

Final Technical Report

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*Grant 20*1790 Increasing Demand for Michigan's Emerging Hard Cider Industry
Through Communication and Promotion*

Submitted January 31, 2023

Goals and Objectives

Objective 1: Evaluate consumer preferences for Michigan cider.

We will use experimental economics methods evaluate the ways that might increase demand for Michigan-made hard ciders. A core concern for cideries is how they might improve consumer knowledge about cider characteristics. We will conduct two studies in 2019. First, we will determine the importance of how consumers identify a cider product, such as dry, sweet, or with a catchy name. Based on input from the Michigan cider producers, consumers often base decision-making on names or key words rather than actual flavor profiles. As cider is an emerging industry, consumers may not be knowledgeable about cider styles or flavor profiles; whereas in more established markets such as beer, more consumers can differentiate between IPAs and pilsners. Anecdotal evidence suggests that drinkers are likely to say they like “dry” ciders, but often prefer to consume “sweet” ciders. To test this hypothesis, we will choose one type of cider and divide it into three taps: tap one will be labeled “sweet cider,” tap two will be labeled “dry cider.” After tasting the beverage, we will survey drinkers about the sensory characteristics of the cider. By tracking how much the cider labels influence the choice and taste perceptions of the differently labeled cider, we can more clearly determine the importance of labeling on cider preferences even when the cider is the same. For the second study, we will ask informational questions about how much cider event attendees knew about the product before and after the event. By focusing on changes in consumer knowledge at this event, we can estimate how much more likely consumers will purchase more cider after learning about cider characteristics at the festival.

We will also survey a representative sample of Michigan cider drinkers via a professional sampling group, such as Qualtrics. We will utilize cluster and factor analysis to group consumers into market segments, which will allow Michigan cideries to more accurately target their advertising campaigns. The survey will also include a hypothetical discrete choice experiment. This empirical method allows us to answer questions regarding how preferences and perceptions influence the choice of a cider and how promotional campaigns increase how consumers value products. Because so little is known about how consumers evaluate ciders, these data will be of interest for all Michigan cider producers and marketers, as it will help them develop more effective advertising campaigns. Additionally, we will identify the buying relationships between cider, beer, wine, and liquor by calculating price elasticities, which are valuable in identifying how consumers decide what drink to purchase. Dr. Malone conducted pilot studies in November, 2017, and July, 2018, and the results were disseminated to growers and cider producers at the 2018 Great Lakes Fruit and Vegetable EXPO in Grand Rapids, MI. We will design the survey for this project based on the information generated from Dr. Malone’s pilot projects.

Objective 2: Quantify the contributions of Michigan apples to the value-added supply chain for Michigan cider.

To better understand the impacts of Michigan apple production on the growing cider industry, we will quantify the contributions of Michigan apples to the value-added supply chain for Michigan cider. In fall 2019, we will survey all MCA members to determine the value of apple fruit received from Michigan producers that is intended for cider production. We will also quantify the amount of Michigan apple juice as well as

juice imported from other states. We will use these numbers to measure the economic impact of Michigan apples in the cider industry as well as determine the costs and benefits of using Michigan fruit. Lastly, data will be extrapolated using a growth model to project future apple needs for the Michigan cider industry. Results will be disseminated to cider producers and apple growers at educational events, such as the Great Lakes EXPO, to plan for future orchard establishment and potential contractual agreements between entities. We will also circulate results via the new MCA web platform to increase communication between growers and cider producers.

Results, Conclusions and Outcomes

A total of 729 valid responses were collected from a third-party survey administrator, Qualtrics. The survey was designed to replicate over five choice experiments per respondent to assess baseline willingness to pay and the cross price preferences over competing beverage options including beer, wine, hard seltzer, and mixed drinks. That is, the survey design allows for statistical determination of the relative price differentials between cider and alternative adult beverages that would entice consumers to switch one for the other. Measures of cross product substitutability are called cross-price elasticities and measures the percent change in expected consumer demand of a product should its price change relative to substitutes.

The consumer willingness to pay model results indicate that the average willing price for 12oz serving of hard cider is \$6.98, comparable to specialty beers. For survey respondents this option, the average premium placed on in-state brewed cider was \$1.41 for a 12oz serving. The estimates indicate that beer is the most direct substitute, though other adult beverages share similar substitutability with hard cider. Accordingly, a 10 percent increase in the price of hard cider will result in a 1.7 percent increase in beer purchases. At the same time, that 10 percent increase in the price of cider will increase wine sales, hard seltzer and mixed drinks by 1.6, 1.5 and 1.4 percent, respectively.

These estimates were used to generate economic impact estimates of this budding Michigan industry. This effort is unique in that the resulting estimated economic impact accounts for lost economic activity associated with substituted adult beverages. Economic impact estimates were limited to the consideration of Michigan-produced hard cider. Generating economic impact estimates of Michigan's hard cider industry requires recognizing the full extent of the supply chain activities from raw materials to final sale to consumers for consumption. This is because the industry structure of this industry is not represented in standard economic simulation models and has to be built up along each stage of the supply chain. To keep the analysis within budget, the research team extrapolated from a prior supply chain simulation for craft beer which recognized the unique mix of locally sourced ingredients and inputs, not found in the sales of national brands. However, the key components of hard cider differ from craft beer, and adjustments were made to add apple and other fruit-based inputs in the analysis in place of barley and hops. While Michigan is one of the leading producers of apples, we found that the apples used in cider production mostly require importing into the state.

This finding suggests that supply chains can be deepened in the state as growers shift to cider varieties of apples.

The supply chain analysis required breaking out consumption into two broad categories: on-premise and off-premise consumption. We used estimates from Michigan craft beer sales, suggesting 81 percent of sales are for off-premise consumption. Estimates also required accounting for exports out of the state, and unlike the craft beer estimates, the model assumes that none of Michigan's hard cider production is exported from the state.

Time Span

Grant period, 1/21/2021-8/1/2022; project activities carried out 4/20/21-8/1/22. Grant period: April 1 - December 31, 2020. On April, 25, 2022, a no cost extension requested to accommodate COVID-19 interruptions and in response to an institutional change of the project lead. Effective effort on this project spanned from April 2020 to June, 2022.

Work Accomplished/ Methods

The following protocols were used in the cultivar evaluations:

- **Literature review** – A review of the existing literature was undertaken to determine relevant prior research to this effort, including topics specific to cider demand and production as well as methods of consumer demand analysis. This literature informed the interview discussions with producers (cideries) and planned intercepts with consumers.
- **Collection of Cider Producers and Production** – Michigan's Department of Licensing and Regulatory Affairs (LARA) is tasked with licensing producers of adult beverages, including beer, liquor/liqueurs and wines. Cider producers are not distinguished from wine producers for tax assessment. Therefore using LARA license registrations alone is not sufficient to determine producers and volume of production. Rather, each licensed producer required vetting to determine if cider or wine was the primary production.
- **Interviews with Producers** – Informal interviews and discussions with cider producers were carried out with in person and phone. Few interviews were conducted, as commonalities arose early indicating sourcing of inputs and distribution of cider products. While cider requires many of the same ingredients required for wine production, cideries are tend to operate much more like breweries in producing for both on-premise and off-premise consumption. The distinction informed up- and down-stream supply chain modeling. The findings largely support that locally sourced ciders use apple supplies from outside of Michigan due to the absence of desirable varieties for cider operations.
- **Intercepts/Survey** – Initial plans for on-site intercepts was interrupted by the COVID-19 pandemic. To push the research forward, a survey approach was adopted in the place of on-site interviews. A web-based survey instrument

replicating consumer choice among different combinations of products and prices was established and administered by Qualtrics. The survey collection was completed in March of 2022, resulting in 729 valid responses. Through choice replication, a total of 8,748 choice experiments were recorded.

- **Economic Supply-Chain Simulation** – The IMPLAN Pro economic simulation software and data for Michigan was used to trace baseline expenditures and model such expenditures based on the hypothesized supply chain. The survey of consumers allow recognition of lost sales of competing products, beer, wine, hard seltzer and mixed drinks. That is, the average substitution was derived, such that an increase in cider consumption requires at least a partial decrease in other adult beverages. Interviews with producers suggested that the local supply chain acts similar to that of beer brewers, rather than wine producers. Hence, similar supply chain facing Michigan craft beer brewers was utilized, substituting key grain inputs with fruit and other associated inputs to cider production. Implementation of IMPLAN Pro was provided by the MSU Center for Economic Analysis.
- **Report Write Up** – A final report of this research findings has been published by Kazi Oishi as a thesis requirement for graduation with a master’s degree from MSU Department of Agricultural, Food and Resource Economics in June of 2022. The report takes into account and reports the literature review, methods and findings described here.

Communication Activities, Accomplishments and Impacts

Communications of findings were interrupted by faculty assignment changes, but reporting on the findings of this research is ongoing, starting with the 2022 MSU publication of Kazi Oishi’s master’s thesis. The report received international attention at the 2022 Beeronomics Conference in Dublin Ireland in June 2022, along with a slide-deck presentation. Two more publications are in early implementing stages. The first will largely mirror the intent of the published masters thesis, focusing on measuring the economic value of the craft cider supply chain. The second focuses on consumer choice modeling of this effort and the survey findings to better understand consumer segments and consumer choice across substitute products.

Budget Narrative

Project expenses largely followed the initial project budget. However, COVID-19 interruptions reduced the costs of interviews/surveys by eliminating planned travel costs. The project principle solicited and received approval for a budgetary change to allocate interview savings to communication expenses for presenting the findings and approach at the 2022 Beeronomics Conference in Dublin Ireland.

