Tax me if you can: Philanthropy, tax incentives and inefficiency

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Abstract

Whether philanthropy is an effective way to correct for market (as well as political) failures has been held under scrutiny. Yet, governments provide generous tax incentives to philanthropists; and when the wealthiest citizens create foundations with their names and donate millions in order to provide public goods, society welcomes their behavior with enthusiasm. In this paper, we investigate the conditions under which philanthropists improve on social welfare by providing alternative public goods, when philanthropy is rewarded with tax credits, as in many European countries as well as US states.

Our results indicate that when the technology of provision of public goods exhibits increasing returns to scale, a philanthropist can create inefficiencies through two channels: the more obvious, cost channel, but also through changes in the behaviour of the median voter. More specifically, we find that when the median voter is of intermediate income, she will choose a lower tax rate in the presence of a philanthropist; this will decrease or increase total welfare, depending on the relative difference between the average and median incomes. In our setting, any increase of total welfare with philanthropy is due to rich individuals' welfare increases at the cost of poor individuals' welfare decreases.

1 Introduction

Since the beginning of the 21st century, the rise of rich philanthropists and concerns about inequality grew steadily and simultaneously (Peter and Lideikyte Huber (2021)). On one hand, in 2010, Bill Gates and Warren Buffet launched "The giving pledge", to inspire the super-rich to donate their wealth. On the other hand, in 2013, Thomas Piketty released the first edition of "Capital in the XXIst century", documenting a long trend of income and wealth inequality (Piketty, 2013). There is no consensus on how to tackle the increasing inequality. For some, charitable foundations can address the most urgent needs while for others is just a palliative for an issue that should be addressed by governments. That is, by generous taxes on wealth (Saez and Zucman (2019)).

In this paper, we investigate what the majority-preferred wealth tax would be , taking into account the philanthropic behavior of the super-rich, when the government offers generous tax incentives to philanthropists [1]. That is, we allow the donations to be responsive to the tax scheme, in particular to tax credits. Such incentives for donations are widespread around the world (Andreoni and Smith, 2021) and, for instance, are similar to the US State tax credits.

While philanthropic organizations such as the Gates Foundation and the Ford Foundation do not solely focus on inequality, they engage in related initiatives. For instance, they are concerned

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[1] On optimal tax incentives for philanthropists see for example (Diamond, 2006)

with poverty alleviation, food security, education, gender equality, and more.[2] Specifically, these donations are utilized for building schools and hospitals, as well as funding research in health and technology. Hence, these foundations provide public goods along the state-provided public goods and society welcomes their behavior with enthusiasm (see CAF survey, 2014).[3] Nonetheless, it is sometimes argued that their existence obeys ulterior motives: political use (Saunders-Hastings, 2018), altruism or prestige (Harbaugh, 1998), signaling wealth (Glazer and Konrad, 1996), tax avoidance (Andreoni and Smith, 2021), etc. But even if these donations are well-intentioned, Reich (N.d.) highlights their erosive effects on democratic institutions by introducing a plutocratic bias, where philanthropists affect decision-making in democracy, shaping public policies and public goods provision. Reich highlights that this may not only pose an accountability crises but that it also affects the efficiency of the provision. For instance, Dasgupta and Kanbur (2011) argue that philanthropy may aggravate income inequality. Hence, the effectiveness of philanthropy in addressing market and political failures is a subject of scrutiny (see for example Besley and Ghatak (2007) and Baron (2007)). In this paper, we do not focus on the potentially unscrupulous motives for the creation of large philanthropic corporations (Reich, N.d.) or massive donations. Instead, we investigate the conditions under which the 21st-century philanthropists improve on the social welfare by providing alternative public goods, given the presence of a tax scheme that provides donation incentives.

In our model, there is a society that decides the tax rate level by majority rule. Taxes are used to provide a public good that is produced with a technology that exhibits increasing returns to scale. In the simplest version, there is one individual who is rich enough to provide an alternative public good, produced with the same technology.[4] His incentives to provide this alternative public good are determined by their preferences and the tax scheme.

We assume that philanthropists prefer any extra unit of public goods to be provided by themselves than by the government (warm glow effect). Arguably, ownership in the production of public goods provides these philanthropists, not only with ego rents, but also with control over the resources and political power. The tax scheme is modeled as tax credits. That is, rather than reducing the taxable income (tax deductions), donations are deducted from their wealth tax obligation.

We show that tax deductions to philanthropists create distortions in the level and provision of public goods. While incentivizing donations has been seen as a way of internalizing positive consumption externalities that lead to underprovision of donations (see for example (Kaplow, 1995)), we show that even if the rich decided not to donate, equilibrium tax level and public goods provision might diminish. Moreover, when the rich do donate, even if the tax level increased, the provision of public goods may diminish. This is more in line with current applied work on the relationship between tax incentives and the volume of charitable giving, as in (Fack and Landais, 2010) that show that show that the increase in fiscal incentives toward charitable giving in France did not lead to the expected increase in gifts.In current work, we try to show that resources can be wasted when economic inequality is large.

We also find conditions under which total welfare is reduced in the presence of a philanthropist.

[2] Bill and Melinda Gates Foundation is "fighting the greatest inequities"

[3] https://www.cafonline.org/about-us/publications/2022-publications/caf-world-giving-index-2022

[4] In an extension we allow for a relatively inefficient government.

2 The philanthropy model

We consider an economy populated by N (odd) individuals.Each individual $i = 1, ..., N$ is endowed with wealth $\omega_i \geq 0$, with $\sum_i \omega_i = \Omega$, and her utility depends on her private level of consumption $c_i \geq 0$ and on the total level of public good $g \geq 0$.

Technology All public goods are produced with a linear technology and a fixed cost $F \in (0, \Omega)$, and are perfect substitutes. Without loss of generality we assume that the constant marginal cost of production is equal to 1. The government's production of public goods, g_s, is financed with a proportional wealth tax, τ, which is decided by majority voting.

Every individual in this economy might have a preference for becoming a philanthropist and privately producing the public good, but given the fixed cost not everyone can afford to. Let g_i be the level of public good provided by individual i. The philanthropist values her own public good more than the state provided one: $\beta_i \geq 0$ captures i's ego rents of producing the public good herself. In the current section, we assume that there is only one citizen, called Bill, with wealth larger than the fixed cost. Hence, other than Bill, citizens cannot produce the public good privately. We also consider an environment with more than one philanthropists after our main analysis, in section 4.

Preferences Let $\beta_i > 0$ and one citizen, $i = b$, such that: $\omega_b > F$ and $\omega_i < F$ for all $i \neq b$.
Then, i's utility is given by

$$U_b(c_b, g_s, g_b) = ln(g_s + (1 + \beta_b)g_b) + c_b \text{ for } i = b \tag{1}$$

$$U_i(c_i, g_s, g_b) = ln(g_s + g_b) + c_i \text{ for } i \neq b \tag{2}$$

Tax credits Bill can decide how to distribute his tax obligation, $\tau\omega_b$ between taxes and philanthropy.
Let $\tilde{g}_b$ be Bill's contribution towards his own public good. Then $g_b = \max\{0, \tilde{g}_b - F\}$ is the level of public good produced by him. We say that Bill is a philanthropist if $\tilde{g}_b > F$. Hence, the total provision of public good $g = g(\tau, F)$ is

$$g(\tau, F) = g_b + \tau\Omega - min\{\tau\omega_b, \tilde{g}_b\} - F \tag{3}$$

Timing The game is played in two consecutive periods. In the first period, $t = 1$, individuals vote on their preferred level of tax rate. Thus, each i decides her individually optimal (τ^i, g^i) that maximizes her utility, subject to the production technology in Equation (3), the feasibility constraints $c_i \geq 0$, $g \geq 0$ and $g_b \geq 0$, and

$$\begin{cases} c_i = \omega_i(1 - \tau) & \text{for all } i \neq b \in N \\ c_b = \omega_b - \max\{\omega_b\tau, \tilde{g}_b\} & \text{for } i = b \end{cases}$$

The tax rate is decided by majority voting.

In the second period, $t = 2$, Bill decides whether to become a philanthropist, and if so, his level of contribution towards his own public good, $\tilde{g}_b$.

Wealth distribution $\Omega - \omega_b > \omega_b$. In order to match the distribution of wealth in reality, we assume that Bill's wealth is smaller than the sum everybody else's wealth. We consider the opposite case in section 5 of the paper.

3 Analysis

Since this is a sequential game, we solve backwards. In $t = 2$, Bill, taking the tax rate decided by majority voting in $t = 1$ as given, has to decide whether to produce his public good or not, and how much of it, in the first case.

3.1 Bill's choice at $t = 2$

Call π_b Bill's choice of whether to become a philanthropist or not, with $\pi_b = 1$ when he is, and $\pi_b = 0$ when he is not. At $t = 2$, if Bill decides not to become a philanthropist, his utility is:

$$U_b(\tau, F, \omega_b, \Omega, \pi_b = 0) = ln(g_s) + c_b = ln(\tau\Omega - F) + (1 - \tau)\omega_b \tag{4}$$

If, instead, Bill decides to become a philanthropist, he solves the following maximization problem:

$$\begin{aligned} \max_{g_b, c_b} U_b(c_b, g_b, g_s, \tau, \omega_b, \Omega, F, \beta_b, \pi_b = 1) = ln(g_s + (1 + \beta_b)g_b) + c_b \text{ s.t. } g_b = \tilde{g}_b - F > 0 \\ c_b = \omega_b - \tilde{g}_b - max\{0, \tau\omega_b - \tilde{g}_b\} \geq 0 \end{aligned} \tag{5}$$

Remark 1 *If Bill decides to become a philanthropist,* $\tilde{g}_b \geq \omega_b\tau$ *for all* $\beta_b > 0$

Notice that Bill marginally values his own public good more than the state provided one. More specifically, the marginal rate of substitution between g_b and g_s is constant and equal to $1 + \beta_b$, the two being substitutes. Thus if Bill decides to become a philanthropist he will spend at least all of his tax obligation towards his own public good.
Moreover notice that if the marginal utility of private provision of public goods, $\frac{\beta_b+1}{g+\beta_b g_b}$, is smaller than the marginal utility of consumption of private goods, 1, the philanthropist would never spend more than the tax deduction on the provision of his own public goods.

Assumption 1 $\beta_b + 1 \leq g + \beta_b g_b$

The above assumption contains equilibrium outcomes, thus we need to check after the equilibrium derivation, under which parameter values it holds. Deriving an equilibrium where it does not hold is feasible, but not an interesting case to study: if the philanthropist's valuation for his own public good is so high so that he is willing to donate more than his tax obligation (and up to his wealth) towards his public good, his actions are not affected by the tax rate, and thus the incentives of individual voters remain the same as in an economy without philanthropy.

Remark 1 and Assumption 1 imply that if Bill becomes a philanthropist, he will donate exactly $\tilde{g}_b = \omega_b \tau$ towards his public good. Then, Bill's utility when he is a philanthropist is given by:

$$U_b(\tau, F, \omega_b, \Omega, \beta_b, \pi_b = 1) = ln(g_s) + c_b = ln(\tau(\Omega - \omega_b) - F + (1 + \beta_b)(\tau\omega_b - F)) + (1 - \tau)\omega_b \quad (6)$$

Since the level of consumption is the same in equations 3 and 5, it is straightforward to see that Bill will prefer to become a philanthropist if $\tau > \frac{F}{\omega_b}\frac{\beta_b+1}{\beta_b}$. Define $\overline{\tau_b} = \frac{F}{\omega_b}\frac{\beta_b+1}{\beta_b}$, the highest tax rate for which Bill prefers not to be a philanthropist[5]. Notice that it is increasing in the fixed cost and decreasing in Bill's wealth and his ego rent.

Corollary 1 *Whenever* $\omega_B/F < \frac{1+\beta_b}{\beta_b}$ *Bill will never become a philanthropist.*

Proof $\omega_B/F < \frac{1+\beta_b}{\beta_b} \Rightarrow \overline{\tau_b} > 1$. Since the voters' chosen tax rate cannot be bigger than 1, under these parameter restrictions Bill can never become a philanthropist.

3.2 Voters' ideal points

Let $g = g_s + g_b$. In $t = 1$ individuals vote on their preferred level of public good, or equivalently on their preferred tax level. Conditional on Bill's choice, $\pi_b \in \{0, 1\}$, each voter i's preferences are single-peaked, and she chooses her preferred level of tax, $\tau_i(\omega_i, \pi_b)$, that solves the following utility maximization problem[6]:

$$\begin{aligned} \max_{c_i, g} \quad & U_i(g, c_i \mid \pi_b) = ln(g) + c_i \\ \text{s.t.} \quad & g = \tau_i\Omega - \pi_b F \geq 0 \\ & c_i = (1 - \tau_i)\omega_i \geq 0 \\ & \tau_i \in [0, 1] \end{aligned}$$

$$\Rightarrow \max_{\tau_i} U_i(\tau_i \mid \pi_b) = ln\,(\tau_i\Omega - F(\pi_b + 1)) + (1 - \tau_i)\omega_i \text{ s.t. } \tau_i \in [0, 1] \quad (7)$$

Conditional on Bill's choice, i's preferred tax level is $\tau_i(\omega_i, \pi_b) = \frac{1}{\omega_i} + \frac{F(\pi_b+1)}{\Omega}$, strictly decreasing in her wealth and total wealth, and strictly increasing in the fixed cost and philanthropy.

Individual i's utility, not conditioning on Bill's choice is then:

$$U_i(\tau_i) = \begin{cases} U_i(\tau_i \mid \pi_b = 0) = ln\,(\tau_i\Omega - F) + (1 - \tau_i)\omega_i & \text{if } \tau_i \leq \overline{\tau_b} \\ U_i(\tau_i \mid \pi_b = 1) = ln\,(\tau_i\Omega - 2F) + (1 - \tau_i)\omega_i & \text{if } \tau_i > \overline{\tau_b} \end{cases} \quad (8)$$

Define $\overline{\omega} \equiv \frac{\Omega\omega_B\beta_b}{\Omega F(1+\beta_b) - \omega_B\beta_b F}$. Also let $\underline{\omega}$ be the individual wealth level that solves $ln(\frac{F}{\omega_b}\frac{1+\beta_b}{\beta_b}\Omega - F) = ln(\frac{\Omega}{\omega_i}) - 1 - \omega_i F(\frac{2}{\Omega} - \frac{1}{\omega_b}\frac{1+\beta_b}{\beta_b})$.

[5] At $\overline{\tau_b}$ Bill is indifferent between becoming a philanthropist or not, but we break the tie assuming that when indifferent, he opts out of being a philanthropist.

[6] Although Bill is also a citizen and thus participates in voting on the optimal tax level, since by assumption he is the society's wealthiest individual, he can never influence the voting outcome, as he is never the median voter, and thus we do not explicitly write down his own maximization problem at $t = 1$ here.

Proposition 1 *Individual i's optimal tax rate, $\tau_i^*(\omega_i)$ is given by:*

$$\tau_i^*(\omega_i) = \begin{cases} \tau_i(\omega_i, \pi_b = 0) = \frac{1}{\omega_i} + \frac{F}{\Omega} & \textit{if } \omega_i > \overline{\omega} \\ \overline{\tau_b} & \textit{if } \underline{\omega} < \omega_i \leq \overline{\omega} \\ \tau_i(\omega_i, \pi_b = 1) = \frac{1}{\omega_i} + \frac{2F}{\Omega} & \textit{if } \omega_i \leq \underline{\omega} \end{cases}$$

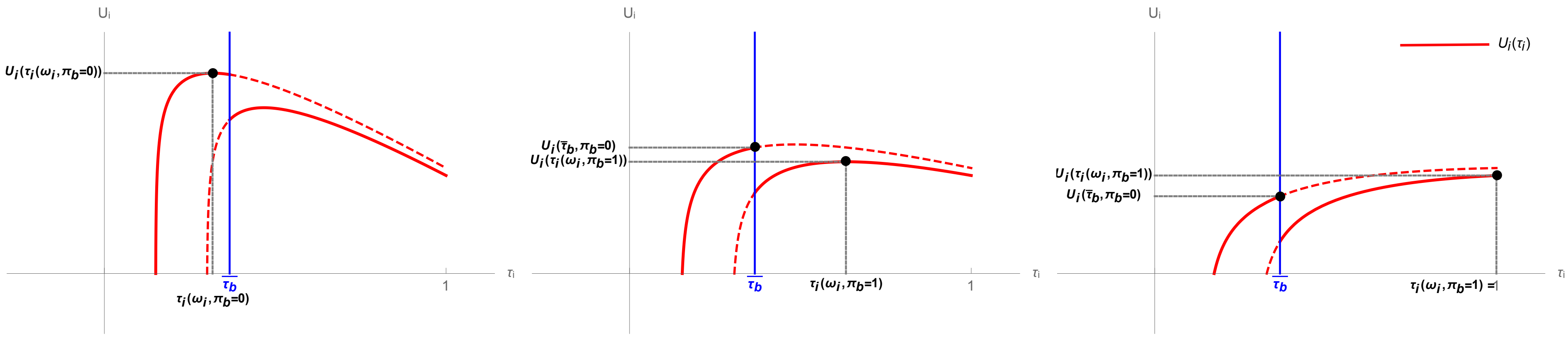
Proof. We wish to show that i has a different optimal tax rate function that is continuous in ω_i in each of the partitions $[0, \underline{\omega}], (\underline{\omega}, \overline{\omega}], (\overline{\omega}, \omega_b)$ of the set of wealth levels.
First note that $U_i(\omega_i, \tau, \pi_b = 0) > U_i(\omega_i, \tau, \pi_b = 1)$ $\forall i$, $\forall \tau$, ie all individuals prefer a philanthropy free environment at every level of tax rate. It is straightforward to show that that rich individuals' optimal choice of tax rate is not affected by philanthropy; for all i so that $\omega_i > \frac{\Omega\omega_B\beta}{\Omega F(1+\beta) - \omega_B\beta F} = \overline{\omega} \Rightarrow \tau_i^*(\omega_i) = \tau_i(\omega_i, \pi_b = 0) = \frac{1}{\omega_i} + \frac{F}{\Omega} < \overline{\tau_b}$.
For all i such that $\omega_i \leq \overline{\omega}$, utility is maximized at some $\tau \geq \overline{\tau_b}$. Given the discontinuity of $U_i(\tau_i)$ at $\overline{\tau_b}$, the optimal choice of tax rate within this subset of the domain depends on the comparison between $U_i(\overline{\tau_b}, \pi_b = 0)$ and $U_i(\tau_i(\omega_i, \pi_b = 1))$. Any individual with $\omega_i < \overline{\omega}$, is indifferent between $\overline{\tau_b}$ and $\tau_i(\pi_b = 1)$ if:

$$ln(\frac{F}{\omega_b}\frac{1+\beta_b}{\beta_b}\Omega - F) + (1 - \frac{F}{\omega_b}\frac{1+\beta_b}{\beta_b})\omega_i = ln([\frac{1}{\omega_i} + \frac{2F}{\Omega}]\Omega - 2F) + (1 - \frac{1}{\omega_i} - \frac{2F}{\Omega})\omega_i \Rightarrow$$

$$ln(\frac{F}{\omega_b}\frac{1+\beta_b}{\beta_b}\Omega - F) = ln(\frac{\Omega}{\omega_i}) - 1 - \omega_i F(\frac{2}{\Omega} - \frac{1}{\omega_b}\frac{1+\beta_b}{\beta_b}) \quad (9)$$

Note that its left hand side (LHS) of equation 9 is a constant. Also note that its right hand side (RHS) is a continuous function of ω_i, whose domain is the convex set $[0, \infty)$. Hence, the range of the RHS is $(-\infty, +\infty)$, and then there exists an individual wealth level that solves the above equation, call it $\underline{\omega}$. Furthermore, the derivative of the RHS with respect to ω_i is equal to $-\frac{1}{\omega_i} - \frac{2F}{\Omega} + \frac{F}{\omega_b}\frac{\beta_b+1}{\beta_b} < 0 \;\forall\; \omega_i < \overline{\omega}$, and thus the RHS is decreasing in its domain.
Then, $\forall\omega_i > \underline{\omega}$ the LHS of Equation 7 becomes strictly bigger than the RHS, and thus the optimal tax rate is $\overline{\tau_b}$. By the same token, $\forall\omega_i \leq \underline{\omega}$ the LHS of Equation 7 becomes strictly smaller than the RHS, and thus the optimal tax rate is $\tau_i(\omega_i, \pi_b = 1)$. ■

Figure 1 below Represents the three cases in Proposition 1. The intuition behind Proposition 1 is fairly straightforward, keeping in mind that independently of their wealth, all individuals are better off when Bill is not a philanthropist. Very wealthy individuals that can guarantee themselves high levels of private consumption prefer low tax rates, at which Bill does not become a philanthropist. These are individuals whose utility conditional on no philanthropy is maximized before $\overline{\tau_b}$, and thus they do not change their voting behaviour due to Bill. On the contrary, very poor individuals that cannot get enough utility from private consumption, prefer a high level of taxation even though this implies that philanthropy will take place. Even though their voting behaviour changes due to Bill, their conditionally $\overline{\tau_b}$ optimal tax rate levels are above for any $\pi_b = \{0, 1\}$.
Individuals with intermediate levels of wealth, will optimally choose $\overline{\tau_b}$, the maximum tax rate level at which Bill does not do philanthropy, in order to guarantee themselves a philanthropy free environment. In a philanthropy free environment they would have opted for a tax rate higher than $\overline{\tau_b}$.



Rich Individuals: $\omega_i \in (\overline{\omega}, \omega_b)$ — Intermediate Wealth: $\omega_i \in (\underline{\omega}, \overline{\omega}]$ — Poor individuals: $\omega_i \in [0, \underline{\omega})$

Figure 1. Individual utility for different wealth levels. The graphs represent the three cases in Proposition 1, ie voter i's utility for the wealth partitions $[0, \underline{\omega}), (\underline{\omega}, \overline{\omega}], (\overline{\omega}, \omega_b)$. For all individuals utility is discontinuous at $\overline{\tau_b}$. The wealthiest individuals' optimal tax rate is lower than $\overline{\tau_b}$. Individuals with intermediate levels of wealth have an incentive to keep Bill from being a philanthropist, by optimally choosing $\overline{\tau_b}$. The poorest individuals are hurt by philanthropy, however their optimal tax rate is higher than $\overline{\tau_b}$.

3.3 Majority Voting

First, let's consider the special case when $\omega_i = \omega \ \forall i \neq b$. Then, it is straight forward that every individual i's optimal tax rate is the same i.e. $\tau_i^* = \tilde{\tau} \ \forall i$ and thus majority voting will result in $\tilde{\tau}$. Depending on the level of ω, $\tilde{\tau}$ will correspond to one of the three cases in Proposition 1.

Now, let's turn to the general case where: $\omega_i \neq \omega_j \ \forall i \neq j \in [1, ..., N]$. If preferences are single peaked, the Median Voter Theorem holds, and majority voting will elect the median voter's preferred level of tax rate. Define the median voter to be the voter with the median wealth level, ω_m, and call τ_{med}^* her ideal tax rate. Thus, if preferences are single peaked, majority voting will result to $\tau^* = \tau_{med}^*$. While the shape and discontinuity of U_i raises concerns about whether preferences are single peaked (apparent for all wealth levels in Figure 1), we provide proof that they indeed are.

Proposition 2 *Every tax rate τ in the subset $(\overline{\tau}, \tau(\underline{\omega}))$ can never be a Condorcet winner and thus can never win majority voting. In the remainder of the set, $[0, \overline{\tau}] \cup [\tau(\underline{\omega}), 1]$ preferences are single peaked.*

Proof. Even though preferences are not necessarily single peaked for all i in $\tau \in [0, 1]$ (individual utility might have more than one local maxima for some i), we seek to prove that the candidate tax rates in majority voting are restricted into a subset of $[0, 1]$ where every individual utility has a unique local maximum. Define N_R to be the number of individuals with wealth $\omega_i > \underline{\omega}$ and N_P the number of individuals with wealth $\omega_i < \underline{\omega}$

First, we consider every individual i with $\omega_i > \underline{\omega}$. For these individuals, utility is maximized in the region $\tau \in [0, \overline{\tau_b}]$, and thus $\forall i$ with $\omega_i > \underline{\omega}$, $\overline{\tau_b} \succ \tau$, $\forall \tau > \overline{\tau_b}$, since $U_i(\tau, \pi_b = 0) > U_i(\tau, \pi_b = 1) \forall \tau, \forall i$. Hence, for all individuals with $\omega_i > \underline{\omega}$, $\overline{\tau_b}$ dominates everything on its right.

Now we turn to every individual i with $\omega_i \leq \underline{\omega}$. Note that for these individuals $\tau_i^*(\omega_i) = \tau_i(\omega_i, \pi_b = 1) \geq \tau^*(\underline{\omega}) = \frac{1}{\underline{\omega}} + \frac{2F}{\Omega}$, since $\frac{\partial \tau_i(\omega_i, \pi_b=1)}{\partial \omega_i} < 0$. Then since $\forall i$, U_i is strictly increasing in $(\overline{\tau_b}, \tau^*(\underline{\omega}))$, we have $\tau^*(\underline{\omega}) \succ \tau$, $\forall \tau \in (\overline{\tau_b}, \tau^*(\underline{\omega}))$.

Furthermore, $\forall i$ we have $\tau^*(\underline{\omega}) \succ \overline{\tau_b}$. This follows directly from the definition of $\underline{\omega}$. Take

$$U_i(\overline{\tau_b}) - U_i(\tau^*(\underline{\omega})) = ln(\frac{F}{\omega_b} \frac{1 + \beta_b}{\beta_b} \Omega - F) - ln(\frac{\Omega}{\underline{\omega}}) + \omega_i(\frac{1}{\underline{\omega}} + F(\frac{2}{\Omega} + \frac{1}{\omega_b} \frac{1 + \beta_b}{\beta_b}) \leq 0$$

By the definition of $\underline{\omega}$, the above is exactly equal to 0 at $\underline{\omega}$, and it is also increasing in ω_i. Thus, for every i such that $\omega_i < \underline{\omega}$, the above holds with strict inequality. Then, it also holds that $\tau^*(\underline{\omega}) \succ \overline{\tau_b} \succ \tau$, $\forall \tau < \overline{\tau_b}$. Hence, for all individuals with $\omega_i \leq \underline{\omega}$, $\tau^*(\underline{\omega})$ dominates everything on its left.

It follows then that every $\tau \in (\overline{\tau_b}, \tau^*(\underline{\omega}))$ would lose any head to head election against $\tau^*(\underline{\omega})$ if $N_P > N_R$; equivalently, it would lose any head to head election against $\overline{\tau_b}$ if $N_R > N_P$. Then, the region of candidate tax rates in majority voting is restricted to $\tau \in [0, \overline{\tau_b}] \cup [\tau^*(\underline{\omega}), 1]$.

In this subset of $[0, 1]$ preferences are single peaked for every individual: first, consider all individuals with $\omega_i > \underline{\omega}$. For them it holds that $\tau_i(\omega_i, \pi_b = 1) = \frac{1}{\omega_i} + \frac{2F}{\Omega} < \tau^*(\underline{\omega}) = \frac{1}{\underline{\omega}} + \frac{2F}{\Omega}$. Then for them utility is strictly decreasing in $[\tau^*(\underline{\omega}), 1]$, and since $\overline{\tau_b} \succ \tau \ \forall \tau > \overline{\tau_b}$, their utility function has a unique local maximum $[0, \overline{\tau_b}] \cup [\tau^*(\underline{\omega})), 1]$.

Now we turn to individuals with $\omega_i \leq \underline{\omega}$. For them utility is strictly increasing in $[0, \overline{\tau_b}]$, strictly

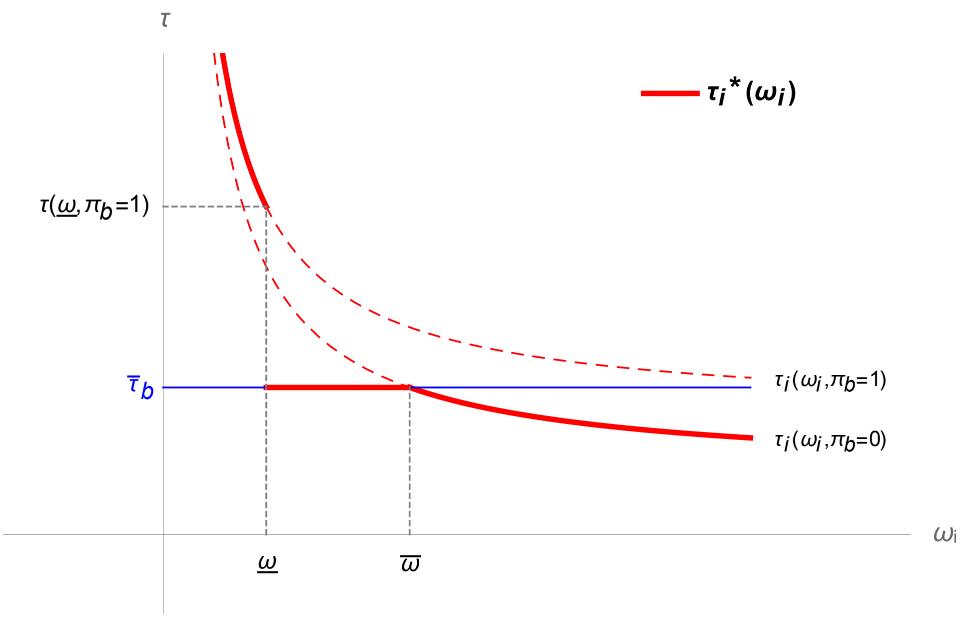


Figure 2. Optimal tax rate as a function of wealth

concave in $[\tau^*(\overline{\omega}), 1]$ and $\overline{\tau_b} \sim \tau^*(\overline{\omega})$. Thus, their utility function also has a unique local maximum in $[0, \overline{\tau_b}] \cup [\tau^*(\underline{\omega})), 1]$.

■

The intuition behind single peakedness can be derived from Figure 2, that graphs the individually optimal tax rate as a function of wealth. The levels of tax rate $\tau \in (\overline{\tau_b}, \tau^*(\underline{\omega}))$ are not optimal for any i and thus we only need to have single peakedness over the set $[0, \overline{\tau_b}] \cup [\tau^*(\underline{\omega}), 1]$, which is the case.

Corollary 2 *The median voter theorem holds and thus majority voting will elect τ^* that is equal to the median voter's preferred tax level τ^*_{med}. The equilibrium provision of public good then is $g^* = g(\tau^*)$, with:*

$$\tau^* = \begin{cases} \frac{1}{\omega_m} + \frac{F}{\Omega} & \text{if } \omega_m > \overline{\omega} \\ \overline{\tau_b} & \text{if } \underline{\omega} < \omega_m \leq \overline{\omega} \\ \frac{1}{\omega_m} + \frac{2F}{\Omega} & \text{if } \omega_m \leq \underline{\omega} \end{cases}, \qquad g^* = \begin{cases} (\frac{1}{\omega_m} + \frac{F}{\Omega})\Omega - F = \frac{\Omega}{\omega_m} & \text{if } \omega_m > \overline{\omega} \\ \overline{\tau_b}\Omega - F = F\frac{\Omega(\beta_b+1)-\omega_B\beta_b}{\omega_B\beta_b} & \text{if } \underline{\omega} < \omega_m \leq \overline{\omega} \\ (\frac{1}{\omega_m} + \frac{2F}{\Omega})\Omega - 2F = \frac{\Omega}{\omega_m} & \text{if } \omega_m \leq \underline{\omega} \end{cases}$$

As we have already shown, individual i's optimal tax level without philanthropy is $\frac{1}{\omega_i} + \frac{F}{\Omega}$. Thus, by the median voter theorem, a society without philanthropy receives the median voter's preferred level of tax $\frac{1}{\omega_m} + \frac{F}{\Omega}$, and enjoys a level of public good equal to $\frac{\Omega}{\omega_m}$.

Corollary 3 *When the median voter is relatively rich, neither the tax rate nor the level of public good are affected by philanthropy. On the contrary, when the median voter is relatively poor, society receives the same amount of public good with or without philanthropy, financed with a higher tax rate in the first case. Finally, when the median voter's wealth is intermediate, philanthropy implies a lower tax rate and lower public good provision.*

3.4 Welfare

In order to understand the welfare implications of philanthropy in our setting, we compare the median voter's welfare with philanthropy and without. We perform the same exercise for total welfare.

3.4.1 The median voter's welfare

Without philanthropy, the median voter's level of welfare is given by:

$$U_{m0} \equiv U_m(\tau_m(\omega_m, \pi_b = 0)) = ln(\frac{\Omega}{\omega_m}) + \omega_m(1 - \frac{1}{\omega_m} - \frac{F}{\Omega})$$

In the presence of philanthropy, our results in section 3.3 imply that the median voter's welfare is given by:

$$U_{m1} \equiv U_m(\tau_m^*(\omega_m)) = \begin{cases} ln(\frac{\Omega}{\omega_m}) + \omega_m(1 - \frac{1}{\omega_m} - \frac{F}{\Omega}) & \text{if } \omega_m > \overline{\omega} \\ ln((\frac{F}{\omega_B}\frac{\beta_b+1}{\beta_b})\Omega - F) + \omega_m(1 - \frac{F}{\omega_B}\frac{\beta_b+1}{\beta_b}) & \text{if } \underline{\omega} < \omega_m \leq \overline{\omega} \\ ln(\frac{\Omega}{\omega_m}) + \omega_m(1 - \frac{1}{\omega_m} - \frac{2F}{\Omega}) & \text{if } \omega_m \leq \underline{\omega} \end{cases}$$

Proposition 3 *The median voter, independently of her level of wealth, is weakly better off without philanthropy.*

Proof. First of all, notice that since when $\omega_m > \overline{\omega}$ philanthropy never occurs and furthermore the incentives of the median voter are not affected by Bill, her levels of welfare with and without philanthropy are identical. Furthermore, when $\omega_m < \underline{\omega}$ there is a reduction of the median voter's welfare due to philanthropy, equal to $\omega_m \frac{F}{\Omega}$.
Finally, when $\underline{\omega} \leq \omega_m \leq \overline{\omega}$, the difference in the median voter's welfare without and with philanthropy is given by:

$$\begin{aligned} U_{m0} - U_{m1} &= ln[\frac{\Omega\omega_B\beta_b}{\omega_m F(\Omega(\beta_b+1) - \omega_B\beta_b)}] + \frac{\omega_m F(\Omega(\beta_b+1) - \omega_B\beta_b)}{\Omega\omega_B\beta_b} - 1 \\ &= ln[\frac{\overline{\omega}}{\omega_m}] + \frac{\omega_m}{\overline{\omega}} - 1 \end{aligned} \quad (10)$$

The above equation is of the form $ln[x] + \frac{1}{x} - 1$ and we are in the region where $\omega_m \leq \overline{\omega} \Rightarrow x \geq 0$. Thus, the equation is positive and minimized at $x = 0 \Rightarrow \omega_m = \overline{\omega}$. Consequently, for intermediate levels of wealth of the median voter, she is always hurt by philanthropy, except for the marginal case when her wealth is exactly equal to $\overline{\omega}$, in which case she is indifferent between philanthropy or no philantrhopy.

3.4.2 Total Welfare

In a philanthropy free environment, total welfare is given by:

$$TW_0 \equiv TW(\tau_m(\omega_m, \pi_b = 0)) = \sum_{i=1}^{N}[ln(\frac{\Omega}{\omega_m}) + \omega_i(1 - \frac{1}{\omega_m} - \frac{F}{\Omega})] = Nln(\frac{\Omega}{\omega_m}) + \Omega(1 - \frac{1}{\omega_m}) - F$$

Welfare aggregation in the presence of philanthropy is not straightforward. A pure utilitarian approach implies deriving total welfare by summing up the utility levels of all individuals; however, given that β_b can be arbitrarily large, we might observe philanthropy increasing total welfare only as a result of Bill's strict preferences over having his own public good, to the detriment of the rest of the society.

In order to mitigate this problem, we calculate total welfare treating Bill as just another citizen, ie setting $\beta_b = 0$ in his utility function. This is mathematically equivalent to weighting Bill's utility with some weighting parameter smaller than 1.

Note that in our setting this choice is only relevant when $\omega_m < \underline{\omega}$, since this is the only region within which philanthropy takes place. Whenever $\omega_m \geq \underline{\omega}$, the utilitarian approach and ours yield exactly the same results.

Total welfare in the presence of philanthropy is thus given by $TW_1 = TW(\tau_m^*(\omega_m))$:

$$TW(\tau_m^*(\omega_m)) = \begin{cases} \sum_{i=1}^{N}[ln(\frac{\Omega}{\omega_m}) + \omega_i(1 - \frac{1}{\omega_m} - \frac{F}{\Omega})] = Nln(\frac{\Omega}{\omega_m}) + \Omega(1 - \frac{1}{\omega_m}) - F & \text{if } \omega_m > \overline{\omega} \\ \sum_{i=1}^{N}[ln(F\frac{\Omega(\beta_b+1)-\omega_B\beta_b}{\omega_B\beta_b}) + \omega_i(1 - \frac{F}{\omega_B}\frac{\beta_b+1}{\beta_b})] = Nln(F\frac{\Omega(\beta_b+1)-\omega_B\beta_b}{\omega_B\beta_b}) + \Omega(1 - \frac{F}{\omega_B}\frac{\beta_b+1}{\beta_b}) & \text{if } \underline{\omega} < \omega_m \leq \overline{\omega} \\ \sum_{i=1}^{N}[ln(\frac{\Omega}{\omega_m}) + \omega_i(1 - \frac{1}{\omega_m} - \frac{2F}{\Omega})] = Nln(\frac{\Omega}{\omega_m}) + \Omega(1 - \frac{1}{\omega_m}) - 2F & \text{if } \omega_m \leq \underline{\omega} \end{cases}$$

Directly comparing the first and third lines of TW_1 to TW_0, it is straight forward to observe that when the median voter is relatively rich, society is not affected by philanthropy. When instead she is relatively poor, society suffers a loss of welfare due to philanthropy equal to the fixed cost[7]. This is due to the fact that the same amount of public good is built, with a higher tax rate when Bill exists.

When comparing TW_1 to TW_0 in the region $\underline{\omega} \leq \omega_m \leq \overline{\omega}$ however, we observe that whether philantrhopy increases or decreases total welfare is uncertain.

Proposition 4 *When the median voter is of intermediate wealth, philanthropy might decrease or increase total welfare. Rich individuals always benefit from philanthropy, while poor individuals are always hurt by it. An increase of total welfare due to philanthropy is always driven by rich individuals, and depends on how average wealth compares to the median voter's wealth and* $\overline{\omega}$.

Proof. Take $\omega_m \in [\underline{\omega}, \overline{\omega}]$. Then the equilibrium tax rate is $\overline{\tau_b} < \tau_m^*(\pi_b = 0)$, the equilibrium tax

[7] A pure utilitarian welfare function would differ to ours only in the region of median voter wealth $\omega_m < \underline{\omega}$. In this case then:

$$TW_0 - TW_1 = ln\left[\frac{\frac{\Omega}{\omega_m}}{\frac{\Omega}{\omega_m} + \beta(\frac{\Omega\omega_b + F\omega_m(2\omega_b - \Omega)}{\omega_m\Omega})}\right] + F$$

The denominator of the fraction above is larger than the numerator and thus the logarithm is negative. Furthermore, it is decreasing in β. Thus, whether philanthropy increases or decreases overall welfare depends on the relative absolute value of the cost inefficiency and Bill's strict preference for his own public good.

rate in a philanthropy free environment. Now consider the change of utility of any individual i due to philanthropy:

$$U_i(\tau_m^*(\pi_b = 0)) - U_i(\overline{\tau_b}) = ln[\frac{\overline{\omega}}{\omega_m}] + \omega_i(-\frac{1}{\omega_m} + \frac{1}{\overline{\omega}}) \tag{11}$$

We have already shown that this utility difference is positive for the median voter, and note that equation 11 is decreasing in ω_i. Also, note that at $w = \frac{\overline{\omega}\omega_m}{\overline{\omega}-\omega_m} ln[\frac{\overline{\omega}}{\omega_m}] \in (\omega_m, \omega_b)$ equation 11 is equal to 0. Thus, all individuals with $\omega_i < \omega \in [0, \overline{\omega})$ are hurt by philanthropy. The rest of the individuals are better off with philanthropy.

In the region $\underline{\omega} \leq \omega_m \leq \overline{\omega}$, the difference in total welfare without and with philanthropy is:

$$TW_0 - TW_1 = Nln[\frac{1}{\omega_m}\frac{\Omega\omega_B\beta_b}{F(\Omega(\beta_b+1) - \omega_B\beta_b}] + \frac{\omega_m F(\Omega(\beta_b+1) - \omega_B\beta_b) - \Omega\omega_B\beta_b}{\omega_m\omega_B\beta_b}$$

, which depending on the parameter values can be positive or negative. Defining average wealth $\omega_A \equiv \frac{\Omega}{N}$, the above can be rewritten as

$$TW_0 - TW_1 = \frac{\Omega}{\omega_A} ln[\frac{\overline{\omega}}{\omega_m}] + \frac{\Omega}{\overline{\omega}} - \frac{\Omega}{\omega_m}$$

Thus we have:

$$TW_0 - TW_1 > (<)0 \Rightarrow \omega_A < (>)\frac{\overline{\omega}\omega_m}{\overline{\omega} - \omega_m}(ln[\overline{\omega}] - ln[\omega_m])$$

First, notice that since $\omega_m \leq \overline{\omega}$, $min\frac{\overline{\omega}}{\overline{\omega}-\omega_m}(ln[\overline{\omega}] - ln[\omega_m]) = max\frac{\omega_m}{\overline{\omega}-\omega_m}(ln[\overline{\omega}] - ln[\omega_m]) = 1$. Thus, when $\omega_A < \omega_m \Rightarrow \omega_A < \frac{\overline{\omega}\omega_m}{\overline{\omega}-\omega_m}(ln[\overline{\omega}] - ln[\omega_m])$, ie relatively poor but equal societies are always hurt by philanthropy. Furthermore, when $\omega_A > \overline{\omega} \Rightarrow \omega_A > \frac{\overline{\omega}\omega_m}{\overline{\omega}-\omega_m}(ln[\overline{\omega}] - ln[\omega_m])$, ie very wealthy and unequal societies always benefit from philanthropy.

Additionally, note that when ω_m is very close to $\overline{\omega}$, $\frac{\overline{\omega}}{\overline{\omega}-\omega_m}(ln[\overline{\omega}] - ln[\omega_m]) \approx 1$. In this case, when $\omega_A \in [\omega_m, \overline{\omega}]$, $\omega_A > RHS$, relatively equal rich societies benefit from philanthropy.

Finally, by continuity of the RHS, there exists some ω_A such that society is indifferent between Bill and a philanthropy less environment. ■

4 Conclusions and Future Work

In our paper, we consider a philanthropist that can provide his own public good instead of paying taxes, in a setting where the philanthropist's and the state provided public goods are perfect substitutes. We have shown that under the presence of fixed costs when it is socially optimal to only have one public good built, the possibility of philanthropy distorts the incentives of individuals. More specifically, when individuals with an intermediate level of wealth vote on their preferred tax level in order to finance the state provided public good, they opt for a lower tax rate than the one they would have chosen in a setting without philanthropy, in order to keep the philanthropist from building his public good.

We also show, that despite the discontinuity in voters' utility that the presence of the philanthropist results in, preferences are single peaked over the set of possible outcomes, since we can restrict this set only to tax levels that correspond to voters' ideal points.

More importantly, we show that when philanthropy is incentivized with tax credits, with increasing returns to scale in the production of public goods, the cost inefficiency and change of voter incentives that the philanthropist induces can decrease overall welfare. When welfare is increased, it is always due to welfare increases of the wealthiest individuals at the cost of the poorest ones.

We are currently working on several extensions of the baseline model. Considering extreme inequality, where the philanthropist is wealthier than the rest of the society as a whole, is one of them. In this case, for a high enough fixed cost, society can afford only one public good; this can lead to strange results in our setting, such as voters spending money on a state public good that cannot be built, only to convince the philanthropist to provide one. We are also working on a model where tax credits are substituted by tax deductions. In this case, inefficiencies are harder to arise, but still possible. Finally, we consider competition among philanthropists, in order to investigate whether it would correct inefficiencies or exacerbate them.

References

Andreoni, James and Sarah Smith. 2021. "Economics of philanthropic tax incentives." *The Routledge Handbook of Taxation and Philanthropy* pp. 159–177.

Baron, David P. 2007. "Corporate social responsibility and social entrepreneurship." *Journal of Economics & Management Strategy* 16(3):683–717.

Besley, Timothy and Maitreesh Ghatak. 2007. "Retailing public goods: The economics of corporate social responsibility." *Journal of public Economics* 91(9):1645–1663.

Dasgupta, Indraneel and Ravi Kanbur. 2011. "Does philanthropy reduce inequality?" *Journal of Economic Inequality* 9(1):1–21.

Diamond, Peter. 2006. "Optimal tax treatment of private contributions for public goods with and without warm glow preferences." *Journal of Public Economics* 90(4-5):897–919.

Fack, Gabrielle and Camille Landais. 2010. "Are tax incentives for charitable giving efficient? Evidence from France." *American Economic Journal: Economic Policy* 2(2):117–141.

Glazer, Amihai and Kai A Konrad. 1996. "A signaling explanation for charity." *The American Economic Review* 86(4):1019–1028.

Harbaugh, By William T. 1998. "The Prestige Motive for Making Charitable Transfers Author (s): William T . Harbaugh Source : The American Economic Review , Vol . 88 , No . 2 , Papers and Proceedings of the Hundred and Tenth Annual Meeting of the American." *American Economic Review* 88(2):277–282.

Kaplow, Louis. 1995. "A note on subsidizing gifts." *Journal of Public Economics* 58(3):469–477.

Peter, Henry and Giedre Lideikyte Huber. 2021. *The Routledge Handbook of Taxation and Philanthropy.* Routledge.

Piketty, Thomas. 2013. *Le capital au XXIe siècle.* Média Diffusion.

Reich, Rob. N.d. *Just Giving: Why Philanthropy Is Failing Democracy and How It Can Do Better.* 2018 ed.
URL: *https://www.amazon.com/Just-Giving-Philanthropy-Failing-Democracy/dp/069118349X*

Saez, Emmanuel and Gabriel Zucman. 2019. "Progressive Wealth Taxation." *Brookings Papers on Economic Activity* 2019-Fall(2017):437–533.

Saunders-Hastings, Emma. 2018. "Plutocratic philanthropy." *Journal of Politics* 80(1):149–161.
URL: *https://www.journals.uchicago.edu/doi/10.1086/694103*

Charities Aid Foundation. "Public Perceptions of Corporate Giving" (2014).