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Do You Enjoy Having More than Others? Survey Evidence of Positional Goods

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Although conventional economic theory proposes that only the absolute levels of income and consumption matter for people's utility, there is much evidence that relative concerns are often important. This paper uses a choice experiment to measure people's perceptions of the degree to which such concerns matter, i.e. the degree of positionality. Based on a random sample in Sweden, income and cars are found to be highly positional, on average, in contrast to leisure and car safety. Leisure may even be completely non-positional. Potential policy implications are discussed.

INTRODUCTION

One of the main characteristics of modern behavioural economics is that it takes the influence of social context seriously. In this paper we focus on the idea that people may prefer not only to have a high income and consumption level, but also to have more than others, and similarly that people perceive that they are receiving a disutility if they are surrounded by others who have more than they do. Using what Amiel and Cowell (1999) denote a questionnaire-experimental method, which in our case is based on a choice experiment using a random sample in Sweden, we measure people's perceptions of the degree to which relative income, and relative consumption of leisure, cars and car safety, matter.

The idea that relative income and consumption are important for people is far from new. Many prominent economists in the past, including Adam Smith, John Stuart Mill, Karl Marx, Alfred Marshall, Thorstein Veblen, Arthur Pigou, John Maynard Keynes, John Kenneth Galbraith and Tibor Scitovsky, have seriously discussed the observation that people seem to be concerned with their own income and consumption relative to that of others. Despite this fact, and despite a recent increase in mainly theoretical research on status and social comparisons (see e.g. Frank 2005; Hopkins and Kornienko 2004; Luttmer 2005; Alonso-Carrera *et al.* 2005 for recent contributions), such concerns are still treated as non-standard, and microeconomic textbooks rarely even raise the possibility that they might matter.

Whether relative income and consumption concerns exist and are substantial is important for our understanding of many economic phenomena, including aggregate consumption and savings patterns (Duesenberry 1949; Basmann *et al.* 1988), wage formation (Agell and Lundborg 1995, 2003), pricing of cosmetic products (Chao and Schor 1998), labour supply (Neumark and Postlewait 1998) and the demand for risky activities (Becker and Murphy 2000). Furthermore, since relative concerns imply that an increased income or consumption level of each individual imposes negative externalities on the others, one can also argue in favour of policy interventions in response to an over-consumption of goods consumed primarily to demonstrate wealth or success—positional goods in the vocabulary of Hirsch (1976) and Frank (1985a, b). Remarkably, the suggestion of taxing such positional goods more heavily was pointed out more than 150 years ago by John Stuart Mill:

> A great portion of the expenses of the higher and middle classes in most countries, and the greatest in this, is not incurred for the sake of the pleasure afforded by the things on which the money is spent, but from regard to opinion, and an idea that certain expenses are expected from them, as an appendage of station; and I cannot but think that expenditure of this sort is a most desirable subject of taxation. If taxation discourages it some good is done, and if not, no harm; for, in so far as taxes are levied on things which are desired and possessed from motives of this description, nobody is the worse for them.
>
> (Mill 1848, Bk v, Ch. vi)

However, if policy is going to be influenced by the idea of positional goods, we need empirical evidence, and not only gut feelings and introspection. In order to quantify the degree to which relative concerns matter—the main task of this paper—it would clearly be an advantage if all non-essential variables could be fixed. The main advantage of using experimental or survey-based methods is that it provides this possibility.

One example of a questionnaire-experimental approach, and the one adopted here, is that allowing people to make choices regarding hypothetical states of the world in order to reveal their perception of what is intrinsically important to them. In Solnick and Hemenway (1998; 2005), the respondents chose between one state in which they are better off in absolute terms of a certain good, and another state in which they are better off relatively, compared with others. Similar designs were used by Johansson-Stenman *et al.* (2002) and Alpizar *et al.* (2005), but they also allowed the respondents to make repeated choices. In this way it was also possible to estimate the average degree to which relative income and consumption matter. Most of these experiments have been conducted with students,[1] which is standard practice in behavioural and experimental economics. This is the first study that is based on a random sample of the population as a whole; this is an important extension, since it is difficult for students with very limited experience of earning their own money and consuming goods such as cars to make such choices.

Still, using hypothetical choices in a questionnaire setting is of course not without problems, as discussed for example by Bertrand and Mullainathan (2001), and we cannot rule out the possibility that people might exaggerate their preferences in one way or another. Nevertheless, we argue, following Kahneman and Tversky (1979, p. 265), that choices between large hypothetical incomes can reveal useful information when participants have no particular reason to disguise their true preferences.

Section I presents the design of the survey and the experiment, where the respondents make repeated choices between a society A (where the individual is better off in *absolute* terms) and different societies R (where the individual is better off in *relative* terms). It also explains how the degree of positionality can be inferred from the responses. Section II quantifies the perceived mean degrees of positionality. Section III summarizes and concludes the paper.

I. Survey and Experiment

The main survey was sent out to 700 randomly selected individuals aged 18–66 in Sweden in May 2002. Of these, 25 were returned with 'address unknown'. Two weeks after the questionnaire was sent out, a reminder together with a questionnaire was sent out to those respondents who had not yet answered. Of the remaining 675 questionnaires, 335 (50%) were returned. The comparisons of our survey data with population statistics of adults in the same age group in Sweden show no statistical difference at 5% level relating to education structure, income or gender composition, but a slight over-representation of older people. (The 95% confidence interval of age is 42.9–45.7 years in our sample, while the average age for that population in Sweden is 42.3 years: SCB 2003, 2004.) The

questionnaire consisted of two parts. The first part contained socioeconomic questions and the second part contained the experiment.

In the experiment we chose to include income and three goods: company cars (their value), the safety of these cars, and leisure. This was done in order to be able to test some hypotheses which have frequently been assumed in the theoretical literature, and/or in the public debate, but for which there is as yet very little empirical support:

Hypothesis 1. Income is more positional than leisure
(e.g. Boskin and Sheshinski 1978; Frank 1985a, 1999; Ireland 2001; Ljungqvist and Uhlig 2000).

Hypothesis 2. Visible goods and their characteristics, such as the value of cars, are more positional than less visible goods and their characteristics, such as car safety
(e.g. Frank 1985a, 1999).

Hypothesis 3. Leisure is completely non-positional
(e.g. Boskin and Sheshinski 1978; Ireland 2001; Ljungqvist and Uhlig 2000).

Hypothesis 4. Status-signalling goods, such as cars, are completely positional.

The experiment began with an introduction describing the basic idea together with an example:

In this part of the questionnaire we require you to choose which society you consider to be the best one for an imaginary person living two generations into the future. You can, for example, imagine a grandchild, great grandchild or another relative that you are choosing for. By 'best' we mean the society in which your future relative will be most content.

- The difference between the societies is the income level or the amount of consumption for a certain good of your future relative, and the average income and consumption of the society.
- The variety of goods and their prices are the same for both societies. For 100 SEK you can buy the same goods and the same amount in both societies. Prices are expressed in today's price level.
- It is important that you focus your answer on what is in the best interest of the imagined person, and nothing else. There is no 'correct' response to these questions and we ask you to reflect on the choices carefully.

Example In the example below your future relative earns 2000 SEK more in society A compared with society R. You can also see that your future relative earns 5000 SEK/month less than the average income in society A and 3000 SEK/month more than the average in society R.

Society A
- Your relative's income is 20,000 SEK/month after tax.
- The average income in society is 25,000 SEK/month after tax.

Society R
- Your relative's income is 18,000 SEK/month after tax.
- The average income in society is 15,000 SEK/month after tax.

We ask you to choose which society you consider to be the best one for your future relative; that is, the society in which your future relative will be most content. It is important that you focus your answer solely on this; that is: which society is the best for your future relative? You should *not* consider which society is best on the whole.

In the construction of the scenarios we followed Johansson-Stenman *et al*. (2002) and Alpizar *et al*. (2005) by instructing respondents to consider the well-being of an imagined relative living two generations from now when making their choices. This framing was used in order to help respondents to liberate themselves from their current circumstances. Moreover, it seems more natural to choose what is best for an imagined relative than a complete stranger.

The introduction and the example were followed by four questions concerning income, leisure, the market value of cars and car safety. The choice of goods was of course not random. Leisure was included, since it is typically seen as a non-positional good. The market value of the car was included since this is a visible good that presumably can be a positional good. On the other hand, car safety is presumably a less positional good. Since making repeated choices on the same goods, such as in Alpizar *et al*. (2005), may induce anchoring problems, we asked each respondent to make only one choice per good. Because an understanding of price levels is essential to the interpretation of the results, it was repeatedly stressed that the societies were identical in every other dimension, that the price levels were the same and that they were expressed in terms of the current price level in Sweden, since it is possible that utility also depends on changes in income and consumption over time (i.e. positionality in the time dimension); see e.g. Frank and Hutchens (1993).

The first choice concerned the incomes of respondents' relatives compared with the income of others. As in the example, respondents made a choice between two societies—society A (for 'Absolute') and society R (for 'Relative')—that were described by the imagined relative's income and the average income in the two societies.[2] There were three different versions, with different income levels; one of these is shown in Question 1 below. (The levels of all versions for all goods are shown in Table 1.) The reason why income levels were varied among the survey versions is that we wanted to

TABLE 1
SOCIETIES AND DESCRIPTIVE RESULTS FROM THE EXPERIMENT

	Relative's income or consumption	Average income or consumption	Degree of positionality (γ) if indifferent	Share of respondents choosing each society	
				Society A	Society R
Income experiment (*SEK/month*)					
Society A (all versions)	27,000	30,000			
Society R, version 1	25,250	22,950	0.25	25%	75%
Society R, version 2	22,000	20,000	0.5	47%	53%
Society R, version 3	14,800	13,450	0.74	53%	47%
Leisure experiment (*working hours/week*)					
Society A (all versions)	40	36			
Society R, version 1	42.5	46	0.25	60%	40%
Society R, version 2	47	51	0.47	81%	19%
Society R, version 3	61	64	0.75	90%	10%
Car consumption experiment (*market value in SEK*)					
Society A (all versions)	90,000	100,000			
Society R, version 1	84,200	76,500	0.25	39%	61%
Society R, version 2	73,600	69,600	0.54	44%	56%
Society R, version 3	49,300	44,800	0.74	50%	50%
Car safety experiment: risk of fatal accident relative to the average risk of cars 2002					
Society A (all versions)	17% lower	25% lower			
Society R, version 1	10% lower	2% lower	0.30	55%	45%
Society R, version 2	7% higher	17% higher	0.56	78%	22%
Society R, version 3	52% higher	67% higher	0.75	90%	10%

vary the implicit preference for relative income, and in that way to obtain more information about the preferences for relative status in our sample.

Question 1 Income for your future relative

Choose between societies A and R for your future relative:

Society A
- Your relative's income is 27,000 SEK/month after tax.
- The average income in society is 30,000 SEK/month after tax.

Society R
- Your relative's income is 25,250 SEK/month after tax.
- The average income in society is 22,950 SEK/month after tax.

Everything else is the same in the two societies, including the price level. In both societies your relative works 40 hours per week, which is same as the average number of working hours. Choose the society that you consider to be the best for your future relative.

☐ Society A ☐ Society R

There are many ways to incorporate relative comparison into the utility function. Most studies have either used a ratio comparison utility function, $u(x, x/\bar{x})$, or an additive comparison utility function, $u(x, x-\bar{x})$, where x is the individual's income and $\bar{x}$ is the average income in society. It is likely that the positional concern is more complex in reality than in the stylized models most often used. For example, Knell (1999) analyses theoretically 'within-class comparison', 'upward comparisons' and 'society-wide comparisons'. The first two cases include people who care for their status as members of a specific group and people who want to be like the ones with higher status, respectively. Nevertheless, for empirical and experimental simplicity we deal solely with the latter type of comparison; i.e. we assume that people compare themselves with the average in society, which enables us to estimate the positionality degree for each good with only one parameter. For simplicity, we follow an ordinal additive comparison utility function, $u = (1-\gamma)x + \gamma(x-\bar{x}) = x - \gamma\bar{x}$. It is easy to see that γ reflects the *marginal degree of positionality*, i.e. the fraction of the marginal utility of income that is due to the increase in relative income. Thus, when $U = u(x, r) \equiv u(x, x-\bar{x})$ we have

$$\gamma = \frac{\partial u}{\partial r}\frac{\partial r}{\partial x} \Big/ \left(\frac{\partial u}{\partial x} + \frac{\partial u}{\partial r}\frac{\partial r}{\partial x}\right).$$

For example, assume that $\gamma = 0.3$ and consider a small income increase for an individual; this implies an increase in both absolute and relative income. Both of these effects have a positive effect on utility. In this case, 70% of the utility increase is due to the increase in absolute income, and the remaining 30% is due to the increase in relative income.[3] From now on we will refer to γ simply as the *degree of positionality*. Moreover, we will refer to the *mean degree of positionality* as the mean value of γ, with respect to the sample of individuals considered. We will also say that a good is more positional than another good if and only if the mean degree of positionality is higher.

In order to quantify the strength of relative concern, let us consider the hypothetical choice between the two societies in Question 1. If an individual is indifferent, the utility is the same in societies A and R, and hence $x_A - \gamma\bar{x}_A = x_R - \gamma\bar{x}_R$. Solving for γ and inserting the values from Question 1 presented above gives us $\gamma = (x_A - x_R)/(\bar{x}_A - \bar{x}_R) = 0.25$. Thus, if an individual is indifferent, $\gamma = 0.25$, but if he or she prefers society A, $\gamma < 0.25$ and vice versa. Given that the implicit degree of positionality is varied among the respondents, it is possible to estimate the mean value of γ in the population. The degree of positionality for the three different goods is calculated in a similar way.

In the second question we were interested in whether relative concerns also matter for leisure, which is typically seen as a non-positional good; see e.g. Frank (1985a, 1999). From a policy perspective this is a particularly important issue, since large positionality differences between income and leisure may partly or totally offset the distortions that are typically associated with income taxes because of the fact that leisure is considered impossible to tax. Instead of presenting the leisure time per week, we presented the number of working hours. Respondents are presumably more familiar with this, and we can infer the amount of leisure time from that. Note that the grandchild's income is the same in both societies. One version of the labour/leisure question is shown below.

Question 2 Working hours and leisure for your future relative

Choose between societies A and R for your future relative. The societies are the same except for the information given below.

Society A
- Your relative's working hours are 40 hours per week.
- Average working hours are 36 hours per week.

Society R
- Your relative's working hours are 42.5 hours per week.
- Average working hours are 46 hours per week.

Everything else is the same in the two societies, including the price level. In both society A and society R your relative's monthly income is 20,000 SEK, which is the same as the average income. Choose the society that you consider to be the best for your future relative.

☐ Society A ☐ Society R

The last two choices concerned the value of the relative's car and the safety of the car, respectively. How much to spend on these goods is clearly up to the consumer in a free society.[4] However, for our purposes we do not want the respondents to interpret the prescribed consumption as reflections of their future relative's free choice.[5] Therefore we explained that the company at which the relative works provides the car as a fringe benefit, which is not an uncommon practice in Sweden. One version of the value-of-car question is shown below.

Question 3 Market value of the car for your future relative

Choose between societies A and R for your future relative. The societies are the same except for the information given below. This means that the consumption of all other goods is the same in both societies, even if the market value of cars is higher in one society. The company at which your relative works provides a company car.

Society A
- Your relative's company car is a few years old with a market value of 90,000 SEK.
- The average market value of cars in the society is 100,000 SEK.

Society R
- Your relative's company car is a few years old with a market value of 84,200 SEK.
- The average market value of cars in the society is 76,500 SEK.

Everything else is the same in the two societies, including the price level and your relative's income. Choose the society that you consider the best for your future relative.

☐ Society A ☐ Society R

In the question on car safety, the levels were expressed as fatal accident risks and they were all related to today's mean risk level of the car stock, which, according to the Swedish insurance company Folksam, corresponds to the safety level of a Ford

Escort from 1995 at the time of the survey. One version of the question is presented below.

Question 4 Car safety for your future relative

Choose between societies A and R for your future relative. The societies are the same except for the information given below. The company at which your relative works provides a company car. Today a 1995 Ford Escort has a mean risk for fatal accidents in Sweden (based on an analysis by Folksam); we therefore compare the future cars with this car.

Society A
- Your relative has a company car with a mean accident risk that is 17% lower than for a 1995 Ford Escort.
- The average car in the society has a mean accident risk that is 25% lower than for a 1995 Ford Escort.

Society R
- Your relative has a company car with a mean accident risk that is 10% lower than for a 1995 Ford Escort.
- The average car in the society has a mean accident risk that is 2% lower than for a 1995 Ford Escort.

Everything else is the same in the two societies, including the price level. Choose the society that you consider to be the best for your future relative:

☐ Society A ☐ Society R

Again, the definition of the degree of positionality is equivalent to the income case. Denoting safety by s, we can write the utility function, holding everything else constant, as $u = s - \gamma\bar{s}$. Denoting the baseline safety s_0 and the percentage risk reduction compared with the baseline risk Δr, we have $s = s_0/(1 - \Delta r)$and $\bar{s} = s_0/(1 - \Delta\bar{r})$. Substituting and solving for γ when utility is the same in societies A and R then gives

$$\gamma = [(1 - \Delta r_A) - (1 - \Delta r_B)]/[(1 - \Delta\bar{r}_A) - (1 - \Delta\bar{r}_B)],$$

which is equal to 0.30 in the case above.

For each good there are three different versions. These correspond to varying degrees of positionality if the respondent is indifferent, where the chosen degrees of positionality were around 0.25, 0.5 and 0.75, depending on rounding-off. The respondents were randomly assigned to one of the three survey versions. For simplicity, each survey version had the same implicit degree of positionality across goods; so if the question on income had an implicit degree of positionality of 0.5, the other questions had the same implicit degree. In all three versions, society A (the society where the individual is better off in *absolute* terms) was kept the same so that the levels were changed only in society R (the society where the individual is better off in *relative* terms). Table 1 presents the different versions of the experiment, as well as the corresponding shares of the respondents choosing societies A and R, respectively. It is then possible to observe directly the share of the respondents that have a higher degree of positionality than a certain value. For example, in the income experiment 53% choose society R version 2 instead of society A, implying that 53% of the respondents have an implicit degree of positionality for income that is higher than 0.5 (ignoring various kinds of possible errors to be discussed subsequently).

There are clear differences, consistent with our hypotheses, between the responses to the various goods. For example, when indifference between societies A and R reflects a degree of positionality of around 0.25,[6] 60% of the respondents preferred society A in the case of leisure, i.e. they preferred the society where the absolute amount of leisure is

highest; but only 25% of the respondents chose society A in the case of income. Comparisons between the value of cars and car safety provide a similar picture. Hence, from this table it seems quite clear that on average income is more positional on the margin than leisure, supporting Hypothesis 1. This result is consistent with the findings of Solnick and Hemenway (1998, 2005) and Alpizar *et al*. (2005), who found that income is more positional than the number of weeks of vacation. The results also imply that the value of cars is more positional on the margin than car safety, supporting Hypothesis 2.[7] This is broadly consistent with Solnick and Hemenway (2005), who found that safety appeared to be quite non-positional. It is more difficult to say anything from Table 1 about Hypotheses 3 and 4. In the next section we will estimate the mean degree of positionality for the various goods. In this way we can more formally test all of our hypotheses.

II. Estimating the Mean Degree of Positionality

So far we have seen that there appear to be substantial differences between income and leisure, and between the different goods, in the expected directions. However, from a normative perspective, e.g. in an optimal taxation framework, it is also important to know roughly the mean degrees of positionality. From an optimal income taxation perspective, the crucial parameters are the ones associated with income and leisure, whereas for optimal commodity taxation it is important to know the mean values for each market good. The next issue we turn to is therefore quantifications.

We do not directly observe each respondent's degree of positionality, only whether it is smaller or larger than a certain value. In order to estimate the mean degree of positionality for the assumed utility function, we use two methods: a non-parametric method and a parametric one.

For the non-parametric approach, we use the so-called Spearman–Karber estimator. Essentially, this means that we make linear interpolations between the observed shares of choices of societies at different implicit degrees of positionality. The disadvantage of this method is that it does not reflect preference uncertainty and cognitive limitations; i.e. it assumes implicitly that all responses are deterministic. On the other hand, it is well known that parametric methods are sensitive to distributional assumptions. The mean degree of positionality, using the Spearman–Karber estimator, is calculated as

$$E[\gamma] = \sum_{j=1}^{4} \frac{(P_j - P_{j+1})(g_j + g_{j+1})}{2}, \tag{1}$$

where P_j is the share of respondents who choose society R (the society where the individual is better off in *relative* terms) when the implicit degree of positionality is equal to g_j. In order to estimate the mean degree of positionality, we have to make assumptions about the lower and upper bounds of the distribution. We have tested different assumptions, with relatively minor differences between the results, and we report the results for the case where γ is distributed between 0 and 1.

In the parametric approach we introduce an error term, allowing for errors and individual preference uncertainty as well as heterogeneity. Assuming a symmetric distribution of the degree of positionality, we can write

$$\gamma = \alpha + \varepsilon, \tag{2}$$

where $E[\gamma] = \alpha$ and $\text{var}[\gamma] = \text{var}[\varepsilon] = \sigma^2$. This approach is similar to the random utility approach (McFadden 1974), in that it consists of a systematic and a stochastic part.

However, here we introduce the error term in the estimation of the degree of positionality directly, rather than as a part of the utility function. Nevertheless, our *g*-values are derived on the basis of our utility function. Hence both approaches are equivalent except for the distributional assumptions. We also estimated all models on the basis of the random utility approach (available from the authors upon request), with no qualitative differences.

The probability that an individual will choose society R depends on the survey version he/she answered, i.e. on the implicit degree of positionality when he/she is indifferent to the choice between societies A and R (around 0.25, 0.5 or 0.75). Let us denote the implicit degree of positionality in survey version j by g_j. The probability that society R is chosen can then be expressed as:

$$\Pr[R] = \Pr\left[\alpha + \varepsilon > g_j\right] = \Pr\left[\alpha - g_j > \varepsilon\right] \tag{3}$$

If we assume that the error terms are standard normal distributed, α can be estimated with a binary probit model with an intercept and the g variable. The mean degree of positionality is then given by the negative of the ratio of the intercept and the coefficient for g. The reason for this is that the estimated coefficient for the implicit degree of positionality is equal to the inverse of the variance parameter; cf. Cameron (1988). However, in our case it is likely that there is a correlation of responses to the four questions. For example, a person who is highly positional with respect to income can also be expected to be more positional than others in other domains. In order to deal with this, we estimate a multivariate probit model where we allow for a correlation among the responses to the four different questions/goods (Greene 2000).

We also tested several models where socioeconomic characteristics such as age, gender and education were included as explanatory variables. However, in all cases most of the coefficients were insignificant, and therefore we do not report the results from these estimations. (The results are available from the authors upon request.) Moreover, the mean degree of positionality was in all cases almost unaffected by including other explanatory variables.

Table 2 reports the results of the multivariate probit model. All intercepts are positive and all coefficients of the implicit degree of positionality are negative. This means that as

TABLE 2
ESTIMATED MULTIVARIATE PROBIT MODEL ON THE PROBABILITY OF CHOOSING SOCIETY *R* (THE SOCIETY WHERE THE INDIVIDUAL IS BETTER OFF IN RELATIVE TERMS) IN THE CHOICE BETWEEN SOCIETIES A AND R[a]

	Income	Leisure	Car value	Car safety
Estimated parameters				
Intercept	0.980 (0.000)	0.213 (0.272)	0.432 (0.023)	0.645 (0.005)
Parameter associated with the implicit degree of positionality (g)	− 1.493 (0.000)	− 2.067 (0.000)	− 0.574 (0.101)	− 2.543 (0.000)
Estimated correlation coefficients				
Leisure	0.471 (0.000)			
Car value	0.466 (0.000)	0.312 (0.001)		
Car safety	0.196 (0.059)	0.206 (0.051)	0.095 (0.360)	

[a] *P*-values are shown in parentheses.

TABLE 3
ESTIMATES OF THE MEAN DEGREES OF POSITIONALITY (γ) FOR INCOME AND THREE DIFFERENT GOODS[a]

	Non-parametric method	Parametric method
Income	0.53 (0.49–0.57)	0.65 (0.54–0.77)
Leisure	0.22 (0.19–0.25)	0.10 (− 0.05–0.25)
Car value	0.49 (0.46–0.53)	0.76 (0.37–1.15)
Car safety	0.27 (0.23–0.30)	0.25 (0.15–0.35)

[a]95% confidence interval in parentheses.

the implicit degree increases the number of respondents choosing the more positional society decreases, which follows intuition. There is a rather strong correlation among the three different goods and income. This means that there is a strong correlation in preferences among the goods and income; an individual who is more positional than another individual with respect to income is also likely to be more positional with respect to for example leisure.

Table 3 reports the mean degrees of positionality and the corresponding 95% confidence intervals for income and the different goods, based on the two methods described above.[8] For the non-parametric model, the variance of the mean estimate is given by

$$V[E(\gamma)] = \sum_{j=2}^{4} \frac{P_j(1-P_j)(g_{j+1}-g_{j-1})^2}{4(N_j-1)}, \tag{4}$$

where N_j is the number of respondents. For the parametric model, the mean degrees of positionality are given by the negative of the ratios between the intercepts and the parameters associated with the implicit degree of positionality in Table 2; the corresponding variances are estimated using the Delta method (Greene 2000). As can be seen, the mean degrees of positionality for leisure and safety are always considerably and significantly lower than the mean degrees for income and the market value for cars, again supporting Hypotheses 1 and 2. The results from testing Hypothesis 3 and 4—that leisure is completely non-positional and that status-signalling goods are completely positional on the margin—depend on the estimation method. Both of these hypotheses can be rejected on the basis of the non-parametric method, but they cannot be rejected on the basis of the parametric method. These differences between the methods are due to the fact that the confidence intervals are larger in the case of the parametric method, which comes as no surprise since we allow for errors and preference uncertainty as well as preference heterogeneity here. Thus, we can not provide any clear answer to the questions of whether cars are completely positional or not, and whether leisure is completely non-positional or not.

It should be emphasized that the estimated parameters in the parametric method reflect only the systematic part of the utility function, which is the same for all individuals. For example, from Table 1 we see that in the car question 50% chose the non-positional alternative when the choice reflected an implicit degree of positionality of 0.75. This heterogeneity could be a reflection of cognitive limitations and other sources of noise, but it could also reflect genuine preference heterogeneity. We find it likely that it reflects both. Indeed, in the literature of social preferences (see e.g. Fehr and Gächter

2000; Fehr and Fischbacher 2002), a large heterogeneity is typically found also based on tasks that are cognitively very simple. Consequently, our results indicate that income and cars are highly positional on average, which may reflect that they are completely positional for some individuals, partly positional for some and possibly also completely non-positional for some.

Moreover, we found that the mean degree of positionality for car safety is significantly larger than zero. This may in part be due to the fact that car safety has become more visible recently, when safety has become an important sales argument and various safety tests are frequently discussed in advertisement and in media more generally. Moreover, as pointed out by a referee, it is possible that altruistic people (in a safety-focused way) may value general safety in the society; cf. Jones-Lee (1992). If so, the status component of car safety is even larger than is shown here. The reason is that our numerical estimates reflect the net effect, whereas an effect of altruism goes in the opposite direction so that increased safety for others increases the individual's utility. However, taking preference heterogeneity into account, it is of course possible that both leisure and car safety may be completely non-positional for some individuals and partly positional for others.

The results can also be compared with Alpizar *et al.* (2005), who found that on average about half of the utility obtained from an additional dollar comes from relative concerns, and that this share was higher for private cars and housing and substantially lower for vacations and insurance, which are more or less in line with the findings presented here. It is worth noting that the degree of positionality obtained for leisure is somewhat lower in our study than in Alpizar *et al.* (2005), who applied the number of weeks of vacation, based on a comparable non-parametric approach. This may imply that the number of weeks of vacation is more positional than leisure in general.

III. Conclusions

In this paper we have measured people's perceptions of the importance of relative income and consumption. As far as we know, this is the first time that (i) a hypothetical choice experiment method on positionality has been based on a random sample of the population; (ii) the measurement of positionality takes into account preference uncertainty and cognitive errors; and (iii) the degree of positionality for leisure and safety has been measured explicitly.[9] Our analysis shows that relative income and relative consumption of at least some goods matter. It also shows that some goods are more positional than others, where the differences are consistent with our stated hypotheses. The fact that income is found to be more positional than leisure may imply higher and/or more progressive optimal income taxes (see e.g. Boskin and Sheshinski 1978; Ireland 2001; Brekke and Howarth 2003), whereas the fact that the value of cars is more positional than their safety may imply that cars should be taxed more heavily than less positional goods such as safety equipment. (Recall the quotation by John Stuart Mill in the introduction.)

Finally, we are fully aware of the fact that, like other known methods to measure the importance of relative concerns, the method used here has drawbacks. Nevertheless, since the degree of the disagreement within the scientific community is enormous on these important issues—ranging from the economics textbook world, where only *absolute* income and consumption matter, to the other extreme, where only *relative* income and consumption matter—we believe that the benefit of providing new empirical information

in this field is large. We therefore encourage the development and use of alternative methods to shed further light on these issues.

NOTES

1. Solnick and Hemenway (1998) included some faculty and staff members in their experiment. Solnick and Hemenway (2005) used a convenience sample based on responses from their friends and colleagues, and their friends and associates.
2. In the questionnaire we used societies A and B, instead of societies A and R. We use the latter terminology throughout this paper for presentational reasons.
3. Note that we cannot say anything in this framework about the fraction of the total utility that comes from relative versus absolute consumption. Moreover, the meaning of this question is not even clear, in the same way as it is not meaningful to ask about the fraction of our total utility that comes from our consumption of water.
4. The same could be claimed for the work–leisure tradeoff, but it is more common with restrictions in that choice, at least in Sweden.
5. For example, we do not want them to reason in the following way: 'A relatively small amount spent on cars probably reflects that my relative is uninterested in the status value of cars, and prefers to spend more money on for example clothes instead.' Furthermore, a lower or higher market value for the car could be interpreted as more or less consumption of other goods.
6. As can be seen from Table 1, the implicit degrees of positionality vary somewhat between the experiments with the different goods. There is no particular reason behind this, other than that we had several functional forms in mind when we constructed the experiments, and that some numbers were rounded off.
7. In order to test for scale effects, we let another sample of respondents answer a high-scale version of the experiment wherein all levels were approximately doubled. However, these responses were of poor quality, presumably because of the cognitive difficulties of dealing with income and consumption levels far beyond most respondents' experience. We have therefore chosen not to report these results, although they are available from the authors upon request.
8. Moreover, we also ran conventional binary probits (not shown) with almost no differences with respect to the mean degrees of positionality compared with the results based on multivariate probit models.
9. Alpizar *et al*. (2005) focused on weeks of vacation; this is not a good measure of leisure in the sense of overall non-working time, which is what is relevant from an optimal taxation perspective.

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