Community Supported Agriculture and Preferences for Risk and Fairness

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Risk and Fairness Preferences in Community Supported Agriculture *

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Abstract

We aim to elicit consumers' preferences for attributes of consumer supported agriculture (CSA) contracts and their determinants, especially risk and fairness preferences. We combine two incentivized field experiments with a stated choice survey. Risk preferences are structurally-elicited from several *binary lottery choices* and fairness preferences from a *modified dictator game*. We use a *stated choice survey* to determine consumers' preferences for three attributes of CSA contracts: duration, loss in basket size due to production risks and price change. We face-to-face interviewed 162 CSA members. In line with fairness theory, we find consumers are averse to advantageous inequality (AI) toward CSA and non CSA farmers and averse to disadvantageous inequality (DI) toward non CSA farmers; but, we also find evidence of DI seeking toward CSA farmers. In the stated choice survey, we find consumers prefer longer contracts and that it is risk-driven rather than fairness-driven. As expected, consumers exhibit a dislike for losses and for share price increases. Wa find a high willingness to pay to avoid losses. High AI averse consumers tend to be less sensitive to losses. High DI seeking consumers tend to be less sensitive to losses and price increase.

Keywords: CSA; Stated choice; Field experiment; Risk preferences; Fairness preferences

JEL Classification: C93; D63; D81; Q18

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1 Background and motivation

In many countries, community supported agriculture (CSA) is developing. In CSAs, a group of consumers contracts with a local farmer. The local farmer has a production process very close to an organic process but without having necessarily the official organic seal of approval. In CSAs, each consumer buys a share of the harvest before production takes place and thus shares with the farmer the production risks associated to a low-input process. During the growing season, each consumer receives a weekly basket of available products (the size and content of the basket varies with production risks). CSA contracting enables consumers to get fresh and good quality products and risk sharing protects farmers from financial risks since the harvest is paid before production.

Few papers deal with the determinants of CSA membership. Cooley and Lass (1998) review the main results of a survey among 192 CSA members in Amherst, Massachusetts (US). The main motivations for consumers are quality of produce, support for local farming, environmental and food safety concerns and community services (i.e., food donations). The main stated disadvantage is the limited choice of produce, seasonality, pick-up times, visits to the farm and the uncertainty about the CSA share monetary value. In a review article on local food, Brown and Miller (2008) point to the scarcity of research on CSAs, most of the literature being descriptive or case studies on a small number of farms. Brown and Miller (2008) add to the motivations mentioned above social and club benefits. Bougherara, Grolleau, and Mzoughi (2009) compare members of CSAs with non-members in the city area of Dijon, France on a sample of 169 households. They find that the more people are concerned with credence properties of food products, the more likely they are to supply by long term contracting. Connolly and Klaiber (2014) estimate consumer preferences for CSA attributes using a hedonic model. Using data on 453 CSA farms (US), they find a price premium of approximately 7% for USDA organic certification. Finally, Peterson, Taylor, and Baudouin (2015) analyze the determinants of consumers' choice of outlet for local food supply. Using responses to a stated choice survey for 301 US and 317 French consumers, they find consumers favor CSAs to support local farmers, to control for the origin of their food (US only) and out of respect for the environment (French only).

From a preliminary qualitative survey on a sample of CSA contracts,[1] we found that risk sharing and fairness are salient attributes of CSA contracts. Although risk sharing and fairness issues are considered by CSA promoters as two important components of CSA,[2], to our knowledge, these attributes are not yet considered in the literature. The purpose of this study is to fill in this gap by eliciting the influence of risk and fairness preferences for the duration of CSA contracts and the loss in basket size due to production hazards. Even if CSA contracts may differ within a country or between coun-

[1] http://www.reseau-amap.org/

[2] See for example, description of CSA on the following website: http://www.localharvest.org/csa/

tries (see Sproul and Kropp, 2015), these variables of interest play a major role in most CSAs. To address our research question, we face-to-face interviewed 162 CSA members (in Rennes, France) who (1) take part in two incentivized field experiments dedicated to the elicitation of risk and fairness preferences and (2) answer a stated choice survey designed to elicit their preferences for attributes of CSA contracts. Risk preferences, notably loss aversion, are structurally-elicited from several binary lottery choices (Logit model) using cumulative prospect theory (Tversky and Kahneman, 1992). Fairness preferences are structurally-elicited from a modified dictator game experiment (rank-ordered Logit) using a specification of the utility function in the spirit of Fehr and Schmidt (1999) to capture several aspects of fairness preferences (advantageous vs. disadvantageous inequality as defined in following sections). Consumers' preferences for three attributes of CSA contracts, i.e., duration, loss in basket size due to production risks and price change are determined from a stated choice survey (random parameter Logit) using random utility theory.

In line with fairness theory, we find consumers are averse to advantageous inequality (AI) toward CSA and non CSA farmers and averse to disadvantageous inequality (DI) toward non CSA farmers; but, we also find evidence of DI seeking toward CSA farmers. In the stated choice survey, we find consumers prefer longer contracts and that it is risk-driven rather than fairness-driven. As expected, consumers exhibit a dislike for losses and for share price increases. We find a high willingness to pay (WTP) to avoid losses. High AI averse consumers tend to be less sensitive to losses. High DI seeking consumers tend to be less sensitive to losses and share price increases.

The remainder of this paper is organized as follows. In section 2, we present the methodology we used. In section 3, we analyze and discuss our results. Section 4 concludes.

2 Methodology

The aim of the present study is to analyze the impact of two unobservable characteristics, risk and fairness preferences, on CSA contract choices. To address our research question, we elicit these preferences through two incentivized experiments and we implement a stated choice survey. In what follows, we first present the incentivized experiments and next the stated choice survey method we used. For each of them, we present first the experimental design then the empirical specification. Finally, we describe the sample selection procedure.

2.1 Experiment 1. Fairness-preference elicitation

Given how CSA promoters describe CSA contracts, we assume that when consumers commit to a CSA for a long period of time, one of their motivations deals with the sup-

port to local farmers.[3] Farmers are exposed to production hazards and price variation that may impact their revenue. By committing to CSAs, consumers ensure a revenue to farmers, regardless of the level of production. We conjecture that CSA members have an interest in not only how their food is produced, but also who benefits from their food purchase.

2.1.1 Experimental design

We conduct an incentivized experiment dedicated to elicit consumers' fairness preferences using a modified dictator game. More precisely, we examine whether respondents, in a given situation, tend to favor local farmers over themselves and whether being a CSA farmer or not affects their decisions. To this end, we implement a set of decision task that enables us to elicit consumer fairness preferences. Respondents are randomly matched with a local CSA farmer and a local non CSA farmer. To test our conjecture, it was made clear that both CSA and non CSA farmers use the same production process and differ only in their marketing. More precisely, local CSA farmers are described as farmer supplying only CSA, practicing organic farming and environmentally respectful. They sell their products only to committed consumers and their revenues result from consumers' purchase. Local non CSA farmers share the same characteristics regarding organic farming and the respect of environment. The sole difference is that non CSA farmers supply non CSA consumers. Respondents have to decide how desirable are particular payoffs options that differed by the magnitude of the monetary outcomes accruing to themselves and to local CSA and local non CSA farmers.

We use an experimental protocol similar to the one used by Briggeman and Lusk (2011).[4] Each respondent has to rank 13 different options that differ in terms of the amount of money that would be given to the respondents themselves and in terms of the money that would be given to local CSA and non CSA farmers[5] (see Table 1). As argued by Briggeman and Lusk (2011), ranking multiple options from best to worst provide more information than discrete decisions. The 13 options proposed in our experiment were selected as follows. First, a full factorial design of potential payouts was created. Given there are 5 potential payouts (i.e., 0, 1, 2, 3, 4) and 3 recipients (2 farmers and the respondent him/herself), this leads to $5^3 = 125$ possible payouts, too many for respondents to rank. As a consequence, from this full factorial design, we selected 13 options by maximizing a D-efficiency criterion under the constraint that the sum of payouts for

[3] See for example http://www.localharvest.org/csa/

[4] Blanco, Engelmann, and Normann (2011) also use a modified dictator game as well as an ultimatum game to elicit inequality aversion. However, while Briggeman and Lusk (2011) ask repondents to rank several payouts distributions, Blanco, Engelmann, and Normann (2011) provide respondents with a list of binary choices.

[5] Although participants did not know the identity of the CSA and non CSA farmers during the experiment, once all participants have completed the experiment, a CSA and a non CSA farmer have been randomly selected among CSA and non CSA farmers in the surrounding area of Rennes, France, to receive the sum of payoffs dedicated to them.

each option is equal to 8 Euros. This enables to rule out behavior such as maximizing total payoff[6] as an explanation for the ranking of options. Furthermore, to avoid an order effect when presenting the different options, the order of options has been randomized across our subject pool.

Table 1: Experimental decision task for fairness preferences elicitation

Options	You	Local CSA farmer (randomly chosen)	Local non CSA farmer (randomly chosen)
1	4	2	2
2	0	4	4
3	2	2	4
4	3	4	1
5	2	4	2
6	4	0	4
7	3	1	4
8	2	3	3
9	4	3	1
10	1	4	3
11	3	3	2
12	4	1	3
13	4	4	0

Note: Payoffs are in Euro.

2.1.2 Empirical specification

To understand fairness preferences in the sample, the rankings that consumers affect to particular options are estimated using a generalization of conditional logit models, the rank-ordered logit model (ROL) introduced by Beggs, Cardell, and Hausman (1981). The rationale for the use of this model is the following: ranks are ordinal and the ranks each consumer gives are not independent, so neither the ordinary least squares, ordered logit nor ordered probit models provide consistent parameters estimates (Holland and Wessells, 1998). To address this issue, we estimate ROL models which allow both the lack of independency between rankings for each consumer and the ordinal nature of data. The utility U_{ij} consumer i derives from option j is defined as:

$$\begin{aligned} U_{ij} &= V_{ij} + \epsilon_{ij} \\ U_{ij} &= X_{ij}\omega_i + \epsilon_{ij} \end{aligned} \tag{1}$$

where $i = 1, \cdots, n$ indexes individuals and $j = 1, \cdots, 13$ indexes the options. ϵ_{ij} is the random component of the utility of option j for individual i and V_{ij} is the deterministic component of the utility, determined by observed characteristics. In our experiment, consumer i ranks 13 options differing in 3 characteristics: own payoff x, CSA farmer

[6]Such motivation for choice is called efficiency concerns in the fairness litterature, see Engelmann and Strobel (2004). Efficiency is here simply understood as the sum of payoffs, and not in the sense of Pareto efficiency.

payoff y and non CSA farmer payoff z.

As corroborated by numerous experimental works, individuals are not only sensitive to their own payoff but also to payoff differences. We use the utility specification of Fehr and Schmidt (1999). In this way, we are able to disentangle the two forms of inequality and to analyze whether consumers sensitivity toward payoff difference differs depending on its direction. Indeed, inequality can be of two kinds. Although people may dislike having less than others, they may dislike, at the same time, having more than others. This asymmetry in fairness behavior is captured by the model of Fehr and Schmidt (1999) that allows for these two kinds of fairness preferences. Most of individuals express a stronger aversion toward DI (having less than others) than AI (having more than others). Taking into account these features, we specify the deterministic component of the utility consumer i derives from option j as in eq. 2. As in Fehr and Schmidt (1999), we consider two kinds of inequalities (AI and DI); but we also modify the model by considering two kinds of recipients (a CSA farmer and a non CSA farmer), since we assume that AI and DI may differ across recipients.

$$V_{ij} = x_j + \alpha_1 \max\left\{0; y_j - x_j\right\} + \alpha_2 \max\left\{0; z_j - x_j\right\} + \beta_1 \max\left\{0; x_j - y_j\right\} + \beta_2 \max\left\{0; x_j - z_j\right\} \quad (2)$$

In eq. 2, the first two terms, α_1 and α_2 measure the marginal utility derived from DI (i.e., consumer is worse off in terms of payoff than farmer), while the last two terms β_1 and β_2 measure the marginal utility derived from AI (i.e., consumer is better off in terms of payoff than farmer). On the basis of fairness literature, we expect consumers express inequality aversion ($\alpha_k < 0$, $\beta_k < 0$, $k = \{1; 2\}$), such that $|\alpha_k| \geq |\beta_k|$ capturing the idea that the utility loss from DI is larger than the utility loss from AI. In other words, for a given difference in payoffs, the disutility is larger if farmers are better off than consumers than if farmers are worse off.

Rank-ordered Logit model also called the exploded Logit exploits the additional information contained in the preference ranking ordering of options by assuming that each rank is made as part of a sequential random utility selection. If the respondent gives the option the rank of one, as the most preferred, followed by options ranked two, three, and continuing until option J as the least preferred, then this rank order can be represented as: $U_{i,r_{i1}} > U_{i,r_{i2}} > ... > U_{i,r_{iJ}}$, where r_{ih} denotes the option number that received rank h by consumer i. For example, $r_{i3} = j$ means that consumer i considers option j as the third most preferred option.

Under the utility assumption (eq. 1) and the assumption that ϵ_{ij} is independent and identically distributed with an extreme-value distribution, the probability of observing a particular ranking r_i equals :

$$
\begin{aligned}
Pr(r_i; \alpha_1, \alpha_2, \beta_1, \beta_2) &= Pr(U_{i,r_{i1}} > U_{i,r_{i2}} > ... > U_{i,r_{ij}}) \\
&= \prod_{j=1}^{J-1} \frac{e^{V_{ir_{ij}}}}{\sum_{m=j}^{m=13} e^{V_{ir_{im}}}}
\end{aligned} \tag{3}
$$

2.2 Experiment 2. Risk-preference elicitation

When individuals decide to join CSA, they sign up a contract for a given duration, basket size and share price. However, unexpected events or climatic hazards may occur and lead to losses in basket size or cancellations of distribution[7]. To analyze the impact of risk preferences when choosing a particular contract, we conduct an incentivized experiment to estimate individual risk preferences.

2.2.1 Experimental design

We are interested in the elicitation of several risk parameters notably loss aversion since CSA contracts may involve losses. There is a wide variety of methods that could be used to elicit individuals' risk preferences. Because losses are possible in CSAs, the experiment designed by Tanaka, Camerer, and Nguyen (2010) appears as the most appropriate to tackle the problem at hand. Their design has the clear advantage to propose binary lottery choices both in the loss and in the gain domains. More specifically, respondents answer three series of paired lotteries where outcomes and probabilities vary as shown in Table 2. For each of the three series, the probabilities remain constant across the decision task. Each row is a choice between two binary lotteries, Left (L) and Right (R). In the first two series, only gains are possible. In lottery L, probabilities and payoffs are constant across the choices, only the amounts associated to the lowest (resp. to the highest) probability of lottery R vary for series 1 (resp. for series 2). In the third lottery, both gains and losses are introduced while probabilities are identical both between lotteries and across choices.

[7] As recognized by CSA promoters, "many times, the idea of shared risk is part of what creates a sense of community among members, and between members and the farmers. If a hailstorm takes out all the peppers, everyone is disappointed together, and together cheer on the winter squash and broccoli. Most CSA farmers feel a great sense of responsibility to their members, and when certain crops are scarce, they make sure the CSA gets served first. Still, it is worth noting that very occasionally things go wrong on a farm like they do in any kind of business and the expected is not delivered, and members feel shortchanged." (http://www.localharvest.org/csa/)

Table 2: Three Series of Pairwise Lottery Choices

Lottery Left (L)		Lottery Right (R)		Expected payoff difference (L-R)
Series 1				
Prob 0.3	**Prob 0.7**	**Prob 0.1**	**Prob 0.9**	
4	1	6.8	0.5	0.77
4	1	7.5	0.5	0.7
4	1	8.3	0.5	0.62
4	1	9.3	0.5	0.52
4	1	10.6	0.5	0.39
4	1	12.5	0.5	0.2
4	1	15	0.5	-0.05
4	1	18.5	0.5	-0.4
4	1	22	0.5	-0.75
4	1	30	0.5	-1.55
4	1	40	0.5	-2.55
4	1	60	0.5	-4.55
4	1	100	0.5	-8.55
4	1	170	0.5	-15.55
Series 2				
Prob 0.9	**Prob 0.1**	**Prob 0.7**	**Prob 0.3**	
4	3	5.4	0.5	-0.03
4	3	5.6	0.5	-0.17
4	3	5.8	0.5	-0.31
4	3	6	0.5	-0.45
4	3	6.2	0.5	-0.59
4	3	6.5	0.5	-0.80
4	3	6.8	0.5	-1.01
4	3	7.2	0.5	-1.29
4	3	7.7	0.5	-1.64
4	3	8.3	0.5	-2.06
4	3	9	0.5	-2.55
4	3	10	0.5	-3.25
4	3	11	0.5	-3.95
4	3	13	0.5	-5.35
Series 3				
Prob 0.5	**Prob 0.5**	**Prob 0.5**	**Prob 0.5**	
2.5	-0.4	3	-2.1	0.6
0.4	-0.4	3	-2.1	-0.45
0.1	-0.4	3	-2.1	-0.6
0.1	-0.8	3	-1.6	-0.85
0.1	-0.8	3	-1.6	-1.05
0.1	-0.8	3	-1.4	-1.15
0.1	-0.8	3	-1.1	-1.3

Note: Payoffs are in Euro. The last column showing expected payoff difference was not shown to subjects.

Respondents' choices can be used to determine their risk preferences. For instance, in series 1, a risk neutral respondent would choose option L for the first six decisions listed in Table 2 because the expected value of lottery L exceeds the expected value of lottery R for the first six choices. As one moves down each row for a given series of Table 2, the expected value of lottery R exceeds the expected value of lottery L. Thus, responses to these three series of pairwise lottery choices allow us to estimate the risk preference coefficients for each respondent.

2.2.2 Empirical specification

We estimate a structural model assuming cumulative prospect theory (Tversky and Kahneman, 1992). We follow the modeling strategy of Harrison and Rutström (2008) and Andersen, Harrison, Lau, and Rutström (2010) to enable us to identify risk aversion parameters for consumers in our sample.

From Table 2, we observe that respondents face series of lottery choices j where a choice has to be made between two lotteries L and R: $\{p_j^L, y_h^L; (1-p_j^L), y_l^L\}$ and $\{p_j^R, y_h^R; (1-$

$p_j^R), y_l^R\}$. Lottery L (resp. R) offers a high outcome y_h^L (resp. y_h^R) with probability p_j^L (resp. $1 - p_j^L$) and a low outcome y_l^L (resp. y_l^R) with probability p_j^L (resp. $1 - p_j^R$). Note that lottery R has a larger variance than lottery L. We model individual utility as suggested by cumulative prospect theory since it is commonly observed that for choices under risk implying both gains or losses, "losses loom larger than gains". Cumulative prospect theory allows to account for the differences in behaviors in the gain and loss domain. The value function writes as in eq. 4 where r is the concavity of the utility function, y is the outcome of the lottery and λ is the loss aversion parameter.

$$v(y) = \begin{cases} y^r & \text{if } y \geq 0 \\ -\lambda.\left[(-y)^r\right] & \text{if } y < 0 \end{cases} \tag{4}$$

Values of r smaller than 1 yield a concave value function for gains (i.e., risk aversion over gains) and a convex value function for losses (risk seeking over losses). Furthermore, λ reflects the relative sensitivity to losses versus gains and is often found to be larger than 1, indicating loss aversion.

We model the decision as a discrete choice model. We consider a latent variable y^* (see eq. 5). We do not observe y^* but only the choices individuals make:

$$y = \begin{cases} 1 \text{ if } y^* > 0 \\ 0 \text{ if } y^* \leq 0 \end{cases} \tag{5}$$

Under cumulative prospect theory, probabilities are transformed according to the weighting probability function in eq. 6, where γ is a parameter describing the shape of the weighting probability function. $\gamma < 1$ (resp. $\gamma > 1$) implies overweighting (resp. underweighting) of small probabilities and underweighting (resp. overweighting) of high probabilities.

$$\pi(p) = \frac{p^\gamma}{\left[p^\gamma + (1-p)^\gamma\right]^{1/\gamma}} \tag{6}$$

It follows that for individual i and for a given lottery $k \in \{L, R\}$, the prospective utility writes as in eq. 7.

$$PU_i^k = \pi\left(p_j^k\right).v_i(y_h^k) + \pi\left(1 - p_j^k\right).v_i(y_l^k) \tag{7}$$

We consider a Fechner stochastic model, assuming that subjects make errors in comparing expected utility of lotteries. Subject i chooses lottery L if $PU_i^L - PU_i^R + \epsilon > 0$ and lottery R otherwise with ϵ a random component normally distributed with zero mean and variance σ^2. Let $Z = \frac{\epsilon}{\sigma}$. By definition, Z is normally distributed with zero mean and variance one. Then, the probability of choosing lottery L writes as in eq. 8 with $\Phi(\cdot)$ the standard normal distribution function. The probability of choosing lottery R writes as in eq. 9.

$$Prob(PU_i^L - PU_i^R + \epsilon > 0) = Prob(Z > -\frac{[PU_i^L - PU_i^R]}{\sigma}) = \Phi(\frac{[PU_i^L - PU_i^R]}{\sigma}) \quad (8)$$

$$Prob(PU_i^R - PU_i^L + \epsilon > 0) = 1 - \Phi(\frac{[PU_i^L - PU_i^R]}{\sigma}) \quad (9)$$

We estimate four parameters with maximum likelihood: risk aversion in gains r, loss aversion λ, probability distortion γ and the standard deviation of the error component σ. The log likelihood function writes as in eq. 10 where $\mathbf{I}(\cdot)$ is the indicator function, $y_i = 1$ when lottery R is chosen and $y_i = 0$ when lottery L is chosen, $\Delta PU = PU_i^L - PU_i^R$ the difference in prospect utility between the two lotteries.

$$ln\left(L\left(r, \lambda, \gamma, \sigma : y\right)\right) = \sum_i \left\{\left[\ln\left(\Phi\left(\Delta PU/\sigma\right)\right)\right].\mathbf{I}(y_i = 1) + \left[\ln\left(1 - \Phi\left(\Delta PU/\sigma\right)\right)\right].\mathbf{I}(y_i = 0)\right\} \quad (10)$$

Note that even if we introduce a weighted probability function to follow the cumulative prospect theory, in the following analysis we will focus only on the risk and loss aversion parameters. The risk we will consider in the stated choice survey corresponds to a production risk. Consumers face a variable decrease in the size of the basket supplied by the farmer.

2.3 Stated choice survey

Finally, we implement a *stated choice survey* to elicit respondents' preferences for attributes of CSA contracts. In contrast with experimental economics, stated choice methods do not involve monetary incentives (Louviere and Swait, 2000). However, it is a powerful tool when evaluated goods or policies do not exist. It is strongly grounded on structural estimation of preferences (random utility models) and surveys are presented using several simplified choices derived from a careful experimental designthat minimizes respondents' cognitive burden. Stated choice surveys are hypothetical surveys designed to elicit preferences for attributes of a good, here CSA contract. The first step is to determine the salient attributes of CSA contracts and their corresponding levels. For that purpose, we conduct a preliminary qualitative survey on a sample of CSA contracts. In this section, we first present our experimental design including a quick presentation of the main results of the preliminary qualitative survey then our empirical specification.

2.3.1 Experimental design

Price is typically one of the factors to be included because it allows for the estimation of willingness to pay (WTP). To identify other factors, we carry out a qualitative survey of CSA contracts. The content of 23 CSA contracts in several regions of France is analyzed to determine their main features. Our data source is the website of a French national

association of CSAs.[8] The analysis of CSA contracts shows that legally, CSAs are not-for-profit organizations. Farmers are not members of CSAs but subcontractors. The basic basket is a vegetable basket although many CSAs offer other products like eggs, milk, cheese or bread as joint products but not involving risk sharing as in the CSA contract. To focus on CSAs as such, we only consider vegetable contracts in our stated choice survey. In the analyzed CSA contracts, consumers commit to payment before production and for a given duration. The duration of contracts is usually for a season (6 months: 43.48% of analyzed contracts) or annual (10 months; 43.48% of contracts) but some CSAs offer shorter durations. Consumers also commit to associative activities (helping at the delivery location, at the farm or for administrative work for the benefit of the association). The farmer commits to produce according to an organic-like production method with transparency for CSA members. Although risk sharing is at the core of CSA contracts, it is often mentioned only vaguely in the contracts. When mentioned with more details, hazards explicitly relate to climatic hazards and damage from pests. Therefore, CSA contracts are incomplete. Only few contracts mention provision in case of production losses, either by imposing on the farmer to compensate for loss (by providing produce from another source) or by requiring a meeting of CSA members to deal with the hazard.

This qualitative survey helped us to identify the main patterns of CSA contracts and thus to define three three-level attributes of choice of CSA contracts for vegetables described in Table 3. **Duration** describes the CSA contract duration in months. It results from the qualitative survey that the reference contract is 10 months, with 2 alternative contracts proposing shorter durations: 6 and 3 months. This allows us to propose various contract durations and to relax the long term commitment constraint, without the 6 months contracts being the "default" contract. The second attribute is the **Loss** described as the decrease in basket size that occurs once a month due to production risks. It is difficult for consumers to perceive the percent of no distribution during a season or the probability of no distribution. Further, the perceived probability may differ among consumers. This attribute does not refer to the probability that a loss will occur during the duration of the contract but rather to the share of the production that is lost due to production hazards. This means that consumers are certain that the loss will occur and the variation of this attribute only refers to the level of the decrease in basket size. We want to elicit how much loss they can take in a CSA contract. If the attribute level is zero, there is no loss in basket size. If the attribute level is 1/3, the basket is one third smaller in size once a month for sure. And, if the attribute level is 2/3, the basket is two third smaller in size once a month for sure. The last attribute is the **Price** of the basket described as a price change in percentage. One of our working hypotheses is that even if an alternative contract involves more loss and a higher price, it could be chosen for fairness reasons by some CSA members. So we consider both an increase and a decrease in the price level

[8] http://www.reseau-amap.org/

compared to the reference contract. The reference contract is 10 months contract with no loss (i.e., no decrease in the basket size or the amount of vegetables supplied) and no price change (i.e., null variation in price). Table 12 in Appendix presents an example of a choice set.

Table 3: Attributes and levels

Attributes	Attribute levels
Duration (in month)	**10**, 6, 3
Loss (in percentage point)	**0**, 1/3, 2/3
Price (in %)	**0**, -20, +20

Note: Attribute levels for reference contract in bold.

Besides the reference contract, two alternative contracts, namely Contract A and Contract B, are proposed to respondents. A full factorial design would imply $3^3 = 27$ types of contracts. To reduce the number of choices for respondents, we used a fractional factorial design consisting in 15 choice sets blocked in 3 groups of 5 (see Table 11 in Appendix) selected by maximizing a D-efficiency criterion. We had no constraint on the combination of attributes. Each respondent was presented with 5 choice sets and there were 3 versions of the survey.

2.3.2 Empirical specification

In accordance with previous litterature, we estimate consumer preferences for CSA contracts for vegetable supply with discrete choice models. This class of models has been extensively used because it enables to measure the influence of demand attributes. Based on Lancastrian consumer theory (Lancaster, 1966), the total utility associated with the choice of a CSA contract is assumed to be decomposed into seperate utilities for their component attributes or characteristics. However, this utility is known to the individual but not to us. We observe some attributes of the alternatives, but some components of the individual utility are unobservable and are treated as stochastic. Thus the utility is taken as a random variable. The estimation framework of the random utility model proposed by McFadden (1974) allows to estimate the effects of contract attributes and individual characteristics and next to compute WTP indicators.

More precisely, we use the random parameters logit model (RPL) that is becoming the standard reference for stated choice studies because it eliminates limitations of standard logit models such as homogenous preferences among individuals and restricted substitution patterns between alternatives.

As usual in stated choice experiments, consumers' responses are assumed to follow the standard assumptions of random utility theory. For individual i, his (indirect) utility

associated with the choice of an alternative j in a choice set s can be written as in eq. 11.

$$\begin{aligned} U_{ijs} &= V_{ijs} + \epsilon_{ijs} \\ U_{ijs} &= X_{ijs}\beta_i + \epsilon_{ijs} \end{aligned} \tag{11}$$

with $i = 1, \cdots, n$; $j =$ Contract A, B or Reference and $s = 1, 2, 3, 4, 5$.

The utility of an alternative is composed of a deterministic part V_{ijs} and a random part ϵ_{ijs} standing for all unobserved variables, independent of β_i and assumed to follow type I extreme value distribution. The deterministic part of the utility function of individual i associated with alternative j is modelled as a linear function of attributes and an alternative specific constant (ASC) to control for status quo or aversion to move from the reference contract to the alternatives. Finally, β_i is a parameter vector of coefficients of these variables (denoted X_{ijs}) representing individual's taste. The set of preference parameters β_i is distributed across individuals according to a statistical distribution, $\beta_i \approx f(\beta_i|\beta, \sigma_\beta)$, characterized by mean β and standard deviation σ_β. In our study, $f(\beta)$ is specified to be normal. The consumer knows the value of his own β and ϵ_{ijs} for all alternatives and chooses the alternative that maximizes his utility function. So the probability conditional on β_i that individual i will choose the alternative j is given by eq. 12.

$$L_{ijs}(\beta_i) = \frac{e^{X_{is}\beta_i}}{\sum_m e^{X_{ims}\beta_i}} \tag{12}$$

However we do not know β_i and cannot condition on β. So the unconditional probability that individual i will choose the alternative j is given by eq. 13.

$$P_{ijs} = \int \frac{e^{X_{is}\beta_i}}{\sum_m e^{X_{ims}\beta_i}} f(\beta) d\beta \tag{13}$$

We will perform further analysis for the computation of WTP estimates. Coefficients obtained from RPL model cannot be interpreted as the direct effects of the respective explanatory variables on the probability of choosing each particular type of contract. But we can use these coefficients to cumpute mean WTP. WTP for a given attribute corresponds to the marginal rate of substitution between the quantity expressed by the attributes and the price (Louviere and Swait, 2000). Following Hanneman and Kanninen (1999) and Burton, Rigby, Young, and James (2001), the WTP for each attribute k corresponds to the ratio in eq. 14.

$$WTP_k = -\frac{\beta_k}{\beta_{price}} \tag{14}$$

Each of these ratios is understood as a price change associated with a unit increase in a given attribute. Note that a negative value corresponds to a willingness to accept. Given that the preference parameters are distributed across consumers and each consumer will make s repeated choices, the individual i average WTP will be computed as in eq. 15 and the estimate of the WTP for attribute k is obtained by averaging WTP_i across consumers. However, it should be noted that mean WTP obtained is expressed in percentage. To get WTP expressed in Euro, we will apply the reference price of contracts to them, that is 10 €.

$$WTP_{ik} = -\frac{\frac{1}{S}\sum_s \frac{-\beta_{ik}}{\beta_{i,price,s}} L(\beta_{i,s})}{\frac{1}{S}\sum_s L(\beta_{i,s})} \tag{15}$$

Note that by proceeding in this way, we assume a fixed price coefficient. In this case, Train and Weeks (2005) demonstrate that such assumption implies that the standard deviation of unobserved utility is the same for all observations, while in many situations it can vary randomly over observations. Estimation practices that ignore such variations may lead to erroneous interpretation and policy conclusions. To overcome this issue, Train and Weeks (2005) suggested re-formulating the model such that assumptions are made regarding the distribution of WTP.[9] To check the robustness of our results, we also estimate Generalized Multinomial Logit Models (called GMNL-II by Fiebig, Keane, Louviere, and Wasi, 2010) that allows us to get WTP in the WTP space by assuming that the price is normally distributed.[10]

2.4 General survey procedure

Experiments are conducted in two waves: from June to August 2012 and from June to July 2013, in the metropolitan area of Rennes, France. Upon arriving at the place of distribution, individuals are asked if some of them are willing to answer questionnaires about CSAs, including incentivized experiments. Sometimes, appointments are made for the distribution that will take place next week. Overall, 162 subjects, from 16 CSAs participated. All are committed to long term contracts with local farmers for vegetable supply. Before starting, respondents sign up a consent form and are given introductory instructions. Instructions emphasize that (i) all responses are confidential; (ii) they will complete several sets of decision tasks, and (iii) at the end, one of the two incentivized experiments will be randomly selected and actual money will be paid out. The experiment starts with a questionnaire about their usual food purchases (choice criteria for vegetables, identities of their main suppliers of vegetables, level of importance of the respect of environment and the knowledge of products origin ...). Specifically, respondents are asked to answer a

[9] See Hole (2011) for a detailed explanation.

[10] Results of GML Models estimations are reported in Tables 16 and 17 in Appendix.

question formulated as follows: How important is the variable X in your food purchase? Respondents answer through a five-point Likert scale from "Not concerned" to "Very concerned". Next they answer to the stated choice survey and the two incentivized experiments. The order of the two incentivized experiments is randomized to avoid any order effect. Finally, they finish by a questionnaire regarding socio-demographic characteristics (age, gender, level of education, number of people in households, revenue, ...).[11] Respondents know at the beginning of the experiment that only one of the two incentivized experiments, randomly chosen at the end of the experiment, will be remunerated. Next a random draw selects the decision number to be paid in the selected experiment. If the experiment dedicated to the elicitation of fairness preferences is selected, next a random draw selects 2 of the 13 options and the best ranked option is thus remunerated. This enables to maintain consumers incentives to rank all 13 options and not only the best ranked options (Briggeman and Lusk, 2011). Furthermore, a local CSA farmer and a local non CSA farmer are randomly selected at the end of all experiments for each wave of experiments (in September) to receive the amount that has been allocated to them in the experiment. Each participant receives 10 Euros for participation. The average duration of the experiment is 40 minutes and payoffs vary from 8.90 Euros to 19 Euros (on average 12.46 Euros).

3 Results

In a first subsection, we present a descriptive analysis of our sample of CSA consumers and the characteristics of their actual contracts and then, we carry out descriptive analysis of fairness and risk preferences. In a second subsection, we conduct a parametric analysis of the elicitation of fairness and risk preferences and of the stated choice survey results.

3.1 Descriptive analysis

3.1.1 Sample characteristics

Responses to our socio-demographic questionnaire highlight that respondents share common characteristics. As reported in Table 4, most of them are older than 30 years (on average 43.5) and they have a high education (67.90% have pursued their studies at least 3 years in high school). A major part of our sample has a high household income given that the French mean and median net monthly income were respectively 2,130 and 1,712 euros in 2011.[12]

[11] See full version of the questionnaire in Appendix.

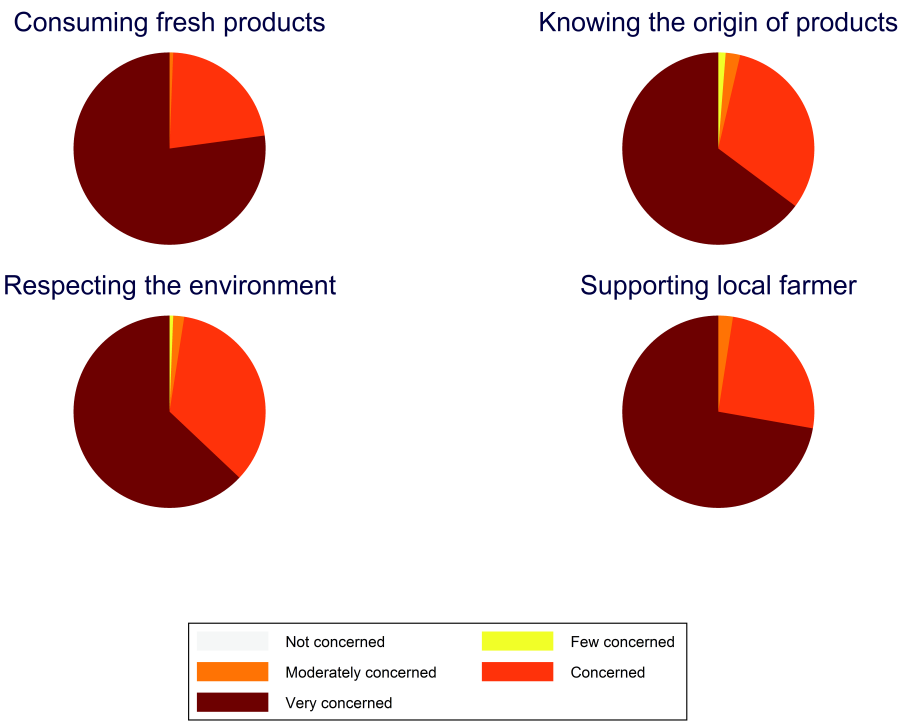
[12] INSEE première (2013), n°1471, Octobre 2013. A more recent survey indicates that the French mean and median net monthly income were respectively 2,995 and 2,461 euros in 2013 but these amounts include financial incomes; INSEE: Enquêtes Revenus fiscaux et sociaux de 2005 à 2013.

Table 4: Socio-demographic characteristics

		Number of respondents	Sample frequency
Age			
	20-30 yrs	19	11.73
	31-40 yrs	57	35.19
	41-50 yrs	36	22.22
	51-60 yrs	33	20.37
	60-70 yrs	17	10.49
Gender			
	male (0)	56	34.57
	female (1)	106	65.43
Household monthly income			
	<1,100€	8	4.94
	1,100-1,899€	17	10.49
	1,900-2,299€	15	9.26
	2,300-3,099€	32	19.75
	3,100-3,999€	44	27.16
	4,000-6,499€	40	24.69
	>6500€	6	3.70
Education level			
	primary school	0	0
	secondary (high) school	1	0.62
	BEP CAP	8	4.94
	Bachelor	11	6.79
	Bachelor +1 or 2 yrs	32	19.75
	Bachelor + 3 yrs	32	19.75
	Bachelor + 4 yrs	20	12.35
	Bachelor + 5 yrs	58	35.80

Respondent are also those who usually make food purchase. Of course, CSA is not the sole outlet; respondents often attend specialized stores (on average 2 times per week) and, in a lower frequency, retail stores (on average 1 time per week). This observation suggests that respondents are more interested in fresh and specialized products than common food products. This is strengthened by answers provided in the questionnaire regarding their motivation in their food purchases. As depicted by Fig. 1, most of respondents are concerned with the consumption of fresh products, the production methods that respect the environment and they exhibit an interest in the origin of the products. This last observation may be related to their concerns about favoring local farmer, this latter being strengthened by the forth pie.

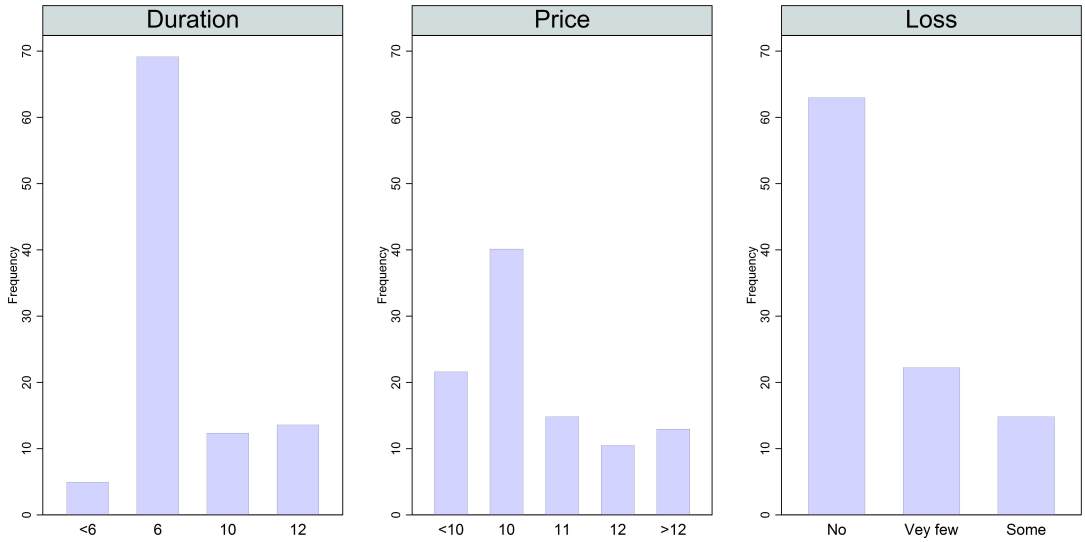
Figure 1: Motivations in food purchases



3.1.2 Contract characteristics

Respondents share similar characteristics in their current contract. If we look at Fig. 2, the largest part of contracts lasts 6 months. Only few contracts last less than 6 months and refer mainly to respondents that have recently joined the CSA. Finally, some contracts last 10 months while other last 12 months but they are mainly annual contracts in which some of them include a period of no supply. Prices are more heterogeneous, the most prominent price being 10 Euros for a basket. But this last observation should be considered with caution because some respondents have only an approximate knowledge of the price of their basket and the size of the basket may also vary across the CSAs. Finally, very few respondents observe losses, and for those who observe losses, losses are very rare and small.

Figure 2: Characteristics of current contracts



Note: The duration of the contract is expressed in months, the price in euros and the loss is a qualitative variable.

Because the value for attributes in the reference contract used in our stated choice survey has been chosen following our qualitative analysis of several CSA contracts, it is not surprising that the reference contract is very close to the most observed features of current contracts. As a reminder, our reference contract assumes a price of 10 Euros and the observation of no loss. Only the duration of our reference contract differs. From our qualitative analysis of CSA contracts, we have observed the same frequency of seasonal and annual contracts (43.48% each) which led us to set the duration equal to 10 months. But in our pool of consumers the modal duration is equal to 6 months (69.14% of consumers) while only 25% of consumers have committed to an annual contract (i.e., 10 or 12 months). The similarity of features between the current contract and the reference contract can explain, at least in part, that 60.49% of decisions observed consists in choosing the reference contract in the stated choice survey.[13] This preference for the status quo has two implications. First, it leads to a higher frequency of choices for attributes corresponding to the status quo (see Table 13 in Appendix). Second, it requires the use of an alternative specific constant (ASC) variable in the parametric analysis of the choices made in the stated choice survey. Besides, two notable results are noteworthy. The first one refers to the choice set 3 of version 2 in which contract A differs from the reference contract only in the Price attribute since it sets a lower price (i.e., -20%). In this case, we note that 33.33% of respondents prefer the reference contract even if the established price is higher. The second observation refers to the choice set 2 of version 3 in which contract B differs from the reference contract only in the attribute Price but it proposes a lower price (i.e., -20%). Again, a significant part of respondents prefer the reference con-

[13] No significant difference is observed across versions.

tract (48.15%). These observations underline that a significant part of respondents prefer keeping the reference contract rather than switching to another, even if this latter sets a lower price. This may suggest some aversion toward transaction costs occurring when changing a contract for another or some fairness concerns from respondents toward CSA farmers. However, before drawing clear conclusions, it is necessary to account for the attribute levels of the third proposed contract as well as individual preferences.

Table 5: Decisions in the stated choice survey

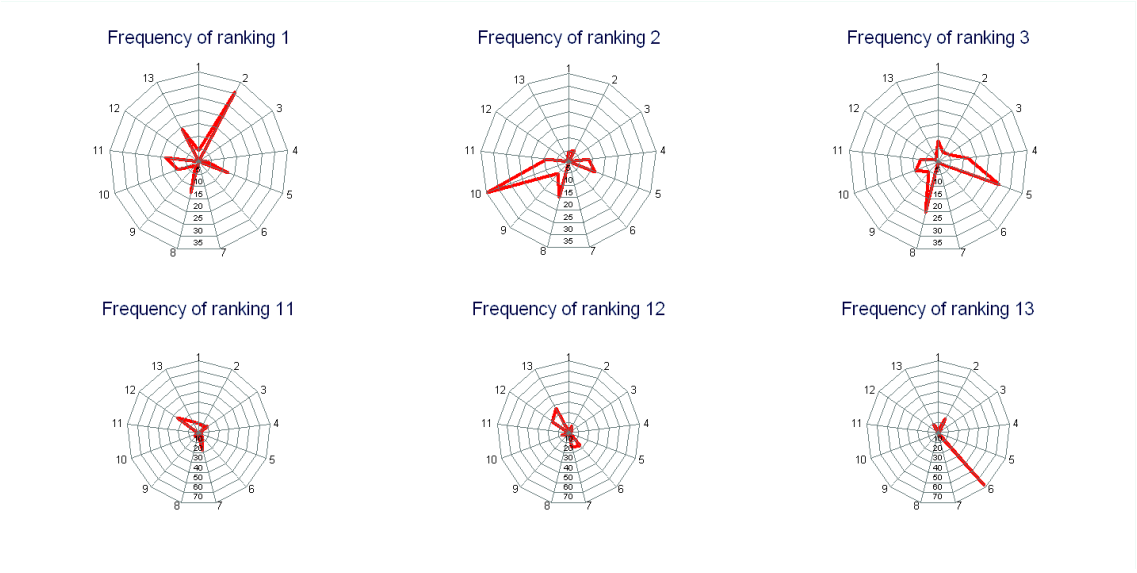
	Choice set number	Contract	Duration (in month)	Loss (in basket size)	Price (in %)	Frequency
Version 1	1	Reference	10	0	0	49.09
		A	6	2/3	-20	29.09
		B	3	1/3	-20	21.82
	2	Reference	10	0	0	65.45
		A	3	2/3	+20	1.82
		B	10	2/3	0	32.73
	3	Reference	10	0	0	54.55
		A	6	1/3	+20	9.09
		B	6	2/3	-20	36.36
	4	Reference	10	0	0	40.00
		A	3	0	-20	23.64
		B	6	0	0	36.36
	5	Reference	10	0	0	72.73
		A	3	1/3	+20	7.27
		B	6	1/3	+20	20.00
Version 2	1	Reference	10	0	0	64.81
		A	10	0	+20	0
		B	10	1/3	-20	35.19
	2	Reference	10	0	0	74.07
		A	10	1/3	+20	5.56
		B	3	0	0	20.37
	3	Reference	10	0	0	33.33
		A	10	0	-20	42.59
		B	6	1/3	0	24.08
	4	Reference	10	0	0	57.41
		A	10	1/3	-20	42.59
		B	3	2/3	+20	0
	5	Reference	10	0	0	83.34
		A	6	0	+20	12.96
		B	3	0	+20	3.70
Version 3	1	Reference	10	0	0	73.59
		A	3	0	0	20.75
		B	3	2/3	-20	5.66
	2	Reference	10	0	0	39.62
		A	3	1/3	-20	7.55
		B	10	0	-20	52.83
	3	Reference	10	0	0	39.62
		A	6	0	-20	58.49
		B	10	2/3	+20	1.89
	4	Reference	10	0	0	73.59
		A	10	2/3	0	22.64
		B	6	0	+20	3.77
	5	Reference	10	0	0	64.15
		A	6	1/3	0	20.75
		B	10	1/3	0	15.10

3.1.3 Fairness-preference results

We first provide descriptive analysis regarding fairness preferences. Fig. 3 displays the number of times each option has been chosen for the best rankings and the worst rankings (Table 1 in section 2.1.1 presents the 13 options available). For instance, on the left

panel at the top of Fig. 3, we observe how many times each option has been classified in first position. A first insight into individual ordering highlights two notable results. First, from Fig. 3, we note that a significant part of our subject pool rank in first position the options that are most favorable to farmers. For instance, option 2 (with a repartition 0,4,4, see Table 1) is ranked in the first position by 30.86% of respondents and option 10 (with a repartition 1,4,3, see Table 1) is ranked in second position by 34.57% of respondents. In addition, 25.93% of respondents choose the option 2 in first position and option 10 in second position. These respondents also favor local CSA farmer since they rank in last position (i.e., rank 13) the option 6 (i.e., repartition 4,0,4, see Table 1). This option is ranked in last position by 67.90% of respondents and options 12 and 13 (i.e., repartition 4,1,3 and repartition 4,4,0, respectively, see Table 1) are ranked in penultimate position by 19.13% and 26.54% of consumers, respectively. Second, CSA farmers are favored: best ranked options correspond to options that favor local CSA farmers while option 6 that disfavors CSA farmers is often ranked in last position.

Figure 3: Best and worst ranked options



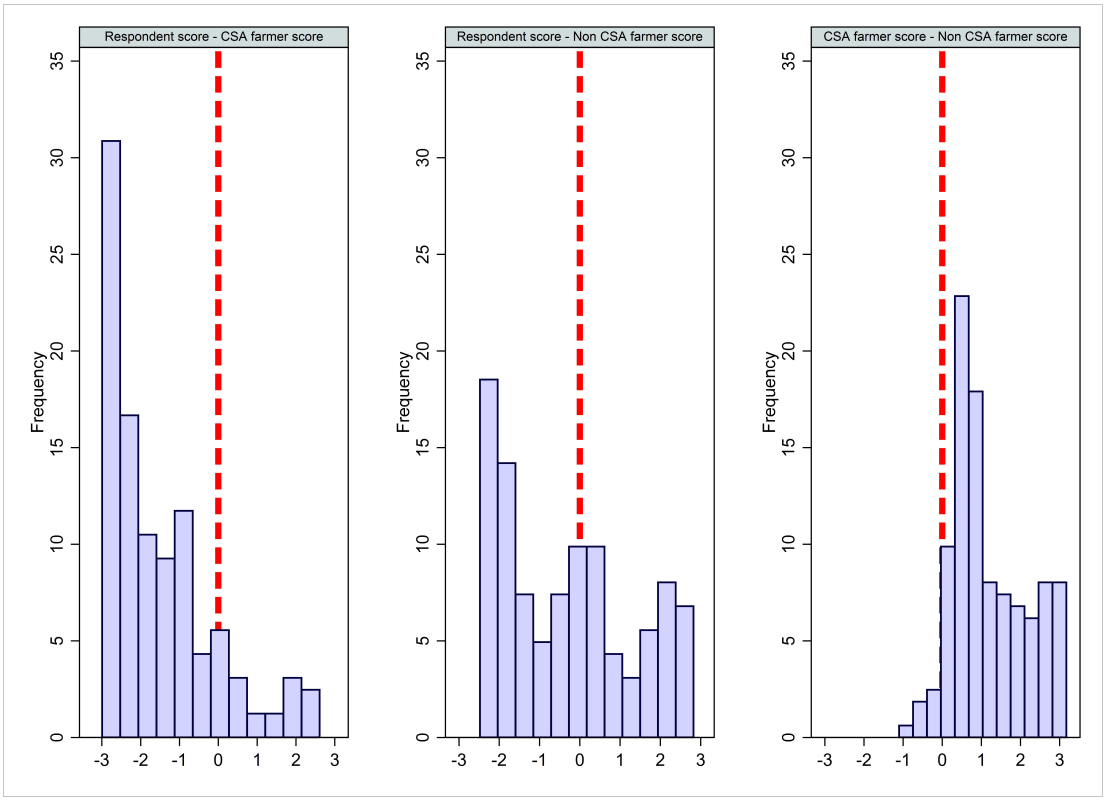
To analyze whether respondents clearly tend to favor CSA or non CSA farmers, one can examine the aggregate ranking respondents make. Given that the ranking provided by respondents informs us about his/her preferences, we need to weight by the rank of the option the amount of money allocated to the recipient; and this for each recipient k. We thus obtain three scores per respondent depending on the recipient k: $score_{respondent}$, $score_{CSA}$ and $score_{nonCSA}$, calculated as follows:

$$score_{ik} = \frac{1}{\sum_{j=1}^{13} amount_{ikj}} \sum_{j=1}^{13} [(14 - r_{ij}) * amount_{ikj}] \tag{16}$$

with $amount_{ikj}$ the allocation of the respondent i to the recipient k in option j, $\sum_{j=1}^{13} amount_{ikj}$

the total amount of money allocated by the respondent i to the recipient k after the ranking of the 13 options and r_{ij} the ranking the respondent i gives to option j.[14] It is straightforward to interpret these scores: for a given respondent, the higher the score for a given recipient is (compared to the others), the more this recipient is favored. To determine whether they give more to local CSA farmer, local non CSA farmer or if they favor themselves, one need to compute the scores difference between all recipients, i.e., between the respondent him/herself and each farmer and between farmers. Fig. 4 displays the histograms of the 3 possible differences between scores. On the left panel of Fig. 4 we see that a large part of observations (85.80%) lies on the negative side, meaning that the total score for the local CSA farmer is higher than the total score of the respondent. Knowing that the higher the score is, the more the agent is favored, one can argue that a large part of our subject pool favors local CSA farmer over themselves. Evidence is more mixed regarding local non CSA farmer: 59.88% of respondents favor non CSA farmers over themselves and 40.12% favor themselves over non CSA farmer. Finally, when we compare the total score obtained by each type of farmers, a clear evidence appears: CSA farmers are favored (94.44% of observations).

Figure 4: Distribution of scores difference



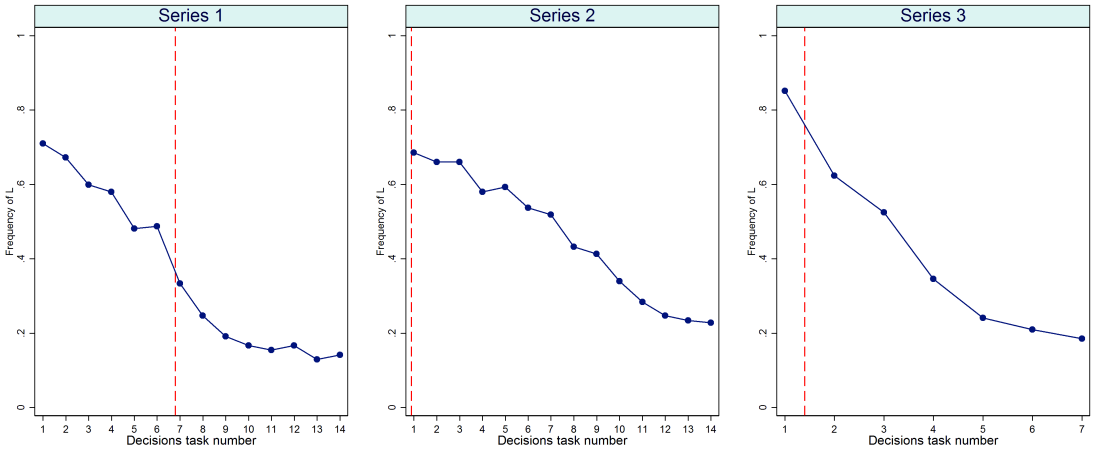
Note: The vertical dashed line represents the equality of scores for the two recipients considered.

[14] We normalize the score by adding $\frac{1}{\sum_{j=1}^{13} amount_{ikj}}$ because the sum of amounts dedicated to each recipient k, regardless of the ranking, differs according to the recipient.

3.1.4 Risk-preference results

Choices made in the risk experiment enable us to observe respondents with consistent preferences, i.e., respondents switch at some points (if at all) from choosing the lottery L to choosing the lottery R, but they do not switch back. All in all, 90.74% of respondents behave consistently in both series. The same proportions of consistent choices are observed under lotteries with low expected payoffs difference (series 2, 93.83% of consistent choices) and potentially high payoffs (series 1, 94.5% of consistent choices). Finally, the introduction of potential losses slightly increases the frequency of consistent choices (series 3, 95.06% of consistent choices). Fig. 5 displays the proportion of choices for lottery L (i.e., safe choice) for each decision in each series. For the three series, the frequency of L choices lies to the right of the risk neutral prediction, showing a tendency toward risk averse behavior among our respondents.[15]

Figure 5: Proportion of lottery L choices in each decision per series and predictions



Note: The vertical dashed line represents the theoretical value for which respondents are risk and loss neutral.

3.2 Parametric analysis

We first present results from ROL models to estimate fairness determinants of utility function. Next, we expose maximum likelihood estimates for risk attitudes. Finally, we present and discuss the results of RPL models and estimates for WTP.

3.2.1 Structural estimation of fairness preferences

Table 6 presents the results for the ROL. First, we find that our model gives better predictions for the least preferred option than for the more preferred one. We can combine that

[15]For Fig. 5 and the reported analysis, the full sample of available observations was used. Fig. 5 and analysis change very little if we instead drop inconsistent respondents, i.e., respondents who switch from R back to L. The average number of safe choices (i.e., lottery L) decreases slightly if we restrict our attention to consistent respondents, but less than 0.1 choices.

result with our previous finding in Fig. 3, that is the worst ranked options are those where farmers, and especially the CSA farmer, are allocated with the lowest amount whereas the more preferred are those where farmers, and especially the CSA farmer, are allocated with the highest amount (see Fig. 3). In Table 6, we examine whether the sensitivity toward inequality differs depending on its direction, as assumed by Fehr and Schmidt (1999) (see eq. 2).

Regarding *disadvantageous inequality* (i.e., consumer is worse off, in terms of monetary outcomes, than farmers), we find that respondents express aversion toward inequality between non CSA farmer and themselves ($\alpha_2 < 0$) while such inequality with a CSA farmer acts positively on their utility ($\alpha_1 > 0$). Contrary to the theoretical model of Fehr and Schmidt (1999) that assumes $\alpha_1 < 0$, we find positive DI toward CSA farmers. We compute percent change in odds of ranking an option ahead vs behind for unit increase of each explanatory variable. For a given payoff allocated to consumer, when payoff allocated to CSA farmer increases by one euro, the odds of ranking an option ahead vs behind increase by 61.4%. However, for a given payoff allocated to consumer, when payoff allocated to non CSA farmer increases by one euro, the odds of ranking an option ahead vs behind decrease by 8.5%.

If we turn to *advantageous inequality* (i.e., consumer is better off, in terms of monetary outcomes, than farmers), consumers express disutility from payoff inequality, regardless of the type of farmer ($\beta_1 < 0$, $\beta_2 < 0$). Aversion is stronger when consumers get a higher payoff than CSA farmer than when consumers get a higher payoff than non CSA farmer: for a given payoff allocated to consumer, the odds of ranking an option ahead decrease by 47.4% when payoff allocated to non CSA farmer decreases by one euro but by 60.4% when payoff allocated to CSA farmer decreases by one euro.

To sum up, these results corroborate the differing sensitivities toward (i) advantageous and disadvantageous inequality and (ii) across recipients. Besides, contrary to Fehr and Schmidt (1999), we find that DI toward CSA farmers is positive and that marginal utility is higher for AI than for DI whatever the recipient. Our result is certainly due to our sample that is exclusively composed of CSA members already sensitive to issues of fairness for CSA farmers. But, this result is not uncommon in the literature. For example, Bonein and Denant-Boèmont (2015) and Blanco, Engelmann, and Normann (2011) report that 44.31% and 37.71% respectively of subjects express a higher marginal disutility for AI than for DI. This result is strengthened by the recent study of Beranek, Cubitt, and Gächter (2015) that aims to compare stated and revealed inequality aversion in three subject pools (Nottingham, Izmir and MTurk). The authors find violations at the median level of the assumption of a greater sensitivity to disadvantageous than advantageous inequality and between 51% and 59% of subjects in their study - depending to the subject

pool - express a higher marginal disutility for AI than for DI in case of revealed preferences.

Table 6: Rank-Ordered Logit results

	Theoretical parameter	Parameter estimates	% change in odds (a)
Marginal utility derived from			
Disad. ineq. btw CSA farmer and subject	α_1	0.478***	61.4%
		(0.038)	
Disad. ineq. btw non-CSA farmer and subject	α_2	-0.088**	-8.5%
		(0.038)	
Adv. ineq. btw CSA farmer and subject	β_1	-0.926***	-60.4%
		(0.030)	
Adv. ineq. btw non-CSA farmer and subject	β_2	-0.643***	-47.4%
		(0.037)	
Goodness of fit			
Number of obs.		2,106	
Log likelihood		-3275.961	
Prob>0		0.0000	
Percentage correctly predict most preferred option		24.07%	
Percentage correctly predict least preferred option		67.90%	

Notes: ***, **, *: denote statistical significance at the 1%, 5% or 10% level, respectively. Robust standard errors in parentheses. (a) Percent change in odds of ranking an option ahead vs behind for unit increase in explanatory variable given the payoff allocated to consumer.

3.2.2 Structural estimation of risk preferences

Results for the estimation of risk preferences with maximum likelihood are reported in Table 7. Specification of eq. 10 allows estimating parameters for risk aversion ($r > 1$), loss aversion ($\lambda > 1$) and probabilities distortion ($\gamma > 1$). We also test for parameters equality to one; especially for γ and λ since expected utility theory assume $\gamma = 1$ and $\lambda = 1$.

Results are reported in Table 7. The significance of the estimated standard deviation σ indicates that consumers evaluate expected utilities of lotteries making mistakes following a normal distribution of zero mean and standard deviation of 0.739. The other results of the ML estimation show that the value function is concave in the gain domain and the estimated parameter r is significantly different from one ($Prob < 0.001$). On average, consumers exhibit risk aversion over gains. Regarding losses, the value function is convex in the loss domain (risk seeking over losses) and the estimated λ parameter is significantly different from one ($Prob < 0.001$). In adddition, $\lambda > 1$ means that losses are overvalued relative to gains of the same size. Finally, consumers overweight small probabilities and underweight high probability, since γ is significantly different from one ($Prob < 0.001$).

Table 7: Maximum likelihood estimation of risk attitudes using cumulative prospect theory and Fechner error model

Risk aversion parameter r	0.523***
	(0.041)
Loss aversion parameter λ	1.652***
	(0.174)
Probability distortion parameter γ	0.684***
	(0.037)
Standard deviation[a] σ	0.739***
	(0.122)
Goodness of fit	
Number of obs.	5,705
Log likelihood	-3,479.2219

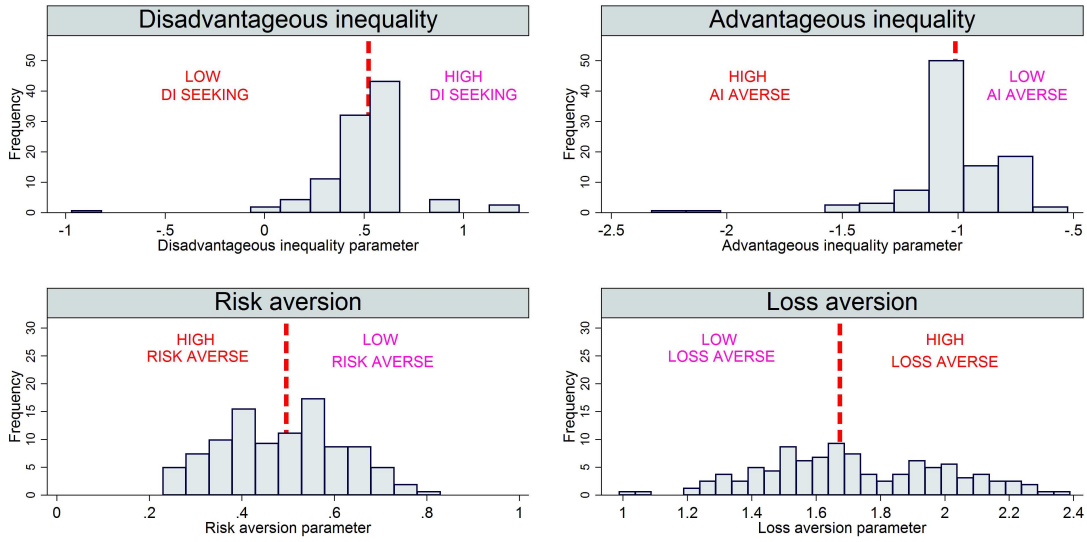
Notes: (a) We consider a normally distributed Fechner error with zero mean and variance σ^2; (b) ***, **, *: denote statistical significance at the 1%, 5% or 10% level, respectively. Standard errors in parentheses, clustering at the individual level.

3.2.3 Results from the stated choice survey

We aim to examine whether fairness and risk preferences may explain why consumers choose a particular contract. To this end, we estimate the empirical specification of eq. (13) according to four preference parameters: AI and DI toward CSA farmers (respectively β_1 and α_1 in Equation (2)) elicited from the incentivized-fairness experiment and loss aversion and risk aversion (respectively λ and r in Equation (4)) elicited from the incentivized-risk experiment.

To get individual estimates for fairness, we estimate ROL model for each category of consumers (i.e., for each possible combination of socio-demographic characteristics: age, gender, income and educational level; see Table 14 in Appendix). By proceeding in this way, we get an individual estimate for each consumer for each type of inequality (AI and DI). Because we are mainly interested in fairness preferences toward CSA, we only retain in the subsequent analysis the individual parameters for inequality toward CSA and do not consider fairness for non-CSA farmers. Regarding risk preferences, we estimate risk preferences with maximum likelihood by adding socio-demographic characteristics (see Table 15 in Appendix) and next we compute the predicted estimates for each consumer. We focus on loss and risk preferences and exclude the parameters describing the weighting probability function because we are more interested in outcomes, namely losses in basket size, than in probabilities. The distributions of individual fairness and risk preferences are depicted in Fig. 6.

Figure 6: Fairness and risk parameters distribution



Note: The vertical dashed line represents the median value.

To study whether such individual preferences affect the probability to choose a particular contract and the sensitivity toward the contract attributes, we divide our sample into two subgroups for each preference parameter, according to the median value represented by the dashed line in Fig. 6. By doing so, we will be able to compare different subgroups of consumers and this allows us to minimize the number of explanatory variables to preserve the quality of our estimations given the size of our sample and to avoid the potential correlation between fairness and risk preferences parameters.

In our estimations, the ASC and Price attributes are specified as non random and the Duration and Loss attributes are specified as random and normally distributed (see Hensher, Shore, and Train, 2005). We specify a normal distribution for the Loss attribute rather than a lognormal distribution (used when the parameter is assumed to be a specific sign) since we do not want to constraint the parameter. We hypothesize that CSA consumers may exhibit an aversion or a preference for losses if driven by fairness. We also consider a quadratic effect for the Duration attribute. However, note that the reported WTP are computed with a linear effect of the duration of the contract.

In a first step, we present general results without taking into account fairness and risk preferences. Results are presented in Table 8. All coefficients are statistically significant at the 1% level except for the Duration attribute that is significant at the 5% level. The model shows statistically significant standard deviations for Duration and Loss attributes indicating random variation of preferences among consumers for these attributes. The heterogeneity across consumers is relatively large for the Loss attribute as the standard deviation coefficient is larger than the mean coefficient. We observe a status quo effect (ASC): as previously reported in Table 5, CSA consumers showing a preference for the

reference contract.

Table 8: Random Parameters Logit model results for the entire consumers sample

	Mean (SE)	SD (SE)	ME[a]	WTP[b]
ASC	0.878*** (0.167)			
Duration	1.608** (0.245)	0.282*** (0.061)	0.200*** (0.079)	0.281*** (0.078)
Duration^2	-0.104*** (0.017)	0.013*** (0.005)		
Loss	-2.632*** (0.553)	4.066*** (0.621)	-0.034*** (0.016)	-4.255*** (0.912)
Price	-0.646*** (0.061)		-0.095*** (0.021)	
Log L		-626.20***		
#obs		2,430		

Notes: ***, **, *: denote statistical significance at the 1%, 5% or 10% level, respectively. (a) Marginal effect at means for a one month increase in contract length for attribute *Duration*, for a 10% decrease in basket size once a month for attribute *Loss* and for a one euro increase in price for attribute *Price*. Marginal effects are estimated using the full model (with quadratic effect of duration).(b) Willingness to pay computed as the ratio of the attribute coefficient to the price coefficient using the linear model (without quadratic effect of duration); WTP reads as the willingness to pay in euros for a one month increase in contract length for attribute *Duration* and for a 10% loss in basket size once a month for attribute *Loss*.

In line with microeconomic theory, an increase in price or in loss decreases the associated utility level provided by the contract choice. Considering the estimated marginal effects for the loss attribute, a decrease of 10% in basket size once a month leads to a 0.034 decrease of the probability of choosing an alternative. The marginal effect is smaller for variations in losses than for price variations; a one euro increase in share price leads to a 0.095 decrease in the probability of choosing an alternative. If we consider WTP estimates, we find that CSA consumers are willing to give up a high amount in the share price to avoid losses. They are willing to pay 4.26 € to avoid a decrease by 10% in basket size once a month; it represents a 42.25% share price increase.

We now turn to the results for the Duration attribute. Surprisingly, the positive and significant (at the 5% level) coefficient associated with Duration indicates an upward sloping duration-demand relationship, suggesting consumers' preference for contract with a long duration so that a one month increase of duration increases by 0.2 the probability of choosing a contract. This suggests that CSA consumers prefer longer contracts either for fairness reasons, to support the farmer on a longer period, or for transaction costs issues, to avoid negotiation costs. Marginal effects are higher for variations in duration than for variations in basket size. This is not true for WTP. We find CSA consumers

are willing to pay 0.28 € for a one month increase in contract length (that is a 2.81% share price increase). This figure is very small compared to the WTP estimated for the Loss attribute (42.25%). Finally, as shown by the quadratic effect of duration, the probability of choosing a contract increases with contract length but at a decreasing rate.

Besides these general results, it is also interesting to look at whether fairness and risk preferences may explain the sensitivity toward contract attributes. To this end, results are presented in two tables: Table 9 and Table 10. In each table, in the left panel, we consider the sample of consumers with an estimated preference parameter below median value and in the right panel, the sample of consumers with an estimated preference parameter above median value. To test whether the sensitivity to contract attribute differs depending on individual preferences, we perform two tests. To this end, in a first step, we conduct mixlogit regression using the user-written command mixlogit to fit mixed logit models (Hole, 2007). Second, we compute the marginal effects and we bootstrap the marginal effects with 100 replications to get standard errors assuming a normal distribution. Finally, we perform a t-test to compare the mean of marginal effects across the two samples of consumers and a Kolmogorov-Smirnov test to compare their distribution. We estimate WTP with 100 replications. General results on the main effects of CSA contract attributes as discussed from Table 8 remain in the models of Table 9 and Table 10. Let us discuss results on the impact of fairness and risk preferences. As explained before, we consider subgroups of consumers (two subgroups for each preference parameter, according to the median value) labeled as in Fig. 6.

A first result concerns contract duration. As mentioned before, CSA consumers prefer a longer contract, which suggests two possible reasons, either out of fairness or in order to avoid negotiation costs. Table 9 helps us to better understand that positive relationship. CSA consumers in the HIGH DI SEEKING group significantly but weakly prefer longer contracts than their counterparts (significant t-test at the 10% level). Preference for AI toward CSA farmers has no significant effect. This shows that the upward sloping duration-demand relationship is weakly driven by fairness motivations, by a preference for DI toward CSA farmers. Table 10 is also helpful. It shows that HIGH LOSS AVERSE and LOW RISK AVERSE consumers prefer significantly longer contracts that their counterparts (significant t-tests at the 1% level). High loss-averse individuals may prefer longer contracts than their counterpart because they always value more increases in contract length, viewed as a gain, than decreases in contract length, viewed as a loss. This is in line with the idea that "losses loom larger than gains". Low risk-averse individuals prefer longer contracts than their counterpart. They are more willing to bear uncertainties about the future.

We now consider the Loss attribute. Consider Table 9. Consumers in the HIGH AI AVERSE group are significantly less sensitive to losses than their counterparts. When losses in basket size increase by 10%, the probability of choosing a contract decreases by

0.026 for HIGH AI AVERSE consumers but by 0.043 for LOW AI AVERSE consumers. The difference in WTP is especially striking. Consumers with a high AI aversion are willing to pay around 2.902 € to avoid a decrease by 10% in basket size once a month while those with a lower AI aversion are willing to pay around 6.123 € that is twice more. These results indicate that fairness is a motivation in sharing production risks: consumers who experience disutility when they are better off, in terms of monetary payoffs, than CSA farmers (i.e., AI aversion) are less sensitive to an increase in loss in basket size. DI has no significant impact.[16] Regarding risk preferences, results are as expected. Those in the LOW LOSS AVERSE group are less sensitive to losses. As shown in Table 10, the probability of choosing a contract when losses in basket size increase by 10% decreases significantly less for low loss averse individuals than for high loss averse individuals (marginal effects: resp. 0.022 and 0.044). Those in the LOW RISK AVERSE group are also less sensitive to losses than their counterpart (marginal effects: resp. 0.029 and 0.040). If we consider WTP, we also find that the WTP of HIGH LOSS AVERSE and HIGH RISK AVERSE individuals are respectively around twice as high as the WTP of their counterpart.

Finally, we consider the Price attribute. Consider Table 9. As for DI, individuals who belong to the HIGH DI SEEKING group are significantly less sensitive at the 1% level to price increase than their LOW DI SEEKING counterpart (marginal effects: resp. 0.087 and 0.106). When price increases, the HIGH DI SEEKING group turns less easily to other alternatives. This could illustrate a willingness to pay a fair price to the farmer. As for AI, we find that the HIGH AI AVERSE consumers are less sensitive at the 1% level to price increase than their counterpart (marginal effects: resp. 0.094 and 0.097). The more averse consumers are to AI, the less easily they will turn to an alternative CSA when share price increases. Also, as shown in Table 10, individuals in the HIGH RISK AVERSE group are significantly less sensitive at the 1% level to share price increase than individuals in the LOW RISK AVERSE group (marginal effects: resp. 0.081 and 0.109). Given a level of contract duration, individuals who choose CSA contracts have no uncertainties on the price of their food during that period. For that reason, it may be that high risk-averse individuals may choose to pay the certain price in CSA than the variable market price. They may do so for a wider range of prices than low risk-averse individuals. Loss aversion has no significant impact.

[16]Notice that in the upper panel of Table 9, the estimated marginal effect for the Loss attribute is higher, although not significant, for HIGH DI SEEKING than for LOW DI SEEKING individuals. So, estimated WTP should be higher for HIGH DI SEEKING than for LOW DI SEEKING individuals. In Table 9, the reverse is reported. This is because marginal effects are estimated using the full model (with quadratic effect of duration) while WTP are estimated using the linear model.

Table 9: Random Parameters Logit models results according to the sensitivity to inequality toward CSA farmers

	Disadvantageous inequality (α_1 in eq.(2))									
	LOW DI SEEKING[a]				HIGH DI SEEKING[b]				Comparing ME	
	Mean (SE)	SD (SE)	ME[e]	WTP[h]	Mean (SE)	SD (SE)	ME[e]	WTP[h]	ttest[f]	KS test[g]
ASC	1.096*** (0.252)				0.681*** (0.222)					
Duration	1.539*** (0.338)	0.069 (0.142)	0.189*** (0.033)	0.254*** (0.096)	1.529*** (0.325)	0.264*** (0.094)	0.206*** (0.034)	0.320*** (0.106)	*	ns
Duration^2	-0.102*** (0.024)	0.024*** (0.010)			-0.099*** (0.023)	0.014* (0.008)				
Loss	-3.008*** (0.848)	4.041*** (1.010)	-0.037*** (0.010)	-4.195*** (1.235)	-2.151*** (0.740)	3.972*** (0.864)	-0.030*** (0.010)	-4.204*** (1.613)	ns	ns
Price	-0.743*** (0.098)		-0.106*** (0.011)		-0.569*** (0.078)		-0.087*** (0.011)		***	***
Log L	-295.95***				-328.40***					
#obs	1,215				1,215					
	Advantageous inequality (β_1 in eq. (2))									
	HIGH AI AVERSE[c]				LOW AI AVERSE[d]				Comparing ME	
	Mean (SE)	SD (SE)	ME[e]	WTP[h]	Mean (SE)	SD (SE)	ME[e]	WTP[h]	ttest[f]	KS test[g]
ASC	0.839*** (0.220)				0.935*** (0.259)					
Duration	1.442*** (0.297)	0.304*** (0.063)	0.200*** (0.035)	0.239* (0.123)	1.885*** (0.396)	0.270*** (0.079)	0.203*** (0.035)	0.325** (0.136)	ns	ns
Duration^2	-0.097*** (0.021)	0.002 (0.007)			-0.120*** (0.027)	0.021*** (0.008)				
Loss	-1.710** (0.670)	3.739*** (0.760)	-0.026*** (0.009)	-2.902** (1.176)	-3.779*** (0.956)	4.326*** (1.017)	-0.043*** (0.010)	-6.123*** (1.662)	***	***
Price	-0.595*** (0.077)		-0.094*** (0.012)		-0.725*** (0.102)		-0.097*** (0.013)		**	**
Log L	-355.749***				-266.076***					
#obs	1,275				1,155					

Notes: ***, **, *:denote statistical significance at the 1%, 5% or 10% level, respectively. (a) Estimated disadvantageous inequity ($\hat{\alpha}_1$) equal or below median value 0.5237311. (b) Estimated disadvantageous inequity ($\hat{\alpha}_1$) above median value 0.5237311. (c) Estimated advantageous inequity ($\hat{\beta}_1$) equal or below median value -1.010454. (d) Estimated advantageous inequity ($\hat{\beta}_1$) above median value -1.010454. (e) Marginal effect at means for a one month increase in contract length for attribute *Duration*, for a 10% decrease in basket size once a month for attribute *Loss* and for a one euro increase in price for attribute *Price*. Marginal effects are estimated using the full model (with quadratic effect of duration). (f) Two sample ttest. Grey cells indicate the statistically highest ME (more sensitive consumer pool for Duration attribute and less sensitive consumer pool for Loss and Price attributes). (g) Two sample Kolmogorov-Smirnov test for equality of distribution functions. (h) Willingness to pay computed as the ratio of the attribute coefficient to the price coefficient using the linear model (without quadratic effect of duration); WTP reads as the willingness to pay in euros for a one month increase in contract length for attribute *Duration* and for a 10% loss in basket size once a month for attribute *Loss*.

Table 10: Random Parameters Logit models results according to sensitivity toward risk

In the loss domain (λ in eq. (4))

	LOW LOSS AVERSE[a]				HIGH LOSS AVERSE[b]				Comparing ME	
	Mean (SE)	SD (SE)	ME[e]	WTP[h]	Mean (SE)	SD (SE)	ME[e]	WTP[h]	ttest[f]	KS test[g]
ASC	1.167*** (0.246)				0.604*** (0.228)					
Duration	1.648*** (0.358)	0.429*** (0.091)	0.190*** (0.039)	0.258** (0.110)	1.733*** (0.354)	0.253*** (0.070)	0.222*** (0.034)	0.313*** (0.104)	***	***
Duration^2	-0.108*** (0.024)	0.009 (0.011)			-0.113*** (0.025)	0.006 (0.007)				
Loss	-1.888** (0.782)	3.992*** (0.965)	-0.022** (0.010)	-3.392** (1.450)	-3.215*** (0.813)	4.138*** (0.890)	-0.044*** (0.010)	-5.389*** (1.239)	***	***
Price	-0.691*** (0.092)		-0.097*** (0.011)		-0.618*** (0.825)		-0.094*** (0.013)		ns	ns
Log L	-319.20***				-303.55***					
#obs	1,230				1,200					

In the risk domain (r in eq.(4))

	HIGH RISK AVERSE[c]				LOW RISK AVERSE[d]				Comparing ME	
	Mean (SE)	SD (SE)	ME[e]	WTP[h]	Mean (SE)	SD (SE)	ME[e]	WTP[h]	ttest[f]	KS test[g]
ASC	0.816*** (0.224)				1.005*** (0.257)					
Duration	1.107*** (0.305)	0.160 (0.125)	0.160*** (0.042)	0.252** (0.115)	2.296*** (0.417)	0.475*** (0.092)	0.243*** (0.031)	0.307*** (0.102)	***	***
Duration^2	-0.074*** (0.022)	0.009 (0.009)			-0.150*** (0.028)	-0.007 (0.014)				
Loss	-2.731*** (0.772)	4.011*** (0.799)	-0.040*** (0.011)	-5.877*** (1.559)	-2.540*** (0.841)	4.093*** (0.923)	-0.029*** (0.009)	-3.134*** (1.123)	***	***
Price	-0.488*** (0.076)		-0.081*** (0.012)		-0.830*** (0.102)		-0.109*** (0.012)		***	***
Log L	-317.20***				-302.68***					
#obs	1,215				1,215					

Notes: ***, **, *:denote statistical significance at the 1%, 5% or 10% level, respectively. (a) Estimated loss aversion ($\hat{\lambda}$) equal or below median value 1.674585. (b) Estimated loss aversion ($\hat{\lambda}$) above median value 1.674585.(c) Estimated risk aversion ($\hat{r}$) equal or below median value 0.4965545. (d) Estimated risk aversion ($\hat{r}$) above median value 0.4965545. (e) Marginal effect at means for a one month increase in contract length for attribute *Duration*, for a 10% decrease in basket size once a month for attribute *Loss* and for a one euro increase in price for attribute *Price*. Marginal effects are estimated using the full model (with quadratic effect of duration). (f) Two sample ttest. Grey cells indicate the statistically highest ME (more sensitive consumer pool for Duration attribute and less sensitive consumer pool for Loss and Price attributes). (g) Two sample Kolmogorov-Smirnov test for equality of ME distribution functions. (h) Willingness to pay computed as the ratio of the attribute coefficient to the price coefficient using the linear model (without quadratic effect of duration); WTP reads as the willingness to pay in euros for a one month increase in contract length for attribute *Duration* and for a 10% loss in basket size once a month for attribute *Loss*.

4 Conclusion

We elicit CSA members' preferences for attributes of CSA contracts and more specifically the impact of fairness and risk preferences. We first elicit fairness and risk preferences using field experiments. We find that consumers are averse to advantageous inequality toward CSA and non CSA farmers and averse to disadvantageous inequality toward non CSA farmers as in fairness theory. But, in contrast to theory, we find evidence of DI seeking toward CSA farmers and a stronger marginal utility for advantageous inequality than for disadvantageous inequality whatever the recipient. We consider three attributes of CSA contracts (Loss, Duration and Price). Our results shed a new light on understanding determinants of CSA consumer choice of CSA attributes. In the stated choice survey, we find consumers prefer longer contracts and that it is risk-driven rather than fairness-driven. As expected, we also find consumers exhibit a dislike for losses and for share price increases, willingness to pay to avoid losses being particularly high. Our study shows that basket size, an attribute not guaranteed in CSAs, is a crucial issue to be addressed. Our qualitative study revealed that very few CSA contracts explicitly address that issue. Besides, there is evidence of supply outside the CSA when products are lacking. In a study on determinants of CSA membership, Bougherara, Grolleau, and Mzoughi (2009) report that in France, some CSA farmers when facing less than expected harvested quantities purchased organic foods outside the CSA contract. However, according to our results, that issue is less crucial when consumers are highly averse to advantageous inequality and when they are highly seeking disadvantageous inequality. This highlights the role of fairness preferences in our sample. Our study also shows that loss aversion and risk aversion are important. These preferences may as well explain provision outside the farm. Our study also highlights a willingness to pay the fair price to the CSA farmer, confirming the ethical orientation of that kind of food supply. CSA consumers' support for CSA farmers may be stronger for core CSA members than for new and/or less involved members, a hypothesis that still needs to be tested.

To further discuss our results, several points should be mentioned. First, in our study, we consider a simple CSA contract where no diversification was possible. Motivations for CSA contracting are in reality more complex involving additionnal products such as meat, cheese, honey etc. Connolly and Klaiber (2014) estimate consumer preferences for CSA attributes using a hedonic model and find a significant impact of additional products on share prices. Second, we did not consider quality or variety of CSA basket but only quantity issues. Indeed, production risks not only impact quantity but also quality especially for fruits and vegetables. Third, our results are context dependent. Experimental literature shows that fairness and risk preferences are context-dependent (Loewenstein, Thompson, and Bazerman, 1989; Beranek, Cubitt, and Gächter, 2015; Charness, Gneezy, and Imas, 2013). Besides, our sample involve only CSA members. As mentioned

before, CSA promoters may be interested in analysing preferences of non CSA consumers to examine potential extension of CSA market shares.

A more global analysis is of course needed to determine the welfare impacts of CSA (see for example, Sproul and Kropp (2015)). As mentionned by Brown and Miller (2008), it would be interesting to determine the environmental impacts of CSA. Questions such as "how many acres at risk for development have been kept in agricultural production due to these local markets? Are farmers who use farmers markets or CSA more or less likely than their counterparts to adopt water and soil conservation practices?" still remain a challenge to better inform policy makers.

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A Appendix

A.1 Presentation of Choice sets

Overall there were 3 versions of the survey and 5 choices sets in each version. Table 11 reports the levels of our 3 attributes for each choice set and for each version of the survey. For each choice set, the consumer had the choice between the reference contract (10 months, no loss and no price variation), and a contract A and a contract B. Only contracts A and B differ across the choice sets.

Table 11: Choice sets used during the stated choice survey

	Choice set number	Contract	Duration (in month)	Loss (in basket size)	Price (in %)
		Reference	**10**	**0**	**0**
Version 1					
	1	A	6	2/3	-20
		B	3	1/3	-20
	2	A	3	2/3	+20
		B	10	2/3	0
	3	A	6	1/3	+20
		B	6	2/3	-20
	4	A	3	0	-20
		B	6	0	0
	5	A	3	1/3	+20
		B	6	1/3	+20
Version 2					
	1	A	10	0	+20
		B	10	1/3	-20
	2	A	10	1/3	+20
		B	3	0	0
	3	A	10	0	-20
		B	6	1/3	0
	4	A	10	1/3	-20
		B	3	2/3	+20
	5	A	6	0	+20
		B	3	0	+20
Version 3					
	1	A	3	0	0
		B	3	2/3	-20
	2	A	3	1/3	-20
		B	10	0	-20
	3	A	6	0	-20
		B	10	2/3	+20
	4	A	10	2/3	0
		B	6	0	+20
	5	A	6	1/3	0
		B	10	1/3	0

To make their decision, consumers were presented a choice set that resemble to the following:

Table 12: Example of a choice set

	Reference	**A**	**B**
DURATION	10 months	6 months	3 months
LOSS	0	0	1/3
PRICE	0%	+20%	+20%
	□	□	□

A.2 Summary of choices per attribute

Table 13 reports the frequency of choices for each attribute. We note that almost half of the respondents prefer a duration of 10 months, no loss and no variation in price.

Table 13: Frequency of choices per attribute

Duration		
	3 months	7.53%
	6 months	16.79%
	10 months	75.68%
Loss		
	0	73.21%
	1/3	18.02%
	2/3	8.77%
Price		
	-20%	23.70%
	0	71.85%
	+20%	4.44%

A.3 Dictionnary of socio-demographic variables

Table 4 in the manuscript reports a description of the socio-demographic characteristics of consumers who have participated in our study. These characteristics have been used in the parametric analyses (ROL, ML and RPL estimations). However, Household montly income and Educational level were qualitative variables that have been recoded in dummy variables for the parametric analyses. Table 14 reports the socio-demographic characteristics of consumers used in the parametric analyses and their type (i.e., continuous or dummy variable). For the variables Household montly income and Educational level, the thresholds of "<3,099€" and "lower than Master degree" respectively, have been chosen so that our pool of consumers was divided in two subgroups of approximatively equal size for each of these variables.

Table 14: Dictionnary of socio-demographic characteristics

Age	Continuous variable
Gender	Dummy variable : 0 if Man
Household monthly income	Dummy variable : 0 if <3,099€
Educational level	Dummy variable : 0 if lower than Master degree

Note: 44.45% of consumers have a household monthly income lower than 3,099€and 48.15% of consumers have an educational level lower than a Master degree.

A.4 Structural estimation of risk preferences including individual characteristics

In this specification, we introduce socio-demographic characteristics. We estimate the parameter of eq. (4)) as a linear function of individual characteristics of consumers (r, λ and γ). Results are reported in Table 15.

Table 15: Maximum likelihood estimation of risk attitudes using cumulative prospect theory

	With individual characteristics
r	0.822***
	(0.119)
Age	-0.007***
	(0.002)
Gender	-0.098*
	(0.050)
Income	-0.007
	(0.052)
Education level	0.115**
	(0.051)
λ	2.710***
	(0.704)
Age	-0.020
	(0.015)
Gender	0.170
	(0.318)
Income	-0.368
	(0.316)
Education level	-0.169
	(0.344)
γ	0.831***
	(0.110)
Age	-0.001
	(0.003)
Gender	-0.103*
	(0.054)
Income	-0.133**
	(0.056)
Education level	0.033
	(0.057)
σ	0.651***
	(0.102)
Goodness of fit	
Number of obs.	5,705
Log likelihood	-3,358.6553
Prob >0	0.000

Notes: ***, **, *: denote statistical significance at the 1%, 5% or 10% level, respectively. Standard errors in parentheses, clustering at the individual level.

The parameter of risk aversion in gains is not significantly different from one ($Prob = 0.1337$). We observe that women and older consumers are more risk averse and that there is no income effect on risk aversion. More educated consumers are less risk averse in gains. The loss aversion parameter is significantly different from one ($Prob = 0.0152$) and no individual characteritics is significant. Finally, the probability distortion parameter is not significantly different from one ($Prob = 0.1253$). Women and high income consumers tend to distort more probabilities.

A.5 Results from stated choice survey in WTP space

Estimations of WTP in WTP space are reported in Tables 16 and 17. The values of WTP are reported in the tables as well as the mean and the standard deviation of the price coefficient since the price is now supposed as randomly distributed. Regarding WTP,

both for fairness and risk preferences, the sign and the magnitude of WTP are similar to those obtained in the preference space (see Tables 9 and 10). As a consequence, all of our previous conclusions regarding the impact of risk and fairness preferences on the choice of a given contract and the two profiles of consumers are robust to the estimations of the WTP in the WTP space.

Table 16: GMNL-II models results according to the sensitivity to inequality toward CSA farmers

Disadvantageous inequality (α_1 in eq.(2))

	LOW DI SEEKING[a]		HIGH DI SEEKING[b]	
	Mean (SE)	SD (SE)	Mean (SE)	SD (SE)
ASC	0.723*** (0.218)		0.386* (0.203)	
Duration	0.247*** (0.093)	0.355*** (0.094)	0.335*** (0.118)	0.427*** (0.118)
Loss	-4.267*** (1.274)	5.835*** (1.307)	-4.693*** (1.737)	9.238*** (2.077)
Price estimate	-0.591*** (0.077)		-0.465*** (0.067)	
Log L	-307.770***		-339.854***	
#obs	1,215		1,215	

Advantageous inequality (β_1 in eq. (2))

	HIGH AI AVERSE[c]		LOW AI AVERSE[d]	
	Mean (SE)	SD (SE)	Mean (SE)	SD (SE)
ASC	0.518*** (0.197)		0.574** (0.226)	
Duration	0.241** (0.097)	0.415*** (0.107)	0.341*** (0.117)	0.409*** (0.125)
Loss	-3.078** (1.312)	7.183*** (1.556)	-5.690*** (1.627)	7.326*** (1.704)
Price estimate	-0.492*** (0.066)		-0.562*** (0.079)	
Log L	-367.160***		-279.793***	
#obs	1,275		1,155	

Notes: ***, **, *:denote statistical significance at the 1%, 5% or 10% level, respectively. (a) Estimated disadvantageous inequity ($\hat{\alpha}_1$) equal or below median value 0.5237311. (b) Estimated disadvantageous inequity ($\hat{\alpha}_1$) above median value 0.5237311. (c) Estimated advantageous inequity ($\hat{\beta}_1$) equal or below median value -1.010454. (d) Estimated advantageous inequity ($\hat{\beta}_1$) above median value -1.010454. WTP reads as the willingness to pay in euros for a one month increase in contract length for attribute *Duration* and for a 10% loss in basket size once a month for attribute *Loss*.

Table 17: GMNL-II models results according to the sensitivity toward risk

In the loss domain (λ in eq.(4))

	HIGH LOSS AVERSE[a]		LOW LOSS AVERSE[b]	
	Mean (SE)	SD (SE)	Mean (SE)	SD (SE)
ASC	0.786*** (0.214)		0.311 (0.206)	
Duration	0.258** (0.107)	0.520*** (0.114)	0.325*** (0.102)	0.227* (0.135)
Loss	-3.355** (1.347)	6.931*** (1.573)	-5.518*** (1.574)	7.705* (2.077)
Price estimate	-0.564*** (0.076)		-0.490*** (0.067)	
Log L	-330.15***		-315.91***	
#obs	1,230		1,200	

In the risk domain(r in eq. (4))

	HIGH RISK AVERSE[c]		LOW RISK AVERSE[d]	
	Mean (SE)	SD (SE)	Mean (SE)	SD (SE)
ASC	0.584*** (0.206)		0.533** (0.215)	
Duration	0.259** (0.118)	0.311** (0.149)	0.300*** (0.095)	0.432*** (0.093)
Loss	-6.111*** (1.981)	9.849*** (2.259)	-3.326*** (1.155)	5.937*** (1.348)
Price estimate	-0.410*** (0.067)		-0.639*** (0.77)	
Log L	-315.64***		-332.31***	
#obs	1,140		1,290	

Notes: ***, **, *:denote statistical significance at the 1%, 5% or 10% level, respectively. (a) Estimated loss aversion ($\hat{\lambda}$) equal or below median value 1.674585. (b) Estimated loss aversion ($\hat{\lambda}$) above median value 1.674585. (c) Estimated risk aversion ($\hat{r}$) equal or below median value 0.4965545. (d) Estimated risk aversion ($\hat{r}$) above median value 0.4965545. WTP reads as the willingness to pay in euros for a one month increase in contract length for attribute *Duration* and for a 10% loss in basket size once a month for attribute *Loss*.

A.6 Questionnaire

You are going to take part in a survey. Our study focuses on the behavior of CSAs members when choosing between different types of contracts. You will participate in a survey to explore your preferences for these contracts. This survey is conducted jointly by INRA and the University of Rennes 1.

By taking part in this experiment, you commit yourself to not disclose to other CSAs members the content of this study. In the same way, your answers will remain confidential and will be treated anonymously. At the end of this study, you will receive a lump sum payment of 10 €, plus an additional payment that depends on your decisions. The amount of your earnings depends only on your decisions so that your final earnings can range from 7.90 € to 180 €. Thank you for participating in this study.

This personal payment will be sent at your home address within 10 days. You are free to dispose of it as you like afterwards.

The information collected is subject to an electronic data processing that aims to study consumer behavior towards CSAs. The data recipients are INRA and the University of Rennes 1. In accordance with the French law known as "Data-processing and Freedoms", of January 6th 1978 modified in 2004, you benefit from the right to access and require rectification of the personal information that has been collected about you. If you wish to enforce this right, please contact XXX. You can also, for legitimate reasons, oppose the processing of data.

This questionnaire is composed of five parts. In the first part, you will have to answer a series of questions about your consumption habits. In the second part, you will have to choose between different types of vegetables contracts according to your personal preferences. In the third part, you will be presented several situations in which you have to choose between two different lotteries. In the fourth part, you need to classify several allocations of 8 € between three different actors. Finally, in the fifth part, you will be asked to answer a few demographic questions.

1) What share of household food purchase do you personally make (check a single box)?

1. ❑ Most of them 2. ❑ About half 3. ❑ Less than half

2) What is your zipcode ? ……..

3) When buying fresh vegetables, how important are the following criteria? Please tick one answer per row.

	Not interested	Few interested	Moderately interested	Interested	Very interested
3-1 Taste:	1	2	3	4	5
3-2 Appearance (color, comestic, texture):	1	2	3	4	5
3-3 Organic food:	1	2	3	4	5
3-4 Production location:	1	2	3	4	5
3-5 Selling location:	1	2	3	4	5
3-6 Environmental impact:	1	2	3	4	5
3-7 Price:	1	2	3	4	5

4) How often do you visit a grocery store for buying food products? Please indicate the number of times per week.

4-1 Large grocery stores (e.g., Supermarkets): …… | |

4-2 Mum & pop stores: …… | |

4-3 Organic food stores (e.g., Whole foods): …… | |

4-4 Specialized stores (e.g.: Butchers, Bakers): …… | |

4-5 Local markets: …… | |

4-6 Directly from farmers (e.g., farms, CSAs, etc.): …… | |

4-7 Other type of stores (Indicate what type): ……

5) Do you know the following farm products sales structures?

	I use them	I know them	I heard about them	I do not know them
5-1 Farmer markets: ……	1	2	3	4
5-2 Collective marketing stores: ...	1	2	3	4

6) Do you feel concerned by the following activities / events?

	Not concerned	Few concerned	Moderately concerned	Concerned	Very concerned
6-1 Fresh produce consumption: ……	1	2	3	4	5
6-2 Cooking fresh produce: ……	1	2	3	4	5
6-3 Knowing the origin of products: ……	1	2	3	4	5
6-4 Respecting the environment: ……	1	2	3	4	5
6-5 Supporting local farmers (close to Rennes): ……	1	2	3	4	5
6-6 Learning more about agriculture: ……	1	2	3	4	5

In France, Consumer Supported Agriculture (CSA) has grown significantly since the creation of the first CSA in 2001. It is consumer association who contracts with a local farmer who commit himself to deliver a basket of vegetables each week at a given delivery place and time.

Consumers contract with the farmer on a fixed period (usually 10 months), and in return he receives a weekly assortment of seasonal vegetables in the form of a basket. The farmer in turn commits to provide fresh produce usually organically produced, implying no guarantee on the size of the basket (climatic hazards for example). The producer commits himself to being as transparent as possible in his production methods and to keep consumers informed about the timetable (sowing, harvesting). The consumer agrees to pay all the baskets in advance, even if the baskets will be more or less filled (potential losses depending on weather conditions). The consumer must pick up the basket each week at the same place and time.

This is the general framework. Some criteria may vary from one CSA to another. In the remainder of the questionnaire we will present several contracts that vary according to some given criteria.

7) The following questions aim to provide some indications about your current CSA contract:
7-a) What is the duration of your contract (in months)?
7-b) What is the basket size you contracted for?
7-c) What is the approximate weight of your vegetables basket?
7-d) What is the price of your vegetable basket?
7-e) How long have you been a CSA member?
7-f) Are there occasionally losses in vegetables baskets including the period from June to March?

Assume that in your CSA contract duration is fixed and equal to **10 months** (44 weeks), including the period from June to March, and you receive a full basket each week (**no loss**). Payments are made monthly, without any possibility of cancellation. We are aware that this hypothetical contract is not necessarily yours, but we ask you to act as if it was the one you have now.
In the following five questions, you will be asked to choose between a reference contract and two other contracts that differ depending on 3 distinct criteria:

Contract duration:
Contract duration can be 3 months (13 weeks), 6 months (26 weeks) or 10 months (44 weeks). The contract always begins in June.
Remember: Duration of the reference contract is 10 months.

Loss in basket size:
Once a month, the basket is smaller because of climatic hazards that are not due to the farmer. Either this basket is filled two-thirds less (-2/3 of usual basket size); or it is a third less filled (-1/3 of usual basket size); or there is no loss (0).
Remember: There is no loss in the reference contract. You receive a full basket each week.

Share price change:
Compared to the share price in the reference contract, there is either no share price change (0%), or a 20% increase in share price (+20%), or a 20% decrease in share price (-20%).
Remember: There is no share price change in the reference contract: 0%.

For each of the following questions, the presented changes in the different contracts are the ONLY CHANGES IN THE CSA CONTRACT – nothing else change compared to the reference situation.
After carefully considering the three proposed contracts, choose the one that suits you best. If you no contract suits you, you can mention it.

8.	Reference contract	Contract A	Contract B
Duration	10 months	6 months	3 months
Loss	0	-2/3	-1/3
Price	+0%	-20%	-20%

Choice:	Reference ❑	A ❑	B ❑
	I cannot answer ❑		
	I refuse to answer ❑		

9.	Reference contract	Contract A	Contract B
Duration	10 months	3 months	10 months
Loss	0	-2/3	-2/3
Price	+0%	+20%	+0%

Choice:	Reference ❑	A ❑	B ❑
	I cannot answer ❑		
	I refuse to answer ❑		

10.	Reference contract	Contract A	Contract B
Duration	10 months	6 months	6 months
Loss	0	-1/3	-2/3
Price	+0%	+20%	-20%

Choice:	Reference ❑	A ❑	B ❑
	I cannot answer ❑		
	I refuse to answer ❑		

11.	Reference contract	Contract A	Contract B
Duration	10 months	3 months	6 months
Loss	0	0	0
Price	+0%	-20%	+0%

Choice:	Reference ❑	A ❑	B ❑
	I cannot answer ❑		
	I refuse to answer ❑		

12.	Reference contract	Contract A	Contract B
Duration	10 months	3 months	6 months
Loss	0	-1/3	-1/3
Price	+0%	+20%	+20%

Choice:	Reference ❑	A ❑	B ❑
	I cannot answer ❑		
	I refuse to answer ❑		

Two tasks will now be exposed to you. This will help us to better understand how you make your decisions. At the end of this study, there will be a draw between these two tasks. From the selected task, one of the situations will be drawn and determine your payment. One of the two tasks will present more or less risky situations. The other task will present several situation of gain sharing.

You will participate in a game in which you will have to choose between two lotteries. Each of these lotteries involves two different gains (in euros) with an associated probability. We present you below 2 series with 14 situations and 1 series with 7 situations in which you have to choose between lottery A and lottery B.

If the present task is randomly selected at the end of the study, 1 out of the 35 situations (2 series with 14 situations and 1 series with 7 situations) will be randomly selected. Your earnings will be computed from the selected situation and the result of the lottery you have selected (lottery A or lottery B).

For each of the 14 situations in series 1:
- Lottery A proposes a gain of 4€ with a probability 0.3 (3 chances over 10) and a gain of 1€ with a probability 0.7 (7 chances over 10).
- Lottery B proposes a gain of 0.5€ with a probability 0.9 (9 chances over 10) and a higher gain that varies depending on the situation with a probability 0.1 (1 chances over 10).

For each of the 14 situations in series 2:
- Lottery A proposes a gain of 4€ with a probability 0.9 (9 chances over 10) and a gain of 3€ with a probability 0.1 (1 chances over 10).
- Lottery B proposes a gain of 0.5€ with a probability 0.3 (3 chances over 10) and a higher gain that varies depending on the situation with a probability 0.7 (7 chances over 10).

Please indicate, for each situation in series 1 and 2 if you prefer lottery A or lottery B.

Series 1	**Lottery A**		**I prefer playing the lottery …**	**Lottery B**		**Situation ↓**
Probabilities:	**0.3**	**0.7**		**0.1**	**0.9**	
Gains : (in euros)	4€	1€	0.❑ A ou B ❑.1	6.8€	0.5€	1 (13-1)
	4€	1€	0.❑ A ou B ❑.1	7.5€	0.5€	2 (13-2)
	4€	1€	0.❑ A ou B ❑.1	8.3€	0.5€	3 (13-3)
	4€	1€	0.❑ A ou B ❑.1	9.3€	0.5€	4 (13-4)
	4€	1€	0.❑ A ou B ❑.1	10.6€	0.5€	5 (13-5)
	4€	1€	0.❑ A ou B ❑.1	12.5€	0.5€	6 (13-6)
	4€	1€	0.❑ A ou B ❑.1	15€	0.5€	7 (13-7)
	4€	1€	0.❑ A ou B ❑.1	18.5€	0.5€	8 (13-8)
	4€	1€	0.❑ A ou B ❑.1	22€	0.5€	9 (13-9)
	4€	1€	0.❑ A ou B ❑.1	30€	0.5€	10 (13-10)
	4€	1€	0.❑ A ou B ❑.1	40€	0.5€	11 (13-11)
	4€	1€	0.❑ A ou B ❑.1	60€	0.5€	12 (13-12)
	4€	1€	0.❑ A ou B ❑.1	100€	0.5€	13 (13-13)
	4€	1€	0.❑ A ou B ❑.1	170€	0.5€	14 (13-14)

Series2	**Lottery A**		**I prefer playing the lottery …**	**Lottery B**		**Situation ↓**
Probabilities:	**0.9**	**0.1**		**0.7**	**0.3**	
Gains : (in euros)	4€	3€	0.❑ A ou B ❑.1	5.4€	0.5€	15 (13-15)
	4€	3€	0.❑ A ou B ❑.1	5.6€	0.5€	16 (13-16)
	4€	3€	0.❑ A ou B ❑.1	5.8€	0.5€	17 (13-17)
	4€	3€	0.❑ A ou B ❑.1	6€	0.5€	18 (13-18)
	4€	3€	0.❑ A ou B ❑.1	6.2€	0.5€	19 (13-19)
	4€	3€	0.❑ A ou B ❑.1	6.5€	0.5€	20 (13-20)
	4€	3€	0.❑ A ou B ❑.1	6.8€	0.5€	21 (13-21)
	4€	3€	0.❑ A ou B ❑.1	7.2€	0.5€	22 (13-22)
	4€	3€	0.❑ A ou B ❑.1	7.7€	0.5€	23 (13-23)
	4€	3€	0.❑ A ou B ❑.1	8.3€	0.5€	24 (13-24)
	4€	3€	0.❑ A ou B ❑.1	9€	0.5€	25 (13-25)
	4€	3€	0.❑ A ou B ❑.1	10€	0.5€	26 (13-26)
	4€	3€	0.❑ A ou B ❑.1	11€	0.5€	27 (13-27)
	4€	3€	0.❑ A ou B ❑.1	13€	0.5€	28 (13-28)

Now assume that you still take part in a game in which you have the choice between lottery A and lottery B. This time each of these two lotteries offer a gain and a loss (in euros) associated to the same given probabilities. We present below a series with 7 situations in which you have to choose between lottery A and lottery B.

For each of the 7 situations in series 3:
- Lottery A proposes a loss of 0.4€ or a loss of 0.8€ with a probability 0.5 (5 chances over 10) each and a gain that varies depending on the situation with a probability 0.5 (5 chances over 10).
- Lottery B proposes a gain of 3€ with a probability 0.5 (5 chances over 10) and a loss that varies depending on the situation with a probability 0.5 (5 chances over 10).

Please indicate, for each situation if you prefer lottery A or lottery B.

Series 3	**Lottery A**		**I prefer playing lottery …**	**Lottery B**		
Probabilities :	**0.5**	**0.5**		**0.5**	**0.5**	**Situation ↓**
Gains or losses: (in euros)	2.5€	-0.4€	0.❑ A ou B ❑.1	3€	-2.1€	(29) (13-29)
	0.4€	-0.4€	0.❑ A ou B ❑.1	3€	-2.1€	(30) (13-30)
	0.1€	-0.4€	0.❑ A ou B ❑.1	3€	-2.1€	(31) (13-31)
	0.1€	-0.4€	0.❑ A ou B ❑.1	3€	-1.6€	(32) (13-32)
	0.1€	-0.8€	0.❑ A ou B ❑.1	3€	-1.6€	(33) (13-33)
	0.1€	-0.8€	0.❑ A ou B ❑.1	3€	-1.4€	(34) (13-34)
	0.1€	-0.8€	0.❑ A ou B ❑.1	3€	-1.1€	(35) (13-35)

In the next task, you will be asked to rank 13 possible distributions of money among three people, depending on your preferences. You should rank the 13 possible distributions from 1 (the best) to 13 (the worst). The three people involved in this experiment are:

- **YOU**: which indicates the amount in euros that is allocated to you.

- **FARMER IN CSA**: which indicates the amount in euros that is allocated to a CSA farmer in the surrounding area of Rennes. This CSA farmer supplies only CSA (he sells his products only to CSA consumers) and he practices organic farming.

- **FARMER NOT IN CSA**: which indicates the amount in euros that is allocated to a non CSA farmer in the surrounding area of Rennes. This non CSA farmer practices organic.

If this task is selected at the end of the study, 2 out of the 13 possible distributions will be randomly selected and you will earn the amount allocated to you in the best ranked option among the 2 selected. Further, a CSA farmer will be randomly selected among CSA farmers in the surrounding area of Rennes and he will be given the amount allocated to the CSA farmer in the selected option. In the same way, a non CSA farmer will be randomly selected among non CSA farmers in the surrounding cities of Rennes and he will earn the amount allocated to the non CSA farmer in the selected option.

	Different types of distribution of 8 euros for …			
Situation	**You**	**Farmer in CSA**	**Farmer not in CSA**	**Your ranking (1 = the best, 13 = the worst)**
1 (14-1)	4	2	2	
2 (14-2)	0	4	4	
3 (14-3)	2	2	4	
4 (14-4)	3	4	1	
5 (14-5)	2	4	2	
6 (14-6)	4	0	4	
7 (14-7)	3	1	4	
8 (14-8)	2	3	3	
9 (14-9)	4	3	1	
10 (14-10)	1	4	3	
11 (14-11)	3	3	2	
12 (14-12)	4	1	3	
13 (14-13)	4	4	0	

15) How old are you ? ……

16) What is your highest education level?

- ☐ 1. Baccalauréat + 5 years
- ☐ 2. Baccalauréat + 4 years
- ☐ 3. Baccalauréat + 3 years
- ☐ 4. Baccalauréat + 1 or 2 years
- ☐ 5. Baccalauréat
- ☐ 6. BEP, CAP
- ☐ 7. Secondary (high) school
- ☐ 8. Primary school

17) What is the size of your household (included you)? ……

18) What is your actual occupation?

- ☐ 1. Farmer
- ☐ 2. Handcraft, Trade manager, Chief-executive
- ☐ 3. Executive, High intellectual occupation
- ☐ 4. Employee
- ☐ 5. Retired
- ☐ 6. Students
- ☐ 7. Unemployed

19) Monthly household income (before taxes):

- ☐ 1. Less than € 1,100
- ☐ 2. Between € 1,100 and € 1,899
- ☐ 3. Between € 1,900 and € 2,299
- ☐ 4. Between € 2,300 and € 3,099
- ☐ 5. Between €3,100 and € 3,999
- ☐ 6. Between € 4,000 and € 6,499
- ☐ 7. Greater than € 6,500

20) Are you a member of an environmental organization (other than CSA) ? ……

For the enumerator:

21) Gender : 0. ❑ Man ou 1. ❑ Woman

Enumerator's ID :

Location of the survey : **Date** :