Inequality and Perceptions on Risk

Risk perceptions and distributional judgments

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Abstract

We examine the role of laboratory questionnaire-experiments and recent applied empirical research on attitudes in understanding the relationships between people’s perceptions of inequality and their perceptions of risk. We consider risk in three interpretations: ‘in vacuo’, in day-to-day life and in the original position. © 2001 Elsevier Science B.V. All rights reserved.

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1. Introduction

The formal links between risk and inequality are well established in the literature. These may be based on a purely formal analogy of mathematical structure (Rothschild and Stiglitz, 1973), or on an analogy that explicitly connects the concepts via representations of social welfare and individual preferences (Atkinson, 1970), or—strongest of all—on an explicit modelling of social welfare and inequality in terms of representative individuals’ attitudes to risky situations (Harsanyi, 1953).

In this paper we examine the foundations of this literature along the two main tracks that have been adopted by researchers: those that treat issues of risk and
inequity in a way that is free of a specific historic or cultural context, and those that seek to embed the issues of risk and inequality judgments within a set of practical questions that are usually closely related to issues of public policy. The first (see Section 2 below) consists of direct approaches to fundamental aspects of distributional judgments in economics. The second (Section 3) is an important aspect of applied welfare economics that focuses upon social values.

2. Inequality and risk: The ‘laboratory’ approach

A primary purpose of the first approach is to examine the meaning of distributional comparisons in terms of familiar concepts such as inequality or risk. It requires some prior explanation of the assumptions concerning the nature of the experiment and of the individual attitudes to be investigated.

2.1. The type of experiment

*Structure:* The formal elements can be very briefly outlined. Let $x$ denote a person’s income where it is assumed that ‘income’ completely represents the relevant aspects of a person’s material well being and let $x$ be distributed according to $F$ that can be taken either as a complete description of the income distribution in society or as a characterisation of the subjective risk confronting the person: for the purposes of the experiment $F$ is usually taken to be discrete. The experiment may also need a reference income for the imaginary society in question, such as mean income $\mu$ or an assumed poverty line $\pi$.

*Involvement:* The issues are typically presented in an abstract ‘laboratory’ setting – such as a lecture room – where students are given a specially structured questionnaire. In this approach it is usually assumed that respondents or experimental participants are in a position of Olympian detachment. However, it is possible to treat them as though they were concerned participants rather than being outside the world created for the experiment (Frohlich and Oppenheimer, 1992, Chapter 3). If individuals are treated as detached then – unlike branches of experimental economics where the focus is on individual actions leading to personal gain – it is not clear that rewards to participants are necessary in the context of social judgments.

2.2. The meaning of attitudes to inequality

There are several distinct interpretations that can be given to the meaning of individual attitudes to risk or inequality; they stem from different basic sets of assumptions about the framework of distributional comparisons and they lead
to different types of empirical investigation. Here it is useful to distinguish three main types.

Inequality and risk aversion: Assume a given structure for welfare and within the intellectual confines imposed by this assumption attempt to estimate the parameters of the welfare function (Amiel et al., 1999). A standard example is the case where the maintained assumption is that welfare has the iso-elastic constant relative inequality aversion structure

\[
W = \int \frac{x^{1-\epsilon} - 1}{1 - \epsilon} \, dF(x).
\]  

Here \(\epsilon \geq 0\) denotes the degree of inequality aversion (Atkinson, 1970) and is the parameter to be estimated.

General welfare functions: The system of \(W\)-contours generated by (1) is mathematically convenient but may have little basis in fact, in that the social preferences so represented do not accord well with the way policy-makers or lay persons view inequality–mean-income tradeoffs. A more general approach would be to consider a welfare function that has few prior constraints. In principle, one could suppose that a person’s welfare contours have an arbitrary form and then devise tests of whether one or more of a list of possible properties of welfare functions appear to be supported by the structure of people’s welfare judgements. For example, one might enquire whether the transfer principle is satisfied by people’s subjective welfare comparisons or violated. The principal properties or axioms on which such test would focus can be expressed equivalently in terms of social judgments about income distribution and individual preferences about uncertain prospects—see for example Table 9.2 in Amiel and Cowell (1999).

Isolating inequality or risk: However, the above approach itself involves a strong assumption—namely that a coherent welfare function exists from which inequality or risk preferences may be inferred. In other words, there is a relation \(W = \phi(I, \mu)\) that may be used to extract inequality rankings from welfare rankings. Likewise, in the context of uncertainty, it is assumed that there is a corresponding relationship \(U = \phi(R, \mu)\) that may be used to extract risk rankings from utility (preference) rankings. However some would question whether it is appropriate to assume that a well-defined welfare ordering or the relationship \(\phi\) actually exist.

For this reason it may be appropriate to consider inequality and risk rankings directly. Clearly, there is a variety of possible combinations of assumptions that permit the researcher to focus on particular issues in distributional analysis, independently of whether one presumes a coherent social welfare function to exist—for example whether inequality or risk rankings at different income levels satisfy scale independence or translation independence, or are characterised by some other shape.
2.3. An overview of results

We focus here on recent work that has pursued the second and third approaches outlined in Section 2.2. In a series of contributions Amiel and Cowell have argued that an appropriate way of conducting this kind of study is to present student respondents with questionnaires during carefully controlled classroom sessions. The technique has been adapted to other distributional contexts including poverty, social welfare and risk. For example, Amiel and Cowell (2000b) investigate whether risk judgments are independent of either translation- or scale-transformations of the distributions: as in the inequality-rankings case the answer is that neither of the standard assumptions is appropriate, but rather individual views on risk rankings depend crucially on the reference income level, based either on mean income $\mu$ or a subsistence minimum $\pi$.\(^1\) A recent contribution (Amiel and Cowell, 2000a) has examined risk and inequality attitudes jointly using a questionnaire-experiment in which the respondents in the same session were presented with almost identical questionnaires in order to address the question of what happens to inequality/risk if you carry out transfers (mean-preserving spreads) at different parts of a multi-person income distribution. Amiel and Cowell (2000a) show that the transfer principle is rejected both in the inequality context and in the risk context for specific types of transfers: people’s perceptions as to ‘what is riskier’ or ‘what is more unequal’ were in conformity with economic orthodoxy if the distributions being compared differed in the tails but otherwise there were systematic violations of the transfer principle. Furthermore, although the risk and inequality maps were significantly different, the personal factors that predispose individuals to respond in orthodox or heterodox fashion are similar in the two types of problem – see Table 1 that shows the estimates of the coefficients of probit regressions where the dependent variable is probability of responding in accordance with the principle of transfers (inequality) or principle of mean-preserving spreads (risk).

The independence of risk and inequality judgments is also addressed in Kroll and Davidovitz (1999) who use a participation experiment to focus on the separation of inequality and risk aversion. They distinguish between a common gamble where everyone makes the same drawing from $F$ and an individual gamble, where each person makes a separate drawing from $F$. They show that individuals (in this case children rewarded for their participation in the experiment) have a strong preference for inequality independent of their perception of personal income risk.

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\(^1\) This finding is similar to that for the inequality case (Amiel and Cowell, 1999) and is broadly in line with ‘Dalton’s conjecture’ (Dalton, 1920).
2.4. Difficulties with the basic model

In many fields of economics it is common to take the expected utility model as fundamental, but the abstract risk-inequality experiments call this into question, as did the early pioneering work inspired by Kahneman and Tversky (1979). It may be that people are just not risk-averse—they like mean-preserving spreads—or that they do not understand the experiment, but the problem may go deeper. It is not clear that people think in terms of preferences over prospects and, if they do have a well-defined preference order, this may violate key axioms such as the independence axiom. Furthermore, in confronting people with choices concerning ‘risk’ in the abstract there may be some ambiguity involving value-laden words—(i) in some case there may be a confusion between ‘better-than’ relationships and risk comparisons; (ii) in many languages ‘risk’ suggests a specifically negative term (the psychological approach usually emphasises loss)—akin to downside risk. These considerations suggest that the context of risky situations may be of central importance to an analysis of the relationship between inequality and risk.

3. Redistribution, inequality and risk in the real world

In view of these reservations about the a priori reasonableness of the theoretical link between inequality and risk orderings it is appropriate to examine the evidence on the connections in practice between perceptions of risk and of inequality. This involves people’s evaluation of their own income prospects and their attitudes to risk. Clearly, the context of the risk is central to the discussion.
and, in Sections 3.1 and 3.2, we consider two interpretations of that context that are especially relevant to normative economics.

3.1. Redistribution and current risk

Politicians and ordinary people sometimes reason in terms of the distributive effects of government policies using a comparison of apparent income inequality before and after government intervention. The same is true for a large part of the economic literature, measuring the redistributive impact of tax-transfer policies. Considerations of risk and uncertainty are often neglected in analysing real-world income distributions.

However to neglect the risk component would be a potentially misleading simplification. Individuals are interested not only in their current income position, but also in the stream of future, uncertain, incomes. This is convincingly illustrated in the questionnaire study of Ravallion and Lokshin (2000). They analyse the answers (in 1996) of a sample of 7000 Russian adults to the question: ‘Do you agree or disagree that the government must restrict the income of the rich?’ Overall 73.6% were in favour of redistribution although respondents at a higher current level of average expenditure are less inclined to be in favour of restricting the income of the rich. But there are large differences in the attitudes of respondents who expect (i) to get a better living standard in the future, (ii) to remain at the same level or (iii) to get a worse living standard. For group (iii) the support for the redistributive programme does not even decrease with the current expenditure level. More than 80% of the respondents in the highest expenditure decile but expecting to be worse off in the future are in favour of restricting the income of the rich.

Risk and uncertainty play a more direct role once we consider the possibility of specific risks – of unemployment, illness or disability. These risks are sufficiently well circumscribed to be insurable in principle, if not by private insurers then in any case through a system of social insurance. The effects of social insurance can be analysed in terms of ex post redistribution with a traditional ex post social welfare function. As soon as the die of fortune is cast and we know who are the lucky (healthy and employed) and who are the unlucky (sick and unemployed), the social insurance transfers can be seen as an income redistribution from the former who pay the taxes and contributions to the latter who get the benefits. However, in this setting an ex ante approach – an evaluation of the institution of social insurance before the roll of the dice – yields important insights. Every insurance scheme leads to ex post transfers to the unlucky, but ex ante rational economic agents will freely choose to insure themselves. Social insurance can be seen as a collective insurance scheme introduced where private insurance markets fail. Ex ante it may even be a Pareto-improvement. However, most real-world social insurance systems go beyond insurance principles, because premia to be paid and benefits to be received are not determined in an
actuarially fair. Actual social insurance institutions therefore result from a mixture of efficient insurance and purely redistributive considerations. The attitudes towards these institutions will therefore also reflect a mixture of self-interest and altruism.

**Self interest:** The self-interest component is determined mainly by two factors. The first is the *subjective perception of the income risk*. Most empirical studies focus on the objective determination of income risks taking into account economic and demographic factors. However, there may be a difference between subjective perceptions and objective estimations by economists. People may misread the empirical evidence and base their predictions on wrong, irrelevant or incomplete information. We also know from experimental work that even in almost ideal information conditions there may be a systematically biased perception of (mainly very small and very large) probabilities (Starmer, 2000). The second factor is the *degree of risk aversion*. To identify differences in degree of risk aversion and in subjective perceptions of income risk – impossible on the basis of observable behaviour without imposing untestable assumptions – it is necessary to construct a direct measure of risk aversion. Recent work has shown that it is possible to operationalise the concept in large questionnaire studies (Arrondel et al., 1998).

**Altruism:** The explicit difference between risk aversion on the one hand and inequality aversion (or ‘altruism’) is in line with the experimental findings of Kroll and Davidovitz (1999) described earlier. However, more direct questionnaire studies may also yield useful insights. One example is a study by Schokkaert et al. (1997) analysing the preferences concerning unemployment insurance of a representative sample of the Flemish working population. Table 2 summarises the results of ordered logit regressions where the dependent variable in

### Table 2
Attitudes towards unemployment insurance in Belgium

<table>
<thead>
<tr>
<th>Variable</th>
<th>Increase generosity present system</th>
<th>WTP for additional coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept 1</td>
<td>2.49 (0.29)</td>
<td>− 0.13 (0.30)</td>
</tr>
<tr>
<td>Intercept 2</td>
<td>− 0.12 (0.27)</td>
<td>− 0.42 (0.30)</td>
</tr>
<tr>
<td>Intercept 3</td>
<td></td>
<td>− 0.88 (0.30)</td>
</tr>
<tr>
<td>Intercept 4</td>
<td></td>
<td>− 1.08 (0.30)</td>
</tr>
<tr>
<td>Prob</td>
<td>0.18 (0.05)</td>
<td>0.09 (0.06)</td>
</tr>
<tr>
<td>Altruism</td>
<td>0.29 (0.16)</td>
<td>0.51 (0.16)</td>
</tr>
<tr>
<td>Non-labour income</td>
<td>− 1.60 (0.29)</td>
<td>− 1.20 (0.30)</td>
</tr>
<tr>
<td>Net wage</td>
<td>− 0.98 (0.34)</td>
<td>2.00 (0.43)</td>
</tr>
<tr>
<td>FCP</td>
<td>0.62</td>
<td>0.64</td>
</tr>
</tbody>
</table>


*Source:* Schokkaert et al., 1997.
the second column is the answer to the question: ‘Do you want the present system of unemployment insurance to become less generous/remain unchanged/become more generous?’ Since the present Belgian system puts a low ceiling on the benefits and so has hardly any insurance value for the higher incomes it was also worthwhile to ask for the willingness-to-pay of the respondents for additional insurance coverage. The dependent variable in the third column is a categorical measurement of willingness-to-pay for what the respondents themselves revealed as their ‘optimal’ benefit amount. The latter was close to actual benefits for the low-income respondents but far above the present ceiling for high-income respondents. Respondents were classified as ‘altruist’ if they answered ‘yes’ to the question: ‘Suppose you have to pay for your own unemployment risk only, would you also be willing to pay for someone with less education than yourself, who works in a sector of activity with higher unemployment probabilities?’ To operationalise the subjective unemployment probability respondents were invited to state on a seven-level verbal scale how they perceived the probability of becoming unemployed in the year to come: For the estimation exercise this verbal scale was transformed into a cardinal 1–7 scale.

The results show that both the degree of altruism and income risk (‘prob’ in Table 2) – have a significant positive effect on the preferences for a more generous system or the willingness-to-pay for additional coverage. Non-labour income has the negative effect which could theoretically be predicted under the assumption of decreasing absolute risk aversion. The effect of net wage is different in the two cases. Higher-income respondents indicate a larger positive willingness to pay for additional insurance coverage. The effect is however reversed in the case where the existing structure of benefits has to be kept unchanged. In fact, due to the ceiling higher-income earners would not gain anything through a more generous system of unemployment insurance. The different results in the two cases indicate that the insurance component plays a crucial role in the evaluation of different schemes of unemployment compensation.

3.2. Redistribution as hypothetical insurance

Section 3.1 considered attitudes and distributional preferences in the context of current risk. Economic agents are uncertain about their future incomes but they know their own current income and wealth position and they have an idea about their own earnings capacity. Broadening the ex ante concept makes it possible to go further and to reinterpret all redistributive activities as social insurance and all evaluations of income distributions as evaluations of ex ante prospects. Consider an hypothetical situation in which individuals do not know their income, their wealth, their earnings capacity and focus on the income prospects of a newly born child or the perspective of parents-to-be who care about the living standards of their yet unborn children. At birth the child’s
unknown income position and earnings capacity are determined partly by her innate endowment, which is only imperfectly correlated with the endowments of the parents. Moreover, as soon as the child is born, chance starts to intervene. The development of her skills will depend on the interaction with her broader social environment. When growing older, she will opt for specific educational choices, but since the future developments of the labour market are difficult to predict, these may be the wrong ones. She will start working in a firm or sector of activity without knowing whether it will prosper or perish. Life is a random walk whose path can only partly be manipulated by explicit intervention (Sinn, 1996).

A rational individual would be willing to insure against these different contingencies of life at age zero. But at age zero individuals are not capable of taking this insurance decision (Mirrlees, 1995) and usually their parents are not allowed to do this for them, because that would come close to bondage (Sinn, 1996). However, if one has to wait until adulthood we are back in the situation of Section 3.1: the veil of ignorance is partially lifted and private insurance markets will face problems of adverse selection. The welfare state can be seen as an answer to this problem by acting as a kind of insurance mechanism: it does not eliminate all the risks, but it allows for redistribution between lucky and unlucky children. This holds for social insurance and may provide justification for the purely redistributive elements in it—what we have called altruism. Income taxation and macroeconomic policy can also be interpreted as insurance mechanisms. The forced redistribution taking place between adults is not a Pareto-improvement from the point of view of these adults. However, it can be a Pareto-improvement if it is evaluated on the basis of the ex ante preferences of the newly or not yet born, i.e. at a moment when the veil of ignorance is not yet lifted.

The ex ante approach to social policy and the welfare state suggests a link between the evaluation of ex ante risky prospects and the evaluation of income inequality ex post. Of course, normally adult decision-makers do not reason from the hypothetical perspective of an unborn child. One could therefore argue that the whole idea of hypothetical insurance is more about justice than about efficiency. And indeed we have come quite close to the philosophical theories of justice based on decisions behind a veil of ignorance in a kind of original position (Harsanyi, 1953; Rawls, 1971; Dworkin, 1981). Dworkin (1981) and Kolm (1985) explicitly use the insurance analogy to derive their (different) theories of justice in an hypothetical original position. In this respect Dahlby (1987) takes an ambitious position. Using the Harsanyi framework, he proposes to interpret the existing indices of economic inequality as measures of the riskiness of the income distribution, when viewed from behind a veil of ignorance. In his approach inequality aversion and risk aversion become identical and laboratory measurement of the latter is informative about the former.
A crucial question in the philosophical debate is the exact interpretation of the original position and the desired thickness of the veil of ignorance. This has immediate implications for the extent of redistribution. Only the characteristics kept behind the veil of ignorance will be compensated for in the ex post distribution. There is a large literature on the problem of partitioning the set of personal characteristics into two subsets: those for which people can be held responsible and those for which they must be compensated (Fleurbaey, 1998). Kolm (1998) relates the discussion explicitly to the problem of risk ascription and introduces the concept of a ‘partially original position’.

This discussion can be clarified by empirical work. Frohlich and Oppenheimer (1992) looked at the choices of experimental subjects in a laboratory-created original position and direct questionnaire studies may also throw some light on the issues. It is an open question how far respondents to survey questions are able to abstract from their own income position (Miller, 1995). Perhaps a more fundamental empirical question relates to the distinction between ‘responsibility’ and ‘compensation’ characteristics. Some (e.g. Roemer, 1993) have taken a relativistic stance, arguing that the dividing line between responsibility and compensation can be seen as culture-dependent, in which case questionnaire studies involving an intercultural comparison may be especially relevant. The example in Table 3 (from Schokkaert and Devooght, 1999) shows the proportion of student respondents in three countries who accept differences in effort and differences in innate intelligence as justifiable reasons for income differences. There is broad consensus about the desirability to remunerate effort but disagreement about the acceptability of income differences due to innate characteristics. The intercultural differences are relatively small.

4. Conclusion

The studies in Section 3.2 have led us away from simple risk-inequality comparisons in the abstract or in day-to-day life. However, from a social point
of view income inequality is just one part of the broader question of justice: As soon as one accepts the notion of the original position as a useful device for thinking about distributive justice, the problem of the exact relationship between risk and inequality cannot be avoided. If one accepts that people must bear the consequences of some forms of risk themselves but should be compensated for others, the discussion about risk and inequality has to be rooted in the broader philosophical question of distributive justice.

Two lessons may be drawn from this brief examination of the extensive literature. First, the identification in the abstract between inequality and risk-orderings or between social welfare and individual choice under risk is too simplistic: the evidence suggests systematic differences between the two types of distributional judgements. Second, a variety of experimental and related techniques may be appropriate for obtaining empirical evidence in this field. The latter point may be a clue to further research developments. It is likely that the standard tools for enquiring into people’s attitudes and judgments – questionnaires and laboratory experiments – will be supplemented or supplanted by innovations in communication, including the Internet.

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References


