Distributional Orderings: An Approach with Seven Flavours

Yoram Amiel, Frank Cowell and Wulf Gaertner

Ruppin Academic Center,
London School of Economics
and Universitaet Osnabrueck

DARP 93
October 2007

The Toyota Centre
Suntory and Toyota International Centres for Economics and Related Disciplines
London School of Economics
Houghton Street
London WC2A 2A

(+44 020) 7955 6674

Abstract

We examine individuals' distributional orderings in a number of contexts. This is done by using a questionnaire-experiment that is presented to respondents in any one of seven "flavours" or interpretations of the basic distributional problem. The flavours include inequality, risk, social welfare and justice. The issue of personal involvement in the distributional comparison is explicitly addressed.

JEL Classification: C13, D63
Keywords: social welfare, inequality, justice, risk, questionnaire experiments.

Distributional Analysis Research Programme

The Distributional Analysis Research Programme was established in 1993 with funding from the Economic and Social Research Council. It is located within the Suntory and Toyota International Centres for Economics and Related Disciplines (STICERD) at the London School of Economics and Political Science. The programme is directed by Frank Cowell. The Discussion Paper series is available free of charge. To subscribe to the DARP paper series, or for further information on the work of the Programme, please contact our Research Secretary, Leila Alberici on:

Telephone:	UK+20 7955 6674
Fax:	UK+20 7955 6951
Email:	l.alberici@lse.ac.uk
Web site:	http://sticerd.lse.ac.uk/DARP

1 Introduction

Do distributional orderings have the "right" shape? The question is relevant for several fields of economic analysis including individual choice under risk and the evaluation of inequality. At its heart is a fundamental axiom of distributional analysis concerning mean-preserving spreads. The axiom is fundamental in two senses: first, it is commonly applied to a broad range of problems concerning distributional comparisons, irrespective of context; second, a version of it is often regarded as essential in characterising risk and inequality measures. In this paper we investigate whether this fundamental axiom is really appropriate. Using a questionnaire experiment in seven different distributional contexts – the seven "flavours" of the title – we examine the way that people appear to compare distributions in practice.

The variety of contexts include not only risk and inequality comparisons but also comparisons explicitly in terms of "welfare." In fact the welfare interpretation forms a particularly useful starting point, since it is capable of being expressed in one of two ways: (1) as social-welfare evaluations of income distributions and (2) as personal-preference evaluations of probability distributions over income. Orthodox economic theory makes a simple link between these welfare interpretations and inequality and risk evaluations respectively.

To address the question that we raised at the start, this paper focuses on two central features of welfare economics as applied to income distributions. First, is the implied shape of the contours used in people's distributional comparisons independent of economic context? Second, is the essence of the fundamental principle – that these contours should respect mean-preserving spreads – consistently observed?

The approach adopted here enables us to focus in a unique way on a number of issues that may affect the nature of distributional comparisons. For example, although theory is often predicated on the assumption that certain distributional values should be independent of personal circumstances, we might in practice expect to see different judgments if the person perceives that there is some personal involvement in the distributional choice. Furthermore, although in the standard theory distributional judgments should be free of the context it would be interesting to know if, in fact, the flavour of the problem has a significant effect.

The paper is organised as follows. Section 2 sets out the welfare-economic background; sections 3 and 4 respectively explain the methodology of the paper and analyse the results; section 5 concludes.

2 Welfare orderings and risk orderings

We have deliberately set out to cover a number of distributional principles simultaneously: let us begin with risk. The nature of risk comparisons developed in Rothschild and Stiglitz (1970) is founded upon the well-known concept of the mean-preserving spread (MPS) – any change in the distribution that can be represented as a sequence of MPSs must represent an increase in risk. This concept is intended to apply both to risks in which an agent is personally involved and that thus may form the basis for individual behaviour, and also to risks that do not involve the decision-maker.

There is a well-known counterpart to the MPS principle in the welfare analysis of income distributions, namely the transfer principle. The view that income disparities are socially undesirable goes back at least as far as Plato. However the explicit formalisation of the transfer principle is comparatively recent. Pigou (1912) formulated the principle in the context of just two persons, but was doubtful about extending it to other cases:

> "...economic welfare is likely to be augmented by anything that, leaving other things unaltered, renders the distribution of the national dividend less unequal. If we assume all members of the community to be of similar temperament, and if these members are only two in number, it is easily shown that any transference from the richer to the poorer of the two, since it enables more intense wants to be satisfied at the expense of less intense wants, must increase the aggregate sum of satisfaction. In a community consisting of more than two members, the meaning of 'rendering the distribution of the dividend less unequal' is ambiguous." (pp. 24-25).

An important step, reformulating the principle for an n-person society, was taken by Dalton (1920):

> ...we may safely say that, if there are only two income-receivers, and a transfer of incomes takes place from the richer to the poorer, inequality is diminished [...] we may safely go farther and say that, however great the number of income-receivers and whatever, the amount of their incomes, any transfer between any two of them, or, in general, any series of such transfers, [...] will diminish inequality. – page 351.

This is the concept that was developed by Atkinson (1970), Kolm (1969) and many other modern writers. The Dalton concept is the principle which permits the application of standard dominance criteria to be applied to the analysis of income distribution. It is embodied in the concept of S-concavity (Dasgupta et al. 1973, Sen and Foster 1997) and standard interpretations of majorisation (Marshall and Olkin 1979). But the concept clearly rests upon a specific interpretation of fundamental distributional principles that may, perhaps, be overly strong.[1]

The wording of Pigou's discussion clearly expresses social welfare in terms of sums of individual utilities and appeals to diminishing individual marginal utility as a basis for a social preference for greater equality. Such a view might not command much support today were it not buttressed by additional argument.[2] The additional argument for the sum-of-utilities approach to social welfare might be sought in the form of appealing to concern for inequality as a kind of consumption externality; this is clearly an approach for which there is no close counterpart in terms of individual choice under uncertainty. However, an alternative approach to the sum-of-utilities can be found in the connection between inequality and risk analysis. This connection was at the heart of Atkinson (1970)'s approach who pointed out a natural affinity between aversion to risk and aversion to inequality but there is an important further argument based on individual choices in the face of risk. Harsanyi, in a number of contributions (1953, 1955, 1977, 1978) made the case for considering social choice amongst income distributions as a reflection of individual choice amongst lotteries: this argument has been expressed either in the form of an impartial outside observer of society or that of personal involvement in that the individual decision-maker is supposed to imagine extending his preferences to social choice by imagining himself as being, with equal probability, in the situation of any of the n members of society.[3]

A further argument for social concern with inequality can be based on Rawls (1971)'s approach to distributional justice. This explicitly uses the concept of a "veil of ignorance" behind which an individual is imagined to make judgments about alternative states of the society of which he is supposed to be member. We thus have a collection of six alternative "flavours" of a fundamental distributional issue, as illustrated in the first three rows of Table 1: do MPSs increase risk, increase inequality, lower social welfare, create a more unjust state of society? These flavours collectively form the basis

[1] For example, a less demanding and relatively under-exploited concept is that of dominance in terms of differentials – see Marshall and Olkin (1979) pp.275-276 for a general treatment, Moyes (1994) and Bosmans (2007) in the context of inequality and Quiggin (1991) in the context of risk.

[2] For a summary of alternative approaches see Moulin (2003), Chapter 2.

[3] We have dicussed the detailed issues raised by the Harsanyi approach in Amiel et al. (2006).

negative formulation	*positive formulation*
risk; non-involvement	Harsanyi welfare; non-involvement
risk; involvement	Harsanyi welfare; involvement
inequality	Rawlsian justice
	fairness

Table 1: Flavours of the distributional problem

for our investigation into distributional attitudes below. However, there may be other reasons which drive people's concern about income distributions; to allow for this we have introduced a seventh flavour under the vague term "fairness" for which we do not attempt to give a precise definition.

3 The Approach

The issue was investigated by using a questionnaire-experiment with student respondents using the method described in full in Amiel and Cowell (1999, 2007). The special feature of the current study was the simultaneous presentation of several distinct variants of the basic welfare-economic issue within the same questionnaire-experimental format.

3.1 The questionnaires

Seven types of questionnaire – the seven flavours – were distributed in controlled sessions with student respondents during lecture or class time in 2003; within each session the seven flavours of questionnaire were distributed randomly. The questionnaire types were similar to each other in most respects but differed in one key feature as explained below.

As in Amiel and Cowell (2007) respondents were invited to consider distributional judgments in a mythical country, Alfaland. Alfaland consists of five regions that may differ from each other in terms of living standards (income) but that are internally homogeneous in terms of income. The realised incomes in each region of Alfaland depend on which of two policies A or B is pursued in the near future. Respondents are first asked to compare the distributional outcomes across the regions of Alfaland in each of six scenarios represented by pairs of income-vector; in each pair there is a distributional outcome from the A policy and an outcome from the B policy. Respondents are asked "In each of questions (1) to (6) two alternative lists of incomes A and B (in Alfaland local currency) are given. Each of these pairs represents the outcomes of the A-policy and the B-policy on the five regions in each of six different situations in which Alfaland might find itself next year. In each case please state which policy you consider XXX by circling A or B." The symbol XXX stands for wording that is specific to each of the seven flavours as follows:

1. (*Ineq*) "...would result in higher inequality in Alfaland."
2. (*Risk*) "...would result in higher risk for a person immigrating to Alfaland."
3. (*Risk-i*) "...would result in higher risk for you as an immigrant to Alfaland."
4. (*Hars*) "would result in a better situation in Alfaland." To create a sharp distinction between this and the next flavour respondents here were also told "Imagine that you are invited to be an outside observer of Alfaland..."
5. (*Hars-i*) "...would result in a better situation in Alfaland." In contrast to the flavour *Hars* respondents were told "Imagine that you have been assigned to one of the regions in Alfaland with an equal chance of being in any one of the five regions."
6. (*Just*) "...as more just for Alfaland." In contrast to the flavours *Hars* and *Hars-i* respondents here were told "Imagine that you have been assigned to one of the regions in Alfaland, but you do not know which one." This captures the idea of the veil-of-ignorance approach of Rawls (1971).
7. (*Fair*) "...would result in a fairer situation in Alfaland."

The respondents are also told that they can indicate indifference between the two outcomes by circling both A and B. Thus seven types of questionnaire were created from one. In each questionnaire the pattern of numerical questions was exactly the same as depicted in Figure 1. Clearly the A vectors can always be obtained from the B-vectors by a MPS (in other words a disequalising transfer). This means that for *Ineq*, *Risk* and *Risk-i* a person answering in line with orthodoxy would check A, whereas for the other four flavours the orthodox response is B.[4] Note that the questionnaire makes no implication about the status quo; nevertheless, in considering the implications of the distributional comparisons in the six separate scenarios, it is interesting to note the "implied transfer" in each pair of distributions. If we were to interpret A and B as "**A**fter" and "**B**efore": in two cases (questions 4 and 5) this involves relatively large amounts; in one case (question 2) this involves a small amount from poorest to richest; in one case (question 3) a small transfer to the richest, but not from the poorest; and in two cases (questions 1 and 6) small transfers involving neither the poorest nor the richest. Question 4 is slightly different from the others in that the "implied transfer" involves a reordering.[5]

1) A = (2, 5, 9, 20, 30)	B = (2, 6, 8, 20, 30)
2) A = (2, 5, 9, 20, 30)	B = (3, 5, 9, 20, 29)
3) A = (2, 5, 9, 20, 30)	B = (2, 6, 9, 20, 29)
4) A = (2, 5, 9, 20, 30)	B = (2, 10, 9, 15, 30)
5) A = (10, 10, 10, 10, 30)	B = (10, 10, 10, 20, 20)
6) A = (2, 5, 9, 20, 30)	B = (2, 6, 9, 19, 30)

Figure 1: The structure of the numerical questions

The numerical questions were then followed by a verbal question, described more fully below and an invitation to indicate any changes of mind about the responses to the numerical questions after having considered the principles stated in the verbal question. Of course for each of the seven flavours the precise wording of the verbal question had to be modified to cor-

[4] Notice that, strictly speaking, this applies also in the case of risk if the principle of mean-preserving spreads is satisfied. The risk in A is unambiguously higher than the risk in B irrespective of whether a person cares about that risk – whether a person is risk averse or not.

[5] In previous work with a similar format we checked whether the order of the scenarios or the order of presentation of the A and B vectors matter; they do not. (Amiel and Cowell 1999 p143)

	Germany	Israel	UK	*All countries*
Ineq	47	52	44	*143*
Risk	48	52	40	*140*
Risk-i	44	51	47	*142*
Hars	48	50	43	*141*
Hars-i	52	53	44	*149*
Just	52	54	45	*151*
Fair	53	50	46	*149*
All flavours	*344*	*362*	*309*	*1015*

Table 2: Sample of respondents

respond with phrasing used in the introduction. There was then a short list of questions covering personal details; however, as noted in the introduction to the questionnaire, each questionnaire-experimental session was run anonymously. Two examples of the seven flavours of questionnaire are provided in Appendix A.

3.2 The respondents

The seven flavours of questionnaire-experiment were run simultaneously with each of three groups of undergraduate students in Germany (Universität Osnabrück), Israel (Ruppin Academic Center) and the UK (London School of Economics). The breakdown is as in Table 2 where it is clear that our goal of distributing the seven flavours in roughly equal proportions in each subgroup of respondents was achieved. Also the one thousand-odd respondents were spread fairly evenly among the three countries.

4 Results

4.1 Numerical questions: overview

The overall results are depicted in Table 3. The leading column again gives the different flavours of the questionnaires. The columns labelled Q1 to Q6 give the proportions of orthodox responses to each of the six numerical questions for each flavour of the questionnaire and the column labelled "joint Q1-Q6" gives the proportion of the respondents who gave the orthodox response to all six questions jointly.

Recall that in all seven flavours full support for the orthodox position would imply 100% for all of Q1,...,Q6 and, of course, for the joint Q1-Q6 as

	Q1	Q2	Q3	Q4	Q5	Q6	joint Q1-Q6
Ineq	37.8%	71.3%	59.4%	57.3%	73.4%	46.2%	14.7%
Risk	41.4%	57.9%	57.1%	56.4%	57.9%	48.6%	14.3%
Risk-i	41.5%	54.9%	50.7%	47.2%	56.3%	42.3%	12.0%
Hars	58.9%	80.9%	72.3%	61.0%	80.9%	56.0%	26.2%
Hars-i	55.0%	78.5%	65.8%	57.0%	76.5%	53.7%	24.8%
Just	60.9%	89.4%	78.8%	62.9%	77.5%	76.2%	32.5%
Fair	51.7%	83.9%	71.8%	61.1%	74.5%	58.4%	26.2%
All	*49.8%*	*74.1%*	*65.3%*	*57.7%*	*71.2%*	*54.7%*	*21.7%*

Table 3: Proportion of orthodox responses in the whole sample

well; it is striking that support for the orthodox position is so low – from 12 % to under 33%, according to flavour.[6] Now consider the pattern of responses, question by question. The relatively high degree of conformity with orthodox views in the case of question 2 (column Q2) is not, perhaps, a surprise. This involves an implied transfer between rich*est* and poor*est*. Even in the case of risk these usually command a greater degree of support than is implied by the responses to the other numerical questions, although it is much lower than on other flavours. Also note that across all the flavour patterns there is usually much less support for the orthodox position in the case where the implied transfer is small and does not involve either the richest or the poorest region (questions 1 and 6) – a common-sense result that applies for all the

[6] The results corroborate the outcomes in previous studies run on different samples. For example the question-by-question ordering of inequality and risk in Table 3 is the same as in Amiel and Cowell (2002); the size of the percentage value of orthodox responses for inequality and for risk is also similar to that in Amiel and Cowell (2002). Also the rank order of orthodox percentages on *Hars*, question by question is the same as for the preference-under-uncertainty question in Amiel and Cowell (2007).

It might be argued that the criterion of getting all six answers in line with orthodox view is overly demanding. If one allows for simple mistakes by the respondent it might be reasonable to consider "at least five out of six" as an indication of an orthodox response. Allowing for near misses modifies the results in the last column of Table 3 as follows:

	"exact"	"near miss"		"exact"	"near miss"
Ineq	14.7%	31.5%	*Hars*	26.2%	48.9%
Risk	14.3%	32.9%	*Hars-i*	24.8%	45.6%
Risk-i	12.0%	26.8%	*Just*	32.5%	55.6%
			Fair	26.2%	43.0%

Clearly allowing for one mistake slightly more than doubles the proportion of "orthodox" responses for negative-worded flavours (left-hand side of table) and slightly less than doubles it for positive-worded flavours (right-hand side). But only in one case, *Just*, does the proportion of orthodox responses exceed 50 percent, even allowing for near-misses.

flavours.[7]

The fact that support for the fundamental distributional principle appears to differ according to where implied transfer occurs could be taken as a simple example of the imp;ortance of context. However, the fine detail of our results reveal two further important context effects according to "flavour." In fact it is worth distinguishing two major "flavour categories:"

- First, where the story-context in the questionnaire focuses on something that is desirable (welfare, justice, fairness) rather than undesirable (inequality, risk). This issue is discussed in section 4.2
- Second, where the story-context in the questionnaire focuses on a supposed involvement of the respondent in the distributional comparison, in contrast to a position of Olympian detachment – see section 4.3.

Other features of context effects – for example, personal characteristics of respondents – are also briefly considered in section 4.3.

4.2 Flavour category 1: positive versus negative

If we compare the first three rows of Table 3 with the next four it is clear that there is a marked difference in orthodox responses depending on whether the flavour concerned represents a positive or a negative statement of the distributional issues; incidentally this is in sharp contrast with the results for the verbal question examined in section 4.5 below.

It is evident from the bottom part of the Table that *Fair* elicits responses that are very similar to *Hars* but that *Just* almost always elicits the highest percentage of orthodox responses among all seven flavours. As it happens *Just* is also the flavour with the smallest number of indifference responses – see Table 4: it may be that this is an intrinsically unambiguous concept that does not leave much room for indifference.

What makes the difference between the two groups of flavours in Table 3? Although the first group are all "negative" flavours and the second group all "positive" flavours, we should not conclude it is simply *because* they are positive/negative that the contrasting response patterns arise: the label "positive" just categorises those flavours where the orthodox position is B$\succ$A (B should be circled) and for the "negative" group of flavours the

[7] The case of question 5 (column Q5) is similar to that of question 2. Notice that a distributional comparison that conforms to the principle of dominance in terms of differentials (see note 1) would concur with the mean-preserving spread principle in the case of Q2 and Q5, but not on the other questions.

		Q1	Q2	Q3	Q4	Q5	Q6
Ineq	143	37.8%	11.9%	16.8%	6.3%	5.6%	25.2%
Risk	140	36.4%	19.3%	19.3%	15.7%	15.0%	24.3%
Risk-i	142	32.4%	16.2%	19.7%	13.4%	17.6%	26.1%
Hars	141	25.5%	11.3%	12.1%	7.1%	9.2%	23.4%
Hars-i	149	28.2%	12.1%	14.1%	8.7%	9.4%	17.4%
Just	151	13.2%	4.6%	4.6%	4.0%	7.3%	7.9%
Fair	149	23.5%	6.7%	12.8%	7.4%	6.7%	14.1%
All	1015	28.0%	11.6%	14.1%	8.9%	10.0%	19.6%

Table 4: Proportion of indifference responses in the whole sample

orthodox position requires that A should be circled. Table 4 suggests that a clear-cut answer was more difficult to give when the issue was couched in terms of either inequality or risk. It is clear that for both risk flavours (*Risk* and *Risk-i*) the proportion of indifferent responses was much higher than for any flavour in the "positive" group (*Hars*, *Hars-i*, *Just* and *Fair*); this may be because respondents are risk neutral or because they find it harder to make up their mind.[8]

4.3 Flavour category 2: Involvement

As we noted in the introduction a key issue concerning risk and certain aspects of welfare is that of involvement – whether the person is invited to place him/herself in the situation about which the judgment is made. Taking the sample as a whole there appears to be greater conformity with the orthodox position when there is no involvement implied in the wording of the questionnaire. To see this compare row 2 with row 3 and row 4 with row 5 in Table 3 or compare rows 1 and 2 in Table 5 where the risk and welfare responses have been aggregated together.[9]

[8]Further evidence on this is provided by the number of cases where respondents abstained from giving a response. Although we did not provide an explicit option "cannot compare," individuals were free to leave particular (A, B) pairs unchecked and it is clear that this non-response was not distributed uniformly across flavours and questions as Table 11 in Appendix C shows. The highest non-response rate by flavour is *Risk-i*; by question the non-response rate is higher for the cases where neither the richest nor the poorest region is involved in the implied transfer.

[9]Consider the proportion of respondents who replied in line with the orthodox position on each of Q1,...,Q6. In the case of Welfare (rows 4 and 5 in Table 3) it is clear that there is vector dominance of the non-involved compared to the involved case. In the case of risk (rows 2 and 3) there is "almost" vector dominance (i.e. dominance with one exception).

		Q1	Q2	Q3	Q4	Q5	Q6	joint Q1-Q6
					All Respondents			
Non-involved	281	50.2%	69.4%	64.8%	58.7%	69.4%	52.3%	20.3%
Involved	291	48.5%	67.0%	58.4%	52.2%	66.7%	48.1%	18.6%
					Males			
Non-involved	157	53.5%	73.9%	65.6%	61.1%	75.2%	59.9%	22.9%
Involved	153	47.1%	64.7%	61.4%	56.2%	72.5%	50.3%	20.3%
					Females			
Non-involved	115	47.0%	63.5%	64.3%	54.8%	63.5%	44.3%	18.3%
Involved	127	53.5%	70.1%	55.9%	48.0%	61.4%	45.7%	17.3%

Table 5: Orthodox responses: involvement versus non-involvement

Underlying this is a more complex pattern. It is also clear from Table 5 that males are more likely to conform to the orthodox position if the issue is presented without involvement but that the situation regarding females appears ambiguous. But if we confine our attention to risk alone then male and female response profiles are almost exactly opposed (see Table 12 in Appendix C): males "orthodox" without involvement, females "orthodox" with involvement![10]

4.4 Personal characteristics and orthodox distributional rankings

Some of these issues come out clearly in a probit analysis of orthodox responses. Let π_i be the probability that a person responds in orthodox fashion to question i and let $\bar{\pi}$ be the probability that the person responds in orthodox fashion to all numerical questions simultaneously. We analysed the marginal impact on the probability of an orthodox response of each of the personal characteristic and of the various flavours of the questionnaire. The model used is given by

$$\pi = \Phi(b_1 x_1 + b_2 y_2 + ... + b_n x_n) \tag{1}$$

[10] It is also interesting to see how this issue of involvement breaks down by the various country subsamples. Table 14 in Appendix C provides the details. For welfare Israeli males and females are more likely to respond in orthodox fashion if the issue is with involvement; but the opposite applies to German males, UK males and UK females. Furthermore UK males respond in the same way for risk as for welfare: they are more likely to be orthodox if the issue is without involvement.

where π takes the value $\pi_1, ..., \pi_6$ or $\bar{\pi}$ for each of the separate regressions, $(x_1, ..., x_n)$ is a vector of personal or other characteristics , $(b_1, ..., b_n)$ is a vector of coefficients and Φ is the normal distribution function.

For each of the regressions we report three different specifications – see Tables 6 to 8. All three specifications use the following variable definitions

- **sex**: equals 1 if reported male, 0 otherwise
- **age**: in years
- **emp**: 1 if employed before, 0 otherwise
- **pol**: self-rated political views on a seven-point scale from extreme left (1) to extreme right (7)
- $\mathbf{inc_{-10}}$: self-rated income position of family looking back 10 years, on a seven-point scale from extremely poor (1) to extremely rich (7).
- $\mathbf{inc_{+10}}$: self-rated prospective income position of self looking forward 10 years, coded as above.
- **ukd**, **deutd**: dummies for respondents from, respectively, UK and Germany.

	π_1	π_2	π_3	π_4	π_5	π_6	$\bar{\pi}$
sex	0.0630	0.1308	0.1925†	0.1880	0.1155	0.2103‡	0.1019
age	0.0063	-0.0097	-0.0225	-0.0166	0.0012	-0.0140	0.0129
emp	-0.1448	-0.1191	-0.0315	-0.1381	0.0013	-0.0835	0.0598
pol	0.0243	-0.0855†	-0.0449	-0.0009	-0.0848†	-0.0226	-0.0941‡
ssecon	0.0589	0.2747‡	0.0544	0.0234	0.1078	0.0307	-0.0084
$\mathbf{inc_{-10}}$	-0.0471	-0.0468	0.0349	-0.0048	0.0010	0.0070	-0.0013
$\mathbf{inc_{+10}}$	-0.0186	0.0374	-0.0474	0.0123	0.0185	0.0273	0.0379
negform	-0.3862*	-0.3841*	-0.3720*	-0.2860‡	-0.2671‡	-0.3407*	0.9435*
ukd	-0.2478‡	-0.4373*	-0.4345*	-0.1894	-0.4056*	-0.2259†	-0.0883
deutd	0.0797	-0.1557	-0.0630	-0.0134	-0.0158	0.1371	0.2285
const	0.8118*	1.9059*	2.0326*	1.8045*	1.6043*	1.1510*	-1.9124*

† significant at 10% level; ‡ significant at 5% level;* significant at 1% level.

Table 6: Responses to numerical questions – Specification I

In addition specifications I and II (Tables 6 and 7) use the following dummies:

	π_1	π_2	π_3	π_4	π_5	π_6	$\bar{\pi}$
sex	0.0569	0.1345	0.1993†	0.1694	0.1115	0.2088‡	0.1006
age	0.0066	-0.0099	-0.0232	-0.0143	0.0010	-0.0151	0.0126
emp	-0.1135	-0.0828	-0.0286	-0.1129	0.0262	-0.0682	0.0850
pol	0.0256	-0.0795†	-0.0419	-0.0138	-0.0792†	-0.0160	-0.0965‡
ssbroad	0.0405	0.2219†	-0.0665	0.1849	0.0693	-0.0752	-0.0705
$\mathbf{inc}_{-10}$	-0.0555	-0.0470	0.0361	-0.0093	-0.0018	0.0075	0.0010
$\mathbf{inc}_{+10}$	-0.0105	0.0373	-0.0418	0.0134	0.0207	0.0314	0.0380
negform	-0.3949*	-0.3764*	-0.3596*	-0.2991*	-0.2636‡	-0.3427*	0.9567*
ukd	-0.1995†	-0.4225*	-0.3774*	-0.2079	-0.3633‡	-0.1554	-0.0599
deutd	0.1000	-0.1250	-0.0277	-0.0534	0.0068	0.1709	0.2529†
const	0.7899*	1.8853*	2.0635*	1.7247*	1.5922*	1.1864*	-1.8922*

† significant at 10% level; ‡ significant at 5% level;* significant at 1% level.

Table 7: Responses to numerical questions – Specification II

- **ssecon**: takes the value 1 if student's special subject is "core economics" as defined in the Appendix, 0 otherwise (specification I only)
- **ssbroad**: takes the value 1 if student's special subject is "broader economics" as defined in the Appendix, 0 otherwise (specification II only)
- **negform**: takes the value 1 if questionnaire flavour is *Ineq*, *Risk* or *Risk-i*, 0 otherwise.

The reason for the focus on special subjects is that in previous studies we have sometimes found that whether respondents had specialised in economics had a significant impact on the probability of their answering in conformity with standard theory. It is clear that, with one exception, this not true in the present case either for the core economics definition (Table 6) or for the broad definition (Table 7). The exception noted above is clear if one checks the coefficient for the $\boldsymbol{\pi}_2$ regression in each case. In this case the implied richest-to-poorest transfer is fairly obvious and so it is, perhaps, not surprising that those with an economics speciality should pick up this point more readily than others.

In the light of the apparent unimportance of the educational background dummy, in specification III we drop it and replace the simple **negform** dummy with flavour-specific dummies **ineq**, **risk**, **risk-i, hars**, **hars-i** and **just**.

One of the remarkable things that is evident in specification III is the role of the flavour dummies. In specifications I and II it is clear that composite

	π_1	π_2	π_3	π_4	π_5	π_6	$\bar{\pi}$
sex	0.0537	0.1390	0.1963†	0.1746	0.1005	0.1926‡	0.0974
age	0.0061	-0.0117	-0.0223	-0.0157	0.0013	-0.0143	0.0131
emp	-0.1126	-0.0782	-0.0388	-0.1172	0.0146	-0.0620	0.0817
pol	0.0318	-0.0602	-0.0390	0.0043	-0.0731	-0.0138	-0.1034‡
$\mathbf{inc}_{-10}$	-0.0603	-0.0528	0.0364	-0.0123	0.0007	0.0048	0.0075
$\mathbf{inc}_{+10}$	-0.0025	0.0439	-0.0371	0.0196	0.0203	0.0370	0.0301
ukd	-0.1964†	-0.3723*	-0.4010*	-0.1779	-0.3489‡	-0.1727	-0.0714
deutd	0.1133	-0.0578	-0.0385	0.0032	0.0175	0.1548	0.2309†
ineq	-0.4088‡	-0.3369	-0.1848	0.1219	0.0834	-0.3900‡	0.9612*
risk	-0.3943‡	-0.6587*	-0.2979	-0.4072‡	-0.4721	-0.3642‡	0.9449*
risk-i	-0.2775†	-0.5165‡	-0.2936	-0.3053	-0.5730*	-0.4048‡	0.7548*
hars	-0.0589	-0.2813	0.0516	0.0703	-0.1553	-0.3222†	0.1032
hars-i	-0.1314	-0.3333	-0.0603	-0.0478	-0.1755	-0.1100	-0.1003
just	0.3938‡	0.1844	0.5535‡	0.3472	-0.0596	0.3579†	-0.3399
const	0.7527‡	2.0986*	1.8740*	1.7026*	1.7103*	1.1479*	-1.8379*

† significant at 10% level; ‡ significant at 5% level;* significant at 1% level.

Table 8: Responses to numerical questions – Specification III

dummy **negform** is everywhere significant – being confronted with a negative questionnaire that is phrased in terms of inequality or risk is more likely to produce heterodox responses than one that is couched in the positive language of welfare. However when one breaks out the effect into separate flavours and drops the special-subject dummy it is clear that **ineq**, **risk** and **risk-i** have their impact principally on π_1 and π_6 – i.e. in the case of those numerical problems where neither the richest nor the poorest is involved in the transfer.

In each of the three specifications it appears that **sex** plays a minor role: On at least one question male respondents are more likely to respond in conformity with the orthodox position. This corresponds with what was found in Amiel and Cowell (2002) and corroborates the results presented in Table 5. It is also clear that the **ukd** country dummy plays an important role in decreasing the probability that an individual will respond in line with economic orthodoxy.

4.5 Verbal question

The verbal question presented the underlying ordering principle precisely by means of an example. Only the detail of the wording of the context differed amongst the seven flavours – the substance of the question was the same in all cases. Respondents were asked to think about a mean-preserving income transfer from a richer region to a poorer region, other things being equal. They were then invited to select from five responses, as illustrated in Figure 2.

a) Risk for a potential immigrant to Alfaland must fall if the ranking by income of all the regions remains the same. If there is any change in the income ranking of the regions then it is possible that risk increases or remains the same.
b) If the transfer is from the richest to the poorest region, and after the transfer the richest region remains the richest and the poorest remains the poorest, risk must fall. In other cases we cannot say a priori how risk will change.
c) The transfer may change the relative position of other regions. So we cannot say a priori how risk will change.
d) Risk for a potential immigrant to Alfaland must fall, even if there is a change in the income ranking of the regions as a result of this transfer, and even if the transfer is not from the richest region to the poorest.
e) None of the above

Figure 2: The alternatives in the verbal question (Risk flavour)

An important point to note here is that the question explicitly allowed for the possibility of multiple answers. The summary of results is depicted in Table 9. The leading column again gives the various flavours and the columns labelled a to d give the proportions of the respondents who selected the corresponding choice and no other. The rows sum to less than 100% for three reasons: (1) responses in the category "none of the above" are not reported; (2) not everyone provided an answer to this question; (3) people sometimes selected more than one of the options and with one exception these multiple choices are not reported. The exception is as follows. If one were to observe the standard theory strictly then the appropriate response should be d and nothing else. But apart from this strictly orthodox response it may also be interesting to consider a "fuzzy-orthodox" case that allows for the respondent to select something else *as well as* option d. The proportion of respondents who do this is given in column $d+$.

It is clear that the level of agreement with the strict orthodox response d is rather modest – some 16 to 20 percent; relaxing the orthodox position to the "fuzzy" version raises the level of agreement by about another 4 percentage points. Among the single-choice responses there is an obvious "winner." Option b focuses just on the extreme incomes in the hypothesised redistribution and leaves open the impact of transfers not involving the extremes: this

	a	b	c	d	$d+$
Ineq	7.7%	30.8%	14.0%	19.6%	21.7%
Risk	10.0%	26.4%	0.0%	19.3%	25.0%
Risk-i	9.2%	24.8%	20.6%	19.9%	22.7%
Hars	13.5%	24.1%	20.6%	19.9%	26.2%
Hars-i	7.4%	28.9%	22.1%	16.1%	18.8%
Just	11.9%	28.5%	18.5%	20.5%	23.8%
Fair	18.1%	24.2%	16.1%	18.1%	22.8%
All	*11.1%*	*26.8%*	*18.6%*	*19.0%*	*23.0%*
Male	9.4%	29.2%	16.8%	19.4%	23.7%
Female	13.4%	24.4%	21.4%	19.2%	22.8%
Germany	10.5%	26.2%	25.0%	22.1%	25.9%
Israel	13.5%	28.7%	17.4%	18.5%	22.4%
UK	9.1%	25.2%	12.9%	16.2%	20.4%

Table 9: The verbal responses

distinction is crucial as we have seen from the numerical questions where it was clear that responses were more likely to be orthodox if the richest or the poorest region of Alfaland were involved. As is clear from column b of Table 9 support for this extremes option dominates that for options a, c or d.

It is evident from Table 9 that there is not much dispersion across the flavours in terms of the degree of support for the orthodox answer d, nor is there any clear relationship between the involved and non-involved flavours of the study. There is very little difference between males and females in terms of the degree of support for the orthodox position in either strict or fuzzy terms, but males are more likely to choose the "extremes only" b option. However respondents in Germany tend to be more orthodox in their responses than those in Israel who in turn are more orthodox than their counterparts in the UK.

For the regression analysis we again used the same three specifications of the basic model used for the numerical questions (see section 4.4). Two separate regressions were run in each case: for π_7, the probability of the respondent giving the strict orthodox response,and for π'_7, the probability of the respondent giving the fuzzy orthodox response. The combined results are presented in Table 10. It is immediate that the choice of specification I, II or III makes very little difference here: none of the specific flavour dummies

	Specification I		*Specification II*		*Specification III*	
	π_7	π'_7	π_7	π'_7	π_7	π'_7
sex	0.0245	0.0096	0.0342	0.0185	0.0352	0.0180
age	0.0191	0.0231‡	0.0187	0.0228‡	0.0189	0.0230‡
emp	0.0270	0.0187	0.0147	0.0036	0.0215	0.0104
pol	-0.0129	-0.0291	-0.0155	-0.0318	-0.0219	-0.0401
ssecon	-0.1050	-0.1086				
ssbroad			-0.0916	-0.0936		
inc$_{-10}$	-0.0423	-0.0451	-0.0279	-0.0313	-0.0268	-0.0301
inc$_{+10}$	0.0278	0.0291	0.0137	0.0157	0.0128	0.0148
negform	0.0445	0.0132	0.0399	0.0096		
ukd	-0.0264	0.0238†	-0.0149	0.0251	-0.0367	0.0024
deutd	0.3538*	0.2243*	0.3386*	0.2083†	0.3110*	0.1798
ineq					0.0526	-0.0264
risk					0.0658	0.0646
risk-i					0.0472	-0.0067
hars					0.0901	0.1082
hars-i					-0.1032	-0.1476
just					0.0621	0.0304
const	-1.2627*	-1.1251	-1.2343*	-1.0975*	-1.2850*	-1.1288*

† significant at 10% level; ‡ significant at 5% level;* significant at 1% level.

Table 10: Responses to verbal question: effects of personal characteristics

is significant, nor is either version of the special subject dummy and the size of the estimates on the other coefficients is similar across each specification. What is noticeable is that there is a role for **age** in the π'_7 regression and an important role for the country dummies – bearing out the provisional conclusions reached from the cross-tabulations.

5 Conclusions

We asked whether distributional orderings have the right shape. As we have discussed, the question can be posed more precisely as: Do the rankings implied in individuals' perceptions of income distribution conform to the standard approaches to a broad class of economic problems? The short answer would appear to be "no": across all seven flavours of the study comparatively few respondents give numerical or verbal answers that fit with the "orthodox" position. In this respect the principle of MPS does indeed appear to be "overly strong" as we mentioned on page 3. However, there is more to be said: three features of the structure of responses are particularly striking.

First, the positions of the worst-off and of the best-off always appear to be focal points. The questions that have implied transfers involving these extremes (Q2 and Q5) elicit similar responses across all seven flavours and these questions often attract a much higher proportion of orthodox reponses than other numerical questions. What is remarkable is the low degree of variation among the six different questions in the *Risk* and *Risk-i* flavours: it may be that these two flavours are conceptually speaking the hardest to evaluate or in connection to risk, small transfers, independent of where they occur, are not sufficient enough to change the evaluation of the respondents. In terms of the verbal approach to the issue, whatever the flavour, no more than 20% support for the orthodox position is universally observed; on the other hand, again across all the flavours, it is interesting to note the relative high support for the "redistribution involving the extremes" position (25-30%).

The second point concerns a class of flavours or contexts. As far as the numerical questions are concerned there is evidently much greater conformity with the standard view on the transfer principle if the context of the question is a "positive" (welfare, justice) rather than a "negative" (inequality). This conclusion comes through strongly both from Table 3 and from the role of the dummy **negform** in the regression analysis.

Third, there is another clear flavour difference. "Involvement" plays a role in people's answers *even though this involvement is purely conjectural* as no-one actually gets paid (or pays) anything. This is especially clear in the case of welfare where there is a greater degree of conformity with the conventional view if one is not notionally involved in the distributional alternatives (*Hars*) than if one is (*Hars-i*). This is true for each of the numerical questions taken separately and for the verbal question – see Tables 3 and 9. The results are not as clear-cut for risk, although in nearly every case *Risk* elicits a greater degree of conformity than *Risk-i*.

References

Amiel, Y. and F. A. Cowell (1999). *Thinking about Inequality.* Cambridge: Cambridge University Press.

Amiel, Y. and F. A. Cowell (2002). Attitudes towards risk and inequality: A questionnaire-experimental approach. In F. Andersson and H. J. Holm (Eds.), *Experimental Economics: Financial Markets, Auctions, and Decision Making*, Chapter 9, pp. 85–115. Dewenter: Kluwer.

Amiel, Y. and F. A. Cowell (2007). Social welfare and individual preferences under uncertainty: A questionnaire-experimental approach. *Research on Economic Inequality 14*, 345–362.

Amiel, Y., F. A. Cowell, and W. Gaertner (2006). To be or not to be involved: A questionnaire-experimental view on Harsanyi's utilitarian ethics. Distributional Analysis Discussion Paper 85, STICERD, London School of Economics, London WC2A 2AE.

Atkinson, A. B. (1970). On the measurement of inequality. *Journal of Economic Theory 2*, 244–263.

Bosmans, K. (2007). Comparing degrees of inequality aversion. *Social Choice and Welfare 29*, 405–428.

Dalton, H. (1920). Measurement of the inequality of incomes. *The Economic Journal 30*, 348–361.

Dasgupta, P. S., A. K. Sen, and D. A. Starrett (1973). Notes on the measurement of inequality. *Journal of Economic Theory 6*, 180–187.

Harsanyi, J. C. (1953). Cardinal utility in welfare economics and in the theory of risk-taking. *Journal of Political Economy 61*, 434–435.

Harsanyi, J. C. (1955). Cardinal welfare, individualistic ethics and interpersonal comparisons of utility. *Journal of Political Economy 63*, 309–321.

Harsanyi, J. C. (1977). Morality and the theory of rational behavior. *Social Research 44*, 623–656.

Harsanyi, J. C. (1978). Bayesian decision theory and utilitarian ethics. *American Economic Review 68*, 223–228.

Kolm, S.-C. (1969). The optimal production of social justice. In J. Margolis and H. Guitton (Eds.), *Public Economics*, pp. 145–200. London: Macmillan.

Marshall, A. W. and I. Olkin (1979). *Inequalities: Theory and Majorization*. New York: Academic Press.

Moulin, H. (2003). *Fair Division and Collective Welfare*. Cambridge Massachusetts: MIT Press.

Moyes, P. (1994). Inequality-reducing and inequality-preserving transformations of incomes: Symmetric and individualistic transformations. *Journal of Economic Theory 63*, 271–298.

Pigou, A. C. (1912). *Wealth and Welfare*. London: Macmillan.

Quiggin, J. (1991). Increasing risk: another definition. In A. Chikán (Ed.), *Progress in decision, utility and risk theory*, pp. 239–248. Kluwer.

Rawls, J. (1971). *A Theory of Justice*. Cambridge, Massachusetts: Harvard University Press.

Rothschild, M. and J. E. Stiglitz (1970). Increasing risk: I. A definition. *Journal of Economic Theory 2*, 225–243.

Sen, A. K. and J. E. Foster (1997). *On Economic Inequality* (Second ed.). Oxford: Clarendon Press.

Appendices

A The Questionnaires

Following are two of the seven questionnaires (flavours *Risk* and *Hars-i*) that were distributed to each of the response groups. The wording of the other five flavours can be inferred from the description in section 3 and are also found on http://darp.lse.ac.uk/7flavors/ As explained in the text the experiment was run so that each respondent had approximately an equal probability of receiving any one of the seven questionnaires.

RISK QUESTIONNAIRE

This questionnaire concerns people's attitude to risk. We would be interested in your view, based on hypothetical situations. Because it is about attitudes there are no "right" answers. Some of the possible answers correspond to assumptions consciously made by economists: but these assumptions may not be good ones. Your responses will help to shed some light on this, and we would like to thank you for your participation. The questionnaire is anonymous.

Alfaland consists of five regions that are identical in every respect other than the incomes of their inhabitants. Everyone within a given region receives the same income, but personal incomes differ from region to region. An immigrant to Alfaland would be assigned at random, with equal probability, to any one of these five regions. Such a person would therefore have a 20% chance of being on any one of five income levels.

Two economic policy proposals A and B are being considered for implementation in Alfaland next year. It is known that ─ apart from their impact on personal incomes ─ the two policies would have the same effect on the population. The impact upon the regions' incomes would depend upon the particular state of the Alfaland economy at the time the policy (A or B) is to be introduced.

In each of questions (1) to (6) two alternative lists of incomes A and B (in Alfaland local currency) are given. Each of these pairs represents the outcomes of the A-policy and the B-policy on the five regions in each of six different situations in which Alfaland might find itself next year. In each case please state which policy you consider would result in higher risk for a person immigrating to Alfaland by circling A or B. If you consider that the two policies will result in the same risk to a potential immigrant then circle both A and B.

1) A = (2, 5, 9, 20, 30)	B = (2, 6, 8, 20, 30)
2) A = (2, 5, 9, 20, 30)	B = (3, 5, 9, 20, 29)
3) A = (2, 5, 9, 20, 30)	B = (2, 6, 9, 20, 29)
4) A = (2, 5, 9, 20, 30)	B = (2, 10, 9, 15, 30)
5) A = (10, 10, 10, 10, 30)	B = (10, 10, 10, 20, 20)
6) A = (2, 5, 9, 20, 30)	B = (2, 6, 9, 19, 30)

\...Continued

In question 7 you are presented with a hypothetical income change and some possible views about the effects on risk of that change. The views are labelled a),..., e). Please circle the letter alongside the view that corresponds most closely to your own. You can check more than one answer, provided that you consider they do not contradict each other. Feel free to add any comment that explains the reason for your choice.

7) Suppose we transfer income from the inhabitants of a relatively high-income region to those of a relatively low-income region, without changing the income of any other region. The transfer is not so large as to make the "rich" region "poor" and the "poor" region "rich", but it may alter their income rankings relative to the other, unaffected regions.

a) Risk for a potential immigrant to Alfaland must fall if the ranking by income of all the regions remains the same. If there is any change in the income ranking of the regions then it is possible that risk increases or remains the same.
b) If the transfer is from the richest to the poorest region, and after the transfer the richest region remains the richest and the poorest remains the poorest, risk must fall. In other cases we cannot say a priori how risk will change.
c) The transfer may change the relative position of other regions. So we cannot say a priori how risk will change.
d) Risk for a potential immigrant to Alfaland must fall, even if there is a change in the income ranking of the regions as a result of this transfer, and even if the transfer is not from the richest region to the poorest.
e) None of the above

In the light of your answer to question 7, would you want to change your answers to questions 1 to 6? If so, please state your new response here.

1)	2)	3)
4)	5)	6)

Finally, we would be grateful for some information about yourself:

- Are you male or female? M/F
- What is your age? ______ years
- What is your special subject of study? ___________
- Were you employed before university? Yes / No

- How would you rate your political views? Please put a √ on this scale. "extreme left" … "extreme right"
- How would you rate your family's income 10 years ago? Please put a √ on this scale. "very poor" … "very rich"
- How would you rate your own income prospects 10 years from now? Please put a √ on this scale. "very poor" … "very rich"

INCOME DISTRIBUTION QUESTIONNAIRE

This questionnaire concerns people's attitude to income distribution. We would be interested in your view, based on hypothetical situations. Because it is about attitudes there are no "right" answers. Some of the possible answers correspond to assumptions consciously made by economists: but these assumptions may not be good ones. Your responses will help to shed some light on this, and we would like to thank you for your participation. The questionnaire is anonymous.

Alfaland consists of five regions that are identical in every respect other than the incomes of their inhabitants. Everyone within a given region receives the same income, but personal incomes differ from region to region.

Two economic policy proposals A and B are being considered for implementation in Alfaland next year. It is known that ─ apart from their impact on personal incomes ─ the two policies would have the same effect on the population. The impact upon the regions' incomes would depend upon the particular state of the Alfaland economy at the time the policy (A or B) is to be introduced.

In each of questions (1) to (6) two alternative lists of incomes A and B (in Alfaland local currency) are given. Each of these pairs represents the outcomes of the A-policy and the B-policy on the five regions in each of six different situations in which Alfaland might find itself next year. Imagine that you have been assigned to one of the regions in Alfaland with an equal chance of being in any one of the five regions. In each case please state which policy you consider would result in a better situation in Alfaland by circling A or B. If you consider that the two policies will result in an equivalent situation then circle both A and B.

1) A = (2, 5, 9, 20, 30) B = (2, 6, 8, 20, 30)

2) A = (2, 5, 9, 20, 30) B = (3, 5, 9, 20, 29)

3) A = (2, 5, 9, 20, 30) B = (2, 6, 9, 20, 29)

4) A = (2, 5, 9, 20, 30) B = (2, 10, 9, 15, 30)

5) A = (10, 10, 10, 10, 30) B = (10, 10, 10, 20, 20)

6) A = (2, 5, 9, 20, 30) B = (2, 6, 9, 19, 30)

\...Continued

In question 7 you are presented with a hypothetical income change and some possible views about the effects on income distribution of that change. The views are labelled a),..., e). Please circle the letter alongside the view that corresponds most closely to your own. You can check more than one answer, provided that you consider they do not contradict each other. Feel free to add any comment that explains the reason for your choice.

7) Suppose income is transferred from the inhabitants of a relatively high-income region to those of a relatively low-income region, without changing the income of any other region. The transfer is not so large as to make the “rich” region “poor” and the “poor” region “rich”, but it may alter their income rankings relative to the other, unaffected regions.

a) The situation in Alfaland must improve if the ranking by income of all the regions remains the same. If there is any change in the income ranking of the regions then it is possible that the situation worsens or remains unaltered.

b) If the transfer is from the richest to the poorest region, and after the transfer the richest region remains the richest and the poorest remains the poorest the situation must improve. In other cases it is impossible to say a priori how the situation will change.

c) The transfer may change the relative position of other regions. So it is impossible to say a priori how the situation will change.

d) The situation in Alfaland must improve, even if there is a change in the income ranking of the regions as a result of this transfer, and even if the transfer is not from the richest region to the poorest.

e) None of the above

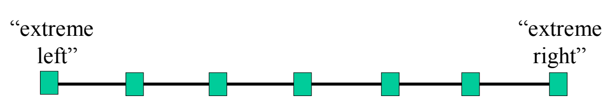
In the light of your answer to question 7, would you want to change your answers to questions 1 to 6? If so, please state your new response here.

1)	2)	3)
4)	5)	6)

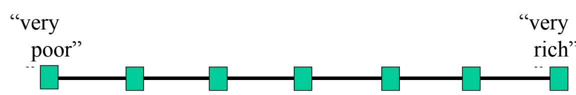
Finally, we would be grateful for some information about yourself:

- Are you male or female? M/F
- What is your age? ______ years
- What is your special subject of study? ___________
- Were you employed before university? Yes / No

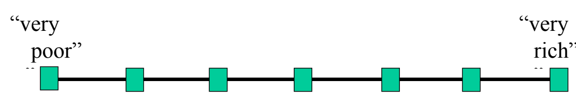
- How would you rate your political views? Please put a √ on this scale.



- How would you rate your family’s income 10 years ago? Please put a √ on this scale.



- How would you rate your own income prospects 10 years from now? Please put a √ on this scale.



B Variable definitions

Respondents were asked about seven background variables and, in addition, we had information about the particular subsample in which they were included from the location of the experiment. Of the seven two were binary – "Are you male or female?", "Were you employed before University?" – and one was numerical – "What is your age?"; these are all self-explanatory.

Viewpoint questions were based on a seven-point scale as depicted at the end of each questionnaire in Appendix A.

Individuals wrote their own unguided response to "What is your special subject of study?" unless they were in a class where the subject was homogenous. Given that the study of economics could be argued to play a role in shaping individuals' attitudes in these areas we chose two possible definitions of the concept:

"Core Economics" subject categories:
economics
econometrics
economic history
mathematical economics
"Broader Economics" subject categories:
Core economics plus
Accounting & finance
Business
Management science
MBA
"Non-Economic" subject categories:
Behavioural science;
Engineering;
Government/politics;
Geography;
History;
International relations;
Law;
Philosophy;
Operational research.

C Tables

We provide here

- an analysis of non-response (Table 11),
- a breakdown of orthodox responses by sex and involvement (Table 12),
- a breakdown of orthodox responses by country and flavour (Table 13),
- a breakdown of orthodox responses on risk and on welfare by sex, involvement and country (Table 14).

By flavour*		**By question****	
Ineq	1.3%	Q1	1.6%
Hars	0.7%	Q2	1.2%
Hars-i	0.8%	Q3	1.4%
Fair	1.2%	Q4	1.9%
Just	1.8%	Q5	1.2%
Risk	1.8%	Q6	1.7%
Risk-i	2.8%		

*calculated as $n_{\text{blanks}}/6N$

**for all flavours combined

Table 11: Proportion of blank responses

	Q1	Q2	Q3	Q4	Q5	Q6	joint Q1-Q6
			Risk: Males				
Non-involved	44.4%	66.7%	59.3%	60.5%	65.4%	58.0%	18.5%
Involved	42.3%	53.5%	50.7%	46.5%	62.0%	43.7%	11.3%
			Risk: Females				
Non-involved	37.7%	45.3%	54.7%	49.1%	50.9%	35.8%	9.4%
Involved	46.0%	55.6%	52.4%	50.8%	52.4%	41.3%	14.3%
			Welfare: Males				
Non-involved	63.2%	81.6%	72.4%	61.8%	85.5%	61.8%	27.6%
Involved	51.2%	74.4%	70.7%	64.6%	81.7%	56.1%	28.0%
			Welfare: Females				
Non-involved	54.8%	79.0%	72.6%	59.7%	74.2%	51.6%	25.8%
Involved	60.9%	84.4%	59.4%	45.3%	70.3%	50.0%	20.3%

Note: In each case the figure is the percentage of orthodox responses

Table 12: Orthodox responses: involvement versus non-involvement by sex

	N	Q1	Q2	Q3	Q4	Q5	Q6	joint Q1-Q6	average Q1-Q6	joint Q1-Q7
					Germany					
Ineq	47	46.8%	78.7%	66.0%	53.2%	85.1%	51.1%	17.0%	63.5%	6.4%
Risk	48	39.6%	56.3%	50.0%	54.2%	60.4%	50.0%	16.7%	51.7%	6.3%
Risk-i	44	40.9%	56.8%	50.0%	50.0%	70.5%	43.2%	15.9%	51.9%	6.8%
Hars	48	64.6%	77.1%	77.1%	62.5%	87.5%	60.4%	29.2%	71.5%	6.3%
Hars-i	52	53.8%	73.1%	51.9%	46.2%	80.8%	44.2%	17.3%	58.3%	0.0%
Just	52	61.5%	84.6%	75.0%	67.3%	65.4%	76.9%	26.9%	71.8%	5.8%
Fair	53	56.6%	77.4%	69.8%	58.5%	73.6%	47.2%	28.3%	63.8%	7.5%
All	*344*	*52.3%*	*72.4%*	*63.1%*	*56.1%*	*74.7%*	*53.5%*	*21.8%*	*62.0%*	*5.5%*
					Israel					
Ineq	52	32.7%	75.0%	55.8%	57.7%	71.2%	44.2%	7.7%	56.1%	3.8%
Risk	52	48.1%	55.8%	57.7%	55.8%	57.7%	44.2%	15.4%	53.2%	0.0%
Risk-i	51	43.1%	56.9%	56.9%	43.1%	58.8%	43.1%	13.7%	50.3%	3.9%
Hars	50	48.0%	82.0%	64.0%	48.0%	74.0%	44.0%	18.0%	60.0%	8.0%
Hars-i	53	56.6%	92.5%	79.2%	66.0%	81.1%	62.3%	28.3%	73.0%	11.3%
Just	54	59.3%	98.1%	87.0%	63.0%	88.9%	81.5%	38.9%	79.6%	11.1%
Fair	50	50.0%	94.0%	84.0%	62.0%	74.0%	68.0%	22.0%	72.0%	4.0%
All	*362*	*48.3%*	*79.3%*	*69.3%*	*56.6%*	*72.4%*	*55.5%*	*20.7%*	*63.6%*	*6.1%*
					UK					
Ineq	44	34.1%	59.1%	56.8%	61.4%	63.6%	43.2%	20.5%	53.0%	4.5%
Risk	40	35.0%	62.5%	65.0%	60.0%	55.0%	52.5%	10.0%	55.0%	2.5%
Risk-i	47	40.4%	51.1%	44.7%	51.1%	42.6%	40.4%	6.4%	45.0%	2.1%
Hars	43	65.1%	83.7%	76.7%	74.4%	81.4%	65.1%	32.6%	74.4%	7.0%
Hars-i	44	54.5%	68.2%	65.9%	59.1%	65.9%	54.5%	29.5%	61.4%	13.6%
Just	45	62.2%	84.4%	73.3%	57.8%	77.8%	68.9%	31.1%	70.7%	8.9%
Fair	46	47.8%	80.4%	60.9%	63.0%	76.1%	60.9%	28.3%	64.9%	6.5%
All	*309*	*48.5%*	*69.9%*	*63.1%*	*60.8%*	*66.0%*	*55.0%*	*22.7%*	*60.6%*	*6.5%*

Note: In each case the figure is the percentage of orthodox responses

Table 13: Results by country: orthodox responses

			Q1	Q2	Q3	Q4	Q5	Q6
				Risk: Males				
Germany	Non-involved	31	48.4%	61.3%	51.6%	64.5%	67.7%	58.1%
	Involved	31	37.9%	62.1%	55.2%	48.3%	69.0%	44.8%
Israel	Non-involved	26	42.3%	61.5%	53.8%	50.0%	69.2%	50.0%
	Involved	18	44.4%	44.4%	55.6%	44.4%	72.2%	38.9%
UK	Non-involved	24	41.7%	79.2%	75.0%	66.7%	58.3%	66.7%
	Involved	24	45.8%	50.0%	41.7%	45.8%	45.8%	45.8%
				Risk: Females				
Germany	Non-involved	17	23.5%	47.1%	47.1%	35.3%	47.1%	35.3%
	Involved	15	46.7%	46.7%	40.0%	53.3%	73.3%	40.0%
Israel	Non-involved	22	59.1%	50.0%	63.6%	59.1%	50.0%	40.9%
	Involved	26	53.8%	61.5%	61.5%	42.3%	50.0%	46.2%
UK	Non-involved	14	21.4%	35.7%	50.0%	50.0%	57.1%	28.6%
	Involved	22	36.4%	54.5%	50.0%	59.1%	40.9%	36.4%
				Welfare: Males				
Germany	Non-involved	29	74.2%	80.6%	80.6%	64.5%	93.5%	74.2%
	Involved	28	46.4%	67.9%	57.1%	53.6%	85.7%	39.3%
Israel	Non-involved	21	47.6%	85.7%	61.9%	52.4%	81.0%	42.9%
	Involved	24	50.0%	91.7%	83.3%	75.0%	87.5%	70.8%
UK	Non-involved	24	62.5%	79.2%	70.8%	66.7%	79.2%	62.5%
	Involved	30	56.7%	66.7%	73.3%	66.7%	73.3%	60.0%
				Welfare: Females				
Germany	Non-involved	17	47.1%	70.6%	70.6%	58.8%	76.5%	35.3%
	Involved	24	62.5%	79.2%	45.8%	37.5%	75.0%	50.0%
Israel	Non-involved	27	48.1%	77.8%	66.7%	44.4%	66.7%	48.1%
	Involved	27	63.0%	96.3%	77.8%	55.6%	77.8%	55.6%
UK	Non-involved	18	72.2%	88.9%	83.3%	83.3%	83.3%	72.2%
	Involved	13	53.8%	69.2%	46.2%	38.5%	46.2%	38.5%

Note: In each case the figure is the percentage of orthodox responses

Table 14: Orthodox responses: involvement versus non-involvement; by flavour and country subgroup