INEQUALITY-AVERSION AND INCOME MOBILITY: A DIRECT TEST

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ABSTRACT

A number of recent papers have found evidence of interdependencies in utility functions, in that, *ceteris paribus,* individual well-being falls as others' income or consumption increases. This paper asks if, in addition, the *distribution* of income in the reference group matters. I consider full-time employees in eleven waves of British panel data, and take life satisfaction and the **GHQ-12** as measures of individual well-being. I show that (i) well-being falls with average income in the reference group, but (ii) well-being is significantly positively correlated with reference group income inequality. This finding runs counter to the supposed public dislike of inequality. Last, I show that inequality-loving is 'strongest for those whose own incomes have shown the most variability over the past three years, and those who are on the steepest income path. As such, income inequality seems to include some aspect of opportunity.

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1.   Introduction

Over recent years a number of papers have started to chip away at the edifice of the atomistic individual utility function, whereby others' behaviour or allocations are irrelevant. This work has largely looked at interdependencies associated with comparisons or concern for status. The results are often consistent with models in which, *ceteris paribus*, individual well-being falls as others' income or consumption increases. The relevant others, to whom the individual compares, are often defined as those with the same individual characteristics, or, less often, those living in the same region or the same household as the individual.

As the term "status" implies, this literature has almost exclusively been concerned with the first moment of the distribution of income (or some other variable) in the reference group. This paper's innovation is to consider the effect of the second moment of reference group income. Heuristically, the question being asked is, given the mean level of income in the reference group, does it matter if that income is more or less widely-distributed?

The growth in inequality since the 1980s in OECD countries has been widely documented (see OECD, 1996). It is commonly supposed that many are worried about such inequality, and as such will be more likely to vote for political parties addressing this issue. To this extent, we might expect that a wider distribution of others' income, *i.e.* an increase in inequality, will be associated with lower well-being.

This paper contributes to the growing literature in economics which uses large-scale survey data on subjective well-being. Specifically, I use eleven waves of British panel data to ask whether individuals have lower levels of well-being when the distribution of income (amongst "relevant others") is wider. I consider only those who are in full-time employment, and

use real yearly income. The reference group is here defined by sex, region and wave, and the distribution of reference group income is picked up by the Gini coefficient. Well-being is alternatively measured by the GHQ-12 index and by a single-item measure of life satisfaction.

The results are quite unambiguous. While the average level of others' income in the reference group typically attracts a negative coefficient in a well-being equation, the Gini coefficient enters positively and mostly significantly. In other words, individuals mark their well-being scores upwards when the distribution of income in their reference group is wider. This finding runs counter to both the perceived public dislike of inequality, and with risk-aversion (if we consider that individuals have a certain fixed probability of both dropping down and climbing up the income distribution in their reference group).

The paper is organised as follows. Section 2 describes some previous literature, and Section 3 presents the data. Section 4 presents the main regression results, while Section 5 points out the key role of income mobility in determining attitudes towards inequality. Section 6 concludes.

2.   <u>Previous Literature</u>

Although there is a great deal of research in social science on income and measures of individual well-being, only little work has considered the importance of income inequality. An early exception is an innovative article by Tomes (1986), which uses data (from the 1977 Quality of Life Survey) on individuals in approximately 200 Federal Electoral Districts in Canada. Matching in census data on income distribution, it is shown that the share of income received by the bottom 40% of the population is negatively correlated (at the ten per cent level) with both satisfaction and happiness for men. The same correlations are insignificant for women. Inequality is thus positively correlated with subjective well-being for men. More recently, Ball

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(2001) shows that happiness and inequality are positively correlated in the raw data from the 1996 World Values Survey. The introduction of a number controls renders this macro correlation insignificant, although still positive. Using experimental methods, Rutstrom and Williams (2000) find no independent role for income inequality in explaining individual choices. Amiel, Creedy and Hum (1999) find only relatively small inequality-aversion in a leaky-bucket experiment carried out on college students.

Somewhat more articles have found a negative correlation between inequality and well-being. An early article by Morawetz ef *al.* (1977) contrasts two different Israeli communities and show that the level of happiness is higher in the community with the more equal income distribution. Although interesting, the result essentially relies on two observations, and does not control for all of the other factors which might differ between the two communities. More recently, Hagerty (1999) uses American General Social Survey (GSS) data from 1989 to 1996 to show that maximum community income and the skew of community income are respectively negatively and positively correlated with happiness scores. Hagerty then uses aggregate data from eight different countries to show that average happiness is lower in countries with wider income distributions. Schwarze and Härpfer (2002) calculate inequality in household gross income at the region and year level in 14 waves of German Socio-Economic Panel data. Life satisfaction is found to be negatively correlated with inequality (although a measure of income redistribution is not significant). Blanchflower and Oswald (2003) find a small but significant negative effect of inequality (measured at the state/year level) on life satisfaction in twenty years of pooled GSS data. Last, Senik (2003), finds no correlation between the Gini coefficient at the region/year level and life satisfaction in five waves of Russian Longitudinal Monitoring Survey (RLMS) data.

Alesina, Di Tella and MacCulloch (2003) explicitly compare long-run US and European

data, from the GSS (1972-97) and Eurobarometer (1975-92) respectively. Over the whole sample, inequality reduces reported subjective well-being amongst Europeans, but not for Americans. The authors suggest greater social mobility in the USA as a potential explanation.

This paper uses British panel data to test the idea that the distribution of income in the reference group matters[1]. The results will show that inequality is fairly unambiguously positively correlated with measures of subjective well-being. The results are therefore consistent with those of Tomes, rather than those of Hagerty and Morawetz *et al.* I will also appeal to the panel nature of the data to show that respondents' own income mobility over the past three years is one of the key factors determining the relation between inequality and subjective well-being.

3.   Data

The analysis of the relationship between individual well-being and reference group income inequality requires information on two relatively little-studied variables in economics: well-being or utility and the reference group. For the former, I use both overall life satisfaction and the GHQ-12 (the latter has been widely applied over the past twenty five years as a measure of psychological well-being). For the reference group, I consider others of the same sex in the same region and year; an earlier version of the paper used the "Leyden" definition -those with the same sex, age and level of education - without appreciably affecting the results. Equally, dropping the sex component of the reference group makes little difference.

The data comes from the first eleven waves of the British Household Panel Survey (BHPS), a general survey covering a random sample of approximately 10 000 individuals in 5 500 British households. The wave 1 data were collected in late 1991 - early 1992, the wave 2 data were collected in late 1992 -early 1993, and so on. This general survey includes, from wave *6* onwards (but not in wave 11), a question on overall life satisfaction: "How *dissatisfied or*

satisfied are you with your life overall", answered on a scale of one (labelled as "Not satisfied at all") to seven ("Completely satisfied"). It also includes, from a self-completion questionnaire, a battery of twelve psychological questions, covering feelings of strain, depression, inability to cope, anxiety-based insomnia, and lack of confidence, amongst others (see Appendix A). Responses are made on a four-point scale of frequency of a feeling in relation to a person's usual state: "Not at all", "No more than usual", "Rather more than usual", and "Much more than usual" (see Goldberg, 1972). The GHQ is very widely used in medical, psychological and sociological research, and is considered to be a robust indicator of the individual's psychological state.

This paper uses the Likert GHQ score. This is obtained by assigning the value of three to the "most positive" answer possible for each question (for example, for the question on feeling under strain, the response "not at all" would be assigned the value of three). Similarly, a value of zero is given to the "most negative" answer, with values of one and two being used for intermediate responses. The Likert GHQ score is then obtained by summing the scores over the twelve questions in the GHQ-12. The scale thus runs from 0 (all twelve responses indicating the worst possible psychological health) to 36 (all answers indicating the best possible psychological health).

The analysis refers to individuals of working age (16 to 60) who are employed (the self-employed are thus excluded). Income refers to levels of real total income over the past year; the vast majority of this will be labour income, the sample being restricted to the full-time employed. Experiments with monthly income did not change the results. There are two reference group variables (defined at the sex, region and wave level[2]). The first refers to average income. Following, for example, Clark and Oswald (1996), we may expect this to be negatively correlated with individual well-being, due to comparisons. The second measures the inequality with which that income is distributed, via the Gini coefficient. The presence or absence of the

mean income variable does not change the correlations with inequality. Equally, other measures of income inequality, such as the ratio of the 90th to the 10th percentile, produce qualitatively similar results.

This estimation sample contains **44 842** observations, covering 11 **727** different individuals. Appendix B shows the distribution of the well-being and income variables in this sample. The Gini for all full-time employees is 0.317. This differs somewhat by region, being generally higher in the South than in the North. Over time, the Gini coefficient rose from 0.308 in 1991 to 0.326 in 1997, before dropping back to its original level.

4.   Basic Regression Results

Table 1 presents full results from ordered probit estimations of the Likert GHQ score and life satisfaction. Various demographic variables, including age, sex, education and marital status, are included as right-hand side variables. Standard errors are corrected for clustering at the reference group level (Moulton, 1986). For ease of representation, the coefficients on a number of dummy variables and the estimated cut-points are not presented in this table.

A number of relatively well-known correlations are found in these regressions. Males have higher GHQ scores, there is a U-shaped relationship between well-being and age (Clark, Oswald and Warr, 1996), and a very strong relationship with physical health. There are smaller effects, although still significant, from education (negative: see Clark and Oswald, 1996) and marital status.

The key income variables appear at the top of the regression. Own income is positively correlated with life satisfaction, but negatively correlated with the GHQ score (as in Clark and Oswald, 1994). Average reference group income attracts a negative estimated coefficient in both regressions, which is significant in the case of life satisfaction.

The contribution of this paper is to introduce the second moment of reference group income into well-being regressions. The Gini coefficient attracts a positive and significant coefficient in both the GHQ and life satisfaction regressions, with a more precise estimate in the latter. *Ceterisparibus,* individuals prefer wider income distributions, as in Tomes (1986). A rise of ten percentage points in the Gini coefficient has a positive effect on well-being that is about one-third the size of the (negative) marital separation effect in the GHQ regression, and two-thirds the size in the life satisfaction regression.

The second panel of Table 1 shows the estimated coefficient on the Gini coefficient in sub-regressions by sex, age and income. All of these estimated coefficients are positive, although none are significant in the GHQ sub-regressions. Although the size of the estimates can not be compared between sub-regressions, the positive estimate on the Gini coefficient is better-defined (*i.e.* the t-statistic is higher) for women, those under 40 and those with below-average income.

The overall impression from Table 1 is that individuals have a taste for inequality in their reference group, with a stronger effect on life satisfaction than on GHQ[3].

The BHPS data is panel: as far as possible, the same individuals are interviewed every year. Table 1's results did not make use of the panel aspect of the data. An obvious test is to control for unobservable individual heterogeneity: the results of panel estimation of Table 1's regressions are summarised in Table 2. There is no accepted method for estimating panel ordered probit equations, so I adopt three compromise solutions. The first is to throw caution to the winds and pretend that both dependent variables are cardinal, so that four really is twice as high as two, which allows me to run within regressions. Alternatively, I collapse the two subjective well-being scales into (1,0) dummies and run first conditional fixed effects logits and then random effect probits. The cut-points are >=28 on the 0 to 36 GHQ scale, and >=6 on the 1 to 7 life satisfaction scale. Both cut the estimation sample roughly 40:60, with 40% having "high well-

being".

The panel GHQ results are universally weak, in that no significant correlation with the Gini coefficient, either positive or negative, is found. On the contrary, almost all of the estimated inequality coefficients in the life satisfaction regressions are positive, and a number of them are significant. This hold especially in the conditional fixed effects logits and the random effects probits, which respect the ordinality of the data[4]. In the last line of Table 2, inequality is significantly positively correlated with life satisfaction in the whole sample, and for the young and those with below-average income, even controlling for individual fixed effects. These panel sub-regression results are similar to those in Table 1's pooled regressions.

5.   Who Likes Inequality? The role of Own Income Variability

An advantage of panel data in this context, apart from allowing for fixed effect controls, is the availability of the individual's own income history. Two experiments were carried out. First, attitudes towards income inequality might be dependent on how variable one's own income has been. Second, the trend in income over recent years could matter. The idea here is that those whose income is on an upward slope may be more favourable to a wide distribution: the more sure you are that you are going to be amongst the winners, the greater you'd like the prize to be.

These experiments are in the spirit of Piketty (1995), whereby individuals learn about the determinants of economic success through their own mobility experience (and this learning requires costly effort): "voters with identical incomes but different social origins vote differently"(p.577). Bénabou and Ok (2001) consider, in a model without uncertainty, that future income prospects determine the current demand for redistribution. They show that "a large majority of the population can be simultaneously below average in terms of current income and above average in terms of expected future income, even though the income distribution remains

invariant" [p.452]. They illustrate with PSID data. Ravallion and Lokshin (**2000**) use **1996** RLMS data to show that the demand for redistribution in Russia is as much a function of income trajectories as of income levels.

The sample was thus restricted to those who were observed for four consecutive years, and who gave income information while employed each year. This reduces the number of observations to around **17 000** and **10 500** in the GHQ and life satisfaction regressions respectively. Next, the standard deviation of the individual's own income over these four consecutive years was calculated, as was the average percentage rise in income over the same period. Two dummy variables were then created, according to whether income variability and mean income rise is above or below the average recorded in this sample. These dummy variables were interacted with the Gini coefficient in the GHQ and life satisfaction regressions. The question being asked here is therefore whether those who have experienced more income mobility, or larger pay rises, are more inequality-loving.

Table **3** summarises the results, showing the estimated coefficients on the Gini and on the interaction term. For example, column 1 in the first panel shows that inequality is positively correlated with GHQ for those with below average income mobility, with an estimated coefficient of **0.846.** In addition, the interaction term in line two is positive and significant, showing that those with above average income mobility are more affected by income inequality (the effect is thirty per cent larger, at 0.846+0.237=1.083). The second and third columns in the first panel reveal that only women and men with above average income mobility are inequality-lovers.

In general, the interaction terms are positive and significant. Those who have themselves experienced greater income variability or larger pay rises are more likely to be positively affected by the inequality of income distribution in the reference group. The inequality-loving

which is evident over the whole sample is therefore more pronounced for those whose own incomes have moved the most over the past three years, and for those whose income trajectory is steepest[5].

6.   Conclusion

Much discussion in the popular press of recent economic developments in Anglo Saxon countries makes the implicit assumption that individuals are inequality-averse. This paper has used eleven waves of panel information on full-time employees in the United Kingdom to test this hypothesis. Using life satisfaction and GHQ-12 scores as proxy measures of utility it has been shown, as is usual, that individual well-being is negatively correlated with the mean level of reference group income, with reference group being defined by sex, region and wave. However, a relatively robust positive correlation has been found with reference group income inequality. To this extent, individuals appear to be inequality-loving rather than inequality-averse.

The positive correlation between inequality and subjective well-being is sharper for those whose own incomes have shown more variability over the past three years, and those who are on steeper income paths. While it is difficult to carry out clean tests, this suggests that income inequality contains an aspect of opportunity. Welch (1999), in his Richard T. Ely lecture to the American Economic Association, underscored that inequality is destructive when "the low-wage citizenry views society as unfair, when it views effort as not worthwhile, when upward mobility is viewed as impossible or as so unlikely that its pursuit is not worthwhile" (p.2). He concludes that such conditions did not pertain in the USA in the late 1960s onwards. A corollary is that inequality need not be harmful for economic growth. While Akerlof and Yellen (1988) note that lower wage dispersion within a firm should lead to higher effort and output, a recent careful

macroeconomic analysis by Forbes (2000) finds that income inequality is positively related to subsequent economic growth. The relationship between inequality, output and utility will likely continue to provide fertile ground for research in social science.

Footnotes

1. As in all of the literature using survey, as opposed to experimental, data, I cannot distinguish between inequality and inequity. In other words, I don't know whether individuals believe that the differences in income are deserved or not. The relative importance of effort and luck in income has been shown to be a significant determinant of attitudes towards redistribution (Corneo and Griiner, **2002).**

2. I use the 19 standard regions in the United Kingdom (Northern Ireland is included in the BHPS from wave 7 onwards). With eleven waves of data, there are **406** observations on reference group income (mean level and Gini coefficient).

3. We shouldn't lose sight of the fact that a restricted definition of inequality is treated here: the distribution of yearly income amongst those in full-time employment. As such, those who we typically think of as particularly disadvantaged - the sick, the unemployed and low-income retirees - do not figure in the analysis. The income of these groups will largely be mandated by the government, so that there will likely be only little variation by reference group.

4. The conditional fixed effect logits are identified by transitions in the dependent variable, and can therefore sharply reduce the number of observations in the regression. The random effects probit does not suffer from this drawback. The stronger results in the random effects probits may be linked to the larger estimation sample size.

5. It is noticeable that the regression results are weaker here for life satisfaction than for the GHQ measure. This is undoubtedly due in part to relatively small sample sizes (in the low thousands) in some of the life satisfaction regressions.

TABLE 1. WELL-BEING, INCOME AND INEQUALITY: ORDERED PROBITS

	GHQ	Life Satisfaction
Yearly Income (£0000)	-0.015	0.031
	(.006)	(.009)
Reference Group Income	-0.062	-0.175
	(.064)	(.086)
Reference Group Gini	0.505	1.287
	(.222)	(.317)
Male	0.270	0.021
	(.026)	(.038)
Age	-0.047	-0.064
	(.004)	(.006)
Age-squared	0.522	0.775
	(.05)	(.081)
Education: High	-0.080	-0.183
	(.016)	(.02)
Education: A/O/Nursing	-0.061	-0.152
	(.013)	(.02)
Health: Excellent	0.748	0.833
	(.015)	(.026)
Health: Good	0.433	0.473
	(.013)	(.02)
Hours	0.002	0.000
	(.001)	(.001)
Married	0.018	0.188
	(.015)	(.021)
Separated	-0.144	-0.193
	(.035)	(.049)
Divorced	0.010	-0.033
	(.022)	(.029)
Widowed	-0.336	-0.224
	(.05)	(.098)
N	44842	21966
Log Likelihood	-126892.4	-31292.149
Log Likelihood at zero	-129003.67	-32380.56

Notes: The regression includes dummies for Number of Children, Household Size, Region and Wave. Standard errors in parentheses.

Estimates on Reference Group Gini Coefficient in sub-regressions:

	GHQ	Life Satisfaction
Women	0.462	1.556***
	(0.322)	(0.542)
Men	0.265	0.883**

	(0.320)	(0.411)
Over 40	0.453	1.044**
	(0.348)	(0.511)
Under 40	0.477	1.379***
	(0.294)	(0.402)
Below average income	0.392	1.530***
	(0.317)	(0.480)
Above average income	0.487	1.045**
	(0.329)	(0.430)

Note: ***= significant at the one per cent level; **= significant at the five per cent level.

TABLE 2. PANEL RESULTS ON WELL-BEING AND INEQUALITY: "WITHIN" AND CONDITIONAL FIXED EFFECT LOGIT REGRESSIONS)

Estimated t-statistics on the Gini coefficient in regressions including all of Table 1's additional right hand side variables (as long as they are time-varying).

	All	Women	Men	Old	Young	Poor	Rich
Within Regressions							
GHQ	1.1	0.6	0.9	1.1	0.7	1.3	0.1
Life Satisfaction	1.4	1.2	0.6	-0.3	2.1**	1.6	0.6
Conditional Fixed Effects Logits							
GHQ	-0.1	-0.1	-0.1	-0.3	0.1	0.1	-1.0
Life Satisfaction	2.1**	1.4	1.4	-0.6	2.7***	2.1**	0.5
Random Effects Probits							
GHQ	0.3	0.5	-0.2	-0.3	0.6	0.5	-0.3
Life Satisfaction	3.5***	2.2**	2.2**	0.8	3.6***	2.9***	2.0**

TABLE 3. WELL-BEING. INEQUALITY AND INCOME MOBILITY:

ORDERED PROBITS

	All	*Women*	*Men*	*Old*	*Young*	*Poor*	*Rich*
GHQ							
Gini Coefficient	0.846**	0.414	0.580	1.312**	0.271	0.111	1.155**
	(.354)	(.487)	(.429)	(.627)	(.523)	(.588)	(.456)
Above average income	0.237***	0.322***	0.194***	0.296***	0.207***	0.120	0.291***
variability x Gini Coeff.	(.054)	(.101)	(.062)	(.076)	(.075)	(.096)	(.067)
Gini Coefficient	0.880**	0.465	0.608	1.355**	0.318	0.144	1.185**
	(.361)	(.497)	(.429)	(.625)	(.527)	(.593)	(.463)
Above average income	0.171***	0.241***	0.129*	0.244***	0.107	0.020	0.260***
rise x Gini Coefficient	(.06)	(.11)	(.069)	(.082)	(.077)	(.098)	(.075)
Life Satisfaction							
Gini Coefficient	0.599	0.565	0.250	-0.034	0.908	0.596	0.450
	(.442)	(.647)	(.58)	(.679)	(.629)	(.904)	(.566)
Above average income	0.104*	0.123	0.123*	0.214**	0.010	-0.101	0.196**
variability x Gini Coeff.	(.06)	(.101)	(.073)	(.087)	(.097)	(.114)	(.079)
Gini Coefficient	0.639	0.575	0.291	-0.029	0.985	0.689	0.478
	(.444)	(.662)	(.577)	(.684)	(.625)	(.908)	(.564)
Above average income	0.037	0.092	0.034	0.190**	-0.105	-0.201*	0.160*
rise x Gini Coefficient	(.062)	(.112)	(.077)	(.090)	(.106)	(.118)	(.092)

Note: All regressions include all of Table 1's additional right hand side variables. ***= significant at the one per cent level; **= significant at the five per cent level; *= significant at the ten per cent level.

Appendix A

The twelve questions used to crcate the GHQ-12 measure appear in the BHPS questionnaire as follows:

1.   Here are some questions regarding the way you have been feeling over the last few weeks. For each question please ring the number next to the answer that best suits the way you have felt.

Have you recently....
a)   *been able to concentrate on whatever you're doing?*

> *Better than usual 1*
> *Same as usual 2*
> *Less than usual 3*
> *Much less than usual. 4*

then
h)   *lost much sleep over worry?*
e)   *felt constantly under strain?*
f)   *felt you couldn't overcome your difficulties?*
i)   *been feeling unhappy or depressed?*
j)   *been losing confidence in yourself?*
k)   *been thinking of yourself as a worthless person?*

with the responses:
> *Not at all 1*
> *No more than usual 2*
> *Rather more than usual. 3*
> *Much more than usual 4*

then
c)   *felt that you were playing a useful part in things?*
d)   *felt capable of making decisions about things?*
        been able to enjoy your normal day-to-day aclivities?
h)   *been able to face up to problems?*
l)   *been feeling reasonably happy, all things considered?*

with the responses:
> *More so than usual 1*
> *About same as usual 2*
> *Less so than usual 3*
> *Much less than usual. 4*

Appendix B. Distribution of key variables

Variable	N	Mean	Std. Dev.	Min	Max
GHQ	44842	25.496	4.871	0	36
Life Satisfaction	21966	5.227	1.109	1	7
Yearly income (£0000)	44842	1.350	0.906	0.0007	37.657
Ref Gp Yearly income (£0000)	44842	1.344	0.258	0.772	2.366
Gini Coefficient	44842	0.297	0.0278	0.184	0.489

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