Money and Happiness: Rank of Income, not Income, Affects Life Satisfaction

Christopher J. Boyce

Gordon D. A. Brown

University of Warwick, United Kingdom

Simon C. Moore

School of Dentistry, Cardiff University, United Kingdom

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Abstract

Does money buy happiness, or does happiness come indirectly from the higher rank in society that money brings? Here we test a *rank hypothesis*, according to which people gain utility from the ranked position of their income within a comparison group. The rank hypothesis contrasts with traditional *reference income* hypotheses, which suggest utility from income depends on comparison to a social group reference norm. We show that the ranked position of an individual's income predicts general life satisfaction, while absolute income has no effect and reference income has little or none. Furthermore, individuals weight upward comparisons more than downward comparisons. According to the rank hypothesis, income and utility are therefore not directly linked: Increasing an individual's income will only increase their utility if ranked position also increases and will necessarily reduce the utility of others who will lose rank.

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Is there a true causal relation between money and happiness? According to conventional economics, there is: Money can buy happiness because it can be exchanged for goods that will increase an individual's utility. Thus money and happiness are assumed to be causally linked, and higher incomes should lead to greater happiness. In line with this *absolute income hypothesis* richer people are happier than those less well off within the same society (Diener, 1984). The correlation between money and happiness is often small, but effect sizes are larger in low-income developing economies (Howell & Howell, 2008) and even small correlations can reflect substantial real differences in happiness (Lucas & Schimmack, 2009). Such results, however, do not necessarily reflect a simple causal relation between money and happiness. The idea that absolute income leads to increased happiness is unable to account for the Easterlin paradox – that income and happiness are positively associated within a country at a given time, but not (or less well) correlated within a country over time (Easterlin, 1974, 1995).

Furthermore, being amongst people richer than oneself can be detrimental to various wellbeing measures (Clark, Frijters, & Shields, 2008; Diener, Sandvik, Seidlitz, & Diener, 1993; Ferrer-i-Carbonell, 2005; Luttmer, 2005), suggesting some type of income comparison takes place. Self-rated happiness and satisfaction scores have been shown to act as valid and reliable proxies for utility. The data have therefore been taken to suggest that utility is influenced not by an individual's absolute level of income but instead by their level of income relative to that of their peers (Duesenberry, 1949).

The *reference income hypothesis* is the dominant model of income comparison and suggests that individuals care about how their income compares to the norm, or reference income, of a socially constructed comparison group. Again, a direct causal

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link is assumed: Increased income will lead to increased utility for an individual if all else is held constant. Individuals gain utility to the extent that their income exceeds the average or reference income of people in their comparison set, and lose it to the extent that their own income falls below the reference level. In such models the average income of a reference group might reflect the level of consumption against which the individual evaluates their own consumption. The use of average income of an assumed reference group typically negatively and significantly predicts a number of variables related to well-being, consistent with the reference income approach (Clark & Oswald, 1996; Groot & van den Brink, 1999; Hamermesh, 1975). The presence of high earning individuals, either in the workplace or neighborhood, reduces satisfaction (Blanchflower & Oswald, 2004; Clark & Oswald, 1996; Ferrer-i-Carbonell, 2005; Luttmer, 2005).

Here we suggest instead that utility is based on an individual's ranked position within a comparison group – the *rank income* hypothesis. According to the rank-based model, people gain utility from occupying a higher ranked position within an income distribution rather than from either absolute income or their position relative to a reference wage (Brown, Gardner, Oswald, & Qian, 2008; Clark, Kristensen, & Westergard-Nielsen, 2008; Hagerty, 2000; Powdthavee, forthcoming; Smith, Diener, & Wedell, 1989). For example, people might care about whether they are the second most highly paid person, or the eighth most highly paid person, in their comparison set (which might contain fellow workers of a similar age and qualification level, neighbors, friends from college, etc). The ranked position of an income will be highly correlated with the position of that income relative to a mean, so evidence previously taken to support a reference income account may be consistent with a rank income account. According to the rank income hypothesis, there is no simple causal

relationship between money and happiness: An increase in income need not increase ranked position and hence need not increase happiness.

A rank based approach to judgment is independently motivated by the fact that in many areas of psychology judgments about items within a context of other items are influenced by the ranked position of the item along the dimension of interest. This perspective originated within psychophysics but has since been extended to economic and social phenomena (e.g. Mellers, 1986; Niedrich, Sharma, & Wedell, 2001; Parducci, 1995; Stewart, Chater, & Brown, 2006). It may be that subjective judgments of utility are governed by the same principles as are judgments of other quantities (Parducci, 1995).

There is already some evidence that rank income rather than reference or absolute income may be important, although previous large scale studies have looked only at satisfaction with economic conditions and not overall life satisfaction. In a study of 16,000 British workers wage satisfaction depended on the ordinal rank of an individual's wage within a workplace (Brown et al., 2008). Further, a study of 9,000 small neighborhoods researchers found that satisfaction with economic conditions became greater as ranked position within a neighborhood increased (Clark, Kristensen et al., 2008). Other studies have also considered rank in the broader context of range-frequency theory (Hagerty, 2000; Smith et al., 1989). However no large-scale study has examined the effect of income rank on self reported general life satisfaction. Here we use data from 12,000 British adults to examine this question. We also examine whether upward comparison (the number of people earning more than oneself) has a greater influence on life satisfaction than downward comparison (Duesenberry, 1949).

Method

We test a simple rank-based model according to which the individual compares to every other person in their reference group and carries out a binary

assessment of whether each individual is in either a better or worse situation than himself (Stewart et al., 2006). Those assigned "worse than" (i-1) are compared to the total number within the reference group (n-1). The ratio gives the individual a relative rank (R_i) normalized between 0 and 1:

$$(1) \quad R_i = \frac{i-1}{n-1}$$

We use R_i to predict life satisfaction in a multiple regression after the influence of other relevant variables had been partialled out. Data are taken from six years of the British Household Panel Survey (BHPS), which is a representative longitudinal sample of British households. All adults, from 1997 to 2004, who answered a life satisfaction question, are included in the analysis[1]. This gives a sample size of 86679. Life satisfaction is the respondent's answer on a 1 to 7 scale to the question: "how dissatisfied or satisfied are you with your life overall?" and is taken here as a proxy for an individual's utility and standardized. Household incomes were adjusted for regional living cost differences and number of individuals in the household. Total household income was divided by the 2004 regional living costs and weighted according to household size (adults = 1 unit; each child = 0.5 units). After such adjustment those with children, or those that may stay at home in the presence of a big income earner, will have comparable spending powers. The demographic characteristics controlled for were age, gender, education, marital status, children, housing ownership, labour force status and disabilities.

We first report analyses comparing rank income and income in the overall sample, then divide the sample into reference groups to enable comparison of the rank

income hypothesis and the reference income hypothesis. Finally, we look for evidence of asymmetric (upward) comparison.

Results

First, the ranked position of each individual's income within the entire sample in a given year was compared to the individual's absolute income as a predictor of life satisfaction.

Table 1 compares absolute income (logarithmically transformed) and rank income variables, controlling for demographic characteristics. Each is significant when entered as the only income-related predictor after controls (columns 1 and 2). The coefficient from column 1 suggests that, once controlling for other factors, the life satisfaction difference between the highest and lowest earners is 0.29 standard deviations. Alternatively the coefficient on the logarithm of household income shown in column 2 suggests that on average an individual will be 0.1 standard deviations higher in life satisfaction than someone earning about half as much. However, rank explains significantly more of the overall variation (R^2) in life satisfaction. Furthermore, when both income variables are entered simultaneously, rank income dominates and absolute income accounts for no additional variance (column 3) consistent with a role for ranked position of income, not income per se, in determining life satisfaction.[2]

Next, we constructed various reference groups to allow for the possibility that people compare their income to others in the same geographical region (of which there were 19 in the BHPS), of the same gender and education (there were three levels of education; graduate, college and neither, giving a total of six groups), or of the same age (individuals were grouped according to 12 different age groupings: all those less than 20 years old, 20-24, 25-29, 30-24, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69 and all those older than 70). In each case we computed the relative rank of each

individual's income within the reference group and also the mean income of all individuals within each reference group. We then predicted each individual's life satisfaction from (a) their relative rank within the reference group, (b) their absolute income (logarithmically transformed), and (c) the mean income of their reference group (logarithmically transformed).

We were then able to test the rank income hypothesis against both absolute income and reference income hypotheses. The results are shown in Table 2 and again the analyses include the full set of demographic controls. In all cases the individual's rank position of income within their reference group accounts for significant independent variance in life satisfaction and dominates the other income variables. When geographically-defined reference groups were assumed, neither absolute nor reference income accounted for significant additional variance (column 1). Similar results were found when individuals were assumed to compare themselves to others of the same education level and gender (column 2). When the reference group was assumed to consist of all others of similar age (column 3), reference group income accounted for significant additional variance after the rank variable but absolute income had no effect. The coefficient on the mean reference group income in column 3 suggests that an individual will be 0.26 standard deviations higher in life satisfaction than someone with the same income but whose reference group earns twice as much. Although the coefficient is significant, the addition of the reference group mean only adds 0.02% to the overall explanation (R^2) of life satisfaction over income rank and further it is unlikely, since the reference group variable has a standard deviation of just 0.2, that an individual's reference group income will vary by as much as one unit.

The final analyses explored the possibility that upwards comparisons were weighted more heavily. It is commonly suggested that comparison is asymmetric, being made mostly to those above oneself (Blanchflower & Oswald, 2004;

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Duesenberry, 1949; Ferrer-i-Carbonell, 2005). We therefore further examine whether the model improves when upward comparison is accounted for. The relative rank measure can be adapted in a way such that higher ranked others have greater (or lesser) impact on the individual's assessment of their own income than those below (above). This is the individual's subjective income rank (*SR*) (Brown et al., 2008):

$$(2) \quad SR_i = 0.5 + \frac{(i-1) - \eta(n-i)}{2\left[(i-1) + \eta(n-i)\right]}$$

Here, η captures the degree of upward comparison. If $\eta = 1$, equation 2 reverts to equation 1. When $\eta > 1$, individuals earning more than *i* influence perception of the individual's rank more than those earning less. If $\eta = 2$, for example, the number of individuals that earn more than *i* matters twice as much as those that earn less. We constructed a subjective rank variable based on the whole sample for each wave according to equation 2 with a given value of η. This was compared to the simple relative rank income variable ($\eta = 1$). With η set to 1.75 (the optimal value) significant additional variance is accounted for [$F(1, 86641) = 8.75$; $p < 0.01$]. The coefficient on the rank variable that incorporates this degree of upward comparison is 0.394 and significant, whereas the coefficient on the absolute income variable is -0.03 and insignificant. This result supports the original claim by Duesenberry (1949) that comparison is primarily upwards and shows further that people compare to those above themselves one and a three-quarter times more than those below.

Discussion

Based on more than 80,000 observations the relative rank of an individual's income predicts the individual's general life satisfaction after controlling for other variables and completely removes the effect of absolute income. When it was assumed that individuals compare themselves to smaller reference groups, relative rank of income continues to dominate life satisfaction, although an additional small

reference group mean income effect was also found. Results suggest that individuals sample from a reference group and compare their own income with sample incomes ordinally – satisfaction is gained from each "better than another" comparison and lost for each "worse than another" comparison. No calculation of mean reference group income is required. According to the rank hypothesis there is no direct causal relationship. Unless the individual's ranked position were perceived to change income could increase without increasing utility.[3] Rank income also predicts a concave utility function when incomes in the comparison set are positively skewed, since an increase in income at the lower end of the income distribution will increase rank faster (Brown et al., 2008; Kornienko, 2004; Stewart et al., 2006). Furthermore, there are fixed amounts of rank in society – only one individual can be the highest earner. The rank hypothesis therefore offers an explanation of why increasing the incomes of all need not raise the happiness of all, while at the same time wealth and happiness are correlated within a society at a given time.

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Author notes

[1] A life satisfaction question was not asked in the 2001 wave and therefore data from 2001 could not be included in the analysis.

[2] A fixed effect analysis, which focuses on explaining the within person variation, was also conducted to assist the demonstration that income rank provides a greater explanation of life satisfaction than absolute income. The fixed effect analysis allows unobservable heterogeneous factors to also be controlled for. Again rank dominates the explanation of life satisfaction. When entered simultaneously the coefficient on the rank variable is 0.06 and significant, whereas the coefficient on the absolute income variable is 0.02 and insignificant.

[3] We note however the possibility that "previous self" may enter into the comparison set (e.g. Vandestadt et al., 1985), in which case any increase in income could lead to increased utility.

Table 1: <u>Pooled OLS regression on life satisfaction comparing logarithm of absolute income and income rank by sample</u>

Independent Variables:	Dependent Variable: Life Satisfaction (standardized)		
	1	2	3
Income Rank[1]	0.288		0.302
	(21.46)**		(10.60)**
Log(Household Income[2])		0.10	-0.006
		(18.66)**	(0.53)
Demographic Controls	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
R-Squared	0.0838	0.0826	0.0838
Observations	86679	86679	86679

Absolute value of t-statistics in parentheses

* significant at 5% level; ** significant at 1% level

1. Based on the individuals household income adjusted for household size and deflated by regional livings cost

2. Adjusted for household size and deflated by regional livings costs

Table 2: <u>Pooled OLS regressions on life satisfaction comparing logarithm of mean income and income rank using various reference groups</u>

Independent Variables:	Dependent Variable: Life Satisfaction (standardized)		
	1	2	3
	Region	Gender and Education	Age
Income Rank[1]	0.294	0.289	0.244
	(10.66)**	(11.37)**	(9.48)**
Log(Household Income[2])	-0.004	-0.007	0.013
	(0.38)	(0.64)	(1.23)
Log(Mean Reference Group Income[2])	0.011	-0.130	-0.263
	(0.11)	(0.53)	(4.93)**
Demographic Controls	Yes	Yes	Yes
Regional Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	86679	86679	86679
R-Squared	0.0838	0.0839	0.0840

Absolute value of t-statistics in parentheses

* significant at 5% level; ** significant at 1% level

1. Based on the individuals household income adjusted for household size and deflated by regional livings cost

2. Adjusted for household size and deflated by regional livings costs