Consumer willingness to pay for locally produced hard cider in the USA

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Abstract

Purpose – This study aims to determine whether consumers are willing to pay a premium for locally produced hard apple cider and examine the factors influencing this premium. This study examines the influence of hard apple cider attributes and consumer characteristics on consumer preferences for local hard apple cider.

Design/methodology/approach – Data from a 2019 survey of 875 Tennessee consumers regarding their preferences for a local hard apple cider were obtained. Probit estimates were used to calculate the premium consumers were willing to pay for a locally made hard apple cider and factors influencing this premium. A multivariate probit was used to ascertain factors influencing the importance of attributes (e.g. heirloom apples, sweetness/dryness, sparking/still and no preservatives added) on local hard apple cider preference.

Findings – Consumers would pay a $3.22 premium for local hard apple cider compared with a $6.99 reference product. Local foods preferences, urbanization, weekly purchases of other alcoholic beverages and shopping venues influenced premium amounts. Other important attributes were sweetness/dryness and no preservatives. Influence of consumer demographics suggests targeted marketing of local ciders could be successful.

Originality/value – Few studies examine consumer preferences for hard apple ciders. This study represents a cross-sectional analysis of the premium consumers would pay for local hard apple ciders and the importance of other hard apple cider attributes.

Keywords Economics, Consumer preferences, Hard apple cider, Local, Attributes

Paper type Research paper

1. Introduction

Hard apple ciders have enjoyed growth with sales reaching over $500m in 2018 (Newhart, 2019). Merwin (2015) notes that commercial cideries are characterized by two types: small-scale "craft" or "artisan" and large-scale or "industrial" cideries. While large-scale cideries

often use juice concentrates, smaller craft cideries often use fresh juice or apples from local or regional orchards (Merwin, 2015). The share of the US cider market comprised by craft cideries has increased from 7.8% in 2014 to 20.1% in 2017 (Brager and Crompton, 2017). Jordan (2016) notes that in the USA, craft beers and hard apple ciders have made a resurgence.

Despite the expanding popularity of craft hard apple ciders, relatively few studies exist regarding consumer preferences for locally produced hard apple ciders. Information regarding consumer preferences and premiums for locally produced hard apple ciders could help smaller craft cideries with product pricing and target marketing of craft ciders. Identifying drivers of consumer choice of local hard apple ciders, such as perceptions about quality and freshness could also assist with development of marketing hard apple ciders.

Tennessee (TN) is an example of a US state where small craft ciders are only recently emerging, with only 7 of the 820 US cideries as of 2018. The industry is emerging in many parts of the USA with many states still having fewer than 20 cideries (Brown, 2018). A portion of TN lies within the Appalachian region which has a rich tradition of apple growing (Veteto and Nabhan, 2011) and encompasses the United States Department of Agriculture Plant Hardiness Zones 5 and 6 which are among the most suitable for apple production (Calhoun, 2010). Yet, little is known about consumer preferences for local chard apple ciders and other hard apple attributes that could influence apple production, such as use of heirloom apples.

Lack of market information may serve as a barrier to small craft cidery startups and expansions and studies regarding consumer preferences and willingness to pay (WTP) for locally produced hard apple ciders are few in number. Existing studies are limited in their sample frame, either using sensory panelists or cidery visitors. Hence, the overall aim of this study is to provide information about alcoholic beverage consumer preferences for locally produced hard apple cider. This article will provide estimates of the premium consumers are willing to pay for locally produced hard apple cider and determine the factors that influence this premium among a larger-scale cross-section of alcoholic beverage consumers. The study also extends the literature by providing measures of how consumer demographics, attitudes and alcoholic beverage purchasing patterns may influence the importance of extrinsic and intrinsic hard apple cider attributes including the use of heirloom apples, no preservatives, sparking/still and sweetness/dryness.

2. Literature review

2.1 Consumer preferences for locally produced hard apple ciders and wines

This section reviews research on consumer preferences for locally produced hard apple ciders and wine. Farris *et al.* (2019) found that consumers tended to exhibit local preferences for hard apple ciders based upon state boundary rather than distance. Tozer *et al.* (2015) found Washington consumers would pay $12.82 per 750-ml bottle for craft hard apple cider which was less than the prevailing market price of regional craft hard apple ciders. However, Smith and Lal (2017) surveyed visitors at seven hard apple cideries in the Hudson Valley region of New York and found nearly 48% of those surveyed would pay a premium of $7 or more for pint of locally made hard apple cider.

Prior studies of the effects of age on preferences for craft hard apple ciders or local wines have shown mixed results. Some studies have found age to be inconsequential upon preferences for hard apple ciders or wines (Surgue and Dando, 2018; Woods *et al.*, 2015). Tozer *et al.* (2015) found that as Washington state consumers' age increased, their WTP for a craft cider increased up to 34.4 years old and then began to decrease. Other studies have suggested age might have a negative effect on preferences for locally made hard apple ciders

(Smith and Lal, 2017; Woods *et al.*, 2013). Results by Everett *et al.* (2017a) showed that older age had a positive effect on WTP for a local TN muscadine wine.

While Surgue and Dando (2018) found that males tended to have greater preferences for hard apple cider, Tozer *et al.* (2015) did not find gender to significantly affect WTP for craft hard apple cider. Findings from local wine preference studies have suggested that male gender tends to positively influence preferences for local wines (Atkin *et al.*, 2007; Woods *et al.*, 2013, 2015). However, other local wine studies have not found a significant effect of gender on local wine WTP (Everett *et al.*, 2017a, 2017b).

Several studies of preferences for hard apple cider (Tozer *et al.*, 2015) and local wine (Everett *et al.*, 2017a, 2017b; Woods *et al.*, 2013, 2015) have not found significant effects of education on product preferences. Smith and Lal (2017) found the average cider visitor to be more highly educated than the general population; however, Kolyesnikova *et al.* (2008) found that the local Texas wine enthusiasts market segment consisted of a higher percentage of wine consumers whose highest educational attainment was high school.

Everett *et al.* (2017b) found household income to have a positive effect on WTP for a TN labeled wine among TN wine consumers. Woods *et al.* (2013, 2015) found income to have a positive effect on preferences for local wines in the northern Appalachian region.

Tozer *et al.* (2015) found that while prior consumption of hard apple cider had a positive effect on hard apple cider WTP, being a beer drinker had a negative effect. Klatsky *et al.* (1990) suggested that wine consumer demographics differed from those who prefer hard liquors. This current study contributes to the literature by considering the effects of other non-beer alcoholic beverage purchases such as wine, liquor and wine coolers on hard apple cider preferences.

Urbanization and location of residence have been found to influence preferences for local wines. Woods *et al.* (2013, 2015) found a negative effect of urban residence on local wine preferences and Everett *et al.* (2017a) found that metro consumers were less likely to have tried a local muscadine wine. Woods *et al.* (2013) found TN wine consumers were less likely to have tried local wines than Ohio wine consumers. Everett *et al.* (2017b) found within state differences, with East TN wine consumers being more likely to be willing to purchase a TN labeled wine than those in the Middle or West regions.

Everett *et al.* (2017a) found consumers who are willing to pay premiums for local foods were more likely to have tried wines and to choose a locally produced wine (Everett, 2017a). Woods *et al.* (2013, 2015) found that more frequent purchases of local foods had a positive effect on consumers having tried local wines and on local wine expenditures.

With respect to the effects of familiarity with, or knowledge about, local wines, Woods *et al.* (2013) found that greater self-described wine knowledge increased the likelihood that the respondent had tried local wines. Other research has shown that prior purchases for local wines increased WTP for the product (Everett, 2017b). Everett *et al.* (2017a) found that knowing the origin of TN wines positively influenced shopping for TN wines at liquor/wine stores. They also found that consumers who placed importance on TN wines helping TN grape growers were more likely to shop for TN wines at wineries.

2.2 Consumer perceptions about hard apple cider attributes
Heirloom apples, old cultivars of apples, are not generally used commercially and may hold interest to craft cider consumers. Snyder (2016) surveyed festival goers and found that consumers derived enjoyment from hard apple ciders by knowing about the apples. Veteto and Nabhan (2011) note that use of heirloom apples in hard apple ciders could cause consumers to associate the beverage with Appalachian apple growing traditions. Smith and Lal (2017) found that cidery visitors' opinions about apple farming education, agriculture

and cider production were highly correlated with experiencing an artisan product. Hence, factors influencing the importance of hard apple ciders made with heirloom apples might be similar to factors influencing local hard apple cider. This study extends the literature by providing information about the factors influencing preferences for hard apple cider made with heirloom apples.

Outreville and Le Fur (2019) studied prices of hard apple ciders offered in Quebec and found that traditional dry ciders were lower priced per liter than effervescent hard apple ciders, suggesting that sparkling hard apple ciders may bring premiums. However, they did not examine consumer demographics of consumers who might prefer a sparkling hard apple cider. This study adds to the literature by examining the influences of consumer demographics and attitudes on preferences for sparkling hard apple cider. Prior wine research suggests that sparkling wine consumers tend to be female (Bruwer et al., 2011; Charters et al., 2011; Lerro et al., 2019; Pickering et al., 2014) and older in age (Cerjack et al., 2016; Lerro et al., 2019). Verdonk et al. (2020) found sparkling wine consumption was most frequent among an "Enthusiasts" segment which tended to be male, younger and more highly educated. Other studies have shown that sparkling wine consumption is higher among more knowledgeable wine consumers (Johnson and Bruwer, 2007; Pickering et al., 2014).

Pickering et al. (2014) found that the same consumer cluster that least disliked hard apple ciders was also likely to prefer dry white wines and dislike sweet wines, suggesting cider consumers might prefer dryer ciders. The demographic of this cluster was predominantly female, older and had higher income. However, Miller and Bruwer (2006) found that younger female consumers were more likely to prefer sweeter wines than their male counterparts and Dodd et al. (2010) found that the sweeter wine preferences segment tended to be younger, less educated and less product involved.

While preferences for no preservatives have not been widely studied in hard apple ciders, wine studies provide potential insights. Costanigro et al. (2014) found a positive WTP for no added sulfite wines. D'Amico et al. (2016) found that females were less likely to pay a premium for no-added sulfites wines. Other studies have suggested that females would pay more for organic wines (Scansy et al., 2020; Mann et al., 2012). D'Amico et al. (2016) and Mann et al. (2012) did not find evidence that age, education or income affected preferences for preservative-free or organic wines. Scansy et al. (2020) and Mann et al. (2012) found that more product involved consumers had stronger preferences for preservative-free or organic wines. Mann et al. (2012) also found the share of wine consumed that is organic was positively influenced by more urbanized residence.

While studies by Tozer et al. (2015) and Smith and Lal (2017) provide useful insights into consumer preferences for hard apple ciders, it is important to note that neither were conducted for surveys of large groups of alcoholic beverage consumers. Tozer et al. (2015) used data from a sensory panel in the Pacific Northwest and Smith and Lal (2017) only studied hard apple cidery visitors in the Hudson River Valley. This study will extend the literature by providing results from a large-scale cross-section of alcoholic beverage consumers regarding preferences for a locally produced hard apple cider and is not restricted to a sensory panel or visitors to cideries. Furthermore, this study adds to the literature by identifying other non-price and non-local hard apple cider attributes that are important to consumers and examines the effects of demographic characteristics and attitudes on the importance of these attributes.

3. Research design: survey instrument, data collection and modeling
3.1 Survey instrument and data collection
A panel of TN residents aged 21 years or older who at a minimum occasionally consume alcohol was recruited for this survey by Qualtrics. The survey was conducted online

through Qualtrics in July 2019. The sample was drawn to represent TN's percentages of female (50.8%), males (49.2%) and age (ages 21–34, 27.0%; ages 35–54, 35.1%; and ages 55 or older, 37.9%). Prior to the fielding of the online survey, an online pre-test with 50 responses was conducted and the survey was revised. A total of 1,261 responded to the full survey and met the survey qualifications.

The survey contained several sections, including familiarity with hard apple ciders, alcoholic beverage expenditures, frequency of purchases of alcoholic beverage by type, preferences for locally produced hard apple cider, importance of hard apple cider attributes, shopping patterns, attitudes toward locally produced foods and demographics. The survey defined hard apple cider as cider made from apples that were fermented to make an alcoholic beverage.

Marketing channels and packaging are likely different between retail shelf sales vs sales in restaurant/bars. Therefore, to help segregate respondents based on who would more likely purchase hard apple cider at a retail setting vs an away from home setting, respondents were asked where they would most likely purchase hard apple cider in the future. Those who indicated they would be most likely to purchase it at grocery, big box or warehouse stores, wine or liquor stores, or a winery, brewery or cider making facility were asked about purchasing a 4-pack of 16-ounce cans of hard apple cider. Cans were selected because of their increasing prominence in craft cider product offerings (Infante, 2019). A total of 1,050 indicated they would most likely purchase hard apple cider in a retail-shelf setting.

These 1,050 respondents were then asked about purchasing TN hard apple cider vs a hard apple cider without the TN label. As shown in Figure 1, TN hard apple cider was defined as "hard apple cider that is made and packaged in the state of TN." In addition, the information screen specified that, "Apples used to make this type of cider are cider apples produced in TN and pressed on-site at the cider making facility." This information screen was presented to participants prior to a hard apple cider choice question. Respondents were also reminded through information screens about their budgets and asked to make as realistic of a choice as possible in a hypothetical situation (Cummings and Taylor, 1999; Blamey et al., 1999).

The premium for a single hard apple cider attribute, TN made, was of primary interest; therefore, a referendum style choice question was used to elicit premiums for a TN made hard apple cider (Figure 2). Referendum style elicitation of WTP is preferred over an open-ended elicitation of WTP (Arrow et al., 1993). The referendum style choice question offered two 4-packs of 16-ounce (pint) cans that might be purchased in a retail shelf setting: one with a TN label, the other without. The sample was divided approximately equally across five TN hard apple cider premium levels (premium = $0.00, $1.50, $3.00, $4.50 or $6.00) compared with the

Figure 1.
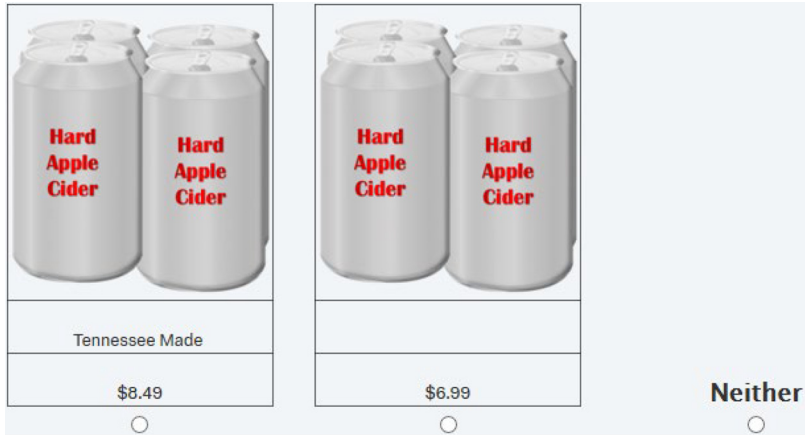Information screen
regarding TN made
hard apple cider

Notes: Assume you are at a retail facility (for example: grocery store, liquor/wine store, or winery/cidery) and you wish to purchase hard apple cider. These two 4-packs of 16 ounce cans of hard apple cider offered on the retail shelf are identical in alcohol content (6 %) and in all aspects except for price and whether the cider is Tennessee Made. Please choose one of the two alternatives or choose neither option

generic reference (no TN label) product price of $6.99. The reference product price was based on prices of nationally sold brands at the time of the survey, while the range of premiums was based upon prices of TN and other regional craft ciders. Each survey price group was offered one premium point. Respondents also were offered the choice to choose neither product. Respondents who chose "neither" were excluded from analysis as they were unwilling to purchase even the reference product.

Those who selected the TN hard apple cider were also asked about the importance (1 = not important at all and . . .5 = extremely important) of hard apple cider attributes to future hard apple cider purchase decisions. Participants were asked about the TN made logo, price, heirloom apples, sparkling (carbonation), sweetness/dryness and no added preservatives. Prior to asking the respondents about the importance of these attributes, respondents were provided information screens about their definitions (Figure 3).

3.2 Probit model – Tennessee made hard apple cider premium
The referendum style contingent valuation question used in this study to elicit consumers' premium for the TN hard apple cider is based on the random utility framework (McFadden, 1974). Let the unobserved difference in utility from choosing the TN hard apple cider (U_{TNi}) vs the reference product (U_{ULi}) be:

$$Y_i^* = U_{TNi} - U_{ULi} = \mathrm{f}(\boldsymbol{X_i}, P_{TNi}), \tag{1}$$

where P_{TNi} is the premium for the TN hard apple cider above the unlabeled hard apple cider and $\boldsymbol{X_i}$ are respondent demographics, alcoholic beverage purchase frequency, alcoholic beverage expenditures and attitudes toward local foods represented (see Table 1 for variable definitions). If $Y_i^* > 0$, the consumer will exhibit the observed behavior of choosing the TN

hard apple cider. The observed indicator variable, TN_i, is equal to 1 when $Y_i^* > 0$ and the TN hard apple cider is chosen, and takes on a value of 0 when the TN hard apple cider is not chosen.

The probability of the ith respondent choosing the TN hard apple cider is:

$$\Pr[TN_i = 1] = \Phi(\alpha + X_i\beta + \beta_{P_{TN}} \cdot P_{TNi}) \qquad (2)$$

If the model is estimated as a probit, Φ, is the normal distribution function (Greene, 2018). The α is a constant, β is a vector of parameters to be estimated on the non-price variables for the ith respondent, X_i, and $\beta_{P_{TN}}$ is the parameter to be estimated for the price premium for the TN hard apple cider (P_{TNi}). The estimated premium for the TN hard apple cider ($\widehat{PREM}_{TN}$) can be expressed as:

$$\widehat{PREM}_{TNi} = -(\alpha + X_i\beta)/\beta_{P_{TN}}, \qquad (3)$$

where the α, β and $\beta_{P_{TN}}$ are from equation (2) and are the estimated parameters from the probit model. $PREM_{TNi}$ are simulated using the coefficients and the variance-covariance

Variable name	Variable definition	Probit Means (N = 875)	MVProbit Means (N = 462)
	Dependent variables		
Probit:			
TN	1 if chose TN made hard apple cider, 0 otherwise	0.528	–
MV probit:	1 if attribute is a very or extremely important attribute to hard apple cider purchase decision, 0 otherwise		
Tennessee made	Tennessee made	–	0.680
Use heirloom apples	Made using heirloom apples	–	0.329
Sparkling	Sparkling (carbonation)	–	0.340
Sweetness/dryness	Sweetness/dryness	–	0.738
Price	Price	–	0.548
No preservatives	No preservatives added	–	0.561
	Explanatory variables		
P_{TN}	Premium TN cider ($0.00, $1.50, $3.00, $4.50 and $6.00)	2.935	–
AGE	Age of respondent in years	47.727	46.665
FEMALE	1 if female gender, 0 otherwise	0.503	0.515
COLLGRAD	1 if college graduate, 0 otherwise	0.402	0.355
HHINCDOL	2018 household income thousand dollars before taxes	69.977	67.403
LOCFOOD	Local foods opinions index[a]	4.178	4.300
METRO	1 if reside in a metro area, 0 otherwise	0.550	0.506
WEST	1 if reside in West TN, 0 otherwise	0.199	0.182
MIDDLE	1 if reside in Middle TN, 0 otherwise	0.384	0.366
FARMBACK	1 if farm background, 0 otherwise	0.270	0.266
FAMILIAR	Familiarity hard apple cider (1 = not at all, . . .5 = extremely)	3.223	3.294
CIDERFREQ	Frequency of hard previous hard apple cider purchases (1 = never, . . ., 8 = weekly)	3.169	2.606
WKLYBEER	1 if a weekly beer purchaser, 0 otherwise	0.275	0.290
WKLYWINE	1 if a weekly wine purchaser, 0 otherwise	0.186	0.197
WKLYWINECOOL	1 if a weekly wine cooler purchaser, 0 otherwise	0.077	0.087
WKLKYLIQ	1 if a weekly liquor purchaser, 0 otherwise	0.127	0.128
WKLYMALT	1 if a weekly malt liquor purchaser, 0 otherwise	0.063	0.056
WKLYALCEXP	Weekly expenditures on alcoholic beverage (at and away from home)	18.089	18.718
CONSEQ	Responses will likely influence offerings of TN made hard apple ciders (1 = strongly disagree, . . ., 5 = strongly agree)	3.718	3.799
GROCERY	1 if most likely purchase hard apple cider in a food retail store (grocery, big box and wholesale club), 0 otherwise	0.657	0.626

Table 1.
Variable names, definitions and means for probit and multivariate (MV) probit models

Notes: [a]*LOCFOODS* is an average of Likert agreement ratings about local foods statements: try to purchase local foods whenever possible, local foods helps local businesses, local foods likely fresher, local foods travel shorter distances so likely better for environment and local foods likely taste better. The calculated Cronbach's scale reliability coefficient is 0.82 > 0.80 (cutoff for using a linear index of the variables) (Cronbach, 1951)

matrix, and the mean and standard errors are calculated with the Krinsky and Robb (1986) method.

3.2.1 Anticipated results for willingness to pay for local hard apple cider. Based upon the findings from previous literature regarding consumers' WTP for locally produced hard apple ciders (Smith and Lal, 2017) and locally produced wines (Everett *et al.*, 2017a, 2017b; Woods *et al.*, 2013, 2015), it is anticipated that TN alcoholic beverage consumers would be willing to pay a premium for a TN hard apple cider. The effect of respondents' age (*AGE*) on $\widehat{PREM}_{TN}$ are difficult to determine, a priori, because of mixed prior research results (Everett *et al.*, 2017a; Smith and Lal, 2017; Surgue and Dando, 2018; Tozer *et al.*, 2015; Woods *et al.*, 2013). From prior research (Atkin *et al.*, 2007; Surgue and Dando, 2018; Woods *et al.*, 2013, 2015), it is postulated that female gender (*FEMALE*) will have a negative effect on $\widehat{PREM}_{TN}$. The effects of being a college graduate (*COLLGRAD*) are difficult to anticipate a priori based on previous research findings (Everett *et al.*, 2017a, 2017b; Smith and Lal, 2017; Kolyesnikova *et al.*, 2008; Tozer *et al.*, 2015; Woods *et al.*, 2013, 2015). Prior research indicates greater household income (*HHINCDOL*) will positively influence $\widehat{PREM}_{TN}$ (Everett, 2017b; Smith and Lal, 2017; Woods *et al.*, 2013, 2015). The variable *METRO* is expected to have a negative effect on $\widehat{PREM}_{TN}$ (Woods *et al.*, 2013, 2015). It is anticipated that East TN consumers will be more likely to pay a premium for a TN hard apple cider, with negative effects of *MIDDLE* and *WEST* (Everett *et al.*, 2017b).

Prior research has positively linked WTP for local foods and the frequency of local food purchases to consumer preferences for local wines (Everett, 2017a; Woods *et al.*, 2013, 2015). Local food opinions were solicited in the form of Likert agreement questions, and were used to construct a simple average index (*LOCFOODS*). The local foods Likert opinion variables were based on those found in prior local food studies (Adams and Adams, 2011; Feldmann and Hamm, 2015). Greater importance of local foods (*LOCFOODS*) is expected to have a positive effect on $\widehat{PREM}_{TN}$. Additionally, it is expected that consumers with greater ties to farming (*FARMBACK*) might view a locally produced hard apple cider from local apples as preferable to a product that is not locally sourced. The variable for hard apple cider familiarity (*FAMILIAR*) is expected to have a positive effect on $\widehat{PREM}_{TN}$ (Woods *et al.*, 2013). Frequency of prior hard apple cider purchases (*CIDERFREQ*) will likely positively influence $\widehat{PREM}_{TN}$ (Everett, 2017b).

The effects of weekly purchases of beer, wine, wine coolers, liquor and malt liquor beverages on $\widehat{PREM}_{TNi}$ are examined. Based on Tozer *et al.* (2015), weekly beer purchases (*WKLYBEER*) might be expected to have a negative effect. However, for wine, wine coolers or other alcoholic beverages, it is difficult to anticipate their estimated coefficients' signs a priori. Prior research findings regarding shopping outlets for local wines (Everett, 2017a) suggest those who are more likely to shop for hard apples at grocery stores (*GROCERY*) will be less likely to be willing to pay a premium for a TN hard apple cider. The variable *CONSEQ*, belief that survey response could influence product offerings, is postulated to have a positive influence on $\widehat{PREM}_{TNi}$ (Li *et al.*, 2017; McKay *et al.*, 2019).

3.3 Multivariate probit model of importance of other attributes

The respondents were asked about the importance of *m* hard apple attributes: (*TN made, use heirloom apples, sparkling, sweet/dry, price* and *no preservatives*) (see Table 1 for definitions). The dummy variable was code as "1" if the respondent rated the attribute as very, or extremely, important. Otherwise the dummy variable was coded as "0." It is hypothesized that the respondent will select the *m*th attribute as important if the utility from doing so exceeds the utility from not doing so. The attributes contribute to the consumer *i*'s utility, as:

$$U_{iM} = f\left(\boldsymbol{\psi}'Z_{im}\right), \quad m = 1, \ \ldots, \ M \tag{4}$$

where the consumer, i, will choose alternative m if:

$$U_{im} \geq U_{in}. \tag{5}$$

The variables, Z_{im} include consumer demographics, alcoholic beverage purchase frequency by type of beverage, alcoholic beverage expenditures and attitudes toward local foods (see Table 1 for variable names and definitions). The utility derived selecting the mth attribute is U_m, while U_n is the utility derived from choosing that attribute as not important. For an m-equation multivariate probit model:

$$y_{\text{im}}^* = \boldsymbol{\psi}'Z_{im} + \boldsymbol{\epsilon}_{im}, \quad m = 1, \ldots, M \tag{6}$$

$$y_{\text{im}}^* = 1 \text{ if } y_{\text{im}}^* > 0 \text{ and } 0 \text{ otherwise.} \tag{7}$$

The $\boldsymbol{\psi}$ is a vector of parameters to be estimated. The random disturbances, $\boldsymbol{\epsilon}_{im}, m = 1, \ldots, M$, are error terms distributed as multivariate normal, each with a mean of zero, and covariance matrix V. The method of estimation is by simulated maximum likelihood (Cappellari and Jenkins, 2003). In the case where $M = 6$, the log-likelihood function for a sample of N independent observations of the multivariate probit is:

$$lnL = \sum_{i=1}^{N} \omega_i log \ \Phi_6 \left[\boldsymbol{K}_{i1}\boldsymbol{\psi}_1'\boldsymbol{Z}_{i1}, \ldots, \boldsymbol{K}_{i6}\boldsymbol{\psi}_6'\boldsymbol{Z}_{i6} | \ V \right] \tag{8}$$

where ω_i is a weight for observation $i = 1, \ldots, N$, and $\Phi_6(\bullet)$ is the multivariate standard normal distribution, and $\boldsymbol{V_{mn}} = 1$ if $m = n$ or $\boldsymbol{K_{im}} \boldsymbol{K_{in}} \boldsymbol{\rho_{mn}}$ if not. Note that $\boldsymbol{K_{ik}} = 2 y_{ik} - 1$ for each $i, k = 1, \ldots, 4$.

3.3.1 Anticipated results for importance of hard apple cider attributes. Female gender (*FEMALE*) is anticipated to have a negative effect on importance of heirloom apples (*use heirloom apples*) being used (Atkin *et al.*, 2007; Woods *et al.*, 2013, 2015). The effects of *age* are not postulated because of mixed findings in the literature (Everett *et al.*, 2017a; Smith and Lal, 2017; Woods *et al.*, 2013; Surgue and Dando, 2018; Tozer *et al.*, 2015; Woods *et al.*, 2015). Income (*HHINCDOL*) is expected to have positive effects on the importance of heirloom apples being used (Everett, 2017b; Smith and Lal, 2017; Woods *et al.*, 2013, 2015). It is anticipated that preferences for local foods (*LOCFOODS*), hard apple cider familiarity (*FAMILIAR*) and past hard apple cider purchase frequency (*CIDERFREQ*) would likely influence the importance of heirloom apples being used (Everett, 2017a; Woods *et al.*, 2013, 2015). Consumers with farm backgrounds (*FARMBACK*) likely have more connection to the agronomic aspects of the hard apple cider production and are postulated to be more likely to view heirloom apples as important.

Given past research findings for sparkling wines, female gender (*FEMALE*) and older age (*AGE*) are anticipated to positively influence the probability of sparkling (*sparkling*) being an important hard apple cider attribute (Bruwer *et al.*, 2011; Cerjack *et al.*, 2016; Lerro *et al.*, 2019; Pickering *et al.*, 2014). It is expected that the importance of sparkling in ciders may be positively influenced by education level (*COLLGRAD*), familiarity (*FAMILIAR*) and purchase frequency of hard apple ciders (*CIDERREQ*) (Johnson and Bruwer, 2007; Pickering *et al.*, 2014; Verdonk *et al.*, 2020).

Sweetness/dryness of hard apple ciders is anticipated to be of greater importance to female, young, less educated and less product involved consumers (Dodd *et al.*, 2010; Miller and Bruwer, 2006; Pickering *et al.*, 2014). Hence, the following coefficient signs are postulated in the *sweetness/dryness* equation*: FEMALE* (+), *COLLGRAD* (−), *FAMILIAR* (−) and *CIDERFREQ* (−). It is anticipated that those who frequently purchase sweeter beverages, such as wine coolers, (*WKLYWINECOOL*), would be more likely to view sweetness/dryness as important.

Female gender (*FEMALE*) is postulated to positively influence the probability that no preservatives (*no preservatives*) is considered a very important hard apple cider attribute (Mann *et al.*, 2012; Scansy *et al.*, 2020). Greater familiarity (*FAMILIAR*) with and more frequent purchase of hard apple ciders (*CIDERFREQ*) are expected to positively influence the importance of the no preservatives attribute (Mann *et al.*, 2012; Scansy *et al.*, 2020). Metropolitan residence (*METRO*) is postulated to have a positive influence on the importance of no preservatives in hard apple cider (Mann *et al.*, 2012). Based on prior research findings (Mann *et al.*, 2012; D'Amico *et al.*, 2016), *LOCFOODS* is expected to positively influence preferences for no preservatives in hard apple cider.

Market development of extrinsic hard apple cider attributes may impact local farm incomes and local economies (*TN made*), preservation of heirloom apple varieties (*use heirloom apples*), and perceived healthiness of hard apple ciders (*no preservatives*). Hence, it is anticipated that consumers' belief in survey consequentiality on the hard apple cider product offerings (*CONSEQ*) will positively influence the importance of these extrinsic hard apple cider attributes more so than the importance of the intrinsic attributes (*sparkling* and *sweetness/dryness*) (Espejel *et al.*, 2007).

4. Results

4.1 Probit model results and estimated premium

Figure 4 shows the percentage of consumers who chose the TN hard apple cider beverage at the different premium levels. When TN hard apple cider was the same price as the generic reference hard apple cider, 95.11% of participants chose the TN beverage over the reference beverage. As the premium increased to $4.50 and $6, the percentages of respondents choosing the TN hard apple cider declined to 35.50% and 27.81%, respectively.

The estimated probit model of choosing the TN hard apple cider (*TN* = 1) derived from equation (2) is presented in Table 2. As shown in Table 2, of the 1,261 respondents, 875 indicated they would likely purchase hard apple cider in a retail setting and answered all the questions needed to estimate the probit model of hard apple cider product choice. The log-likelihood ratio (LLR) test of the estimated probit model against an intercept only model (LLR) suggests the model is significant overall. The model correctly classifies 72.00% of the observations, and the pseudo R^2 is 0.2156. Multicollinearity among the explanatory variables was tested for using a variance inflation factor (VIF). The mean VIF is 1.28 which is not indicative of serious multicollinearity among the variables.

As can be seen in Table 2, the estimated coefficient and associated ME for Pr[TN_i = 1] on the variable *PREMIUM* are significant and negative, as anticipated, and reflect what is shown in Figure 4. The ME of a one-unit ($/4-pack) increase in premium is a 9.5% decline in the Pr[TN_i = 1]. Among the demographic variables, neither *AGE*, *FEMALE* and *COLLGRAD* nor *HHINCDOL* significantly influenced Pr[TN_i = 1] nor the premium for TN hard apple cider at the 95% confidence level. Note that a squared term for *AGE* was not significant. Residing in a metro area (*METRO*) decreased Pr[TN_i = 1] by 9.0% and decreased the premium consumers would pay by $0.95 at the 95% confidence level (Woods *et al.*, 2013, 2015). Hence, TN hard apple cider likely has greater appeal to more rurally located consumers. However, neither region of the state (*WEST,*

Figure 4.
Percent choosing TN
hard apple cider
across premium
levels
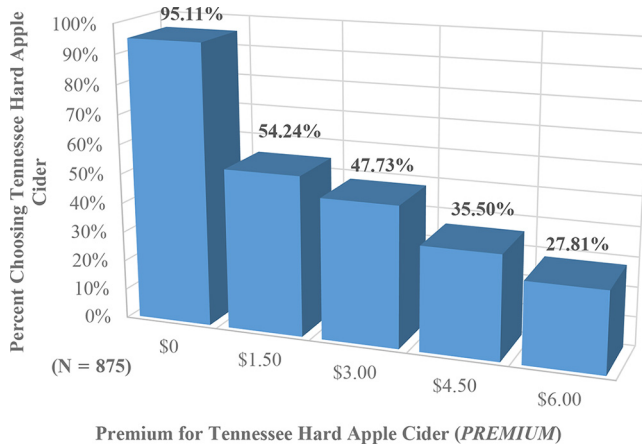
MIDDLE) nor farm background (*FARMBK*) were significant. A possible implication is that premium values for TN hard apple cider are fairly similar across the state, but may be more appealing to rural consumers.

Greater preferences for local foods (*LOCFOODS*) positively influence the probability of selecting and paying a premium for the TN hard apple cider as expected (Everett, 2017a; Woods *et al.*, 2013, 2015). A one-level increase in *LOCFOODS*, which reflects stronger preferences for local foods, increases the probability of choosing the TN hard apple cider by 13.1% and the premium by $1.38. This result suggests that consumers who hold greater concern that their foods be locally sourced will pay a higher premium for a TN hard apple cider than those less local-foods oriented consumers. This result could reflect a synergy between preferences for local foods and a locally made hard apple cider. A potential implication is that some of these consumers may be interested in pairings of local foods with locally made hard apple ciders.

Unexpectedly, neither cider familiarity (*FAMILIAR*) nor frequency of prior purchases (*CIDERFREQ*) had a significant effect on premiums. This result suggests that both new and experienced hard apple cider consumers are equally likely to choose the TN hard apple cider. In addition, overall weekly alcoholic beverage expenditures did not have a significant effect. Unlike Tozer *et al.*'s (2015) finding, weekly beer purchases have no significant effect on the TN hard apple cider premium. However, weekly wine cooler purchases (*WKLYWINECOOL*) had a positive 13.7% effect and weekly malt liquor purchases (*WKLYMALT*) had a negative 16.9% effect on the probability of a consumer choosing the TN hard apple cider. Weekly purchases of wine coolers increased premiums by $1.44 and weekly purchases of malt liquor beverages decreased the premium by $3.11, respectively. These results suggest potential market segments for local hard apple cider that are at least, in part, defined by types of alcoholic beverages frequently purchased. One possible explanation is that wine cooler consumers associate hard apples (which are made with wine-making methods) with wine-based beverages. However, additional research would be needed to verify this explanation.

Belief that survey results could impact TN hard apple cider product offerings (*CONSEQ*) anticipated to influence premiums for TN hard apple cider, but this variable did not have a significant influence at the 95% confidence level. A possible explanation is that, while over 61% agreed or strongly agreed that the survey responses could influence local hard apple

Variable	Estimated coefficient (β)	ME on Pr$[TN_i = 1]^b$	ME on $P\hat{R}EM_{TN}$d Mean	LCL	UCL
Intercept	−0.744				
P_{TNi}	−0.311**	−0.095**			
AGE	−0.004	−0.001	−$0.01	−$0.03	$0.01
FEMALE	0.030	0.010	$0.11	−$0.51	$0.73
COLLGRAD	−0.184	−0.056	−$0.59	−$1.28	$0.10
HHINCDOL	0.000	0.000	$0.00	−$0.01	$0.01
LOCFOOD	0.429**	0.131**	*$1.38*	*$0.84*	*$1.92*
METRO	−0.295**	−0.090**	−$0.95	−$1.60	−$0.30
WEST	−0.087	−0.027	−$0.28	−$1.10	$0.54
MIDDLE	−0.077	−0.024	−$0.25	−$0.94	$0.44
FARMBACK	−0.165	−0.050	−$0.53	−$1.23	$0.17
FAMILIAR	0.009	0.003	$0.03	−$0.32	$0.38
CIDERFREQ	0.023	0.007	−$0.13	$0.08	−$0.28
WKLYBEER	−0.124	−0.038	−$0.40	−$1.16	$0.37
WKLYWINE	0.056	0.017	$0.18	−$0.66	$1.02
WKLYWINECOOL	0.448*	0.137*	*$1.44*	*$0.22*	*$2.65*
WKLKYLIQ	−0.079	−0.024	−$0.25	−$1.22	$0.71
WKLYMALT	−0.559*	−0.169*	*−$1.77*	*−$3.10*	*−$0.44*
WKLYALCEXP	0.008	0.002	$0.02	$0.00	$0.05
CONSEQ	0.101	0.031	$0.32	−$0.02	$0.66
GROCERY	−0.211*	−0.064*	*−$0.68*	*−$1.33*	*−$0.03*
$\overline{PREM}$c			*$3.22*	*$2.91*	*$3.52*

N = 875
Percent correct = 72.00%
Pseudo R^2 = 0.2156
LLR χ^2 (19 df) = 260.96**

Notes: [a]**denotes significance at α = 0.01 and *denotes significance at α = 0.05. [b]The ME of the jth variable X_{ij} on the probability of the ith respondent selecting the TN hard apple cider over that not labeled is $\partial Pr[TN_i = 1]/\partial X_{ij} = \phi_i \cdot \beta_j$, where β_j is the parameter on X_{ij} and ϕ_i is the normal density function. The mean MEs and their associated standard errors are calculated using the Krinsky and Robb method with 5,000 replications (Krinsky and Robb, 1986). [c]The mean premium ($\overline{PREM}$) and associated standard errors are calculated for the 95% confidence level using the Krinsky and Robb method with 5,000 replications. [d]The effects of each variable on WTP, the premium and the associated standard errors are calculated using the Krinsky and Robb method. The ME of the jth non-premium explanatory variable on estimated $\widehat{PREM}_{TN}$ is calculated as $\partial \widehat{PREM}_{TN}/\partial X_j = -\beta_j/\beta_{P_{TN}}$

Table 2.
Probit model of
probability of
choosing TN made
hard apple cider (4
pack of 16-ounce
cans), mean premium
and marginal effects
(ME)[a]

cider product offerings, this belief did not translate to greater premiums for the locally made hard apple cider.

If the consumer said they would more likely purchase hard apple cider in a grocery store (GROCERY) than specialty liquor stores, wineries or cideries, this negatively impacted the probability of choosing the TN hard apple cider by 6.4% and premiums by $0.68 (Everett, 2017a). This result could suggest that if locally made hard apple ciders are offered in grocery retail settings, shoppers may be willing to pay less in this setting than specialty stores.

The estimated mean premium ($\overline{PREM}_{TN}$) respondents would pay for the TN hard apple cider is calculated using the estimated probit model coefficients from Table 2 and equation (3), and is shown at the bottom of Table 2. The $\overline{PREM}_{TN}$ is $3.22 per 4-pack of 16-ounce cans above the reference price of $6.99. The upper (UCL) and lower (LCL) 95% confidence levels are $2.91 and $3.52, indicating a statistically significant non-zero premium. This result suggests, as expected, that among retail store shoppers for hard apple ciders, there is a WTP a premium for TN hard apple cider.

4.2 Multivariate probit model of cider attribute importance

A total of 462 respondents who chose the TN hard apple cider, answered all the questions about the importance of hard apple cider attributes (*TN made*, *use heirloom apples*, *sparkling*, *sweetness/dryness*, *price* and *no preservatives*) (Table 3). Referring back the percentages of respondents selecting each attribute as very important (Table 1), about 73.81% selected sweetness/dryness (*sweetness/dryness*) as very important, 67.97% selected *TN made* as very important and 56.10% selected *no preservatives* as very important. These percentages can be compared with *price* of which 54.8% selected as very important. Hence, an implication of these findings is that the respondents viewed *sweetness/dryness, TN made* and *no preservatives* as more important than price. The result that *TN made* is more important than *price* supports the finding that consumers were willing to pay a premium for the product. However, only around a third of consumers selected heirloom apples being used (*use heirloom apples*) or sparkling as very important. Hence, these two attributes are considered less important to the respondents than hard apple cider price. These results may suggest that locally made hard apple cider product offerings might focus on sweetness/dryness of the ciders and offering hard apple ciders with no added preservatives. Use of heirloom apples in hard apple ciders and sparkling hard apple ciders may be of interest to narrower market segments which can be identified by examining the effects of the demographic and attitudes on the probability that these hard apple cider attributes are very important.

The multivariate probit model of importance probability of the six hard apple cider attributes is significant overall using the LLR test of the model against the intercept only model (Table 3). The multivariate probit model correctly classifies the observations ranging from 61.7 for *price* to 72.7% for *sweetness/dryness*. Nearly all of the correlation coefficients ($\rho 21, \ldots, \rho 65$) between the error terms of the equations are significant, suggesting the use of the simultaneous estimation of the probit equations rather than separate probit models estimation. Furthermore, as shown at the bottom of Table 3, the LLR test of the null hypothesis that all the correlations were equal to zero ($\rho 21 = \rho 31, \ldots, = \rho 65 = 0$) was rejected.

In the case of the TN made attribute (*TN made*), older respondents (*AGE*), those with stronger preferences for local foods (*LOCFOOD*), and those who believed in survey consequentiality (*CONSEQ*) were more likely to view this attribute being very important. These findings are similar to prior studies (Everett *et al.*, 2017b; Li *et al.*, 2017; McKay *et al.*, 2019; Smith and Lal, 2017; Woods *et al.*, 2013, 2015). Similar to Everett *et al.* (2017a), those who indicated they would likely shop for hard apple ciders at grocery stores (*GROCERY*) were less likely to indicate *TN made* was very important.

Two of the variables influenced the importance of *TN made*, but did not influence premiums: *AGE* and *CONSEQ*. While older respondents and those believing in survey response consequentiality were more likely to believe the local attribute was very important, they were not more willing to pay more for a TN hard apple cider than younger respondents or those who did not believe in survey response consequentiality. However, some of the variables significantly influenced both attribute importance and WTP including *LOCFOOODS* and *GROCERY*. Hence, consumers who value local foods and who were more likely to purchase hard apple ciders at liquor/wine stores, wineries or cideries placed a greater importance on the hard apple cider being *TN made* and were willing to pay a premium for it compared to those with low preferences for local foods and those who would shop for hard apple ciders in grocery stores.

Older consumers who have purchased hard apple ciders more frequently in the past and who place more importance on local foods are more likely to believe use of heirloom apples in hard apple ciders is very important (Everett, 2017a; Woods *et al.*, 2013, 2015) (Table 3).

| Variable | Estimated coefficients (ψ) | | | | | |
	Tennessee made	Use heirloom apples	Sparkling	Sweetness/ dryness	Price	No preservatives
INTERCEPT	−3.126**	−2.693	−1.301*	−1.135*	−0.047	−3.276**
AGE	0.010*	0.011*	−0.004	0.000	−0.007	0.009*
FEMALE	0.017	−0.155	−0.030	0.248	−0.029	−0.097
COLLGRAD	0.104	−0.011	0.107	−0.005	−0.049	−0.153
HHINCDOL	−0.001	−0.004*	0.000	−0.001	0.005**	−0.001
LOCFOOD	0.594**	0.232*	0.108	0.297**	0.185	0.608**
METRO	−0.028	−0.122	0.138	−0.034	0.025	−0.091
WEST	−0.330	0.239	−0.197	−0.127	0.115	−0.018
MIDDLE	−0.248	0.123	−0.104	−0.020	0.007	−0.183
FARMBACK	0.095	0.227	−0.190	−0.230	−0.013	−0.313*
FAMILIAR	−0.031	0.088	0.085	0.089	−0.038	0.109
CIDERFREQ	0.034	0.121**	0.004	−0.025	−0.052	0.042
WKLYBEER	−0.218	−0.093	0.044	0.178	−0.198	−0.281
WKLYWINE	−0.088	0.080	0.070	−0.277	−0.061	0.462**
WKLYWINECOOL	−0.382	−0.041	−0.364	−0.067	−0.163	0.065
WKLKYLIQ	0.247	0.290	0.221	0.216	0.312	−0.072
WKLYMALT	0.514	−0.031	0.340	0.843*	0.185	0.460
WKLYALCEXP	0.007	0.009	0.006	−0.003	−0.002	−0.003
CONSEQ	0.220**	0.060	0.016	0.087	0.093	0.117
GROCERY	−0.306*	−0.207	0.148	0.045	−0.051	−0.172
ρ21	0.511**					
ρ31	0.124					
ρ41	0.346**					
ρ51	0.259**					
ρ61	0.373**					
ρ32	0.202**					
ρ42	0.215**					
ρ52	0.169**					
ρ62	0.303**					
ρ43	0.395**					
ρ53	0.168*					
ρ63	0.196**					
ρ54	0.213**					
ρ64	0.155*					
ρ65	0.254**					
Percent correct	72.9	70.47	66.5	61.7	66.5	
LLR χ^2(114 df) = 242.84** N = 462						
LLR ρ21= ρ31, ..., ρ65 χ^2(15 df) = 140.28**						

Notes: [a]**denotes significance at α = 0.01 and *denotes significance at α = 0.05

Table 3.
Multivariate probit
model of attribute
importance to hard
apple cider purchase
decisions

This result indicates that older, more experienced hard apple cider consumers who like to purchase and consume local foods may be a target market for hard apple ciders promoted as using heirloom apples. Unexpectedly, the effect of higher household income on the probability of *use heirloom apples* being very important was negative.

Despite that fact that female gender, age, education level, familiarity with hard apple ciders and hard apple cider purchase frequency were postulated to influence beliefs that *sparkling* is important, none of the demographic characteristics or attributes influenced the importance of the *sparkling* attribute. This attribute was considered very important by a

relatively low percentage of respondents (34%). One interpretation is that respondents, regardless of demographics or attitudes, may be equally receptive to both sparkling and still ciders. The fact that the demographic and attitude variables were not significant could suggest that perceptions about the relatively low importance of sparkling ciders might be pervasive across a variety of cider consumer segments.

Importance of local foods (*LOCFOODS*) positively influenced the importance of sweetness/dryness as an attribute. When marketing local ciders to consumers most interested in local foods, one also likely needs to account for their preferences for sweetness/dryness of the hard apple ciders. Surprisingly, frequent malt liquor purchases (*WKLYMALT*) positively influenced the importance of sweetness/dryness. This result could reflect the growing popularity of flavored malt beverages, such as spiked seltzers, and merits further research. Prior study findings have suggested that sweetness/dryness of hard apple ciders may be more important to females, young consumers, less educated and less product involved consumers (Dodd *et al.*, 2010; Miller and Bruwer, 2006; Pickering *et al.*, 2014). However, *AGE*, *COLLGRAD*, *FAMILIARITY* and *CIDERFREQ* were not significant in the *sweetness/dryness* equation. Similar to prior studies, female gender (*FEMALE*) was found to have a positive influence (Bruwer *et al.*, 2011; Cerjack *et al.*, 2016; Lerro *et al.*, 2019; Pickering *et al.*, 2014). When asked a follow-up question about preferences for sweeter vs drier hard apple ciders, nearly 55% said they preferred a sweet or semi-sweet hard apple cider. Just over 38% preferred a semi-dry hard apple cider, but only about 7.3% said they would prefer a dry hard apple cider. Hence, the majority surveyed indicated they preferred a sweet or semi-sweet hard apple cider. Those with higher incomes were less likely to believe hard apple cider price (*Price*) is a very important attribute. This result is as expected as lower-income respondents would likely be more price conscious than higher-income consumers.

The probability that *No Preservatives* is a very important hard apple cider attribute was significantly influenced by *AGE* and *LOCFOODS*. Thus, those who are older and with stronger local foods preferences are more likely to believe no added preservatives are important. While greater familiarity with hard apple ciders and more frequent past purchases of hard apple cider were anticipated to positively influence importance of *No Preservatives*, neither had a significant effect. This result suggests that both more and less familiar hard apple cider consumers will have similar preferences for no preservatives. However, an interesting finding is that weekly wine consumers were also more likely to believe *No Preservatives* is very important. This could possibly be the result of frequent wine purchasers' experiences with sulfites in wines as noted by Costanigro *et al.* (2014). However, additional research would be needed to ascertain this. However, though beers may contain preservatives as well, being weekly beer purchasers did not have a significant effect on the probability of *No Preservatives* being very important. While wine studies have found a positive WTP for organically produced or no added preservatives wine (Costanigro *et al.*, 2014; D'Amico *et al.*, 2016; Mann *et al.*, 2012; Scansy *et al.*, 2020), a study of beer consumers found that beer that was certified organic had a negative effect on WTP (Waldrop and McCluskey, 2019).

5. Conclusions, implications, limitations and future research

The craft hard apple cider market is emerging, but relatively few studies of consumer preferences for locally produced craft hard apple ciders exist. This study expands on previous literature, which, while providing useful results, focused on data from groups of sensory panelists or visitors to hard apple cideries. This study uses a statewide sample of alcoholic beverage consumers, not a smaller group of sensory panelists or those who were visitors to hard apple cideries, to evaluate consumer preferences for locally produced hard apples in retail settings. A growing number of smaller craft cideries have been marketing hard apple ciders in retail settings in cans, hence a 4-pack of 16-ounce cans in a retail setting was the product

packaging format and setting for this study. The results from this study help identify premiums that shoppers in these settings might pay for locally produced hard apple ciders, market profiles for those willing to pay the highest premiums and the importance of other hard apple cider attributes to consumers, beyond product price and locally produced.

Results from this study suggest that alcoholic beverage consumers would pay a premium for a 4-pack of 16-ounce cans of a locally made hard apple cider in a retail setting, suggesting consumers in retail settings beyond the cidery door would pay premiums for locally produced hard apple cider. This finding is contrary to those by Tozer *et al.* (2015), but similar to those by Smith and Lal (2017). Importantly, this study shows a positive premium not just among cidery visitors, but across alcoholic beverage consumers. However, the findings in this study do show a differential in premiums between those who would purchase at specialty retail outlets, such as cideries or liquor, wine or beer stores, vs grocery shoppers. Those who were likely to shop for hard apple ciders at the grocery store would pay a premium $2.98 vs a $3.66 premium among those who would shop for hard apple ciders at specialty (liquor, wine or beer) stores or at cideries or wineries. One potential reason for the negative price effects of grocery shopping for hard apple ciders may be that the locally labeled brands would have to compete directly with less expensive nationally marketed hard apple cider brands on grocery shelves. This was not studied directly in this analysis, and additional research is needed to confirm or refute this. While a larger premium could be captured, notably, just under 66% of the respondents anticipated that they would most likely purchase hard apple cider at the grocery store. Therefore, while hard apple cider makers might be able to offer ciders at higher premiums in more specialized retail settings, the majority of consumers anticipate buying cider in a grocery setting.

The results from this study suggest a strong connection between preferences for local foods and premiums for locally made hard apple ciders. Promotion of locally made hard apple ciders could be targeted to those with greater local food preferences, perhaps even selling locally made hard apple ciders at markets specializing in local foods. Additional research might examine settings for consumption of hard apple ciders that are purchased at retail settings. If consumers do not consider hard apple ciders beverages for meal pairing, marketing campaigns by cideries might focus on how hard apple ciders can be paired with local cuisine.

In a region of apple growing heritage (Appalachia), this heritage might be an effective message to market hard apple ciders to local residents and tourists alike. Debriefing questions after the choice set revealed those choosing the locally made cider tended to value helping local businesses, and knowing about where their cider is made. Marketing campaigns by cideries might include a focus on the history of the business and its regional location.

Unlike prior research, this study investigated how weekly purchases of a variety of alcoholic beverages, beyond wine and beer, might influence preferences for locally made hard apple ciders. Frequent wine cooler purchasers were willing to pay higher premiums for locally made hard apple ciders, while weekly malt liquor beverage purchasers would discount locally made hard apple ciders. Interestingly, neither weekly wine purchases nor weekly beer purchases had any significant influence. These results could reflect that consumers who prefer refreshing beverages such as wine coolers, with sweetness, unlike beer or drier wines, may be more drawn to locally made hard apple ciders.

Looking beyond the attributes of price and locally made, other important hard apple cider attributes were sweetness/dryness and no added preservatives. Meanwhile use of heirloom apples and sparkling were of lesser importance. This result could suggest that local craft apple cider makers should consider sweetness/dryness (in particular, sweet or semi-sweet) as well as no preservatives in marketing their products. These attributes held particular appeal to those who had stronger preferences for local foods. While the relative

lack of importance of heirloom apples use to consumers is somewhat surprising, this could be because of less familiarity with heirloom apples. While an information screen about heirloom apples was provided in the survey, it may be the first time many consumers have heard the term used for hard cider apples. The fact that more frequent prior hard apple cider purchasers were more likely to choose this attribute as very important hints that this attribute may hold greater appeal to more experienced hard apple cider purchasers.

This study was conducted for one state and to fully understand the effects of a local labeling on consumer preferences for hard apple ciders, additional geographic regions should be considered. The survey represents a single snap-shot in time when it is likely consumer preferences for hard apple ciders may be changing over time. This study does not capture any inter-temporal effects. Because this study represents a stated-choice experiment, the results should be confirmed with in-store experiments or revealed choice data. While the primary focus of this research is to provide premium measures for a locally processed cider made from local apples, the results regarding the importance of multiple other hard apple cider attributes suggest that future research could combine multiple attributes into a discrete choice experiment to obtain premium estimates for these attributes.

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