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Farmer-owned brand purchases: The importance of label comprehension and price fairness perception

The farmer-owned label is a relatively recent addition to the crowded landscape of information on food and drink product packages. Due to its novelty, research on the farmer-owned label is still scarce. Using 451 responses from random food consumers in the United States, we attempt to explain variability in the purchase of farmer-owned brands in ten different food and drink product categories in terms of label comprehension and price fairness perception. Our structural equation model results are contrary to expectations: we find a negative relationship of label comprehension to the farmer-owned brand share, which implies food consumers do not support the various implications of farmer ownership of food brands. In addition, respondents who perceive more distributive price fairness and procedural price fairness purchase a higher proportion of farmer-owned brands. Implications for researchers, practitioners, and policymakers are discussed.

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Introduction

Food producers and marketers convey increasingly more information to consumers about the presence or absence of certain product and process attributes by means of logos, labels, and other mechanisms. Theoretically, such mechanisms reduce the level of information asymmetry between producers and consumers and thus limit market imperfections. Some of the many examples relate to organic production (Chekima *et al.,* 2019), genetic modification (Grebitus and Van Loo, 2022), product origin (Grashuis and Su, 2022), and traceability (Liu *et al.,* 2019).

A relatively new label is the farmer-owned label. At its essence, the farmer-owned label constitutes an information signal regarding the ownership of the brand: the brand is (collectively) owned and managed by farmers who are members of cooperatives or similar organisations. While there are approximately 2,000 cooperatives in the United States (U.S. Department of Agriculture, 2021), relatively few have brand equity as indicated by trademarks (Hardesty, 2005; Grashuis, 2017). Even fewer cooperatives use the farmer-owned label to complement any brand equity.

The farmer-owned label also has deeper implications, particularly in terms of who supplies the ingredients and who captures the profits. In cooperatives, farmers have dual roles as suppliers or customers and investors (Limnios *et al.,* 2018); by contrast, shareholders of corporations are generally only investors and not suppliers or customers of the business organisation. To be specific, farmers who are members of marketing cooperatives invest equity and also sell output (e.g. corn, milk, cotton) to the business organisation. Generally, farm-gate prices are higher for farmers who are members of marketing cooperatives (Jardine *et al.,* 2014; Grashuis, 2020).

The farmer-owned label is related to other labels and similar mechanisms in the consumer marketplace. Arguably the best comparison is facilitated by the Geographic Indication (GI) and the Protected Designation of Origin (PDO).

The motivation behind GIs and PDOs is to provide a communication signal for consumers and to generate a positive return for farmers (Bellassen *et al.,* 2022). Thus, even though the direct connotation of GIs and PDOs is the origin of the product (e.g. Gorgonzola cheese, Irish whiskey, Orkney lamb), the underlying premise is to reward farmer investment. According to Hayes *et al.* (2004), farmer-owned brands form a subset of GIs.

Empirical evidence of the effect of the farmer-owned label is mixed (Grashuis, 2021). One possible explanation for the mixed findings is label comprehension. In one of the few studies on the farmer-owned label, Grashuis (2021) conducted a framed choice experiment with Dutch milk consumers and only estimated a significant price premium if information about the profit allocation to farmers as opposed to investors is disclosed. The result highlights a possible lack of comprehension on the part of consumers who are not informed or educated in terms of the farmer-owned label. In the broader literature, label comprehension has been identified as an important driver of consumer behaviour (McEachern and Warnaby, 2008; Grimes *et al.,* 2009).

Hypothesis 1: Comprehension of the farmer-owned label is positively associated with the purchase of farmer-owned brands

Another overlooked factor with potential to explain the mixed evidence of the farmer-owned label is fairness. Fairness in general and price fairness in particular have been of recent and current interest to the agri-food industry (Hendrickson and James, 2016). Concerns with fairness stem from increases in market concentration at the downstream stage of the value chain. Due to mergers and acquisitions, there are increasingly fewer processors and retailers, with potentially adverse consequences for transparency in contracts and spot market transactions with farmers. Food consumers with other-regarding preferences may gain utility from allocating more profit to farmers than other agents

in the value chain (Briggeman and Lusk, 2011; Busch and Spiller, 2016; Samoggia *et al.,* 2021). The same type of food consumers may therefore support the farmer-owned label and its various implications.

Hypothesis 2: Consumers with price fairness preferences are more likely to purchase farmer-owned brands

Taking the above into consideration, we build on prior research by Grashuis (2021) with an empirical study of consumer behaviour in the context of farmer-owned brands in ten food and drink product categories. However, unlike Grashuis (2021), we do not study revealed consumer preferences for product or process characteristics in an experimental setting; instead, like Tandon *et al.* (2020) and Segovia *et al.* (2022), we assume a behavioural perspective via the consideration of consumer psychographic characteristics to help explain variability in stated preferences. Specifically, we address the question if it is possible to explain variability in the consumer choice of farmer-owned brands in terms of label comprehension and price fairness perception? Put differently, are consumers who comprehend the farmer-owned label more likely to choose farmer-owned brands? And are consumers who perceive price unfairness in the agri-food value chain also more likely to choose farmer-owned brands?

We address the above questions using survey responses from 451 food consumers in the United States. We explain variability in the purchase of farmer-owned brands at the consumer level by building a structural equation model with label comprehension and price fairness perception as latent predictors. Our novel findings are surprising. Generally, respondents who perceive more price fairness in the agri-food value chain are more likely to purchase farmer-owned brands. Also, respondents who have a superior comprehension of farmer-owned label implications are less likely to purchase farmer-owned brands. We thus address a substantial gap in the empirical literature on the importance of psychographic characteristics to the purchase of farmer-owned brands. There are several implications for researchers, practitioners, and policymakers, which are further discussed in the conclusion.

Food Consumer Survey

In April of 2022, we conducted an online survey on Qualtrics. To avoid variability in brand availability across regions, we limited the geographic pool of the respondents to the Midwest region of the United States. Food and drink brands in the Midwest region may not be available in, for example, the Northeast region, and vice versa. Another motivation for the Midwest region is the location of the research team. The respondents also needed to meet three other criteria: (1) to be at least 18 years of age, (2) to be the primary grocery shopper in their household, and (3) to have consumed at least one of the following ten food or drink products within the prior three-month period: almond milk, apple juice, butter, cheese, cranberry juice, milk, orange juice, organic milk, raisins, or rice. We selected these product categories because of the

presence of farmer-owned brands. We received a total of 465 responses to the online survey. We dropped eight respondents who failed an attention check as well as six respondents with missing data, thus reducing the sample size to 451.

The survey consisted of four parts: (1) demographic information, (2) comprehension of the farmer-owned label, (3) perception of price fairness in the agri-food value chain, and (4) purchase of farmer-owned brands in the ten product categories. We report the summary statistics of the demographic characteristics of our sample in Table 1.

Table 1: Demographic Characteristics of the Sample.

Variable	Mean	Standard Deviation
Age: 18-24	0.03	0.17
Age: 25-34	0.47	0.50
Age: 35-44	0.28	0.45
Age: 45-54	0.14	0.34
Age: 55-64	0.05	0.22
Age: 65 or older	0.03	0.17
Gender: Female	0.47	0.50
Education: High school or less	0.08	0.28
Education: 2-year college degree	0.09	0.28
Education: 4-year college degree	0.61	0.49
Education: Advanced college degree	0.22	0.42
Income (x1000)	63.07	22.75
State: Illinois	0.15	0.36
State: Indiana	0.29	0.46
State: Iowa	0.03	0.17
State: Kansas	0.04	0.21
State: Michigan	0.10	0.31
State: Minnesota	0.04	0.20
State: Missouri	0.10	0.30
State: Nebraska	0.01	0.08
State: North Dakota	0.02	0.12
State: Ohio	0.15	0.36
State: South Dakota	0.01	0.08
State: Wisconsin	0.05	0.22

Source: Own composition

Overall, the average respondent is relatively young (50% are 34 years of age or younger) and educated (83% have a four-year college degree or higher). While the sample is not necessarily reflective of the overall population, these respondents are all grocery shoppers who make purchase decisions and brand choices and are therefore of interest to the study.

To inform consumer comprehension of the farmer-owned label, we showed respondents four generic statements about ownership, governance, supply source, and profit allocation implications (see Table 2). Each statement featured a correct option, an incorrect option, and an "I don't know" option. The four generic statements are not based on an existing instrument, which to our knowledge is not available in the

**Table 2:** Farmer-Owned Label Comprehension.

Statement	Percentage
Ownership	
The brand is owned by farmers	0.84
The brand is owned by investors	0.14
I don't know	0.02
Governance	
Farmers make business decisions about the brand	0.79
Farmers do not make business decisions about the brand	0.16
I don't know	0.05
Supply Source	
The ingredients used in the product come from the owners of the brand	0.60
The ingredients used in the product come from independent suppliers	0.33
I don't know	0.07
Profit Allocation	
A higher percentage of the price goes to farmers	0.68
A lower percentage of the price goes to farmers	0.26
I don't know	0.06

Source: Own composition

Figure 1: Consumer Perceptions of Distributive, Procedural, and Interactional Price Fairness.
Source: Own composition

literature. To avoid order bias, we randomized the order of the correct option and the incorrect option; the "I don't know option" always appeared last.

The average respondent has a relatively strong comprehension of the basic implications of the farmer-owned label. On average, 84% and 79% know the brand is owned and managed by farmers as opposed to investors, respectively. However, without additional information, fewer respondents grasp the deeper implications of the farmer-owned label. Sixty percent of the respondents identify the correct source of the product ingredients as farmers, while 68% of the respondents know a higher percentage of the price is allocated to farmers as opposed to investors.

Following Busch and Spiller (2016), we estimated the price fairness perceptions of respondents in the context of the overall agri-food value chain. Our approach also relates to Gielissen and Graafland (2009) and Samoggia *et al.* (2021), who measured price fairness perceptions in the coffee and processed tomato sectors, respectively. Like Samoggia *et al.* (2021), we also considered three different components of price fairness: (1) distributive fairness, which concerns the relative profit allocation among buyers and sellers, (2) procedural fairness, which relates to the price-setting procedure of the sellers, and (3) interactional fairness, which considers the honesty and transparency of the sellers (Samoggia *et al.,* 2021). We informed each component with two to three five-point Likert statements with "entirely disagree" and "entirely agree" as the anchors (see Figure 1). All the statements have been adapted from Gielissen and Graafland (2009), Busch and Spiller (2016), and Samoggia *et al.* (2021). According to the data, approximately 50% of
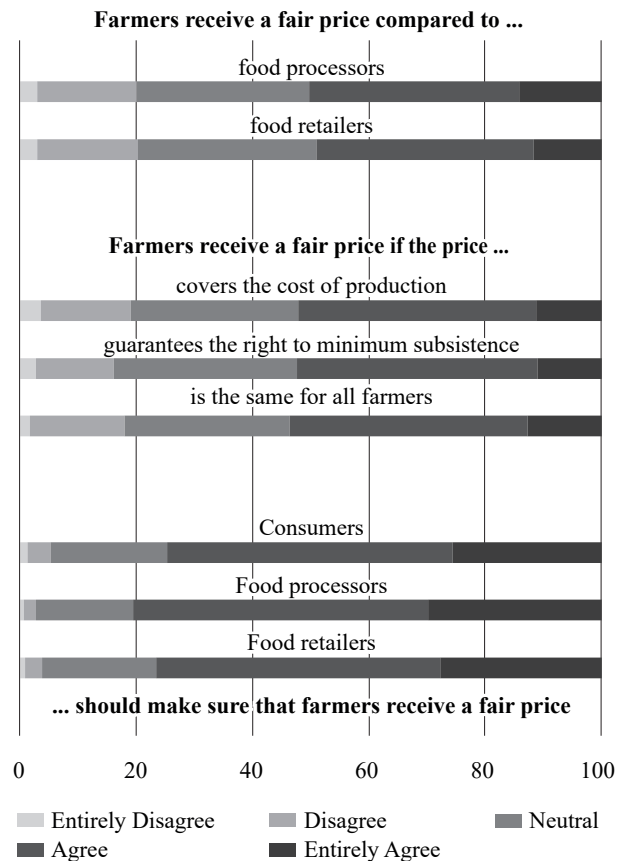
the respondents agree that farmers receive a fair price compared to food processors and food retailers, which concerns the construct of distributive price fairness. Like Busch and Spiller (2016) and Samoggia *et al.* (2021), we thus observe a substantial number of respondents who think price distributions in the agri-food value chain are not fair. On average, respondents agree more with the three statements in relation to the construct of procedural price fairness. Considering the similarity in the distributions, all three statements appear to approximate the concept of procedural price fairness to the same degree. The distribution is further skewed to the left in terms of interactional price fairness as approximately 80% of the respondents agree that other parties in the agri-food value chain (i.e. consumers, food processors, food retailers) bear some responsibility for farm-gate prices.

For respondents who indicated to have purchased a given food or drink product within the prior three-month period, we also asked about the selected brand. Among the five options we showed one farmer-owned brand, two name brands, as well as "store brand" and "other". As reported in Figure 2, the overall share of the farmer-owned brand varies across the ten product categories. The share is the largest in the almond milk and the cranberry juice categories, and the smallest in the cheese category. Most of the competition is derived from other name brands as store brands have a relatively small share ranging from four percent (organic milk product category) to 20 percent (milk product category).
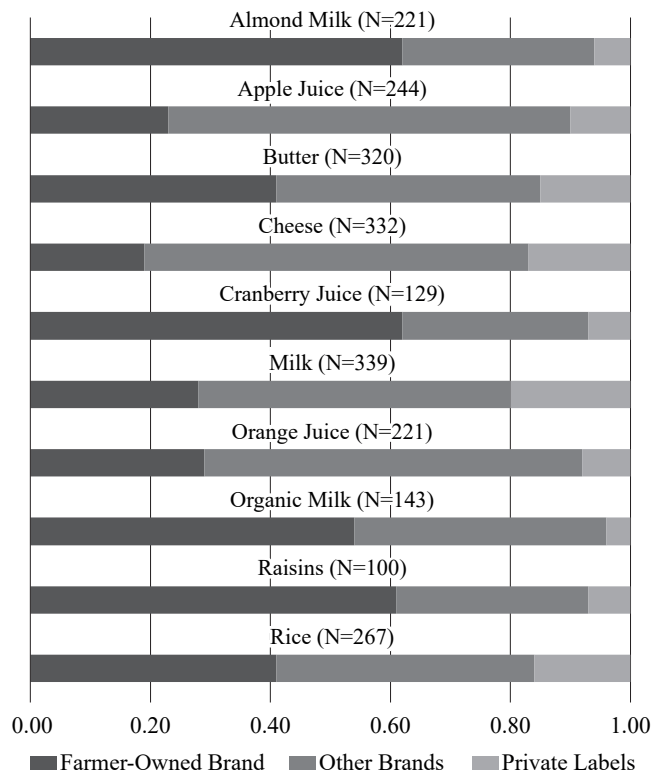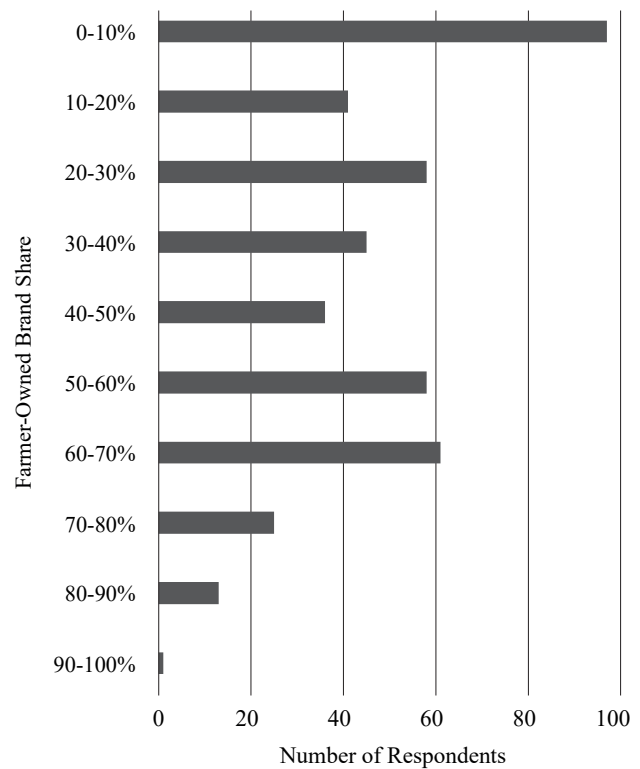
Figure 2: Farmer-Owned Brand Share Across Product Categories.
Source: Own composition

Figure 3: Distribution of the Farmer-Owned Brand Share.
Source: Own composition

For each respondent, the farmer-owned brand share at the individual level is calculated as the ratio of the number of purchased farmer-owned brands to the number of purchased food and drink products. The share ranges from zero to one, where zero indicates that the respondent purchased no farmer-owned brands, and one indicates that the respondent only purchased farmer-owned brands. For example, if a respondent purchased five of the listed food and drink products in the prior three-month period and two of the five came from a farmer-owned brand, then the farmer-owned brand share for the individual is 0.40. Across the full sample and all ten product categories, the mean share of the farmer-owned brand is 0.36. Furthermore, as depicted in Figure 3, the distribution is non-normal with a right skew as a relatively large proportion of respondents do not purchase any farmer-owned brands.

Structural Equation Model of Farmer-Owned Brand Share

With label comprehension, distributive price fairness, procedural price fairness, and interactional price fairness as latent constructs, we use the structural equation modelling (SEM) method to explore the statistical relationships. SEM has a long history in the field of social sciences (Tarka, 2018). Increasingly more economists in the field of agricultural and food economics use the method to involve behavioural science elements (Grashuis and Cook, 2021; Tong *et al.,* 2021). SEM involves the analysis of covariances and correlations to test statistical relationships by combining the various characteristics of exploratory factor analysis or confirmatory factor analysis as well as multiple regression (Ullman, 2001; Bollen and Pearl, 2013). A typical structural equation model has two components: (i) the measurement model, which contains the relationships between the latent variables and its manifest variables, and (ii) the structural model, which contains the relationships between the latent variables.

Following Jöreskog (1970), the structural model is given by

$$\eta = B\eta + \Gamma\xi + \zeta \tag{1}$$

where, if q is the number of outcome variables and r is the number of predictors, η is the $q \times 1$ vector of endogenous latent variables (i.e. outcome variables), ξ is the $r \times 1$ vector of exogenous latent variables (i.e. predictors), and ζ is the latent stochastic term. B and Γ are the $q \times q$ and $q \times r$ vectors of parameters for the endogenous and exogenous latent variables, respectively. There is one equation for each outcome variable in the structural model. The measurement model is defined as

$$y = \Lambda_y\eta + \epsilon \tag{2}$$

and

$$x = \Lambda_x\xi + \delta \tag{3}$$

where x is the vector of manifest variables in relation to the exogenous latent variables, y is the vector of manifest variables for the endogenous latent variables, Λ is the vector of

random parameters to be estimated, and δ and ε are the stochastic terms for x and y, respectively. Our base structural equation model is illustrated in Appendix 1 and estimated in Stata 17 using the sem command. Correspondingly, Table 3 also lists all the model variables, which are the four latent variables (i.e. distributive price fairness, procedural price fairness, interactional price fairness, label comprehension), their manifest variables, and the outcome variable (i.e. farmer-owned brand share).

Results and Discussion

We report the results of the base structural equation model in Appendix 2. The coefficients (i.e. path loadings) are standardised to facilitate easy interpretation of the statistical relationships. The coefficients thus indicate how many standard deviations the outcome variable increases or decreases with a one-unit (i.e. standard deviation) change in the predictor.

Farmer-Owned Label Comprehension

Label comprehension is negatively related to the farmer-owned brand share. An increase of one standard deviation in label comprehension is estimated to decrease the farmer-owned brand share by 0.235 standard deviations. To be clear, respondents who better understand the various implications of the farmer-owned label have a significantly lower farmer-owned brand share, which is contrary to Hypothesis 1. There are several considerations. First, respondents do not appear to accept or support the underlying implications of the farmer-owned label. If the implications form a deterrent as opposed to a stimulant to the purchase of farmer-owned brands, then the very foundation of the farmer-owned label should be called into question. Second, when examining the loadings of the four manifest variables to the latent construct of label comprehension, the largest magnitude is observed for the price implication (i.e. a higher percentage of the price goes to farmers), followed by the ownership implication (i.e. the brand is owned by farmers) and the governance implication (i.e. farmers make business decisions about the brand). As such, the result is driven by the price implication, which serves as the main objective behind the farmer-owned label. Third, on the positive side, the farmer-owned label is not the only product or process attribute of relevance to the purchase decisions of food consumers. Price, quality, taste, and other attributes may also explain variability in the farmer-owned share. As such, the latent construct of label comprehension should be tested in a controlled experiment with other attributes to better isolate its effect and prevent any upward or downward bias.

The result regarding the negative relationship of label comprehension to the farmer-owned brand share relates to Grashuis (2021), who failed to find a significant price premium for the farmer-owned label in the absence of additional information in terms of the payoff distributions to farmers as opposed to investors. Grashuis (2021) recommended education to increase label comprehension, and the same applies here. Arguably the best solution is for some umbrella organisation, such as an industry-level union or council representing farm producer organisations, to make a collective investment in an information or communication campaign to improve the comprehension of the farmer-owned label and its various implications. As price fairness in the agri-food value chain is of relevance to overall society, policymakers may also help address the situation by educating the public about the farmer-owned label.

Table 3: Overview of Structural Equation Model Variables.

Variable	Measurement Scale	Variable Type
x1	1-5	Manifest Variable
x2	1-5	Manifest Variable
x3	1-5	Manifest Variable
x4	1-5	Manifest Variable
x5	1-5	Manifest Variable
x6	1-5	Manifest Variable
x7	1-5	Manifest Variable
x8	1-5	Manifest Variable
x9	1-2	Manifest Variable
x10	1-2	Manifest Variable
x11	1-2	Manifest Variable
x12	1-2	Manifest Variable
Distributive Price Fairness		Latent Variable
Procedural Price Fairness		Latent Variable
Interactional Price Fairness		Latent Variable
Label Comprehension		Latent Variable
Farmer-Owned Brand Share	0-1	Outcome Variable

Source: Own composition

Price Fairness Perception

According to the results, the latent constructs of distributive price fairness and procedural price fairness both have significant and positive relationships to the farmer-owned brand share, which is evidence in favour of Hypothesis 2. All else equal, respondents who have a more positive perception of distributive price fairness purchase a higher proportion of farmer-owned brands. A one standard deviation increase in the latent construct of distributive price fairness is associated with a 0.351 standard deviation increase in the farmer-owned brand proportion. The estimated effect of the latent construct of procedural price fairness on the farmer-owned brand share is larger at 0.412 standard deviations. The higher the perceived fairness in terms of the price-setting procedures of the buyers in the agri-food value chain, the greater the farmer-owned brand share. Both estimates come as a surprise if the farmer-owned label is assumed to be a response to unfair farm-gate prices.

The relationship of the latent construct of interactional price fairness to the farmer-owned brand share is not significantly different from zero. While the three statements which act as the manifest variables of interactional price fairness commanded the most agreement among respondents, it is unable to significantly explain variability in the farmer-owned brand share. Therefore, respondents with lower or higher degrees of agreement in terms of interactional price fairness do not have significantly different farmer-owned brand shares. The lack of a significant relationship is surprising as interactional price fairness is in part determined by the perceived responsibility of consumers to ensure fair farm-gate prices. However, respondents who feel more responsible do not have a significantly higher farmer-owned brand share than respondents who feel less responsible.

Model Fitness and Improvement

An inherent objective of the SEM method is the pursuit of good fit to the data. As reported in Table 4, the goodness-of-fit statistics of our structural equation model do not meet the criteria recommended in the literature (Schreiber *et al.,* 2006; Hooper *et al.,* 2008; Kline, 2015). Therefore, in the interest of conformity, it is necessary to specify a more parsimonious model with fewer variables and fewer relationships. At the same time, other covariances and correlations must be considered if statistically significant.

Table 4: Goodness-of-Fit of the Structural Equation Model.

	Base Model		Final Model	
	Model Statistic	Guideline	Model Statistic	Guideline
X2	894.098		57.379	
p > X2	0.000	<= 0.05	0.000	<= 0.05
RMSEA	0.082	<= 0.07	0.062	<= 0.07
CFI	0.707	>= 0.95	0.975	>= 0.95
TLI	0.665	>= 0.95	0.946	>= 0.95

Source: Own composition

The final model, which conforms to the definitions of good fitness (see Table 4), is based on three changes to the base model: (1) the nonsignificant relationship of the latent construct of interactional price fairness to the farmer-owned brand share is removed; (2) the latent construct of label comprehension is only manifested by one variable (i.e. a higher percentage of the price is allocated to farmers as opposed to investors); (3) the latent constructs of procedural price fairness and interactional price fairness are manifested in part by the same variables. Appendix 3 displays the final model, for which there are three key takeaways. First, the estimated path loadings in the structural model are almost identical in the final model as compared to the base model. Second, the latent construct of label comprehension only explains a relatively small amount of the variance in the farmer-owned brand share. Third, the three different components of price fairness (i.e. distribute price fairness, procedural price fairness, interactional price fairness) are not independent of one another.

Summary and Conclusions

We conducted a survey in order to analyse consumer behaviour in the context of farmer-owned brands. The survey elicited information about the comprehension of the farmer-owned label and the perception of price fairness in the agri-food value chain, which we used in a structural equation model to help explain variability in the purchase of farmer-owned brands in ten food and drink product categories. According to the results, label comprehension is related negatively to the purchase of farmer-owned brands, which implies the various implications of the farmer-owned label (i.e. increased profit allocation to farmers as opposed to investors) are not supported by the average consumer. Also, distributive price fairness and procedural price fairness have a positive relationship to the purchase of farmer-owned brands, which raises questions about the direction of causality.

Our findings have several implications. For researchers, our scale of price fairness is applicable in other studies of the agri-food value chain. Using material from various publications, the three separate components (i.e. distributive price fairness, procedural price fairness, and interactional price fairness) all have strong internal consistency; the manifest variables all load significantly on the latent constructs. For practitioners, there is reason to be concerned about the very foundation of the farmer-owned label. Food consumers may not support the main implication of farmer ownership, which concerns the increased allocation of profit to farmers as opposed to investors. At the very least, consideration ought to be given to further decreasing the asymmetry of information between producers and consumers, many of whom do not comprehend the deeper implications of the farmer-owned label. For policymakers, there is also an opportunity to become engaged in the education of the public regarding farmer ownership or participation in the downstream stage of the agri-food value chain. For example, policy may address the current deficit of attention afforded to agricultural cooperatives and similar initiatives in high school curricula.

We note several weaknesses and limitations to inform future research directions. First, we explained variability in the farmer-owned brand share in terms of two consumer psychographic characteristics (i.e. price fairness perception, label comprehension). However, brand choice is determined by many other variables such as price sensitivity, risk preference, and brand loyalty. More research is necessary to inform the true relationship of price fairness perception and label comprehension to the farmer-owned brand share while controlling for the effect of other possible determinants. Second, we showed respondents a series of eight statements to inform price fairness and a series of four statements to inform label comprehension. While the measurement model showed a good fit to the data, there may exist other statements with a superior capacity to manifest the latent constructs. Also, instead of a predetermined set of statements, fewer restrictions may allow respondents to better inform latent constructs. For example, a free word association task may yield a better insight into price fairness perception and label comprehension. Third, we estimated a pooled structural equation model by aggregating the purchases of farmer-owned brands in ten different food and drink product categories. However, there is much heterogeneity across the ten product categories in terms of brands, competitors, prices, and other product and process attributes. In addition, consumers may behave differently across the ten product categories. Therefore, a dedicated model for each product category may yield different results as to the relationships of label comprehension and price fairness perception to the farmer-owned brand share.

Acknowledgement

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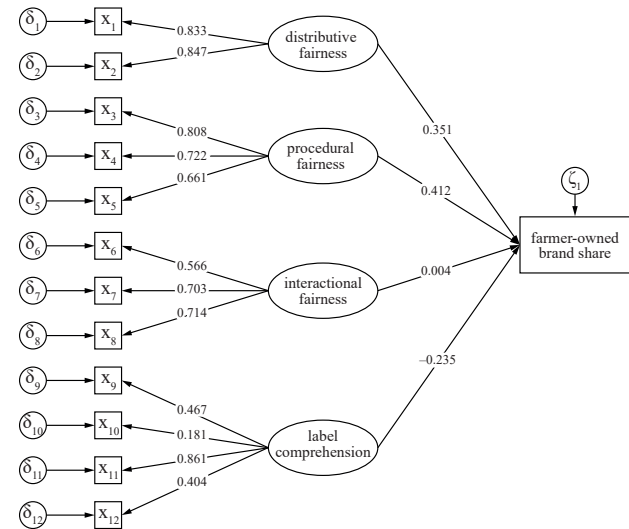
Appendix

Appendix 1: Hypothesised Structural Equation Model.
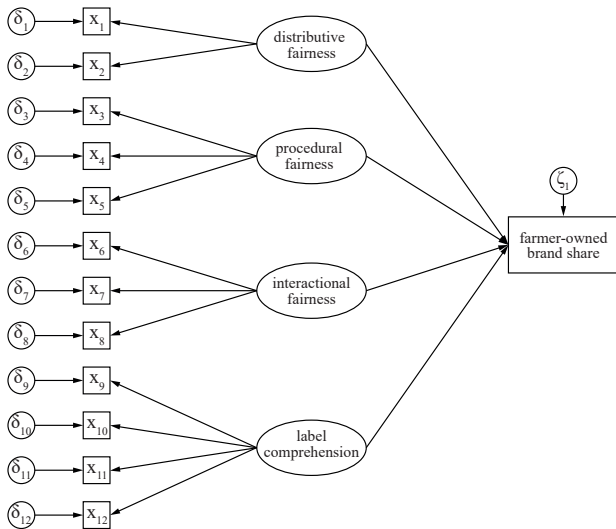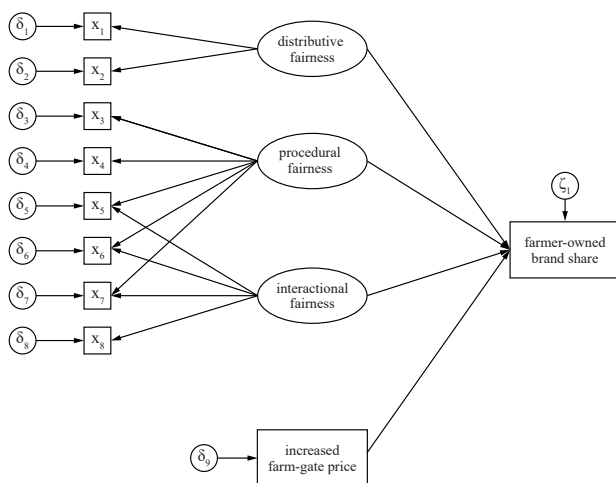

Source: Own composition

Appendix 2: Results of the Base Structural Equation Model.

Source: Own composition

Appendix 3: Results of the Final Structural Equation Model.

Source: Own composition