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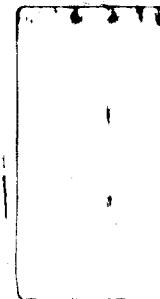
## A positive theory of economic fairness

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## A positive theory of economic fairness

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### Abstract

This paper presents a positive theory of economic fairness which strives for generality by characterizing the fairness values which people share across differing contexts. The study attempts to isolate these underlying values from the more situation-specific perceptual effects (e.g., framing effects) which may have an impact on reported fairness. Central to the proposed theory is the *Accountability Principle* which, roughly speaking, requires that a person's fair allocation (e.g., of income) vary in proportion to the relevant variables which he can influence (e.g., work effort), but not according to those which he cannot reasonably influence (e.g., a physical handicap). The results of telephone interviews and written questionnaires are presented in support of the theory.

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### 1. Introduction

Manifestations of concern for distributive justice may be found in politics, in markets and in laboratories. This concern often is seen as having a significant impact on the pursuit of political, economic and social goals. In the realm of politics, for example, Britain's former Prime Minister Margaret Thatcher failed to heed an enduring lesson of fairness when in 1990 she introduced a poll tax (a flat, per head levy). The same policy, which six centuries earlier set off a Peasants' Revolt in Britain and forced the 14-year-old King Richard II to flee for his life, led to Thatcher's resignation within the year and to the

<sup>1</sup>My sincere thanks are extended to Gary Biglaiser, Werner Güth and Joe Oppenheimer for feedback on earlier versions of this paper and to two referees of this journal for many helpful comments and suggestions which have been incorporated into this version. Any errors of omission or commission remain, of course, mine.

eventual repeal of the poll tax amid public outrage over the unfairness of this tax. In the private sector, gasoline price increases at the pump soon after the 1990 Iraqi invasion of Kuwait based on anticipated increases in crude prices led in the US to public cries of price gouging. Five months later, at the onset of the Persian Gulf War, major oil refiners initially froze, and then actually lowered, wholesale gasoline prices despite widespread expectations of soaring crude prices, a turnabout in policy which was widely attributed to public relation concerns. Recently, an expansive literature has emerged around experimental studies which generally confirm a role for fairness in economic decision making.<sup>2</sup> In fact, much of the current interest in fairness can probably be traced to the seminal Güth et al. (1982) bargaining experiment in which subjects demonstrated a willingness to incur personal sacrifice for "fair" allocations.

Given the evidence from different sources that attitudes about fairness influence economic behavior, it would be useful to have a theory of this phenomenon. As an effort in this spirit, this paper presents a positive theory of economic fairness (or distributive justice) which strives for generality by characterizing the fairness values which people share across differing contexts or situations. It is best classified with "equity theory" (found mostly within social psychology) which relates fair allocations to so-called "inputs." The theory advanced here aids, I hope, in clarifying this relationship by introducing the *Accountability Principle*. Roughly speaking, this principle requires that a person's *entitlement* or fair allocation (e.g., of income) vary in proportion to the relevant variables which he can influence (e.g., work effort), but not according to those which he cannot reasonably influence (e.g., a physical handicap). In addition, a formula for the fair allocation of economic variables is presented which embodies the principle and which relates the fair allocation to inputs, outputs, endowments and costs. The evidence brought to bear on the theory comes from responses to hypothetical scenarios presented to subjects in telephone and written attitude surveys. However, one might view as casual evidence of this principle many of the arguments in the debates about Affirmative Action or the Americans with Disabilities Act.

Pursuing a *positive* approach to fairness, equity theory has its origins in the work of sociologists Homans (1958, 1961), Blau (1964), who through the application of economic principles, proposed modeling social behavior as exchange.<sup>3</sup> This spawned an extensive literature among social psychologists including Adams (1965), who was the first to state explicitly an equity formula, and Walster et al. (1973, 1978) who tried to refine it. This transdisciplinary research program came full circle when Selten (1978) suggested how equity theory could be applied to economic behavior.

Most of the voluminous literature on fairness in economics to date, however, has been dominated by a *normative* approach which has generated a plethora of theories with differing premises and conclusions. With roots in philosophy, just a few prominent examples of these theories include those traceable to Aristotle (*Ethica Nicomachea*),

<sup>2</sup>To mention but a few, see Bolton (1991), Fehr et al. (1993), Forsythe et al. (1994), Franciosi et al. (1995), Frey and Bohnet (1995), Frohlich and Oppenheimer (1992), Hoffman et al. (1996), Spiegel et al. (1994).

<sup>3</sup>Several contributors to this literature trace its origins to Aristotle (*Ethica Nicomachea*). A more recent, and radical, example of the application by a sociologist of economic principles to sociological issues is Coleman (1990).

Bentham (1791), Foley (1967), Rawls (1971) and Nozick (1974). Based on introspection and deduction, normative theories of fairness aspire to a high level of generality. A striking characteristic of this literature until recently has been the paucity of empirical investigation which addresses the value of these theories as descriptions of the fairness standards held by real people.

Nevertheless, recent attention in economics has turned to the possible impact of fairness on actual attitudes and behavior. Most of these studies have taken the form of the aforementioned experimental tests. Very few studies have treated economic theories of fairness in conjunction with a survey design. The main such surveys known to the author are those of Yaari and Bar-Hillel (1984) and of Kahneman et al. (1986, 1986) (or KKT) including several spin-offs of the latter.<sup>4</sup> The former attempt a comparative test of various distribution mechanisms without clear-cut results. KKT (1986a), on the other hand, report strong results to buttress their new theory of dual entitlement. This theory, however, restricts its scope to the fairness of changes in transaction terms between customers and merchants, tenants and landlords or employees and employers. These experimental and survey studies have contributed much to our understanding of fairness and of perceptions of fairness. Nevertheless, their aspirations for theoretical generality have by and large remained modest. Moreover, other survey results, such as Konow (1995)<sup>5</sup> and Yaari and Bar-Hillel (1984), cast doubt on existing normative and positive theories of economic fairness as generalizable propositions about actual fairness values.

A view commonly drawn from the empirical fairness research to date is that fairness is a highly differentiated phenomenon which varies widely with context, e.g. social, institutional or cultural context. For example, Shiller et al., 1991 (p. 389) state that "notions of fairness are very situation-specific." This kind of institutional and geographic specificity is what Elster (1990, 1992) means by "local justice." Isaac et al. (1991) outline a theory of fairness which depends on institutions but they concur with Elster (1989) who states that "at present I am not able to formulate any robust or even plausible generalizations" about *institutions*. Thompson et al. (1990), on the other hand, seem to make progress in formulating generalizations about *culture*. The striking similarity of responses to fairness survey questions among subjects in different countries, however, suggests little variation in notions of fairness across this contextual dimension, the one across which it would be perhaps most expected.<sup>6</sup> The author's view, elaborated in Sections 2 and 4 of this paper, is that much of what appears singular

<sup>4</sup>The survey of Gorman and Kehr (1992) is identical to KKT while that of Frey and Gygi (1988), Frey and Pommerehne (1993), Ng (1988), Shiller et al. (1991) contain some fairness questions inspired by KKT's study. Blinder and Choi (1990) also included survey questions on fairness but was not chiefly focused on fairness issues. The larger studies of Arts et al. (1991), Kluegel and Smith (1986) and Szirmai (1986) examine attitudes toward economic inequality, but their theoretical discussion is limited and chiefly sociological and psychological rather than economic.

<sup>5</sup>That paper undertakes a comparative analysis based on survey results of distributive justice according to egalitarianism, Aristotle (1925), Rawls (1971), Nozick (1974), Foley (1967) and Varian (1974), KKT (1986a, b), and the theory proposed there.

<sup>6</sup>See, for example, the Shiller et al. (1991) research on U.S. and Soviet subjects and the results for common questions among subjects in Canada (KKT, 1986b), Germany (Frey and Pommerehne, 1993), Switzerland (Frey and Gygi, 1988) and the US (Konow (1995, 1996)).

or indecipherable is due to perceptual effects, not to the lack of generality in actual fairness values.

While searching for a fairness theory which bridges contexts, this single paper is not, of course, able to state and verify applications of this theory to all situations involving issues of distributive justice. In particular, the immediate goal is to present the theory applied to the fair allocation of a single, sufficiently divisible economic variable (such as income) and to demonstrate the consistency of this theory with the fairness standards of a majority of people. Thus, the concern of this model is with fairness of outcomes or endstates, not with fairness of opportunities.

Section 2 of the paper provides the reasons for and the details about the methodology chosen for this study. The balance of the paper builds up the theory stepwise with the pertinent survey evidence presented at each step. The Accountability Principle is stated in Section 3, while Section 4 examines how subjects interpret scenarios given incomplete information and what the possible effects of this interpretation are on the results. A formula for the entitlement which embodies the Accountability Principle is suggested in Section 5. The concluding remarks in Section 6 contain thoughts on how to generalize and add to this approach to distributive justice.

## 2. Methodology

Below I review the issues surrounding the choice of method and the details of the surveys.

### 2.1. Issues of method

The presumption of the theory and conclusion of the empirical work here is that economic fairness is a genuine concern of real people which may be described in rigorous terms. Because of the possibility of perceptual effects, however, what is fair according to the values of the majority may sometimes differ from what the majority perceives or reports to be fair. As used here, a *perceptual effect* is detected when the quantity or presentation of information about the same actual endstates affects subject judgments. Specifically, one type of perceptual effect is due to incomplete information.<sup>7</sup> This was addressed by constructing survey questions with differences in the quantity of information about endstates and identifying the resulting differences in responses.

Other perceptual effects may emerge, however, which are related to the evaluation of *given* information. Fairness perception may be subject to "framing effects" whereby responses are affected by variations in the *presentation* of a scenario in which the information about the endstates is qualitatively and quantitatively identical.<sup>8</sup> Since the

<sup>7</sup>An example can be seen in question 2 of this paper (see Section 4) in which a majority of respondents judges a pay differential between two identical workers unfair until they are made aware of a proportionate difference in voluntary work time.

<sup>8</sup>For example, KKT (1986b) identify money illusion in responses to fairness questions. See Kahneman and Tversky (1979), Tversky and Kahneman (1986) for more on framing effects.

chief focus of this paper is on fairness values, not framing effects, several guidelines were adopted to try to eliminate the kind of scenarios with which the latter have been associated. These included generally keeping the details simple, using certain rather than risky outcomes, using levels of rather than changes in variables and formulating several questions with inconsequential changes in presentation to confirm that subjects were responding to the information and not to the frame.

I view reported fairness as a product of true underlying values which we must sometimes interpret with an awareness of distinct perceptual effects.<sup>9</sup> Thus, agreement on principles of fairness (even unanimity) does not preclude substantial disagreement on perceptions of fairness. The potential gap between actual and perceived fairness may invite misrepresentation of fairness issues.<sup>10</sup> The author (1993) has argued with a simple illustrative model in which information is imperfect that one may observe a "mimicry" effect (to borrow a term from Frank, 1990), i.e., people may feign virtue or appeal to specious claims about fairness to promote their own interests (underscoring the importance of learning about "true" fairness). Indeed, concern that a personal stake in the outcome might introduce a mimicry effect bias in the results was one reason for the choice of a survey format and for the effort to make the situations evaluated as remote as possible from the narrowly defined personal interests of the subjects.

The theory and specific scenarios designed to test the theory of this paper evolved as products of *repeated induction*. That is, surveys prior to this one suggested hypotheses which led to pilot tests, then to revised hypotheses, then to revised surveys.<sup>11</sup> The evaluation and reevaluation of the theory and scenarios were based on the results of previously canvassed questions, on the author's intuition and on the unsolicited but nonetheless frequent supplemental remarks of respondents.

### 2.2. The surveys

In order to test the theory in differing contexts, subjects confronted a variety of unique scenarios. Also, contrasting versions of certain scenarios were posed which differed only in some crucial aspect (along the lines of KKT, 1986b). Other questions appeared in numerous similar versions which differed with respect to the magnitude of some parameter. Contrasting or similar versions of questions were never posed to the same subjects.

<sup>9</sup>Thus, fairness is seen not merely as a framing effect or a manifestation of expectations. Indeed, the observation that history and institutions (see Isaac et al., 1991) and expectations (see Franciosi et al., 1995) matter for reported fairness is, in the author's opinion, more a reflection of the importance of history, institutions and expectations for perceptual effects than for the underlying fairness values.

<sup>10</sup>Indeed, a large part of the low regard for fairness among some in the economics profession is surely due to the belief that fairness arguments are merely subterfuge for the furthering of self-interest. But, as Zajac, 1985 (p. 120) points out, "if the justice arguments are such transparent frauds, why are they advanced in the first place and why are they given serious attention?"

<sup>11</sup>Actually, the framework of the theory including the Accountability Principle and the entitlement formula initially emerged as an alternative interpretation of KKT's results (1986a,b) and without prior knowledge of equity theory or the other fairness survey literature.

The results reported in this paper are actually derived from two surveys: telephone interviews and written questionnaires.<sup>12</sup> In order to draw responses from a diverse group of individuals, telephone interviews were conducted with adults in the Los Angeles area. Although no single metropolitan area is necessarily representative of the country as a whole, Los Angeles is populous and its residents are arguably more representative of the even larger world population given the great cultural diversity and large immigrant community there.<sup>13</sup> 481 residents, 18 or older, of the Los Angeles area were contacted of whom 43% were male and 57% female.<sup>14</sup>

A written questionnaire was also administered to students at Loyola Marymount University (LMU) and was undertaken for two reasons. First, many questions involved scenarios which were too lengthy or too mathematical for most respondents to evaluate without a written presentation of the details. Second, group-administered surveys alone among data collection methods avoid, for all intents and purposes, the possible self-selection bias associated with nonrespondents.<sup>15</sup> In comparing the populations sampled here, the telephone interviews solicited the views of a more diverse group, but the demographic characteristics of the LMU student population are similar to those of Los Angeles area residents with the chief difference being age (e.g., the median age of the latter is about ten years greater). Responses were collected from a total of 1 570 mostly undergraduate students enrolled in courses from a wide variety of fields.

To examine possible differences in the sample populations in the two surveys, several questions were included in the written questionnaires which were identical or similar to ones in the telephone interviews and to ones in the KKT surveys. The striking consistency of results across these samples for identical or similarly phrased questions strengthens one's confidence in the universality of fairness values and in the interpretation of the responses presented here.

<sup>12</sup>Additional results from these surveys are reported in Konow (1995, 1996)). The telephone interviews included twenty unique questions, counting contrasting and similar versions, which were sorted into twelve versions consisting of five questions each which were posed in interviews lasting only about five minutes. The 47 questions (including contrasting and similar versions) on the written questionnaires were sorted into 29 versions of the survey consisting of three to eight questions per form depending on the length and complexity of the questions. Following verbal instructions from the administrators respondents were given ten minutes to complete the questionnaire.

<sup>13</sup>According to the 1990 census of Los Angeles county, one third of the almost nine million inhabitants were foreign born and over half of these entered the U.S. since 1980. In an effort to elicit responses from as many of the targeted subjects as possible, telephone interviews were conducted in eight languages: Arabic, Cantonese, English, Japanese, Korean, Mandarin, Russian and Spanish.

<sup>14</sup>Nonlisting of telephone numbers was addressed by the use of random digit dialing, and nonresponse was reduced by attempting to contact all subjects up to twelve times: four times during the day, four times in the evening and four times on weekends. When the responses of male and female subjects were weighted equally, it was found that none of the results was fundamentally affected: the same response was chosen by a majority and the statistical significance remained unchanged.

<sup>15</sup>A mailed questionnaire would have addressed the first problem of format complexity, but here also the ability to identify a satisfactorily random sample is compromised and such questionnaires tend to elicit notoriously low response rates (usually less than 30%, according to Fowler (1988)) raising the concern over self-selection bias. In contrast, administrator reports and enrollment records suggest near universal response to our survey among those classes surveyed. A third advantage of this format is the greater candor by respondents which is usually associated with this more anonymous method.

### 3. Fair's fair: the accountability principle

This section introduces some basic definitions and proposes a central principle of fairness upon which further analysis in the paper is built. To help illustrate the definitions and principle, they are presented parallel to a version of a simple scenario which served as a benchmark for numerous questions on both the telephone and written surveys.

The concern here is with the fair allocation of some economic variable which is desired by some individuals, for example, the quantity of bananas. Fairness is a relative concept, and it involves comparisons among *participants* to a relationship. Consider, for instance, the amount of bananas allocated to each of two persons shipwrecked on an otherwise uninhabited island. The set of participants among whom comparisons are made is called the *reference group*, and the natural choice here consists of the two castaways. The *entitlement* of participant *i* is defined as the "fair" quantity to allocate to *i*, for example, the fair quantity of bananas to allocate to one of the castaways.

Fairness is not only a relative concept but also a subjective valuation. The entitlement, therefore, depends on the view of an *observer*, or a person evaluating the fairness of a situation, for example, a survey respondent (or subject) considering a scenario involving the two castaways.<sup>16</sup> In evaluating the entitlement, an observer may consider the perceived *output*, or the production of the variable being allocated, e.g., bananas which have been collected for eating, and the participant's perceived *input* to this output, e.g., a measure of the castaway's contribution to the availability of bananas such as his productive time or the number of bananas he collects. A participant's input forms a basis for his perceived merit to receive some portion of the output in the observer's view. That is, the input of a participant affects his entitlement, here determining how worthy each of the castaways is to receive bananas.

In evaluating the entitlement, one considers relevant *discretionary variables*, or those variables which affect production or costs and which the participant can influence. For example, a castaway chooses his work effort so an observer can be expected to consider it a discretionary variable, and it is relevant since it should have an impact on the level of output. This is contrasted with *exogenous variables*, or those variables which the participant cannot reasonably influence. For example, a congenital condition, such as a missing hand of one castaway since birth, would be considered an exogenous variable.

A view of the relationship among the entitlement, discretionary variables and exogenous variables is expressed in the following principle.

**Accountability Principle:** *The entitlement varies in direct proportion to the value of the participant's relevant discretionary variables, ignoring other variables, but does not hold a participant accountable for differences in the values of exogenous variables.*

That is, *ceteris paribus*, the entitlement of a participant is proportionate to his relevant discretionary variables, relative to others. For example, a castaway who is twice as hardworking and efficient is, ignoring other variables, deserving of twice as many

<sup>16</sup>Nevertheless, differences across observers in their perceptions of variables relevant to fairness, while discussed in the following section, are not a subject of the formal model. Thus, the fact that the variables used represent an observer's perception is not reflected in the notation or always explicitly stated. Also, it is assumed throughout the paper that all of the allocable variable is distributed.

bananas. Nevertheless, the participant is neither rewarded nor punished for exogenous variables, even if they have an effect on output. For instance, a castaway with one hand who works as hard as but produces less than his two-handed counterpart deserves just as many bananas. In other words, this principle proposes that, for allocation purposes, participants only be held accountable for factors they can reasonably influence. Of course, what constitutes discretionary or exogenous variables may be subject to individual interpretation.<sup>17</sup> The results of this study suggest, however, that there exists considerable agreement on the classification of many variables and that the Accountability Principle is a view held by most observers most of the time.

Consider now version A of question 1 on the written questionnaire which is one manifestation of the castaway scenario.<sup>18</sup>

*1A.* Bob and John are identical in terms of physical and mental abilities. They become shipwrecked on an uninhabited island where the only food is bananas. They can collect as many bananas as they want by climbing up a tree, picking them before they fall into the ocean and throwing them into a pile. In this way Bob picks 12 bananas per day and John picks 8 per day. Bob takes from the pile the 12 bananas he picked leaving John with the 8 which John picked. Please rate this as:

Fair 74%      Unfair 26%       $N=76, p=0.001$

From a sample ( $N$ ) of 76, 74% of the respondents found this fair and 26% unfair. One can conclude that a majority (more than 50%) of the population (i.e., Los Angeles residents or, in this case, LMU students) would make the same choice (here "Fair") as the sample at the 0.001 level of significance ( $p$ ).<sup>19</sup> Results reported in this paper are characterized as significant if  $p \leq 0.05$ , that is, if the probability is 95% or greater that the answer selected by most sample respondents would be chosen by most of the population. Although they may generally differ, here the unit of output, bananas for eating, is the same as the natural choice for the unit of input, bananas picked. Bob and John are portrayed as equal in terms of the exogenous variables of innate abilities and visibly differ only with respect to the discretionary variable of picking activity. Thus, the entitlement allocates in proportion to the actual input of bananas picked and total output equals the total input, therefore the fair quantity of bananas to allocate to each equals the quantity picked by each.

<sup>17</sup>Some variables which are relevant, such as the impact of health on labor input, many contain both discretionary and exogenous components, e.g., the benefits of physical exercise and genetic predisposition to a certain state of health. On the other hand, the proper classification of many variables seems obvious to most observers. For example, work effort and self-initiated education lend themselves to consideration as discretionary variables while age, race and sex seem natural choices for exogenous variables.

<sup>18</sup>Version A of question 1 is denoted 1A. In this paper the numbering of questions from the written questionnaire is set in italic (e.g., 1A) and while that for questions from the telephone interviews is set in bold type (e.g., 2A).

<sup>19</sup>The level of significance results from the construction of a special test statistic for proportions and its comparison with one-tailed  $t$  values. For a discussion of the tests of proportions and differences in proportions employed in this paper, see Fleiss (1981) or Glasnapp and Poggio (1985). In the case of the written survey,  $p$  should be consumed with the following caveat: while an attempt was made to stratify appropriately the sample by drawing on a variety of LMU classes, available methods precluded the kind of formal algorithm for randomness employed in the telephone survey.

Consider version B of this question.

*1B.* Bob and John become shipwrecked on an uninhabited island where the only food is bananas. They can collect as many bananas as they want by climbing up a tree, picking them before they fall into the ocean and throwing them into a pile. Bob and John are identical in terms of physical and mental abilities except that Bob was born with one hand and John with two. Together they pick a total of 20 bananas per day, but because of his condition Bob picks fewer bananas per day than John. John takes 12 bananas from the pile leaving 8 for Bob.

Fair 19%      Unfair 81%       $N=78, p=0.001$

In question 1C the final sentence of 1B was changed to "John takes 10 bananas from the pile leaving 10 for Bob" which respondents evaluated as follows.

Fair 90%      Unfair 10%       $N=78, p=0.001$

In these questions Bob and John are identical, as far as the reader can see, with respect to discretionary variables; therefore equal allocations are fair. The same difference in allocation as question 1A is now judged unfair since a discrepancy in input is due here to an exogenous variable, i.e., a congenital condition, which should not matter. This interpretation of this scenario was repeatedly confirmed in other similar questions in both the written and telephone surveys including ones in which the ratio of actual inputs to outputs was explicitly equal.

It must be noted that as a subjective valuation the entitlement depends on the particular observer's information about, perceptions of and subjective preferences for the relevant variables. Moreover, the entitlement is intended for application to other allocated variables including other goods, utility, satisfaction, income, wage, wealth, revenue or price. Each of these represents a different standard of measurement, or *metric*, for the allocated variable. There are several senses, therefore, in which the entitlement may vary according to the observer and specifics of the scenario including perceived merit, choice of metric and choice of reference group.<sup>20</sup> These issues are taken up in greater detail in the following section.

#### 4. Subject interpretation and its effects

Subjects who are confronted with a specific scenario must resolve how to interpret the information provided, how the scenario relates to their own fairness values and how ultimately to respond. This section explores subject interpretation and its effects on responses.<sup>21</sup>

<sup>20</sup>Yet we observe that participants in the labor and other markets seem able to resolve these interpretative questions for themselves in a consistent and predictable manner and that their decisions have important implications for outcomes (see, for example, the discussions in Akerlof, 1982, Akerlof and Yellen, 1988).

<sup>21</sup>Much of the discussion in this section draws on results from additional survey questions which, for considerations of the length of the paper, are not reproduced here.

#### 4.1. Implicit assumptions

The results of this study suggest that information plays an important role in determining the extent to which, indeed whether, a situation will be judged fair or unfair. A scenario often does not contain all the information an observer might consider pertinent and, in fact, subjects sometimes expressed a desire for more information (which was never provided). In such cases, respondents made implicit assumptions about unknown variables. Changes in the *explicit* information can dramatically affect results through its influence on the *implicit* assumptions of the respondents. In particular, the answers and supplemental comments of subjects indicate that they, depending on the circumstances, take one of two approaches to coping with information gaps.

First, subjects may extrapolate from the facts provided to form assumptions about relevant variables. For example, additional survey questions identified subjects using information about a participant's occupation or location, which are not per se relevant to fairness, to form assumptions about its relative profitability, which is relevant. Second, when there is no reliable basis for extrapolation, respondents may make a *ceteris paribus* assumption about missing facts. That is, subjects will simply assume that the unknown variables about participants, say, their income or utility, are equal and that the only differences in data are those explicitly provided.

The fairness theory proposed here was found to be quite robust with respect to altered presentations of a given scenario and even to very different scenarios designed to test a given proposition. Nevertheless, perceived fairness can be very sensitive to changes in information which affects the implicit assumptions of the respondents. Question 2 from the telephone interviews underscores this point. Version A reads:

2A. Smith and Jones work in identical office jobs at a large company and have the same experience, seniority and past performance records. Smith gets paid \$800 per week while Jones gets paid \$400 per week.

Fair 6%      Unfair 94%       $N=123, p=0.001$

In version B the second sentence reads "Smith chooses to work 40 hours per week and gets paid \$800 while Jones chooses to work 20 hours per week and gets paid \$400" with the responses:

Fair 74%      Unfair 26%       $N=121, p=0.001$

In version A most respondents make the *ceteris paribus* assumption that the input of work hours (and all else) is the same, view entitlements as equal and judge the pay differential unfair. When a proportionate difference in voluntary work time, a discretionary input, is made explicit in version B, most find this fair.<sup>22</sup>

In version C of this question the second sentence of version A is replaced with "Jones, who has otherwise been healthy, worked half time last week because of doctor visits at which he found out he had a serious heart condition. Smith got paid the usual \$800 while

<sup>22</sup>When respondents are faced with a richer choice involving equal allocations, proportional allocations and an alternative intermediate to these two, direct proportionality continues to be chosen by a majority, in fact, by an even larger majority (see question 5 in Section 5.2).

the company paid Jones only \$400 because of the missed time" resulting in these responses:

Fair 36%      Unfair 64%       $N=98, p=0.005$

The majority swings back to unfair because here the difference in work time is due to a health condition which most respondents apparently view as exogenous.

This question illustrates that perceived fairness is sensitive to information but is not capricious. Indeed, this type of effect is not specific to *fairness*. One would expect similar fluctuations if economists were asked to evaluate the *efficiency* of scenarios in which the information varied similarly.<sup>23</sup> The roles of information and implicit assumptions are often encountered among the results reported below.

#### 4.2. Choice of metric

An important interpretative decision by the observer is the choice of the metric, i.e., whether to measure fairness in units of utility, satisfaction, income, goods, revenue, etc. Typically, the metric will seem obvious to most observers based on the context, as is usually the case when only one allocable variable is mentioned. At other times the observer must decide, based on the explicit or implicit possibility of more than one metric. With multiple possibilities, the choice of metric can be crucial if fairness measured in one variable, say the quantity of a good, leads to a different allocation from fairness measured in the other, say utility. This is illustrated below.

Question 1D asked subjects to evaluate the fairness of using satisfaction (or utility) over the quantity of a good.

1D. Bob and John become shipwrecked on an uninhabited island where the only food is bananas which simply fall at the rate of 22 per day to the ground. The two men are identical in terms of physical and mental abilities except that, even doing the same activities, Bob digests bananas faster than John and therefore needs 20% more bananas than John to feel just as full. Bob takes 12 bananas from the pile leaving 10 for John.

Fair 69%      Unfair 31%       $N=81, p=0.001$

Given the absence of any explicit difference in their discretionary variables, Bob and John have equal entitlements. This result supports satisfaction or utility, not the good, as the metric. The fair quantities of bananas are derived, of course, from the fair amounts of the relevant variable, utility.

In general, one would expect observers to deal with the choice of metric as they have been observed to deal with other informational problems: they use available information and estimate from it the value of missing variables using extrapolation or the *ceteris paribus* assumption. For example, one would expect, in the view of observers who value utility, that the utility functions of participants would be assumed the same unless some information suggests otherwise.

<sup>23</sup>For instance, imagine the probable responses to different versions of a question about the efficiency of a firm's pricing policy in which subjects are alternately told that the market in question is characterized by one seller, one seller who can perfectly price discriminate, few sellers and many sellers.

#### 4.3. Possible sources of dispersion

An effect of the lack of uniform subject interpretation is dispersion or differences across respondents in evaluating the fairness of a given situation. Of course, a theory, by definition, is not expected to explain all aspects of reality but, at best, only to capture its salient features. Moreover, the chief purpose of this paper is to present and defend a fairness theory which is characteristic of the views of a majority, not to investigate the sources and magnitudes of minority opinions. Nevertheless, it reveals something about fairness itself to consider briefly possible sources of dispersion, some obvious and some subtle, suggested by this study.

Some dispersion can be attributed to standard sources of error common to any empirical research, e.g., error due to subject mistakes, misunderstanding and carelessness. Some subjects may also simply have an undeveloped or underdeveloped sense of fairness (in the sense shared by the majority). This could lead to an inability to evaluate fairness or to a tendency to associate it incorrectly with certain states. For example, one respondent, who selected the response of the minority to a question, commented "It's fair because it's efficient," failing to distinguish the two.

In addition, one result indicated that respondents might deny a premise which was explicitly to be taken as given in evaluating the scenario. Consider question 3:

3. Jane has baked 6 pies to give to her two friends, Ann and Betty, who do not know each other. Lately Ann has been down on her luck while Betty has enjoyed good fortune. Therefore, it would take 4 pies to make Ann as happy as Betty is with 2 pies. In distributing the pies what is fairer:

- |    |                                  |     |
|----|----------------------------------|-----|
| A. | 2 pies to Ann and 4 to Betty, or | 0%  |
| B. | 4 pies to Ann and 2 to Betty, or | 47% |
| C. | 3 pies to each?                  | 53% |

$N=226, p=.2$

Part B is consistent with the choice of satisfaction or happiness which, as suggested by question 1D above, should be preferred as the metric over the good (part C). Nevertheless, in statistical terms, the two are tied here. One possible explanation was provided by a respondent who, in choosing part C, commented "We all know that food is no way to happiness," presumably as a reflection of concern for eating disorders. This suggests that respondents may deny a premise (in this case, that food makes happy) while perhaps agreeing with the notion of fairness in utility.

As discussed previously, incomplete information may also lead subjects to different conclusions because of differing implicit assumptions, for example, about whether certain variables are discretionary or exogenous. The greater the potential for differing implicit assumptions, the less uniformity one would generally expect in the responses.<sup>24</sup> When the source of an inequality in allocation is more forcefully identified as being exogenous, however, the opposition to such an inequity is nearly uniform. Even in these cases,

<sup>24</sup>For instance, question 2A explicitly portrays Smith and Jones as equal and only a small minority of respondents (6%) appears to conceive of an unstated difference in their discretionary variables which could justify their pay differential. On the other hand, six times as many respondents (36%) dissent from the majority view in question 2C in which one can easily imagine that Jones bears some responsibility for the heart condition (perhaps through lack of exercise or poor diet) which results in his pay cut.

though, a few dissenting views surface. Questions 4A and 4B help illustrate these points and their probable source.

- 4A. A small company employs both men and women but the women are paid on average about 80% of what the men are paid.
- |         |            |                  |
|---------|------------|------------------|
| Fair 5% | Unfair 95% | $N=111, p=0.001$ |
|---------|------------|------------------|

This was followed up by the question:

Do you think that men on average contribute more in the workplace than women?

The initial and follow-up questions in version B were identical except for the substitution of "white" for "men" and "black" for "women" with the responses:

- |         |            |                  |
|---------|------------|------------------|
| Fair 1% | Unfair 99% | $N=112, p=0.001$ |
|---------|------------|------------------|

Respondents were nearly unanimous in viewing these as unfair, consistent with categorizing sex and race as exogenous variables but in contrast to the significant disparity in earnings among these groups in the real world. This opinion held in spite of the fact that 17% (23%) of those who answered "unfair" felt that men (whites) do contribute more in the workplace. These results underscore the importance when determining entitlements of ignoring exogenous variables even when they are associated with differences in inputs.<sup>25</sup>

Another possible source of dispersion is what I term *threshold effects*. These have to do with the fact that when evaluating the fairness of a situation, observers allow some slack between actual allocations and their idealized standard of fairness. When such discrepancies exist, differences across respondents in their tolerance for such deviations may account for additional dispersion in responses. These threshold effects may be grouped into two categories.

First, the "threshold for unfairness" is related to variations in the size of the deviation of an actual allocation from the entitlement holding constant values of exogenous variables. Additional survey questions found 1) the percentage of unfair responses (not surprisingly) increasing with the deviation of the actual from the fair amount, 2) more people rating a negative deviation as unfair than a positive deviation when both deviations are portrayed in the same manner, and 3) a more than proportionate increase in unfair responses when actual allocations are not only below the entitlement but below costs.<sup>26</sup> Second, the "threshold for fairness" relates to variations in the size of exogenous variables across participants holding constant actual allocations. The Accountability Principle embedded in the entitlement formula calls for a strong approach: the complete disregard of exogenous variables. This view garners substantial support from numerous results here. Additional questions found, however, that an ever diminishing majority is vigorously willing to apply this strict standard of fairness when it is increasingly at

<sup>25</sup>An interesting anecdote, however, is that one half (all) of those who found the earnings differential fair felt that men (whites) do contribute more in the workplace. This higher percentage probably suggests the view by these respondents that women (blacks) are on average less meritorious in some manner of their own doing. At the other extreme, some people may always view all variables as exogenous, none as discretionary, and support perfect equality of outcomes. Such is apparently the case among those few who advocate perfect equality of income regardless of variables such as work effort which most view as discretionary (see Arts et al., 1991).

<sup>26</sup>See also Jasso (1990) for additional analysis of the degree of perceived fairness.



variance with allocations associated with exogenous variables, i.e., as the importance of exogenous variables grows. Nevertheless, the Accountability Principle was quite robust with a significant majority maintaining support for it even when exogenous variables played a very large role.

Finally, it appears that in reaching judgments about what to call fair, people may draw not only on accountability but also, under certain circumstances, altruism (or needs) and efficiency. Differences across individuals in the weight they place on accountability versus these other principles may also lead to dispersion. This view is discussed at greater length in Section 6.

## 5. A specification for the entitlement

In this section, a formula for the entitlement is proposed which gives flesh to the Accountability Principle introduced in Section 4 by suggesting an application to endowments, production and costs. This formula is intended as a didactic and mnemonic tool and consists of three terms. To motivate the entitlement formula and to demonstrate its consistency with the data, we return below to the case of our two castaways, Bob and John.<sup>27</sup> The castaway paradigm is supplemented by other scenarios in order to verify the generality of certain claims and to test more specific propositions.

### 5.1. The endowment term

The first term in the entitlement formula is the endowment term. Participant  $i$ 's allocation endowment, or simply endowment, denoted  $e_i$ , is his portion of the allocated variable which is unrelated to any productive or merit-based activity. For example, the allocation endowment includes any bananas which just happen to fall from a tree into a castaway's possession. Since the endowment is, by definition, unrelated to any discretionary variables of the participants, it is, therefore, exogenous. Applying the Accountability Principle to the endowment such that one "does not hold a participant accountable for differences in the values of exogenous variables" means that each participant should receive an equal fraction of the total endowment in the reference group regardless of each participant's personal endowment. That is, the endowment term of the entitlement formula proposes that each participant receive

$$\frac{\sum_{i=1}^n e_i}{n}$$

where  $\sum_{i=1}^n e_i$  is the total endowment of the allocated variable and  $n$  is the number of participants in the reference group.

Questions *IE* and *IF* focused on this term of the entitlement formula assuming that no production is possible.

<sup>27</sup>This simple example was chosen to minimize the potential for framing effects, unanticipated implicit assumptions and considerations of third parties. In addition, all the terms of the formula in this example are denominated in a single variable, bananas. If that were not the case, an evaluation could only take place if observers converted the various terms to a common metric (e.g., utility).

*IE*. Bob and John...[as question *IA*]...only food is the bananas which fall from the only two banana trees on the island. Bob and John are unequipped to pick any additional bananas. 12 bananas per day fall from the tree under which Bob happens to sit while 8 bananas per day fall from the tree under which John happens to sit. They collect the bananas which fall from the trees and put them in a pile. Bob takes from the pile 12 bananas leaving John with 8.

Fair 28%      Unfair 72%       $N=115, p=0.001$

Question *IF* was identical except for the final sentence which read "Bob takes from the pile 10 bananas leaving John with 10" which most subjects judged fair:

Fair 94%      Unfair 6%       $N=119, p=0.001$

Most respondents opposed different individual allocations and favored equal division of the total endowment in support of the endowment term.<sup>28</sup>

### 5.2. The production term

The second term of the entitlement formula refers to the perceived output or that portion of the allocated variable which is produced. For instance, the output in the castaway example is the bananas which are picked from the trees. The output of participant  $i$  for contributing to production, the bananas he generates through his climbing and picking, is denoted  $q_i$ . The fair costs, if any, borne by  $i$  for his contribution to production are denoted  $c_i$ . For example, these costs may be the incremental bananas a castaway consumes because of the additional energy expended in climbing trees and picking bananas (fair costs are discussed in greater detail in Section 5.3). Thus, the output net of fair costs for  $i$  equals  $q_i - c_i$  and for the group equals  $\sum_{i=1}^n (q_i - c_i)$ .

The production term relates the fair allocation of this total output net of costs to the perceived input. In the view of an observer,  $i$ 's input,  $x_i$ , is a measure of his contribution to output and may, in the current scenario, be thought of as the bananas picked by  $i$ . The Accountability Principle calls for the entitlement to vary "in direct proportion to the value of the participant's relevant discretionary variables, ignoring other variables." That is, the output net of fair costs should be allocated in proportion to the discretionary component of the participant's input, for example, in proportion to productive work effort. Nevertheless, the input is also a function,  $x_i(\varepsilon_i)$ , of a participant's resource endowment,  $\varepsilon_i$ . The latter (not to be confused with the allocation endowment,  $e_i$ ) consists of exogenous personal resources of  $i$ , both human and physical, relevant to the production of the allocated variable, for instance,  $i$ 's innate climbing, picking and sorting skills. These, according to the Accountability Principle, should not affect a participant's allocation.

<sup>28</sup>Note, however, that if the perceived metric is the participants' satisfaction or utility, the accountability principle is applied not to the good but to the objective functions from which fair allocations of the good are then derived. Thus, the endowment term does not necessarily imply equal allocations of goods or income. In particular, suppose the objective (call them utility) functions of participants are viewed as incorporating an "endowment effect" (Thaler, 1980) whereby objects in their possession are valued more highly than those not already in their possession. In that case, observers might view an unequal status quo as fairer than a redistribution which generates more dramatic (and reversed) inequalities in participants' utilities.

Thus, we define an adjusted input,  $\hat{x}_i$ , which excises the exogenous component and isolates the discretionary component of the input for participant  $i$ .<sup>29</sup> Then  $i$ 's contribution to production, adjusted for exogenous factors, relative to that of all participants is  $\hat{x}_i / \sum_{i=1}^n \hat{x}_i$ . This fraction is equal to the ratio of his adjusted input to the sum of the adjusted inputs of all participants and is a measure of  $i$ 's relative merit to receive the output. The production term of the entitlement formula proposes that  $i$  receive this fraction of the total output net of fair costs or:

$$\frac{\hat{x}_i}{\sum_{i=1}^n \hat{x}_i} \cdot \sum_{i=1}^n (q_i - c_i).$$

Thus, when Bob and John have equal resource endowments in question 1A, their inputs need not be adjusted and their fair allocations are in proportion to their unadjusted inputs. If Bob, however, due to a congenital condition, has only one hand, he is unable, with the same time and effort as John, to harvest as many bananas. Hence, their adjusted inputs are equal and, assuming equal fair costs, Bob is entitled to an equal number of bananas consistent with the results of 1B and 1C.

Question 5 provides a different test of the production term in which the allocated variable is income and the input is labor time. With no explicit differences in costs or resource endowments, this question examines somewhat more precisely to what extent entitlements vary with inputs.

5. Bill and Sam manage a small grocery store at different times and on different days. The manager's duties are always the same and the days and times which each work vary pretty much randomly, but Bill works 40 hours per week while Sam works 20 hours per week. Suppose the manager's salary for a 60 hour week is \$1200. Which of the following is the most fair division of this salary?

- |    |                                     |     |
|----|-------------------------------------|-----|
| A. | Bill gets \$600 and Sam gets \$600. | 2%  |
| B. | Bill gets \$700 and Sam gets \$500. | 13% |
| C. | Bill gets \$800 and Sam gets \$400. | 85% |
- $N=295, p=0.001$

These results strongly support the proposition that, with no explicit role for exogenous variables, the ratio of fair allocations exactly equals the ratio of inputs.

### 5.3. The fair costs term

Third term of the entitlement formula (and a variable in the production term above) is fair costs,  $c_i$ . These are costs of production for which it is fair, in the view of the observer, to compensate the participant. Identifying fair costs precisely turns out to be a more

<sup>29</sup>One (but by no means the only) way to think of  $\hat{x}_i$  is the following. Define the value perceived by the observer of  $i$ 's input if  $i$  had another participant's, say  $j$ 's, resource endowment,  $x_j(\varepsilon_j)$ . If, in this manner,  $i$  is "put in the shoes of" all other participants in his reference group and his input is averaged, we find an input of  $\hat{x}_i = \sum_{j=1}^n x_j(\varepsilon_j)/n$  which adjusts for the effects of resource endowments. For example, this could be the average of what one-handed Bob in questions 1B and 1C would contribute to banana production if put not only in his own shoes but also in those of two-handed John.

complicated task. There is ample evidence from prior surveys, however, of what fair costs are not: opportunity costs. For example, question 10 of KKT (1986b) reads:

A grocery store has several months supply of peanut butter in stock which it has on the shelves and in the storeroom. The owner hears that the wholesale price of peanut butter has increased and immediately raises the price on the current stock of peanut butter.

79% of the 147 telephone respondents to this question found this price change unfair although it is consistent with a change in opportunity costs.<sup>30</sup>

If fair costs are not opportunity costs, are they costs incurred? This hypothesis seems to gain qualified support from two versions of question 6 in my telephone survey which both began - "Suppose numerous companies sell dishwashing liquid at an average price of \$2.00 a bottle" and continued as follows.

6A. Acme Soap Company sells its dishwashing liquid at \$2.50 a bottle which reflects the higher local business taxes where it produces.

Fair 54%      Unfair 46%       $N=107, p=0.25$

6B. The Acme Soap Company could sell its dishwashing liquid at \$1.50 a bottle and still make the same profit as the other companies because of a local government subsidy where it produces. Acme sells its dishwashing liquid at \$2.00 a bottle.

Fair 41%      Unfair 59%       $N=105, p=0.05$

Versions C and D of this same question, however, appear to contradict this hypothesis. They continued as follows.

6C. Acme Soap Company sells its dishwashing liquid at \$2.50 a bottle which reflects the higher production costs due to Acme's failure to modernize its machinery.

Fair 40%      Unfair 60%       $N=117, p=0.001$

6D. The Acme Soap Company could sell its dishwashing liquid at \$1.50 a bottle and still make the same profit as the other companies because it has invented a more efficient way of making soap. Acme sells its dishwashing liquid at \$2.00 a bottle.

Fair 54%      Unfair 46%       $N=118, p=0.2$

Although the absolute responses to 6A and 6D are not significant at the 5 percent level, one may infer that a deviation in the entitlement from that of others in the reference group due to a difference in costs incurred is more fair if that cost difference is due to exogenous but not discretionary variables. That is, in versions A and B Acme Soap Company's cost difference is given (short of its relocating), while versions C and D imply Acme's own responsibility for the cost difference. Therefore, there is a statistically significant

<sup>30</sup>This was confirmed in various other scenarios; see also questions 1, 2A, 4A, 5A, 9A, 12 and 15 of the same paper. On the other hand, opportunity costs may influence or help define fair costs. For example, results of Ng (1988) from a question about restaurant pricing suggest that survey respondents may be swayed by economic arguments regarding efficiency and opportunity costs (which in his vignette are also partially consistent with fairness values discussed in this paper). Nevertheless, Ng's extensive and cogent arguments never succeed in persuading a clear majority of adult non-economists of the fairness of a price increase due to increased opportunity costs with constant incurred costs.

difference in the fairness of the higher price between versions A and C ( $p=0.001$ ) and of the lower price in versions B and D ( $p=0.001$ ) even though respondents are at times ambivalent (in statistical terms) about the fairness of the absolute prices. Thus, the fair cost sword cuts both ways: a firm may either benefit or suffer from cost differences in accordance with the Accountability Principle.

In the spirit of accountability for discretionary variables, a participant should not be compensated for voluntary "inefficiencies" in production, as suggested by version G of the castaway question.

IG. Bob and John...[as question 1B]...into a pile. The two men are identical in terms of physical and mental abilities except that Bob takes 5 hours to pick the bananas while John takes 4 hours because Bob chooses to work at a slower pace. Nevertheless, they pick 9 bananas each for a total of 18. Bob takes 10 bananas from the pile leaving 8 for John.

Fair 24%      Unfair 76%       $N=80, p=0.001$

The input chosen, bananas picked, is calibrated according to its contribution to production which, in this case, is the same for both. Thus, the production term allocates equal amounts. Turning to the fair costs term, Bob works longer than John, but this additional time cost is not compensated since it is due to Bob's discretionary choice to work more slowly. Thus, entitlements here are equal and the disparity in allocation is unfair.

Questions 7A and 7B are concerned with the fair burden of costs in the context of a classic externality problem.

7A. Two firms await the decision of a court on a disagreement between them. Without a pollution control device, a chemical factory discharges waste into a river. With the \$1000 device, the waste may be eliminated altogether. There is a brewery downstream which uses the river water. If the chemical factory does not use the pollution control device, the brewery incurs a cost of \$500 to filter the water it uses from the river. Suppose the court decides the chemical factory has the rights to the river and, therefore, that it is the responsibility of the brewery to filter the water or to pay the chemical factory to use the pollution control device.

Fair 20%      Unfair 80%       $N=240, p=0.001$

Version B of this question was identical except for the last sentence which read "Suppose the court decides the brewery has the rights to the river and, therefore, that it is the responsibility of the chemical factory to use its device or to pay the brewery to use its filter" and was judged:

Fair 84%      Unfair 16%       $N=219, p=0.001$

This example illustrates that, even though the Coase Theorem might apply such that the assignment of property rights does not matter for purposes of efficiency, it matters very much for purposes of fairness. In the spirit of assigning responsibility for discretionary variables, these results suggest that the emitter is obliged to bear all costs associated with its production, even when the costs to it of eliminating the externality are higher if it turns out side payments are not arranged, but that the emitter is then permitted to include these in its fair costs. If, however, these costs are borne by another, then the

assignment of costs consistent with the Accountability Principle is that only the bearer is entitled to incorporate these incurred costs into its fair costs.

#### 5.4. The entitlement formula

The entitlement formula combines in additive form the endowment, production and fair cost terms and for participant  $i$  equals:

$$\frac{\sum_{i=1}^n e_i}{n} + \frac{\hat{x}_i}{\sum_{i=1}^n \hat{x}_i} \cdot \sum_{i=1}^n (q_i - c_i) + c_i.$$

As follows from the discussion of the individual terms, this formula represents an application of the Accountability Principle to the allocation endowment and to the costs and benefits associated with production.<sup>31</sup> Most of the survey questions reported thus far focused on a single term of the entitlement formula at a time. Now we turn to joint tests of multiple terms of the formula. These questions, however, were never directed at more than two terms of the formula at a time in order not to strain the patience of respondents.<sup>32</sup>

Question 1H examined jointly the first and second terms of the formula under the implicit assumption of zero costs, and 62% of respondents chose "Fair" over "Unfair" in evaluating an unequal allocation which was consistent with the formula ( $N=78, p=0.025$ ). This question was offered in several different forms in order to examine the sensitivity of the results to slight changes in presentation or wording. The consistency of the responses across different versions was remarkable. Question 1I asked subjects to consider the scenario in 1H, to compare the allocation in 1H with two others and to choose the fairest of the three.

II. Bob and John...[as question 1A]...only food is bananas. 10 bananas per day fall to their feet on land while others fall into the ocean. They can collect...[as question 1A]...into a pile. In this way Bob picks 7 bananas per day and John picks 3 per day. Thus, there are a total of 20 bananas per day on the island. If you could decide the distribution of bananas and wanted to be fair, which of the following would you choose?

- Bob gets 10 bananas, the 7 that he picked plus 3 which fell, and John gets 10, the 3 which he picked plus 7 which fell. 33%
- Bob gets 12 bananas, the 7 that he picked plus 5 which fell, and John gets 8, the 3 which he picked plus 5 which fell. 61%
- Bob gets 14 bananas, the 7 that he picked plus 7 which fell, and John gets 6, the 3 which he picked plus 3 which fell. 6%

$N=206, p=0.005$

<sup>31</sup>It turns out that this formula is equivalent to certain well-known formulae in the aforementioned equity theory literature when  $n=2$ ,  $e_1=e_2=0$ ,  $\varepsilon_1=\varepsilon_2$  and, in the case of Adams (1965),  $c_1=c_2=0$ , or, in the case of Walster et al. (1978),  $c_1=\hat{x}_1$  and  $c_2=\hat{x}_2$ .

<sup>32</sup>As reported below, tests of the entitlement formula sometimes seem to yield higher percentages in support of the hypothesis when the questions address a single rather than multiple terms of the formula. While the responses to all of these simultaneous tests are highly significant with a substantial majority of respondents always in agreement, subject comments suggest a possible reason for this effect: the simultaneous presentations taxed the attention or patience of a larger minority of respondents who then tended to choose randomly or to select the most naive answer (usually equal allocations).

Distribution A is completely egalitarian and recognizes no role for input to production, B is predicted by the entitlement formula and C suggests a rule of proportionality be applied to all rewards.<sup>33</sup>

Question 11 omits the endowment term and examines the production and fair costs terms.

11. Bob and John... [as question 1A]... only food is the produce of two banana trees. They can collect... [as question 1A]... into a pile. If they could avoid working, they would both need the same amount of bananas to maintain a healthy diet. The additional energy expended working, however, causes Bob to burn up 2 more bananas per day than if he did not work. The same amount of picking causes John to burn up 4 additional bananas per day because the bananas on his tree are more difficult to reach. Working the same number of hours Bob and John pick 22 bananas per day. John takes 12 bananas from the pile leaving 10 for Bob.  
Fair 75%      Unfair 25%       $N=77, p=0.001$

To all appearances, the castaways' relevant inputs are the same, earning them equal amounts of the output net of fair costs. John's fair costs of production, however, are higher than Bob's by two since bananas from his tree are more difficult to harvest, a fact he presumably cannot influence. The fair allocation, therefore, gives two more to John than to Bob. From these questions we see that the distribution suggested by the entitlement formula is chosen by a statistically significant majority of the population and is consistently confirmed in differing versions.

## 6. Conclusions

This paper sought to propose and provide empirical support for a positive theory of distributive justice based on accountability as applied to a single, sufficiently divisible economic variable. I conclude with a few thoughts and a little evidence about the limits of the current model and how a more general ethical theory might be constructed.

First, the model should be extended to multiple and insufficiently divisible variables. The generalization to multiple variables (e.g., multiple allocated variables, multiple time periods and multiple states) might be accomplished within the current framework by evaluating fairness using a common metric such as expected discounted utility. The extension to insufficiently divisible or differentiated variables (e.g., unique antiques or office spaces of differing qualities) might be achieved through a kind of "second best" approach to fairness.

Second, the theory might be broadened beyond accountability to incorporate additional principles. Based on evidence from these surveys as well as the research of others (for

<sup>33</sup>Part C seems to be implied by some of the "equity theory" literature. The results for question 11 reported here actually come from two almost identically worded questions: the one stated here and another which combined the first and fifth sentences of this question into "Bob and John are identical in terms of physical and mental abilities, but Bob chooses to pick 7 bananas per day and John chooses to pick 3 per day." Answer B was selected by 61% of respondents ( $N=143$ ) in the former version and by 62% ( $N=63$ ) in the latter version.

example, Elster (1989, 1992), Yaari and Bar-Hillel, 1984, Zajac, 1985), I believe that a more general theory can be constructed on three potentially conflicting principles: (1) accountability, (2) altruism (or needs) and (3) efficiency. While the Accountability Principle is viewed here as enjoying broad applicability, evidence suggests that altruism and efficiency may sometimes have an impact on (and perhaps even dominate) notions of justice.<sup>34</sup> Altruism is thought of here as a selfless concern for the allocation of others which becomes particularly acute when their basic needs are threatened. The impact of efficiency on fairness judgments is revealed by question 8 from the telephone survey.

8A. Tom and Sam both work in a grocery store. They have the same qualifications and work performance. The grocery store pays Tom more than Sam.  
Fair 14%      Unfair 86%       $N=104, p=0.001$

Versions B and D of this question appeal to efficiency reasons for the pay differential while version C attributes it solely to a physical difference between the two workers. In all four cases a statistically significant majority of 65-85% of respondents judged a pay differential unfair. Nevertheless, there was a highly significant increase in the percentage of fair responses when statements about efficiency, as opposed to personal characteristics, were introduced. Additional questions, which attempted to pin down this efficiency concern, suggest that people are willing to trade off not only Pareto efficiency but the Hicks-Kaldor efficiency which favors redistributions, including ones which generate losers, as long as gains outweigh losses overall. These results suggest, however, that efficiency may sway, but not necessarily dominate, fairness views.

Finally, a further step toward generalizing ethical theory is to go beyond merely characterizing the *values*, with which the entire preceding discussion has been concerned, to an analysis of *norms*. The distinction I wish to draw here is between moral preferences, or values, and social rules of conduct, or norms, which may utilize the values, for example, fairness may serve as a standard in reciprocity.<sup>35</sup> Thus, when allocations are related to personal interaction, we often expect Person A to be more (or less) than "fair" to Person B when B is more (or less) than fair to A. It may be that the most significant economic impact of fairness is due, not to its existence per se as a value, but to its status in matters of reciprocity.

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<sup>34</sup>These three principles coincide with the three ethical concerns which Frohlich and Oppenheimer (1992, 1994) identify from considerable experimentation into preferences for just distributions of income. In Konow (1993, 1996), it is argued that people tend to focus on accountability except when attention is shifted to one of the other principles due to its extreme scarcity.

<sup>35</sup>This is close to Hirschleifer's *affections vs. passions* (Hirschleifer, 1993). Rabin (1993), in fact, formulates an insightful model of reciprocity.

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