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# Perceptions of Fairness and Allocation Systems

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**Abstract:** This paper explores the conditions of acceptability of differing allocation systems under scarcity and evaluates what makes a price system more or less fair. We find that fairness in an allocation arrangement depend on the institutional settings inherent in the situation, such as information, transparency and competition and the perceived institutional quality (e.g., fiscal exchange and institutional trust). Results also indicate that the solution “weak people first” is seen as the fairest approach to an excess demand situation, followed by “first come, first serve”, the price system and an auction system. On the other hand, a random procedure or an allocation through the government is not perceived to be fair. Moreover, economics students seemed to be less sceptical towards the price system than other subjects although we observe that female students are more sceptical than male students.

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*“When a dish in short supply is shared at a polite dinner party, there is seldom any verbal dispute. If things go well, the dish gets divided without any verbal dispute. If things go well, the dish gets divided without any discussion or intervention by the host. When questioned, everybody will agree that each person should take his fair share (...) What is judged to be fair according to our current standards of morality depends on a complex combination of contingent circumstances – such as who is fat and who dislikes cheese. Moreover, if we observe what actually happens, rather than what people say should happen, we will find that it also depends on how each person at the table fits into the social pecking order. Woe betide the poor relative sitting at the table on sufferance in the last century who helped himself to an over-generous portion of his favourite dish”*

Binmore (1998, p. 275)

## I. INTRODUCTION

Economists have long believed that the central objectives of economics have been to solve issues of scarcity and efficiency, through the analysis of how society makes choices concerning the use of its limited resources (Stiglitz 1988). To achieve these goals economists have relied on the traditional homo economicus model, where through the pursuit of their own self interest individuals will achieve utility and efficiency maximization of the resources available. While this theory holds in many situations, recent evidence shows that individuals do not always make decisions based upon their own self benefit. It has been shown that motives such as altruism, fairness, or morality affect the behaviour of many individuals. Fairness has for a long time been considered of no relevance for economic analysis, however the relevance of fairness has been discussed in many other research areas, such as aspects of justice (Rawls 1972, Baumol 1986, Buchanan 1975, Sen 1987). Baumol (1986, pp. 1-2) states “... that issues of fairness are often more to the point than the literature of welfare economics seems to suggest (...) [and] economists’ reluctance to deal with these issues is not a reasoned response to an analysis of the problem, but a reflection of their inability until recently to get any analytic handle upon issues of justice in economic decision”. Singer (1999) argues that the normative concept of justice has been operationalised in the empirical literature as fairness. The economic justice is caught between two competing values of culture: individualism based on a rational agent and

egalitarianism, where the agent is motivated by a concern for justice and a sense of equality. However, this view disregards Smith's (1790) concept of sympathy, where Smith recognises more motives than that of pure self interest by indicating that sympathy is a cornerstone of individual behaviour. He states: "How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it" (Smith 1790, p. 9). Sally (2000) furthers this line of reasoning to show a connection between sympathy and strategy, by arguing that strategic interdependency and social interaction are intimately linked. Sympathy guides strategy formulation and is generated by social interaction, as "rational players must create mental models of other participants and this act of modelling naturally narrows psychological distance and creates fellow-feeling ... In addition, if common knowledge is to be part of the structure of a game, then the creation of such mutual understanding will affect the fellow-feeling among the players and may alter their basic actions" (Sally 2000, p. 3).

Closely related theories have been analysed, such as: altruism, extreme altruism (self sacrifice), cognitive dissonance, fairness, helping behaviour, punishment and reciprocity (see e.g. Becker 1981, Batson 1992, Camerer et al. 2004, Coleman 1990, Elster 1989a, 1985, 1996, 2006, 2007, Fehr et al. 2002, Fehr and Fischbacher 2003, Frey, Savage and Torgler, 2010a, 2010b, Henrich, 2004, Kahneman, Knetsch, and Thaler 1986a, Krebs 1991, Piliavin and Charng 1990, Schlicht, 1984). Tyler (1997) analyses why people obey the law stressing the relevance of fair procedures to enhance law obedience. Tyler and Smith (1998) state: "Studies show that judgments about what is "just", "fair", or "deserved" are central social judgments that lie at the heart of people's feeling, attitudes, and behaviours in their interactions with others" (Tyler and Smith 1998, p. 595). Among the most common ways to analyse fairness are natural experiments (Kahneman et al. 1986a) and laboratory experiments (Fehr and Kirchsteiger 1994, Rabin 1993). People seem to be motivated by putting into account fair and equitable allocations (Dawes and Thaler 1988). Kahneman et al. (1986a) analyse how fairness affects market behaviour.

Deutch (1975) identified three of the core principles that underlie many of the issues of distributional fairness, which included: equity, equality and need. Such that equity outcomes are directly proportional to inputs, equality outcomes are distributed equally, and needs based outcomes are allocated on the basis of those in greatest need are the first supplied (Bazerman et

al. 1995). This would indicate that situational factors have a very important role in determining a needs based allocation, leading to a welfare based outcome, where as equity is more in line with traditional economic rational and equality as more socially derived. The equity theory is one of the first models of distributive justice (Adams 1965). Tyler and Smith (1998) argue that the equity theory is important because it hypothesises that satisfaction and behaviour are linked not only to the objective outcome levels, but also to outcomes received in relation to those which were judged to be fair. Disadvantage in such a situation can create anger and advantage feelings of guilt (Adams 1965, Homans 1961).

Fairness is not restricted to personal interactions. It influences the behaviour of individuals in important economic and political domains as, e.g., tax payments (Spicer and Becker, 1980; Spicer and Lundstedt 1976, Song and Yarbrough 1978, Torgler 2007). The relationship between taxpayers and the government can be viewed as an exchange relationship. A lack of equity between taxpayer's own exchange and those of others creates a sense of distress. People will engage in behaviours such as tax evasion, designed to restore equity. Baumol (1986, p. 9) mentions an illustrative old example. How can we assure that two people divide a cake fairly? One way is that one person cuts the cake into two parts and the other then chooses. As Baumol states, this game can be expanded by introducing more individuals or more than one product. If the cake is not homogeneous and the individuals' tastes are not identical "superfairness" may arise. It is the case when, e.g., the cutter judges the two pieces of the cake to be equal and the chooser does not. The cutters will on the one hand divide what he/she believes is half of the cake and the chooser on the other hand might obtain in his view more than half of it. Similar to this game, distribution justice has also been analysed in experiments. Güth et al. (1982) first introduced the ultimatum bargaining game and argue that "subjects often rely on what they consider a fair or justified result. Furthermore, the ultimatum aspect cannot be completely exploited since subjects do not hesitate to punish if their opponent asks for "too much" (Güth et al. 1982, p. 384). Ultimatum experiments have shown that in many experiments the modal offer is (50,50), the mean offer somewhere around (40,60), and the smaller the offer the higher the probability that the offer is rejected. Ochs and Roth (Ochs and Roth 1989, Roth 1995) argue that it is not necessary to state that players try to be fair. Instead it is enough to suppose that they estimate the utilities of the players they are bargaining with. While individuals may have a clear concept about what is fair and may influence their strategic play, the individual

will adapt their ideas of fairness in response to experience and interactions with others: "... although the strategic environment is influenced by ideas about fairness, ideas about fairness are influenced by the strategic environment" (Roth 1995, p. 271). Another aspect of this game which focused on reciprocity, where the idea is that players cared about the intention of their opponents, such that players help those who have helped them and punish those who have hurt them (Fehr, Fischbacher, and Gächter 2002, Henrich 2004, Oberholzer-Gee 2007).

Previous studies have explored the link between fairness and shortage using survey data. In telephone surveys of randomly selected residents of two Canadian metropolitan areas, Kahneman et al. (1986a) has shown that people consider the use of prices to eliminate the excess of demand to be unfair. This is consistent with the observation that firms do not adjust prices and wages as often as traditional economic theory would suggest. Moreover, we also observe formal laws that penalize vendors who take advantage of shortages by increasing prices for water, fuel and other necessities after a natural disaster (Camerer, Loewenstein, and Rabin 2004). Frey et al. (2010a, 2010b) on the other hand, explore behavioural consequences of excess demand in life-and-death situations observing that fairness and social norms can arise during such events.

The intention of this paper is to investigate the perceived fairness of differing allocation system upon a scarce resource to see if the aspects of fairness do indeed shape perceptions of individuals. To these ends we utilize the responses of 93 students to varying allocation systems to rank and evaluate the fairest allocation systems. Section II discusses the data collected via the survey and presents the primary questions and hypotheses associated with each. Section III presents the empirical results and some discussion in relation to other findings. Section IV provides a comparative analysis of all the differing allocation systems and finally Section V draws some concluding remarks.

## II. SURVEY & DATA

For the purposes of this analysis we use a survey of 93 economics students in the third semester undertaken at the University of Basel in 2001. This survey was aimed at shedding light on the individual's perception of the relative fairness of differing allocation systems when confronted with an *excess demand* situation, with several situational treatments. The questionnaire is very similar to one used by Frey and Pommerehne (1988, 1993). In contrast to their household survey

carried out in Switzerland (canton of Zurich) and Germany (Berlin) covering the general population, our study focuses on the opinion of students. This has the advantage of working with a homogeneous subject pool. The questionnaire included also a range of basic information (e.g., age, gender, whether economics is their major, whether they work part-time) and further questions that we will discuss in the following sections. To explore perceived fairness we use a set of six questions pertaining to variations of the original scenario.

*Question 1: At a sightseeing point reachable only on foot a well has been tapped. The bottled water is sold from a private supplier to thirsty hikers. The price is 1 CHF (Swiss Franc) per bottle. Daily production, and thus the stock, is 100 bottles. On a particularly hot day 200 hikers want to buy a bottle. As a consequence the supplier raises the price to 2 CHF per bottle. What do you think about this price rise?*

This situation forms the basis for further questions. Changes are comparable with different treatments in experiments. We believe that it is interesting to see how fairness consideration varies across the allocation types. To this base scenario, we first introduced a change in supplier, from private firm to a local authority (government supplier), to determine if there is a shift in sentiment between public and private suppliers increasing prices. Public enterprises' announcement of a price rise for their services often causes strong opposition<sup>1</sup>. From this question the following hypothesis can be formulated:

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<sup>1</sup> For example, councils in several Queensland communities have drastically increased the pricing of water, e.g. Redcliffe in the Morten Bay Shire has had a 66% (\$550/year) increase in water charges and an average of 10.7% increase across South-East Queensland (Vogler 2010). This increase is a response to the price increase put in place by UnityWater, the retail front for Queensland State Government Water run by former Brisbane City Lord Mayor Jim Soorley. Soorley stated that "everyone ... will have to pick up the real cost of water ... which includes desalination plants, recycled water facilities and the building of new pipeline" (Hoffman 2010). This increase has generated anger and public outrage, residents have argued that the rise is grossly unfair. The UK and Canada provide further examples. The Canadian public health system is cherished by its citizens so much that it comes in 4<sup>th</sup> in a recent poll of the country's most cherished features, after the flag and ice-hockey (Hebert 2010). Providing an efficient and effective health care system has been a clear and persistent goal of Canadian governments for decades, but attempting to alter it is fraught with danger. The Medicare system has been described as a "sacred cow" in Canadian politics, any politician who discusses making fundamental changes to the system risks to be punished by the electorate (Picard 2008). In recent elections all 5 parties had the same policy on healthcare. It seems that the public does not accept changes in fee or charges and have historically punished politicians for doing so.

*Hypothesis 1: Students judge the price adaptation from 1 CHF to 2 CHF to be more unfair, if made by the local authorities instead of a private supplier.*

*Question 2: At a sightseeing point reachable only on foot a well has been tapped. The bottled water is sold from **local authorities** to thirsty hikers. The price is 1 CHF (Swiss Franc) per bottle. Daily production, and thus the stock, is 100 bottles. On a particularly hot day 200 hikers want to buy a bottle. As a consequence the supplier raises the price to 2 CHF per bottle. What do you think about this price rise?*

Next we state that any surplus revenue generated through the price increase will be donated to an aid agency (Red Cross) and again ask to rate the level of fairness of the price rise. Do attitudes towards the price rise change if excess profits are donated? Foster (2001) argued that on the one end of the spectrum there is an embarrassment motivation which means that a person is ashamed to appear to be ungenerous. Thus, the person gives in order to escape from such an embarrassing situation, reducing so his/her moral costs. As a second motivation, individuals enjoy the feeling of their own generosity (Kahneman and Knetsch 1992). Furthermore, individuals can see charitable donation as a kind of insurance to finance a safety net service. In the shadow of the future (“veil of uncertainty”) they may profit themselves. Indirectly, they benefit, insofar as charity services strengthen the social fabric. Thus the following hypothesis can be formulated from question 3:

*Hypothesis 2: Students sense the price system as fairer when the revenue is handed over to a charitable institution.*

*Question 3: Suppose the well owner would hand over the surplus revenue from the price increase to the **Red Cross**. What do you think about this price rise?*

As an extension to this scenario, we added a need based occurrence, such that on a hot day some individuals suffer from the heat and need water. People might feel that the supplier was not entitled to a rent increase in a situation where people urgently *need* the water. On the other hand, the supplier had not contributed in any way to such a hot day situation which even leads to heat stroke. From this the following hypothesis can be formulated against question 4:

*Hypothesis 3: In emergency situation, students evaluate the price adaptation from 1 CHF to 2 CHF in an urgent situation as more unfair compared to a normal situation.*

*Question 4: On a particularly hot day, some people have a **heat stroke**. The private seller raises the price to 2 CHF per bottle of water. Do you find the price more acceptable, equally acceptable or less acceptable than when such an emergency case did not occur?*

Additionally we asked if the introduction of additional information was made available to hikers at the beginning of the footpath, made a difference to perceptions of fairness by stating that demand sometimes exceeds daily stocks of water. Information is needed to formulate expectations about the value of a specific alternative, this leads to our next hypothesis:

*Hypothesis 4: The better a hiker is informed about a possible excess demand situation, the better he/she can build expectations and the higher the evaluated fairness of a price system.*

*Question 5: At the beginning of the footpath the hikers are **informed**, that the demand for water sometimes exceeds the daily stock. Do you consider the price increase to 2 CHF by the supplier to be more acceptable, equally acceptable or less acceptable than if they were not informed?*

We then asked if the supplier had a second product available, at a higher price and on the hot days this product was also raised, would the price rise of the first product be equally, less or more acceptable than if the second product did not exist. Implementing another product enlarges the probability set of an individual and as Frey and Pommerehne (1988) state it could be expected that this would make people more content.

*Hypothesis 5: The price increase for the more expensive beverage is considered to be fairer because hikers have the possibility to choose the other beverage.*

*Question 6: Consider the following situation: The supplier at the sight-seeing point offers a **more expensive beverage** at 5 CHF per bottle. On a particularly hot day the price of this **more***

*expensive beverage is raised to 8 CHF. Do you consider this price rise to be more acceptable, equally acceptable, less acceptable than if this second offer did not exist?*

Finally we included a competitor nearby, and asked if only the original supplier raised the price would this be equally, more or less acceptable. Like the additional product line added in the previous question, competition can be seen as an expansion of individuals' choice set. By integrating another supplier, people have the chance to use the exit option if they are unhappy and switch from one supplier to the other.

*Hypothesis 6: The introduction of an additional supplier has the consequence that the price increase for bottles of water by the first supplier is considered to be fairer because the hiker can easily switch to the other supplier.*

*Question 7: We have now a situation in which **another supplier** located **near** the sight-seeing point also offers water, but at a price of 1 CHF per bottle. Do you consider the price increase to 2 CHF by the supplier at the sight-seeing point to be more acceptable, equally acceptable or less acceptable?*

While analysing a system, it is always important to compare different alternatives together. Thus, new institutions have been implemented including: queuing ("first come, first served"), random allocations, allocation by the local government, auction, and finally allocation by need ("weaker first").

Where possible our results are compared with the Frey and Pommerehne (1988) findings, the intention is to determine the robustness of their findings by changing singular parameters such as group structure. This procedure is similar to experiments where small changes in the design are used to test the robustness of results. This allows testing the robustness of the design and to avoid erroneous conclusions. Interestingly, we are not observing enough papers that test the robustness of results. Rubinstein (2001), e.g., stresses that the current incentive system does not reward replications. He brings an appropriate example:

"Let us say you are a researcher who is interested in a paper by Prof. X who claims to have found something quite interesting. Let us say that you find the results plausible but you are not sure that the

experiment was done properly and that indeed conclusion is valid. Do you have any incentive to repeat the experiment? No, because no one would publish it. Yet, you are interested in the subject matter and you probably think that Prof. X's finding is sensitive to a certain key detail of the experiment. Now you are quite eager to demonstrate your point and to publish a paper. In order to do that you have to first confirm Prof. X's basic claim. If you fail to repeat Prof. X's result, your point is lost. Thus, you approach the experiment with a desire to confirm the published result" (p. 626).

Furthermore, we have expanded the comparative analysis implementing more institutions and we explore the determinants of a price system's perceived fairness and its alternatives using a multivariate analysis. Similar to experiments we controlled for a few parameters: all students were from the same classes and filled out the survey at the same time in the same room. Compared to the study of Frey and Pommerehne (1988) we found that the price system was much more accepted. But this result cannot simply be interpreted as an indication of the impact of indoctrination. First of all, the two data sets are not comparable. Furthermore, (Frey and Meier 2005) offer empirical evidence against the belief that professional economists are in general more selfish than other persons. Using a wide data set they show that economic training does not make people act more selfish. Furthermore, our analysis has a strong comparative perspective.

In general, hypothetical questions offer the chance to investigate in a simple manner theoretical questions in regards to fairness in an excess demand situation. However, such an approach assumes that individuals know how they may behave in actual situations and assumes that individuals have no special reason to disguise their true preferences (Kahneman and Tversky 1979). Exploring risk aversion with laboratory experiments Holt and Laury (2002) compared behaviour under real and hypothetical incentives for lotteries that ranged from several dollars up to several hundred dollars. Their results indicate substantial differences between hypothetical and real payoffs in high payoff tasks (higher level of risk aversion for real payoffs). They therefore criticise that their findings "raises questions about the validity of Kahneman and Tversky's suggested technique of using hypothetical questionnaires to address issues that involve very high stakes. In particular, it casts doubt on their assumption that "people often know how they would behave in actual situations of choice"" (p. 1650).

### III. EMPIRICAL RESULTS

Looking at *Table 1* we observe that raising the price via price system, as a consequence of excess demand, is deemed to be unfair by only 19.4% of respondents. More students found it "fair"

(26.9%). 73.1% found it fair or acceptable. More than half of the people thought the price system acceptable. Frey and Pommerehne (1988) report that only 22% found the price system fair or acceptable compared to 78% judging it unfair. As our results differ strongly from their findings one reason could be that economics students already have some knowledge about economics and a more specific knowledge about price systems than an average householder<sup>2</sup>. However, such conclusions should be treated with caution. What can be said is that the price system has been evaluated as a quite acceptable institution to solve an excess demand situation. Next we implemented a second system of allocation, a shift from private to public supplier, where now the local government has been instituted as controlling the excess demand. If we let the price system work, changing the supplier from a private supplier to the local authorities, we would predict that acceptance would fall. Results in *Table 1* indeed indicate that public enterprises' announcement of a price rise for their services often causes relatively strong opposition.

A large proportion of individuals (46.2%) evaluated the use of the price system by the government as unfair. To better compare the two systems (government versus private supplier) we asked "If you compare question 1 with question 2, how do you judge government's price increase?" We find a strong support of *hypothesis 1*. Students deemed the government's adaptation less acceptable. 51.6% of the students found it less acceptable and 36.6% were neutral. Only 11.8% find the government intervention as more acceptable. Frey and Pommerehne (1988) obtained similar results. The students thought it is unfair for the government to take profit from the shortage situation raising the price and thus increasing revenue. But when these excess profits are donated to charity, would we observe a shift in fairness perceptions? Almost 50 percent of the students found that surplus revenue distribution to the Red Cross was fair, 92.5% evaluated it as fair and acceptable, providing strong support for *hypothesis 2*. This indicates that fairness is strongly correlated to distribution justice. The results of Frey and Pommerehne (1988) were similar. However, the percent of households thinking the charity to be unfair was higher. 27% found it unfair and 8% found it very unfair.

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<sup>2</sup> Or we may observe a selection effect. Students more in favour of a price system are more likely to study economics than other (social) sciences.

Table 1: Fairness of Allocation Systems

	<i>Allocation via Price System by a Private Supplier</i>	<i>Allocation via Price System by the Government</i>	<i>Surplus Revenue Distribution to the Red Cross</i>
Unfair	19.4%	46.2%	7.5%
Acceptable	53.8%	40.9%	43%
Fair	26.9%	12.9%	49.5%
	<i>Allocation via Price System by the Government</i>		
Less acceptable	51.6%		
Equally acceptable	36.6%		
More acceptable	11.8%		

In a next step we explore in a multivariate analysis what shapes these differences. *Table 2* presents the results using an ordered probit model. The ordered probit models are relevant in such an analysis insofar as they help analyse the ranking information of the scaled dependent variables (level of fairness of the price system/surplus distribution via the Red Cross or in the comparative analysis the acceptability difference between the price system done by a private supplier and the government). However, as in the ordered probit estimation the equation has a nonlinear form, only the sign of the coefficient can be directly interpreted and not its size. Calculating the marginal effects is therefore a method to find the quantitative effect a variable has on our dependent variables. The marginal effect indicates the change in the share of students (or the probability of) belonging to a specific fairness/acceptability level, when the independent variable increases by one unit. In the results the marginal effects are presented only for the highest values. In some estimations we will have missing values<sup>3</sup> which explains the lower number of observations. *Table 2* presents the results. Equation (1) shows that females found the price less fair than males. The quantitative effects indicate that being female rather than male reduces the probability of stating that the price increase by a private supplier is fair by 27.3 percentage points. This is quite a large effect. In the specifications (2) and (3) we add further factors. Fiscal exchange is a proxy that measures whether subjects are satisfied with government's provisions<sup>4</sup>. A higher value may be related to a higher level of government

<sup>3</sup> For example due to don't know or no response answers.

<sup>4</sup> Question: Looking at the returns of the state (based on your nationality) for the taxes paid would you say that the returns are rather good (value 3), adequate (value 2), rather bad (value 1). One should note that don't know has been coded as a missing value.

acceptability. This is nicely observable in specifications (4) and (5). An increase in the fiscal exchange scale by one unit increases the probability of stating that the price system allocation via the government is more acceptable by around 7 percentage points. On the other hand, it reduces the perceived fairness of a market system as can be seen in equation (2) and (3) with marginal effects of more than 10 percentage points. An age dummy variable has been built to explore whether age matters<sup>5</sup>. The results in specifications (3) and (5) show that there is no age effect. In addition we explore whether there is a difference between doing an economic major or minor. One could argue that individuals studying a major may be more in favour of the market system approach. However, equation (5) indicates that we don't observe a statistically significant difference between individuals doing an economic major or minor. In addition, we observe that working part-time (earning own money) has no effect on individuals' fairness perceptions. Interestingly, we observe an age effect when focusing on the perceived fairness of handing over the surplus revenue from the price increase to the Red Cross. Being in the age bracket 24 to 44 rather than in the reference group reduces the probability of reporting that such an approach is fair by 21.5 percentage points. Moreover, we also observe that individuals doing an economics major have a lower probability stating that such a strategy is fair. The effect is quite large as we can see in specification (6). Doing an economics major reduces the probability of stating that this is a fair strategy by 53.9 percentage points. In specification (6) we also explore whether institutional trust<sup>6</sup> is correlated with a higher support for a distribution to an international organization such as the Red Cross. Brewer et al. (2004, 2005) argue that individuals may derive their trust in international organizations from even more general forms of trust and Torgler (2008) finds empirical support for such spillover effects. The results indeed indicate a positive correlation. An increase in the institutional trust index by one unit from the average increases the probability of stressing that the Red Cross solution is fair by 2 percentage points.

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<sup>5</sup> The average age was 23. Due to the lack of variability we build a dummy for being above the average.

<sup>6</sup> Index based on the level of confidence in the press, the radio, television, the legal system, the police, the army, labour unions, work organisations, large private companies, independent experts, political parties, local authorities (at the communal and cantonal level), federal government, the two chambers (Nationalrat and Staenderat), the federal administration, the European Union, and the United Nations. Scale for each institution: none at all (0), not very much confidence (1), quite a lot of confidence (2), a lot of confidence (3). The index goes from 15 to 55 with a mean value of 28.

Table 2: Determinants of Fairness of Allocation Systems

Ordered Probit Models						
<i>Dependent Variables</i>	<i>Fairness Allocation via Price System by a Private Supplier</i>			<i>Acceptability Compared to Allocation via Price System by the Government</i>		<i>Surplus Revenue Distribution to the Red Cross</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Independent Variables:</b>						
Female	-0.651**	-0.664**	-0.726**	-0.012	-0.045	0.396
z-value	-2.44	-2.41	-2.41	-0.17	-0.13	1.01
marg. effect	0.273	-0.201	-0.210	-0.012	-0.009	0.149
Fiscal Exchange		-0.394**	-0.337*	0.072*	0.332*	
z-value		-2.06	-1.79	1.83	1.71	
marg. effect		-0.135	-0.112	0.072	0.069	
Age 24 to 44			-0.435		0.186	-0.546*
z-value			-1.45		0.61	-1.92
marg. effect			-0.134		0.041	-0.215
Economics Major					0.230	-5.160***
z-value					0.62	-22.12
marg. effect					0.043	-0.539
Working Part-Time			-0.320		0.132	0.263
z-value			-1.09		0.43	0.81
marg. effect			-0.111		0.027	0.103
Trust in Institutions						0.048**
z-value						2.42
marg. effect						0.019
N	89	83	82	83	82	83
Pseudo R2	0.0297	0.0452	0.0647	0.0165	0.0195	0.1193

Notes: The symbols \*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1% levels, respectively. Reference groups: Male, Age 20 to 23, Economics Minor, Not Working Part-Time.

Table 3: Scenario Extension

	<i>Hot Day with Heat Stroke</i>	<i>Information to the Subjects</i>	<i>Price Increase of a further Beverage</i>	<i>Competition</i>
Less acceptable	63.4%	5.4%	12.9%	8.6%
Equally acceptable	34.4%	30.1%	49.5%	50.5%
More acceptable	1.1%	63.4%	37.6%	39.8%
No response	1.1%	1.1%	0%	1.1%

Next we added an emergency type situation and assume that some people are suffering heat stroke and require water. The results in *Table 3* seem to confirm our expectations, as 63.4 % find it less acceptable to raise prices in light of the urgent need supporting *hypothesis 3*. While the supplier may not have created the hot day, people feel that the supplier is not entitled to take advantage in a situation where people have an urgent *need*. We included the availability of additional information to climbers prior to starting out on the footpath this information indicated that it was possible that water would be in shortage. Moreover, as information is needed to formulate expectations about the value of a specific alternative, it is not surprising that the results in *Table 3* seem to support the hypothesis. The findings show that 59% of the students found it more acceptable if they were provided more information about the water availability. By now including another product to the suppliers range we have effectively increased the options of an individual, which should increase contentment and thus acceptability. Contrary to the findings of Frey and Pommerehne (1988), subjects found the price system more acceptable (37.6%) or at least equally acceptable (49.5%). Frey and Pommerehne reported that 55% of the subjects found it less acceptable. As already seen, these results are compatible with the other findings that economics students have a certain experience in following economic theory. In the next question, we added an additional supplier, which can be viewed like the additional product as expanding the individual's choices and giving them the ability to switch from one supplier to the other. According to our findings in the previous question we should see similar results. *Table 3* confirms our expectations: 39.8% found it more acceptable and 50.5% equally acceptable and only 8.6% less acceptable. This result is also different from Frey and Pommerehne (52% found it less acceptable).

## IV. COMPARATIVE ANALYSIS

While analysing a system, it is always important to compare different alternatives together. Thus all the allocation systems have been included together, including now also: First come first served (queuing), random allocation (lottery), government (authoritarian) allocation, auction, and weaker first (needs). We provide a cursory discussion for each of these allocation types then *Table 4* and *5* display the comparative results.

### *1. First Come, First Served*

This institution allocates solely by using time and thus effort as criteria. This rule is applied often. Imagine, for example, the allocation of seats in a train, bus, tram or street parking. Oberholzer-Gee (2006, p. 427) points out:

“Car dealerships deliver vehicles in the order in which they were purchased. At airports, passengers are by and large checked in in the order in which they arrive. Theme parks use waiting lines to allocate seats on popular rides. VeriSign, Inc., the Internet firm, has developed a service which allows parties to be next in line to obtain a currently used domain name once it is deleted from the registry. Call centers queue calls, and the organizers of sport and entertainment events typically sell tickets on a first-come, first-served basis. Government agencies and nonprofit organizations commonly use waiting lists to allocate scarce resources. Health services, housing vouchers, rooms in nursing homes, hangars at airports, and spots in daycare centers are frequently made available in the order in which applications for these services were received. Universities use waiting lists to allocate seats in popular courses, student housing, books from the library and parking spaces.

However, the rule fails to consider the need of a person, which could be relevant, when there is an excess demand of water. Elster (1989b) distinguishes between two sorts of queues: i) voluntary standing in line (queues of immigrant visas, consumer goods) or ii) formed by natural process (e.g., care units after a disaster). This type of allocation is purely a function of time of arrival (time in queue) and is not dependent on other factors like age, gender, class etc. In times of scarcity individuals can be viewed as having two competing and diametrically opposed natures: individualism based on rational self-interest and egalitarianism based on social justice and fairness (Singer 1999). Our situation is placed somehow between both distinctions.

According to a natural process (hot day) people are thirsty and want to drink water which is scarce. First come, first served can lead to a queue, which has the disadvantage of wasteful allocation. Queuing is similar to paying a price, but nobody collects the price and benefits from it (Elster 1989b). Queuing behaviour can be viewed as an attempt at solving several competing issues: firstly it can be seen as an attempt to maximise social welfare (Hassin and Haviv 2006); secondly resolution of the scarcity of resources; or ordered queues can be used in an attempt to maintain some level of social justice or fairness (Avi-Itzhak and Levy 2004, Avi-Itzhak, Levy and Raz 2005, Larson 1987).

## 2. *Random Distribution*

Random procedures have a long and varied history. Oberholzer-Gee, Bohnet and Frey (1997) illustrate some examples. At the University of Basle, in the seventeenth century, subjects to teach were appointed in a lottery. As a consequence, Jakob Bernoulli had to teach medicine instead of mathematics. Furthermore, in the Roman Republic, a large number of important decisions were taken by lottery, e.g., the allocation of provinces amongst the senators. In Athens almost all officials and council members were chosen by lottery. Generals and a small number of magistrates (chosen by direct election) needing special qualifications were exceptions (Elster 1989b).

Today, random lotteries are used, for example, in the awarding of oil drilling, tax auditing, public house allocations, educational institutions or immigration<sup>7</sup>. They even play a role in political contexts<sup>8</sup>. The use of random distribution is associated with uncertainty and social indifference. Each hiker has the same chance of being selected. Thus, lotteries are blind towards personal characteristics. Oberholzer-Gee, Bohnet and Frey (1997) point out that a lottery is only socially acceptable if *competence* is available. Professors' subjects could be randomly distributed, because competence was given by appointing capable universal scholars to the University of Basle. Elster (1989b) argues that "I know of no instance of social lotteries without

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<sup>7</sup> The Diversity Visa Lottery, an annual event whereby prospective immigrants with no hope of family sponsorship can receive a green card to come to America.

<sup>8</sup> Elster (1989b) reports an example occurred in Sweden after the election 1973. After a tie between the socialist and the nonsocialist blocs in Parliament, decision was made tossing a coin. Furthermore, Elster discussed the pros and cons of a lottery voting. Other authors as Lindbeck (1976) proposed randomly timed elections and Thaler (1999) suggested assigning members of U.S. congress randomly, to congressional committees.

some pre-selection or post-selection scrutiny on the basis of need, merit and the like” (1989b, p. 68).

### 3. *Distribution by the Local Government*

This allocation system is based on the adjudication of a group of people, chosen in a democratic process. According to Frey and Pommerehne (1988), the distribution of water is made by the “local authorities” according to their respective judgement. This reduces a possible framing effect by the word “government”, leading to negative feelings. Local authorities follow certain administrative rules. However, despite such constitutional rules can induce governmental agents to act for the citizens, there exists a certain asymmetric information and thus a principal-agent problem. The government has an information advantage over the citizens, which enables it to anticipate the future decision and to act for its own advantage. Buchanan (1975) points out that it is unrealistic to expect that elected officials neither have personal preferences nor exercise their influence over collective outcomes. Thus, it can be doubted whether the distribution is fair or even efficient, where goods are scarce, incentives for rent-seeking activities increase. In some countries instrumental friendship is an important mechanism in the allocation of scarce goods (see Elster 1989b).

### 4. *Auction*

Auctions have been used circa 500 BC in Babylon (Cassady 1967). Furthermore, the Romans used auctions in commerce very often (Smith 1987). Allocation by auction creates a market system. Auctions are often seen as mechanisms for generating a fair price, as they allocate an item to the buyer who values it most highly. Thus, there appears to be consistency with price system or competition. It can be hypothesised that auction will be evaluated in a similar way as the price system. We informed the subjects about the English auction system, because it is the best known<sup>9</sup>.

### 5. *“Weaker First”*

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<sup>9</sup> In the English Auction, the standing bid cannot be withdrawn. Any new bid is admissible if it is higher than the standing bid. The auction ends when there is no new higher bid. The last amount is the final price. There are other types of auctions, the most commonly used are: Dutch, Japanese, Sealed-bid or Second-price auctions (see Smith 1987). These rules are important because they can affect the bidding incentives (see Vickrey 1961).

Need could be an important criteria for fairness consideration. Therefore, we implemented an institution which takes in consideration that at the beginning some have a disadvantage compared to others. This means that a favoured group has an advantage over others. Weaker people (e.g., pregnant women, children, handicapped, old people) are at a very low welfare level because of some sort of handicap. Thus, this category is defined by status. This rule is often used in disaster situations like ship accidents. Elderly people, e.g., are favoured because they have already done much for society and enable us to enjoy our present standard. Giving them priority in the competition for scarce water is a way to pay it back. However, if we had to choose between a young father or an older man dying for thirst, which one would be selected? It can be argued that the old man should have a lower priority because helping the young father helps to save more life years. Our situation is certainly not so dramatic. Here, younger hikers may be more robust to the hot temperature and thus need less water to go on further.

To evaluate these allocation systems, people had to arrange the different institutions according to their fairness. This enables us to build a ranking between them (see Table 4 and 5). First of all, we wanted to see which system has been judged as the fairest solution. Table 4 indicates that “weak people first” seems to be seen as the fairest solution to an excess demand situation. However, Table 4 does not give full information about the exact ranking of the institutions.

*Table 4: Fairest Solution*

	<i>Percent</i>	<i>Cumulative Percent</i>
Weak People First	53.8	53.8
First Come, First Serve	16.1	69.9
Price System	9.7	79.6
Auction System	8.6	88.2
Government Distribution	1.1	89.3
Random Procedure	1.1	90.4
No Answer	9.6	100.0
Total	100.0	

Because “weak people first” was the fairest solution with such a clear result we did not put it into account in *Table 5*. *Table 5* can be read, e.g., as follows: 71% of the people found the institution

“first come first serve” fairer than a “random distribution”. It has a similar structure as *Table 4*. However, “government distribution” is in a better light, almost equal to the “auction system”. Furthermore, the “price system” is evaluated as fairer than the “auction system” and the “random system” is clearly seen as the most unfair one.

Putting into account the terms of efficiency, the ranking might be different. What are the reasons that ordering differs when procedures are ranked by their fairness? The results confirm that institutions taking account of the “need” of a person are considered to be fairer than others. This explains why “weak people first” is seen as the fairest solution. Society has a certain tradition to following this rule. Humanitarian agencies often first evacuate “vulnerable” and “innocent” civilians such as women, children and the elderly. The Geneva Convention provides special protection and evacuation priority for pregnant women and mothers of young children (Carpenter 2003).

In line with the findings of Frey and Pommerehne (1988), “first come, first served” is considered to be quite fair. Kahneman, Knetsch and Thaler (1986b) asked the question to 191 adults in Vancouver confronting them with the situation where there is an excess demand of football tickets. They give the subjects three distribution systems: auction, lottery and queue (first-come first-served basis). They found similar results for the queue. Queue was evaluated as the fairest (68%) method, followed by lottery (28%) and the auction (4%). However, why is “first come, first served” seen as highly fair? The willingness to wait and stand in line can be seen as a measure of the need for the good (Elster 1989b). Furthermore, despite the possibility of inefficiency, waiting can also be seen as an effort. Oberholzer-Gee (2007) conducted a field experiment covering 500 individuals waiting in line at different locations in Philadelphia to explore the willingness to accept additional waiting time in exchange for a monetary payment. A large majority of individuals (62%) granted the request to jump the queue and higher offers lead to greater success even in the case where the individual ends up not accepting the compensation. In fact most individuals refused to be compensated. It could be that subjects read price signals as indicators for the experimenter’s opportunity cost of time.

The most convincing argument can be that “first come, first served” does not include money in allocating scarce water. This argument can also stand for random mechanism or local government distribution. However, waiting creates a disadvantage to those people having higher opportunity costs, as, e.g., richer people, and as a sort of “neutral” mechanism prevents from

favouritism or bribery. In our example, favouritism would be difficult to realise, because of transparency and identification. Another important argument is that “first come, first served” is a system which enables individuals to have clear expectations. If you get up early in the morning, there is a higher chance to get water. Moreover, the sellers may have interest to generate queues as it signals a desirable product (Oberholzer-Gee 2006).

Table 5: Comparative Analysis Between the Different Systems

<i>is fairer than (%)</i>	<i>First Come, First Serve</i>	<i>Price System</i>	<i>Auction</i>	<i>Government Distribution</i>	<i>Random Procedure</i>
First Come, First Serve	-	45 <sup>i</sup>	56	56	71
Price System		-	58	57	67
Auction System			-	42 <sup>ii</sup>	45 <sup>iii</sup>
Government Distribution				-	48 <sup>iv</sup>
Random Procedure					-

Notes: <sup>i</sup> 39% believe that Price System is fairer (9% did not answer); <sup>ii</sup> for 41% of the people the government distribution is fairer (10% did not answer); <sup>iii</sup> 39 % did not agree and 9% did not answer; <sup>iv</sup>36% did not agree, and 9% did not answer).

It is also surprising that random procedure has been evaluated as the worst solution, despite this rule puts into account “social blindness”. Why are random procedures so rarely seen as a fair system? Elster (1989b, pp. 116-121) searches for reason why lotteries are not so often used as expected: i) people want to have reasons for what they do, ii) people dislike making close decisions, iii) inability to keep the ex ante perspective firmly in mind. An ex post wrong decision may be the best choice in the ex ante situation. A military commander, as Elster (1989b) argues, who chooses the attack plan by random process (e.g., flip a coin) to confound the enemy, might

be strongly criticised when things go wrong, iv) the most interesting argument, the attachment to the process. Elster (1989b, pp. 118-119) stresses that:

“First, one may argue that in the long run respecting procedural values leads to better substantive outcomes, even if in a given case they may appear burdensome and pointless (...) Second, one may argue that even when the outcome is substantially the same whether or not these values are respected they have an independent importance (...) Third, one may argue that some process values are so important that they should be respected even when the final decision is thereby made substantively less good (Elster 1989b, pp. 118-119).

Contrary to the findings of Frey and Pommerehne (1988), the price system again was placed quite better at rank three. These findings seem to confirm that economics students have less concern about the unfairness of the price system.

In *Table 6* we explore what factors influence the number one choice “weak people first”. We have used a probit model (1=weak people first choice, 0=other choices). As can be seen gender is the major factors. Being female rather than male increases ceteris paribus the probability of stating that the solution “weak people first” is the fairest by more than 28 percentage points.

*Table 6: Determinants of “Weak People First”*

Probit Models		
<i>Dependent Variable</i>	<i>Fairest Solution:</i>	
	<i>Weak People First</i>	
	(7)	(8)
Independent Variables:		
Female	0.814**	0.813**
z-value	2.29	2.28
marg. effect	0.607	0.282
Age 24 to 44		0.267
z-value		0.78
marg. effect		0.016
Economics Major		-0.321
z-value		-0.4
marg. effect		-0.116
Working Part-Time		0.043
z-value		0.13
marg. effect		0.099
N	82	81
Pseudo R2	0.051	0.057

Notes: The symbols \*, \*\*, \*\*\* represent statistical significance at the 10, 5, and 1% levels, respectively. Reference groups: Male, Age 20 to 23, Economics Minor, Not Working Part-Time.

## V. CONCLUSION

A main purpose of this paper was to better understand the conditions for the acceptability of different allocation systems and to evaluate what makes a price system more or less fair. After discussing general tendencies in the fairness literature, the starting point was a situation stamped by scarcity. Based on the work of Frey and Pommerehne (1988, 1993) who might have been influenced by the work of Kahneman, Knetsch and Thaler (1986a), we analysed how economics

students evaluate different allocation systems. Fairness in an arrangement depends on the institutional background, e.g., information transparency and competition let the price system appear as fairer. Compared to the Frey and Pommerehne subjects, economics students were much less sceptical towards the price system. However, we also observe that females are more sceptical than males. Women are also more in favour of a “weak people first” solution (compared to other strategies) in an excess demand situation than men. In addition, a higher perceived fiscal exchange is correlated with a higher level of acceptance for having the local government regulate the price increase in case of a shortage. We also observe in line with Torgler (2008) spillover effects. A higher level of institutional trust is correlated with a higher support for redistributing the revenue surpluses (due to the price increase) to an international aid organization, namely Red Cross.

In reality we find that sellers do care about fairness. Ski resorts in Switzerland and bathing resorts in Italy or Spain, e.g., are often characterised by an excess demand, with long lift queues and crowded slopes and strands. Why do sellers not simply raise the rates and earn the extra revenues? And why do the most popular restaurants have reservation lists for more than a month? Frank (1988) argues that in such a situation pricing patterns differ substantially from a self-interest model. In many cases, fairness seems to play a certain role.

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