Non-discriminatory Donation Relief and Strategic Commitment under Political Competition☆

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Abstract

Tax relief for private donations towards the provision of collective goods can protect minorities from majority-driven outcomes in which tax revenues are exclusively used to finance the provision of public goods that are only valued by the majority. In this paper we show that non-discriminatory tax relief for private donations can arise in political equilibrium as a strategic commitment device aimed at creating and supporting political alliances that would not otherwise be able to coalesce.

Keywords: Tax Relief, Private Donations, Strategic Policy Commitment
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1. Introduction

Because of budgetary pressures, governments have increasingly come to rely on the private sector for the provision of collective goods and services. Accordingly, there has been a growing focus in the public debate on how government incentives for private contributions – typically delivered in the form of tax reliefs – should be structured; and, more specifically, on whether they should be offered indiscriminately, without varying the level of relief depending on the extent to which different types of donations generate a "public benefit", and without limit on the size of donations that can benefit from relief.[1]

In this paper, we re-examine the political-economy rationale for non-discriminatory donation relief: can non-discriminatory donation relief, as we observe it, be rationalized as an equilibrium outcome of political competition?

Our paper is a first attempt to build a bridge between two main strands of literature on the voluntary provision of public goods. The first has focused on how tax policy and government spending affect charitable giving (Warr, 1982, 1983; Roberts, 1984, 1987; Bernheim, 1986; and Bergstrom *et al.*, 1986). With reference to the subsidization of private donations, this literature has shown that diverting public funds towards tax relief for private giving can raise the total level of provision of public goods above the level that could be achieved if the same public funds were used directly to provide the goods (Andreoni and Bergstrom, 1994).

The second, more recent, strand of literature has examined public provision choices by elected representatives when public goods can also be provided privately and the role that such provision choices play in the determination of political outcomes (Epple and Romano, 1996a, 1996b; Gouveia, 1997; Scharf, 2000; Horstmann *et al.*, 2007; Horstmann and Scharf, 2008). One of the key conclusions from this literature is that majorities may prefer a mixed regime of public provision with private donations over either pure private provision or pure public provision, and may deploy tax relief

[1] See National Audit Office, 2013; and *The Surprising Relationship Between Taxes and Charitable Giving*, the Wall Street Journal, December 12, 2015; *Tax Expenditures: Overview and Analysis*, Congressional Research Office, April 30, 2015; *The Political Economy of Tax Expenditures*, Athena Kalya, Directorate-General for Economic and Financial Affairs, slide presentation at the ECFin Taxation Workshop, Brussels, October 19, 2015.

strategically to shift the burden of provision onto minority donors.

The above-mentioned studies are concerned with situations where only one type of public good is provided and where individuals are only heterogeneous in their preferences over levels of public good provision. In practice, collective provision typically involves multiple goods and services,[2] and each of those goods and services can vary in their characteristics, characteristics that different individuals value differently.[3] Thus individual preferences will also be heterogeneous with respect to the *composition* of collective good provision, not just with respect to *how much* provision there should be. This means that, in regimes where collective goods are privately provided, in part or in full, by minorities, these minorities will direct their donations towards the kinds of collective goods that they favour rather than towards those that the majority favours, implying a reduced scope for the majority to rely on private provision by minorities – and thus a reduced scope for leveraging on tax relief for this purpose.

In such cases the private provision of public goods can serve to fill a minority demand that left unmet by majority-driven public provision choices (Weisbrod, 1975), and so non-discriminatory donation relief can be viewed as a concession by the majority to minorities – a concession that protects minorities from the "tyranny of the majority" in relation to the composition of collective good provision. Still, why should the ruling majority agree to such a concession? In other words, why do we observe majority-sanctioned tax relief being granted on donations towards collective goods that are not valued by the majority? In this paper we argue that subsidies to private giving can be used as a locking-in mechanism that enables heterogeneous groups to

[2]Transactional data obtained from the UK's Charities Aid Foundation (CAF) shows that between June 2009 and July 2014, there were: 4.5 million donations made to over 80,000 different UK registered charities.

[3]This can be true whether or not the goods and services provided satisfy similar needs. For example, in the UK, there are seventeen donkey sanctuaries registered with the UK's Charities Commission and each of those has a different mission statement – the Island Farm Donkey Sanctuary aims to "house donkeys and some other animals who are neglected and abused", while the Isle of Wight Donkey Sanctuary has a three-pronged mission aiming to "Provide health-care and welfare for abandoned, rescued and homeless donkeys. To educate children about the heritage and roles of donkeys. To support other charities through association with our donkeys."

cement political alliances.

The premise of this argument is that tax incentives for giving are enshrined in the tax system and cannot be easily overturned in the short run. Tax constitutions in developed countries typically prescribe a two-speed system for tax policy changes: a fast track that allows governments to easily change tax rates and levels of public spending, and a slow track for structural tax reforms.[4] And indeed, over the last twenty years UK governments have changed either the tax rate or the income brackets every year, but the subsidy rate to donation reliefs has been modified only three times. The same pattern is in evidence when we look at the US case: while tax rates or income brackets have been changed almost every two years, tax relief provisions have been modified only nine times over the past eighty years.

Tax relief is linked to tax rates,[5] and so changes in the level of taxation, which can

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[4]This two speed system has evolved from principles that were first enshrined in the *Magna Carta* of 1215: first, governors had the right to collect taxes to be able to pursue the common good; second, any reform of the tax system required the consensus of *commune consilium regni* (Lindsey, 2003). To approve tax and spending changes, a simple majority of the Parliament is sufficient in the UK system, and a simple majority is sufficient in both chambers in the US system (Parliament Acts of 1911 and 1949). On the other hand, modifying the structure of taxes in the US requires a simple majority in the lower chamber and 60% of the votes in the Senate (alternatively, tax reform can be accomplished through a budgetary "reconciliation procedure"; Congressional Budget Act of 1974). In the UK a simple majority is sufficient, but the House of Lords can unilaterally suspend the decision for a maximum of one year before it can be debated again.

[5]Tax relief provisions vary across countries. In the US, individuals who claim itemized deductions are allowed a federal income tax deduction for gifts and other donations of property to charitable organizations of up to 50% of adjusted gross income when the donation is to a public charity, and 30% of income when it is made to a private foundation. Corporations can also claim a deduction, but are subject to a lower ceiling of 10% of net income. In Canada, the federal government and the provinces offer a two-tiered income tax credit to individuals and corporations for charitable donations: for donations below $200, the federal basic credit rate is 15%, while every dollar donated above $200 is credited at a federal rate of 29%, thus allowing middle income taxpayers who make large donations to claim at a rate in excess of their personal tax rate (in some provinces combined federal and provincial credits can surpass 50% for large gifts). In the UK, there is a governmental match of 20 pence for each pound donated out of after tax income. In addition, higher-rate taxpayers can claim a 20 pence rebate on each pound donated out of after-tax income For a full discussion of the UK system and of donation responses to UK tax incentives, see Almunia *et al.* (2018).

be enacted upon comparatively more quickly, also entail changes in the implied level of public subsidization of private giving by minorities. Linking taxation and donation subsidies in this way can be pivotal to how minorities rank different candidates in a political contest, and can thus affect political outcomes. Non-discriminatory tax relief effectively removes a dimension of ex-post political discretion that may otherwise cause a candidate to lose the support of a subset of minority voters. What we show in the theoretical analysis that follows is that, if changes to the structure of tax relief provisions are sufficiently slow to enact, tax relief can arise in political equilibrium as a means of supporting political alliances that would not otherwise be sustainable.

To develop our arguments, we focus on a model of political competition where there are multiple collective goods and where public provision can be augmented by private donations. In this setting we characterize policy choices and political outcomes with and without non-discriminatory tax relief for private donations (i.e. tax relief that does not discriminate across donations towards different collective goods).

First, we show that, if changing the structure of tax reliefs involves a sufficient time lag, an incumbent policy-maker would never want to commit to a given tax rate level but may want to introduce non-discriminatory tax relief for donations in order to secure her re-election in the next period. Second, we demonstrate that tax reliefs can arise in equilibrium at a constitutional stage – whether citizen vote over the permanent introduction of tax reliefs or just over the introduction of procedural rules that make it comparatively more difficult to overturn tax relief provisions.

The rest of the paper is structured as follows. Section 2 describes the model and characterizes the collective and voluntary provision of collective goods under different tax regimes. In Section 3 we analyze how different tax regimes affect political competition. Section 4 show how tax relief can arise endogenously in equilibrium. Section 5 concludes. Proofs of results are given in the Appendix.

2. Policy choices and private contributions

We describe a model of public and private provision choices and voting choices in an economy with heterogeneous agents. Individuals differ from one another with respect to their preferences for two different varieties of public goods, with respect to their preferred level of public good provision, or with respect to both. Individuals vote for one of a set of candidates who run for public office. The winning candidate decides both the level of public provision for each good and the level of tax relief to apply for each good, with the required public funds being raised through a uniform tax. Public provision can be augmented by private donations that are non-cooperatively selected by individuals, as in Bergstrom *et al.* (1986). The outcome of the election and the actions that ensue from such outcome (tax policies and donation choices) are fully anticipated by all voters.

This section describes our set-up and characterizes donation choices and policy choices in alternative tax regimes. Implications for political competition are discussed in Section 3.

2.1. Endowments and preferences

Our analytical setup is deliberately simple, for tractability and to best highlight the structure of our arguments. The specialized setting we use is nevertheless sufficiently rich to allow for the various regimes that could occur in a less restrictive environment.

Consider an economy with $N \geq 3$ individuals who each receive utility from private consumption and from the consumption of two public good varieties, identified by $k \in \{a, b\} \equiv K$. The two varieties can each be provided privately from individuals' income or publicly through tax revenues. The total amount provided for each is the sum of public provision and private provision, and is denoted as $G(k)$, $k \in \{a, b\} \equiv K$ (or, in vector notation, as $G = \big(G(k),\, k \in K\big)$).

Individuals all have identical pre-tax incomes, y, but differ from one another with respect to their preferences for the two different varieties of public goods and their preferences for public goods vs. private consumption. Individuals belong to one of three preference types, denoted by $j \in \{a, b, 0\} \equiv J = K \cup \{0\}$, each represented in the population in a proportion $q_j < 1$, with $\sum_j q_j = 1$. (For notational ease, we will use j^- to refer to the complement in K of a type $j \in K$, i.e. $a^- = b$ and $b^- = a$.) Individuals of type $j = 0$ place no value on public goods. Individuals of type $j \neq 0$ have a positive marginal valuation for public good variety j, which is equal to $\overline{\eta}$ up to a level of provision equal to $\hat{G} > 0$, falling to $\hat{\eta} < \overline{\eta}$ above $\hat{G}$; and a constant marginal valuation $\underline{\eta} < \hat{\eta}$ (also implying $\underline{\eta} < \overline{\eta}$) for public good variety j^-. Types a and b thus place a positive value on public goods, but each favour a different public good variety. Each has a piecewise concave total valuation for the public good it favours more (which, under suitable conditions, yields an interior solution with respect to the choice of provision) and a linear total valuation for the good it favours less.[6] We can represent these preferences with the following type-specific utility functions:

$$\begin{aligned}
&\text{Type } \ j = 0: \ \ U_0(c_0^i, G) = c_0^i; \\
&\text{Type } \ j = a: \ \ U_a(c_a^i, G) = c_a^i + \hat{\eta}\, G(a) + (\overline{\eta} - \hat{\eta}) \min\{G(a), \hat{G}\} + \underline{\eta}\, G(b); \\
&\text{Type } \ j = b: \ \ U_b(c_b^i, G) = c_b^i + \hat{\eta}\, G(b) + (\overline{\eta} - \hat{\eta}) \min\{G(b), \hat{G}\} + \underline{\eta}\, G(a);
\end{aligned}$$

where c_j^i is private consumption of an individual i of type j, and where $\overline{\eta} > \hat{\eta} > \underline{\eta}$. The distinction between type-0 individuals and type-$j \neq 0$ individuals isolates heterogeneity with respect to preferred levels of provision; whereas the distinction between type-a and type-b individuals isolates heterogeneity in preferences with respect to the preferred mix of public goods.

Figure 1 depicts the total valuation that an individual of type $j \neq 0$ places on varying quantities respectively of public good j and public good j^-. The kink corresponds to the allocation $\hat{G}$ of public good variety j at which the marginal valuation falls from $\overline{\eta}$ to $\hat{\eta}$.

The marginal cost of provision is unity for both public good varieties. Government spending is financed through a proportional income tax levied at rate, t. Public goods can be publicly provided by government at levels $Z(k) \geq 0$, $k \in K$ ($Z = \big(Z(k),\, k \in K\big)$ in vector notation). Additionally, there can be government subsidies for private contributions towards the two public good varieties. Donation subsidies are typically offered in the form of a tax deduction, which has the effect of lowering the price of giving to donors;[7] for the purpose of our analysis, such relief can be equivalently modelled as taking the form of proportional subsidy rates $s(k)$, $k = \{a, b\}$, that are applied to the gross-of-subsidy donation value. Thus, given a donation $v^i(k)$ by individual i towards public good variety k, a subsidy $s(k) > 0$ reduces the price of giving to donors by a factor $1 - s(k)$.

[6] Assuming the valuation for the less favoured variety to be also concave would have no effect on the analysis or results. We assume linearity for the sake of simplicity.

[7] In some countries (e.g., the US) the relief is structured as a deduction of the donation made from taxable income; in others UK the system has both a rebate and a match component, with the latter being paid directly by government to charities and being equal to the tax payable on the match-inclusive donation; this is fully equivalent to a US-style deduction.

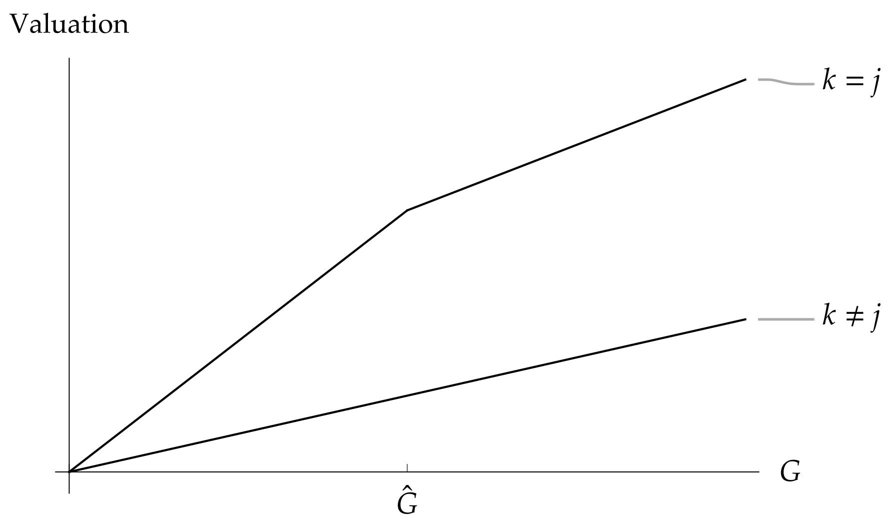

Figure 1: Total valuation by individuals of type $j \in \{a, b\}$
for levels of public good varieties $k = j$ and $k \neq j$

In outcomes where choices are symmetric across individuals of the same type (the cases we shall focus on), levels of taxation, public good provision and subsidization of private provision must satisfy the government budget constraint

$$tNy = \sum_k \Big(Z(k) + s(k) N \sum_j q_j v_j(k) \Big), \tag{1}$$

where $v_j(k)$ denotes individual donations by type-j individuals towards public good variety k; and the budget constraint for an individual of type j is

$$c(j) + \sum_k \, (1 - s(k))\, v_j(k) = (1 - t)y. \tag{2}$$

We consider two alternative scenarios: in one scenario the levels of donation subsidy, $s(k)$, can be selected by the policy-maker independently of the income tax rate, t; in the other, $s(k)$ is constrained to be equal to the tax rate (i.e. it must take the form of a 100% deduction of donations from taxable income).

We study a game characterized by the following sequence of actions: citizens observe the set of candidates and vote under a plurality-rule electoral system; the winner of the election is the candidate with the most votes, and that winner then becomes the policy-maker (stage 1); the elected policy-maker chooses a level of taxation and levels of public spending on each of the two public goods from the available funds (stage 2); citizens observe levels of public spending on each of the two public good varieties and simultaneously select private donations towards each of these varieties (stage 3).[8] We restrict attention to sub-game perfect equilibria of the above game, and proceed to solve for an equilibrium by backward induction.

In the rest of this section we shall focus on the last two stages of the above sequence, that is on private donation choices and optimal policy choices that anticipate donation responses. Implications for elections (stage 1) and for constitutional design are discussed in Section 3.

2.2. Contribution equilibria for given tax/subsidy regimes

We consider symmetric Nash equilibria of the last-stage, simultaneous-donations game. The amounts given towards each collective good variety by individuals of type

[8]This is consistent with the way choices are sequenced in a citizen-candidate model of political competition (Osborne and Slivinski, 1996; Besley and Coate, 1997).

j can be characterized as in the standard non-cooperative model of private provision of a public good where each individual chooses her own contribution taking others' contributions as given (Bergstrom *et al.*, 1986).

In equilibrium, type-0 individuals never contribute to any variety of public good, since their valuation for both public good varieties is zero. Individuals of type $j \neq 0$ contribute to the provision of a public good variety if the price of giving is lower or equal than to their marginal valuation for that variety, $\eta \in \{\underline{\eta}, \hat{\eta}, \overline{\eta}\}$ ($\underline{\eta} < \hat{\eta} < \overline{\eta}$).

As previously discussed, for a subsidy rate $s(k) \in [0, 1]$, the price of giving towards good variety k is $1 - s(k)$.[9] Then, depending on the size of the subsidy, there are three possible regimes:

(i) if the subsidy rate is such that $1 - s(k) > \overline{\eta}$, then no donations toward any good variety will take place;

(ii) if the subsidy rate is such that $\hat{\eta} < 1 - s(k) \leq \overline{\eta}$, donations towards public good variety $k = j$ by type j are $v_j(j) = (\hat{G} - Z(j))/(q_j N)$; while type j^-'s donation towards variety j are zero (given that $\underline{\eta} < \hat{\eta} < 1 - s(k)$);

(iii) if the subsidy rate is such that $1 - s(k) \leq \hat{\eta}$ an individual of type $j = k$ will donate all of her disposable income towards her more favoured public good variety, but she still will not contribute to her less favoured good variety j^- (given that $\underline{\eta} < \hat{\eta}$).

In order to highlight the role of subsidies, we focus on scenarios where $\overline{\eta} < 1$ and so there are no private contributions without subsidies. We also assume that $\hat{G} < Ny/2$, i.e. the economy's aggregate resources are sufficient to achieve levels of

[9] As is customary in the literature, it is assumed that donors do not "see behind the veil" of the government budget constraint and therefore do not internalize the effect that their donation has on the government budget constraint through the subsidy. This is typically justified on the grounds that, at the margin, adjustments in the government budget may involve adjustments in private transfers (which we do not model here) rather than adjustments in spending. In addition, in the framework we are studying, even if donors were fully sophisticated and could see behind the government's budget, and even if marginal adjustments were on government spending, these would typically be on spending for a good that is less favoured by the donor rather than on spending for the good towards which the donation is directed.

provision equal to $\hat{G}$ for both public good varieties and also leave some resources for private consumption.

2.3. Policy choices with no contribution subsidies

We first examine the case where, in stage 2, there are no contribution subsidies ($s(k) = 0,\ k \in K$), and the policy-maker in office only makes choices with respect to levels of taxation and levels of public good provision, which must satisfy the budget constraint $Nty = Z(a) + Z(b)$.

In the final stage, citizens observe Z and obtain after-tax income $(1 - t)y$. As $\overline{\eta} < 1$, by assumption, for $s(k) = 0,\ k \in K$, donations are zero. In what follows, without loss of generality we assume $y = 1$.

A policy-maker of type 0 will always select $t = 0$ and a zero level of public provision for both public good varieties.

A policy-maker of type $j \neq 0$ would use all tax revenues to fund provision of public good variety j, which she values more than variety j^-, even for $G(j) > \hat{G}$. However, she would select a positive tax rate $t > 0$ if and only if it generates a positive surplus $\overline{\eta}Nty - ty$ for her own type; this requires

$$\overline{\eta} > 1/N; \tag{3}$$

i.e. that the private marginal cost of funding provision through taxes (which equals $1/N$) be at least $\overline{\eta}$, the valuation of her favoured public good variety (which is where tax revenues will be spent). We additionally assume

$$\hat{\eta} < 1/N, \tag{4}$$

which, given that $\hat{G} < Ny/2$, implies that policy-makers will select a tax rate $t < 1$ that leaves some income for private consumption, rather than selecting a rate $t = 1$ that directs all of the economy's income towards public good provision.

The conditions on the preference parameters that define the scenarios of interest can then be summarized as follows:

Assumption 1. $\underline{\eta} \leq \hat{\eta} < 1/N < \overline{\eta} < 1.$

Under these conditions, a policy-maker of type $j \neq 0$ always chooses a tax rate $t^N = \hat{G}/N$ to finance public provision of her favoured good variety at the level $\hat{G}$ and does not engage in public provision of the public good variety she likes less. Absent subsidies, private contributions are zero.

2.4. Policy choices with untied contribution subsidies

Suppose next that ad valorem contribution subsidies at rates $s(k) \in [0, 1]$, $k \in K$, are available to the policy-maker. It may then be profitable for a policy-maker of type $j \neq 0$ to fully or partially rely on subsidies on private donations for the provision of either public good variety j, or variety j^-, or both.

A subsidy on private contributions towards k lowers the private price of giving from unity to $1 - s(k)$, with the gap between the private cost and total cost of donations being publicly funded. The government's budget constraint therefore becomes $\sum_{k \in K} Z(k) + \sum_{k \in K} s(k)V(k) = Nty$, where $V(k) = \sum_j v_j(j)$ is total private donations towards public good variety k.

Consider now the choices faced by a policy-maker of type $j \neq 0$. By financing her favoured variety through taxation, the cost of provision is shared by all taxpayers, and the individual unit cost paid by each citizen (including the policy-maker) is the lowest possible, $1/N$. When subsidies to private contributions are put in place, no matter how large the subsidy is, it will always be the case that the cost of private provision of variety j is incurred by type-j individuals disproportionately more than by type-j^- individuals. Thus, if the policy-maker relies on private donations (entirely or partially), the cost of provision is incurred disproportionately more by type-j individuals, including the policy-maker. Therefore, a policy-maker of type $j \neq 0$ will always choose to fully provide good j publicly without subsidizing private donations of variety j. Given that $\hat{\eta} < 1/N$, however, the policy-maker would never select a policy such that $Z(j) > \hat{G}$. Thus, $Z(j) = \hat{G}$; and since donations are zero for $G(j) \geq \hat{G}$ and $s(j) = 0$, we conclude that $G(j) = Z(j) = \hat{G}$.

Under Assumption 1 the policy-maker never publicly provides the good variety she likes less. However, from the point of view of the same policy-maker, a subsidy on donations towards j^- can be used to manipulate the level of private donations in the direction of a desired level of variety j^- exploiting private donations of group j^-. Even so, the policy-maker would never adopt a positive subsidy rate for variety j^- such that individuals of her own type (type j) make donations towards variety j^-, as the private cost to individuals of type j in this case would be $1/N > \underline{\eta}$.

Suppose then that the policy-maker adopts a positive subsidy rate such that only citizens of type j^- make private donations toward variety j^-, i.e. such that $\underline{\eta} < 1 - s(j^-) < \overline{\eta}$ (which results in a level of private provision of variety j^- equal to $\hat{G}$). In this case, we know from our previous argument that she would choose $Z(j) = \hat{G}$; and that, in order to trigger private donations by type j^-, the subsidy rate must be such that $1 - s(j^-) \leq \overline{\eta}$. The minimum level of subsidy that can sustain donations towards variety j^- (and that maximizes the policy-maker's payoff in this regime) is therefore $s(j^-) = 1 - \overline{\eta}$. The individual cost borne by all citizens, included type-j, if there are positive private donations toward variety j^-, subsidized at rate $s(j^-)$, is $s(j^-)\hat{G}/N$. If type-j's valuation for variety j^- is not high enough, i.e. $\underline{\eta} < (1 - \overline{\eta})/N$, the marginal cost paid by type-j individuals to finance private donations toward variety j^- is higher than the marginal utility from consumption $\underline{\eta}$. In this case a policy-maker would never subsidize donations toward the public good she likes less. The following discussion focuses on scenarios where the above condition is met, implying that, absent a tie-in, the subsidy is zero (whether or not discriminatory subsidies are allowed):

Assumption 2. $\underline{\eta} < \dfrac{1 - \overline{\eta}}{N}$.

Under Assumption 2, a policy-maker of type j never subsidizes donations toward variety j^-:

Lemma 1. *If $\underline{\eta} < (1 - \overline{\eta})/N < \hat{\eta} < 1/N < \overline{\eta}$, a policy-maker of type $j \neq 0$ will always choose (Z, t, s) such that subsidy rates satisfy $1 - s(k) > \overline{\eta}$ (i.e. $s(k) < 1 - \overline{\eta}$), $k \in \{A, B\}$, public provision levels are $Z(j) = \hat{G}$ and $Z(j^-) = 0$, and the tax rate is $t = \hat{G}/N \equiv t^N$.*

Proof in the Appendix.

2.5. Policy choices with tied contribution subsidies (tax relief)

We next characterize policy choices under an institutional constraint that directly ties the subsidy to the tax rate, i.e. a constraint $s(k) = t$, $k \in K$, as implied under a system where private donations attract income tax relief.[10]

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[10]This need not be a permanent constraint: tax relief provisions may be changed by policy-makers but, once in place, they constrain tax policy choices in the short run.

The tie-in between tax rate and subsidy rate implies that a policy-maker of type j is obliged to offer a donation subsidy $s(k) = t,\ k \in K$, for donations towards all public good varieties, including variety j^-, if she wants to raise tax revenues to provide variety j publicly, irrespectively of how much she values good j^-. In mechanical terms, this constraint can be thought of as involving two separate constraints, a non-discrimination constraint, $s(k) = s, k \in K$, and a further tie-in constraint $s = t$. The only tax instrument in this case is t.

For $1 - s = 1 - t > \overline{\eta}$, there will be no private donations to either variety; for $\hat{\eta} < 1 - t \leq \overline{\eta}$ total donations would be $V(k) = \hat{G} - Z(k),\ k \in K$; and for $1 - t \leq \hat{\eta}$ total donations would be $V(k) = q_k N - Z(k),\ k \in K$.

A policy-maker of type 0 always chooses $s = t = 0$ in the absence of any constraint, and so a tie-in is immaterial if the policy-maker is of this type.

As previously shown (Lemma 1), a policy-maker of type $j \neq 0$ would, without a tie-in, choose $s(k)$ to be less than $1 - \overline{\eta}$ (and thus to have no effect on donations if positive), and a tax rate $t^N = \hat{G}/N$. Then, if $1 - t^N > \overline{\eta}$, selecting a level of taxation equal to t^N under a constraint $s = t$ and using the revenues to provide variety j at level $\hat{G}$ would trigger donations by type j^- towards variety j^-. This would, in turn, reduce the level of public provision of variety j below $\hat{G}$ and trigger donations by type j towards variety j. The policy-maker then faces two options: she could either choose to raise the tax rate (and thus the subsidy rate) to the level, t^S, that generates enough revenue to publicly provide $Z(j) = \hat{G}$ units of variety j and also cover the cost of subsidies to private giving towards variety j^-; or she could reduce the tax rate, t^Z, to the point where the subsidy become ineffective at triggering donations, which requires public provision of variety j to be reduced below $\hat{G}$.

Consider the first option: the policy-maker rises the tax rate to $t = t^S > 1 - \overline{\eta}$ to provide $Z(j) = \hat{G}$ and cover the cost of private donations toward variety j^-. If donations towards j^- equal $V(j^-) = \hat{G}$, the government's budget constraint is $t^S N = \hat{G} + t^S \hat{G}$, giving

$$t^S = \frac{\hat{G}}{N - \hat{G}} \equiv t^{S\prime}. \tag{5}$$

However, if donations by j^--type individuals exhaust their income before their total level of subsidized donations reaches $\hat{G}$ (i.e. $(1 - t^{S\prime})\hat{G} > q_{j^-} N$) the subsidized level of provision of variety j^- will be $\dot{G} = q_{j^-} N/(1 - t^S) < \hat{G}$.

The government's budget constraint in this case is $t^S N = \hat{G} + t^S n_{j^-}/(1 - t^S)$, where $n_{j^-} = q_{j^-} N$, giving a tax rate $t^S = t^{S\prime\prime}$.

The rest of our discussion rules out unrealistic scenario where, with a subsidy $s = t^S$, type-j^- individuals would use all their income to make donations towards collective consumption, making their private consumption equal to zero.

The alternative option for the policy-maker is to choose to publicly provide variety j at a level below $\hat{G}$ and lower t up to a point where a tie-in $t^Z = s$ does not trigger donations:

$$t^Z = 1 - \overline{\eta}. \tag{6}$$

A subsidy rate $s(k) = t^Z$ shuts down donations by all types, allowing the policy-maker to devote all public funds to providing variety j, resulting in a gain to the policy-maker equal to $(\overline{\eta} - \underline{\eta})\, t^Z N$.

The policy-maker's optimal choice in this case can be determined simply by comparing the level of payoff the policy-maker obtains under each alternative: her payoff for $t = t^S$, where $Z(j) = \hat{G}$ and where there are donations $V(j^-) = \min\{\hat{G}, n_{j^-}/(1 - t^S)\}$ subsidized at rate t^S; and her payoff for $t = t^Z$ (or more precisely just below it), in a regime where there are no private donations and public provision of variety j is at level $t^Z N < \hat{G}$.

The difference between the payoff levels obtained by policy-maker under the two regimes is increasing in $\overline{\eta}$ and decreasing in $\underline{\eta}$; and so the minimum value of $\overline{\eta}$ that satisfies the inequality, which we shall denote as $\tilde{\eta}$, is a decreasing function of $\underline{\eta}$. Thus, $\overline{\eta} > \tilde{\eta}$ represents a sufficient condition for a subsidy tie-in to induce the policy-maker to offer a positive level of subsidy:

Lemma 2. *For $\hat{G} < \tilde{G}$, if $\overline{\eta} \leq (N - \hat{G})/N$ a tie-in constraint has no effect on the choice of the policy-maker of type $j \neq 0$. If $(N - \hat{G})/N < \overline{\eta} \leq \tilde{\eta}$, it induces a policy-maker to select $t = t^Z = 1 - \overline{\eta}$, lowering the level of public provision of variety j to $(1 - \overline{\eta})N < \hat{G}$ and leaving donations towards both varieties at zero. If $\overline{\eta} > \tilde{\eta}$ it results in a choice of tax (and subsidy) $t = t^{S\prime} = \hat{G}/(N - \hat{G})$ and a level $\hat{G}$ of donations towards variety j^-. A sufficient condition for the latter to occur is $\overline{\eta} > \tilde{\eta}_{MIN}$.*

Proof in the Appendix.

It is worth noting that a partial tie-in that allows relief to be zero for one of the two collective good varieties would have no effect on policy choices, as a majority type-$j \neq 0$ policy-maker would, in that case, restrict tax relief to donations towards variety j (which would, in turn, be redundant as no donations towards variety j would take place for $Z(j) = \hat{G}$).

3. Tax relief for donations and political competition

Moving now to stage 1 of the game, we study the implications of a subsidy tie-in for the outcome of political competition. Our focus is on scenarios where there is no absolute majority type (and so there is meaningful political competition), i.e. $q_j < 1/2,\ j \in J$, and where $q_a > q_0 > q_b$ (implying that in a contest between a type-a and a type-b candidate, the former always win).[11] We first discuss how a subsidy tie-in affects voting outcomes and then how a tie-in can arise endogenously as part of a fiscal constitution.

3.1. Subsidy tie-in and Condorcet outcomes

To characterize political outcomes in a representative system, we first look at the level of support that a candidate can expect to receive in a sequence of two-candidate majority voting races; that is, we look at the outcomes of two-candidate elections in which voters do not use weakly-dominated strategies. Since no single type constitutes a majority, the preferences of two out of three types will dictate the outcome of the election.[12] Implications for the case of plurality voting are discussed in the following subsection.

In all cases, the most-preferred candidate type for each citizen is always one of their own type, irrespectively of whether or not a subsidy tie-in is present.

To understand how individuals rank candidates of a type different from their own, suppose first that there is no subsidy tie-in. If the policy-maker is of type 0, the utility

[11]The case $q_a < q_0 < q_b$ is symmetrically identical.

[12]We assume that candidacy involves no cost, and so standing for election is always a weakly undominated strategy. We also assume that no citizen enters if another citizen of the same type does; since entering when there is another citizen of the same type entering as a candidate cannot produce a better electoral outcome for the second entrant, and could produce a worse one. This allows us to ignore repetitive equilibria.

of all types is $y = 1 \equiv U_j(0)$. If the policy-maker is of type $j \neq 0$, then the utility of type j^- is $1 - t^N + \underline{\eta}\hat{G} = 1 - (1/N - \underline{\eta})\hat{G} \equiv U_{j^-}(j \neq 0) < 1$, and the utility of a type-0 individual is $1 - t^N = 1 - \hat{G}/N < 1 \equiv U_0(j \neq 0)$. Thus, absent a subsidy tie-in, the ranking of policy-maker's type by each citizen type is

$$
\begin{aligned}
&0 \succ_0 a \sim_0 b;\\
&b \succ_b 0 \succ_b a;\\
&a \succ_a 0 \succ_a b.
\end{aligned}
\tag{7}
$$

($\succ_j$ denotes type j's preference relation.) This leads to the following result:

Lemma 3. *If untied tax reliefs are available, the Condorcet winner is a candidate of type* 0.

Now consider a scenario with a subsidy tie-in (tax relief). If the policy-maker is of type 0, the utility of all types is still $U_j(0) = 1$. If the policy-maker is of type $j \neq 0$, we must distinguish three cases: (i) if $\overline{\eta} < (N - \hat{G})/N$, the subsidy tie-in has no effect and rankings are as for (7); (ii) if $(N - \hat{G})/N < \overline{\eta} \leq \tilde{\eta}$, the policy-maker selects a tax rate $t^Z = 1 - \overline{\eta}$, thus lowering the public provision of variety j and inducing zero donations toward both varieties (all citizen types incur the cost of the tax, but only variety j is provided); the rankings of candidate types in this case remain as for (7); (iii) if $\overline{\eta} > \tilde{\eta}$, the policy-maker selects a tax rate $t = t^{S'}$, which supports a level $\hat{G}$ of public provision of variety j and triggers private provision of variety j^-; in this case a type-j^- citizen prefers a policy-maker of type $j \neq 0$ to one of type 0 if and only if $U^S_{j^-}(j \neq 0) > U_j(0) = 1$.

With reference to case (iii), it is always possible to find a combinations of values η and N for which, with a subsidy tie-in, type-j^- voters prefer a type-$j \neq 0$ policy-maker to a type-0 policy-maker. Two forces drive this result: first, when $\overline{\eta}$ is high enough, say $\overline{\eta} > \tilde{\tilde{\eta}}$, type-$j^-$ individuals place a high valuation on their favoured good variety; second, for N large enough, say $N > \tilde{N}$, the per capita cost (per capita tax) of both publicly providing public goods and subsidizing private provision is low. Then citizens of type j^- would prefer a policy-maker of type $j \neq 0$, who both selects a low tax and subsidizes private donations toward variety j^-, to a policy-maker of type 0 who chooses zero public provision and offers no subsidy. The ranking of candidate types by type-b voters under a subsidy tie-in changes to

$$b \succ_b a \succ_b 0. \tag{8}$$

We can then state the following result:

Proposition 1. *In the presence of a tied-in donation subsidy (tax relief), and for $q_a > q_b$, sufficient conditions for a candidate of type a to be the Condorcet winner are $\overline{\eta} > \tilde{\eta}_{MIN}$ and $N \geq \tilde{N}$.*

Proof in the Appendix.

Under these conditions, a tie-in induces a type-$j \neq 0$ policy-maker to offer a positive donation subsidy, decreasing the price of giving towards variety j^- by j^--type individuals and allowing them, in this way, to gain access to the public good variety that they prefer but would not be publicly provided otherwise. This makes a type-$j \neq 0$ policy-maker more attractive to type-j^- individuals in comparison with a type-0 policy-maker.

3.2. Plurality voting

Consider now the case of plurality voting, in a scenario with the following features: (i) the winning candidate is that which receives the most votes (relative majority); (ii) candidacy involves no cost; (iii) voting is sincere but candidate choices are strategic (later we also briefly address the case where voting is strategic). Given our assumption $q_j < 1/2$, $j \in J$, no single type constitutes a majority, and so the behaviour of two out of three types again dictates the outcome of the election. Again, the most-preferred candidate type for each voter is always one of their own type, irrespectively of whether or not a subsidy tie-in is present. Thus, if a citizen of each type $j \in J$ stands for the election, each candidate j will receive $q_j N$ votes.

First we consider the case in which there are no tax-reliefs. Suppose a candidate of type b stands for election. Under sincere voting, given the ranking preferences (7) a type-a candidate would win the election. If no type-b citizen stands for election, under sincere voting type-b citizens would vote for a type-0 candidate, who would then win the election. Given that $U_b(a) < U_b(0)$ when tax reliefs are not available, and anticipating that candidacy of a type-b individual will result in a type-a candidate winning the election, citizens of type b will never stand for election and so type 0 wins the electoral competition.[13]

When a subsidy tie-in (tax relief) is available and $\overline{\eta} > \tilde{\eta}_{\text{MIN}}$ and $N \geq \tilde{N}$, the preference ranking of type-b citizens becomes (8).

If a candidate of each type stands for election, under sincere voting each candidate obtains $q_j N$ votes, and given $q_a > q_0 > q_b$, a candidate of type a wins the election. On the other hand, if a candidate of type 0 does not stand for election, type 0 citizens are indifferent between a type-a and a type-b candidate, and so either type can win the election. Given that the cost of candidacy is zero, type-0 citizens are indifferent with respect to the decision of standing for election. If type-b citizens anticipate that with no candidate of type 0 she would win the election, they would choose to stand, and type-a citizens in this case would be indifferent about whether or not to stand. Analogously, if type-a citizens anticipate that with no candidate of type 0 she would win the election, they would choose to stand, and type-b citizens in this case would be indifferent about whether or not to stand. Thus in any equilibrium of this game a candidate of type $j \neq 0$ wins the election.

We can then state the following result:

Proposition 2. *Under plurality voting, if citizen vote sincerely, candidacy choices are strategic, and candidacy is costless, absent a tied-in subsidy (tax relief) a candidate of type* 0 *wins the electoral competition. With a tied-in donation subsidy, sufficient conditions for a candidate of type $j \neq 0$ to win the election are $\overline{\eta} > \tilde{\eta}_{MIN}$ and $N \geq \tilde{N}$.*

Again, a tie-in forces policy-makers of type $j \neq 0$ to offer a positive donation subsidy that allows type-j^- individuals to gain access to the public good variety they prefer but that would not be publicly provided otherwise. By doing so, it prevents a type-0 candidate winning.[14]

[13]Type-a citizens anticipate that a candidate of her own type never wins the election, and therefore are indifferent about standing as candidates or not standing.

[14]If voting is strategic, results remain unchanged, with outcomes being driven by strategic voting choices rather than by candidacy choices.

4. Donation relief as an equilibrium outcome

4.1. Securing re-election

The results of the previous section show that tax relief can change the preference ordering of citizens over candidates and, in this way, shape political outcomes. In this section we demonstrate that, if temporary commitment over tax rules is feasible and $\overline{\eta} > \tilde{\eta}_{\text{MIN}}$ (i.e. if a tie-in constraint makes a difference for how candidates are ranked), donation relief can be leveraged on strategically to secure re-election.

Suppose that elected candidates stay in office for one period. During her term in office policy-makers can modify tax provisions, with the change coming into force in the subsequent term. Specifically, consider a case in which a policy-maker of type $j \neq 0$ can introduce (or remove) a non-discriminatory constraint, $s(k) = t$ for $k \in K$, with her decision coming into effect in the subsequent term and forcing her successor in office to adopt a subsidy rate such that $s(k) = t$, $\forall k \in K$, for any tax rate, t, she chooses.

If a new electoral contest is run and there is no tie-in constraint in place, the incumbent would lose to a type-0 challenger. By committing to a tie-in, on the other hand, the incumbent can secure either re-election or election of a type-j candidate, and, by doing so, a payoff for her own type that exceeds the payoff under a type-0 policy-maker. This is because whenever the conditions for Proposition 1 and 2 apply, a type-j^- individual prefers the policy choice of a type-j policy-maker to that of a type-0 policy-maker; and vice-versa.[15]

If, instead, a type-0 policy-maker is in office to begin with, then she would not choose to introduce a tie-in constraint, which in turn would secure that a type-0 candidate would always be elected, indefinitely. So, if the choice of whether or not to introduce a tie-in constraint is left to elected policy-makers, whether or not it will arise depends on the type of the policy-maker in office in the first period; i.e. it is fully path-dependent.

While a type-$j \neq 0$ policy-maker may wish to commit to a subsidy tie-in, she would never want to enter into a commitment with respect to the tax rate, even if it

[15]Since the payoff to a type-j individual under a type-j^- policy-maker is no less than the payoff to a type-j^- individual under a type-j policy-maker, and the payoffs of both types are the same under a type-0 policy-maker.

were possible (see Appendix B for a proof). In other words, the strategic use of tax relief does not stem from policy-makers' inability to commit to tax rates.

4.2. Donation relief in tax constitutions

A constraint that ties the subsidy rate to the tax rate could also arise at a constitutional stage (stage 0) in which citizens have to vote, before the election takes place, over the adoption of the tie-in constraint regardless of the type of future elected policy-makers. Under the conditions for which Proposition 1 applies, a policy-maker of type $j \neq 0$ will be elected in stage 1 if and only if a tie-in constraint is in place; absent the constraint, a policy-maker of type 0 will win the election under both plurality rules (Lemma 3 and Lemma 4). Then a constraint will receive the support of both type-a and type-b individuals if their anticipated utility from introducing the constraint is higher than the utility they would obtain with the election of a type-0 candidate. This is always the case whenever the conditions for Proposition 1 and 2 are met.

Figure 2 depicts the region of parameter values $\overline{\eta}$ and N (the shaded area) for which a constitutional rule on granting tax relief for donations would receive majority support – i.e. where Propositions 1 and 2 apply – for $\hat{G} = N/5$ (implying $t^S = 1/4$), $q_b = 1/4$ (implying $\hat{G} = N/5 < n_b/(1 - t^S) = (N/4)/(3/4) = N/3$), $q_a = 7/16$, $q_0 = 5/16$, $\underline{\eta} = 1/(20N)$ and $\hat{\eta} = 2/(3N)$.

Although most tax systems in developed economies offer tax relief for charitable donations, tax relief provisions typically do not have constitutional force: tax provisions *can* be changed, albeit more slowly than tax rates can. Nevertheless, even if indefinite commitment over tax relief provisions is not a feature of tax constitutions, for a subsidy tie-in to arise in political equilibrium it is enough to have rules in place that make changing the structure of tax provisions sufficiently slow; in turn, it is easy to show that such rules would receive majority support at a constitutional stage.

Suppose that there is a constitutional stage (stage 0) where citizens can vote on whether or not to introduce a procedural rule such that changes to the structure of the tax system take at least one term to be decided and enacted. At stage 1, a candidate is chosen at random, after which the candidate selects taxes for stage 1 and decides whether or not to introduce tax relief. An election is then carried out to select a stage-2 policy-maker. Also suppose that the conditions in Proposition 1 and 2 are met. If

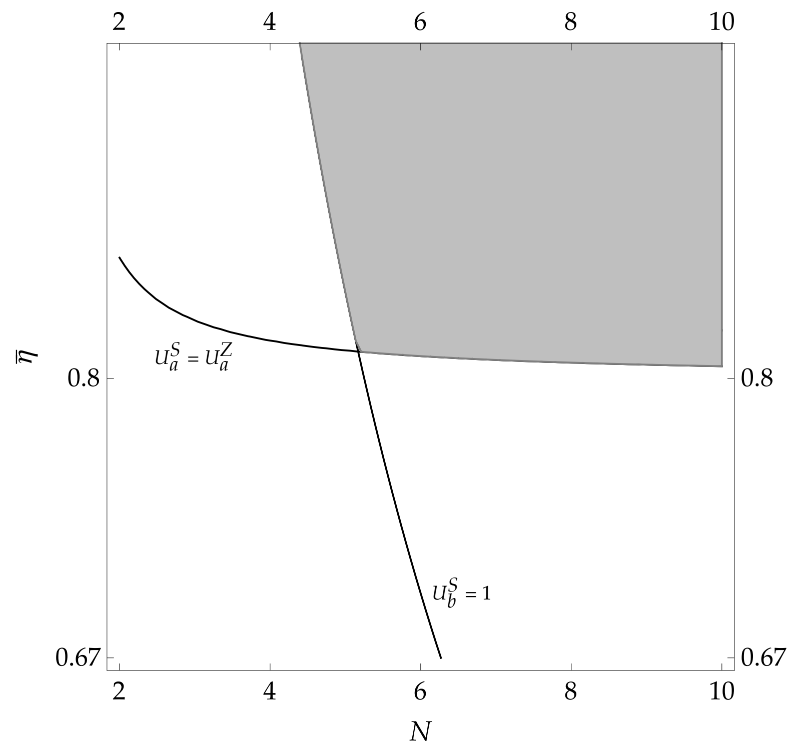

Figure 2: Agreement on a constitutional tie-in of donation subsidies to tax rates

a type-0 policy-maker is selected in the first stage (which occurs with probability q_0), whether or not the procedural rule is introduced in stage 0 is irrelevant: she will never introduce a tie-in constraint. If a type-$j \neq 0$ candidate is selected at stage 1 (which occurs with probability $1 - q_0$), she will introduce a subsidy tie-in (which will come into force in stage 2) if and only if the rule has been introduced at stage 0; by doing so, she will secure the election of a candidate of type $j \neq 0$ at stage 2,[16] an outcome that, when a subsidy tie-in is present, is preferred by both type-$j \neq 0$ individuals to a type-0 candidate winning. This means that, at stage 0, introducing procedural rule that slows down the reversal of tax relief provisions receives the support of both type-a and type-b voters.

Donation relief can thus arise in equilibrium whether, at the constitutional stage, citizen vote over the introduction of a permanent tie-in constraint or over the introduction of tighter procedural rules for changing the structure of tax provisions (including tax relief provisions).

4.3. Discussion

The preceding analysis has aimed to articulate a political-economy rationale for donation relief, and has shown how it can arise as part of a political equilibrium. The model we have used to develop our arguments is designed to highlight the structure of the problem in its simplest possible form; but the arguments and conclusions do not hinge on the specific assumptions we have made. For example, the symmetry in preferences between individual types that value public goods is presentationally convenient but is not essential.

We have also abstracted from income differentials: allowing for income heterogeneity would translate into heterogeneity in the private cost of public funds to different individual types, but would otherwise leave the structure of the problem unchanged. A possible interpretation of our model is one where the preferences for different public good varieties by different types are locally different because of income differentials – i.e. where the minority "swing" type of our model is a higher-income type that regards the majority-favoured public good varieties as inferior to higher

[16]In the second period a candidate $j \neq 0$ is elected whenever the tie-in constraint is put in place, and $q_j > q_{j^-}$.

quality varieties that are privately funded.[17]

Our discussion has focused on tax relief for giving, but a similar argument could also be made with respect to tax relief that is offered for semi-private or fully private expenditures (e.g. private health care expenditures). Indeed, tax relief can be viewed as a particular instance of "secondary" government measures that are structurally nested (explicitly or implicitly) in other measures – structurally in the sense of involving comparatively more inertia with respect to policy changes. A broader implication of our analysis is then that such secondary measures may play a key role in shaping policy outcomes with respect to the main measures that they accompany, and may play a strategic role in securing political consensus.

5. Concluding remarks

Tax incentives for giving are present in the tax systems of most developed economies. A key feature of these provisions is that they are linked to the level of taxation and are difficult to reverse. In this paper, we have shown that tax relief on donations protects minorities from outcomes where high taxes are exclusively used to finance provision of public goods that these minorities do not value. Through these incentives, political forces can cement alliances that would otherwise not be able to coalesce.

If we look at the history of tax institutions, and at how tax relief is used in practice, we find clues that point to tax relief being used to mediate differences in policy preferences. In the case of the US, for example, the charitable deduction was instituted in 1917 simultaneously with a substantial tax hike on the very rich to support the war effort. And, although the stated rationale at the time for introducing the deduction was to promote "social spending" that would support lower-income groups and the poor, looking at the current distribution of US charitable contributions by category,

[17]With progressive income taxation, the subsidy implied by income tax relief on donations towards the public goods that are favoured by higher-income minorities is higher than the average rate of taxation, and so the appeal of income tax deductions for those minorities is even stronger. Our analytical setting can readily be modified to allow for different levels of income and different (but interlinked) marginal rates of taxation for types a and b, with no change in the structure of the arguments and no change in conclusions.

we see that only a fraction of total contributions can be considered to be redistributive (Clotfelter, 2016).[18]

Our argument also has relevance for a long-standing puzzle surrounding donation relief: as Roberts (1984) first pointed out, even if we abstract from any heterogeneity in preferences for public goods, tax relief for donations can only be rationalized as being part of an optimal policy mix if the absolute value of the price elasticity of giving exceeds unity; if it less than unity, then directly providing the public goods or directly transferring funds to charities are more effective ways of using public funds. Yet the empirical evidence seems to suggest that giving is relatively price-inelastic – for UK donors, for example, Almunia *et al.* (2018) obtain a central estimate of about -0.1. The political-economy rationale that we have highlighted in our analysis can help us reconcile this evidence with the tax institutions that we observe.

[18] Another clue comes from the evolution of provisions for "tax expenditures" (not limited to charitable deductions) in the US tax code between 1980 and 2000: they were tightened by Republican administrations in the 1980s and then relaxed by later Democratic administrations, despite the fact the provisions predominantly benefit higher-income minorities. In the UK, the question of whether donation incentives should be fully tied to taxation took center stage during 2008/2009 (see Scharf and Smith, 2015), when proposals were considered that would decouple the level of relief from marginal tax rates and introduce a composite relief rate for donors in all tax brackets. The proposals were later abandoned – arguably for political reasons.

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Appendix A Proofs of lemmas and propositions

A.1 Proof of Lemma 1

It is easy to show that a policy-maker of type $j \neq 0$ always prefers to provide her favoured good variety (j) through public provision rather than subsidize donations towards it. First, given that $\hat{\eta} < 1/N$ and that triggering donations towards j would involve her own type making contributions, the policy-maker would never select a policy such that $G(j) > \hat{G}$, either through public provision or through subsidies or a combination of the two, because in all cases this would involve a private marginal private cost for type j of no less than $1/N$. To see this, note that a necessary and sufficient condition for a subsidy to be preferable to public provision, from the point of view of a policy-maker of type $j \neq 0$, in order to finance provision of variety j at level $\hat{G}$ is

$$\frac{\hat{G}}{N} > s(j)\,\frac{\hat{G}}{N} + (1 - s(j))\,v_j(j) = s(j)\,\frac{\hat{G}}{N} + (1 - s(j))\,\frac{\hat{G}}{q_j N}. \tag{9}$$

This would require $q_j > 1$, which is a contradiction.[19]

A policy-maker of type $j \neq 0$ could conceivably wish to subsidize donations towards variety j^- (her less favoured public good variety) in order to induce donors of type j^- to supply the variety she favours relatively less at a low cost to its own type, making diverting tax revenues to partially fund the provision of variety j^- worthwhile to type j despite the fact that $\underline{\eta} < 1/N$. However, it can be shown that doing so will never be optimal for a type-$j \neq 0$ policy-maker. First, the policy-maker would never adopt a positive subsidy rate for variety j^- such that individuals of her own type (type j) make donations towards variety j^- – as the private cost to individuals of type j in this case would be $1/N > \underline{\eta}$. Suppose instead that the policy-maker adopts a positive subsidy rate such that only citizens of type j^- make private donations toward variety j^-, i.e. such that $\underline{\eta} < 1 - s(j^-) < \overline{\eta}$ (which results in a level of private provision of variety j^- equal to $\hat{G}$).

In this case, we know from our previous argument that she would choose $Z(j) = \hat{G}$, and so her payoff would be $U_j(c_j, G) = 1 - t' + (\underline{\eta} + \overline{\eta})\,\hat{G}$, with $t' = (1 + s(j^-))\,\hat{G}/N$, which covers public provision of variety j and the subsidization of private provision of variety j^- by type j^- individuals, both at level $\hat{G}$. The minimum level of subsidy that can sustain donations towards variety j^- (and that maximizes the policy-maker's payoff in this regime) is $s(j^-) =$

[19] The above discrete comparison does not consider combinations where public good variety j is partly publicly provided and partly privately provided by subsidized donations. However, it is easy to verify that if the donation subsidy is set optimally for a given level of $Z_j < \hat{G}$ (so as to induce a total volume of donations equal to $\hat{G} - Z_j$), it is always optimal for the policymaker to increase Z_j up to $\hat{G}$, which in turn chokes private contributions.

$1 - \overline{\eta}$, and so the policy-maker's payoff can be expressed as

$$\begin{aligned} U_j(c_j, G) =& 1 - (2 - \overline{\eta})\, \hat{G}/N + (\underline{\eta} + \overline{\eta})\, \hat{G} \\ =& 1 - \hat{G}/N + \overline{\eta}\, \hat{G} + \Big(\underline{\eta} - (1 - \overline{\eta})/N\Big)\, \hat{G}. \end{aligned} \tag{10}$$

With a zero subsidy, on the other hand, the policy-maker's payoff is

$$U_j(c_j, G) = 1 - \hat{G}/N + \overline{\eta}\, \hat{G}, \tag{11}$$

which is greater than or equal to (10) if and only if $\underline{\eta} < (1 - \overline{\eta})/N$, which never holds under Assumption 1. Thus a policy-maker of type $j \neq 0$ will always choose a policy (Z, t, s) such that subsidy rates does not trigger donations toward either varieties ($1 - s(k) > \overline{\eta}$) and the tax rate, $t = \hat{G}/N \equiv t^N$, is such that she publicly provides only the variety she likes most at level $Z(j) = \hat{G}$, and does not fund the public good she likes less, $Z(j^-) = 0$.

A.2 Proof of Lemma 2

As previously shown (Lemma 1), a policy-maker of type $j \neq 0$ would, without a tie-in, choose $s(k)$ to be less than $1 - \overline{\eta}$ (and thus to have no effect on donations if positive), and a tax rate $t^N = \hat{G}/N$. Then, if $1 - t^N > \overline{\eta}$, i.e. if $\overline{\eta} < (N - \hat{G})/N$ a subsidy tie-in at the policy-maker preferred rate of taxation has no effect, and so it does not constrain the policy-maker's choice, which remains unchanged under a tie in. If, however, $\hat{\eta} < 1 - t^N < \overline{\eta}$, i.e.

$$\overline{\eta} \geq \frac{N - \hat{G}}{N}, \tag{12}$$

under a constraint $s = t$, selecting a level of taxation equal to t^N trigger donations by type j^- towards variety j^-, and this would in turn reduce public provision of variety j below $\hat{G}$ and thus also trigger donations by type j towards variety j. Thus, whenever (12) holds, the policy-maker could either choose to raise the tax rate (and thus the subsidy rate) to the level, t^S, that generates enough revenue to publicly provide $Z(j) = \hat{G}$ units of variety j and cover the cost of subsidies to private giving towards variety j^-; or she could reduce the tax rate, t^Z, to the point where the subsidy become ineffective at triggering donations, which requires public provision of variety j to be reduced below $\hat{G}$.

Under the first option, where the policy-maker chooses $t = s = t^S > 1 - \overline{\eta}$, if donations towards j^- equal $\hat{G}$, the government's budget constraint is $t^S N = \hat{G} + t^S \hat{G}$, giving

$$t^S = \frac{\hat{G}}{N - \hat{G}} \equiv t^{S\prime}. \tag{13}$$

However, if $(1 - t^{S\prime})\hat{G} > n_{j^-}$, where $n_{j^-} = q_{j^-} N$, then donations towards variety j^- by j^- individuals exhaust their income before their total level of subsidized donations reaches $\hat{G}$, and so net-of-subsidy donations towards variety j^- equal n_{j^-}, and the subsidized level of provision becomes $n_{j^-}/(1-t^S) < \hat{G}$. The government's budget constraint in this case is $t^S N = \hat{G} + t^S n_{j^-}/(1-t^S)$, giving

$$t^S = \frac{\hat{G} + N - n_{j^-} - \sqrt{(\hat{G} + N - n_{j^-})^2 - 4N\hat{G}}}{2N} \equiv t^{S\prime\prime}. \tag{14}$$

Let then $\tilde{G}$ be the level of public good such that $t^{S\prime} = t^{S\prime\prime}$:

$$\tilde{G} = \frac{N + n_{j^-} - \sqrt{N^2 + {n_{j^-}}^2 - 6Nn_{j^-}}}{4}. \tag{15}$$

For $\hat{G} \leq \tilde{G}$ the tax rates are such that $t^{S\prime} \leq t^{S\prime\prime}$, whereas for $\hat{G} > \tilde{G}$ we have $t^{S\prime} > t^{S\prime\prime}$. Thus, a policymaker would choose a tax rate $t^S = t^{S\prime}$ if $\hat{G} \leq \tilde{G}$ and a tax rate $t^S = t^{S\prime\prime}$ if $\hat{G} > \tilde{G}$.

For $\hat{G} > \tilde{G}$, it is always the case that $t^S = t^{S\prime\prime} < t^{S\prime} < 1 - \hat{\eta}$ and $G < \hat{G}$. For $\hat{G} \leq \tilde{G}$, on the other hand, $t^S = t^{S\prime} < t^{S\prime\prime}$; and so, in principle, it would be possible for donations towards variety j^- to rise above $\hat{G}$ if $t^{S\prime\prime} > 1 - \hat{\eta}$. It is easy to show that this case can be ruled out: both $t^{S\prime}$ and $t^{S\prime\prime}$ are increasing in $\hat{G}$ and become equal to each other at $\hat{G} = \tilde{G}$, where

$$t^S = 1/2 - \frac{n_{j^-} + \sqrt{N^2 + {n_{j^-}}^2 - 6Nn_{j_-}}}{2N} < 1/2 < 1 - 1/N < 1 - \hat{\eta} \tag{16}$$

(since $N \geq 3$ and $\hat{\eta} < 1/N$, by assumption). Thus, for $\hat{G} \leq \tilde{G}$ we always have $t^S = \min\{t^{S\prime}, t^{S\prime\prime}\} < 1 - \hat{\eta}$.

The rest of our analysis will focus on the case $\hat{G} \leq \tilde{G}$, ruling out unrealistic scenario where, with a subsidy $s = t^S$, j^--type individuals would use all of their income to make donations towards collective consumption, making their private consumption equal to zero.

The alternative option for the policy-maker is to choose to publicly provide variety j at a level below $\hat{G}$ and lower t up to a point where it equals

$$t^Z = 1 - \overline{\eta}, \tag{17}$$

the minimum subsidy rate that does not trigger donations. When this applies, however, it would always pay to marginally lower the tax rate further so as to shut down donations by all types, as doing so would divert funds from provision of variety j^- to that of variety j, resulting in a gain to the policy-maker equal to $(\overline{\eta} - \underline{\eta})\, t^Z N$. This implies that the policy-maker's optimal choice can be determined simply by comparing the level of payoff the policy-maker obtains for $t = t^S$, where $Z(j) = \hat{G}$ and there are donations $V(j^-) = \min\{\hat{G}, n_{j^-}/(1 - t^S)\}$ subsidized at rate t^S with the corresponding level of payoff for $t = t^Z$ (or more precisely just below it) in a regime where there are no private donations and public provision of variety j is at level $t^Z N < \hat{G}$.

We next compare the level of payoff the policy-maker obtains for $t = t^S = t^{S\prime}$ with the level of payoff the policy-maker would obtain for $t = t^Z$. A type j policy-maker always prefers a tax rate t^S to a tax rate t^Z, if and only if

$$(\overline{\eta}+\underline{\eta})\hat{G}-t^S=(\overline{\eta}+\underline{\eta})\hat{G}-\frac{\hat{G}}{N-\hat{G}}>\overline{\eta}Nt^Z-t^Z=(1-\overline{\eta})(\overline{\eta}N-1). \tag{18}$$

The difference between the left- and right-hand sides of the inequality is increasing in $\overline{\eta}$ and decreasing in $\underline{\eta}$, and so the minimum value of $\overline{\eta}$ that satisfies the inequality, which we shall denote as $\tilde{\eta}$, is a decreasing function of $\underline{\eta}$. Then a value of $\overline{\eta}$ that satisfies the inequality for $\underline{\eta}=0$ will also do so for any value of $\underline{\eta}$ between zero and $1/N$. Setting $\underline{\eta}=0$ and solving for the value of $\overline{\eta}$ that makes the condition binding, we obtain

$$\overline{\eta}>\frac{N+1-\hat{G}+\sqrt{(1+N-\hat{G})^2-4N(1-\hat{G}/(N-\hat{G}))}}{2N}\equiv\tilde{\eta}_{\text{MIN}}, \tag{19}$$

which is always greater than the lower bound $1/(N-\hat{G})$ in (12). Condition (19) thus represents a sufficient condition for a subsidy tie-in constraint to induce the policy-maker to offer a positive level subsidy for donations on j^-[20].

A.3 *Proof of Proposition 1*

Consider a scenario with a subsidy tie-in (tax relief). If the policy-maker is of type $j=0$, the utility of all types is still $U_j(0)=1$. If the policy-maker is of type $j\neq 0$, then we must distinguish three cases: (i) if $\overline{\eta}<(N-\hat{G})/N$, the subsidy tie-in has no effect and rankings are as for (7); (ii) if $(N-\hat{G})/N<\overline{\eta}\leq\tilde{\eta}$, utility for type j^- under a $j\neq 0$-type policy-maker is $1-t^Z+\underline{\eta}t^ZN=1-(1-\overline{\eta})(1-\underline{\eta}N)\equiv U^Z_{j^-}(j\neq 0)<1$ (since $\underline{\eta}<1/N$), and utility for type 0 is $1-t^Z=\overline{\eta}\equiv U_{j^-}(j\neq 0)<1$ – the rankings of candidate types in this case thus remain as for (7); (iii) if $\overline{\eta}>\tilde{\eta}$ utility for type j^- under a $j\neq 0$ policy-maker is $1-t^S-(1-t^S)\hat{G}/(q_{j^-}N)+(\overline{\eta}+\underline{\eta})\hat{G}\equiv U^S_{j^-}(j\neq 0)$. This is greater than $U_j(0)=1$ if and only if

$$\overline{\eta}>\frac{(1+q_{j^-})N-2\hat{G}-\underline{\eta}(N-\hat{G})q_{j^-}N}{(N-\hat{G})q_{j^-}}\equiv\tilde{\tilde{\eta}}. \tag{20}$$

The limit for $N\to\infty$ of the difference $\tilde{\eta}-\tilde{\tilde{\eta}}_{j^-}$ is $1+\underline{\eta}>0$. Thus, by continuity, there must be a value $\tilde{N}\geq 0$ satisfying

$$\tilde{\eta}-\tilde{\tilde{\eta}}\geq 0,\quad \tilde{N}\geq 0,\quad \tilde{N}(\tilde{\eta}-\tilde{\tilde{\eta}})=0, \tag{21}$$

[20] The policy-maker could also shut down donations towards variety j^- by selecting $t=1$ and $Z(j)=N$. This is preferred to the above outcome if $\overline{\eta}\hat{G}+\hat{\eta}(N-\hat{G})>1-\hat{G}/(N-\hat{G})+(\overline{\eta}+\underline{\eta})\hat{G}$. Solving for the minimum value of $\hat{\eta}$ that satisfies this, we find that it equals $1/N$ for $\hat{G}=0$ and is increasing in $\hat{G}$ for $\hat{G}<N/2$ (as assumed). Thus, the restriction $\hat{\eta}<1/N$ rules out this possibility.

above which $\overline{\eta} > \tilde{\eta} > \tilde{\tilde{\eta}}$. Then, for $\overline{\eta} > \tilde{\eta}$ and $N > \tilde{N}$, the rankings of candidate types by type-b voters under a subsidy tie-in will change to

$$b \succ_b a \succ_b 0; \tag{22}$$

and so preference rankings become

$$\begin{aligned} &0 \succ_0 a \sim_0 b; \\ &b \succ_b b \succ_b 0; \\ &a \succ_a b \succ_a 0. \end{aligned} \tag{23}$$

Thus, under a subsidy tie-in the Condorcet winner is a type-a candidate.

Appendix B Committing to a tax rate

Suppose that a policy-maker of type a is in office. If a candidate of her type is a Condorcet winner in the absence of any constraints, then commitment over the level of taxation is immaterial. If a candidate of type 0 is a Condorcet winner in the absence of constraints, then committing to a tax $t = t^0 = 0$ could allow a type $j \neq 0$ to secure re-election but re-election would produce the same allocation of resources as if a type-0 candidate had won. Still, a policy-maker of type $j \neq 0$ could commit to a positive tax rate that is equal to or below t^N and support a level of provision of variety j that is equal to or below $\hat{G}$. Restricting attention to equilibria that do not rely on weakly undominated strategies, a type-$j \neq 0$ could also not secure re-election by committing to a tax rate $t \in (0, t^N]$.[21] We can conclude that a policy-maker of type a never commits to a tax rate.

[21] There exists an equilibrium in weakly undominated strategies in which a type-a policy maker pegs the tax rate at $t = t^N$ and a type-0 policy-maker (who does not place any value on winning per se and is indifferent between alternative uses of public funds) devotes all funds to provide variety a if elected (off the equilibrium path); voters of both type 0 and type b are then indifferent between a type-0 and a type-a candidate, which in turn makes it possible for a type-a candidate to be re-elected.