Can positional concerns enhance the private provision of public goods?

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Can Positional Concerns Enhance the Private provision of Public Goods?[1]

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Abstract: The social welfare effect of positional concerns over public goods is composed of two parts, a positional outcome and an outcome in terms of public goods provision. When agents have homogenous positional preferences over the public good, they overinvest in the positional public good, resulting in a zero-sum positional race with a higher provision of the public good. When agents differ in their positional preferences, the overall impact on social welfare is positive when endowments are homogenous and uncertain when endowments are heterogeneous. Given that the social loss from position-seeking is lower than the social gain from rank seeking, there is an increase of social welfare. If agents have different initial endowments, positional preferences might still be welfare enhancing as long as the positional loss does not exceed the gain in terms of public good provision.

JEL Classification : C91, H41

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Can Positional Concerns Enhance the Private provision of Public Goods?

1. Introduction

It is widely recognized that people care for their relative position. Nevertheless the co-existence of positional goods (status being the ultimate positional good[2]) with non-positional goods may generate a crucial social dilemna. According to Frank (2005, p.137), "*the conflict stems from the fact that concerns about relative consumption are stronger in some domains than in others. The disparity gives rise to expenditure arms races focused on positional goods—those for which relative position matters most. The result is to divert resources from non-positional goods, causing welfare losses*." Because of the very specific nature of positional goods (Hirsch, 1976), seeking a higher rank is necessarily gained at the expense of other agents, resulting in zero or negative sum games. Each step up the ladder of status for one person logically requires a step down for another. For instance, there is no place for an eleventh economist on a 'Top Ten' list. Consequently, status seeking agents make expenditures on positional goods to get a higher relative position, but as all agents make the same efforts, all obtain an identical position. In an economy with private consumption goods, positional preferences lead to a welfare loss, which can be aggravated if public negative externalities are considered (Ng and Wang, 1993; Van Long and Wang, 2008; Frank, 2008).

Although positional motivations for purchase have been identified early (e.g., Veblen, 1899; Hirsch, 1976; Frank, 1985; Alpizar et al., 2005), theoretical and empirical investigations about their importance in relation to public goods are very scarce (e.g., Holländer, 1990; Solnick and Hemenway, 2005). Contrasting with this literature gap, anecdotal evidence supports that charitable contributions or contributions to public goods may be motivated by positional concerns. For instance, Turner inspired the successful idea of the Slate 60 list of the top American donors. Indeed, he argued that the Forbes 400 list of richest Americans was discouraging the wealthy from giving away their money for fear of slipping down the rankings. *"When Ted Tuner forked over $ 200 million to charity two years ago, he felt a tremor … Instead of the joy of giving, he was consumed by the fear of falling… off the Forbes Four Hundred list of wealthiest Americans. The man …. has another great idea. Why not start an annual list of the most generous, offering an 'Ebenezer Scrooge Prize' that embarrasses stingy billionaires and 'heart of Gold Award' to honour philanthropists?"* (Dowd, 1996). Simply put, we explore whether positional concerns can improve social welfare through a higher level of private provision of public goods.

[2] Even if there are some possible distinctions between status and position, we use these two terms interchangeably in this contribution.

Using a model of voluntary contribution to a public good, we show that positional preferences might be a driver in public good provision and increase social welfare. When agents have homogenous positional preferences over the public good, they overinvest in the positional public good. There is no positional gain (everyone runs to keep at the same place), but a higher provision of the public good. Indeed, positional preferences allow public good provision, prevent free rider behaviour and thus increase social welfare. When agents differ in their positional preferences over the public good, the overall impact on social welfare is positive when endowments are homogenous and uncertain when endowments are heterogeneous. When endowments are homogenous, the intuition is as follows : individuals who invest in the public good are those who have the highest positional preferences (and gain the most in terms of rank) whereas individuals who free ride are those who place the lowest value on their rank (and lose the less). Given that the social loss from rank-seeking is lower than the social gain from rank-seeking, there is an increase of social welfare. If agents have different initial endowments, this result is not always true and the economy might suffer from a positional loss. Positional preferences might still be welfare enhancing as long as the positional loss does not exceed the gain in terms of public good provision.

This paper proceeds as follows. Section 2 presents a basic framework of consumer behaviour with positional preferences and shows that the standard free riding equilibrium is not the only equilibrium in the positional public good game. In section 3, we analyse the impact of positional preferences on social welfare if agents possess identical preferences for status seeking. In section 4, social welfare effects are discussed in the case agents have heterogeneous positional preferences by distinguishing in the case where initial endowments are homogenous and the case where they are heterogeneous. Section 5 concludes and discusses future research.

2. A model of individual behaviour with positional preferences

In a theoretical model of voluntary contribution mechanism, we consider individuals motivated by a relative standing effect whereby individuals care about their rank as a contributor to the public good instead of their absolute level of contribution. We consider a one-shot public good game where individual *i* has positional preferences and chooses his individual contribution x_i (with $x_i \in \left[0, \frac{D_i}{p}\right]$) to the public good that maximises the following utility function that is composed of the addition of two elements, namely, a monetary payoff and a positional payoff:

$$U_i\left(x_i, x_j, \alpha_i\right) = \pi_i\left(x_i, x_j\right) + R_i\left(x_i, x_j, \alpha_i\right) \quad (1)$$

Interestingly, the utility of individual *i* depends on his own contribution but also on the contributions of others not only because of the public good nature (monetary payoff) but also because of relative standing issues (positional payoff) (see below). The first part $\pi_i\left(x_i, x_j\right)$ is a standard payoff function for a voluntary contribution mechanism, defined as follows:

$$\pi_i\left(x_i, x_j\right) = D_i - px_i + \frac{G}{N}\left(x_i + \sum_{j \neq i} x_j\right) \tag{2}$$

where D_i represents the monetary endowment and *p* the cost of his contribution. *G* is the group marginal payoff, *N* is the number of individuals in the group, and $\frac{G}{N}$ is the marginal per capita return of the public good. We assume that $p > \frac{G}{N}$ and that $p<G$, which corresponds to a standard public good dilemma assumption. The second part of the payoff function $R_i\left(x_i, x_j, \alpha_i\right)$ is the positional payoff:

$$R_i\left(x_i, x_j, \alpha_i\right) = \alpha_i \times \left(x_i - \bar{x}_j\right) \tag{3}$$

where $\bar{x}_j = \frac{\sum x_j}{(N-1)}$ is the average contribution of all players ($j \neq i \in [1, N]$).

The positional payoff is composed of two terms:

- the difference between individual *i*'s contribution and the average contribution of all other players $\left(x_i - \bar{x}_j\right)$, which constitutes *i*'s relative position compared to others.

- the positional parameter of the individual α_i. This parameter is specific to each individual and measures the nature and strength of positional concerns. If $\alpha_i < 0$, individual i's utility increases when *i* contributes less than others, but if $\alpha_i > 0$, individual *i*'s utility increases when *i* contributes more than others. If $\alpha_i = 0$ individual *i* does not care about his relative standing and only enjoys the monetary payoff, which corresponds to conventional *homo economicus* preferences.

Given the importance of positional concerns in our framework let us explain further the role played by the positional parameter. The model considers that relative contribution influences utility levels. Interestingly, if someone contributes to the public good at the same amount as others in average (*i.e.*, identical relative position), his contribution will not give him other benefits than the monetary payoff. Let us assume a higher relative position for individual *i*, *i.e.* $\left(x_i - \bar{x}_j\right)$>0, which means that individual *i*

contributes more than others, in average. Then, if *i* has a positive positional parameter $\alpha_i > 0$ (resp. a negative positional parameter $\alpha_i < 0$), individual *i*'s positional payoff increases (resp. decreases). On the opposite, by assuming a lower relative position for individual *i*, *i.e.* $\left(x_i - \bar{x}_j\right) < 0$ only the individuals that have a negative positional parameter ($\alpha_i < 0$) will increase their positional payoff. In this particular case, individual *i* enjoys benefiting from the public good with a personal contribution lower than the average. He enjoys the pleasure of "making a better deal than other players". Negative positional behavior differs from free-riding behavior. A free rider favours private consumption independently of other players' decisions. A player with negative positional preferences chooses the level of contribution with respect to the average level of contribution of others. So, in the case of negative positional preferences, the player aims to reduce his contribution relatively below the average contribution as he enjoys contributing less than others.

The utility maximising behavior leads to the following proposition:

> **Lemma 1:** An individual with positive positional concerns contributes all his endowment (respectively nothing) to the public good, if the non-monetary value of his relative position, α_i, is higher (respectively lower) than the monetary loss of contributing to the public good, $p - \frac{G}{N}$. Individuals with negative positional concerns never contribute to the public good.

Proof : The optimal contribution is such that $\underset{x_i}{Max} \; U_i(x_i, x_j, \alpha_i)$. From which, it can be deduced that: $\frac{\partial U_i(x_i, x_j, \alpha_i)}{\partial x_i} = -p + \frac{G}{N} + \alpha_i > 0 \Leftrightarrow \alpha_i > p - \frac{G}{N}$. The optimal contribution to the public good is such that $x_i^* = 0$ if $p - \frac{G}{N} > \alpha_i$ and $x_i^* = \frac{D_i}{p}$ if $p - \frac{G}{N} < \alpha_i$. ■

There are two equilibria in this game: zero or all endowment. This diverges from the standard public good equilibrium where the equilibrium is to contribute nothing. So, *status seeking may counter-balance free-riding incentives in a one shot public good game*. Figure 1 depicts the slope of the utility function as a function of the positional parameter. For individuals with a high enough positional parameter, the marginal utility is positive. The more they contribute, the higher their utility.

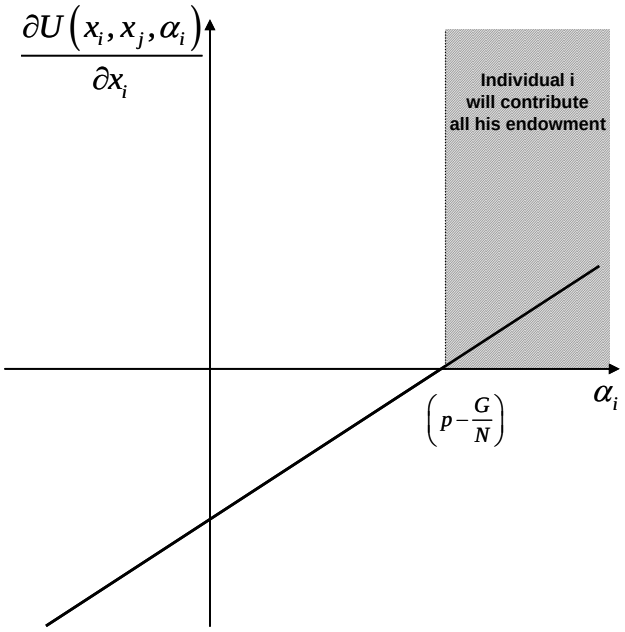

Figure1. Marginal utility for individual i as a function of the positional parameter

Our aim is to analyse social welfare implications of positional preferences on public goods. We consider now an economy composed of N individuals with *k* contributors to the public good ($1 \le i \le k$) and (*N-k*) free-riders ($k \le i \le N$). According to lemma 1, contributors contribute all their endowment. Social welfare when taking into account contributions to the public good is then the sum of utility of those who contribute and utility of those who do not contribute:

$$W_p = \underbrace{\sum_{i=k+1}^{N} D_i}_{\text{private consumption}} + \underbrace{\frac{G}{p}\sum_{i=1}^{k} D_i}_{\text{public consumption}} + \underbrace{\sum_{i=1}^{k} \frac{\alpha_i D_i}{p}}_{\text{positional utility}} - \underbrace{\sum_{i=1}^{N} \frac{\alpha_i \sum_{j \neq i} D_j}{(N-1)p}}_{\text{positional externality}} \qquad (4)$$

This social welfare is the sum of four terms. The first term is the social gain due to consumption of the private good, for the (*N-k*) individuals who do not contribute to the public good. The second term is the social gain due to public good contributions: the overall contribution to the public good is equal to $\sum_{i=1}^{k} \frac{D_i}{p}$, and the group marginal payoff is equal to G. The third term is the positional utility for the *k* contributors, who draw a positional reward from their own contribution to the public good. The fourth term is the positional externality for all individuals: each contribution decreases the position of all other individuals. To determine the benchmark, we consider the case where individuals do not possess positional preferences. In this case, nobody contributes. Then, individual utility is equal to endowment, and social welfare is equal to:

$$W_{\text{no position}} = \sum_{i=1}^{N} D_i \quad (5)$$

The social welfare effect of positional preferences leading to voluntary contributions to public good is then equal to:

$$\Delta W = W_{\text{position}} - W_{\text{no position}} = -\sum_{i=1}^{k} D_i + \frac{G}{p}\sum_{i=1}^{k} D_i + \sum_{i=1}^{k} \alpha_i \left(\frac{D_i}{p} - \frac{\sum_{j \neq i} D_j}{(N-1)p}\right) - \sum_{i=k+1}^{N} \alpha_i \frac{\sum_{j \neq i} D_j}{(N-1)p} \quad (6)$$

The aim of our paper is to determine the impact of positional preferences on social welfare, that is the impact of the parameter α_i on ΔW. In the two following sections, we will analyse the impact of positional preferences on social welfare. In section 3, we assume individuals who have identical positional preferences, whereas in section 4, agents have different values to their relative position.

3. Private provision of public goods with homogeneous preferences for position

According to Frank (2005, 2008), the consumption of positional goods necessarily gives rise to welfare losses. More precisely, the idea is that if one good is more positional than another good, the search for status leads to an increase of consumption of positional goods and a decrease of consumption of non positional goods. However, as everyone consumes more of the positional good, nobody increases her relative position. Individuals do not get the expected positional benefit. Moreover, some resources are diverted to positional goals and social welfare decreases. *"As in the familiar stadium metaphor, all stand to get a better view, but when all stand no one sees better than when all were seated"* (Frank, 2008, p. 1778) and certainly everyone suffers legs ache which would reduce their global well being. This result is conditional on private positional goods. In the case of public goods, where underprovision is frequent, positional concerns may divert some resources from private consumption to private provision of public goods. So, positional concerns induce a positive externality through collective good consumption (Holländer, 1990). Then if these positive externalities can mitigate or even cancel out the free-riding behaviour in the provision of public goods, positional preferences may be welfare enhancing.

<u>Proposition 1</u>: If individuals are homogeneous with respect to their relative position, i.e., $\alpha_i = \alpha_j = \alpha \ \forall i, j \in \{1,2,...,N\}$, the search for status in public good contribution always increases social welfare whatever individuals' initial endowment, i.e $\forall D_i$.

Proof: All individuals have homogeneous preferences implying equivalent behaviour towards their contribution: either all free ride, or all contribute their entire endowment. If all free ride, welfare will be unchanged by positional preferences. If all contribute, the social welfare effect of positional preferences given in (6), becomes:

$$\Delta W = \left(\frac{G}{p} - 1\right)\sum_{i=1}^{N} D_i + \sum_{i=1}^{N} \alpha\left(\frac{D_i}{p} - \frac{\sum_{j \neq i} D_j}{(N-1)p}\right) = \left(\frac{G}{p} - 1\right)\sum_{i=1}^{N} D_i + \alpha\left[\sum_{i=1}^{N}\left(\frac{D_i}{p} - \frac{(N-1)\sum_{i=1}^{N} D_i}{(N-1)p}\right)\right]$$

$$\Delta W = \left(\frac{G}{p} - 1\right)\sum_{i=1}^{N} D_i > 0 \text{ .} \blacksquare$$

In the case where all individuals have homogeneous preferences even if the search for status motivates their contribution to public good, the global gain of status-seeking is nil. No one will obtain positional gains or losses as in the case of private goods (Frank, 2005, 2008). The positional benefits from some individuals will be counterbalanced by positional losses of the others. This result can be explained by our assumption of homogeneous preferences (all individual give the same value to their relative position) and our definition of relative position (comparison between individual and average contribution of all other individuals). Even if positional preferences do not increase positional benefits, because the positional good is a public good, it is overprovided as compared with the benchmark provision and social welfare increases. In other words, positional preferences can prevent free-rider behaviour. Of course the gain in public good depends mainly on the group marginal payoff.

4. Private provision of public goods with heterogeneous preferences for position

It is more realistic and consistent with empirical investigations (e.g., Solnick and Hemenway, 2005) to assume that individuals do not give the same value to status. For instance, Charness and Rabin (2002) showed experimentally that some participants made choices motivated by search for status while others do not. If individuals differ in their positional preferences, do positional preferences still lead to increases of social welfare? The overall outcome on social welfare still depends on two kinds of effects. First, an *effect of voluntary public good provision* due to the diversion of some resources from the non-positional good (here the private good) to the positional good, which is always positive (see section 3). Second, a *positional effect*, which might no longer be cancelled out and can either be positive or negative. Indeed, individuals will choose their respective contributions depending on their positional preferences (parameter α_i). Their contributions depend both on their positional preferences and their endowments which both can vary from one agent to another. So individuals end up with various relative positions.

Proposition 2: Assume that individuals differ in their positional preferences.

- **If all individuals have identical endowments, then positional preferences in public goods provision lead to an increase in social welfare.**
- **If individuals have heterogeneous endowments, then the effect of positional preferences in public goods provision on social welfare is ambiguous.**

Proof: Suppose all individuals have identical endowments ($D_i = D$) and there are *k* contributors. The social welfare gain of positional preferences can then be written *as follows*:

$$\Delta W = kD\left(\frac{G}{p}-1\right)+\frac{D}{p}\sum_{i=1}^{k}\alpha_i\left(1-\frac{k-1}{N-1}\right)-\frac{D}{p}\sum_{i=k+1}^{N}\alpha_i\frac{k}{(N-1)}$$

As the positional parameter is higher for individuals who contribute than for individuals who do not, we have $\alpha_i \geq p-\frac{G}{N}$ for $i \in [1,k]$ and $\alpha_j < p-\frac{G}{N}$ for $j \in [k+1,N]$.

We can deduce that for contributors, $\sum_{i=1}^{k}\alpha_i\left(\frac{N-k}{N-1}\right) \geq k(p-\frac{G}{N})\left(\frac{N-k}{N-1}\right)$

And for free-riders, $-\sum_{j=k+1}^{N}\alpha_j\left(\frac{k}{N-1}\right) > -k(p-\frac{G}{N})\left(\frac{N-k}{N-1}\right)$

Then $\frac{D}{p}\sum_{i=1}^{k}\alpha_i\left(1-\frac{k-1}{N-1}\right)-\frac{D}{p}\sum_{i=k+1}^{N}\alpha_i\frac{k}{(N-1)} > 0$ and $\Delta W > 0$.

When individuals have different endowments, the effect on social welfare might be positive or negative: $\Delta W = (\frac{G}{p}-1)\sum_{i=1}^{k}D_i + \sum_{i=1}^{k}\alpha_i(\frac{D_i}{p}-\frac{\sum_{j\neq i}D_j}{(N-1)p}) - \sum_{i=k+1}^{N}\alpha_i\frac{\sum_{j\neq i}D_j}{(N-1)p}$. ■

This proposition shows that when all individuals have the same endowment, social welfare is increased by positional choices on public good contribution not only because of the positive externality on public good consumption, but also because the positional benefit of those who contribute is higher than the positional loss of non-contributors. Indeed those who contribute have higher positional taste (α_i) than those who do not contribute. Unlike Frank (2005), this result shows that heterogeneous positional preferences with identical endowments can ultimately enhance social welfare.

In the case of heterogeneous endowments, this result can be reversed. The contribution varies from one individual to another not only because of differing positional preferences but also because individuals possess different endowments. The positional effect on contributors and on non-contributors is therefore uncertain. The positional effect on contributors depends on their relative position on contribution, i.e. $\left(\frac{D_i}{p} - \frac{\sum_{j \neq i} D_j}{p(N-1)} \right)$ (how much they contribute when compared to others) and on their positional taste (α_i). As they contribute to the public good, their positional taste is positive (i.e. $\alpha_i \geq p - \frac{G}{N}$). If they contribute more than others (on average), they will benefit from an increased relative position. But if they have a lower endowment than other contributors, they then lose in terms of relative position, i.e. $\left(\frac{D_i}{p} - \frac{\sum_{j \neq i} D_j}{p(N-1)} \right) < 0$. If their positional taste is high, which means that they really care about relative position, their loss of utility will then be very high. The other effect that composes the positional effect is the one on non-contributors. If non-contributors have negative positional tastes (α_i<0) they prefer contributing less than others and benefit from a decrease in their relative position. Also, when non-contributors have positive positional preferences, but not high enough to contribute $\alpha_i < p - \frac{G}{N}$, they will suffer a loss from contributing less than others. So, positional preferences on public good contribution might lead to a decrease in social welfare because of an overall negative effect on positional externalities when individuals possess different positional preferences and endowments, even if there is always a positive effect due to public good provision.

Interestingly, if individuals have heterogeneous positional preferences (and different endowments) and if they compare their contribution to the average contribution of other persons *having the same endowment,* then the first part of proposition 2 applies and positional preferences in public good provision lead to an increase in social welfare[3]. Indeed, it seems more realistic to assume that people

[3] If individuals do compare their contribution to the average contribution of other persons having the same endowment their utility may then be written as:

$$U_i(x_i, x_{j \neq i, j \in I}, x_{k \notin I}) = \Pi(x_i, x_{j \neq i, j \in I}, x_{k \notin I}) + \alpha_i(x_i - \frac{x_{j \neq i, j \in I}}{I-1})$$

where I denotes the group of individuals having the same endowment as individual ***i***,

and $\Pi(x_i, x_{j \neq i, j \in I}, x_{k \notin I})$ is the monetary payoff, which depends on overall contribution to public good,

and $\alpha_i(x_i - \frac{x_{j \neq i, j \in I}}{I-1})$ is the positional payoff, which depends on the relative position $(x_i - \frac{x_{j \neq i, j \in I}}{I-1})$ defined by comparison to the average contribution of individuals having the same endowment as individual *i*.

It is then easy to show that positional concerns in public good provision lead to an increase of social welfare (increase of public good provision, and overall positive positional payoff).

do compare themselves with similar persons. Aristotle argued that 'we envy those who are near us in time, place, age, or reputation' (Rhetoric, 1338a). For instance, Ted Turner is engaged in a competition with the wealthiest Americans, and does not care about his position relative to poorest persons. In the same vein, Clark and Oswald (1996) showed that individuals compare themselves to reference groups including other persons similar to themselves on some dimensions.

6. Concluding remarks

Using a model of consumer behaviour, we showed that positional concerns regarding public goods contribution can increase social welfare, especially when all individuals have the same positional preferences. In this particular case, social welfare increases because of a higher provision level of the public good while the overall effect on positional revenue is nil because the increase in relative position of some individuals is cancelled out by the loss of relative position of others. In the case where all individuals have the same endowment and different positional preferences, positional concerns on public good provision also improve social welfare because of two positive effects: an increase in public good provision and a positive sum-game on position. This overall positional benefit comes from the fact that those who give more value to status get the higher status, and those who get a lower status (as they do not make any expenditure for status) give less value to status. This result also holds when the status is defined by comparison to similar (in income) individuals, in case of different endowments. If individuals have heterogeneous positional preferences and if the status is defined by comparison to individuals who have different endowments, status seeking in public good provision may decrease social welfare if negative externalities on status are larger than benefit from public good provision.

Since positional preferences to public good provision may increase voluntary contribution to public goods, eradication, e.g., through progressive taxation, of all status-seeking behavior through public intervention is not always desirable. While positional races on private goods can be detrimental to social welfare (Frank, 2005), positional races on public goods can be conducive to Paretian improvements. Consequently, a major issue to policymakers is to limit positional races in the private goods domain while promoting them in the public goods domain. It is widely admitted that positional preferences are more likely to remain latent if there is no socially visible way to rank individuals on the considered dimension. From a practical viewpoint, 'social visibility' can stimulate positional choices in the public goods realm. Interestingly, experimental evidence regarding contribution to public goods (where the common pool is not divided among participants but invested in stabilizing

climate change) shows that much greater personal support is obtained when the subjects are allowed to make their contributions in public as compared with anonymous investments (Milinski et al., 2006). In the same vein, a recent marketing study showed that status competition can promote pro-environmental behaviour, even at a private cost for individuals (Griskevicius et al., 2010). The authors argue that 'visible' ecofriendly purchases (by contrasting shopping alone online with shopping in public) are rooted in the idea of competitive altruism, that is people compete for status by trying to appear more altruistic. The huge success of Toyota Prius in United States, when most other hybrid models struggle to find buyers is frequently attributed to its ability to confer status to its owners.

Positional concerns are complex and depend largely on the interactions between several parameters such as the type and scarcity of public good involved and the reference group to which this individual wishes to belong and so on (Solnick and Hemenway, 2005). For example, according to the reference group, some public goods serve as positional markers and can generate positive-sum positional races while other public goods cannot, leading to less socially desirable outcomes in terms of public goods provision. Nevertheless, the situation is not fixed and can vary across time and space. In addition to improve the social visibility of some public goods contributions, policymakers can also promote new reference groups by manufacturing additional dimensions of status.

Solnick and Hemenway (2005) showed that positional concerns about relative position are stronger in some domains than in others, by contrasting private and public goods. Our analysis considers only positional concerns about contributions to a public good ('Do I contribute more or less than others, and how much ?'). Our results about individuals'choice and their welfare implications would be different if we assume that individuals have also some positional preferences on private good consumption and some other positional preferences on contributions to public goods. Some individuals can seek to occupy top positions in several races, regardless of their private or public natures. As said Ted Turner: "My hand shook when I signed the papers," he recalls, about his first big gifts to universities and the environment, "because I knew I was taking myself out of the running for the richest man in America". (Dowd, 1996). A natural extension to our study will be to analyze the overall impact of different combinations of positional preferences regarding public and private goods on the whole economy.

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