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Abstract

Private standards – such as Fair Trade (FT) – have emerged as a response to consumer, civil society and corporate concern about the conditions under which imported food is produced. A large empirical literature exists on the welfare implications of smallholder participation in FT schemes and on consumers' willingness to pay for ethical products. However, the question whether smallholder farmers prefer to produce under FT has never been studied. Understanding smallholders' preferences is crucial in light of the main critiques on FT namely that the poorest smallholders are often excluded and that FT is too supply-driven. Using a choice experiment, we investigate preferences of rice smallholders for (organic) FT in Benin and compare the value of three contracts (domestic contract, FT, organic FT). We find that farmers prefer domestic contracts over FT contracts. They prefer contracts with fewer requirements but contract benefits can outweigh the costs related to these requirements in the case of FT contracts. This does not hold for FT contracts with organic standards. Our results imply that adding organic requirements to FT contracts may undermine the adoption and spread of FT certification and limit the expansion of FT production and trade.

Key Words: Global value chains, Private standards, Contract-farming, Rice, Organic, Ethical certification

JEL classification: Q01, Q13, Q17, Q18, Q56

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1 Introduction

Trade in agri-food products between low-income and high-income countries has increased rapidly over the past decades. This trade is increasingly subject to private standards, which emerge as a response to consumer, civil society and corporate concern about the conditions under which imported food is produced (Gomez et al., 2011; Swinnen and Maertens, 2007; Giovannucci and Ponte, 2005; Key and Runsten, 1999). Private food standards include baseline standards focussing on food quality and safety issues as well as sustainability standards focussing on ethical and environmental aspects of food production and trade (Raynolds, 2012; Beuchelt and Zeller, 2011; Humphrey and Schmitz, 2002).

Fairtrade (FT) is a sustainability standard that focuses on ethical issues. It was introduced by the Dutch development organization Solidaridad in the 1980s with the aim of ensuring benefits of trade for smallholder producers in low-income countries. The FT concept comes into practice through Fairtrade International (FLO), the organization that sets the FT standards and requirements, and FLO-Cert, an independent organization that certifies farmers - usually groups of farmers organized in an association or cooperative – and inspects compliance with the FT requirements. FT standards include requirements related to production practices, working conditions, labor remuneration, environmental management, and social policies. Farmers' benefits include anti-cyclical mark-ups on prices, long-term trading relationships, credit facilities and consultancy to build producers' capacity (Ruben et al. 2009; Becchetti and Constantino, 2008). FT certification has known a steady expansion and reached a global trade value of US$ 6 billion in 2012 (FLO, 2012d). More than 20 different products are produced under FT standards, including the typical tropical agro-industrial commodities such as cocoa, coffee and tea as well as tropical fruits such as bananas, pineapple and mango. More recently, FT standards expanded to include staple and grain crops such as quinoa and rice.

The literature on FT focuses on the impact of FT certification on smallholders' livelihoods, on smallholders' access to FT contracts, and on consumer preferences for FT certified products (see Nelson and Pound (2009) for a literature review on the impact of FT; Dragusanu et al. (2014) for the economics of FT; Andorfer and Liebe (2012) for FT consumption). Some studies find positive impacts of FT certification on smallholders' income

and poverty level, agricultural productivity and innovation, and subjective well-being (e.g. Balineau, 2015; Chiputwa et al., 2015; Weber, 2011; Becchetti and Constantino, 2008), while others find no effects (e.g. Ruben and Fort, 2012; Barham et al., 2011; Jaffee, 2008; Bacon et al., 2008; Mitiku et al., 2015). One of the main critiques on FT is that the poorest smallholders with few productive assets are excluded from FT schemes (Gomez et al., 2011; Ruben et al, 2009). They lack initial capital to apply for FT certification and are not able to comply to the FT requirements, such as prohibition of child labour (Ruben and Fort, 2012; Raynolds, 2002). Another critique is that FT is too supply-driven: farmers producing under FT requirements are not able to sell their produce under FT conditions as demand is not high enough (Dragusanu et al., 2014; Barham and Weber, 2012; Mendez et al., 2010). In recent years focus on the consumer side of FT has increased. An emerging literature investigates consumer preferences and their willingness-to-pay (WTP) for FT certified products. In general, these studies find that consumers are willing to pay a significant premium for ethical sourcing and that significant consumer heterogeneity exists (Vlaeminck et al., 2015; Hainmueller et al. 2015; Grunert et al., 2014; Disdier and Marette, 2012).

In this paper, we take a different view and study the preferences of farmers to engage in FT contracting. We conduct a discrete choice experiment (CE) among 305 smallholder rice farmers in Savalou, Benin, a region where a FT rice scheme was introduced recently. To the best of our knowledge, there are no studies that investigate farmers' preferences for FT certification[2]. It is thus implicitly assumed in the literature that farmers prefer to produce under current FT standards. Yet, a better understanding of farmers' preferences for FT standards and of the drivers and constraints for FT adoption among farmers could prove very helpful to improve the design of FT standards and certification schemes (Chiputwa et al., 2015). It has been argued that smallholder certification could be more effective if better knowledge about farmers' marketing preferences and the design of contracts were available (Abebe et al., 2013; Schipmann and Qaim, 2011; Blandon et al., 2009) and if certification schemes would be better adapted to local circumstances (González & Nigh, 2005; Warning & Sadoulet, 1998; Barrett et al., 2001). With our approach, we can shed light on the willingness of farmers to accept FT requirements, which FT requirements form a barrier for farmers to adopt FT standards, and which FT benefits are valued by farmers.

[2] We need to note that some studies have investigated farmers' contracting and marketing preferences in general and farmers' preferences for different coffee certifications, without a focus on FT standards e.g. Ibnu et al., 2015; Abebe et al., 2013; Schipmann and Qaim, 2011 and Blandon et al., 2009.

The rice sector in Savalou, Benin is a particularly relevant case to study farmers' preferences for FT-contracting. First, farmers have different contract experiences as both a FT scheme was implemented through a public-private partnership in the past next to a domestic contract-farming scheme. Second, Benin is a net rice importer but the government is aiming at rice self-sufficiency and surplus exports of rice. Contract-farming, whether domestic or international, has been put forward as a possible solution to stimulate domestic production and value chain development. Third, rice is a staple crop which did not receive much attention in the FT and contract literature as the majority of the literature has focused on high-value and industrial input crops.

The paper is structured as follows: The next section portrays the rice sector in Benin and our data collection and sampling process. Section three describes how farmers' preferences can be inferred through CEs and the attributes that were chosen. In section four, we document the sampled farmers' experience with contracts and certification in the region. In section five and six the results are exposed and section seven concludes with attention to policy and future research.

2 Research background and data collection

2.1 The rice sector in Benin

As in other countries in Western Africa, the consumption of rice in Benin has increased sharply during the past decade, especially in urban areas. Benin is sometimes described as an import-biased food market for rice (Demont and Ndour, 2014; Demont, 2013). Urban consumers prefer Asian imported rice above domestic rice (Rutsaert et al., 2013; VECO, 2011). It has been argued that governments can reverse this import-bias by investing both in demand-lifting investments such as quality upgrades together with the more traditional supply-shifting investments focusing solely on production increases (Barrett, 2008; Demont et al., 2013). In the aftermath of the 2008 food price crisis, rice became a priority crop in the country's agriculture and food security strategies (MAEP, 2011). By 2018, the government is aiming at rice self-sufficiency, and eventual export of surpluses, in order to save foreign exchange reserves, reduce the country's vulnerability to external shocks and to ensure food security (MAEP, 2011). This focus on domestic rice production and quality upgrading has

yielded some initial successes. While rice imports have increased tremendously in the past decade, from 72 thousand ton in 2001 to 600 thousand ton and more from 2006 till 2010, they dropped quite sharply, to 368 thousand ton, in 2011 (Figure 1). On the other hand, rice production quadrupled in the past decade and increased most sharply in 2011 to 147 thousand ton. Despite these initial successes, domestic rice production still only satisfies 34% of the country's demand and the Beninese rice sector stays characterized by low quality and low added value (Demont et al., 2011; VECO, 2011).

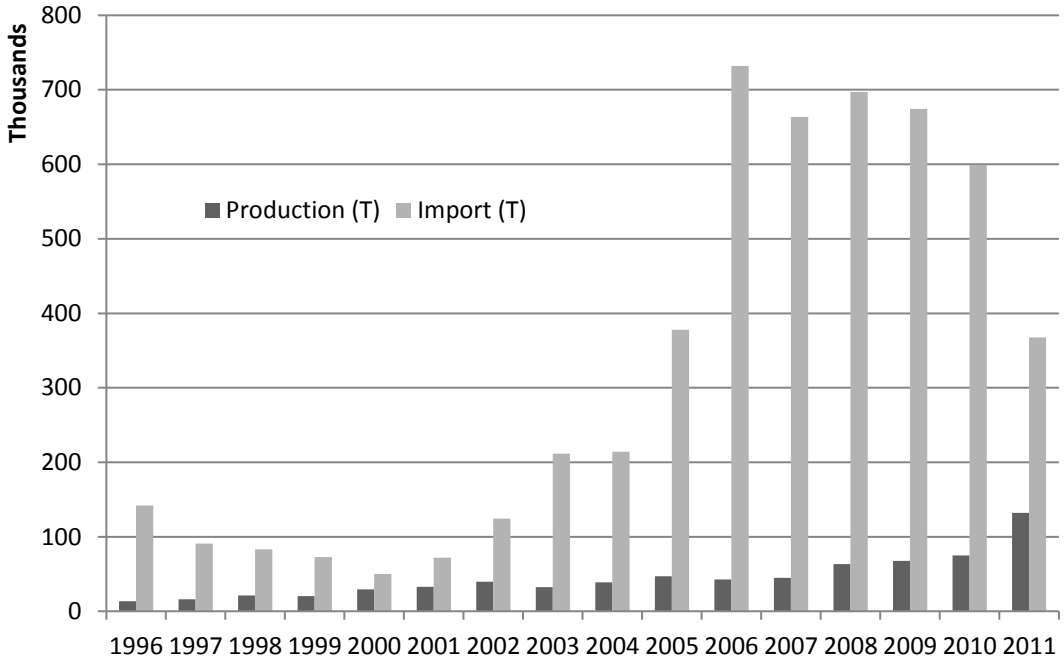


Figure 1. Evolution of the amount of consumed rice in Benin, in tonnes (T) of paddy rice (FAOSTAT, 2012).

2.2 Study area, contract-farming and FT-contracting

The main rice producing areas in Benin are the departments Atakora (28% of the rice area), Alibori (21%) and Collines (20%). Rice is mainly grown by smallholder farmers in rain-fed lowland production systems with only one rice harvest per year (Wopereis et al., 2013; Seck et al., 2013). Farmers mainly commercialize threshed un-milled paddy rice through spot market exchanges, either with traders collecting paddy rice at the farm-gate or with vendors at the nearest markets. The municipalities of Glazoué, Bantè and Savalou in the central Collines department are especially recognized to have the largest lowland rice

potential in the country (MAEP, 2011). Our study area includes three districts (Doumé, Tchetti and Kpataba) around Savalou, located in the Collines department of Benin (Figure 2).

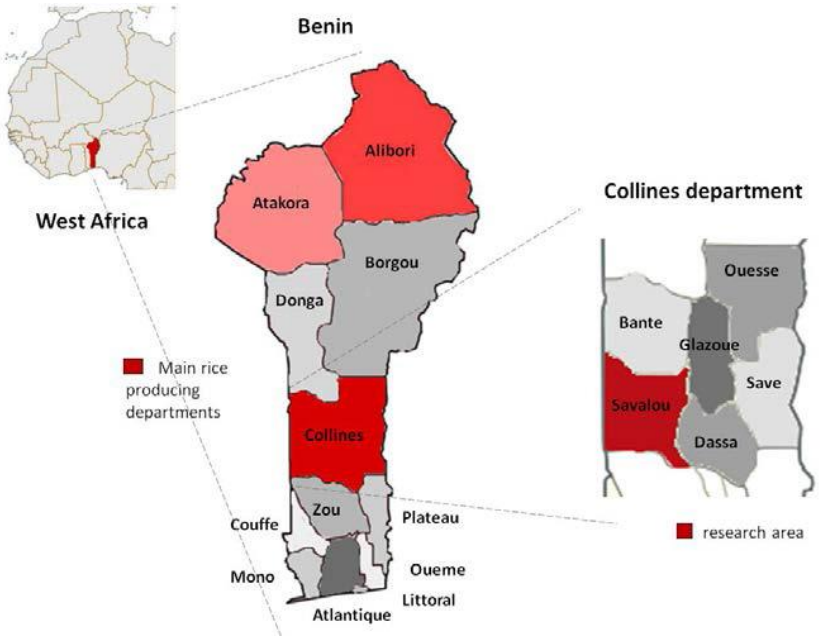


Figure 2. Rice producing regions in Benin and research area

We purposively selected this region because two rice contracting schemes have been installed in the Collines region with the goal of increasing both productivity and quality of domestic rice production. The first scheme is a (short-term) FT-contracting scheme organised by a Belgian NGO in collaboration with a Belgian retail group. The scheme was set up in 2009 with the perspective of using the incentives of a FT-contract as a lever to upgrade the quality of domestic rice production to the quality standards of an international market and thereby improve the reputation of domestic rice quality and reverse urban consumers' preferences for imported rice. Producers needed to master the requirements of FT certification and international quality and food safety standards (VECO, 2011)[3]. This included the choice of suitable grouped production sites, the use of certified seeds, in-line sowing, limiting the quantities of fertilizer, and mastering traceability through an internal control system. The functioning of already existing producer organizations was revitalized and transparency, good governance and democracy were promoted. Through this scheme symbolic quantities (36 tons in total) of high-quality long grain FT-certified rice were exported to Belgium from 2009 until 2012. Farmers received a FT price of 536 FCFA/kg; which constitutes a mark-up of more than 40% compared to the local market price of 370 FCFA/kg for long grain rice. Even

[3] For a complete overview of the technical standards applied in the scheme for production of FT rice, we refer to page 23 of the VECO, 2011 report.

though this trade constituted only a very small volume, the scheme helped farmers to increase rice productivity, rice quality and their organizational skills (VECO, 2011).

The second is an ESOP (*Entreprises de Services et Organisations de Producteurs*) contract-farming approach, initiated by CIDR in 2006 (*Centre International de Développement et de Recherche*), that aims at connecting farmers to the domestic urban market in an efficient and sustainable way. An ESOP is a private enterprise that contracts groups of 10-15 producers (organised in producer organisations) for the delivery of high-quality rice. At the beginning of each season, the ESOP and farmer groups agree on a written contract specifying the quantity of rice to be delivered, the delivery time, a fixed producer price (which was 150FCFA/kg in 2012 for local paddy rice) and some quality specifications such as rice variety, impurity and humidity thresholds, and payment modalities. In return, the ESOP provides inputs on credit (seeds, fertilizer and herbicides), training on quality improvements and technical field assistance. The ESOP collects the rice in the villages, processes the paddy rice and sells it as a local quality rice *riz Délice* in domestic urban markets.

2.3 Data collection and sampling strategy

We collected data in two phases. First, we collected household survey data during April - May 2013 in the four main rice producing districts in Savalou (Doumé, Tchetti, Ouesse and Kpataba). A two-stage stratified random sample was drawn. In the first stage, 21 villages were selected in the four districts according to the presence of contract-farming. In the second stage, rice farming households were stratified according to whether they participated in the FT/ESOP scheme or not. In total 396 households were sampled in the selected villages. We used a quantitative structured questionnaire, including various modules on household demographics, land and non-land assets, agricultural production and commercialization, income, food security, and credit. One module asked farmers' perceptions on the benefits and barriers of contract-farming in general and FT contracts specifically. The household survey data were complemented with information on infrastructure, accessibility, market access, and rice farmer groups from a village survey.

Second, we implemented a CE in August - September 2013 in the districts of Doumé, Tchetti and Kpataba. We selected 13 villages from the original household sample, resulting in a sample of 305 farmers with balanced contract experience. The final sample includes 148

farmers who never had any contract experience and 157 farmers with contract experience, including ESOP contracting for the domestic market (*n*=31), FT-contracting for the international market (*n*=45) or both (*n*=81). This sampling strategy allows us to compare preferences of farmers with different contract experiences.

3 Choice Experiment Design

To assess farmers' preferences for FT certification we rely on a CE. This is a survey-based stated preference elicitation method introduced by Louviere and Hensher (1982), which can be used to reveal which FT certification attributes have a higher likelihood to be supported by farmers. The method is common in marketing research to reveal consumers' preferences for new product characteristics and in environmental economics for non-market valuation (see e.g. Rousseau and Vranken, 2013; Hoyos, 2010). It has been used recently to understand farmers' marketing preferences in Thailand (Schipmann and Qaim, 2011) and smallholders' preferences for contract-farming in Ethiopia (Abebe et al., 2013). In a CE, farmers are presented with several choice cards that include alternative varieties of a good or service – in this case a contract type - differentiated by their attributes and attribute levels, and are asked to select their most preferred alternative. A baseline alternative, the opt-out scenario, is included in each choice set in order to interpret the results in welfare economic terms and make the choices as realistic as possible. Choosing the opt-out corresponds to not entering into a contract and thus doing what a farmer without a contract would usually do: selling rice independently through a spot-market transaction at the current market price. At least one attribute of the alternative varies systematically across respondents so that preference parameters of an indirect utility function can be inferred (Carson and Louviere, 2011). Choosing one alternative over the others implies that the utility of the chosen alternative exceeds the utility derived from the other alternatives (Ben-Akiva & Lerman, 1985). This way, farmers' preferences for both hypothetical and real traits of contracts and certification schemes can be revealed.

3.1 FT-contracting attributes and attribute levels

To identify a list of potential attributes, we relied on the current contract details of the ESOP and FT schemes in Savalou as well as the general FT standards for small producer

organizations (FLO, 2011)[4]. After three farmer group discussions with members from different producer organizations in the districts and three field tests, we selected 6 attributes relating to different quality, social and production requirements and benefits (Table 4): 1) herbicide use, 2) chemical fertilizer use, 3) child labour, 4) FT (social) premium, 5) input provisions and 6) a (minimum) selling price. Added together, these requirements constitute various hypothetical and real marketing/contracting/certification options. Many other contract characteristics, such as form of contract, relation to the buyer or payment mode, can also influence the willingness to enter into a contract (Abebe et al., 2013; Schipmann and Qaim, 2011). However, as the scope of our paper is preferences for FT contracts, attributes that present general characteristics of contract-farming and are not specifically related to FT certification, were not included in the final CE. Moreover, inclusion of too many attributes could result in cognitive overload during the choice process.

Table 4. Attributes and attribute levels used in the choice experiment

Attribute	Attribute levels
Herbicide use	Forbidden
	Training and precise dose
	No restrictions (SQ)
Chemical fertilizer use	Forbidden
	Reduced dose
	No restrictions (SQ)
Child labour	Forbidden
	No restrictions (SQ)
Fairtrade premium	FT premium offered (30 FCFA/kg)
	No Fairtrade premium (SQ)
Input provision	In cash
	In kind
	No provisions (SQ)
Selling price (FCFA/kg)	115, 135, 150 (SQ), 165, 180, 200 FCFA/kg

Note: FCFA = West African CFA franc (XOF) ; 150 FCFA = €0.23 (EUR/FCFA = 655) at the time of the experiment (August 2013) ; SQ = levels of the status quo option

The first and second attribute (herbicide and chemical fertilizer use) relate to the FT standards of environmental protection: pest management, soil and water guidelines, environmental management and biodiversity (FLO, 2011). These standards ensure farmers implement agricultural practices that are sustainable, minimize (health and safety) risks, and protect biodiversity. Both attributes consist of three levels: 1) forbidden, 2) training and precise dose or just reduced dose and 3) no restrictions. For herbicide use, farmers would

[4] For a full overview on FT standards, we refer to the document Fairtrade Standard for Small Producer Organizations (FLO, 2011)

receive a training to use a precisely defined dose or face a ban on its use. It was explained to the farmers that restrictions on herbicide and fertilizer use would be controlled by the contracting party. Lastly, if herbicide or fertilizer use is (partially) allowed in the CE scenario, it does not imply that they are automatically provisioned by the contracting party (to protect the independence of these attributes with the input provisioning attribute).

The third attribute (child labour) relates to the FT standards of labour conditions: child labour and child protection (FLO, 2011). This attribute consists of two levels: 1) forbidden and 2) no restrictions. FT standards state that members of the producer organization must not employ children below the age of completion of compulsory schooling and in any case not lower than the age of 15. In Benin, education is compulsory for children aged between six and eleven (Unesco, 2007). If child labour is forbidden, farmers cannot employ children below the age of 15[5].

The fourth attribute (FT premium) relates to a very specific characteristic of a FT contract. The social premium is paid directly by the buyer to the farmer organization and the use of the premium needs to be agreed on democratically by the producers themselves. It can be used for a wide range of investments, including investments to increase farmer productivity and community infrastructure such as a health center. This attribute consists of two levels: 1) no premium and 2) a premium of 30 FCFA per kilogram paddy rice (the social premium was calculated during the actual certification process).

The fifth attribute (provision for seeds, fertilizer and herbicides) consists of three levels: 1) no input provision, 2) in cash provision and 3) in kind provision. Typically, FT provides some advance crop financing to producer groups (Dragusanu et al., 2014). Both cash and in kind provisions are provided in the beginning of the season. When fertilizer and herbicide is forbidden in the same contract, we constrained the design of the CE so that no inputs are provided.

The price levels for the last attribute (selling price) are set around the mean price the farmers in the household survey sample received in the previous rice season (2012), namely 150 FCFA per kg of paddy rice. The price attribute has six levels: 115, 135, 150, 165, 180 and 200 FCFA/kg. The market option implies the average price in 2012 of 150 FCFA per kg paddy rice.

[5] Under strict conditions such as after school or during holidays, they are allowed to help the members as stated in the FLO standards.

3.2 Experimental design, choice cards and experimental procedure

Based on the attributes and their levels, we constructed choice cards with two generic contract / certification scenarios and one status quo (SQ) defined as selling independently on the market (Figure 3). Since respondents cannot answer 648 (= 2^2 x 3^3 x 6) different choice cards, we used Ngene software to create a D-efficient design. This design takes the determinant of the asymptotic variance-covariance matrix, based on a given amount of choice situations and prior estimates, that corresponds with the lowest possible errors of the estimates (ChoiceMetrics, 2012). D-efficiency tries to maximize the amount of information becoming available with a minimum number of choices to be made. The priors of the parameters were estimated based on the household survey data collected in May 2013. Eventually, 18 choice cards were created in two blocks of nine cards (D-error = 0.046753). Every farmer was thus asked to choose between 9 different hypothetical contract scenarios. We made sure that no dominated choice cards were included in the eventual CE.

We carefully implemented the CE by first explaining the purpose together with the attributes and levels. To make sure that the farmer understood the CE, we first gave him/her a test card. It was emphasized that the task was hypothetical and choosing a different marketing option could not affect the current contracting situation of the farmer. Nevertheless, we included a 'cheap talk' script to reduce the propensity of respondents to answer in a way to please the interviewer (Cummings et al, 1995).

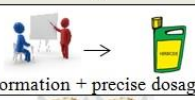
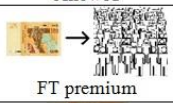
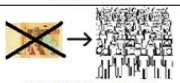
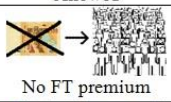
	Contract option		Market option
	A	B	C
Herbicide use	 Formation + precise dosage	 No restrictions	 No restrictions
Chemical fertiliser use	 Forbidden	 No restrictions	 No restrictions
Child labour	 Allowed	 Forbidden	 Allowed
FT premium	 FT premium	 No FT premium	 No FT premium
Input provision	 In cash	 No restrictions	 No restrictions
Selling price	200 FCFA/kg	180 FCFA/kg	Market price

Figure 3. Example of choice card as shown to rice farmers during the interview

3.3 Econometric approach

We use mixed logit (MXL) models with 500 halton draws (Revelt and Train, 1998; Hensher and Greene, 2003) to analyse the CE data and reveal farmers' preferences for FT contract attributes. MXL models account for unobserved, unconditional heterogeneity and are therefore useful to account for the preference heterogeneity observed in contract schemes (Schipmann and Qaim, 2011; Blandon et al., 2009). All parameters except the price attribute are specified to be normally distributed. We keep the price attribute fixed because we expect farmers to have homogenous preferences for a higher selling price (we relax this assumption in the WTP-space model, see further). We include an alternative-specific constant (ASC) in our model coded one for the market option and zero for the contract scenarios. A negative coefficient thus indicates a positive utility of moving away from the market option into a contract scheme. All categorical variables are dummy-coded since it allows more straightforward interpretation (Rousseau and Vranken, 2013). In this way, our ASC captures both the utility of moving away from the status quo and the utility of the base level of the dummy-coded attributes which enables us to compare the relative value of the contract attributes versus the value of the market option (De Valck et al, 2014)[6].

Even if the MXL is able to identify the unobserved sources of heterogeneity, it does not explain the possible sources of heterogeneity (Birol et al., 2006). In a second MXL specification we thus interact the ASC parameter with individual farmers' characteristics and previous contract experience to understand how contract preferences can differ with contract experience and specific farm characteristics[7]. Finally, WTP/WTA values for the different contract attribute levels are derived. These welfare estimates are totalled to construct the relative value of three different contracts: a domestic rice contract characterizing the existing ESOP scheme, an international rice contract characterizing the existing FT scheme, and an organic FT contract (purely hypothetical). We calculate these welfare estimates both in preference space and WTP-space since it has been recently argued that the WTP-space model derives more stable welfare estimates because they are obtained at the estimation stage and not through simulations (Zander et al., 2013; Hole & Kolstad, 2012; Balcombe et al., 2009).

[6] Nevertheless we tested the model using effects coding to make sure a dummy-trap was not present and the estimated parameter of the effect-coded ASC did not significantly differ from the dummy-coded ASC (ASC_{EC}: -2.996 ; ASC_{DC}:-2.63) (see Bech &Gyrd-Hansen, 2005).

[7] We ran multiple latent class models to investigate whether distinctive classes existed of farmers with relatively homogenous preferences within their class. From these regressions we learned that farmers' preferences for contracting in our sample do not differ substantially enough to make a useful latent class approach feasible. Including the usual socio-economic suspects or more advanced parameters related to contract farming in the segment membership function neither improved model fit nor understanding.

4 Sample characteristics, agricultural constraints and contract experiences

In Table 1 we summarize the main farm and farmer characteristics of our sample including human, physical and social capital, location, preferences and specifics on rice production and agricultural constraints. Descriptive statistics are given for the full sample and for subsamples of farmers who never had experience with rice contracting (n=148) and farmers having experience with an ESOP contract (n=31), a FT contract (n=45) or both (n=81). T-test comparisons of means are given for non-contract farmers versus contract-experienced farmers.

Table 1. Characteristics of rice farmers, 2013

Variables	Full sample (N=305)	Non-contract farmers (N=148)	By contract experience		
			ESOP only (N=31)	FT only (N=45)	ESOP and FT (N=81)
Human capital					
Male head	0.94	0.91	0.97	0.98	0.95
Age head (yrs)	42.2 (11.7)	41.2 (11.9)	41.3 (10.7)	44.6*(12.1)	43.1 (11.6)
Education head (yrs)	2.36 (3.6)	2.84 (4.1)	0.94**(2.3)	1.78 (2.9)	2.36 (3.4)
Children (#)	3.71 (2.3)	3.52 (2.3)	3.71 (2.3)	3.04 (2.2)	4.42*** (2.3)
Adults (#)	2.72 (1.2)	2.76 (1.2)	2.35* (0.9)	2.73 (1.2)	2.79 (1.1)
Physical capital					
Land owned (ha)	14.8 (14.3)	13.9 (13.2)	12.4 (7.6)	11.4 (8.4)	19.3**(19.2)
Land cultivated (ha)	8.35 (7.1)	7.35 (6.6)	7.61 (4.2)	6.47 (4.7)	11.5***(8.9)
Livestock units	3.19 (6.6)	2.29 (3.3)	2.75 (5.1)	1.97 (2.5)	5.66***(11.1)
Multi poverty index	0.30 (0.15)	0.29 (0.14)	0.37**(0.17)	0.32 (0.15)	0.28 (0.14)
Social capital					
Farmer org. member	0.83	0.64	1.00***	1.00***	1.00***
Off-farm occupation	0.64	0.70	0.58	0.56*	0.60
Location and preferences					
Market distance (km)	4.93 (4.5)	4.33 (4.5)	6.61***(3.4)	3.73 (4.3)	6.04***(4.6)
Credit access [a]	2.63 (0.9)	2.65 (0.9)	2.48 (0.9)	2.55 (0.9)	2.69 (1.0)
Rice production					
Rice area (ha)	0.91 (2.1)	0.71 (0.6)	0.80 (0.5)	0.91* (0.7)	1.35**(3.9)
Rice yield (Ton/ha)	1.97 (1.1)	1.85 (0.96)	1.90 (1.0)	1.99 (1.3)	2.22***(1.1)
Avg price (FCFA/kg)	156 (32)	150 (28)	152 (7.7)	167***(44)	162***(35)
Cost of inputs (€/year)	71.8(128)	50.0 (48.7)	82.4***(84.6)	64.9*(64.6)	112***(224)
Kids helping in HH (#)	2.13 (1.74)	1.91 (1.7)	2.1 (1.66)	1.98 (1.5)	2.67***(1.87)

Note: Mean values are shown. For continuous variables, standard deviations are shown in parentheses. Mean values of different contract schemes are tested against farmers with no contract experience: *p < 0.1, **p < 0.05, ***p < 0.01; [a] Credit access equals one if access is very difficult and four if easy

Farmers are on average 42 years old. They have 2.36 years of education, although this number is lower for contract farmers. The average household consists out of 2.7 adults and 3.7 children. Land is not a constraining factor in the area as each farmer owns on average 15 hectares of agricultural land. Farmers cultivate on average one hectare of rice which represents around 13% of their total cultivated area. Especially farmers that have experience with ESOP and FT have more livestock units (higher percentage of cattle units). Farmers

balance around the multidimensional poverty index as being classified as poor. All contract farmers are member of a farmers' organization and 64% of the households have an off-farm income source. Distance to the market is on average 5 kilometres with ESOP farmers located further away. Credit access is being assessed as rather difficult. Rice yields are higher for farmers who had experience with both ESOP and FT contracting. FT farmers were able to sell their rice at a higher average price, 165 FCFA/kg compared to 150 FCFA/kg[8]. Costs of agricultural inputs for rice are significantly higher for all contract farmers compared to non-contract farmers. On average 2.13 children help in the household with agricultural work and this number is higher for farmers with both FT and ESOP experience (2.67 children). Farmers were specifically asked about the main constraints for increased rice production and profitability of rice farming. The lack of mechanization was mentioned as the principal constraint by 25% of the sampled farmers. All field labour such as land preparation, weeding and harvesting remains manual. However, mechanization of rice production and processing is considered essential to improve the quality of rice and the profitability of rice farming in West Africa (AfricaRice, 2011). Next to mechanization, input and credit access (18% and 17% respectively), weeds and predators (17%) and soil fertility (12%) are identified as major constraints to lifting rice production in the Collines region.

To get more insights in the evaluation of the FT and ESOP contract schemes, we asked ESOP and FT farmers to mention three possible advantages and disadvantages of the contract scheme they participated in. Last, we asked farmers with no contract experience why they did not enter in a contract scheme in the past. In general, farmers attribute different advantages and disadvantages to the ESOP and FT contract schemes although a guaranteed market is the principal advantage for both types of contracts (Table 2).

Table 2. Stated (dis)advantages of different contracts for experienced farmers

Stated contract advantages	ESOP	FT	Stated contract disadvantages	ESOP	FT
Guaranteed market	31%	26%	Too low prices	**27%**	**10%**
Access to inputs and credit	**22%**	**6%**	Delayed payments	19%	16%
Higher prices	**13%**	**25%**	Uncertainty regarding the market	**12%**	**22%**
Acces to modern inputs	9%	12%	Limited access to inputs and credit	11%	8%
Experience with new techniques	9%	7%	Too low revenues	7%	4.1%
Stable prices	5%	7%	Difficult to respect requirements	**6%**	**23%**
Acces to exterior market	**1%**	**9%**	Limited access to modern inputs	6%	5%

Note: ESOP: domestic contract-farming approach (answers from 112 experienced farmers). FT: international FT contracting approach (answers from 126 experienced farmers).

[8] At the time of the survey, only a small number of farmers were still selling their produce under FT conditions, which explains why this difference is not that large.

ESOP contracts are primarily experienced positively by farmers for their access to inputs and credit, while FT contracts are positively reviewed for their higher prices and enabling access to an exterior market. Delayed payments are an issue for both types of contracts. ESOP farmers state too low prices as the main disadvantage of the contract while farmers experienced with FT put difficulties to respect all contract requirements as their principal constraint. FT contracts demand more effort from farmers compared to ESOP contracts, especially relating to environmental and labour requirements. Last, FT farmers mention uncertainty regarding the market as a major disadvantage which may seem strange at first since FT stands for building long-term relationships. This finding however may be case-specific as the FT certification in our region was used as a (short time) lever to increase rice quality. The experimental FT certification scheme started in 2008 and by 2013 almost no FT rice was exported anymore, hence the uncertainty.

Table 3. Stated reasons for farmers not to join a particular contract scheme

Reasons of farmers not to join a contract scheme (n=148)	ESOP	FT
Non availability / difficult to access / not in a farmer organization	36%	39%
Production issues (conditions too exigent, production constraints, ...)	19%	29%
Commercialization issues (contract price too low, payment delays, ...)	33%	11%
Perception issues / uncertainty (past experience, fear of defaulting)	3%	14%
Independence (decision power)	7%	4%

Contract availability stays the primary reason why farmers decide not to join a particular contract scheme (Table 3). For ESOP contracts, farmers mention commercialization issues related to low contract prices and payment delays as the main reason not to join. For FT contracts, farmers are especially concerned with production issues such as too exigent production requirements or having too little productive assets to comply with quantity requirements.

5 Farmers' preferences for FT certification

The estimation results of the MXL models are reported in Table 5. All parameter coefficients are compared to the SQ levels (market option) with no restrictions on child labour, fertilizer and herbicide use, no input provisions, no FT premium, and the average 2012 market price for one kilogram of paddy rice of 150FCFA. All parameter coefficients in model

(1) with the exception of child labour are significant at the 1% level. Heterogeneity exists for all contract attributes except for reduced dose of fertilizer, reasserting the use of the MXL.

Results show that respondents in general prefer producing rice under some type of contract scheme compared to independently selling rice on the market. The status quo option was only chosen 152 times out of 2745 choices or 5.5%. Farmers prefer contracts offering a higher buying price which is in line with economic theory.

Table 5. Mixed logit models for farmers' preferences for different contract attributes.

	Model (1)		Model (2)	
	Mean	S.E.	Mean	S.E.
Mean parameter				
Price per kilo (FCFA)	0.02***	(0.00)	0.02***	(0.002)
ASC	-2.63***	(0.20)	-2.72***	(0.56)
Training and precise herbicide dose	0.46***	(0.13)	0.48***	(0.13)
Herbicide use forbidden	-1.13***	(0.15)	-1.08***	(0.15)
Reduced dose of fertilizer usage	-0.55***	(0.10)	-0.53***	(0.10)
Fertilizer use forbidden	-2.27***	(0.17)	-2.23***	(0.17)
Child labor not allowed	-0.27**	(0.12)	-0.30***	(0.12)
In cash provisions	1.02***	(0.12)	1.03***	(0.12)
In kind provisions	1.00***	(0.11)	1.01***	(0.12)
FT premium offered	0.75***	(0.11)	0.72***	(0.11)
ASC x FT experience			-0.64**	(0.30)
ASC x ESOP experience			-0.51*	(0.31)
ASC x Distance to market			0.12***	(0.03)
ASC x Multi Poverty Index			-3.45***	(0.91)
ASC x Rice area (% on total)			-2.69**	(1.34)
ASC x Credit Access			0.45***	(0.13)
Standard deviation parameter				
Training and precise herbicide dose	0.88***	(0.16)	0.74***	(0.16)
Herbicide use forbidden	1.26***	(0.14)	1.22***	(0.14)
Reduced dose of fertilizer usage	-0.05	(0.42)	0.22	(0.32)
Fertilizer use forbidden	1.81***	(0.174)	1.78***	(0.17)
Child labor not allowed	-1.12***	(0.13)	-0.39*	(0.23)
In cash provisions	-0.60***	(0.20)	0.91***	(0.16)
In kind provisions	0.79***	(0.17)	1.10***	(0.13)
FT premium offered	0.94***	(0.12)	0.96***	(0.13)
Observations	8,208		8,208	
Log likelihood	-1817		-1788	

*** p<0.01, ** p<0.05, * p<0.1

Farmers in general have a negative preference for contract terms relating to the environmental requirements of FT standards. Complete restrictions on herbicide use and especially on fertilizer use are strong disincentives for farmers to enter into a contract. Farmers also dislike reducing the dose of present fertilizer use without extension service which could be explained by the fact that actual yields are lower than potential yields (Wopereis et al., 2013; Africarice, 2011). However, the positive coefficient for training and

precise dose of herbicide use suggests that this disincentive could be countered by the contracting party if some form of extension service is given to the farmer prior to the restriction. In that way, extension services could help farmers to understand the reasoning for limiting herbicide use and the benefits to apply a more precise dosage. Labour conditions in contracts relating to the prohibition of children working on the fields are less preferred by farmers compared to contracts without such restrictions[9]. Contract parties that provide advances, whether in cash or in kind, have a higher likelihood to be adopted. Finally, farmers have a positive preference for contracts entailing a premium that can be used to be socially invested in the community or used to improve the activities of the producers' organizations.

In model (2) we interact the ASC parameter with farmers' contract experience. Farmers who produced under the ESOP and the FT contract are more willing to enter into a new contractual agreement compared to farmers who never had any contract experience. This showcases the positive experiences of the local rice producers with the contract schemes. Model (2) also exploits some possible sources of random heterogeneity found in model (1) through inclusion of several individual farmer and farm characteristics. Several interactions with the ASC are in line with the literature on contract farming dealing with market imperfections and transaction costs. Estimation results show that farm households who score higher on the multi-poverty index are more willing to sign a contract than less poor households as these poor farmers are more likely to lack the assets to produce marketable surpluses themselves (e.g. Barrett, 2008). Second, farmers having easier access to credit have a lower preference to enter into a contract (although their general preference remains positive towards contracts). This is logical as contracts are often used by credit constrained farmers to circumvent credit market imperfections (e.g. Key and Runsten, 1999). Third, farmers cultivating a larger rice area share relative to their total cultivated land are more likely to enter into a contract as they in general are less averse of contracts (e.g. Schipmann and Qaim, 2011). Fourth, in our sample, farmers who are living more distant from the market have a lower preference to enter into a contract (52% of status quo choices originate from farmers living 9-12 km away from the market place). This is surprising as one would expect benefits from contract-farming in terms of reduced transaction costs to be higher for more remote farmers (e.g. Masakure and Henson, 2005). The result is likely explained by the fact that rice

[9] In non-tabulated regressions, we interacted the attribute child labour with the number of kids in the household. We find that this negative preference is driven by larger households consisting of a high number of children. Besides, splitting the sample over FT experienced farmers and non-FT farmers, we find that child labour attribute is insignificant for the non-FT farmers (sign is negative). This may indicate that prohibitions on child labour may not be a main deterrent for farmers to enter into a FT contract ex-ante.

production is less important for the most remote farmers, who have a smaller rice area and larger cattle herds.

6 The relative value of domestic and (organic) FT contracts

In this section we assess how different contract attributes are valued by farmers. The marginal value of each contract attribute represents the farmer's willingness to accept (WTA) compensation to forego an attribute or marginal willingness to pay (WTP) for an attribute (Birol et al, 2009). The decision to use herbicide, fertilizer or child labor resides with the farmer and the related attributes resemble farmers' WTA compensation payments from the contractors to comply with these restrictions. Input provisions and a FT premium are contract benefits for farmers and these attributes resemble farmers' WTP. The estimated coefficients in the MXL models can be interpreted as farmers' WTP for a contract attribute in case of positive coefficients and farmers' WTA a contract attribute against a higher price in case of negative coefficients. We need to interpret the estimates relative to the average rice price of 150 FCFA per kilogram of paddy rice. As a robustness check and sensitivity test, we calculated the WTP/WTA values both via the MXL model through simulation and directly at the estimation stage via the WTP-space model. These welfare estimates are reported in Table 6. The values of the WTP-space model are consistently higher than those of the preference-space model (although not by much) and we discuss the latter more conservative values.

Table 6: Welfare estimates (in CFCA) for contract-farming design attributes, derived from two models: mixed logit (MXL) and willingness-to-pay in space (WTP-S) model.

		MXL		WTP-S	
	Contract Attributes	Mean	95% CI	Mean	95% CI
Herbicide use	No restrictions	Reference		Reference	
	Training and precise dose	+17	[5,29]	+16	[2,30]
	Use forbidden	-55	[-71,-38]	-67	[-85,-49]
Fertilizer use	No restrictions	Reference		Reference	
	Reduced dose	-27	[-37,-17]	-33	[-44,-22]
	Use forbidden	-102	[-126,-78]	-115	[-145,-86]
Child labor	Allowed	Reference		Reference	
	Forbidden	-20	[-29,-10]	-20	[-29,-10]
Provisions	No provisions provided	Reference		Reference	
	In cash	+50	[37, 62]	+55	[38,71]
	In kind	+48	[37,59]	+48	[36,61]
FT premium	No FT premium offered	Reference		Reference	
	FT premium offered	+32	[21,43]	+37	[24,51]

Note: The estimated coefficients can be interpreted as farmers' WTP for a contract attribute in case of positive coefficients and farmers' WTA a contract attribute against a higher price in case of negative coefficients.

Three important results can be drawn from the WTA/WTP values for the individual attribute levels in Table 6. First, the WTP value for the FT premium (32 FCFA) approximates closely the value of the real 30 FCFA FT premium paid to farmers' organizations in the FT scheme. This is an indication that the estimates are realistic and that the CE was well understood by the farmers. Second, farmers need a large compensation to accept a contract that prohibits the use of herbicides and fertilizer. This is not surprising and indicates farmers have a preference for chemical input use when soil fertility is very low and weed pressure high. The result implies that introducing organic production requirements in FT or other contracts will require substantial compensation in terms of higher contract prices. Third, farmers dislike contracts with child labour restrictions. Although if sufficient input provisions and extension services are provided, these benefits outweigh the disadvantages related to child labour restriction.

Finally, the CE method allows us to add up the marginal WTP/WTA values to construct the value (utility) farmers attach to different contracts and certification schemes (see e.g. Zander et al., 2013). This enables us to reveal which contracts are preferred by farmers and for which contracts premium payments are needed to make the contract acceptable. We calculate the relative values of three different contracts: the ESOP contract (domestic market), a regular FT contract (international market), and an organic FT contract (international market). The total WTP for these contracts and the associated contract design attributes are presented in Table 7. A positive contract value should be interpreted as value adding for the farmer while a negative contract value as value decreasing, indicating that farmers need a compensation to enter the contract above the current arrangements.

Table 7. Relative value of different farming contracts.

	Independent	ESOP contract	FT contract	Organic FT contract
Herbicide use restricted?	No	Training + dose	Training + dose	Yes
Fertilizer use restricted?	No	No	Yes, reduced	Yes
Child labor allowed?	Yes	Yes	No	No
Provisions provided?	No	Yes, in kind	Yes, in kind	Yes, in kind
FT premium offered?	No	No	Yes	Yes
Relative contract value	0	+65 FCFA/kg	+50 FCFA/kg	-97FCFA/kg

Smallholders identify contracts for both the domestic as the international market as a way to improve their current situation. Contracts with the least number of restrictions relative to their contractual benefits are preferred most, as could be expected. The values of the ESOP and FT contract are positive. This means that farmers' WTP to enter into a contractual agreement is larger than the WTA compensation for the different contract requirements. These contracts are seen as a way to overcome market imperfections and both current and non-current contract farmers want to participate in future schemes. Although FT contracts implement more stringent requirements, especially related to environmental and labour conditions, our results indicate that farmers are willing to adhere to these standards if provisions, a social premium and a minimum selling price are provided. The picture is different for the organic FT contract. The WTA compensation for the full restrictions on herbicide and fertilizer use is larger than the WTP for the services offered in the contract. In order to enter into a FT organic contract, a significant compensation of 97 FCFA/kg needs to be paid on top of a minimum selling price and social premium. For a staple crop like rice, we doubt whether such incentive payments are financially viable to sustain the existence of this type of contract.

As a final remark, we want to stress that our positive values for the domestic and FT contracts should not be interpreted that contracting parties are offering contracts at a too high price or that they should lower their contract prices. We interpret the positive values as an indication of the implicit cost or shadow price of market imperfections solved by the contract. The negative contract value indicates that although some market imperfections might be solved, in its entirety, this contract increases the implicit cost of market imperfections compared to the current situation.

7 Conclusions

In this study, we use a CE to examine the preferences for contracting of smallholder rice farmers in Benin. We find that smallholders prefer to market their produce under a FT contract or a domestic contract compared to selling it independently on the market. This finding contrasts previous findings on farmers' marketing preferences which found that sweet pepper farmers in Thailand prefer to sell on the spot market (Shipmann and Qaim, 2011). This contrast can partially be explained by the specific context. The rice sector in the Collines region is characterized by low quality, small added value, substantial market imperfections and high transacting costs. In such circumstances, contract-farming may overcome market

imperfections and reduce transaction costs, and our results indicate that farmers indeed perceive contract-farming as beneficial. We find that preferences for contract-farming are higher for farmers with previous contract-farming experience, farmers who are more resource constrained or have less access to credit. In addition, our results show that input provision and extension services in a contract substantially increase the likelihood that farmers accept the contract. These findings further corroborate the interpretation that farmers perceive contract-farming as a way to overcome the constraints caused by market imperfections.

Our results show that farmers have the highest willingness to accept the domestic contract-farming scheme in which extension and inputs are provided by the buyer without any restrictions on fertilizer use and child labour. At current market prices farmers are also willing to accept a FT contract including fertilizer and child labour restrictions and a social premium, but they are not willing to accept an organic FT contract that completely prohibits chemical input use. To accept the latter contract, farmers require significant monetary compensation.

These findings have important implications. First, they show that rice contract-farming for the domestic urban market might be effective in better linking farmers to markets and stimulating the domestic rice sector in the interest of food security. This conclusion is corroborated by recent research on the impact of smallholder contract-farming in the rice sector in West Africa (Maertens and Vande Velde, 2014). Second, our finding that organic FT certification is only acceptable for farmers if contract prices are significantly higher implies that a rather large price premium is necessary to make contracts including organic certification self-enforcing (Swinnen and Vandeplas, 2011). This finding is in line with existing studies on the costs and impacts of organic certification, which use partial budgeting and impact evaluation methods (e.g. Lyngbaek, Muschler, and Sinclair, 2001; Mendez et al. 2010; Beuchelt and Zeller, 2011). Third, we can compare our results on farmers' preferences for FT and organic certificates with the results from consumer studies on the willingness to pay for certified food products. The latter type of studies generally finds that consumers are willing to pay a substantial premium between 10 and 25 percent for food that is certified to ethical and sustainability standards (Dragusanu et al., 2014; Tully and Winer, 2014). Confronting our results with this evidence however raises questions on the increasingly popular practice of combining FT and organic certification. This practice is completely demand-driven as the same consumers value both ethical and organic standards; but it is less evident from a supply perspective as producers value FT and organic requirements very differently. Our results imply that adding organic requirements to FT contracts may

undermine the adoption and spread of FT certification and limit the expansion of FT production and trade (Barham and Weber, 2012).

Finally, we would like to praise the merits of CE research in understanding farmers' preferences in order to link them to markets. Investments (by governments and donors as well as private investments) in 'linking-farmer-to-markets' type of programs have increased substantially over the past decade, and CE research can contribute to making these investments more effective by taking into account farmers' preferences in a systematic and coherent way. Also sustainability standards and certification schemes are expanding rapidly, and CE research can contribute to tailor these standards and schemes better to the needs and preferences of the farmers that are to benefit from them. Our results are of course specific for the case-study that we analyzed: rice in the Collines region in Benin. As rice is a rather atypical FT crop, we call for CE research on FT certification for other crops in other regions to compare our results with and come to a more generally-valid conclusion on farmers' preferences for contract-farming and certification.

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