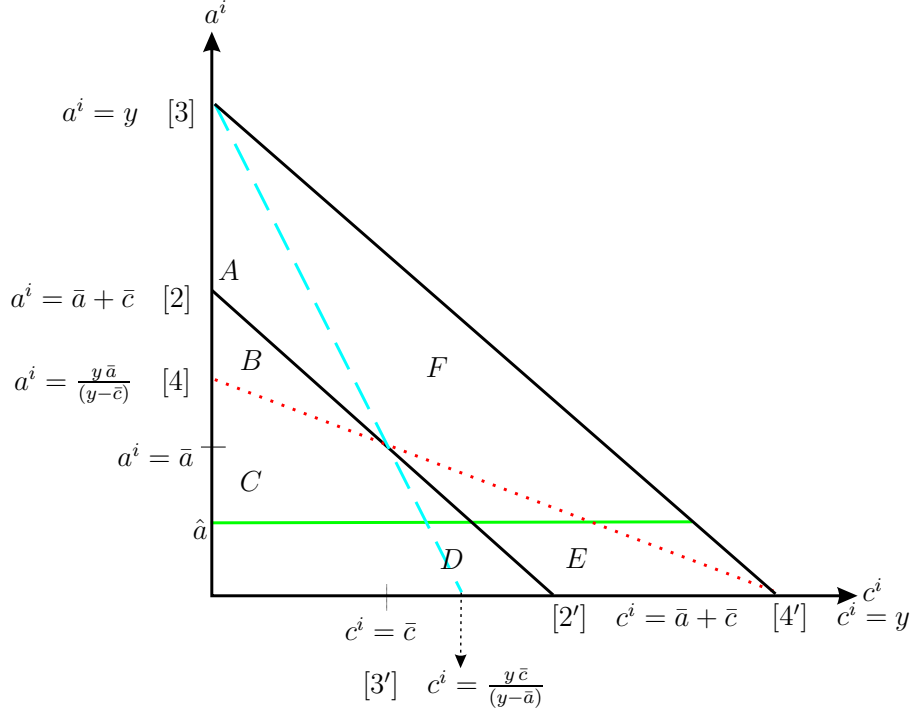


Figure 1: Support/rejection of the single reform proposal

not captured in figure 1 is when  $0 < \gamma \neq \delta < 1$ . One can show the linear indifference curve that separates the supporters from the opponents lies in between the curves [2] – [2'] and [3] – [3'] or [2] – [2'] and [4] – [4'] respectively. Furthermore, we have the following proposition

**Proposition 1** *All indifference curves, including [2] – [2'], [3] – [3'] and [4] – [4'], must cross in one point where  $a^i = \bar{a}$  and  $c^i = \bar{c}$ .*

**Proof.** We evaluate the general indifference condition (8) at  $c^i = \bar{c}$  and obtain

$$a^i = \frac{[\gamma \bar{a} + \delta \bar{c}] y - [\delta y + (\gamma - \delta) \bar{a}] \bar{c}}{\gamma y + (\delta - \gamma) \bar{c}}.$$

It is easily verifiable that this simplifies to  $a^i = \bar{a}$ . Hence, an individual that is indifferent between scenarios 1 and  $x$  and who has a value  $c^i = \bar{c}$  must have  $a^i = \bar{a}$ . Since the indifference conditions (9) - (11) are all special cases of (8) they must all cross in this point. Since the indifference curves are linear the crossing point is unique. ■

The intuition for this proposition is that a voter with an individual parameter constellation  $a^i = \bar{a}$  and  $c^i = \bar{c}$  is indifferent with respect to the prevailing income tax system, because the tax rate reduction that results from any reform is always equal to the respective widening of the individual tax base.

## 4 Asymmetrical reforms

Equation (8) shows that the critical level  $\tilde{a}_x^i$  for the individual support/rejection-decision of tax reform  $x$  depends negatively on  $c^i$ . As a consequence, it is not possible to say whether a voter will support or reject an isolated abolishment or cut of *one* tax concession only by looking at how much she benefits from this particular deduction possibility.

Let us illustrate this by considering the reform scenario 4, where the government plans to abolish/cut only the exemption of  $[a]$  while leaving the exemption of  $[c]$  unchanged. For a given value of  $a^i$  it is less likely that an individual supports the reform 4 the higher is her value  $c^i$ . Graphically this can be illustrated by the horizontal broken line in figure 1. Voters with a given level  $\hat{a}$ , which is assumed to lie below the average  $\bar{a}$ , can either vote for any reform if they have also have a low value of  $c^i$  (in C), for reforms 4 and 2 (in D), only for reform 4 (in A) or against any reform if their value  $c^i$  is high (in F). In other words, individuals can vote against a cut of the  $[a]$ -exemption even though they benefit below average from this deduction possibility. This can happen if they are affected heavily from the other deduction possibility, the  $[c]$ -exemption, which the government - however - does not plan to touch in scenario 4. The reason is the following: If the tax exemption  $[a]$  is reduced, two effects will result for any voter  $i$ : a widening of the individual tax base and a drop in tax rates via the budget constraint of the state. In relative terms, since we have a proportional income tax system in our model, the effect from the tax rate reduction is equally large for all voters. But the base broadening effect is gets stronger for individuals with a small initial tax base. Voters with  $\hat{a}$  and a high value of  $c^i$  benefit little from the  $[a]$ -exemption, but can deduct a large fraction of their gross income due to the tax privilege  $[c]$ . Their individual tax base is small and thus the inclusion of  $[a]$  matters more for these voters than the tax rate reduction, which leads them to reject the reform scenario 4.

Note that this logic only applies to "complicated" income tax systems with more than one initial deduction possibility. If there is only one initial exemption, it is straightforward to see that the tax rate reduction effect in relative terms is always larger (smaller) than the base broadening effect if the individual exemption is below (above) the average deduction possibility.<sup>6</sup> But in a more complicated initial situation the following proposition holds:

**Proposition 2** *The existence of discretionary tax concessions is per se conducive to their mutual persistence.*

The existence of the exemption  $[c]$  per se makes it less likely that voters support an asymmetrical reduction of the exemption  $[a]$ . This is one fundamental reason why asymmetrical cuts are difficult to implement in a complicated income tax system.

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<sup>6</sup>The same logic can be applied to *symmetrical* tax reforms in complicated initial situations. One can be seen from the indifference condition for symmetrical reforms, equation (9), that the critical value  $\tilde{a}_2^i$  also depends negatively on  $c^i$ , but the impact is equi-proportionate.

## 5 Voting results

The coalition against reform 4 that we have discussed in the last section is built by all voters with individual constellations of  $a^i$  and  $c^i$  such that they are located in the areas  $A$ ,  $B$  and  $F$ . Analogously, all voters whose individual parameters are such that they end up in areas  $D$ ,  $E$  and  $F$  vote against an isolated cut of  $[c]$ . The membership of an individual to one of the six areas depicted in figure 1 is endogenous and depends on the relation of the individual values  $a^i$  and  $c^i$  to the average values  $\bar{a}$  and  $\bar{c}$ .<sup>7</sup> These individual specific parameter values  $a^i$  and  $c^i$  are in principal known to the government, e.g. from previous tax declarations. The gross income  $y$  is an exogenous parameter that also is known to the government. If all individual values  $a^i$  and  $c^i$  are known, the government can easily calculate the average values  $\bar{a}$  and  $\bar{c}$  and derive the endogenous three indifference curves via the budget constraint of the state that separate the six groups  $A - F$ .

Let us denote with  $\mu_j$  ( $j = A, B, \dots, F$ ) the voters in the respective area  $j$  in figure 1 as a non-negative fraction of the total voting population, with  $\sum_i \mu_j = 1$ . If, for example, the distribution of  $a^i$  and  $c^i$  across the voting population is such that  $(\mu_A + \mu_B + \mu_F) > \frac{1}{2}$ , and simultaneously  $(\mu_D + \mu_E + \mu_F) > \frac{1}{2}$  neither the reform scenario 3 nor the reform scenario 4 will have a political chance to get implemented. In the remainder of this section, we will look at one specific subset of constellation that gives rise to a particularly interesting equilibrium outcome, where *only* a symmetrical reform, but no asymmetrical reform wins the support of the public.

Figure 1 not only shows that people with below-average levels of  $a^i$  can vote against an isolated cut of  $[a]$ , but it also indicates that some individuals who reject an asymmetrical reform still can support a symmetrical change. This is the case for voters in the areas  $B$  and  $D$ . The intuition is the following: Individuals in  $B$  benefit relatively strong from the deduction possibility of  $[a]$ , but relatively little from that of  $[c]$ . They would not vote for an isolated cut of the exemption  $[a]$ . For the same reason, voters in  $D$  would not vote for an isolated cut of  $[c]$ . But if both tax exemptions are to be reduced *simultaneously*, the effect of the general tax rate reduction over-compensates the effect of the foregone tax privilege. For individuals in  $A$  and  $E$ , matters are different. For them, the deduction possibility of  $[a]$  (respectively,  $[c]$ ) is so important that they would never support a reduction of this tax concession, neither in isolation, nor in combination with a reduction of the other.

Intuitively, if the groups  $B$  and  $D$  are politically decisive, then a symmetrical reform will be feasible, even though no asymmetrical tax reforms has won the public

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<sup>7</sup>In the appendix we summarize the general necessary and sufficient conditions for the group membership of an individual  $i$  to either of the six groups  $A - F$  for given exogenous parameters and for given aggregate averages  $\bar{a}$  and  $\bar{c}$ . We neglect the asymmetrical case with  $0 < \gamma \neq \delta < 1$  for simplicity.

support. It is straightforward to provide a numerical example where this is the case

$$\begin{pmatrix} \mu_A \\ \mu_B \\ \mu_C \\ \mu_D \\ \mu_E \\ \mu_F \end{pmatrix} = \begin{pmatrix} 0.05 \\ 0.30 \\ 0.10 \\ 0.15 \\ 0.24 \\ 0.16 \end{pmatrix} \quad (12)$$

A symmetrical tax reform would win the support of the majority, since the groups  $B, C$  and  $D$  together are larger than  $A, E$  and  $F$ . But only if a symmetrical approach is proposed by the government do these three groups vote together in favor of a change in the status quo. Suppose the government proposes the incremental reform scenario 3. The groups  $B$  and  $C$  still vote in favor of this reform. But the group  $D$  does not, because it partially benefits from the exemption of  $[c]$  and is not compensated in this scenario by a sufficient cut in tax rates. Although the group  $A$  joins those who vote in favor of the reform, the majority is now against an adoption. The same is true if the government proposes reform scenario 4: Group  $B$  drops out from the reform supporters, group  $E$  joins in. But all in all, the majority ( $A, B$  and  $F$ ) is against this reform.

In the numerical example above we have an exclusive feasibility of symmetrical tax reforms, because an implicit logrolling between the groups  $B$  and  $D$  is possible and successful. Implicit logrolling (or "issue combining") is known as a mechanism where "political entrepreneurs who offer programs to the voters make up a complex mixture of policies designed to attract support." (Buchanan and Tullock (1999)). In our model we apply this idea to a context where the voting behavior of individuals is determined by how much they are affected by the different tax concessions. In a setting with two issues, two groups can engage in logrolling if (i) they have opposite preferences with respect to both issues, (ii) each group is pivotal with respect to that issue where it is among the majority coalition without logrolling, and (iii) each group has the more intensive preferences for that issue where it is among the minority without logrolling. It is easily verifiable that the groups  $C$  and  $F$  do not match any of the three conditions and hence will not participate in an implicit logrolling. In the numerical example above, the conditions (i) and (ii) hold for the groups  $A$  and  $B$  on the one side, and  $D$  and  $E$  on the other. The two pairs of groups have different "preferences" with respect to the two issues and each group is pivotal. The condition (iii), however, is only satisfied for the groups  $B$  and  $D$ . This is a direct consequence of the "voting paradox" that was derived in the last section.

Consider the case where all members of the groups  $D$  and  $E$  have identical values  $a^i = \hat{a}$ , but the  $E$ -types have higher values of  $c^i$  than the  $D$ -types. Without logrolling, both groups vote for reform 4, but against reform 3. They are thus among the majority with respect to the issue to abolish the exemption  $[c]$ , and among the minority with respect to the issue to abolish the exemption  $[a]$ . But the two groups  $D$  and  $E$  differ in their intensity of preferences. It is the primary concern of individuals in area  $E$  to prevent the abolishment of  $[c]$ , i.e. the  $E$ -types

have more intensive preferences with respect to that issue where they are among the majority without logrolling. Only group  $D$  matches the third condition for implicit logrolling. Analogous considerations apply to the groups  $A$  and  $B$ . Only group  $B$  matches all three conditions. Hence, individuals who belong to the groups  $B$  and  $D$  in figure 1 vote for a symmetrical tax reform, because they can profit from an implicit logrolling.

In the numerical example above, this logrolling is successful, because there is a majority for the reform 2. In general the case that a radical tax reform wins the support of the public, whereas any incremental reform is rejected, holds if the following three conditions are simultaneously satisfied:

$$\begin{aligned} \text{(I)} \quad & \mu_D + \mu_E + \mu_F > 0.5 \\ \text{(II)} \quad & \mu_A + \mu_B + \mu_F > 0.5 \\ \text{(III)} \quad & \mu_B + \mu_C + \mu_D > 0.5 \end{aligned}$$

Conditions (I) and (II) imply that no incremental reform can be implemented. If condition (III) also holds, then a symmetrical change is feasible, because the logrolling of the groups  $B$  and  $D$  is pivotal. Since condition (I) implies that  $(\mu_A + \mu_E + \mu_F) < \frac{1}{2}$  etc., the three expressions can be simplified and we can derive

**Proposition 3** *A symmetrical cut is exclusively feasible if and only if,*

$$\begin{aligned} \text{(I)} \quad & \mu_F > \mu_C \\ \text{(II)} \quad & \mu_B > \mu_E \\ \text{(III)} \quad & \mu_D > \mu_A \end{aligned} \tag{13}$$

Each logrolling group must be larger than the complementary non-logrolling group with opposite preferences, and the group of unconditional reform opponents ( $F$ ) must be larger than the group who vote for any change in the status quo. The case we have discussed in this section supports the widely held view of political economists according to which symmetrical cuts of exemptions are easier to implement than asymmetrical ones. In our model this result does not depend on the "pressure group"-argument outlined in the introduction, but its existence is due to logrolling and the lack of the "voting paradox" that is relevant for asymmetrical cuts in complicated income tax systems. Yet, it would not be correct to conclude that only symmetrical cuts are feasible under all circumstances. In equation (13) we have specifically derived the necessary and sufficient conditions that must hold for an *exclusive* feasibility of a symmetrical tax reform. If these conditions for a logrolling equilibrium hold, however, then a complete elimination of all tax exemptions (the radical reform scenario 2) is just as feasible as a small, symmetrical cut, and both of these options are politically superior to a cut, or even a complete elimination of only one deduction possibility.

Note that this logrolling equilibrium is not a Condorcet winning scenario. In the numerical example (12) a radical reform can be implemented. In the new situation without any tax exemptions, however, there would again be a majority who votes for

the reintroduction of the tax concessions. After the reintroduction, there is again a majority for a radical abolishment, and so on. This represents the insight put forward by Bernholz (1973) that under implicit logrolling there are cyclical majorities. An analysis of these long-run aspects of tax reforms is beyond the scope of the present paper.

## 6 Concluding remarks

In this paper we have provided a simple framework to study the political economics of various strategies to implement a revenue neutral income tax reform. We have shown that in a complicated tax system with more than one initial tax base exemption even such individuals can vote against an isolated reduction of one concession who benefit below average from this tax privilege. A symmetrical tax reform approach might be the superior political option, because there can be implicit logrolling possibilities. Under some circumstances a symmetrical reform approach is in fact the only viable option. This result holds if a sufficient number of voters benefit differently from the two single concessions, so that only a joint abolishment of the single concessions allows for a compensation through the reduction of tax rates. But it is not true in general that only symmetrical changes of the income tax system are feasible. In these logrolling equilibria, however, a radical abolishment of all tax concessions is politically equivalent to a small symmetrical reduction.

## A Appendix

To sum up, the necessary and sufficient conditions for the membership in any of the six groups are given by

$$\begin{aligned}
 A &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid c^i + a^i > \bar{c} + \bar{a}, a^i > \bar{a}, c^i < \bar{c} \frac{(y-a^i)}{(y-\bar{a})} < \bar{c} \right\} \\
 B &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid c^i < \bar{c}, c^i + a^i < \bar{c} + \bar{a}, a^i > \bar{a} \frac{(y-c^i)}{(y-\bar{c})} \right\} \\
 C &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid a^i + c^i < \bar{a} + \bar{c}, a^i < \bar{a} \frac{(y-c^i)}{(y-\bar{c})}, c^i < \bar{c} \frac{(y-a^i)}{(y-\bar{a})} \right\} \\
 D &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid a^i < \bar{a}, c^i + a^i < \bar{c} + \bar{a}, c^i > \bar{c} \frac{(y-a^i)}{(y-\bar{a})} \right\} \\
 E &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid c^i + a^i > \bar{c} + \bar{a}, c^i > \bar{c}, a^i < \bar{a} \frac{(y-c^i)}{(y-\bar{c})} < \bar{a} \right\} \\
 F &= \left\{ (a_i, c_i) \in \mathbb{R}_+^2 \mid c^i + a^i > \bar{c} + \bar{a}, a^i > \bar{a} \frac{(y-c^i)}{(y-\bar{c})}, c^i > \bar{c} \frac{(y-a^i)}{(y-\bar{a})} \right\}
 \end{aligned}$$

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