Daisuke Chon
AA15388691
ECON 105
Dr. Vespa
7/31/2021

Empirical Assignment: Beer

Section 1: Data Collection

1. **Location:**

   This data was collected from my local supermarket. Specifically, it was collected from a supermarket located right next to the bustling metro station of Futako-Tamagawa in Tokyo, Japan. I believe this particular supermarket sees a greater than average volume of customers every day as it is located underground in *depachika* format, that is it is located right under a bustling shopping center that attracts shoppers from all over the city and its surrounding prefectures.

2. **Controlled Variables**

   In terms of the beers analyzed, I opted to stay as consistent as possible by only recording beers packaged individually in 350ml (11.8 oz) cans with a +- 20ml (0.68oz) room for error. Most if not all of the beers specified in the dataset were packaged in 350ml aluminum cans but some of the bottled ones fell within the range I just provided. As such, I believe we can effectively rule out differences in prices being caused by a difference in volume.

   Also, given that all data items were collected from the same supermarket, I believe we can also rule out differences in prices being caused by different vendor policies.

3. **Variables**

   I recorded 3 main variables across each beer I recorded:

   The first is price. This price is in Japanese Yen.

   The second is style. I differentiated between whether the beer was packaged in an aluminum can or in a glass bottle.

   The third is alcohol content.

   These three variables should be pretty self-explanatory but I also added a final column in my data set explaining what exactly was special (IE, a selling point) about each beer I recorded. For example, I noted whether a beer was marketed as being ‘healthy’ by not having any carb-content or whether a beer was imported. I also made sure to note what was the difference between each beer substitute listed which leads me to my last subsection.

4. **Other Specifications**

   Finally, I opted to include in the data set several beer substitutes. I believe that in Japan, a unique aspect of the local alcohol industry is that there are many beer substitutes displayed on store shelves right next to the many different beer brands and types there already are. They have the same volume, rough alcohol content, makers, price range, and even the packaging looks similar to the beer brands. The only real differences would be the general taste and alcohol base they are created from. (Beer would be based from, well beer and these substitutes would be based from shochu, vodka, or whiskey). For example, the most basic one is called a “Lemon Sour” and as the name implies, it tastes more like lemonade than alcohol sold in the same volume and alcohol content as beer. There are also different fruit flavors such as grapes, peaches, strawberries, and even one that is mixed with barley tea.

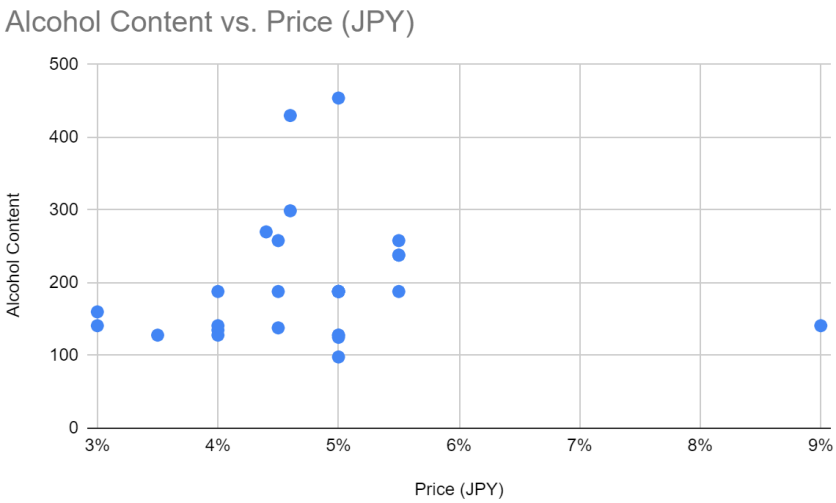
   While calling these beverages ‘beer substitutes’ admits the fact that they aren’t beers, I feel they compete in the same specific market as beer: Low price alcoholic beverages with relatively low alcohol content and high marketing differentiation efforts made through advertising and branding. As such, I felt they would also be interesting data points to include.

Section 2: Analysis

It's hard for me to say how much the retailer I collected the data from had a hand in putting their own markup on the prices I gathered. There were quite a few beverages with the exact same price with one or two outliers. However, I find it hard to believe that similar classes of beers from different makers would be priced the exact same as each other.

One thing that is noticeable is that the beer substitutes listed seem to net a lower average price and a much closer spread than the beers listed. Not only this, the supermarket I visited was well stocked with all sorts of flavors for some of the different brands of substitute.

Another observation I made was that there seems to be price differentiation based on the 'class' of beer we were talking about. For example, 'healthy' (if you can call them healthy) low/no-carbohydrate beers seem to have a much lower average price and standard deviation compared to regular beers. Imported beers were also on average more expensive compared to local ones. I believe there is also something that can be said about beers from microbreweries like the *Rydeen Beer Weizen* and the *Flying IPA* but since those were the two microbrewery-class beers I gathered, I do not think I can make any credible statistical inferences from just their data points.



Finally, as this chart will show, it's hard to say whether there is a relationship between alcohol content and price. There seems to be some outliers

Section 3: Speculation

As discussed in lecture, the beer industry in Japan in some ways seems to operate similarly to the American beer industry: Four major players competing mainly in advertisement more than prices. Foreign brands seem to have a harder time being competitive in prices which makes sense due to transportation costs and the away-from-home disadvantage that foreign brands have. I get the feeling the 'healthy'-class of beers are actually just low-quality beers made from recycled ingredients used to make the regular beers first being squeezed of the last bits of drinkable alcohol that can be squeezed out. As such, the marginal cost of production would be lower which would explain why the price of these seemingly miracle beers are so low. Regardless of process, I feel this 'healthy'-class of beers can be further specially analyzed into its own sub-market within the greater cheap low-buzz alcohol market in Japan.

In terms of the beer substitutes, I believe the tighter spread for the beer substitutes implies a harsher competition between the big beverage companies of Japan. (Kirin, Suntory, Sapporo, and Asahi) More interestingly, I believe the abundance of flavors may imply a collusive collective effort to deter entry. For example, in lecture, it was mentioned how incumbent cereal firms would deter entry by new firms by creating new flavors of cereals such that the entrants would not be able to differentiate themselves from the incumbents. In this way, I believe perhaps Kirin with its *Hyouketsu* brand and Suntory with its *buzz* or *Strong Zero* brands are deterring entry as much as possible though it seems Sapporo and Asahi were able to fill a few gaps with their *Buff Plum Sour* and *Calpico Sour* brands. The reason I speculate that this is a collusive effort is because between Kirin's *Hyouketsu* brand and Suntory's *Strong Zero* brand, there seems to be a lot of overlap in terms of what flavours they offer: putting lemon aside as that is the premise of these substitutes, namely grape, peach, pineapple, orange, and plum wine flavours are offered by both brands, almost like a signalling game to

coordinate on what flavours to dominate together to keep their market share of the more specific beer substitute market. Obviously, I haven't looked into any of the history behind the releases of these flavours so I can't say for certain whether there was a collusive signalling game but it is noticeable that the flavor-market is essentially a duopoly rather than a quadrapoly like the beers.

As a final remark, it seems microbreweries are attempting to create a new market in seemingly high quality fancy beers, IPAs, and other buzzwords that I'm not going to even begin to try to spell out. I think you can see Kirin attempt to tap into this market with their slightly higher-than-average priced IPA and white ale.

Section 4: Data

All data can be accessed in this link:
https://docs.google.com/spreadsheets/d/17GR36v8Uw4lpKyJhZSkdDOU-H5alU91qKQkCqD-BL6Y/edit?usp=sharing

It is also shared as a PDF just in case it cannot be accessed.

Beer Name	Price (JPY)	Style	Alcohol Content	Differentiation Point (where Applicable)
Sapporo 麦とホップ (Wheat and Hops)	128	Aluminum Can	5%	
Asahi Super Dry	188	Aluminum Can	5%	Has a very clear bitter taste. My personal favorite.
Asahi Super Dry 瞬冷辛口	188	Aluminum Can	5.50%	Supposedly feels cold when you drink it
Sapporo Black Label	188	Aluminum Can	5%	
Kirin 一番搾り	188	Aluminum Can	5%	Always produced using fresh wheat and hops
Kirin 一番搾り糖質ゼロ	188	Aluminum Can	4%	Like the above but apparantly has no carbs so its supposedly healthier
Kirin Lager	188	Aluminum Can	5%	A Lager beer
Kirin Classic Lager	188	Aluminum Can	4.50%	Like the above but uses an older formula probably
Echigo Flying IPA	258	Aluminum Can	5.50%	An IPA from Japan's first microbrewery
Asahi Orion Draft Beer	188	Aluminum Can	5%	A draft beer that originated from the tropical Okinawa
Kirin Grand Kirin IPA	238	Aluminum Can	5.50%	Supposedly Kirin's more high quality brand of beer
Kirin Grand Kirin White Ale	238	Aluminum Can	5.50%	Supposedly Kirin's more high quality brand of beer
Asahi Style Free	135	Aluminum Can	4.00%	Has no carbohydrates inside so its supposedly healthier
Kirin Green Label	138	Aluminum Can	4.50%	Carbs are cut down by 70% so its supposedly healthier
Asahi Off	128	Aluminum Can	3.50%	Zero carbs, zero artificial flavors, zero purine
Suntory 金麦　糖質75%OFF	128	Aluminum Can	4%	Carbs are cut down by 75% so it's supposed to be healthier
Kirin のどごし＜生＞	128	Aluminum Can	5%	Pretty standard beer tbh
Asahi Clear	125	Aluminum Can	5%	Thinner taste than Asahi's Superdry brand
Rydeen Beer Weizen	454	Glass Bottle	5%	Made from a microbrewery using water from some special source. Apparantly has a fruity taste
Pilsner Urqell	270	Typical Can	4.40%	An import from Czechia
Guiness Draft	258	Typical Can	4.50%	Your classic Irish Guiness
Longboard Island Lager	430	Glass Bottle	4.60%	That nice beer they have over at Hawaii
Corona Extra	299	Glass Bottle	4.60%	Not to be mistaken for the virus
Kirin 氷結レモン (Hyouketsu Lemon)	98	Aluminum Can	5%	A lemon sour that competes in the same market as beer. Also comes in the following flavors: Grapefruit, Lime, Peach, Grape, Pineapple, Mandarin
Suntory ほろよい (buzz)	141	Aluminum Can	3%	A spirit that competes in the same market as beer. Comes in the following tastes: Grape, Peach, Honey Lemon, Iced Tea, and Yogurt
Sapporo 男梅サワー (Buff Plum Sour)	188	Aluminum Can	5%	A very sour beer substitute. Uses salted plums as its taste base.
Suntory Strong Zero	141	Aluminum Can	9%	Its a lemon sour but stronger. Comes with the following flavors: Lemon, Orange, Pineapple, Grape, Peach, and Plum Wine
Suntory Oolong High	141	Aluminum Can	4%	It's alcohol mixed with barley tea. For the traditionalist that doesn't like the taste of alcohol.
Asahi Calpico Sour	160	Aluminum Can	3%	It's alcohol mixed with Calipico if you know what that is. Kinda like if you mixed shochu with Kool-aid or a Caprisun.

Data Analysis of both beers and substitutes	
Mean	197.5172414
Median	188
Minimum Price	98
Maximum Price	454
Standard Deviation	84.45777503

Data Analysis of just the Beers	
Mean	211.2608696
Median	188
Minimum Price	125
Maximum Price	454
Standard Deviation	89.03483353

Data Analysis of just the substitutes	
Mean	144.8333333

Legend	
	Local, Regular Beers
	Low/No Carbohydrate 'Healthy' Beers
	Imported Beers
	Beer Substitutes

Median	141
Minimum Price	98
Maximum Price	188
Standard Deviation	29.43070958

Data Analysis of Regular Beers

Mean	230.1111111
Median	188
Minimum Price	125
Maximum Price	454
Standard Deviation	91.52748792

Data Analysis of Low/No Carb Beers

Mean	143.4
Median	135
Minimum Price	128
Maximum Price	188
Standard Deviation	25.31402773

Data Analysis of Imported Beers

Mean	314.25
Median	284.5
Minimum Price	258
Maximum Price	430
Standard Deviation	79.0627388

Data Analysis of Local Beers

Mean	189.5789474
Median	188
Minimum Price	125
Maximum Price	454
Standard Deviation	76.11636982