Equity judgments and context dependence: Knowledge, efficiency and incentives

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Abstract

Distributional equity concerns are often at least as important as economic efficiency and ecological sustainability in environmental and natural resource management policies. Until recently, however, economists have shied away from tackling equity issues, primarily because equity appeared as a slippery concept, varying across people and circumstances. This study takes this context-dependence of equity judgments as a starting point and shows that such dependence, far from being random, is systematic. A series of controlled laboratory treatments with University students were designed to investigate the role on distributional equity judgments of such context factors as knowledge of one's position in society, how the existence of equity-efficiency tradeoffs can affect equity judgments, and the importance of material incentives compared with hypothetical situations, where 'in principle' judgments are called for. Key results include the relative discriminating power of context factors, the hierarchy of context-dependence, the dissymmetry between support and opposition to equity principles, and the impact of different wealth endowments on equity judgments. A number of common beliefs are found not to be substantiated by our experimental findings.

Keywords: Equity, fairness, resource allocation, environmental policy, experimental economics, welfare economics, public choice

JEL: C92, D03, D63, H23, Q56, Q58

1. Introduction

Distributional equity concerns can be a major aspect of environmental policies when economic efficiency or other policy motivations prevail (Johansson-Stenman & Konow, 2009). Equity concerns can lead stakeholders to resist certain policies and raise their costs of implementation. A major problem in dealing with equity issues is the plurality of the notions of equity. Depending on which one is referred to, a given policy will appear as 'fair' or 'unfair'[1], and therefore, will or not be resisted. Any social resistance to a policy increases its implementation costs, thereby offsetting any other social gains it might have in store. Understanding the nature and the origins of such resistance on grounds of perceived inequity appears as a major policy issue, at least in democratic societies.

To make matters worse, notions of equity vary with context and with people (Konow, 2001). For a given situation, different people will invoke different equity notions, while the same person will change perspective depending on the situation. Equity judgments, depending on context or situation, have thus appeared to many analysts to be a very slippery business, where rational reasoning has a limited role, if any. Luckily, social research has shown that the number of equity notions is limited, numbering roughly a dozen, depending on categorisations (see e.g. Rose et al., 1998; Ashton & Wang, 2004). This 'stock' of equity notions seems to be quite universal and valid across countries and cultures, as international negotiations on climate change have demonstrated. Of course, the choice of specific sub-sets, as well as relative emphasis, varies widely across cultures.

In the present study, the various equity principles identified in the literature were investigated using controlled lab experiments, where elements of context-dependence were systematically manipulated. The use of controlled lab experiments for studying distributional equity preferences is not a first: Frohlich & Oppenheimer (1992), Fehr et al. (2006) and Herne & Mård (2006) have opened the way. Such studies are part of the broader effort to apply the methods of behavioural economics to social welfare analysis (Guth, 1994; Bernheim &

[1] In this paper 'fairness' and 'equity' will not be distinguished. Both will refer to the social distribution of benefits or costs, that is, to who gains and who loses.

Rangel, 2009). The next section summarizes the relevant literature and lays the ground for our methodological approach presented in section 3, as well as the experimental design. Section 4 presents the key findings and section 5 concludes.

2. Equity and context-dependence: psychological perception and cognitive construct

The diversity of notions of equity or distributional fairness across situations, people and circumstances can be analysed from different perspectives. At one level, differences can be viewed as psychological: this leads to the study of perceptions of fairness. At another level, they can be viewed as cognitive categories, leading to the study of categorizations of equity. There exists a large literature on each.

2.1 Perceptions of fairness

Family upbringing, type of education, position in the community, religion or philosophy, political ideology and socially dominant values are just some factors that can affect perceptions of fairness: they tend to create specific beliefs about how things should be and thus expectations. When these expectations are not met, the situation is seen as unfair. Psychological tendencies towards idealism or pragmatism, individualism or collectivism, respect of authority or revolt also affect perceptions of fairness. Schmincke et al. (1997) analysed the effect of ethical frameworks on perceptions of organizational justice, and found that 'ethical formalists' were more sensitive to procedural justice and 'ethical utilitarians' were more sensitive to distributional justice. Frey and Powell (2005) examined how different worldviews in different cultures (Jamaica and New Zealand) supersede the right-left political divide in perceptions of distributive justice. Parks and Vu (1994) investigated how individuals from highly individualistic versus those from at the time (early 1990s) highly collectivist cultures (USA and Vietnam) resolve conflicts of distributional equity. They found systematic differences of behaviour, notably in the choice of sharing rules. Lupfer et al. (2000) looked at

how people judged fairness of standard situations and found that they judged fairness to themselves differently from fairness to others. Directly relevant to our study, Hoekstra (2000) identifies four basic personal attitudes that perceptions of fairness in water allocation decisions: individualism, egalitarianism, hierarchism and fatalism. Of particular relevance to environmental policy, Syme et al. (2006) investigate how perceptions of fairness across cultures relate to ecological risks.

2.2 Categorizations of equity as cognitive constructs

Putting some order in the jungle of causes and influences outlined in the previous section can be done from two different standpoints. One is a categorization of such influences and how they work; the other is a categorization of the results of all such influences; namely, of the notions of equity people end up using. This second perspective aims at producing an analytical framework to analyse people's use of these notions. This is the perspective taken in this study.

There seems to be two ways to do this. One is to identify basic and general principles that underlie all the equity notions or rules people use; the other is to identify the notions or rules themselves. Though both are acts of categorization, they operate at different levels and fulfil different purposes. The first is purely a classification exercise, useful for organizing experiments, questionnaires, or other research material, whereas the second can be seen as 'chosen', 'used', 'invoked' or 'activated' by people. In this study, we take the second approach.

Examples of the first approach can be found with Ringius et al. (1998; 2002) who, in the context of international climate change negotiations, identify three basic principles – or elements – for deciding 'equitable' burden allocations:

- *responsibility*, where the allocation reflects responsibilities in causing the problem;
- *capability*, where the allocation reflects ability to pay and to undertake action;
- *need*, where basic human rights are to be secured.

It appears from their and from other similar work that such categorizations are useful as benchmarks for *designing* fair or equitable allocations; that is, they have a normative purpose. A fair or equitable allocation is one that includes all three of the above aspects; if it lacks one or more, it is not 'fair'.

Konow, in particular in his 2001 paper, identifies three different basic principles:

- *accountability*, the most basic equity principle, related to individual outcomes
- *efficiency* – a secondary equity principle, related to 'total' outcomes
- *needs* – a constraint or threshold-like equity principle

to which he later adds (Johansson-Stenman & Konow, 2009)

- the principle of *equality*.

In his case, this categorization is a result of interpreting survey data in response to whether there exists universal categories of fairness that people then 'interpret' (to use his terms) in different ways – this variance in interpretation introducing the idea of context. Konow then uses this information by modelling people's specification of equity criteria as a function of context on the universal notions of fairness. In short, this categorization seems to have an instrumental purpose in modelling people's 'production' of equity criteria. He goes further, however, by showing that, at least in the USA, accountability 'trumps' the other two principles and therefore constitutes the 'fundamental essence' of fairness judgments.

Konow's approach, although he subsequently took it in other directions, marks already a transition towards the second method, whereby one merely tries to identify and name, like a botanist, the equity principles that people actually use. This produces a list, rather than a logical ensemble. Rose's work, in Rose (1992), Rose & Webber (1992), Rose et al. (1998), Rose & Stevens (1998) and Rose & Zhang (2002), has produced a widely cited list of equity criteria or principles, which we have endorsed and used in this study, just as others have, e.g. Cazorla & Toman (2001) and Cai et al. (2008). In the first study, the list registered the different equity criteria that the various parties to climate change negotiations invoked in order to push forward preferred CO_2 abatement policies and resist others. This approach had

several merits. It highlighted the different components included in notions of equity, and by the same token, their multi-layered depth. In other words, at least in our view, they made clear the number of parameters that enter into the definition of a notion of equity, such as that used by international negotiators. Another merit is that the list, although finite in number, does not need this number to be fixed. Depending on the problem at hand, the list will include 6, 10 or 14 equity criteria (on average about a dozen), but it will always, it seems, be drawn from a background 'stock' available to us, and which evolutionary anthropologists can explain from a naturalistic point of view.

2.3 Dependence of equity judgments on context

Perhaps the most enlightening paper written on the role of context on equity judgments is that by James Konow in 2001. Although his purpose was different from ours, his analysis sets the scene. His key proposition is that judgments of fairness or equity are "not context-*specific* but context-*dependent*"; nor are they context independent. Although he does not say it in these terms, what this means is that the factors that influence equity judgments do not do so at random, but in a systematic manner. In other words, although context does affect equity judgments, it does not do so randomly. There are specific patterns to be discovered that tell us something about what forces are at work in society that shape people's views on what is fair and what is not. This is no different than Emile Durkheim's discovery, in 1897, that suicide was as much a social phenomenon as a psychological one[2].

At one extreme, context-*specific* means that

> Equity is a complex idea that resists simple formulations. It is strongly shaped by cultural values, by precedent, and by the specific types of goods and burdens being distributed. To understand what equity means in a given situation we must therefore look at the contextual *details* (H. Peyton Young, *Equity: In Theory and Practice*, 1994, p. xii).

[2] Durkheim is credited to have the first established sociology as a discipline unto its own. In 1903, he published the classic '*Les règles de la méthode sociologique*', where he asserted that social phenomena could be explained by social 'laws'. He proved it with '*Le Suicide*'. Economics, more so than sociology, has since proven his point.

At the other extreme, context-*independent* means that

> The complete principle of distributive justice would say simply that a distribution is just if everyone is entitled to the holdings they possess under the distribution (R. Nozick, *Anarchy, State, and Utopia*, 1974, p. 151).

The first view is usually adopted by behavioural and social scientists, while the second view is usually adopted by moral philosophers. The problem with the first view is that it indeed puts equity judgments beyond the realm of rational analysis: every specific detail of a situation may influence and change them. The result would be a totally random pattern of influences. As for the second view, to quote Konow (2001: p. 138),

> Normative theories of justice seem almost as numerous as the fairness contexts identified by social scientists.

An additional bonus with Konow's idea is that it provides us with a method to check if, in fact, contextual influences do reveal non-random patterns or not; in other words, whether context has a systematic structure. It opens the study of equity judgments to quantitative and analytical techniques. The present study has taken up this opportunity.

3. Methodology & experimental setup

The present study built on and combined four previous insights, which are all elements of our approach:

(1) Existence of a finite number of equity notions (e.g. Rose et al., 1998)

(2) Equity judgments depend on context in a systematic, non-random way (Konow, 2001)

(3) The distinction between situational and universal equity judgments (Kashimi et al., 1988; Syme et al., 1999; Konow, 2008)

(4) Trade-offs exist between efficiency and any notion of equity (Le Grand, 1990)

Accordingly, we have based this study on a dozen equity principles, which can be grouped in the following manner for greater clarity (abbreviations used later are also given):

- Notions of relative position (in socio-economic space)

Inequality-related notions

- ***Eql:*** Equality (equal distribution to all irrespective of individual characteristics)
- ***Mm:*** Rawls' maxmin (the least favoured are given highest priority)
- ***Sov:*** Sovereignty (distribute in proportion to differences in existing wealth or rights)
- ***FI:*** 'Future interests' (give some weight to future stakeholders or future generations)

Ability-to-pay notions

- ***AtP:*** Ability to pay (in proportion to one's income or wealth)
- ***VE:*** Vertical equity (a progressive distribution rate, often used in taxation schemes)
- **HE:** Horizontal equity (in proportion to the size of one's family, district or country, often used in deciding rates for basic needs, such as water and electricity)

- Process equity notions

Market process and corrections thereto

- ***Mkt:*** 'Market justice' (the distribution resulting from allocations through a free and efficient market are considered to be acceptable or even desirable on equity grounds)
- ***Par:*** Pareto compensation (following a market allocation, compensations are made so that one is left worse off after compared to before)
- ***Exc:*** Special exceptions rule (before or after a some allocation outcome, special groups of stakeholders are singled out as not being subject to that allocation rule; often (but not necessarily) in relation to market allocation outcomes)

Social and political processes

- ***Cns:*** Consensus (is considered fair any outcome resulting from a procedure that produces some form of social consensus)

- ***SB:*** Sovereign bargaining (is considered fair any outcome agreed upon by elected representatives)

In addressing element (1) of our approach, the careful reader will have noticed the absence of Ringius et al.'s principle of *responsibility* and Konow's principle of *accountability*. One can understand both as being two sides of the same coin: the first distributes burdens in proportion to impacts caused by the stakeholders; the second distributes rewards in proportion to effort invested. The reason is that, contrary to those above, the reference base for the responsibility – accountability principle is endogenously defined rather than exogenously. Ability to pay and horizontal equity, for instance, refer to stakeholders' *state* variables such as income and family size. By contrast, responsibility and accountability refer to causal action and individual investments in effort. Although they form a very general principle of equity, their operational implementation can require elaborate ad-hoc evaluations. This is why we have not included them in this study, although of course they can and will be included in later work.

Element (2) of our approach translates into the design of controlled lab experiments where specific context factors are systematically manipulated. These factors include elements (3) and (4) above: (3), by designing treatments with and without knowledge of one's position in the distribution of initial wealth endowments, and (4) with treatments with and without equity-efficiency tradeoffs. In addition, to control for self-serving motives (see Fong, 2001; Lange et al., 2008), treatments with and without real (monetary) stakes were run, with 'cheap talk' treatments run first. Rawls' (1971) 'veil of ignorance' scenario is implemented by the 'no knowledge' treatment in (3), and Syme's (1999) distinction is implemented both by (3) and by the 'with vs. without' real stakes treatments. These treatments define three dimensions: known (K) vs. unknown (U) position in society; without (E) vs. with (P) efficiency or productivity tradeoffs; and with (M) vs. without (T) real monetary stakes. Combined into a complete factorial, they define 8 scenarios: 1 = TEK, 2 = MEK, 3 = TPK, 4 = MPK, 5 = TEU, 6 = MEU, 7 = TPU and 8 = MPU. Thus scenario 1 (TEK) is in 'cheap talk' mode (T), with no

efficiency tradeoffs (E) and with known position (K) in society (i.e., in one's experimental group).

Experimental subjects differed by their initial wealth endowment and their 'number of dependents', representing for example family size, an important parameter for investigating the prevalence of the 'horizontal equity' principle. They also differed by their *individual* productivity factor, designed so that a dollar given to a richer participant (measured by the initial endowment) has a greater multiplying factor in terms of total money available for distribution. This could represent the higher marginal propensity to save and invest of richer people, as opposed to the higher marginal propensity to consume of poorer people. Thus a dollar given to the poorest individual had no amplifying power while a dollar given to the richest created two dollars available for distribution, with linearly interpolated values in between. As a result, each equity principle leads to different *total* productivity factors of the dollars distributed. Thus, equality leads to a total factor of 1.50 whereas ability-to-pay leads to a factor of 1.34, since this principle distributes less money to rich than to poor participants. The final differentiating factor, the contribution of individual effort, was kept equal to one for all participants, since the principle of accountability was not part of this study.

In each of the 8 scenarios defined above, experimental subjects were asked to rate on a Likert scale each of the 13 equity principles. The Likert scale had 21 points, ranging from –10 (maximum opposition) to +10 (maximum support), with 0 representing indifference or indecision. Every subject thus rated 13 principles 8 times, in 8 different settings, given his or her own position in the group, if known. In a given scenario, each equity principle was ranked using participants' ratings, assuming, in this case, their additivity. (This also assumes interpersonal comparability, where a +6 by one individual is assumed equal to a +6 by another. Although debatable, this was deemed acceptable for this study as a first approximation). For the 4 paid scenarios (the even-numbered ones containing the code letter M), the equity principle ranked highest (i.e. collectively most preferred) was used to allocate the available sum of money: 50 ECUs or experimental currency units. The total gains in

ECUs, including the initial wealth endowment, were transformed into real dollars at the end of the 8-scenario session, using an exchange rate that reflected the budget constraint for that session.

Participants were organized in groups of 10 and the allocation decision was to be done within this group. A total of 10 groups had been planned, though only 9 eventually were set up, yielding a total of 90 valid participants. Thus, if in a given paid scenario the equality principle prevailed, the available sum of money was distributed equally across the 10 members of the group. Experiments were carried out with University students.

4. Results

We report on the more salient results generated by our experiments: the extent to which different context parameters discriminate among equity judgments; how equity judgments compare in terms of context-dependence; whether support and opposition to equity judgments differ in context-dependence; the impact of including an equity-efficiency tradeoff; and the role of initial wealth endowments.

4.1 Context discrimination

The first treatment may be referred to as investigating the positional 'knowledge effect' and implements Rawls' 'veil of ignorance" concept' (specifically, scenarios 5=TEU and 6= MEU); the second may be called the 'efficiency effect', and the third the 'incentive effect'.

A measurement of 'discriminating power' can be defined, such that it will be greater the more diverse the equity judgments in response to a change in context parameter. Thus, if they differ more when comparing K to U than when comparing M to T, we shall say that the knowledge factor is 'more discriminating' in equity judgments than the incentive factor. Given a level of aggregation of the data into a small number of bins, the measurement principle is to compare the number of changes in the categories of support and opposition.

This approach only leads to a first approximation, as the absolute results depend on the level of aggregation (number of bins); but the relative rankings remain stable.

A first level of analysis aggregated the data for each equity principle into 3 bins, where intensities on the interval]+2, +10] defined 'support', the interval [-2, +2] defined 'indifferent', and the interval [-10, -2[defined 'opposition'. One can then, as a first approximation, distinguish between the simple categories of 'support', 'opposition', 'bipolar', 'undecided' and 'no data', where 'bipolar' means a U-shaped distribution and 'undecided' a flat distribution, subject to statistical significance criteria. It then examined the number of category changes for each of the 13 equity principles in each of the three dimensions, that is, across each of the eight scenarios. Thus, when comparing scenarios 1 (TEK) and 3 (TPK) to scenarios 6 (MEU) and 8 (MPU), that is, E vs. P, there were across the 13 principles 7 category changes between S1 and S3, compared to only one change of 0.5 between S6 and S8, a unique change from 'undecided' to 'no data'. Thus in scenario 8, in 12 out of 13 cases, the equity judgments were identical at the level of aggregation chosen: if a principle was supported under E, it was also supported under P, and vice versa. In this sense, confronting scenarios 1 and 3 is 14 times 'more discriminating' than confronting 6 and 8: this defines the (rather crude) discrimination metric. There are however four scenarios where K and U are compared, and likewise four for each of the other two dimensions E/P and M/T. By summing all such scores over the four scenarios one can define a measure of total discriminating power. On this basis, one can then compute the discriminating power of each dimension: K relative to U, E relative to P, and M relative to T. Table 1 provides the results.

Table 1 : Discriminating power of context-factor treatments

Experimental context type	Discriminating power coefficient	Treatment parameter
K > U	2.08 (strong)	Position knowledge & self-serve
E > P	1.64 (medium)	Equity-efficiency tradeoff
M > T	1.14 (weak)	Real stakes vs. cheap talk

Table 1 tells two stories. The first is that K discriminates equity judgments more than U; that is, when participants knew their wealth position in the group, they supported some equity principles and opposed others more strongly than when they did not know whether they were rich or poor (the information being revealed later). Likewise, introducing an equity-efficiency tradeoff weakened the differences in equity judgments, and not having real monetary stakes had the same effect. These are raw results in quest of interpretation. For now, one can hypothesize that K>U (in terms of discriminating power) reflects self-serving motives, in accordance with Johansson-Stenman and Konow's (2009) observations; that E>P reflects the fact that counter-balancing efficiency or productivity effects take the edge away from pure equity judgments; and that M>T means real stakes sharpen preferences for equity. Logically then, across all three dimensions K-U, E-P, and M-T, scenario 2 (MEK) should be the most discriminating and scenario 7 (TPU) the least. This is indeed the case, the discriminating power of the former being 4 times stronger than the latter.

One can go further in making quantitative comparisons, and the box below summarizes in another way the values in Table 1 above:

KU > EP > MT
knowledge effect > efficiency effect > incentive effect

These tell us that the knowledge factor is more powerful than the efficiency factor which itself is more powerful than the incentive factor – at least on the grounds of these results. In the first case, the K treatment is more than twice as discriminating than U, whereas M is hardly 15% more discriminating than T. This may come as a surprise. Taken literally, the latter result is telling us that distributional equity judgments do not depend much on, or are not very sensitive to, the presence or absence of real stakes, and therefore, logically, to the magnitude of these stakes. One may conclude with the following tentative statements:

- Knowledge of one's own socio-economic position in society dominates judgments of equity. However, the discriminating power of U itself is far from being zero: in the units of this study, the U measure is 29.5 compared to K's 61.5 (the ratio being 2.08).
- Equity judgements without efficiency or productivity tradeoffs discriminate more than when such trade-offs are present, as could be logically expected. Our study was able to quantify this difference: efficiency tradeoffs reduced the intensity of equity concerns by about 35%.
- If introducing real monetary stakes create incentives for sharper preferences, the effect is quite small overall: it increases discriminating power by less than 15%. However, for individual equity principles, introducing real stakes can have significant effects, either dampening or amplifying those observed in 'cheap talk' mode. This can be compared to Alpizar et al.'s (2008) conclusions.

To conclude, the most efficient experimental conditions for comparing people's equity judgments in different contexts are, according to our results, where socio-economic position is known, no efficiency tradeoffs are involved, and real rewards are at stake. Regarding the first point, however, one needs to go further and disentangle subjects' equity considerations from their self-serving motives, another experimental treatment planned in the next phase of this research.

4.2 Hierarchized context-dependence

Which equity judgments are more context dependent than others and by how much? Can we rank them as a function to their sensitivity to changes in context? The experimental data sheds some light on this question. Two levels of aggregation were used and compared to check for ranking consistency: overall, it remained quite stable, with only minor differences in rankings, mostly adjacent. At any rate, four distinct groups of equity principles stood out, invariant to the level of aggregation.

- Group A was highly sensitive to changes in contextual factors, that is, to experimental treatments, and comprises only the market justice principle. Distributions in equity judgments responded to all changes in treatments.
- Group B groups those principles that are moderately sensitive: sovereignty, sovereign bargaining, vertical equity and Rawls' maxmin principle.
- Group C groups principles with some but low sensitivity: equality, horizontal equity, ability to pay, the exceptions principle and consensus.
- Group D groups principles which did not appear sensitive to any of the treatments carried out and include 'the future's interests' and Pareto compensation.

The meaning of these results are, for example, that the two group D principles generated (much) more support than opposition irrespective of which experimental scenario is considered: the histogram of relative frequency distributions hardly changes shape across all 8 scenarios. By contrast, market justice is most sensitive across all scenarios.

The next question is whether some equity principles are more sensitive to some context parameters than others. This of course excludes group D above, but also the principles of intergenerational equity and special exceptions, which were very little sensitive to all treatments. This question distinguishes a principle which could be sensitive to many parameters but only moderately so, compared to one which could be very sensitive but to only a couple of parameters. Results can be summarized as follows:

- The M/T dimension (the influence of real tangible stakes) is the one with the weakest experimental impact: only the sovereign bargaining principle was sensitive to it. This principle is also sensitive to the K/U dimension but not to E/P. Non-dependence on E/P may reflect the high degree of uncertainty in the final allocation of benefits when using this process principle, given that it depends on stakeholder representatives who must be trusted. This would explain by it is also sensitive to T/M: it mattered whether real money was at stake or not.

- The following principles were sensitive to the E/P dimension (the role of equity-efficiency tradeoffs): equality and, under K conditions (i.e. not so much under U conditions): ability to pay, market justice and the sovereignty principle.
- The most wide-reaching factor was the K/U dimension. Were highly sensitive to it: vertical equity, horizontal equity, and sovereign bargaining; under E conditions: equality, market justice and sovereignty; and under P conditions ability to pay.

4.3 Support–opposition dissymmetry

An unexpected finding from the experiments was the dissymmetry between support and opposition with respect to equity principles. It was possible to compare sensitivity to changes in context treatments of the degree of support and the degree of opposition. The key finding is that opposition is more context dependent than support. This can be summarized in the following formula, where 'Opp' represents the total quantity of opposition to one or a given set of equity principles and 'Supp' the total quantity of support; ΔX represents a change in context parameter X. This inequality was robust across treatments.

$$\frac{\Delta(Opp)}{\Delta X} > \frac{\Delta(Supp)}{\Delta X}$$

This relationship was established by first measuring total average support for all 13 equity principles and ranking them accordingly. The variability of their level of support across context treatments was then measured establishing a new ranking. Table 2 shows the two rankings side by side. Clearly, the more support an equity principle obtains, the more stable its level of support, and vice-versa (rank correlation coefficient is –84%).

Table 2 : Inverse correlation between support and stability of equity judgments

Equity	Ranked by support	Ranked by variability	
FI	**1**	**11**	Least dependent
Par	**2**	**12**	on context
Exc	**3**	**9**	
AtP	**4**	**8**	
Cns	**5**	**10**	
Egal	**6**	**6**	
HE	**7**	**7**	
Sov	**8**	**2**	
Mkt	**9**	**1**	
SB	**10**	**3**	
Mm	**11**	**5**	Most dependent
VE	**12**	**4**	on context

As already mentioned, 'future's interests' (FI) and Pareto compensation (Par) obtained most widespread support and were also least sensitive to changes in context parameters. The least supported principle was that of vertical equity (VE), which ranked high in terms of variability (4th out of 12). As for the most context-dependent principle, market justice (Mkt), it ranked low in terms of support: 9th out of 12.

One way to interpret this dissymmetry is that positive equity judgments are more grounded in 'absolute' principles, whereas negative judgments more closely reflect the specific situation in which the distribution of benefits or costs is at stake. This builds on and adds to Syme et al.'s (1999) distinction of universal vs. situational equity. An extrapolation would be that negative judgments involve self-serving motives to a greater degree than positive ones, but such a statement can only be formulated as a hypothesis and would need to be tested with tailor-made experiments.

An implication of this finding is that it might be easier or less costly to tackle the reasons underpinning opposition than those underpinning support for an equity judgment, should such a judgment be seen as obstructing a policy program.

4.4 Equity-efficiency tradeoffs

In the first section, efficiency considerations were shown to affect equity judgments mostly by dampening them; that is, when equity-efficiency tradeoffs are present, the intensity of support or opposition to different equity principles diminishes. This can be stated in another way: considerations of efficiency and equity interact and affect each other. This section provides some of the results obtained on this interaction.

We start with a particularly topical result, in that it directly relates to the use and desirability of market-based instruments, especially in the context of environmental and natural resource management policies (see Chichilnisky et al., 2000, for an overview of this issue). This is the principle of 'market justice' viewed as a distributional equity principle. Those who support it consider that allocations resulting from an efficiently operating free market system are ethically and socially acceptable as well as desirable; that is, they have distributional equity status. Note that no reference is made here to any notion of equality, which is a notion of outcome equity; 'market justice' is a concept of process equity.

Figure 1 compares equity preferences for market justice between scenarios TEK and TPK; that is, with and without efficiency tradeoffs, under known socio-economic positioning but without real stakes (the aggregate graphs for MEK and MPK with real stakes look almost identical). The aggregate graph conveys a very clear message: when efficiency criteria are introduced in the experiments, the general support-opposition profile for market justice is reversed. When no efficiency aspects are involved, roughly twice as many subjects oppose this principle as those who support it; when efficiency consequences are introduced, the difference is reversed almost symmetrically. Recall that these measures of support and opposition really measure total intensities, not number of subjects (see detailed response data in lower left quadrant).

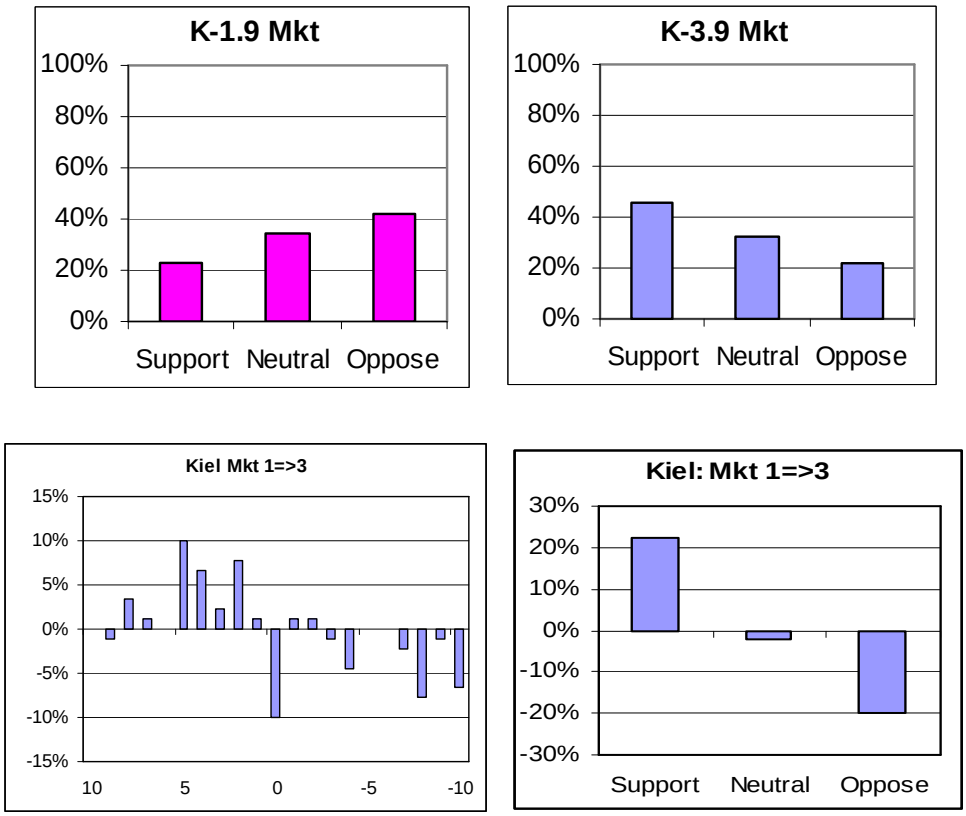

Figure 1: An example of equity-efficiency interaction for the principle of 'market justice': top panels: raw data; bottom panels: 21-point and 3-bin aggregates (Scenarios TEK vs TPK).

The implication is that market-based instruments are less likely to be opposed on grounds of inequity if their efficiency benefits, net of transaction costs, are substantial and well publicised. Again, this has nothing to do with perceptions of inequality in outcomes: the focus is on equity perceptions of a process, allocations by markets assumed to be free and efficient. The validity of this last assumption is of course moot, but is a totally different issue.

The market justice principle is in fact structured by the whole spectrum of E vs P scenarios: in all four P scenarios, this principle was clearly much more strongly supported than opposed. But the E scenarios differ depending on the K-U dimension. Under known positioning, that is, in the two EK scenarios, opposition is stronger than support; but under 'veil of ignorance' conditions, in the two EU scenarios, support is stronger, but only slightly so. That is, P conditions override all other considerations for market justice, but under E conditions, knowledge of one's position in society plays a role.

One can contrast these results for market justice with those for equality taken as a normative equity principle. This principle is affected by efficiency tradeoffs but less so than by the K-U dimension. Equality generates more support than opposition in all 8 scenarios, but is more strongly supported under U than under K conditions. U introduces a degree of uncertainty while K introduces self-serving motives. The experimental data also yielded information on the respective role of uncertainty and self-serve motives, not reported here. The presence of equity-efficiency tradeoffs did not therefore affect all equity judgments in the same manner. Indeed, only two others out of the remaining 11 were sensitive to E vs .P.

4.5 Initial wealth distribution and equity judgments

There is a common belief that the rich in society tend to oppose distributional policies more so than the poor. This may mean two things. It may mean that the rich oppose distributional equity in general and prefer to support, say, policies based on economic efficiency. It may also mean that the concept of equity reduces to that of equality, meaning that the rich oppose greater equality in society. Before going any further, it is important to distinguish distribution from redistribution. In the first case, a certain quantity of benefits (or costs) is *already* available for distribution, without needing to transfer anything from anyone to someone else. By contrast, redistribution means *transferring* goods (or bads) from some people to other people in a zero-sum game (see Alesina et al., 2005 and Ebert, 2007). In the experiments carried out in this study, only the distribution of benefits without transfers from rich to poor was examined – a more interesting case if the goal is to study the preferences for distributional equity. As it turns out, such beliefs are poorly grounded and were not supported by our experimental data. The role of initial wealth endowments on one's equity judgments strongly depends on which equity principle is invoked, and the rich do not unambiguously oppose equality as an equity principle. This study thus adds to previous experimental results provided by Cherry et al. (2005) and by Buckley & Croson (2006).

Recall that equality as an equity principle means that an equal distribution of the benefits (or costs) is preferred across all stakeholders irrespective of their individual characteristics. In the experiments, this meant that the amount of money available for distribution was divvied out equally to those initially well endowed (the rich) and to those initially poorly endowed (the poor), with the initial richest to poorest wealth ratio being 5 to 1 ($25 to $5). At the end of the session, subjects were paid the sum of their initial endowments and of their gains. To simplify exposition, the 10 wealth levels in a group have been aggregated to three: poor ($5, $7, and $9), middle ($12, $14, $16, and $18), and rich ($21, $23 and $25).

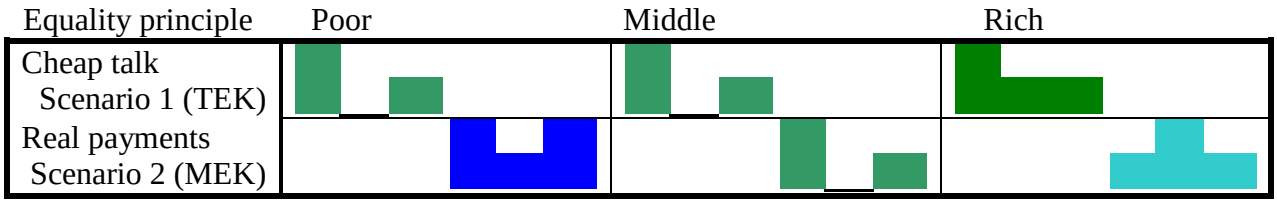

Figure 2: Initial wealth and equity preferences for the principle of equality, comparing scenarios 1 and 2 (***T***EK vs. ***M***EK)

Figure 2 shows how initial wealth influenced equity preferences for the equality principle and compares scenarios 1 (TEK) and 2 (MEK), that is, cheap talk and real stakes under the most discriminating context: no efficiency tradeoffs and full knowledge of one's socio-economic position in society. Clearly, in none of the cases do the rich oppose an equal distribution, and in no case are their preferences much different from those of the other wealth categories. In cheap talk mode, the rich tend to favour equality just like the poorer subjects, indeed more so; with real monies at stake, they remain ambiguous, much like everyone else. The overall result, then, is that the rich like the poor are of two minds with respect to equality. The only difference between the rich and the other two categories lies in how they differ between cheap talk and real stake modes: the rich clearly favour equality when no real monies are at stake, but hesitate to do so when real money is to be distributed. The other two

categories did not exhibit this change of preference. For obvious reasons, these results would not extend to redistribution where transfers from the rich to the poor are involved.

The findings for equality extend by and large to the political process principles: sovereign bargaining and consensus (see Appendix 1). The role of initial wealth on the remaining equity principles can be summarized as follows:

- The poor support and the rich oppose: ability to pay, vertical equity, and Rawls' maxmin
- The poor oppose and the rich support: sovereignty and market justice
- Both rich and poor support the future's interests, Pareto compensation, the exceptions rule and horizontal equity.

Some of these results come as no surprise: that the first three are supported by the poor and opposed by the rich clearly reflects the strongly progressive nature of these equity principles, which are defined as a function of wealth. The same can be said of the sovereignty principle. However, the role of wealth on preference for market justice was less obvious and is very revealing of the link between the distribution of wealth in society and the voting power of one's wallet: in the market place, the rich have a bigger say than the poor. Apparently, experimental subjects spontaneously intuited this link and voted accordingly.

That the rich always oppose an equitable distribution is wrong, at least until the distribution principle is clearly identified. Their preferences will depend on which equity principle is considered and their choice of equity principle is itself context-dependent. The experiments generated the data for studying this context-dependence, but the analysis of the results is justifiable of a separate study.

5. Conclusions

The hypothesis that motivated this work has been largely substantiated by our experiments: context-dependence of equity judgments, far from being random, is systematically structured and therefore, in principle, predictable. In particular:

1. Context-dependence is hierarchized: some equity judgments are more context-dependent than others; and one will be more sensitive to certain context parameters than to others.
2. Of the three context factors studied, uncertainty about one's position in society has the greatest effect on one's equity judgments; considerations of equity-efficiency tradeoffs rank second; and the role of material incentives, though not negligible, ranks last.
3. Efficiency and equity considerations interact in ways specific to each equity principle. One cannot extrapolate from the equality-efficiency tradeoff to other equity principles.
4. Market-based instruments are less likely to be opposed *on grounds of inequity* if their efficiency benefits, net of transaction costs, are credible and great enough.
5. Opposition to an equity principle appears more context-dependent than support for it. A policy maker would find it less costly to tackle the reasons underpinning opposition than those underpinning support.
6. The role of wealth on one's equity judgments is not always straightforward and depends strongly on which equity principle is involved. And the rich do not in general oppose equality in distribution, provided no transfers from rich to poor are involved.
7. When real stakes are involved in equity judgments, their role compared to when they are absent is ambiguous. In some cases, real stakes have an exacerbating effect; in others they have a dampening effect. More work is needed to understand the nature of this ambiguity.

The results reported here are but skimming the surface of the issues explored in this study. First, there is still much to analyse from the data produced by the experiments. Second, the experiments should be run identically again and in other settings, for example with participants other than University students or with students in other countries. Third, the study of how self-serving motives operate in equity judgments is far from exhausted; in particular, a third experimental treatment will be added in the next phase whereby participants are asked to choose a distributional rule not for their own group, but for another identically structured group, which will remain anonymous. Fourth, accountability as an equity principle

responding to individual effort will be included and its interaction with other principles investigated. Ringius et al.'s responsibility principle can be understood as being to the distribution of burdens what accountability is to the distribution of rewards: it does not seem to differ fundamentally. Fifth, 'field-truthing' of experimental outcomes will allow for the control of external validity: are results from the lab relevant for policy making in the field?

The scientific study of equity has only just begun. But equity is well on its way to appear on an equal analytical footing with economic efficiency. In a democratic system, policy makers can only benefit if their constituencies increase their support because policies appear fairer. Social welfare will also improve. This is particularly true of environmental and natural resource management policies, where distributional consequences not only affect social welfare, but environmental outcomes.

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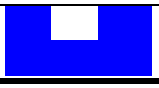
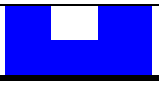
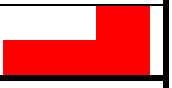
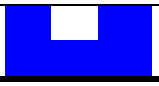
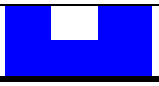
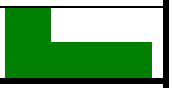
Appendix 1 –Initial wealth and equity judgments comparing *T*EK and *M*EK

Equity principles Sc 1(TEK) vs. Sc 2(MEK)	**POOR** Survey	Payment	**MIDDLE** Survey	Payment	**RICH** Survey	Payment
Egal - survey						
- real payments						
Mm - survey						
- real payments						
FI - survey						
- real payments						
AtP - survey						
- real payments						
VE - survey						
- real payments						
HE - survey						
- real payments						
SB - survey						
- real payments						
Cns - survey						
- real payments						
Mkt - survey						
- real payments						
Par - survey						
- real payments						
Exc - survey						
- real payments						
Sov - survey						
- real payments						

Greens = majority support; blues = bipolar or undecided; red/orange = majority opposition.