Iowa Spirits Case Interview

1. What impact did Covid have on the overall liquor market in Iowa?

    a. After smoothing for seasonality, both total sales and volume of liquor purchased by stores in Iowa increased following the impact of Covid. As shown in Figure 1, monthly sales rose from approximately $30M in March 2020 to around $35M by the end of 2021. Figure 2 highlights that this growth can be partially attributed to an increase in demand. Monthly liquor purchases jumped from a steady level of 1.8 million liters per month before March 2020 to over 2 million liters by the beginning of 2021. This upward trend reveals a growing demand in the Iowa spirit market post-Covid.

    b. The two most common pack sizes in the market are the 6-pack and 12-pack. As illustrated in Figure 3, these two pack options account for approximately 90% of all sales in any given month. Over the period from 2018 to 2022, market share for 6-packs has increased by roughly 10%, while 12-pack sales have declined by a similar margin. Figure 4 shows the count of unique liquor categories (i.e. tequila, gin, etc.) offered for different pack sizes over time. From 2017 to 2021, there is an increase in optionality of pack sizes. Both the market size shift and pack size optionality have significant implications for operational and logistical processes. Vendors need to potentially adjust their operations to accommodate new pack sizes, as well as focusing more on providing products in a 6-pack size.

2. Which are the fastest growing types of liquor (e.g., vodka, tequila, rum, etc.)? How has market share changed over time?

    a. Figure 5 highlights the market share over time for different liquor categories. Overall, vodka and whisky are the two most popular categories in Iowa, accounting for over 50% of the total market share in any given month. Figure 6 highlights the fastest growing types of spirits, with mezcal growing the fastest with a compounded annual growth rate (CAGR) of 26.7%, followed by distilled spirits and tequila (a type of mezcal). Looking more in-depth, Figure 7 highlights that the volume of tequila sold has accelerated from ~77,000 liters purchased per month in 2019 to over 100,000 liters, a 30% increase. Similarly, Figure 8 reveals the relative price of tequila has also increased significantly over the past few years. Price per liter increased from $23 per liter in 2019 to $27.5 by the beginning of 2022, or a ~20% increase. Growing demand combined with increasing prices have driven tequila sales to grow significantly over the past few years. Tequila's popularity in Iowa seems to be increasing while simultaneously rising costs do not seem to be slowing consumers down. This seems like an opportune time to enter the tequila market in Iowa.

3. In late 2019 Heaven Hill Brands bought a portfolio of liquor brands from Constellation Brands. What impact did this have on Heaven Hill's growth?

    a. Figure 9 outlines the portfolio of liquor brands that Heaven Hill Brands purchased from Constellation. Figure 10 outlines the growth rate of Heaven Hill's sales from 2019 to 2020 by original (the portfolio of brands they already owned) and acquired brands. In 2020, the acquired brands accounted for 63% of all sales. Total sales overall grew by 139%, of which the acquired brands accounted for 90% of this growth.

    b. In general, the acquisition increased the overall base of Heaven Hill's total sales. Between 2019 and 2020 sales increased drastically, but this is because of the incorporation of new products. It would be helpful to observe several more years of data to observe the potential long-term effect of the merger. A larger footprint combined with potential synergies with original product offerings can allow Heaven Hill Brands to grow more exponentially in the Iowa spirit market.

4. Grouping individual store brands together (e.g., all of Walmart, Liquor Barn, Hy-Vee, etc.), who are the top 10 retailers by year?

    Figure 11 outlines the top 10 retailers by total sales each year, with the sorting going from largest to smallest (i.e. Hy-Vee is the largest retailer in 2017). It seems the largest retailers of spirits in Iowa are franchise big-box retailers like Hy-Vee, Wal-Mart, and Sam's Club. Several convenience stores from Casey's to Kum & Go and alcohol specific retailers like Central City Liquors are also within the top 10 retailers. Figure 12 demonstrates a similar list in terms of volume and seem consistent with Figure 11. These tables are useful for vendors in considering who are important clients in terms of market share.

5. What data integrity issues did you discover? How could you (or how did you) solve/account for these?

    a. The raw data contained retailers with inconsistent names (i.e. store numbers in the name field). I standardized store names by applying regular expressions, as manual review of ~2,200 unique store names would not be feasible.

    b. Having simple condition statements (i.e. stopifnot()) that check certain conditions are met. Deduplication of data is also important in certain circumstances. Most importantly, consistent sanity checks of data and results to catch any errors or data quality issues.

    c. Automating processes is the most scalable way to resolve solutions. For example, if we have many string columns we want to convert to numeric columns, using regular expressions within loops we can confirm if there are any erroneous values and clean them efficiently. Additionally, standardizing data is an effective method of efficiently dealing with quality issues at a larger scale.

APPENDIX:

Figure 1. All liquor total sales and moving average

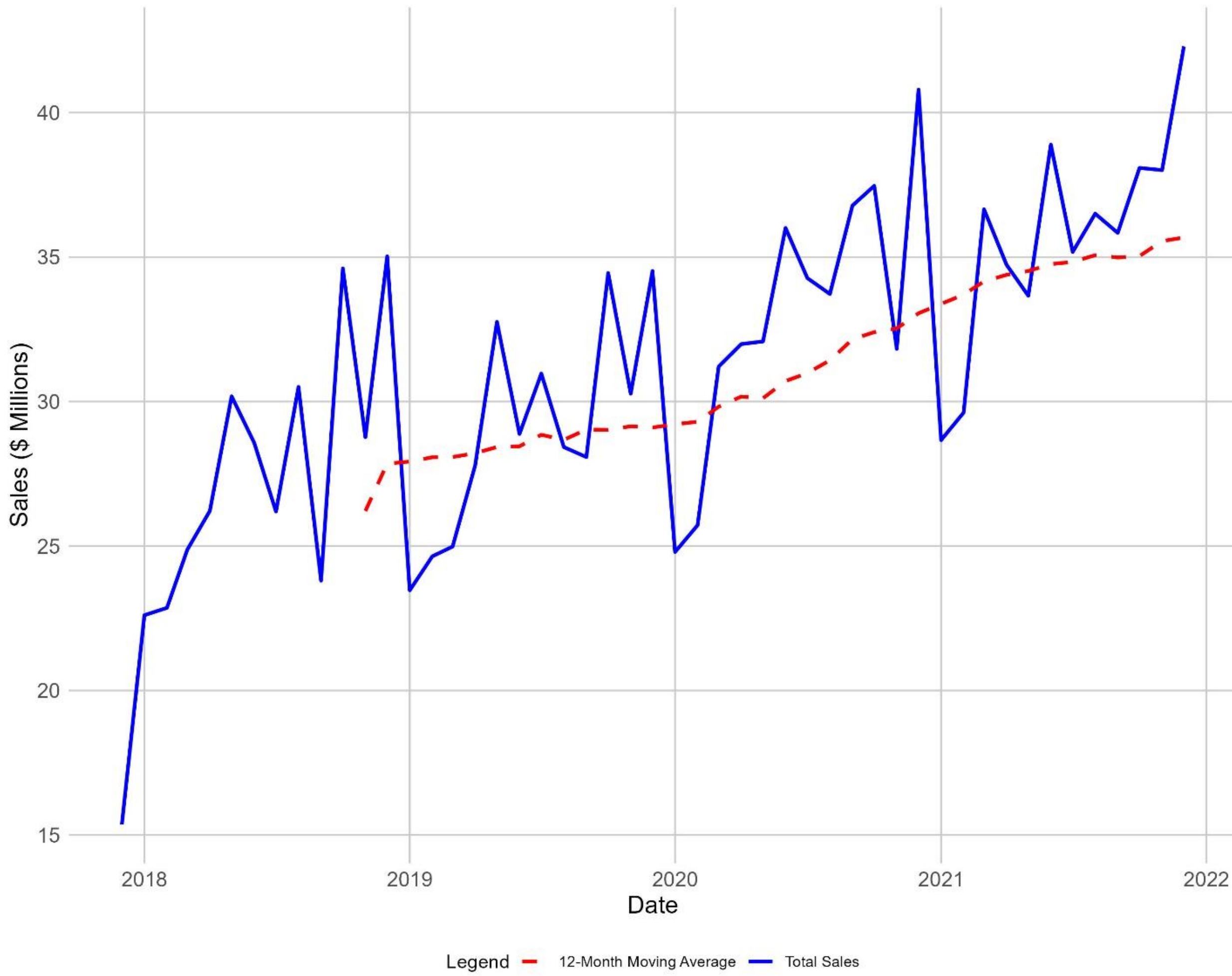

Figure 2. All liquor sales volume and moving average

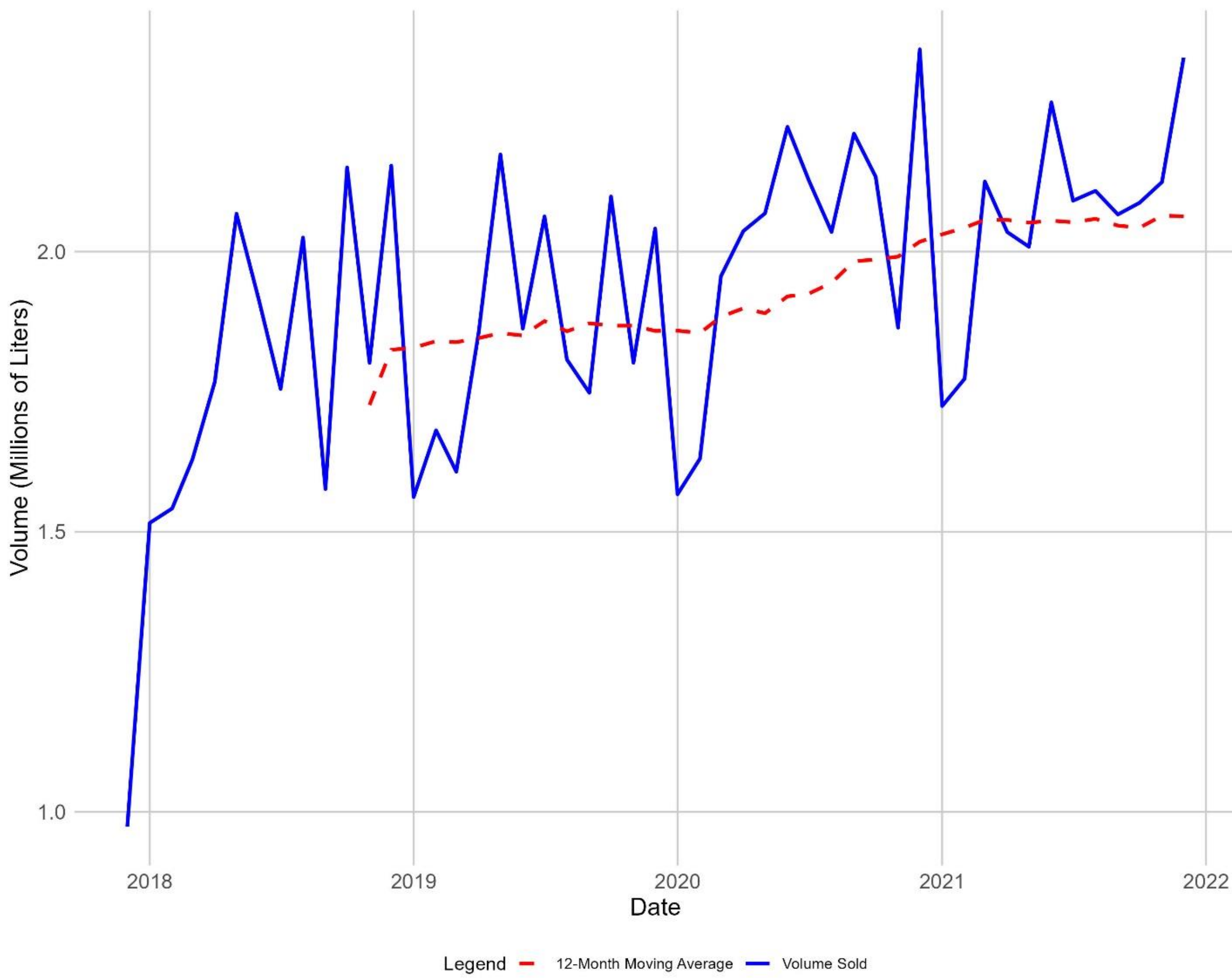

Figure 3. Market share (in terms of total sales) for 6 pack and 12 pack

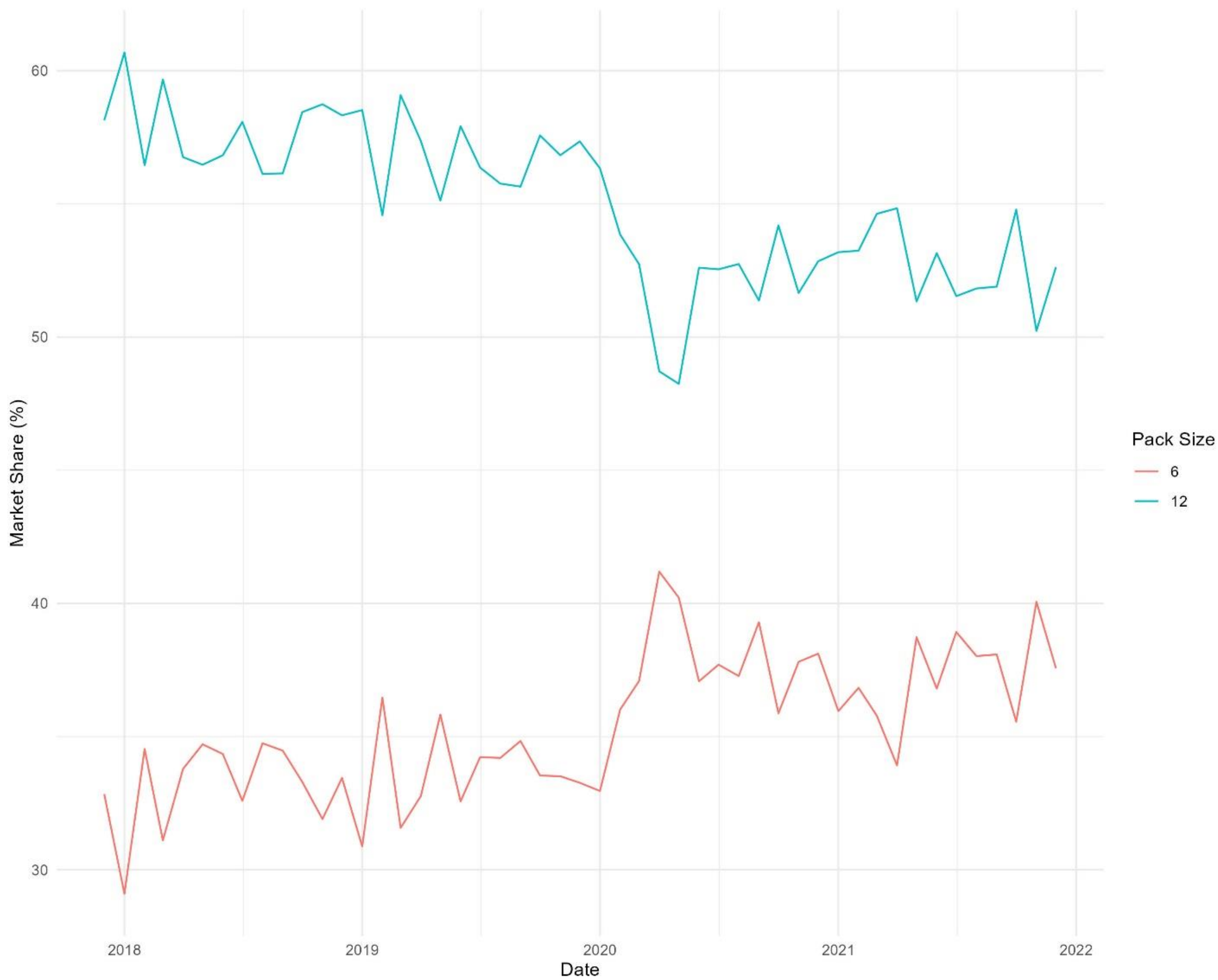

Figure 4. Unique count of liquor categories for pack sizes

2017		2018		2019		2020		2021	
Pack size	Count of categories	Pack size	Count of categories	Pack size	Count of categories	Pack size	Count of categories	Pack size	Count of categories
12	13	12	13	12	13	12	13	12	12
6	13	6	13	6	13	6	13	6	12
48	9	24	11	24	11	24	11	24	11
24	9	10	10	48	10	48	10	3	10
10	8	48	10	10	9	1	10	1	10
4	8	1	10	3	9	10	9	10	9
1	5	4	7	1	7	8	8	48	8
3	5	3	7	5	6	3	8	8	8
5	3	8	6	8	6	4	6	4	7
8	2	5	4	4	5	5	5	5	5
44	1	20	2	20	3	20	3	20	2
15	1	2	2	2	3	30	2	15	2
32	1	44	1	16	2	44	1	30	2
-	-	15	1	44	1	9	1	44	1
-	-	9	1	15	1	15	1	9	1
-	-	32	1	9	1	16	1	60	1
-	-	18	1	18	1	60	1	120	1
-	-	-	-	32	1	18	1	16	1
-	-	-	-	-	-	2	1	18	1
-	-	-	-	-	-	-	-	2	1
-	-	-	-	-	-	-	-	28	1

Figure 5. Market share (in terms of total sales) by liquor category

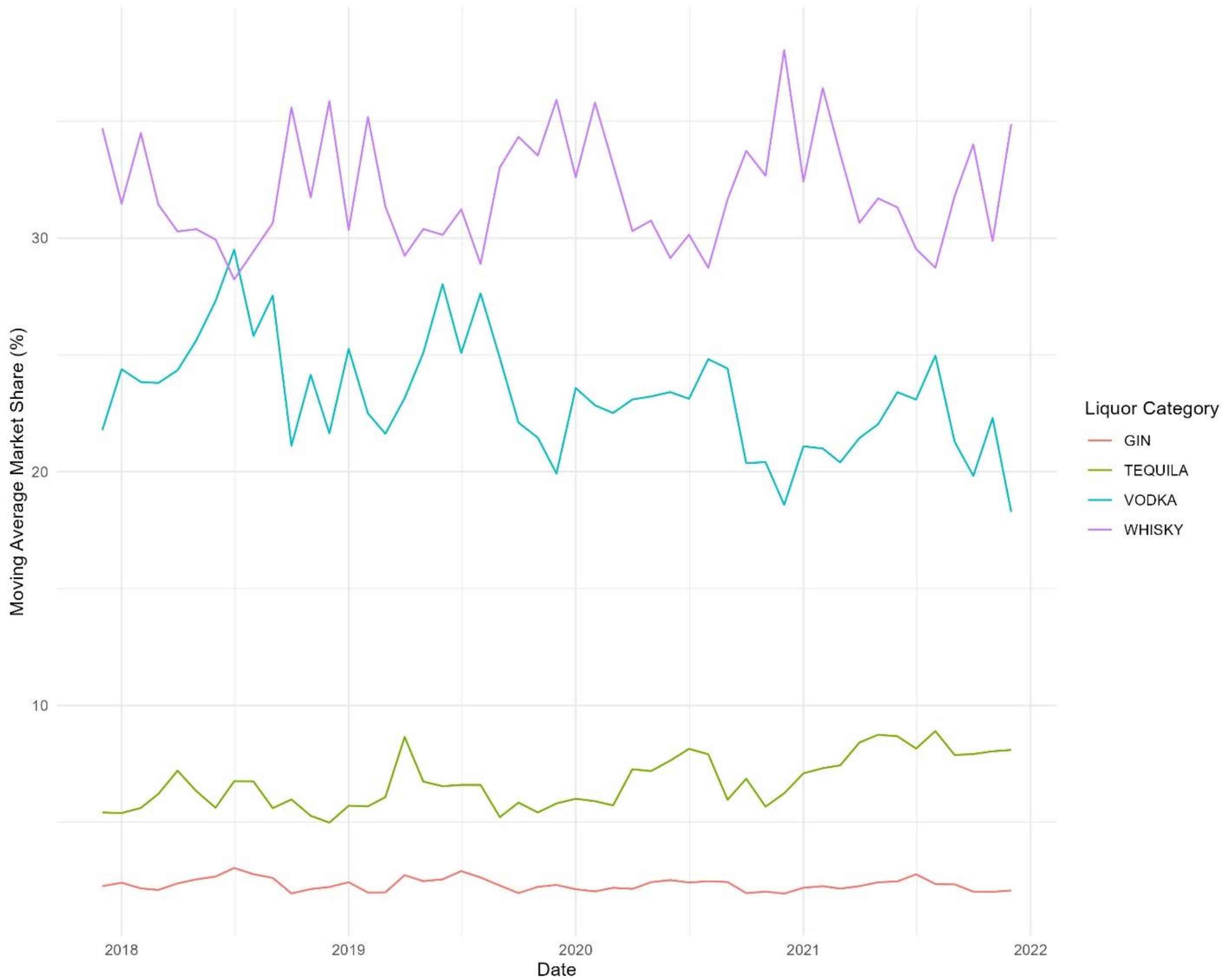

Figure 6. CAGR by liquor category (2018-2021)

Liquor Category	CAGR
MEZCAL	26.7%
DISTILLED SPIRITS	20.5%
TEQUILA	12.2%
COCKTAILS/RTD	12.1%
LIQUEUR	6.7%
WHISKY	6.6%
BRANDIES	5.4%
SCHNAPPS	5.0%
GIN	4.1%
OTHER	3.9%
RUM	2.7%
VODKA	2.6%
UNKNOWN	-18.7%

Figure 7. Moving average of consumption for tequila sales

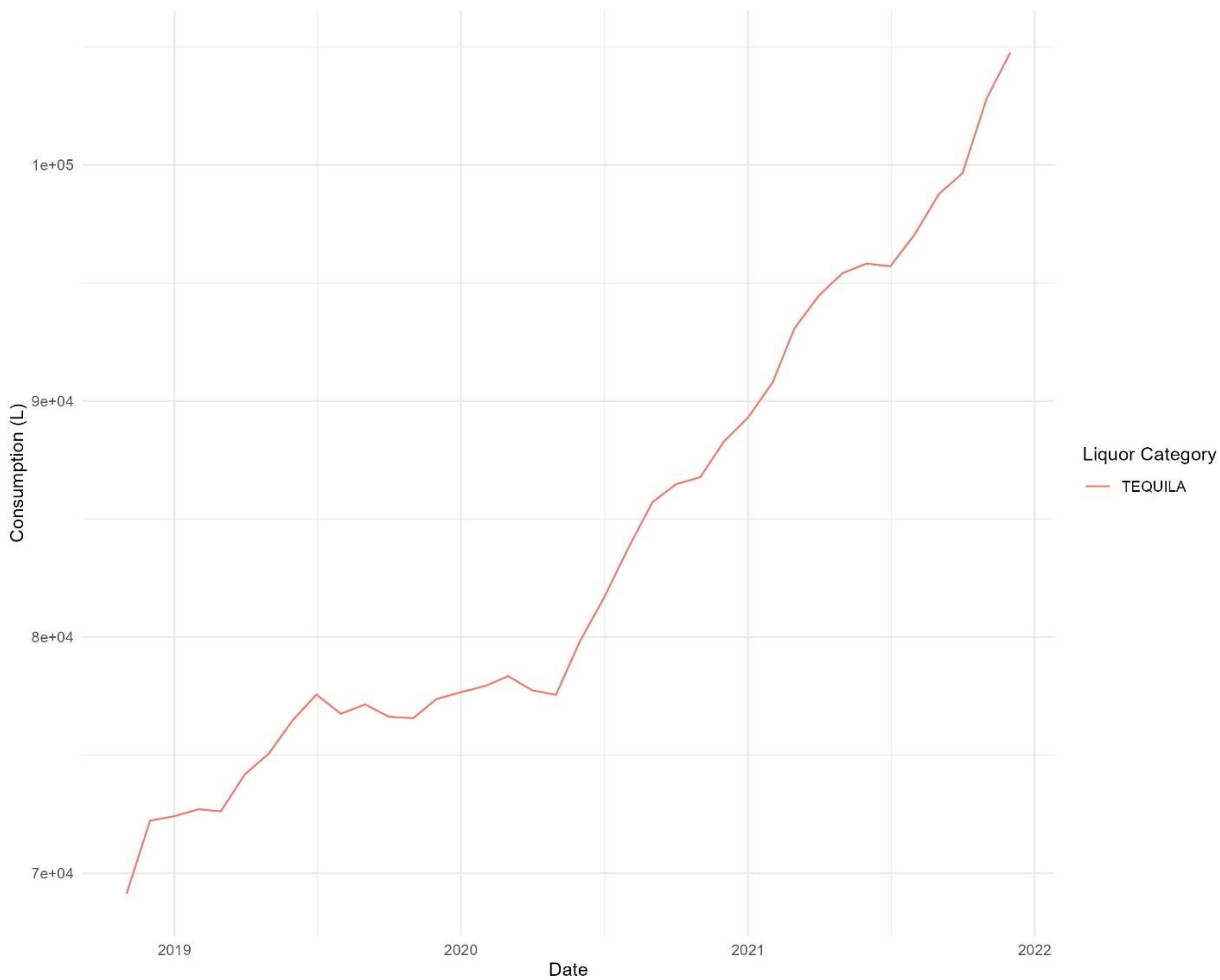

Figure 8. Moving average of price (total sales/total volume) for tequila sales

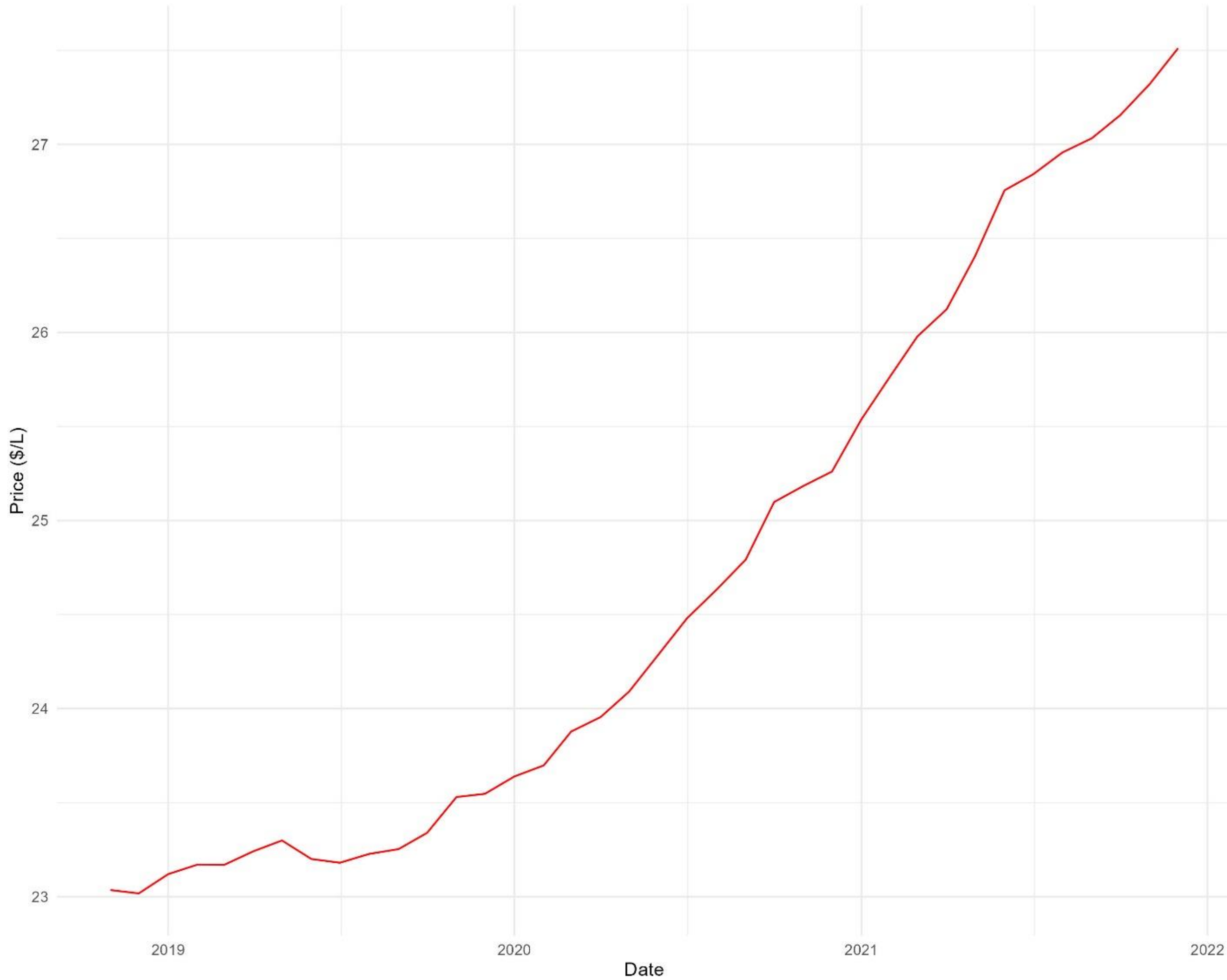

Figure 9. List of brands Heaven Hills purchased from Constellation Brands

Purchased Brands
BLACK VELVET
BLACK VELVET PET
BLACK VELVET TOASTED CARAMEL
BLACK VELVET MINI
BLACK VELVET RESERVE
SOOH MACNAUGHTON CANADIAN WHISKY
MCMASTER'S CANADIAN WHISKEY
MCMASTERS CANADIAN
SERPENTS BITE APPLE CIDER

Figure 10. Heaven Hill's sales by original and acquired brands

	2019 Sales	2020 Sales	Annual Growth
Original	$ 8,933,313	$ 10,481,920	17%
Acquired	$ 2,676,785	$ 17,291,143	546%
Total	$ 11,610,098	$ 27,773,063	139%

Figure 11. Top 10 retailers by sales

2017	2018	2019	2020	2021
HY-VEE	HY-VEE	HY-VEE	HY-VEE	HY-VEE
FAREWAY	FAREWAY	FAREWAY	FAREWAY	FAREWAY
SAMS CLUB	WAL-MART	WAL-MART	WAL-MART	WAL-MART
CASEYS	SAMS CLUB	SAMS CLUB	SAMS CLUB	CENTRAL CITY LIQUOR
WAL-MART	CASEYS	CENTRAL CITY LIQUOR	CENTRAL CITY LIQUOR	SAMS CLUB
CENTRAL CITY LIQUOR	CENTRAL CITY LIQUOR	CASEYS	CASEYS	CASEYS
COSTCO WHOLESALE	COSTCO WHOLESALE	KUM & GO	KUM & GO	KUM & GO
KUM & GO	KUM & GO	COSTCO WHOLESALE	COSTCO WHOLESALE	TARGET
TARGET	TARGET	WILKIE LIQUORS	TARGET	COSTCO WHOLESALE
BENZ DISTRIBUTING	WALGREENS	LOT-A-SPIRITS	WILKIE LIQUORS	WALGREENS

Figure 12. Top 10 retailers by volume

2017	2018	2019	2020	2021
HY-VEE	HY-VEE	HY-VEE	HY-VEE	HY-VEE
FAREWAY	FAREWAY	FAREWAY	FAREWAY	FAREWAY
WAL-MART	SAMS CLUB	WAL-MART	WAL-MART	WAL-MART
SAMS CLUB	WAL-MART	SAMS CLUB	SAMS CLUB	SAMS CLUB
CASEYS	CASEYS	CASEYS	CENTRAL CITY LIQUOR	CENTRAL CITY LIQUOR
COSTCO WHOLESALE	CENTRAL CITY LIQUOR	CENTRAL CITY LIQUOR	CASEYS	CASEYS
CENTRAL CITY LIQUOR	COSTCO WHOLESALE	COSTCO WHOLESALE	KUM & GO	COSTCO WHOLESALE
KUM & GO	KUM & GO	KUM & GO	COSTCO WHOLESALE	KUM & GO
TARGET	WILKIE LIQUORS	WILKIE LIQUORS	WILKIE LIQUORS	TARGET
WILKIE LIQUORS	BENZ DISTRIBUTING	WALGREENS	WALGREENS	WALGREENS

Figure 13. Polk county total sales 2020

Figure 14. Polk county total sales 2021