Stellenbosch 2023 Abstract Submission

Title
How do U.S. wine consumers escape from COVID-19 restrictions by seeking for variety? A Machine Learning approach on purchase behavior

I want to submit an abstract for:
Conference Presentation

Corresponding Author
Shuay-Tsyr Ho

E-Mail Corresponding Author
shuaytsyrho@ntu.edu.tw

Affiliation
Department of Agricultural Economics, National Taiwan University, Taiwan

Co-Author/s

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wolfram Rinke</td>
<td>Department of Information-Technology and Information-Management, Fachhochschule Burgenland GmbH, Austria</td>
</tr>
</tbody>
</table>

E-Mail Co-Author/s

<table>
<thead>
<tr>
<th>E-Mail</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="mailto:wolfram.rinke@fh-burgenland.at">wolfram.rinke@fh-burgenland.at</a></td>
</tr>
</tbody>
</table>

Keywords
Wine, Variety-seeking, Purchase behavior, Machine learning, Data mining, COVID-19

Research Question
How is wine consumer's variety-seeking tendency changed by COVID-19 restrictions and how do purchase patterns differ between restricted and unrestricted periods?

Methods
Machine learning is used to model variety-seeking behavior. We do a variance analysis of partial derivatives of variety measures and compare the varietal patterns across unrestricted and restriction periods.

Results
Variety-seeking behaviors differ across periods defining COVID-19 pandemic, which sheds light on the heterogeneity of wine purchase diversity driven by the degree of approaching restriction and unrestricted periods.

Abstract
COVID-19 pandemic shocked the food and beverage markets and shaped the environment and atmosphere for every individual to feel both spatially and psychologically stuck or trapped, which might lead to higher degree of variety-seeking behavior among consumers feeling a sense of threat (Kim, 2020). Variety-seeking behavior is found
to be used by consumers as a coping mechanism when they feel low sense of personal control (Levav and Zhu, 2009). Strands of relevant literature tap into reactance theory (Brehm, 1966), compensatory behavior (Cutright, 2011), and environmental psychology (Meyers-Levy and Zhu, 2007). In this research, we treat the COVID-19 pandemic as the context and use alcoholic beverage as the research target to examine how people’s purchase behaviors responds to the distress and isolation brought about by the social-distancing measures.

Consumer research, psychology, and marketing field have looked into the relationship between variety-seeking and self-control using lab experiment data (Kim, 2020; Levav and Zhu, 2009; Yoon and Kim, 2018). The purpose of this research is to fill in the gap in both the breadth and depth of the variety-seeking and control restoration issues using the very specific context of global pandemic setting. Kim (2020) uses experimental data to investigate how the threats of COVID-19 pandemic perceived by people affect their variety-seeking behavior. The author bases the evidence on theories like reactance theory and evolutionary theory, which are related with the hypothesis developed in this study that it’s the perceived threats to lives and freedom that evoke varietal behaviors attempting to regain the sense of control and freedom. More importantly, choice is a representation, in Western society, of ability to express self, control environment, and determine the boundary of freedom (Stephens et al., 2007; Kim and Drolet, 2003). The study shows that subjects diversify their choices in food and stationary items when they are provided with information regarding the trajectory of COVID-19 pandemic development and are also asked to self-evaluate the degree of life-threatening risk of such global pandemic. The argument is built upon that the pandemic threatens people’s self-esteem and their freedom and control are significantly impaired.

Recent but earlier studies explore the question from different angle. Yoon and Kim (2017) examine how socioeconomic status would diversify their choices to “win back” their sense of personal control that is eroded by their perception of low economic mobility due to their status objectively judged in the society’s hierarchy. Levav and Zhu (2009) uses spatial confinement exemplified by the both the store and shopping environment to examine customer’s behavioral responses in both varietal and unique purchase decisions. Narrow aisles lead to not only more variety-seeking pattern but also more uniqueness-seeking pattern.

The Consumer Panel Dataset provided by NielsenIQ (NielsenIQ, 2023) used by this research is a longitudinal dataset comprised of cross-sectional panel of households who constantly provide transaction information on their grocery purchases using an in-home scanner. We examine the variety-seeking behavior with count measure of UPC items to observe how people diversify their alcohol purchase at different points of time during the pandemic and how such variety-seeking behavior is driven by household’s socio-demographic characteristics. Our research design employs the social-distancing measures imposed during the COVID-19 pandemic in the United States. Two windows of time are considered: The closure of business and public service from March 10th to July 14th, 2020, and the Limited public gathering from October 8th to November 3rd, 2020 (ACAPS, 2022). We will empirically document how consumer’s purchase behavior varies by the length of time during the restriction period and by the days ahead of lifting the restrictions. We use a model to describe the households and purchases in relation to variety-seeking behaviors. The independent variable includes socio-demographic characteristics and the purchase patterns of households. The dependent variables include numbers of UPC (Universal Product Code). We use feed-forward artificial neural network (ANN) to derive the partial derivatives and calculate the dependency matrix (Rinke, 2015). Finally, we do a variance analysis of partial derivatives for the three identified observation periods as unrestricted, pre-restricted, and restriction periods.

Our findings show that the proposed theories do not explain all types of households’ purchase behavior. At the household level, we identify differences in purchase behavior in terms of varietal patterns across three periods before, during, and after the restriction periods. The tendency to increase the purchase variety is stronger as the time approaches the end of restriction period than during the restriction period itself. The results show that the model parameters “number of restriction period passed” and “days to restriction” have the highest explanatory power. The number of restriction period is most influential in the pre-restriction period and slightly stronger in the restriction period than in the unrestricted period. During the restriction period, the parameter “days within restriction” is the most influential parameter. By examining further into the timing during the restriction period, the heterogeneity in variety-seeking behavior could be captured that people’s perception of the status of restriction measure alters their choice diversification.
Reference


File Upload (PDF only)

- AAWE-2023_Rinke-and-Ho.pdf

Consent

✔️ I agree to the privacy policy.

You find the link to our privacy policy at the bottom of the page. In the privacy policy you find a link for exporting and/or erasing your personal data stored in our database.
How do U.S. wine consumers escape from COVID-19 restrictions by seeking for variety? A Machine Learning approach on purchase behavior

Abstract

Wolfram Rinke, Department of Information-Technology and Information-Management, Fachhochschule Burgenland GmbH, Austria. Email: wolfram.rinke@fh-burgenland.at

Shuay-Tsyr Ho, Department of Agricultural Economics, National Taiwan University, Taiwan. Email: shuaytsyrho@ntu.edu.tw (Corresponding author)

Keywords: Wine, Variety-seeking, Purchase behavior, Machine learning, Data mining, COVID-19

Research Question
How is wine consumer's variety-seeking tendency changed by COVID-19 restrictions and how do purchase patterns differ between restricted and unrestricted periods?

Methods
Variety-seeking behavior is modeled using machine learning. We do a variance analysis of the partial derivatives of variety measures and compare the varietal patterns across unrestricted, pre-restriction, and restriction periods.

Results
Variety-seeking behaviors differ across periods defining COVID-19 pandemic, which sheds light on the heterogeneity of wine purchase diversity driven by the degree of approaching restriction and unrestricted periods.

Introduction
COVID-19 pandemic shocked the food and beverage markets and shaped the environment and atmosphere for every individual to feel both spatially and psychologically stuck or trapped, which might lead to higher degree of variety-seeking behavior among consumers feeling a sense of threat (Kim, 2020). Variety-seeking behavior is found to be used by consumers as a coping mechanism when they feel low sense of personal control (Levav and Zhu, 2009). Strands of relevant literature tap into reactance theory (Brehm, 1966), compensatory behavior (Cutright, 2011), and environmental psychology (Meyers-Levy and Zhu, 2007). In this research, we treat the COVID-19 pandemic as the context and use alcoholic beverage as the research target to examine how people’s purchase behaviors responds to the distress and isolation brought about by the social-distancing measures.
Literature Review

Consumer research, psychology, and marketing field have looked into the relationship between variety-seeking and self-control using lab experiment data (Kim, 2020; Levav and Zhu, 2009; Yoon and Kim, 2018). The purpose of this research is to fill in the gap in both the breadth and depth of the variety-seeking and control restoration issues using the very specific context of global pandemic setting. Kim (2020) uses experimental data to investigate how the threats of COVID-19 pandemic perceived by people affect their variety-seeking behavior. The author bases the evidence on theories like reactance theory and evolutionary theory, which are related with the hypothesis developed in this study that it’s the perceived threats to lives and freedom that evoke varietal behaviors attempting to regain the sense of control and freedom. More importantly, choice is a representation, in Western society, of ability to express self, control environment, and determine the boundary of freedom (Stephens et al., 2007; Kim and Drolet, 2003). The study shows that subjects diversify their choices in food and stationary items when they are provided with information regarding the trajectory of COVID-19 pandemic development and are also asked to self-evaluate the degree of life-threatening risk of such global pandemic. The argument is built upon that the pandemic threatens people’s self-esteem and their freedom and control are significantly impaired.

Recent but earlier studies explore the question from different angle. Yoon and Kim (2017) examine how socioeconomic status would diversify their choices to “win back” their sense of personal control that is eroded by their perception of low economic mobility due to their status objectively judged in the society’s hierarchy. Levav and Zhu (2009) uses spatial confinement exemplified by the both the store and shopping environment to examine customer’s behavioral responses in both varietal and unique purchase decisions. Narrow aisles lead to not only more variety-seeking pattern but also more uniqueness-seeking pattern.

Data and Method

The Consumer Panel Dataset provided by NielsenIQ (NielsenIQ, 2023) used by this research is a longitudinal dataset comprised of cross-sectional panel of households who constantly provide transaction information on their grocery purchases using an in-home scanner. We examine the variety-seeking behavior with count measure of UPC items to observe how people diversify their alcohol purchase at different points of time during the pandemic and how such variety-seeking behavior is driven by household’s socio-demographic characteristics. Our research design employs the social-distancing measures imposed during the COVID-19 pandemic in the United States. Two windows of time are considered: The closure of business and public service from March 10th to July 14th, 2020, and the Limited public gathering from October 8th to November 3rd, 2020 (ACAPS, 2022). We will
empirically document how consumer’s purchase behavior varies by the length of time during the restriction period and by the days ahead of lifting the restrictions. We use a model to describe the households and purchases in relation to variety-seeking behaviors. The independent variable includes socio-demographic characteristics and the purchase patterns of households. The dependent variables include numbers of UPC (Universal Product Code). We use feed-forward artificial neural network (ANN) to derive the partial derivatives and calculate the dependency matrix (Rinke, 2015). Finally, we do a variance analysis of partial derivatives for the three identified observation periods as unrestricted, pre-restricted, and restriction periods.

Results

Our findings show that the proposed theories do not explain different types of households’ purchase behavior. At the household level, we identify differences in purchase behavior in terms of varietal patterns across three periods before, during, and after the restriction periods. The tendency to increase the purchase variety is stronger as the time approaches the end of restriction period than during the restriction period itself. The results show that the model parameters “number of restriction period passed” and “days to restriction” have the highest explanatory power. The number of restriction period is most influential in the pre-restriction period and slightly stronger in the restriction period than in the unrestricted period. During the restriction period, the parameter “days within restriction” is the most influential parameter. By examining further into the timing during the restriction period, the heterogeneity in variety-seeking behavior could be captured that people’s perception of the status of restriction measure alters their choice diversification.

References


