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Fair to the cow or fair to the farmer? The preferences of conventional milk buyers for ethical attributes of milk

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ABSTRACT

Conventional dairy farming has been under pressure for lacking animal welfare, biodiversity loss through abandonment and intensification of grassland, and low milk prices during the 2015/16 milk price crisis. The relatively stable organic milk prices during the milk price crisis indicate that consumers have preferences for product characteristics besides the price. We investigate through a choice experiment the willingness-to-pay (WTP) of German conventional milk buyers for ethical attributes of milk production that address the above-mentioned concerns. Respondents have the highest WTP for animal welfare – free-stall plus summer pasture – followed by biodiversity conservation, support for small, below-average income farms, and regional milk production. Respondents also have a positive WTP to support all farms but only in combination with regional production. We further find a positive WTP to support small farms in combination with tethering. This implies animal-welfare concerns are somewhat counterbalanced by fairness aspects. Our insights may support developing labels and agri-environmental policies concerning ethical aspects of conventional milk production.

1. Introduction

Dairy farming in the EU has been recently under pressure for several reasons. From an animal welfare point of view, the keeping of cows in tie-stalls (where they are tethered and cannot move freely) and their frequent lack of access to pasture has been criticized (Algers et al., 2009; Kikou, 2015).

Moreover, an important part of European biodiversity depends on the existence of grassland and its management and hence on how the production system of dairy farming is organised (Klimek et al., 2007). Diverse and extensive grassland management supports a high level of biodiversity (Wätzold et al., 2016; Young et al., 2007) whereas intensively managed pasture leads to less biodiversity (Plieninger et al., 2012). However, extensive grassland management with low economic yield is not economically viable today (Hodgson et al., 2005). Even intensively managed grassland is under growing pressure to convert to arable land as grazed-herbage is increasingly replaced by maize silage and concentrated feed, resulting in even more adverse effects on biodiversity (IEEP, 2007).

Conventional dairy farmers have also been under pressure in terms of profitability. During the recent EU milk price crisis, producer prices dropped from around 0.38 €/kg in 2014 to less than 0.27 €/kg in 2016 for conventional milk in Germany (Bioland, 2017). These low milk prices led to the closure of many small farms and contributed to the trend of conversion to more intensive, large-scale milk production (Ilchmann, 2017; Sauer, 2016). Similar milk price developments took place in other European countries (see BLE, 2017 for Germany, France, and Austria). Only at the end of 2016, after public intervention by the EU (buying up and storage of skimmed milk powder) and the provision of financial support to dairy farms, milk prices returned to levels seen prior to the milk price crisis (EU Milk Market Observatory, 2017).

Interestingly, during the milk price crisis, producer prices for organic milk remained rather stable in Germany at around 0.48 €/kg, (Bioland, 2017). This is unusual as previously the price of organic milk typically followed conventional milk price fluctuations. However, a similar widening of the gap between organic and conventional milk prices could be observed in France during the milk price crisis (CLAL, 2017). This, together with an increasing share of organically produced agricultural goods, including milk, over the past 10 years (Meredith and Willer, 2016), suggests that consumers are increasingly willing to pay more for what they perceive are higher-value agricultural products.

Yet organic milk does not offer much product and price differentiation, which suggests that the product and price segment between conventional and organic milk has not yet been fully utilized. So, besides organic farming, another marketing strategy for more stable milk prices, which may also address the challenges of dairy farming

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mentioned above, could be value creation and product differentiation through the introduction and marketing of different ethical attributes of production. Ethical attributes are associated with social and environmental issues (Luchs et al., 2010).

Several economic studies on preferences for ethical milk attributes have been conducted in Europe applying either choice experiments (CE) or other willingness-to-pay (WTP) approaches. Previous CE studies have focused on preferences for organic and local milk (Illichmann and Abdulai, 2013), partly in combination with other attributes (Hasselbach and Roosen, 2015 with brand names; Klein, 2011 with fair prices for producers; Wägeli et al., 2016 with exclusion of GMO production). Some studies analysed preferences for ethical milk attributes on a more general level but have not involved a monetary valuation of specific attributes (e.g. Stolz et al., 2011; Zander and Hamm, 2010). Others directly asked respondents about their WTP for certain ethical attributes (Hellberg-Bahr et al., 2012 and Weinrich et al., 2014 for pasture milk; Ellis et al., 2009 for animal welfare; Emberger-Klein et al., 2016 for regional milk).

We contribute to this literature by conducting a CE among German milk buyers to elicit their WTP for ethical attributes of milk production. Our study is novel as we focus on conventional milk buyers and include a comprehensive list of ethical milk attributes which enables us to rank the relevance of the ethical attributes for the conventional milk buyers. These attributes are: animal welfare, the support of biodiversity through milk production, financial support for small farms with below-average income or for all farms, and production in one's own region. Furthermore, the ethical attributes in our experiment are not linked to the explicit use of labels, certifications or brands, as in previous studies (Hasselbach and Roosen, 2015; Illichmann and Abdulai, 2013; Klein, 2011; Wägeli et al., 2016). This is because there is no existing label for these ethical attributes (except for regional origin) in Germany and they have not been covered in valuation studies. Our study also provides novel insights in other respects. Previous valuation studies focused on fair prices to all farmers (Klein, 2011). We introduce another dimension of farmers' equity by including fairness to small, below-average income farms. To our knowledge, this is also the first study to provide a monetary valuation for biodiversity conservation in the context of milk production.

The aforementioned studies on milk preferences focused on values, attitudes, socio-demographic variables and norms to explain variation in preferences for ethical milk attributes (e.g. Emberger-Klein et al., 2016). In addition to socio-demographic factors, we use stated buying behaviour towards milk to explain heterogeneity in consumers' preferences for ethical milk attributes. The explanatory variables we use are: gender, frequency of organic milk purchase, currently paid milk price, having donated to animal protection and having a farmer as a friend or family member.

Moreover, we investigate respondents' preferences for some combinations of ethical attributes (four interaction effects) which, to our knowledge, have not been addressed in the literature.

(1) Fairness for dairy cows vs. equity for small, poor farms. How do milk buyers value support for small, below-average income farms that use tethering of dairy cows (1a) with pasture and (1b) without pasture?
(2) Influence of product origin on preferences for fairness to milk producers. Do buyers prefer to support (2a) small, below-average-income farms only or (2b) all farms in their region?

Our results can inform the development of labels for milk products which reflect customers' preferences and are also relevant for the development of agri-environment policies in general. From an economic perspective, the design of agri-environment policies and in particular agri-environment payments should be based on the population's preferences for public goods provided by agriculture (Hall et al., 2004). Our study provides information on the preferences of a substantial part of the population – conventional milk buyers – for selected public goods related to milk production.

2. Choice modelling

To investigate the trade-offs in milk preferences we use the stated-preference method choice experiments. Appendix A provides an overview of the basic methodological approach whereas here we focus on specific aspects needed to understand our analysis. We employ a mixed logit model (MLM) with a panel specification for calculating overall mean WTP values over the whole sample. To ensure meaningful WTP estimates with correct signs, the utility parameter for price is assumed to be fixed, whereas the other parameters are normally distributed. In the MLM the probability of observing a sequence of choices under the assumption of a certain parameter distribution $f(\beta)$, e.g. normal distribution, is specified as (cf. Train, 2009 for general considerations and for an example see Kuhfuss et al., 2016):

$$P_n = \int \prod_s \left(\frac{\exp(\beta' x_{nsi})}{\sum_{j=1}^{J} \exp(\beta' x_{nsj})} \right) f(\beta) d(\beta) \quad (1)$$

WTP values are calculated as the negative ratio of the marginal utility estimates for the attributes ($\beta_{attribute}$) and the marginal utility estimate for price (β_{price}). The confidence intervals of the WTP are computed based on the delta method (Bliemer and Rose, 2013).

$$WTP = -\frac{\beta_{attribute}}{\beta_{price}} \quad (2)$$

Alternative-specific constants (ASC) are included for the A-alternative, the lowest-price fixed alternative and the 'no-buy' option and are assumed to be fixed. We selected the model with A-ASC, since including this constant improved the model fit and the constant turned out to be significant. As Hensher et al. (2015, p. 52) note: "Treating constants as generic parameters…should only be done if, empirically, the ASCs for two or more alternatives are found to be statistically equivalent." Furthermore, an ASC can be used to test for systematic bias, where respondents might tend to select the first alternative in a choice set (Hasselbach and Roosen, 2015)."

We use a latent class model (LCM) with class membership function to analyse the preferences of different milk consumer groups. It allows for separate estimation of WTP values for each estimated latent class of consumers. Since we are interested in the preferences of milk buyers who usually buy the cheapest milk, using an LCM is more appropriate than using MLM with heterogeneity. We identify the cheapest milk buyers by including a question on the currently paid price for milk in the survey questionnaire and use the currently paid price as one determinant of preferences. Thereby, respondents' currently paid milk price serves as an indicator of price consciousness, which we expect to have an influence on the WTP for ethical milk attributes.

In the LCM employed here the utility parameter estimates are assumed to vary between classes of respondents and are fixed within the classes (cf. Boxall and Adamowicz, 2002). The number of classes in an LCM is specified by the analyst and is usually determined after estimation of models with all possible and plausible number of classes based on the resulting values of information criteria such as the