Real farmer share, perceived farmer share and fair distribution in food chains from a consumers' perspective

Busch, Gesa[1]; Spiller, Achim[2]

[1]Department of Agricultural Economics and Rural Development, Georg-August-University of Göttingen, Göttingen, Germany, gesa.busch@agr.uni-goettingen.de
[2]Department of Agricultural Economics and Rural Development, Georg-August-University of Göttingen, Göttingen, Germany, a.spiller@agr.uni-goettingen.de

Abstract

Discussions about fair revenue distribution in food supply chains gained importance in 2008 as self-employed milk producers entered a strike against dairies (EU milk strike). Based on this strike, a broad discussion in the media emerged and society as well as politics got involved in a debate over fair prices for farmers in general. During milk strike, citizens in Germany mainly sympathized with the famers, while the food retailers were seen as the main cause of the problem. However, it remained unanswered what fairness and a fair revenue distribution in food production means. Hence, the present study aims to analyze citizen perceptions of a fair farmer share and to find factors contributing to this evaluation. Therefore, an online survey was conducted in November 2012. Respondents were asked to estimate the distribution of the food dollar among different supply chain partners and to indicate how a fair distribution should look like. Farmers are mainly perceived to be treated unfairly in supply chains and should get more compensation from a consumer's point of view. Food retailing should mainly loose shares in this context. A contribution to the perceived unfair compensation of farmers makes distributive fairness, interactional fairness and process control.

Keywords: Fairness, Food dollar, Consumer survey, Supply Chain

Introduction

Discussions on fairness and justice are not a new phenomena, this debate goes back to antiquity. In the case of food production, discussions about fair producer prices and fair revenue distribution have gained new importance in recent years. In 2008, farmers in the EU went on strike against low producer prices and marked a turning point in the discussion of price fairness. Based on this strike, the media and civil society entered into a broad discussion on the topic. Thereby, citizens mainly sympathized with famers, while food retailers were seen as the main cause of the problems (Böhm & Schulze, 2010). Further, EU politicians also got involved in the discussion, and the EU commission implemented the High Level Experts' group on milk (HLG) to stabilize market prices and producers' income and to enhance transparency in the market (EU Commission, 2010). In 2012, the so called "milk package" was designed with the aim of boosting the position of dairy producers in the supply chain and preparing the sector for a more market-oriented and sustainable future regarding the end of the milk quota system in 2015 (EU Commission, 2014).

Only two years prior, the distribution of proceeds in food supply chains became already a publicly discussed topic. The European Parliament published a resolution highlighting the decreasing farmer shares in the EU in the past that were not compensated by decreased production costs for farmers or increased processing cost in the industry. Recommendations are construed by the Parliament that the reduction of farmer share and the development of food markets should be observed and the role of farmers need to be strengthen to maintain high quality food production in the EU (EU Parliament, 2009). In summary, there have been discussions in recent years where producers, public and politics came together over concerns about the decreasing farmer shares and a fair revenue distribution among partners in the food supply chain.

In fairness research there are several theories explaining factors belonging to fairness and necessities for fairness judgments, but to our best knowledge, what people perceive as fair regarding revenue distribution in food chains and farmer share remains fairly unknown. Researchers have found in laboratory experiments and in the field that citizens have concerns over inequality (Chang & Lusk, 2009). Citizens also seem to be concerned about the distribution of outcomes in food supply chains (Briggeman & Lusk, 2011). Especially in the market of locally produced food, Toler *et al.* (2009) found some evidence that fairness considerations influence food choices. They conclude that there is market potential for local farms through highlighting fairness aspects on farmers markets and grocery stores. This is supported by findings that indicate fairness preferences also apart from fair trade products.

There are hints that people are interested in food that is fairer in terms of revenue shifting to (family) farms and fair prices for farmers (Rimal *et al.,* 2006, Chang & Lusk, 2009, Zander & Hamm, 2010 and Briggeman & Lusk, 2011 for organic products; Toler *et al,.* 2009 and Schneider & Francis, 2005 for local food). It is fairly not known how people perceive the current distribution of revenues in the food chain and how a fair food supply chain with a fair revenue distribution should look like. This is of great importance for developing fairer strategies for food markets (as part of CSR (corporate social responsibility) strategies) and policy decisions that are accepted within society as well as for generating attention among further consumer segments through e.g. labeling.

Therefore, this study tries to figure out a fair distribution of the food dollar (the revenues each supply chain partner receives from one dollar spent in a grocery store) from a consumer's point of view and to find factors that build consumers' fairness judgments in food chains with a focus on the farmer share. This is done for the case of Germany where the combination of a high share of discount retailing and the comparably high share of alternative production methods, e.g. organic provides a good background for fairness debates.

Theoretical Approaches of Fairness in Food Chains

Fairness in general has been interpreted differently, but most models relate to fairness as people´s aversion to inequality. Fehr & Schmidt (1999) model fairness as "a self-centered inequity aversion of a person", which means that people who consider fairness as important resist inequitable outcomes and consider their own pay-off in comparison to others (1999: 819). Thereby, people's preference for fair actions cannot be understood individually, but must be embedded in an economic environment that largely affects actions. Thus, e.g. in game theory one selfish player can affect inequity-averse players to the extent that they also behave selfishly as a response (Fehr & Schmidt, 1999). To frame fairness judgments, individuals use reference outcomes (Xia *et al.,* 2004). These are based on complex social comparison processes and the comparative relative pay-offs affect the perception of material well-being as well as behavior (Fehr & Schmidt, 1999: 821).

Based on research on organizational justice, Colquitt *et al.* (2001) summarized that *distributive* and *procedural fairness* can be distinguished. *Interactional fairness* is sometimes introduced as a third dimension of fairness (Colquitt *et al.*, 2001; Lupfer *et al,.* 2000). This classification is found in several fairness studies (e.g. Kröger & Schäfer, 2014; Collie *et al., 2002;* Lupfer *et al.,* 2000). However, there are also studies measuring interactional justice as

the social part of procedural fairness (e.g. Folger & Konovsky, 1989; Skarlicki & Latham, 1996). Following this discussion, it is not quite clear whether interactional fairness, with the dimensions of interpersonal and informational fairness (Colquitt *et al.,* 2002), must be seen as an autonomous fairness dimension or as an aspect of procedural considerations. The dimension that contributes more to a fairness judgment depends mainly on study setting, people's diversity and also on whether the situation is personally experienced or witnessed (Lupfer *et al*., 2000). In the following, the different fairness dimensions are introduced in more detail.

Distributive fairness

Distributive fairness, in general, describes the fairness of outcomes. According to Adams' (1965) equity theory, he describes and measures it as the ratio of inputs to outcomes. If this ratio is balanced, an outcome is perceived as fair. In food supply chains, the price every partner in the chain receives for their products is described as outcome. Therefore, price fairness in the form of revenue distribution among the food supply chain will be the main area of interest in this study. Price fairness in particular is a relatively young concept that is mainly derived from the justice and equity theories (Diller, 2000: 164). There are three different perspectives on price fairness in food chains that need to be distinguished. First, *price fairness from a consumers' perspective* deals with the fairness of prices that consumers pay for commodities (e.g. Diller, 2000; Bolton *et al.,* 2003). Second, *price fairness from a producer's perspective* evaluates fair prices that producers get for their products (e.g. Hellberg-Bahr & Spiller, 2012), often also evaluated as a price-plus paid by the end-consumers for an additional altruistic value (e.g. Briggeman & Lusk, 2011 and Padel *et al.,* 2009 for organic products; Andorfer & Liebe, 2013 for fair trade products). Third, *price fairness as fair distribution among supply chain partners* investigates the fairness of the portion of the total revenues allocated to every single supply chain partner (e.g. Chang & Lusk, 2009). All types of price fairness have in common, that a comparison is needed to form a fairness judgment. These references can be other prices from the past, prices of other products or the outcomes from other people. Regarding fairness perception, a price comparison is "a necessary but not sufficient condition", as other aspects influence the fairness perception as well (Xia *et al.,* 2004: 2), such as the procedure and the interaction, which are explained below.

Procedural fairness

Procedural fairness was introduced into justice research in the 1970's (Colquitt *et al.,* 2001). It added a new dimension to the fairness debate and describes the way in which outcomes are achieved. For food production, this can be pricing because it is the procedure that manages the

revenue distribution to each stage of the supply chain. Van den Bos *et al.* (1997; 1998) state that if people do not have access to information about outcomes of others for a comparison, the importance of procedural fairness in contrast to distributive fairness increases. If people do have information about the outcomes received by others, these outcomes are more important than the procedural fairness in an overall fairness judgment.

Additionally, Folger (1977) finds that people who can control a procedure (who have a 'voice' in a decision process) are more satisfied with a process than people without control.

Interactional fairness

Rabin (1993) mentions that the intention behind an action also influences people's evaluation of fairness and forms their (re-)actions. Therefore, the interactional fairness forms the third dimension of fairness. Interactional fairness can further be divided into interpersonal fairness, such as perceived politeness and respect, and into informational fairness, which describes explanations that are given for decisions (Colquitt *et al.,* 2002).

Transferring these fairness dimensions to the evaluation of distribution of the food dollar from a consumers perspective, it indicates that the revenues itself (distributive fairness), the pricing strategy in which these revenues are distributed (procedural fairness) and the behavior of the trading partner in terms of honesty, respect (interpersonal fairness) and quantity and quality of information (informational fairness), are forming the overall fairness judgment. When people judge their personal experiences, they foremost invoke procedural and interpersonal criteria, but while judging fairness of others, distributive criteria are emphasized (Lupfer *et al.,* 2000). According to studies by Van den Bos *et al.,* (1997; 1998), the procedural fairness is more important if consumers do not have information about the revenue distribution in food chains, but if consumers do have this information, the absolute number of revenues yields more in a fairness evaluation than the procedure.

Food Dollar and Farmer Share

For the whole supply chain, the revenue distributions among the different partners are often referred to as the 'food dollar', expressing the revenues received from one dollar spent in a grocery store by consumers. The marketing margin describes the revenues for all supply chain partners downstream of agriculture. The farmer share or farm value is the proportion farmers get of the amount consumers spend on food products in grocery stores (Elitzak, 1996). Thereby, farmer shares normally vary highly between different commodities. Generally speaking, the farmer share decreases with an increasing degree of processing, and the shares

are higher for animal products compared to crops (Elitzak, 1996; TI, 2014). In 2011, the farmer share in Germany for all products was 26.1%. Between product categories there is a great variation from 7% for grain, 24.6% for meat and meat products, 38.8% for milk and milk products up to a farmer share of 51.2% for eggs (TI, 2014). In the US, the USDA assesses within the food dollar marketing bill a lower farmer share for all products with a total farmer share of 17.6% (USDA, 2014). In the US, data is also available for the added value of other industry groups to food production in another part of the food dollar series. In 2011, food processing added 15.8%, packaging 2.8%, transportation 3.4%, wholesale trade 9.4%, retail trade 13.3% and farm production and agribusiness a value of 12.2% to the food dollar, which equals 17.6% farmer share in the marketing bill, because farm costs paid to non-farm and non-agribusiness establishments are included there (USDA, 2014). For Germany, there are no official sources available for numbers downstream of agriculture. Industry also refuses information about the revenue shares.

There are several studies analyzing the motives of buying food products with regard to altruistic motivation including fairness (e.g. Sunding, 2003; Umberger *et al*., 2009; Lusk *et al.*, 2007; Andorfer & Liebe, 2013), but there are only a few studies investigating consumers' evaluation of fair revenue distribution in food chains. Chang & Lusk (2009) use a stated-preference-experiment to measure consumers' preferences for the distribution of benefits resulting from food purchases of organic bread among the food supply chain partners. The survey design includes measuring the likeliness of buying 12 loaves of organic bread that differed in price and in the amount of benefits made of to small farmers, large farmers, agribusiness processors (wheat millers and bakers) and supermarkets. The main finding of the authors is that people show altruistic preferences only for the benefits of small farmers.

To the best of our knowledge, there are no studies collecting data about the fairness perception of food dollar distribution from a consumers' perspective without including a price premium for additional product attributes.

Data and Empirical Methods

A standardized questionnaire was developed to measure fairness in food supply chains with a focus on the farmer share. The questionnaire starts with questions about gender and monthly income, which were set as a quota according to the German population. This part is followed by two questions about the food purchase. In a next step, respondents had to estimate the revenues distribution of 1€ spent by a consumer in a supermarket for a certain product

between the supply chain partners (food dollar). The observed products were fresh milk, schnitzel and bread rolls. Afterwards, the respondents were asked to indicate how a fair distribution between supply chain partners of 1€ spent for the same products should look like. Both questions were designed as open-ended questions. In the following, real farmer shares for different products were shown and respondents were asked to evaluate these shares in terms of fairness on a 5-point Likert-scale (-2 = "fully unfair", 0 = "indecisive", +2 = "fully fair"). This was followed by a part about the understanding of fair prices for farmers and chances for fair prices in the current food market. Additionally, the perception of experienced fair treatment was surveyed. Those questions were also answered on 5-point Likert-scales ranging from -2 = "I fully disagree", 0 = "indecisive" up to +2 = "I fully agree". The questionnaire closed with socio-demographic questions. A pre-test was done online with research assistants and students.

The online sample consists of 291 consumers and was conducted in November 2012. 50.2% of the respondents are male and 49.8% are female. On average, respondents are 44.59 years old, which is only slightly higher than the average in the German population (43.9 years) (Statistisches Bundesamt, 2014). Due to quota regulations, income groups are represented according to the German population.

Data analysis consists of two parts. In a first step, consumers' estimates of real farmer shares are descriptively compared to the perceived shares and to the fair shares for milk, schnitzel and bread rolls.

Secondly, data about the attitudes towards fair prices and fair treatment in the supply chain is integrated in an exploratory factor analysis to expose relations and to reduce data. A principal component analysis with orthogonal rotation (varimax) was used. The Kaiser-Meyer-Olkin value and the Bartlett's test of sphericity verify the adequacy of the sample (Field 2009). On basis of the Eigenvalue criteria (Eigenvalue > 1) and the illustration in the Scree-Plot, six factors were extracted. The Cronbach's alpha values indicated the reliability of the factors, which should be higher than 0.6 for first time used scales and 0.7 for twice or more used scales (Field 2009; Nunally 1978). After that, the explanatory power of the factors for the deviation of perceived and fair shares was tested for each product using linear regression. Suitability of data was tested looking at multicollinearity, Durbin Watson and residuals (Field, 2009). Additionally, data was tested for outliers, according to recommendations of Field (2009) (Cooks and Mahalanobis Distance).

Results

Fair revenue distribution in the supply chain from a consumer perspective

Table 1 shows the consumers' perceived shares received by the supply chain partners and the consumers' perception of fair distribution as shown in the results of the consumer survey. Additionally, the real farmer shares derived from literature are shown. For all other partners it was not possible to get reliable numbers for the received shares of revenues. Calculated are the deviations of the estimated and real shares as well as the deviations of estimated and perceived shares. In the following, the results are described for the different supply chain partners.

	Real farmer share	Perceived shares	Deviation of real and perceived shares	Fair shares	Deviation of perceived and fair shares
Milk					
Farmer	38.8[1]	24.65 (11.19)	-14.15	45.05 (11.71)	+20.36 (11.56)
Dairy	-	32.88 (10.75)		29.23 (7.34)	-3.61 (11.43)
Food Retailer	-	42.46 (15.61)		25.71 (10.17)	-16.76 (14.48)
Bread Roll					
Farmer	7.00[1]	15.45 (9.64)	+8.45	29.14 (11.20)	+13.77 (11.27)
Cereal trader	-	15.82 (6.59)		15.95 (5.85)	+0.14 (7.48)
Corn mill	-	15.70 (6.54)		16.98 (5.50)	+1.28 (6.63)
Industrial bakery	-	23.70 (9.70)		18.99 (6.87)	-4.74 (9.72)
Food retailer	-	29.33 (13.75)		18.94 (9.03)	-10.45 (11.64)
Schnitzel					
Farmer	24.6[1]	21.93 (11.24)	-2.67	37.19 (11.52)	+15.29 (11.80)
Animal trader	-	20.81 (6.93)		18.54 (6.86)	-2.29 (8.42)
Slaughterhouse	-	23.56 (7.60)		21.75 (6.75)	-1.85 (8.12)
Food retailer	-	33.70 (13.34)		22.51 (8.65)	-11.15 (13.18)
Mean for all products					
Farmer	-	20.72 (8.62)		37.15 (9.59)	+16.49 (9.46)
Cereal trader/animal trader	-	18.27 (5.44)		17.22 (5.49)	-1.05 (6.64)
Dairy/Corn mill/industrial bakery/slaughterhouse	-	23.87 (5.64)		21.69 (4.15)	-2.23 (6.02)
Food retailer	-	35.07 (12.30)		25.80 (8.18)	-12.75 (11.01)
Values are expressed in Euro Cents of the food dollar. Values in brackets indicate the standard deviation. Source: [1]Wendt (2012); own calculations					

Table 1. Real shares, estimated shares and fair shares of the supply chain partners

Farmers:

With an estimated revenue share of 24.65% and a real share of 38.8%, the farmer share in food supply chain is underestimated by consumers for *milk products* (-14.15%). In a fair distribution, consumers would award 45.05% of the milk revenues to the farmers, which is the highest value over all products. In the case of *bread rolls*, the farmer share is overestimated (15.45% estimated compared to 7% real share). According to the consumers' declaration, in a fair distribution an additional share of 13.77% should be awarded to the farmers. The

estimated share for *schnitzel* (21.93%) is closest to the real shares (24.6%) in relation to the tested goods. In a fair distribution, 37.19% should be awarded to the farmers. So here again, an additional revenue share of 15.29% is conceded to the farmers.

Traders:

For both cereal and animal traders the revenue shares are considerably overestimated, although reliable numbers are missing. A share of 15.82% for cereal traders seems far too high and is located at the same level as farmer shares for *bread rolls*. Only an additional revenue share of 0.14% is given to the cereal traders in a fair distribution from the consumer's point of view.

A similar pattern can be observed in the case of *schnitzel*, where the estimated share of the animal trader constitutes 20.81%. In a fair distribution, the share is reduced to 18.54%, which is still quite high.

Processors:

For *milk* products, the shares of the dairies were requested and were estimated with a share of 32.88%. In a consumers' perception of fair distribution a slight decrease of -3.61% is demanded.

In the value chain for *bread rolls'* two processors, the corn mill and the industrial bakery, are included. With an estimated share of 15.82% the result is similar to the corn traders share. In a fair distribution, an additional revenue share of 1.28% is awarded to this supply chain partner. The industrial bakeries real shares are estimated at 23.70% compared to a perceived fair share where the revenues are reduced (-4.74%) to 18.99%.

Food retailers:

The food retailers are the supply chain partners with the highest deviation of estimated real shares and perceived fair shares. Thereby, the food retailers would loose more than 10% revenue share for all products in a perceived fair distribution. In the case of *milk*, this loss is the highest (-16.76%) followed by *schnitzel* (-11.15%) and *bread rolls* (-10.45%).

Fairness dimensions in food chains from a consumers' perspective

To get insights into the fairness constructs underlying consumer evaluation of fairness in food chains with a focus on the farmer role, an exploratory factor analysis was conducted. Using this methodology, single aspects belonging to the same construct can be detected. For the fairness debate, it is important to know the fairness constructs consumers use to judge distributions, procedures and interactions and if fairness theories apply for the food dollar. In

total, six reliable factors describing fairness constructs were found. Table 2 shows the results of the factor analysis.

Factor 1: "Distributive Fairness for Farmers", Cronbach's Alpha: 0.796; explained variance: 9.364%	μ (σ)	Factor loadings
[1]How fair are the farmers revenues compared to their efforts?	-0.35 (0.95)	0.73
[1]How fair are the farmers revenues compared to the responsibility that they have in food production?	-0.45 (0.94)	0.64
[1]How fair are the farmers revenues compared to the profit that the processing industry gains from the products?	-0.53 (0.93)	0.68
[1]How fair are the farmers revenues compared to the profit that the food retailers gain from the products?	-0.60 (0.90)	0.65
[1]How fair are the farmers revenues compared to the expenses and investments made by them?	-0.53 (0.82)	0.60
Factor 2: "Price Fairness for Farmers", Cronbach's Alpha: 0.750; explained variance: 6.701%		
[2]A price for the farmers is fair if the trading partners act honestly.	1.33 (0.81)	0.75
[2]A price for the farmers is fair if all partners are compensated according to their efforts.	1.30 (0.84)	0.70
[2]A price for the farmers is fair if it covers the production costs.	1.24 (0.96)	0.66
[2]A price for the farmers is fair if it is reliable.	1.01 (0.90)	0.55
Factor 3: "Procedural Fairness I", Cronbach´s Alpha: 0.770; explained variance: 13.140%		
[2]A price for the farmers is fair if every farmer generates the same profit.	0.02 (1.14)	0.83
[2]A price for the farmers is fair if every farmer gets the same price.	0.39 (1.11)	0.63
[2]A price for the farmers is fair if the existence of all farmers is assured.	0.92 (1.08)	0.72
[2]A price for the farmers is fair if it recovers harvest losses.	0.70 (1.04)	0.62
Factor 4: "Procedural Fairness II", Cronbach's Alpha: 0.660; explained variance: 10.672%		
[2]If fair prices for farmers should have a chance supply and demand must act freely in the market.	0.50 (1.02)	0.78
[2]A price for the farmers is fair if it is formed by supply and demand.	0.67 (0.94)	0.75
[2]A price for the farmers is fair if it is negotiated.	0.59 (0.98)	0.57
Factor 5: "Interactional Fairness" , Cronbach's Alpha: 0.873; explained variance: 10.711%		
[2]I think that society treats farmers fairly.	-0.43 (0.93)	0.79
[2]I think that politics treat farmers fairly.	-0.41 (1.04)	0.77
[2]If I have the farmers' performance in mind they get enough appreciation through compensation.	-0.64 (1.02)	0.70
[2]I think that food retailers treat farmers fairly.	-0.70 (0.99)	0.71
[2]I think that the food industry treats farmers fairly.	-0.75 (0.95)	0.67
[2]From my point of view adduced performance and experienced appreciation are closely related in agriculture.	-0.01 (0.96)	0.58
Factor 6: "Process control Farmers", Cronbach's Alpha: 0.791; explained variance: 9.404%		
[2]The power of big food producers prevent the forming of fair prices for farmers.	1.26 (0.86)	0.80
[2]The power of big food traders prevent the forming of fair prices for farmers.	1.26 (0.89)	0.72
[2]If fair prices for farmers should have a chance, politics must campaign for it.	0.90 (1.00)	0.62
[2]That the farmer share of food prices gets smaller shows that farmers are capitalized.	0.91 (0.96)	0.65
[2]Farmers get too little from the overall profit in food production.	1.13 (0.88)	0.57
Kaiser-Meyer-Olkin-Criteria: 0.875, total explained variance: 59.993 %; declared factor scores ≥ 0.4. [1] Scale from +2 ="Very fair" to -2 ="Very unfair". [2]Scale from +2 ="I totally agree" to -2 ="I totally disagree".		

Table 2. Results of the exploratory factor analysis

In general, distributive, procedural and interactional fairness constructs were found by means of factor analysis. Distributive fairness clearly shows up in factor 1 and factor 2, whereas in factor 2 there are also items that rather belong to procedural and interactional fairness. Therefore, this factor is named "Price fairness for farmers". Factor 3 and 4 are bundle

procedural fairness items according to the procedure as an equal treatment for every farmer (factor 3) and as pricing is formed by the market (factor 4). Factor 5 represents interactional fairness items, including interpersonal fairness aspects but also distributive fairness items. Factor 6 also refers to procedural fairness and bundles items that describe farmers' process control in pricing.

The means of each item within a factor give insights into the fairness perceptions for this dimension. As seen in factor 1, respondents perceive the farmers' revenues as unfair on average. In terms of price fairness, factor 2 shows honesty of trading partners, effort-outcome ratio, cover of production costs and reliability of prices as rather important for price fairness evaluation. Procedural fairness in terms of equality is of further importance, but to a lesser degree. Thereby, the existence of all farmers and the recovering of harvest losses are seen, on average, as part of price fairness whereas same prices and profits for all farmers are only slightly supported (factor 3). The comparably high standard deviations in this factor points to higher heterogeneity in the answers in this factor. The average of respondents also accepts that fair prices need a free market where supply and demand can react (factor 4). The statements on procedural fairness show that farmers are perceived to be at a disadvantage compared to other supply chain partners. Moreover, on average process control is perceived as very low for farmers on average (factor 6).

Relationship between fairness evaluation and fair revenue allocation

To test which fairness dimensions influence the food dollar distribution for the farmer share, three regression models (one for each product) were tested. Therefore, the deviation of real and fair shares from the food dollar allocation was introduced into the models as dependent variable. The six fairness dimensions found in the factor analysis were included as independent variables. Table 3 shows the results of the regression analyses. In total, three significant influencing dimensions were detected for all products whereas the other three factors do not influence the fairness perception of revenue allocation. The R^2 values for milk and schnitzel are .19, while for bread the explanatory power of the model only accounts for 10%.

The strongest influence on the revenue allocation for all products forms the construct of distributive fairness. Thereby, the highest influence can be observed in the case of milk, followed by schnitzel and bread. The relationship is represented negatively, which means that the unfair the food dollar allocation is perceived, the unfair the distribution is rated in the items. Also, the interactional fairness, represented by factor 5, influences the deviation

between perceived real and fair shares negatively. The more unfair the farmer shares are estimated, the less fair the interaction with farmers is evaluated. Interactional fairness seems to be more important in the case of schnitzel than for milk and bread. The process control farmers experience in the food chain also forms consumer's fairness perception with similar coefficients for all products, while for bread, process control has a higher impact than interactional fairness. Procedural fairness and the mixed price fairness factor do not influence the deviation of perceived and fair shares.

Independent Variables	Beta			T		
	Milk	Bread	Schnitzel	Milk	Bread	Schnitzel
Factor 5 Interactional Fairness	-.175	-.157	-.272	-3.249***	-2.789**	-5.049***
Factor 6 Process control Farmers	.145	.184	.148	2.701**	3.269***	2.738**
Factor 1 Distributive Fairness for Farmers	-.386	-.229	-.279	-7.190***	-4.072***	-5.164***
Factor 3 Procedural Fairness I	.037	.027	-.080	0.679	0.479	-1.479
Factor 2 Fair Prices for Farmers	.043	.065	.092	0.809	1.165	1.700
Factor 4 Procedural Fairness II	-.046	-.042	-.58	0.857	-0.744	-1.069
Dependent Variable: Deviation of perceived real and fair shares for either milk, bread, or schnitzel. *** p ≤ .001: **p ≤ .01; *p ≤ .05 Milk: Adj. R^2 = .19; F = 11.95*** Bread: Adj. R^2 = .10; F = 6.16***, Schnitzel: Adj. R^2 = .19; F = 10.92***						

Table 3. Regression models to explain the deviation of perceived real from fair shares

Discussion

The results of the food dollar distribution in this study show that farmers are compensated unfairly and should earn more of the food dollar from a consumer perspective, while processors and food retailers should lose shares. The overestimation of the share of intermediaries underlines the presumption of little consumer knowledge about food production and supply chain organization. There is older data for Germany where the animal trader share is between 0.04 and 0.09 €/kg slaughter weight (Korbun *et al,.* 2004), which would be even less if transformed to the food dollar. This would be in line with the US Data of a share of 3.4% for transportation in general (USDA, 2014). In a fair distribution from a consumer point, farmers should get the highest share for fresh milk. Milk is the most unprocessed product tested in this study, followed by schnitzel and bread rolls. This is in line with the real farmer share that decreases with increasing procession and is higher for animal than for plant products (Elitzak, 1996; TI, 2014).

The results of the factor analysis in this study have shown that the constructs of distributive, procedural and interactional fairness are found in the consumers' evaluations, however, the

dimensions are mixed up to some extent, as seen in factor 2 and factor 5. The responses to the fairness items indicate that farmers are perceived as disadvantaged in the supply chain compared to other partners. Farmers efforts, responsibility and investments, especially compared to processors and retailers, are not enough compensated in commodity prices from a consumer's point.

In commercial terms, small and local sound better than big and global to consumers (Eden & Bear, 2010). On the one hand, in Germany, food retailing is highly concentrated with the four biggest retailers holding a market share of 85% (Bundeskartellamt, 2014). In the processing sector, again, only a few companies have high market shares, for example dairies (Top 5 = 42%; Molkerei-Industrie, 2014) and slaughterhouses (TOP 5 = 63%; ISN, 2013). On the other hand, farms are often small to medium sized, mostly family-run businesses. For example, there are 76,000 dairy farmers in Germany (Destatis, 2014). Due to the market power of processors and retailers in the food market, farmers are seen as "underdogs" that are disadvantaged because of the external situation. This effect occurs mainly because of smaller size and less market power. Consumers' identify with underdogs and sympathize with them (Paharia *et al.,* 2011). Empirical studies indicate a positive correlation between concentration and selling prices in food markets (see Sexton & Lavoie, 2001 for a review), which also indicates solidarity of consumers with farmers, as both may suffer to some extend from market power of processors and retailers. These effects could even be used as an explanation for the sympathy of the public with dairy farmers in the 2008 Milk Strike.

The regression models have shown that there is a significant influence on the deviation between perceived and fair shares of distributive fairness, process control (as part of procedural fairness) and interactional fairness. In contrast, procedural fairness in terms of price finding (equal prices or free markets) and the mixed factor of fair prices show no influences. As Lupfer *et al.,* (2000) conclude, distributive fairness plays a more important role in a fairness evaluation of others compared to personal evaluation. As consumers evaluated the treatment of farmers and not of themselves, the result is in accordance with the findings of Lupfer *et al.*, (2000). Furthermore, through first estimating the real food dollar and then sharing out a fair food dollar, respondents were forced to think about the distribution of revenues and had a clear frame of reference in mind when answering the questions used for factor analysis. This reference is necessary for fairness judgments (Xia *et al.,* 2004) and may also explain the lesser importance of procedural parameters (Van den Bos *et al.,* 1997; 1998). The imputed weak process control to farmers also shows influences on the fair food dollar distribution in the meaning that low perceived farmers' process control leads to a higher

redistribution of shares to farmers. This indicates that consumers somehow sympathize with farmers and is in accordance with the discussion of the food dollar distribution mentioned above. Little process control leads to dissatisfactions in a process (Folger, 1977). This also holds true for interactional fairness. Consumers can easily put themselves in the situation of farmers in terms of treatment from policy, supply chain partners or society and perceive this treatment as important for fairness as these statements are expressed quite openly. There is evidence from research that it is easier for people to state what is unfair than what is fair (Xia *et al.,* 2004). The three factors showing no influence are all asking for actions resulting in fair prices for farmers and not for unfair prices.

Conclusion and further research

In this study a fair distribution of the food dollar and fairness constructs influencing the perception of a fair food dollar distribution were analyzed. Farmers were seen as the most unfairly compensated partner in the supply chain. Fairness for farmers in the food dollar distribution is driven by monetary, but also by non-monetary, fairness considerations, at least from a consumer's point. The results have importance for the societal and political discussion, as well as for marketing aspects. For the first points we found that consumer's preference for boosting the position of farmers in the supply chain is in accordance with political attempts of the European Commission. Thereby, fairness cannot be achieved by only increasing the farmer share but also increasing the voice of the farmers is important for the acceptance of food chain systems.

For marketing activities these results are interesting for developing CSR-Strategies and redefining labeling. By highlighting a fair position and compensation for farmers further consumer segments could be exploited. Current consumer trends already show emerging market shares for local direct marketing. This is due to various private and public attributes, e.g. food safety and support for local economy (Thilmany *et al.,* 2008), but fairness and distribution to others could also play a role (Toler *et al.,* 2009) as consumers see themselves in a similar dependence role like farmers. Direct purchases could offer a win-win situation. In those initiatives, process control, independence and distributive advantages for farmers should be highlighted to underline advantages of buying these products. Further research should test fairness perceptions in more detail and establish a link to buying intentions to stress the practical impact of results.

Limitations

With regard to limitations, it must be added that real farmer shares were shown to respondents before answering fairness statements that were used for factor analysis. Therefore an influence on the responses cannot be excluded. According to Xia et al. (2004), for conducting fairness judgments on prices, references are needed for comparison. By giving respondents the farmer revenues in absolute numbers without revenues of other supply chain partners and without commenting organizational forms of supply chains and inputs delivered by each partner, these references could potentially not be classified correctly. As knowledge about supply chain organization and efforts in food production seems to be quite low in general public, a priming effect cannot be excluded.

References

Andorfer, V.A., Liebe, U. (2013). Consumer behavior in moral markets. On the relevance of identity, justice beliefs, social norms, status, and trust in ethical consumption. European Sociological Review.

Bolton, L.E., Warlop, L. and Alba, J.W. (2003). Consumer perceptions of price (un)fairness, Journal of Consumer research, 29, 474-491.

Böhm, J., Schulze, B. (2010). Der Milchstreik aus Medien- und Verbrauchersicht – Empirische Analyse auf Basis des Framing-Ansatzes. In: Kayser, M., Böhm, J. and Spiller, A. (eds.): Die Ernährungswirtschaft in der Öffentlichkeit – Social Media als neue Herausforderung der PR, 185-229.

Briggeman, B.C., Lusk, J.L. (2011). Preferences for fairness and equity in the food system. European Review of Agricultural Economics, 38(1), 1-29.

Bundeskartellamt (2014). Sektoruntersuchung Lebensmitteleinzelhandel, Bonn

Chang, J.B., Lusk, J.L. (2009). Fairness and food choice. Food Policy, 34(2009), 483-491.

Colquitt, J.A., Conlon, D.E., Wesson, M.J., Porter, C.O.L.H., NG, K.Y (2001). Justice at the millenium: a meta-analytic review of 25 years of organizational justice research. Journal of Applied Psychology, 86(3), 425-445.

Collie, T., Bradley, G., Sparks, B.A. (2002). Fair process revisited: differential effects of interactional and procedural justice in the presence of social comparison information. Journal of Experimental Social Psychology, 38(2002), 545-555.

DESTATIS (2014). Tiere und tierische Erzeugung. Haltungen mit Rindern und Rinderbestand für Mai 2014 und November 2014. URL: https://www.destatis.de/DE/ZahlenFakten/Wirtschaftsbereiche/LandForstwirtschaftFischerei/TiereundtierischeErzeugung/Tabellen/BetriebeRinderBestand.html (28.12.2014).

Eden, S., Bear, C. (2010). Third-sector global environmental governance, space and science: comparing fishery and forestry certification. Journal of Environmental Policy & Planning,
12(1), 83-106.

Elitzak, H. (1996). Food cost review, 1996. USDA, Agricultural economic report no. 761.

EU Commission (2010). Milk and milk products. High Level Expert Group on Milk. http://ec.europa.eu/agriculture/markets/milk/hlg/index_en.htm (05.10.2014).

EU Commission (2014). The "milk package". http://ec.europa.eu/agriculture/milk/milk-
        package/index_en.htm (05.10.2014).

EU Parliament (2009). Entschließung des Europäischen Parlaments vom 26. März 2009 zu
        Lebensmittelpreisen   in   Europa.
        http://www.europarl.europa.eu/document/activities/cont/201004/20100422ATT73
        210/20100422ATT73210DE.pdf

Fehr, E., Schmidt, K.M. (1999). A theory of fairness, competition and cooperation. The
        Quarterly Journal of Economics, 114(3), 817-868.

Field (2009). Discovering statistics using SPSS. Los Angeles, London, New Delhi, Singapore,
        Washington D.C, SAGE.

Folger, R., Konovsky, M.A. (1989). Effects of procedural and distributive justice on reactions
        to pay raise decisions. Academy of Management Journal, 32(1), 115-130.

Interessengemeinschaft Schweinehalter Niedersachsen (ISN) (2013). ISN-Schlachthofranking
        2013 – Konsolidierungskurs schreitet weiter voran. http://www.schweine.net/bild-
        der-woche/isn-schlachthofranking-2013-konsolidierungskurs-
        s.html?highlight=top+schlachtunternehmen& (04.02.2015).

Korbun, T., Steinfeldt, M., Kohlschütter, N., Naumann, S., Nischwitz, G., Hirschfeld, J.,
        Walter, S. (2004). Was kostet ein Schnitzel wirklich? Ökologisch-ökonomischer
        Vergleich der konventionellen und der
        ökologischen Produktion von Schweinefleisch in Deutschland, Schriftenreihe des
        IÖW 171/04.

Kröger, M, Schäfer, M. (2014). Between ideals and reality: development and implementation
        of fairness standards in the organic food sector. Journal of Agricultural and
        Environmental Ethics, 27, 43-63.

Lupfer, M., Weeks, K., Doan, K., Houston, D. (2000). Folk conceptions of fairness and
        unfairness. European Journal of Social Psychology, 30, 405-428.

Lusk, J.L., Nilsson, T., Foster, K. (2007). Public Preferences and Private Choices: Effect of
        Altruism and Free Riding on Demand for Environmentally Certified Pork.
        Environmental & Resource Economics, 36(4), 499–521.

Molkerei-Industrie (2014). Spezial. Branchenübersicht Milch 2014, Bad Breisig.

Padel, S., Röcklinsberg, H. and Schmid, O. (2009). The implementation of organic principles
        and values in the European regulations for organic food. Food Policy, 34(2009),
        245-251.

Paharia, N., Keinan, A., Avery, J., Schor, J.B. (2011). The underdog effect: the marketing of

disadvantage and determination through brand biography. Journal of Consumer Research, 37(5), 775-790.

Rabin, M. (1993). Incorporating fairness into game theory and economics. The American Economic Review, 83(5), 1281-1302.

Rimal, A., Moon, W., Bralasubramanian, S.K. (2006). Pervceived risks of agro-biotechnology and organic food purchases in the United States. Journal of Food Distribution Research, 37(2), 70-79.

Schneider, M.L., Francis, C.A. (2005). Marketing locally produced foods: Consumer and farmer opinions in Washington Counts, Nebraska. Renewable Agriculture and Food Systems, 20(4), 252-260.

Sexton, R.J., Lavoie, N. (2001). Food processing and distribution: An industrial organization approach. In: Gardner, B.L., Rausser, G.C. (eds.): Handbook of Agricultural Economics, Marketing, Distribution and Consumers, 1 (B), 863-932.

Skarlicki, D.P., Latham, G.P. (1996). Increasing citizenship behavior within a labor union: a test of oganizational justice theory. Journal of Applied Psychology, 81(2), 161-169.

Statistisches Bundesamt (2014). Altersstruktur der Bevölkerung auf Grundlage des Zensus nahezu unverändert. URL: https://www.destatis.de/DE/ZahlenFakten/GesellschaftStaat/ Bevoelkerung/Bevoelkerung.html (06.07.2014).

Sunding, D.L. (2003). The role for government in differentiated product markets: looking to economic theory. American Journal of Agricultural Economics, 85(3), 720-724.

Thünen-Institut für Marktanalyse (2014). Anteil der Verkaufserlöse der Landwirtschaft an den Verbraucherausgaben für Lebensmittel inländischer Herkunft in Deutschland. URL: http://www.ti.bund.de/de/startseite/institute/ma/aktuelles-service/erzeugeranteil-an-den-nahrungsmittelausgaben-in-deutschland-verharrt-2012-auf-hohem-niveau.html (29.09.2014).

Thilmany, D,, Bond, C.A., Bond, J.K. (2008). Going local: Exploring consumer behavior and motivations for direct food purchases. In: American Journal of Agricultural Economics, 90(5), 1303-1309.

Toler, S., Briggeman, B.C., Lusk, J.L., Adams, D.C. (2009). Fairness, farmers markets, and local production. In: American Journal of Agricultural Economics, 91(5), 1272-1278.

Umberger, W.J., McFadden, D.D.T., Smith, A.R. (2009). Does altruism play a role in
        determining US consumer preferences and willingness to pay for natural and
        regionally produced beef? Agribusiness, 25(2), 268-285.

USDA (2014). Food dollar series. URL: http://www.ers.usda.gov/data-products/food-dollar-
        series/food-dollar-application.aspx#.VCkvkVcueSr (29.09.2014).

Van den Bos, K., Lind, E.A., Vermunt, R., Wilke, H.A.M. (1997). How do I judge my
        outcome when I do not know the outcome of others? The psychology of the fair
        process effect. Journal of Personality and Social Psychology, 72(5), 1034-1046.

Van den Bos, K., Wilke, H.A.M., Lind, E.A., Vermunt, R. (1998). Evaluating outcomes by
        means of the fair process effect: evidence for different processes in fairness and
        satisfaction judgements. Journal of Personality and Social Psychology, 74(6),
        1493-1503.

Wendt, H. (2012). Anteil der Verkaufserlöse der Landwirtschaft an den Verbraucherausgaben
        für
        Nahrungsmittel inländischer Herkunft in Deutschland. URL:
        http://www.ti.bund.de/de/ma/aktuelles-und-service/ (08.11.2012).

Xia, L., Monroe, K.B., Cox, J.L. (2004). The price is unfair! A conceptual framework of price
        fairness perceptions. Journal of Marketing, 68(4), 1-15.

Zander, K., Hamm, U. (2010). Consumer preferences for additional ethical attributes of
        organic food. Food Quality and Preference, 21, 495–503.