



Competitor Spend Predictive Modeling

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AGENDA

- Executive Summary
- Business Problem
- Project Objectives & Goals
- Background Research
- EDA & Findings
- Proposal & Challenges
- Success Criteria
- Q&A



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EXECUTIVE SUMMARY

- We conducted a thorough business understanding and came across with an appreciation for market side.
- We conducted a thorough EDA and produced:
 - Aggregated box-plot for all competitors which gives us a high level view of the data.
 - Drilled down into 3 brands that have all 79 data points.
 - Created 12 time series graphs cut in various ways.
 - Top 3 breweries constantly invested in TV advertisement.
 - The advertisement spend pattern is similar per beer type in different companies.
 - Created trending view by grouping into 2 year increment.
 - Upward trending brands appear in a certain cycle.
- We developed a plan on multiple approaches to the predictive model and identified the challenges.

BUSINESS PROBLEM

- AB InBev turns to GRP to measure their impact on Total Addressable Markets.
- Share of Voice is a metric used to estimate the percentage of spend or advertising impact. AB InBev's media team uses a fixed budget to achieve SoV goals.
- The assumption is that competitors also manage a portfolio with a fixed pool of money. Any shift in one brand's GRP must be offset by a peer brand's GRP.



“

*Utilize Predictive Analytics to
build a predictive model that
would forecast competitors
GRPs with 1 year time horizon.*



BACKGROUND - MARKET & CUSTOMER SEGMENTS

| GEOGRAPHIC | DEMOGRAPHIC | PSYCHOGRAPHIC | BEHAVIORAL |
|--|--|---|--|
| <ul style="list-style-type: none"> ● International Operations > Nearly in 50 nations | <ul style="list-style-type: none"> ● All adult group ● Most consumption: > 21 - 27 age group ● Drinker Gender ratio: > 7:3 Men to Women ● High income not required | <ul style="list-style-type: none"> ● Trends and Demand <ul style="list-style-type: none"> > Special beers (Bud Ice & Bud Ice Light) > Manageable pack size (Smaller bottles 25cl) > Increased awareness of alcohol's negative impact | <ul style="list-style-type: none"> ● Mostly drink with others ● Key occasions: Meals, parties, leisure ● Most preferred alcohol drinks among Americans |

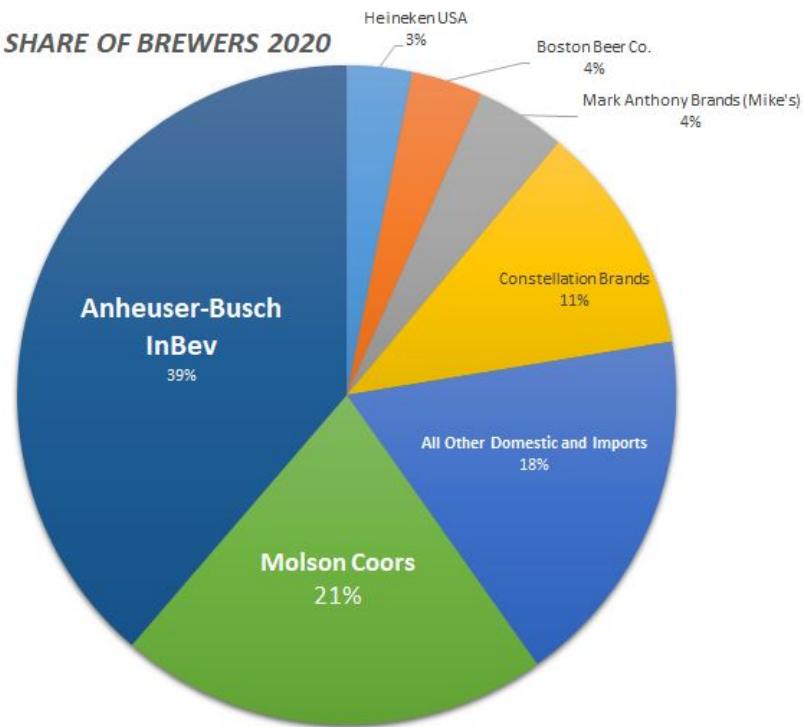


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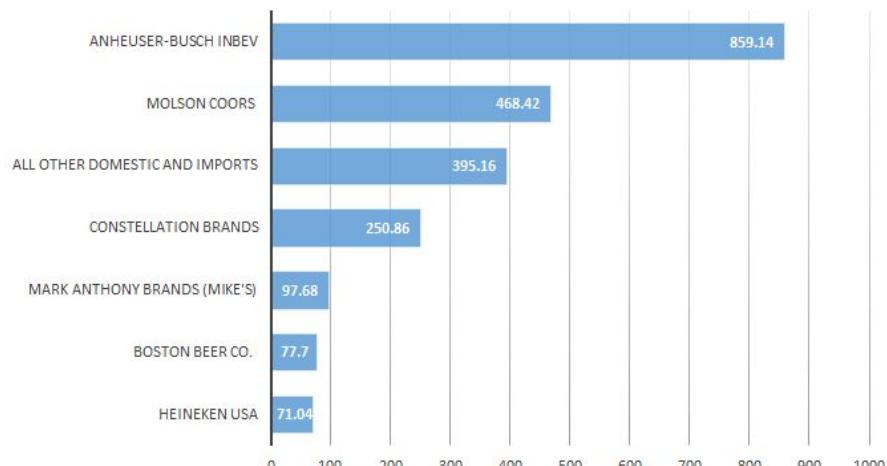
Business Understanding

BACKGROUND - COMPETITOR ANALYSIS

MARKET SHARE OF BREWERS 2020



Total Craft Beer Sales 2020 (in million)



GRP DATA OVERVIEW

| Date | AMSTEL BEER | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER | ANHEUSER-BUSCH BEER | ATHLETIC BREWING BEER | BALLAST POINT BREWING CO BEER | BEST DAMN SODA | BLUE MOON BEER | BON VIV Seltzer | BUD LIGHT BEER |
|------|-------------|--|---------------------|-----------------------|-------------------------------|----------------|----------------|-----------------|----------------|
| 0 | 2015-01-01 | NaN | 106.12 | NaN | NaN | NaN | NaN | 0.81 | NaN 323.45 |
| 1 | 2015-02-01 | NaN | 52.81 | 0.42 | NaN | NaN | NaN | 1.10 | NaN 118.25 |
| 2 | 2015-03-01 | NaN | 57.90 | NaN | NaN | NaN | NaN | 125.26 | NaN 368.93 |
| 3 | 2015-04-01 | NaN | 44.74 | 0.90 | NaN | NaN | NaN | 137.76 | NaN 266.26 |
| 4 | 2015-05-01 | NaN | 68.78 | 21.02 | NaN | NaN | NaN | 92.34 | NaN 806.58 |

| AMSTEL BEER | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER | ANHEUSER-BUSCH BEER | ATHLETIC BREWING BEER | BALLAST POINT BREWING CO BEER | BEST DAMN SODA | BLUE MOON BEER | BON VIV Seltzer | BUD LIGHT BEER |
|-------------|--|---------------------|-----------------------|-------------------------------|----------------|----------------|-----------------|----------------|
| count | 2.000000 | 60.000000 | 9.000000 | 1.00 | 1.00 | 1.0 | 75.000000 | 16.000000 |
| mean | 2.415000 | 72.432500 | 26.818889 | 0.97 | 16.82 | 38.8 | 109.048933 | 51.401875 |
| std | 1.718269 | 42.901036 | 26.161892 | NaN | NaN | NaN | 78.318894 | 32.302987 |
| min | 1.200000 | 8.390000 | 0.150000 | 0.97 | 16.82 | 38.8 | 0.040000 | 1.260000 |
| 25% | 1.807500 | 46.180000 | 0.900000 | 0.97 | 16.82 | 38.8 | 49.670000 | 29.372500 |
| 50% | 2.415000 | 61.110000 | 21.020000 | 0.97 | 16.82 | 38.8 | 105.610000 | 53.950000 |
| 75% | 3.022500 | 92.282500 | 35.890000 | 0.97 | 16.82 | 38.8 | 147.270000 | 73.837500 |
| max | 3.630000 | 272.390000 | 69.660000 | 0.97 | 16.82 | 38.8 | 339.870000 | 102.580000 |
| | | | | | | | | 861.340000 |



Rows - 79

Columns - 102

Data Types – Date, Float64

Null Values ~ 30%

Duplicated Values - zero



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Data Understanding

BRANDS - INTERNAL VS EXTERNAL



Number of rows: 79
 Number of columns: 45
 File size in bytes: 3555

| Date | ANHEUSER-BUSCH BEER | BEST DAMN SODA | BON VIV SPIKED SELTZER | BUD LIGHT BEER | BUD LIGHT BEER CHELADA | BUD LIGHT BEER LIME | BUD LIGHT LAR FAMILY | BUD LIGHT LEMONADE | BUD LIGHT SELTZER | ... PRESIDENTE BEER | REDDS APPLE ALE | REDDS APPLE BEER | RITAS FAMILY | SHOCK TOP BEER |
|--------------|---------------------|----------------|------------------------|----------------|------------------------|---------------------|----------------------|--------------------|-------------------|---------------------|-----------------|------------------|--------------|----------------|
| 0 2015-01-01 | NaN | NaN | NaN | 323.45 | NaN | NaN | NaN | NaN | ... | NaN | 13.57 | NaN | NaN | NaN |
| 1 2015-02-01 | 0.42 | NaN | NaN | 118.25 | NaN | NaN | NaN | NaN | ... | NaN | 7.88 | NaN | NaN | NaN |
| 2 2015-03-01 | NaN | NaN | NaN | 368.93 | NaN | NaN | NaN | NaN | ... | NaN | 422.18 | NaN | 30.90 | NaN |
| 3 2015-04-01 | 0.90 | NaN | NaN | 266.26 | NaN | NaN | NaN | NaN | ... | NaN | 185.13 | NaN | 140.78 | NaN |
| 4 2015-05-01 | 21.02 | NaN | NaN | 806.58 | NaN | NaN | NaN | NaN | ... | NaN | 149.91 | NaN | 154.37 | NaN |

5 rows × 45 columns



Number of rows: 79
 Number of columns: 58
 File size in bytes: 4582

| Date | AMSTEL BEER | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER | ATHLETIC BREWING BEER | BALLAST POINT BREWING CO BEER | BLUE MOON BEER | CAPE LINE BEVERAGES-ALCOHOLIC | CERVEZA SOL | COORS BREWING BEER | COORS HARD SELTZER | ... SMITH & FORGE BEVERAGES-ALCOHOLIC HARD CIDER | STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER | TECATE BEER | |
|--------------|-------------|--|-----------------------|-------------------------------|----------------|-------------------------------|-------------|--------------------|--------------------|--|--|-------------|------|
| 0 2015-01-01 | NaN | 106.12 | NaN | NaN | 0.81 | NaN | NaN | 0.54 | NaN | ... | 2.71 | 101.57 | 1.24 |
| 1 2015-02-01 | NaN | 52.81 | NaN | NaN | 1.10 | NaN | NaN | 134.31 | NaN | ... | NaN | 93.78 | 1.39 |
| 2 2015-03-01 | NaN | 57.90 | NaN | NaN | 125.26 | NaN | NaN | 71.06 | NaN | ... | 158.00 | 234.00 | 1.47 |
| 3 2015-04-01 | NaN | 44.74 | NaN | NaN | 137.76 | NaN | NaN | 27.37 | NaN | ... | 113.50 | 95.34 | 0.00 |
| 4 2015-05-01 | NaN | 68.78 | NaN | NaN | 92.34 | NaN | NaN | 70.95 | NaN | ... | 146.86 | 151.82 | NaN |

5 rows × 58 columns

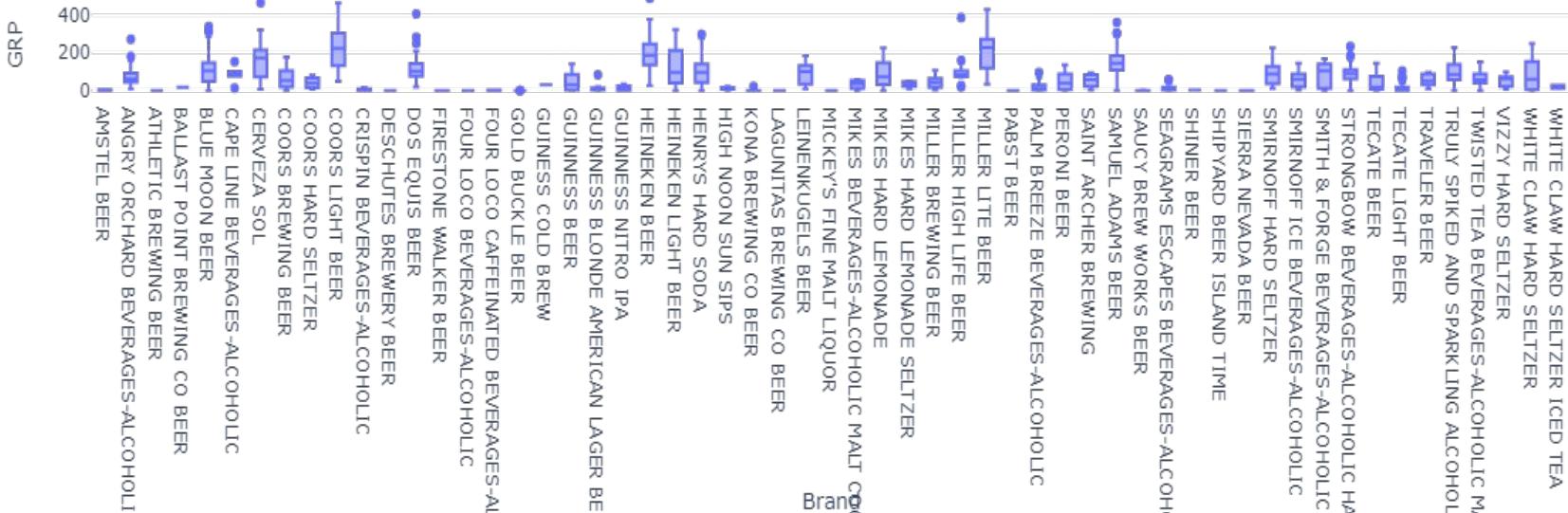


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Data Understanding

DATA ANALYSIS - BOX PLOT DISTRIBUTION

GRP Spend by Beverage Brand



Wide GRP distribution brands are Coors Light Beer, Miller Lite Beer, and Heineken Beer. It can be observed there are outliers for Cerveza Sol, Dos Equis Beer, Samuel Adams Beer but median is highest for Miller lite beer.

TOP 3 COMPETITIVE PRODUCTS

(highest GRP on avg.)

| Coors Light Beer | | | | | | |
|------------------|------|-------|------------------|-------|--------|-------|
| Calories | ABV | Carbs | Price for 6-pack | GRP | | |
| 102 | 4.2% | 5g | \$7.48 | mean | max | count |
| | | | | 225.4 | 463.42 | 79 |



- Lower calories
- Lower carbs
- Belongs to strong brands

| Miller Lite Beer | | | | | | |
|------------------|------|-------|------------------|--------|--------|-------|
| Calories | ABV | Carbs | Price for 6-pack | GRP | | |
| 96 | 4.2% | 3.2g | 7.48 | mean | max | count |
| | | | | 213.04 | 430.38 | 79 |



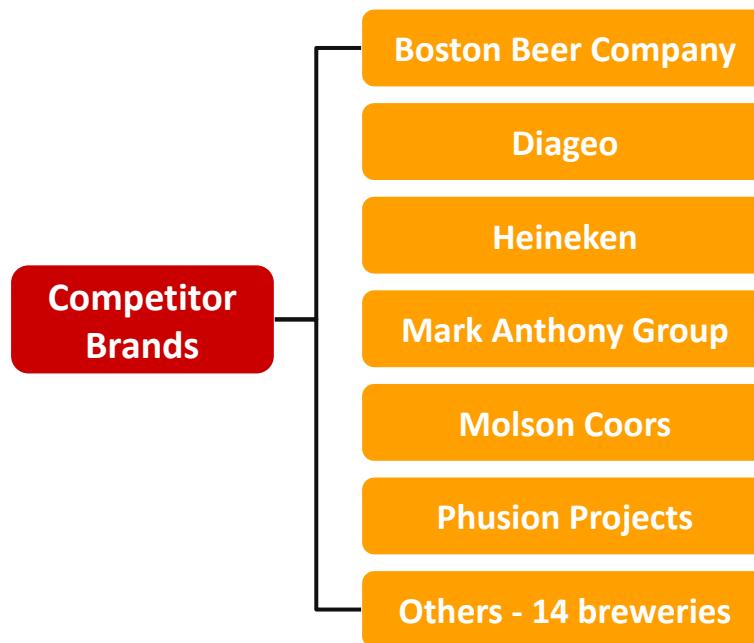
HEALTH / WELLNESS
MINDFUL DRINKING

| Heineken Beer | | | | | | |
|---------------|------|-------|------------------|--------|--------|-------|
| Calories | ABV | Carbs | Price for 6-pack | GRP | | |
| 149 | 0.05 | 11 g | Around \$9 | mean | max | count |
| | | | | 190.63 | 489.78 | 79 |

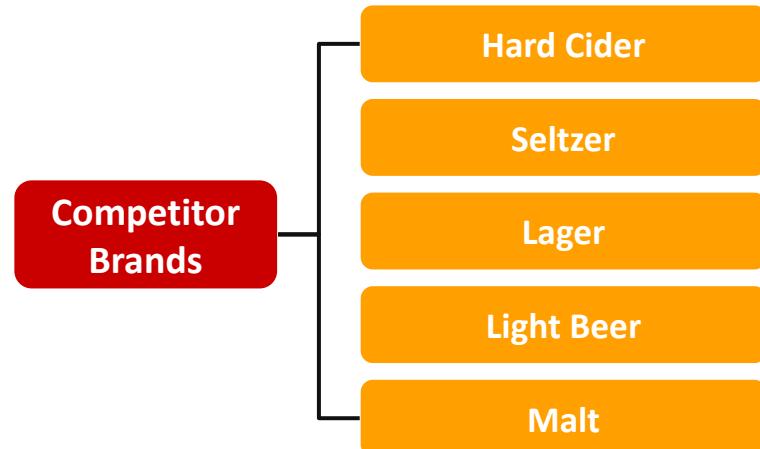


TIME SERIES

BREWERY (7 categories)



BEER TYPE (5 categories)



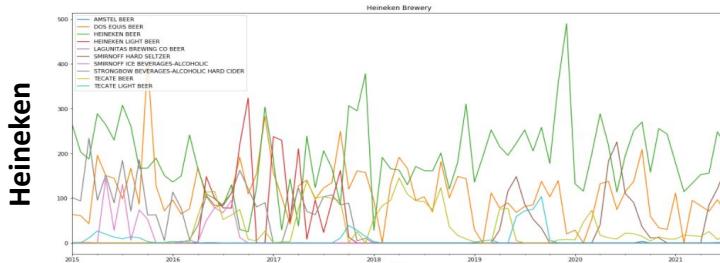


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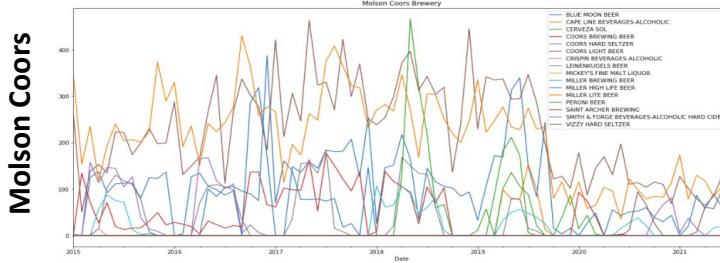
Data Understanding

TIME SERIES - TOP 3 BREWERY

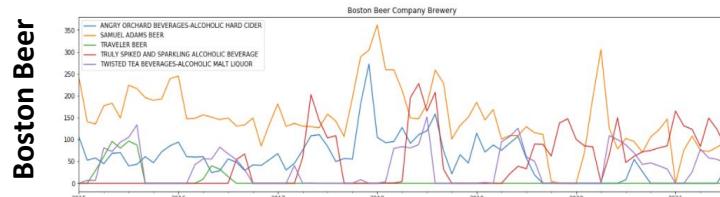
(most complete data - 79 data points)



- Founded in 1864
- \$404 million ad spend (2019)
 - sport/community focus
- Owns 12% of Beer Market Share



- Founded in 2005 (Molson + Coors merged)
- Focus on younger customers



- Founded in 1984
- Craft beer with massive scale in marketing/distribution

THE BOSTON BEER
COMPANY INC.

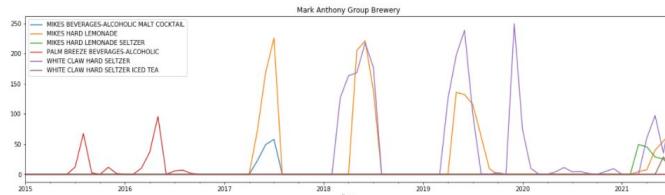


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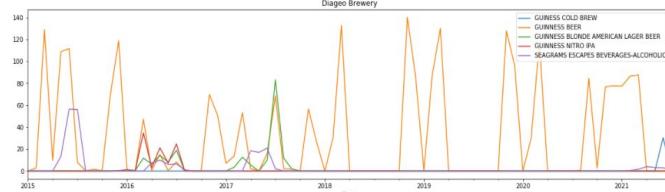
Data Understanding

TIME SERIES - BREWERY

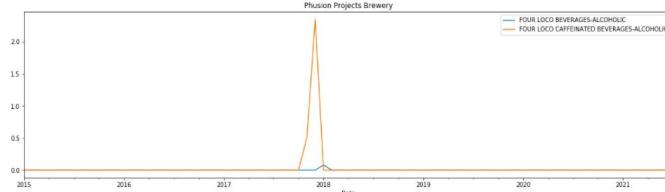
Mark Anthony Group



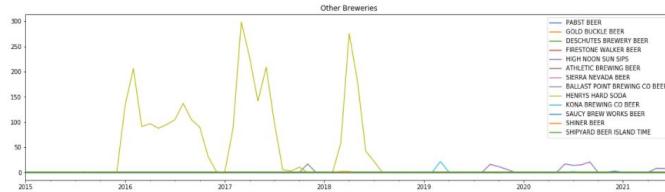
Diageo



Phusion Projects



Other



- Founded in 1981



MARK ANTHONY GROUP INC.
We Build Distinctive Brands

DIAGEO

- Founded in 1997



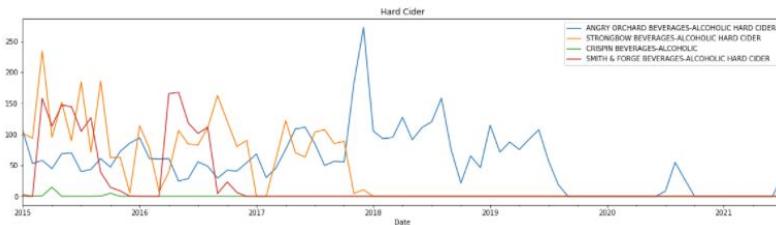
PHUSION PROJECTS[®]
GLOBAL INNOVATIVE ALCOHOL COMPANY

- Founded in 2005

- Includes a total of 14 breweries with 1 brand

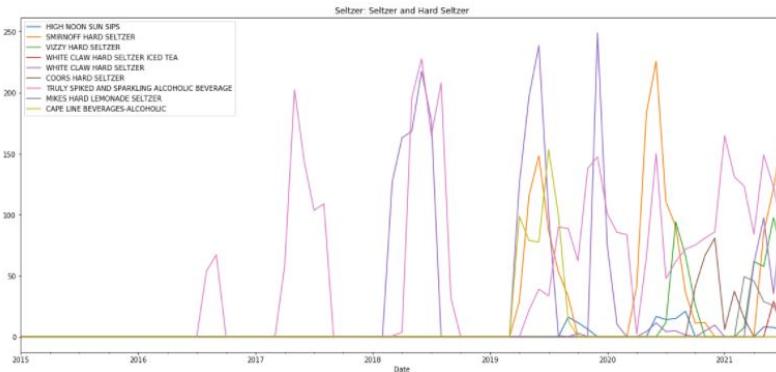
TIME SERIES - TYPE

Hard Cider



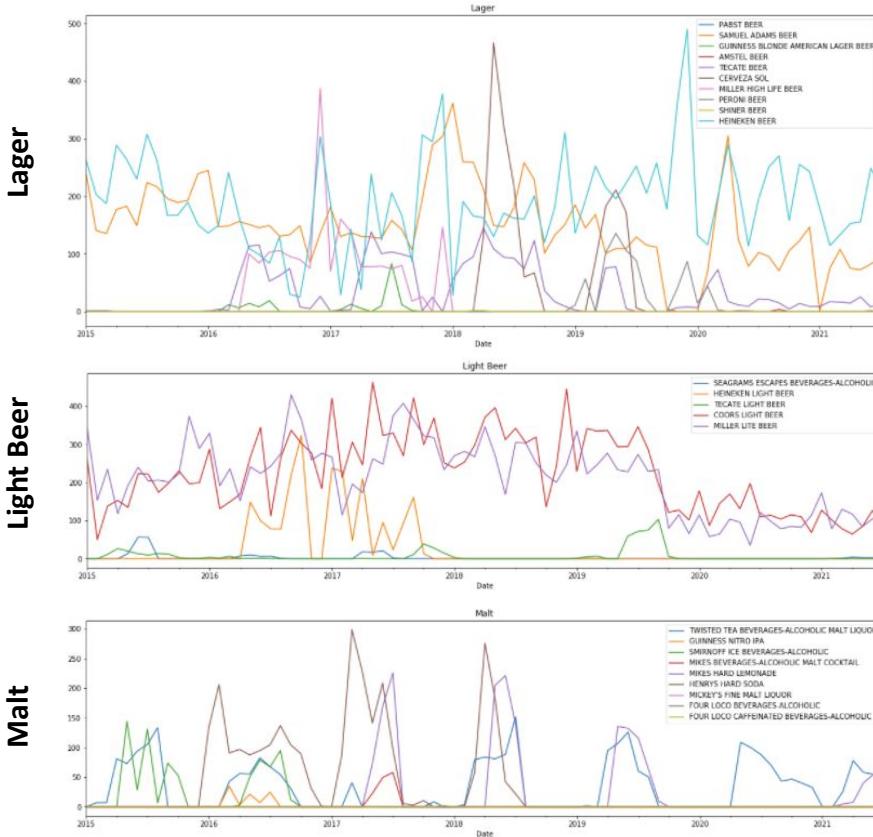
- Decreasing GRP
- Increasing popularity
- Remains a “niche market”
 - gluten-free
 - low alcohol content

Seltzer



- Includes Hard Seltzers & Seltzers
- Increasing GRP
- Became popular with consumers shift into mindful drinking
- Increase on advertisement matches well-being trendline

TIME SERIES - TYPE



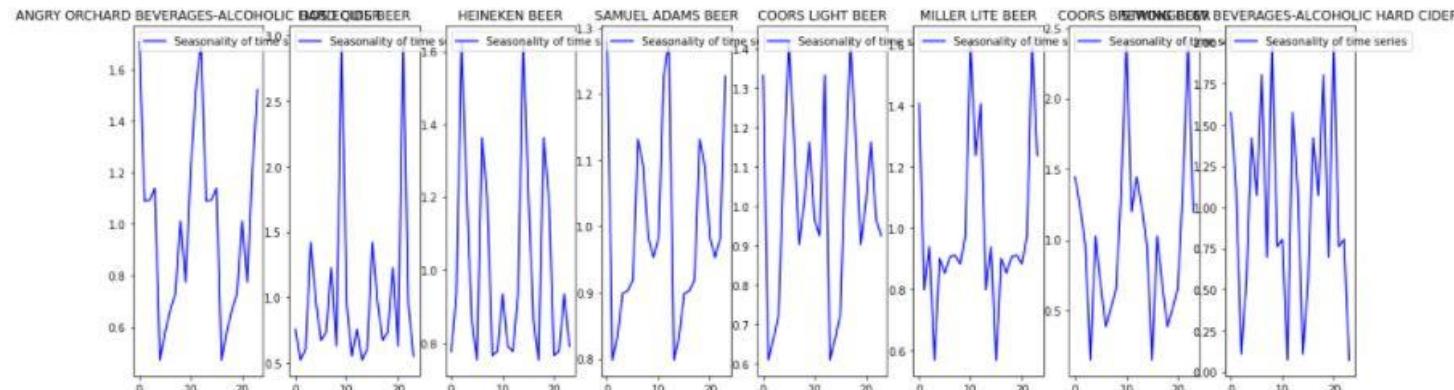
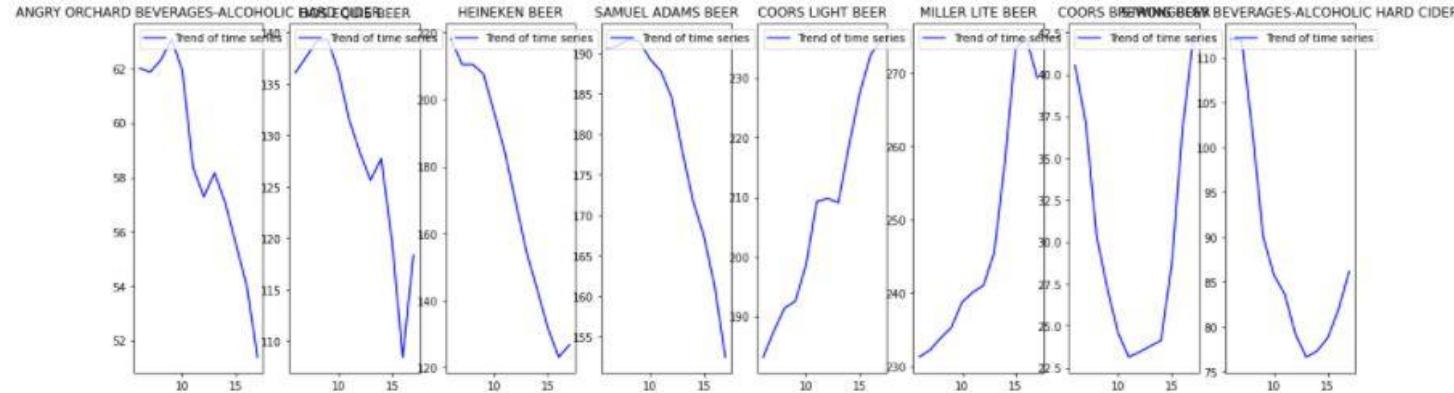
- **Steady pattern**
 - **Constant GRP recorded**
 - **Oldest brewing type**
-
- **Steady pattern until decrease since last year**
-
- **Seasonality pattern**
 - **Acquiring massive appeal**
 - novel beverages - alcohol/beer alternatives



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Data Understanding

TRENDS - January 2015~ December 2016

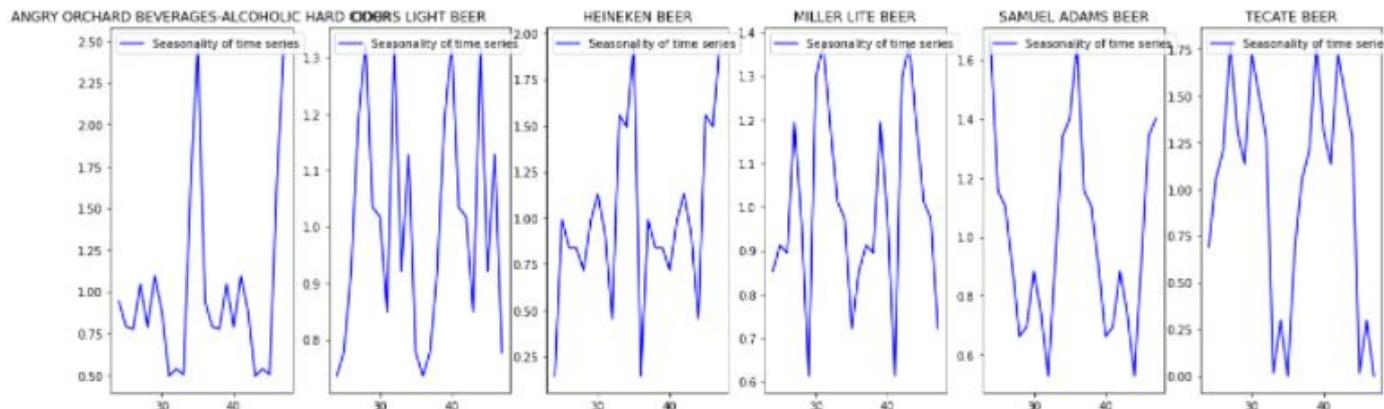
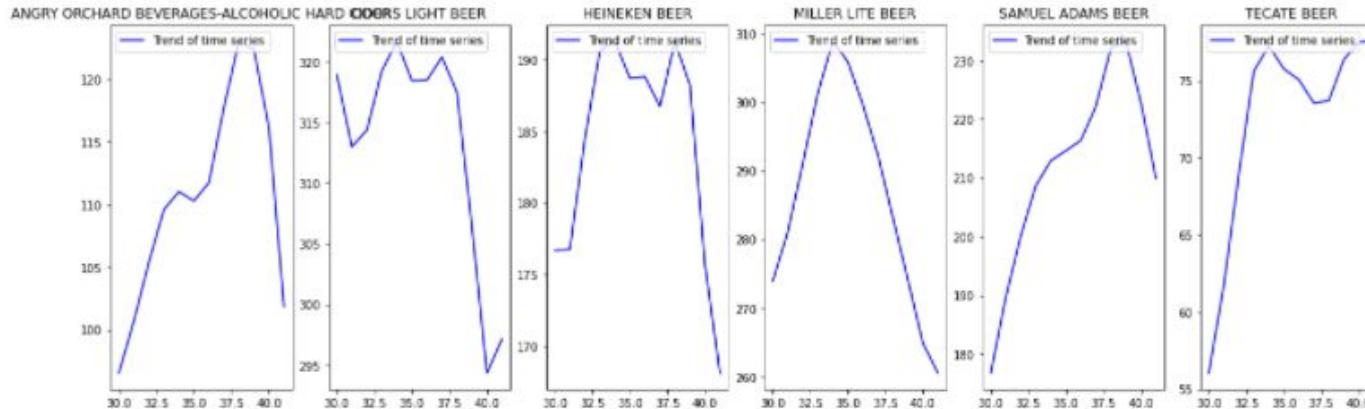




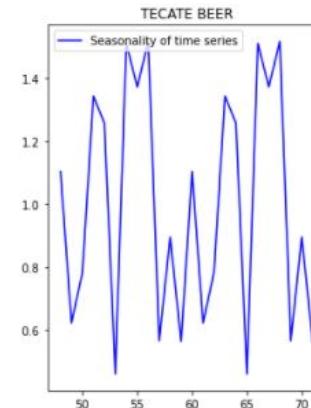
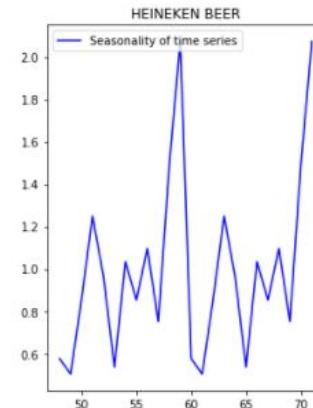
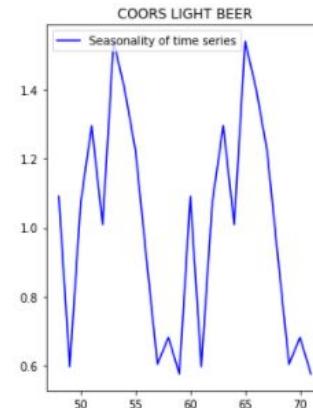
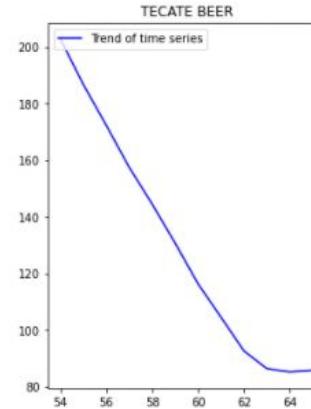
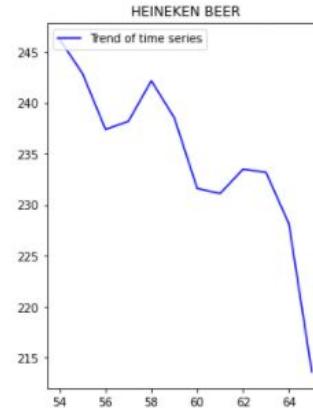
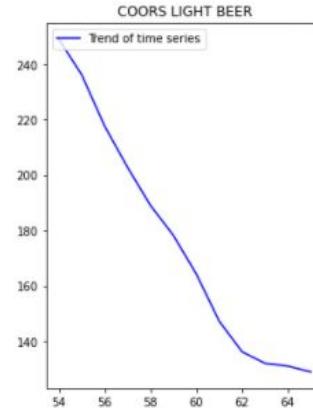
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Data Understanding

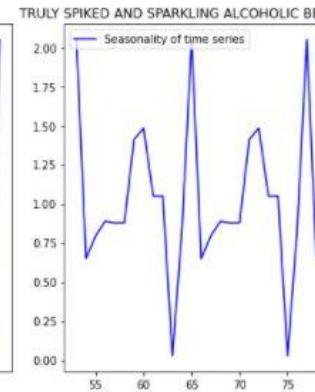
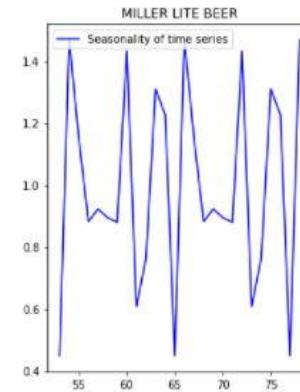
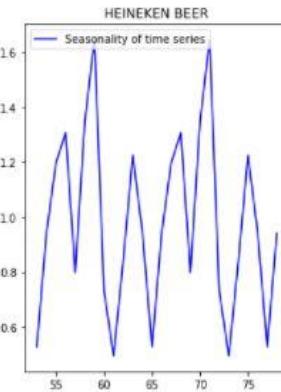
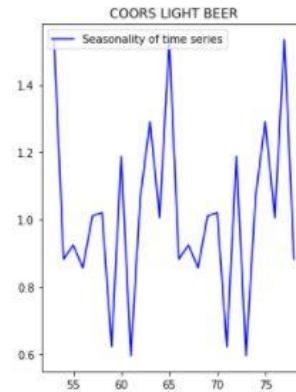
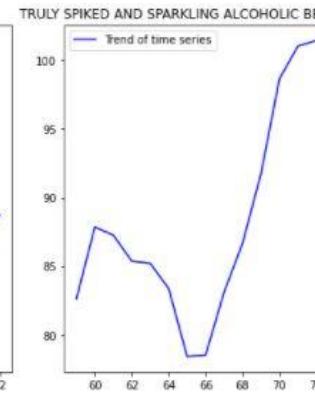
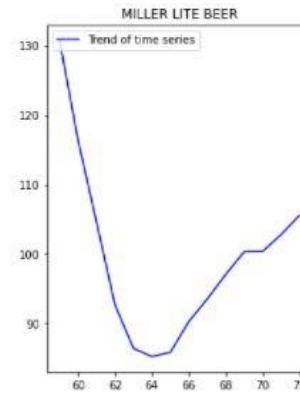
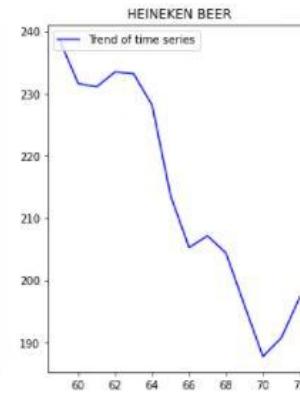
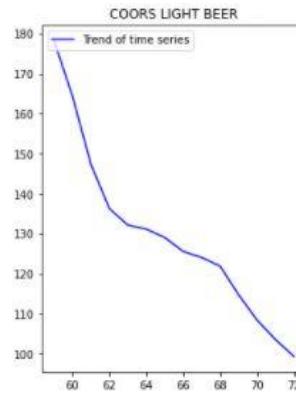
TRENDS - January 2017~ December 2018



TRENDS - January 2019~ December 2020



TRENDS - June 2019~ July 2021





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Data Understanding

TRENDS OVERVIEW

| 2015_16 | | | |
|---|---|--|---|
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| COORS LIGHT BEER (Molson Coors/Light Beer) | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER (Boston Beer Company/Hard Cider) | COORS BREWING BEER (Molson Coors) | LEINENKUGELS BEER (Molson Coors/Lager) |
| MILLER LITE BEER (Molson Coors/Light beer) | DOS EQUIS BEER (Heineken/Lager) | STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER (Heineken/Hard Cider) | PALM BREEZE BEVERAGES-ALCOHOLIC (Mark Anthony Group/Light Beer) |
| TECATE BEER (Heineken/Lager) | HEINEKEN BEER (Heineken/Lager) | | |
| BLUE MOON BEER (Molson Coors/Ale) | SAMUEL ADAMS BEER (Boston Beer Company/Lager) | | |
| GUINNESS BLONDE AMERICAN LAGER BEER (Diageo/Lager) | CRISPIN BEVERAGES-ALCOHOLIC (Molson Coors/Hard Cider) | | |
| GUINNESS NITRO IPA (Diageo/Malt) | GUINNESS BEER (Diageo/Beer) | | |
| HEINEKEN LIGHT BEER (Heineken/Light Beer) | MILLER BREWING BEER (Molson Coors/Beer) | | |
| HENRYS HARD SODA (MillerCoors/Malt) | SEAGRAMS ESCAPES BEVERAGES-ALCOHOLIC (Diageo/Light Beer) | | |
| MILLER HIGH LIFE BEER (Molson Coors/Lager) | SIERRA NEVADA BEER (Ken Grossman/Beer) | | |
| TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) | SMIRNOFF ICE BEVERAGES-ALCOHOLIC (Heineken/Malt) | | |
| | SMITH & FORGE BEVERAGES-ALCOHOLIC HARD CIDER (Molson Coors/Hard Cider) | | |
| | TECATE LIGHT BEER (Heineken/Light Beer) | | |
| | TRAVELER BEER (Boston Beer Company/Wheat Ale) | | |
| | TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) | | |
| 2017_18 | | | |
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| TECATE BEER (Heineken/Lager) | COORS LIGHT BEER (Molson Coors/Light Beer) | LEINENKUGELS BEER (Molson Coors/Lager) | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER (Boston Beer Company/Hard Cider) |
| MILLER BREWING BEER (Molson Coors/Beer) | COORS BREWING BEER (Molson Coors) | | HEINEKEN BEER (Heineken/Lager) |
| TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) | STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER (Heineken/Hard Cider) | | MILLER LITE BEER (Molson Coors/Light beer) |
| TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) | GUINNESS BLONDE AMERICAN LAGER BEER (Diageo/Lager) | | DOS EQUIS BEER (Heineken/Lager) |
| | HEINEKEN LIGHT BEER (Heineken/Light Beer) | | SAMUEL ADAMS BEER (Boston Beer Company/Lager) |
| | HENRYS HARD SODA (Others/Malt) | | BLUE MOON BEER (Molson Coors/Ale) |
| | MILLER HIGH LIFE BEER (Molson Coors/Lager) | | |
| | TECATE LIGHT BEER (Heineken/Light Beer) | | |
| | SEAGRAMS ESCAPES BEVERAGES-ALCOHOLIC (Diageo/Light Beer) | | |

Red: Full data points / Black: With missing data points

TRENDS OVERVIEW

| 2019_20 | | | |
|---|---|--|---|
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| SAMUEL ADAMS BEER (Boston Beer Company/Lager) | COORS LIGHT BEER (Molson Coors/Light Beer) | TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) | DOS EQUIS BEER (Heineken/Lager) |
| | HEINEKEN BEER (Heineken/Lager) | | TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) |
| | TECATE LIGHT BEER (Heineken/Light Beer) | | |
| | BLUE MOON BEER (Molson Coors/Ale) | | |
| | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER (Boston Beer Company/Hard Cider) | | |
| | MILLER LITE BEER (Molson Coors/Light beer) | | |
| | LEINENKUGELS BEER (Molson Coors/Lager) | | |
| | MILLER BREWING BEER (Molson Coors/Beer) | | |
| 2019.6_21.7 | | | |
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) | COORS LIGHT BEER (Molson Coors/Light Beer) | MILLER LITE BEER (Molson Coors/Light beer) | SAMUEL ADAMS BEER (Boston Beer Company/Lager) |
| GUINNESS BEER (Diageo/Ale) | HEINEKEN BEER (Heineken/Lager) | BLUE MOON BEER (Molson Coors/Ale) | TECATE BEER (Heineken/Lager) |
| SEAGRAMS ESCAPES BEVERAGES-ALCOHOLIC (Diageo/Light Bee | LEINENKUGELS BEER (Molson Coors/Lager) | MILLER BREWING BEER (Molson Coors/Beer) | TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) |
| SIERRA NEVADA BEER (Ken Grossman/Beer) | TECATE LIGHT BEER (Heineken/Light Beer) | | |

Red: Full data points / Black: With missing data points

TRENDS OVERVIEW

| 2015_16 | | | |
|---|---|--|---|
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| COORS LIGHT BEER (Molson Coors/Light Beer) | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER (Boston Beer Company/Hard Cider) | COORS BREWING BEER (Molson Coors) | LEINENKUGELS BEER (Molson Coors/Lager) |
| MILLER LITE BEER (Molson Coors/Light beer) | DOS EQUIS BEER (Heineken/Lager) | STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER (Heineken/Hard Cider) | PALM BREEZE BEVERAGES-ALCOHOLIC (Mark Anthony Group/Light Beer) |
| TECATE BEER (Heineken/Lager) | HEINEKEN BEER (Heineken/Lager) | | |
| | SAMUEL ADAMS BEER (Boston Beer Company/Lager) | | |
| 2017_18 | | | |
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| TECATE BEER (Heineken/Lager) | COORS LIGHT BEER (Molson Coors/Light Beer) | LEINENKUGELS BEER (Molson Coors/Lager) | ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER (Boston Beer Company/Hard Cider) |
| | COORS BREWING BEER (Molson Coors) | | HEINEKEN BEER (Heineken/Lager) |
| | BLUE MOON BEER (Molson Coors/Ale) | | MILLER LITE BEER (Molson Coors/Light beer) |
| | HENRYS HARD SODA (Others/Malt) | | DOS EQUIS BEER (Heineken/Lager) |
| 2019_20 | | | |
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| SAMUEL ADAMS BEER (Boston Beer Company/Lager) | COORS LIGHT BEER (Molson Coors/Light Beer) | TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) | DOS EQUIS BEER (Heineken/Lager) |
| TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) | HEINEKEN BEER (Heineken/Lager) | | TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) |
| | TECATE LIGHT BEER (Heineken/Light Beer) | | |
| | BLUE MOON BEER (Molson Coors/Ale) | | |
| | MILLER LITE BEER (Molson Coors/Light beer) | | |
| 2019.6_21.7 | | | |
| Upward Trending | Downward Trending | Down->Up | Up->Down |
| TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE (Boston Beer Company/Seltzer) | COORS LIGHT BEER (Molson Coors/Light Beer) | MILLER LITE BEER (Molson Coors/Light beer) | SAMUEL ADAMS BEER (Boston Beer Company/Lager) |
| GUINNESS BEER (Diageo/Ale) | HEINEKEN BEER (Heineken/Lager) | BLUE MOON BEER (Molson Coors/Ale) | TECATE BEER (Heineken/Lager) |
| | | | TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR (Boston Beer Company/Malt) |

Red: Full data points / Black: With missing data points

SUMMARY ON FINDINGS

- Group by Brewery
 - Top 3 breweries: Heineken, Molson Coors, and Boston Beer Company
- Group by Beer Type
 - Hard cider, Seltzer, Lager, Light beer, and Malt
- Group by every 2-Years
 - Trends: upward, downward, down->up, and up->down

PROPOSAL & CHALLENGES - PREDICTIVE MODELING

Plan 1

Create predictive models of the Top 3 Brands with all 79 data points

- Higher confidence with full data points

Plan 2

Create a model based on Seltzer with 2 years worth of data and possible pattern for new product introduction

Plan 3

Create a predictive modeling with specific patterns based on company's behavior

Plan 4

Identify outliers based on quarters (high and low)

Challenges

- Null values can limit the data's ability to be analysed and modelled for classification and forecasting tasks .
- Imputing values would disregard important temporal information.
- Conventional methods used for handling time series data introduce bias and make strong assumptions on the underlying data generation process, which can lead to poor model predictions.

SUCCESS CRITERIA

TECHNICAL SIDE

- Achieve highest accuracy possible on one-year GRP predictions from our predictive model
- Deliver 3 predictive models with an explicit statement of confidence

BUSINESS SIDE

- Observe any unusual trends in GRP to help pinpoint new trends
- Provide AB InBev with valuable competitive intelligence that could allow for more precise planning

REFERENCE

- <https://www.winemag.com/2019/09/20/rise-of-hard-seltzer/>
- <https://www.statista.com/>
- <https://en.wikipedia.org/>
- <https://www.delish.com/kitchen-tools/cookware-reviews/g33263238/hard-seltzers/>
- <https://vtdigger.org/2021/03/17/makers-of-popular-woodchuck-hard-cider-sold-at-93-loss/>
- <https://www.alliedmarketresearch.com/light-beer-market-A07574>

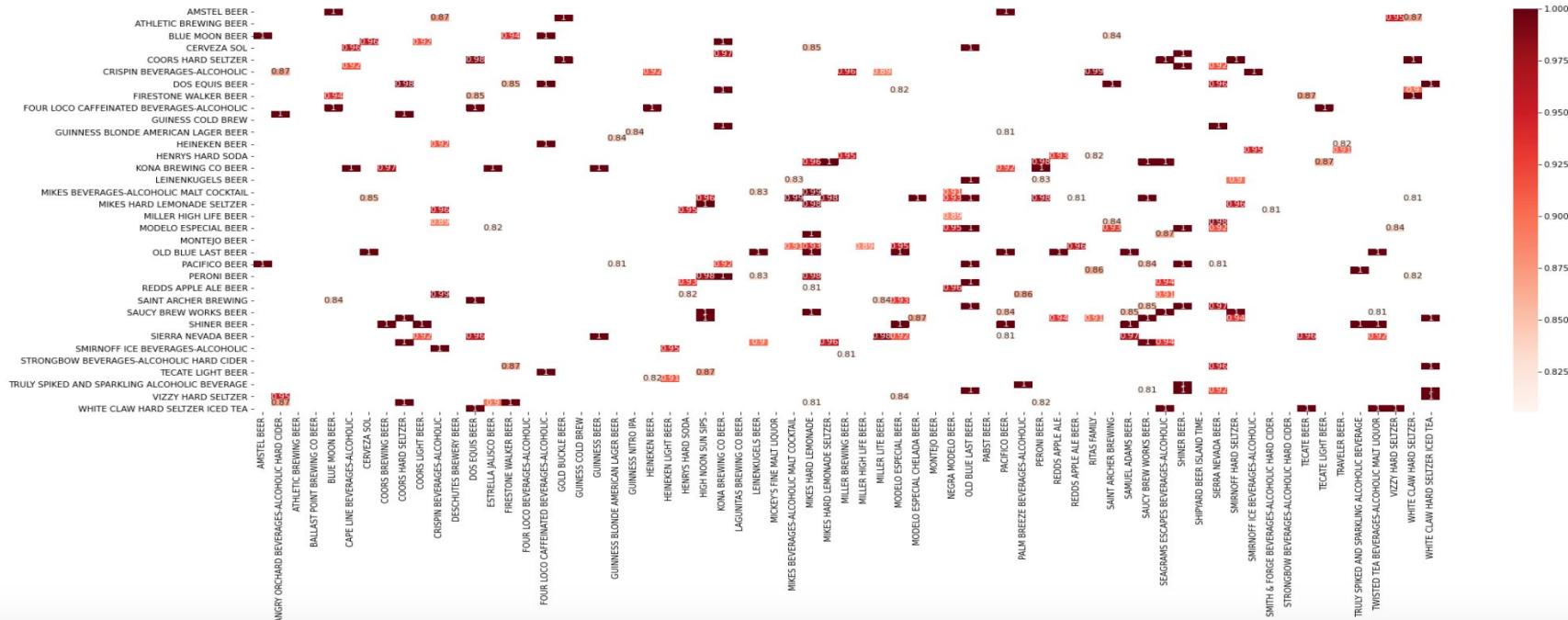
Q&A

Thanks :)



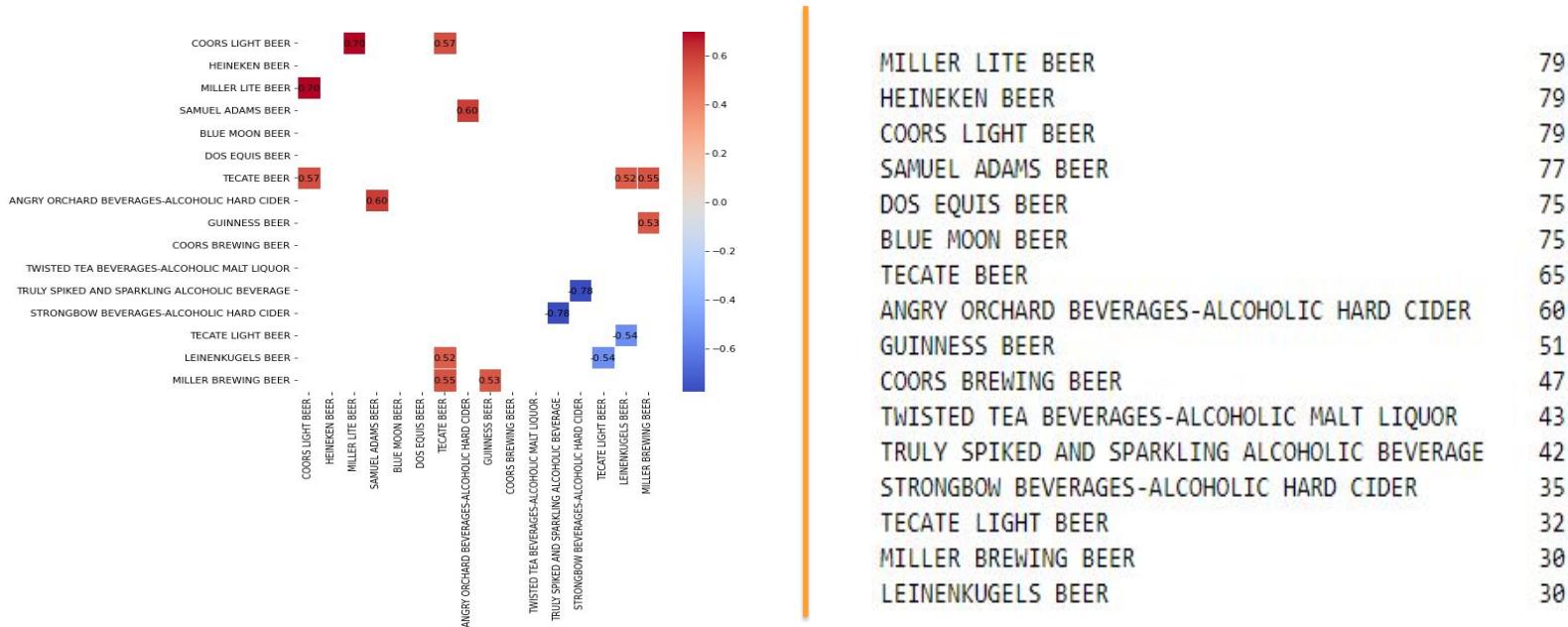
APPENDIX

CORRELATION



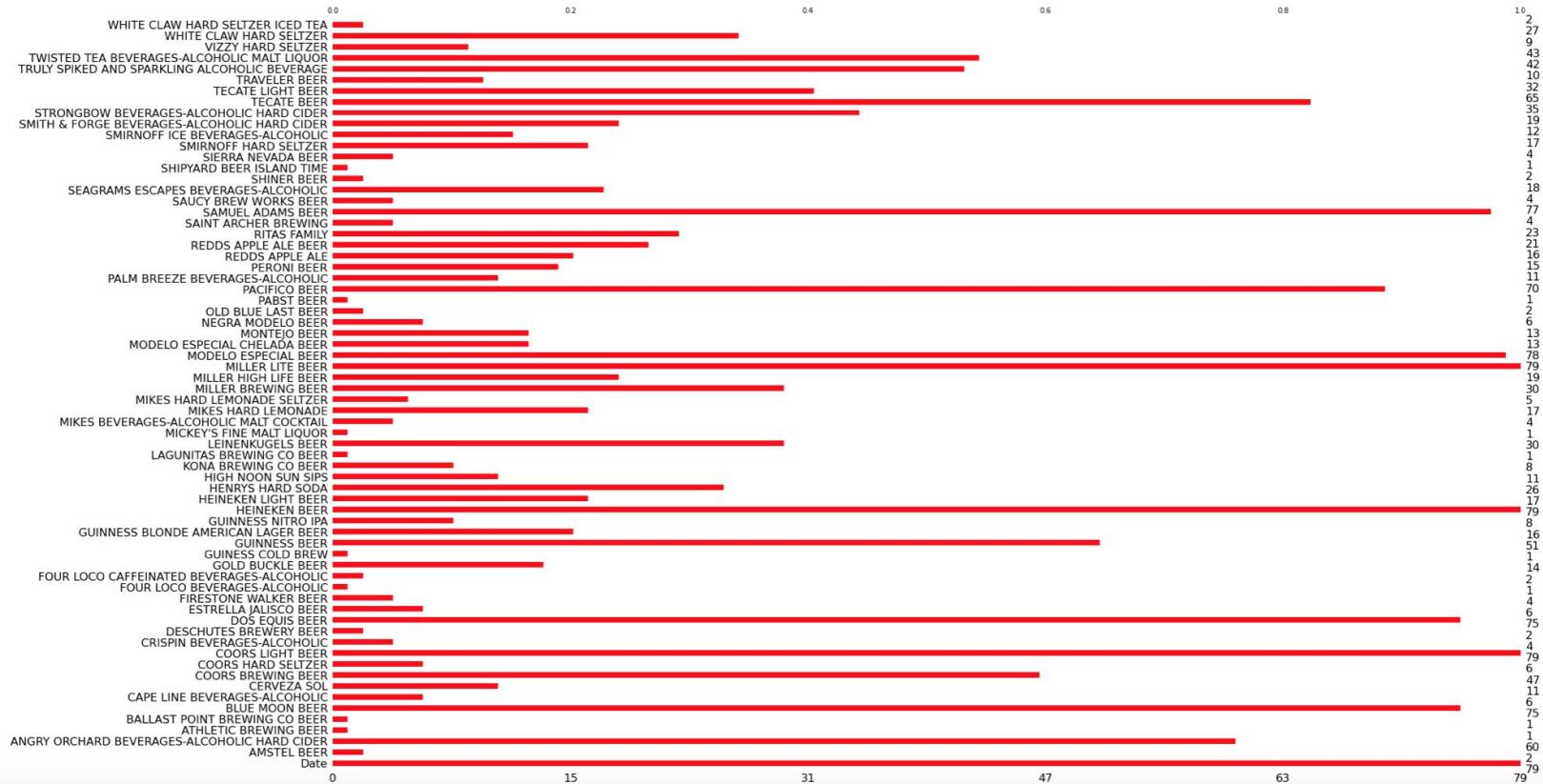
Correlation graph with a 0.8 threshold. There seems to be a correlation between the brands GRP. The graph's colors indicate that most brands are correlated, as the actual correlation numbers are difficult to devise.

GRP COUNT > 30 - COMPETITORS' BRANDS

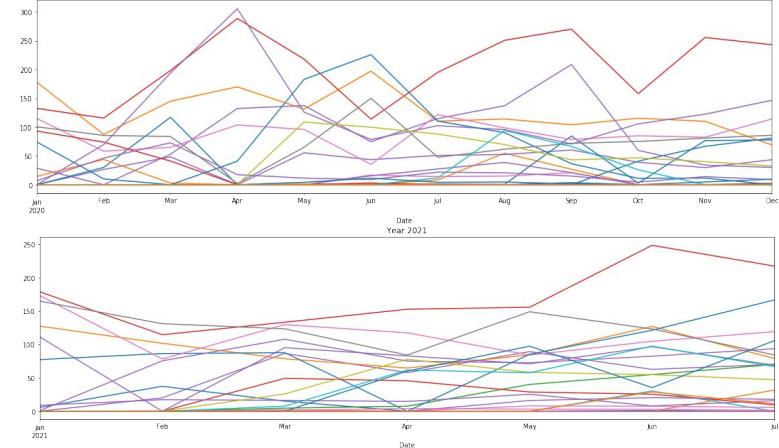
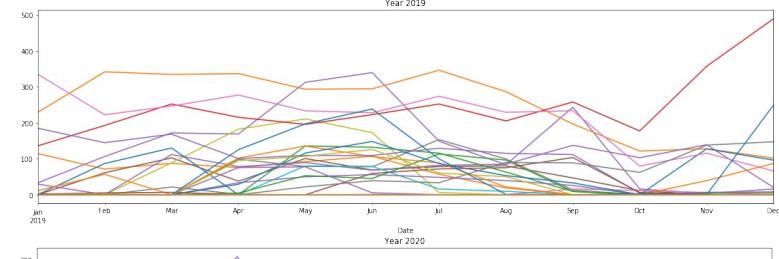
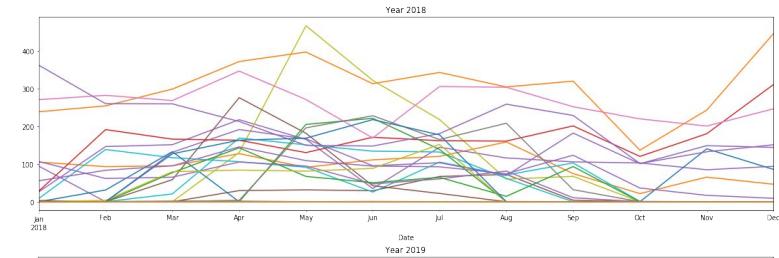
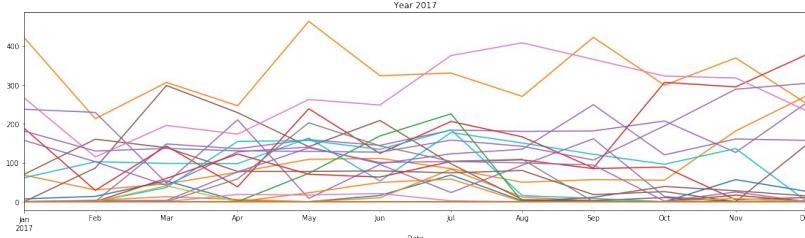
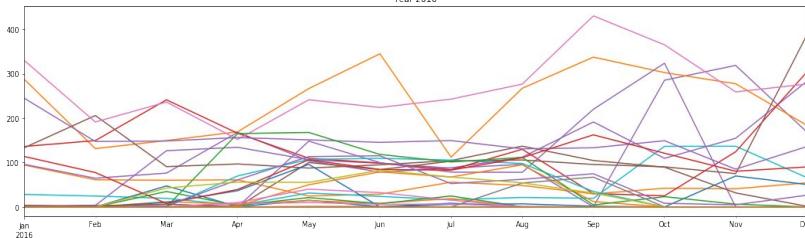
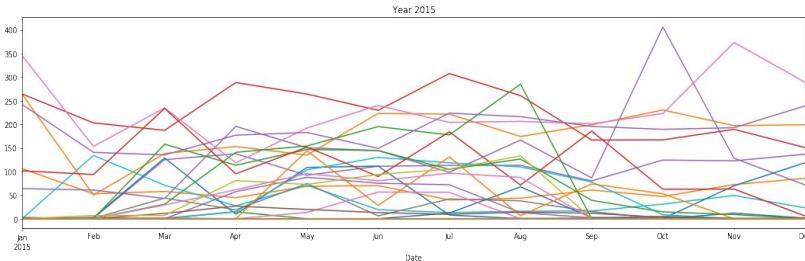


There are 16 brands that have GRP count more than 30. The brands with maximum GRP count are Miller lite beer, Heineken beer, Coors light Beer. This might signify they have had maximum exposure in terms of impressions. Also, It can be observed there is a high positive correlation between Coors tight beer & Miller lite beer and high negative correlation between tecate beer & Coors lite beer.

DATA ANALYSIS - NULL VALUES



YEARLY COMPETITOR'S BRANDS

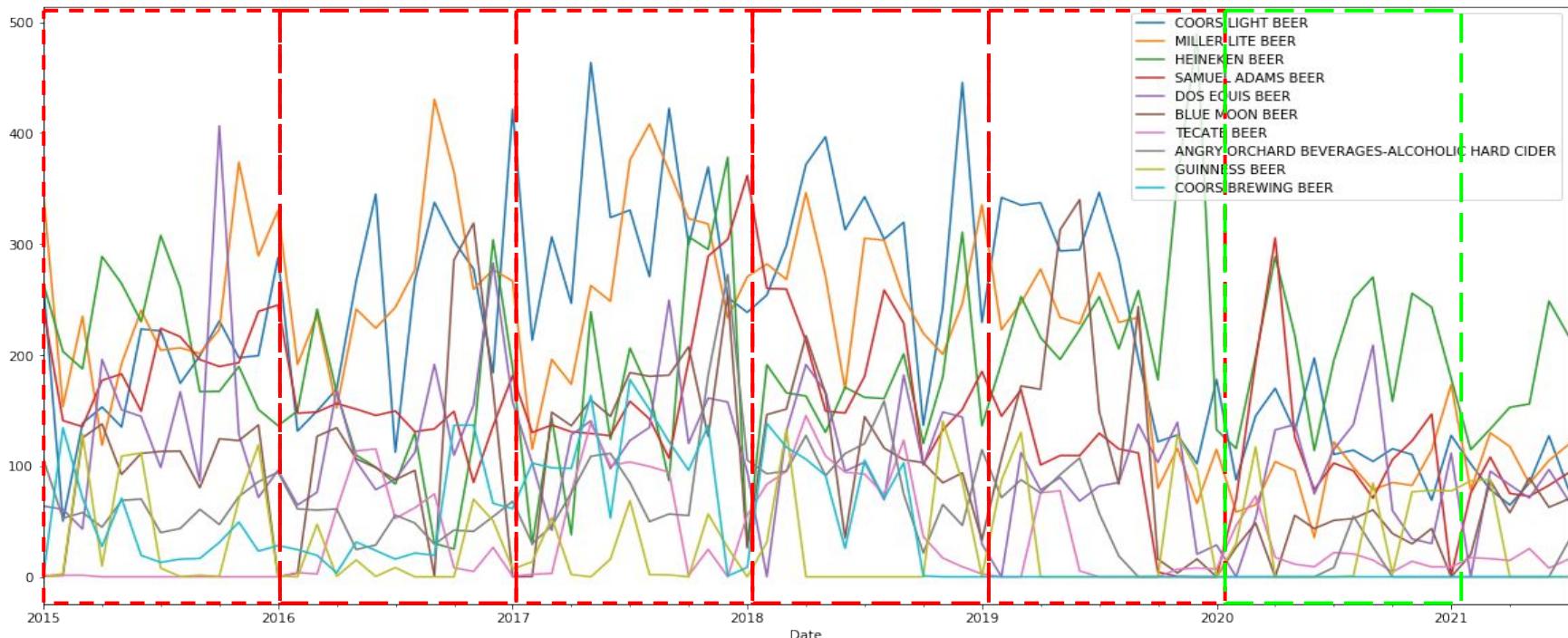


TIME SERIES

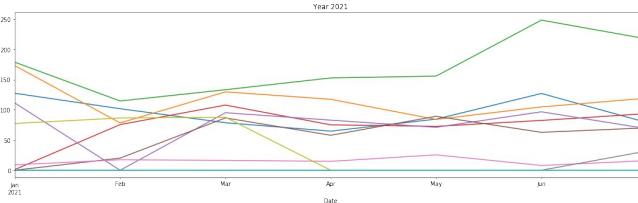
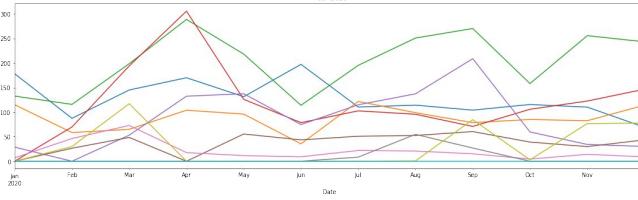
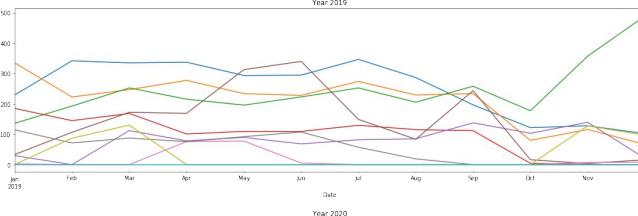
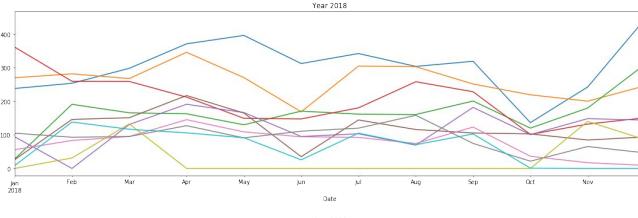
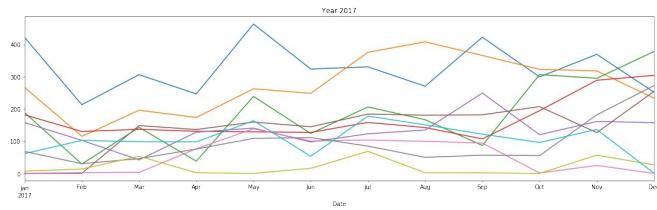
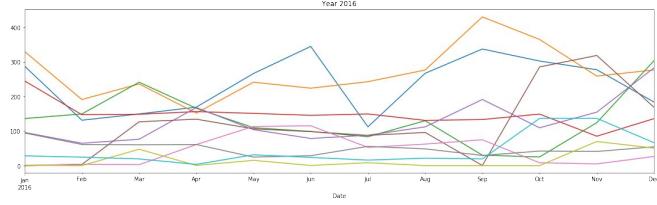
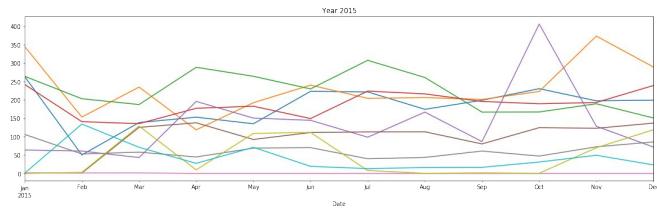


DATA ANALYSIS

TOP 10 COUNTS of GRPS COMPETITORS' BRANDS

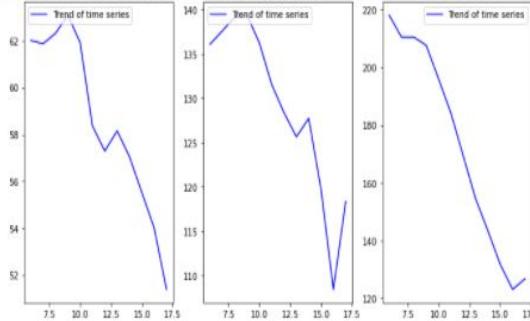


YEARLY TOP 10 Counts of GRPS COMPETITORS' BRANDS



2015_16 Trends & Seasonality (Complete GRP)

ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER



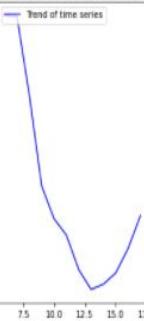
DOS EQUIS BEER



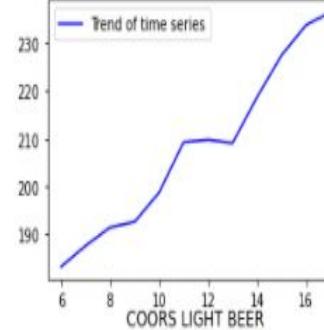
HEINEKEN BEER

SAMUEL ADAMS BEER

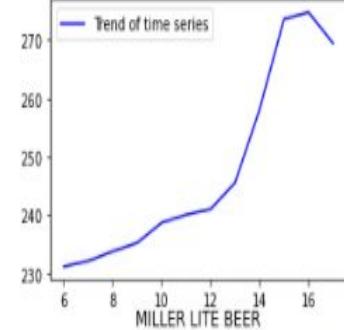
STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER



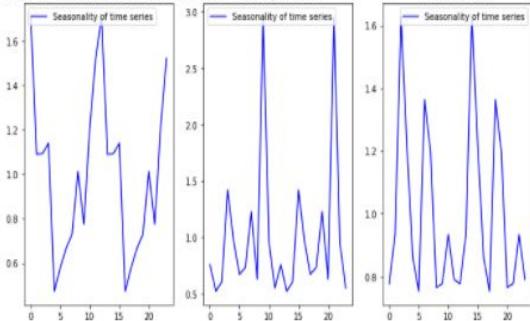
COORS LIGHT BEER



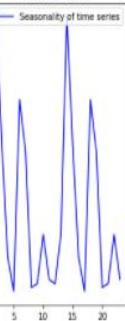
MILLER LITE BEER



ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER

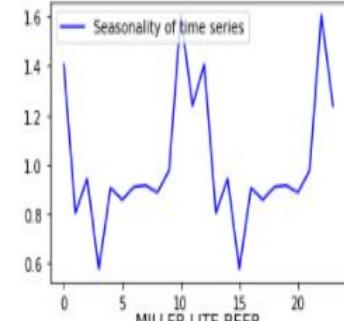
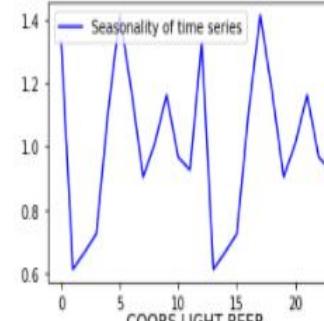
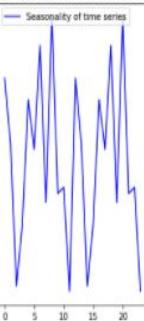


HEINEKEN BEER

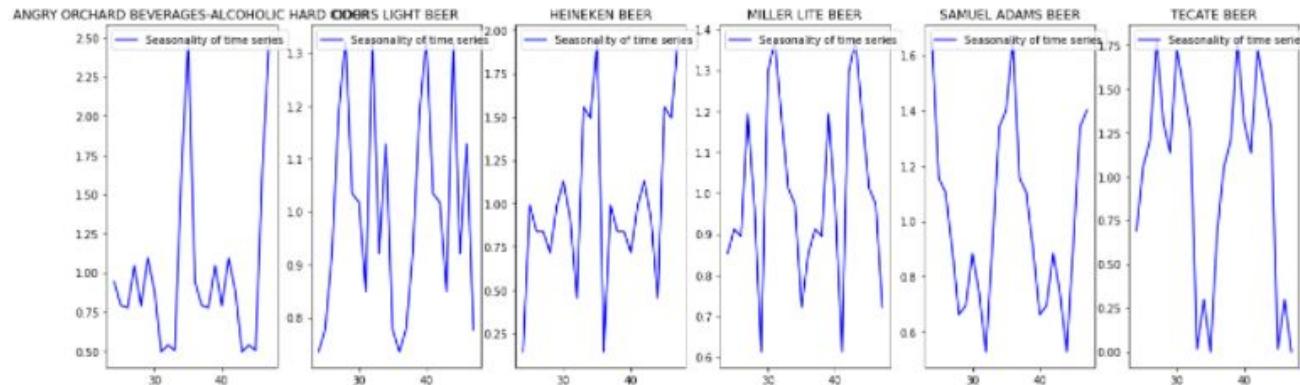
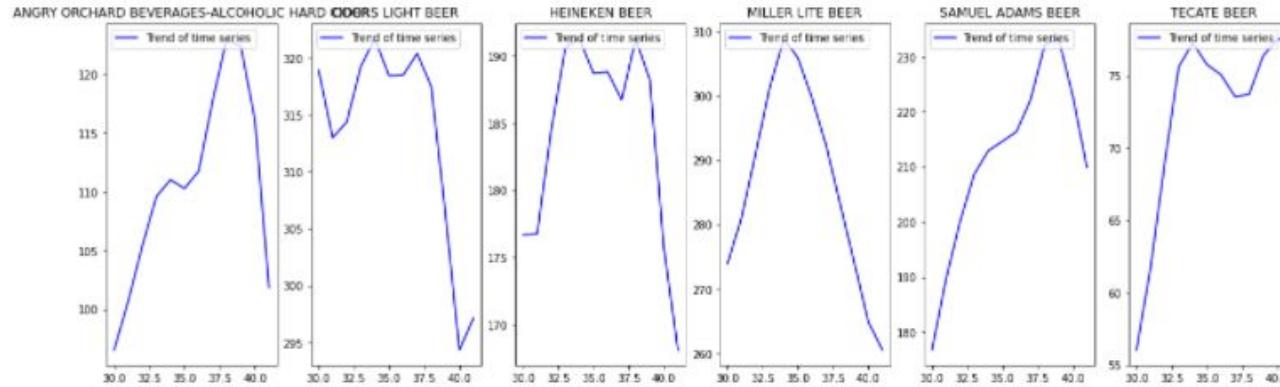


SAMUEL ADAMS BEER

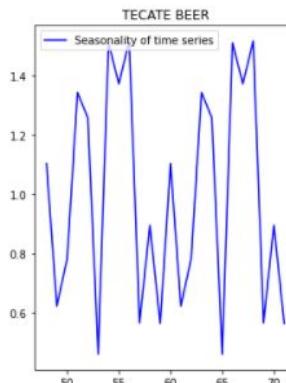
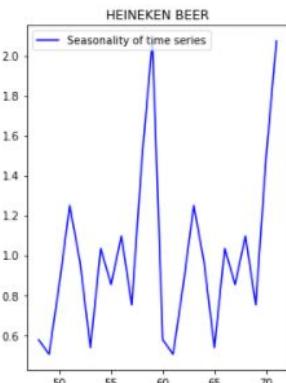
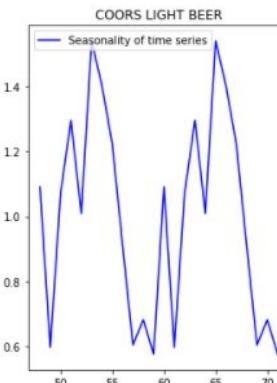
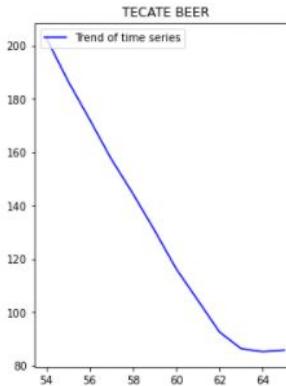
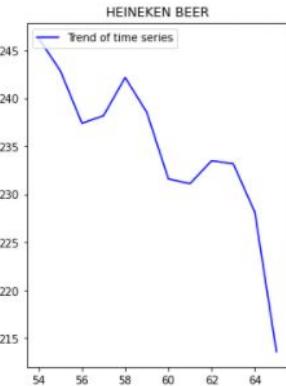
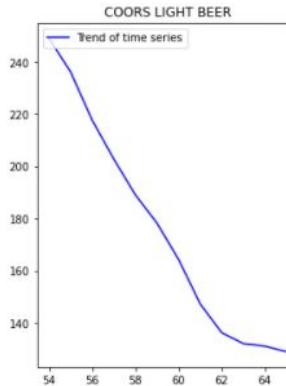
STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER



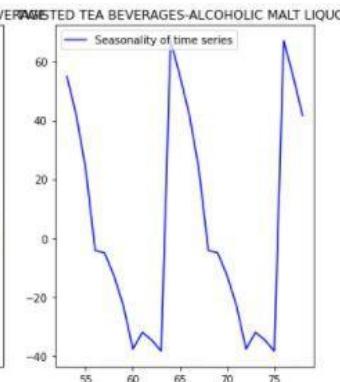
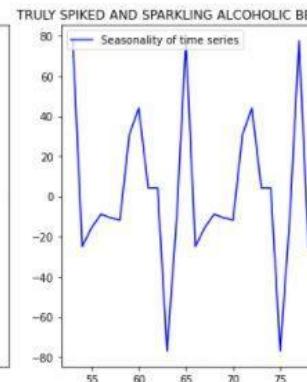
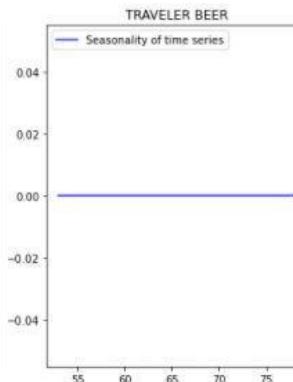
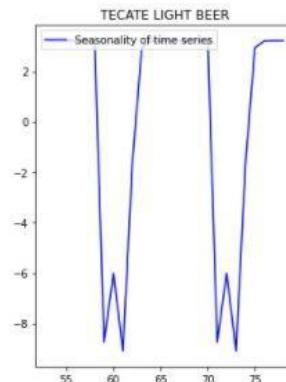
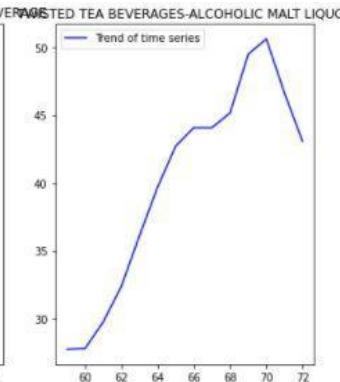
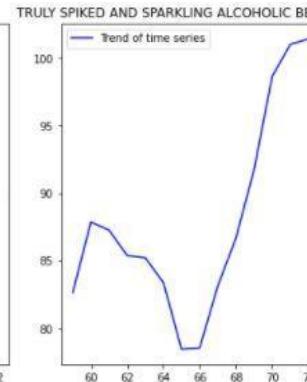
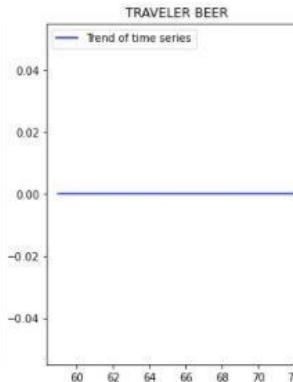
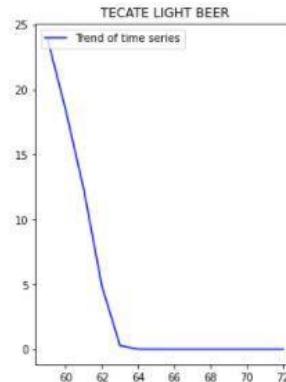
2017_18 Trends & Seasonality (Complete GRP)



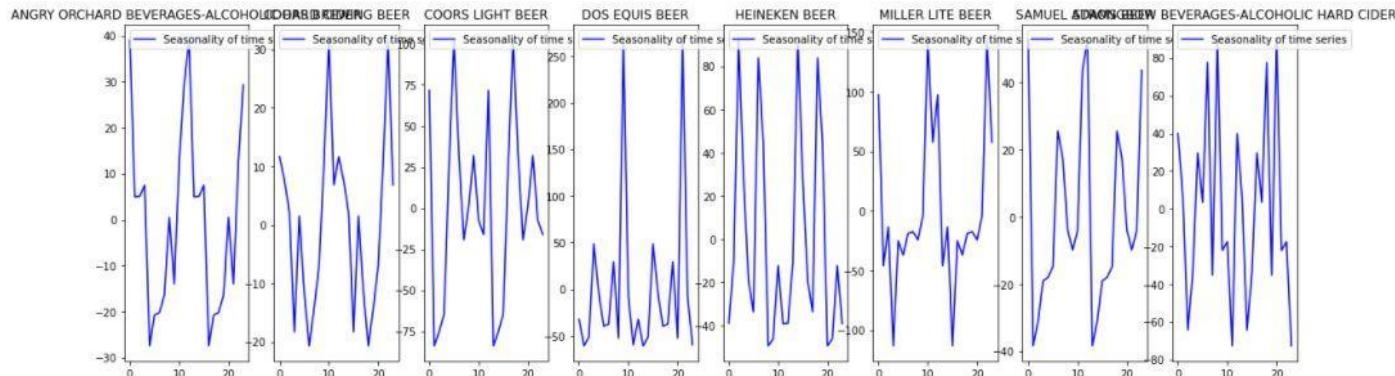
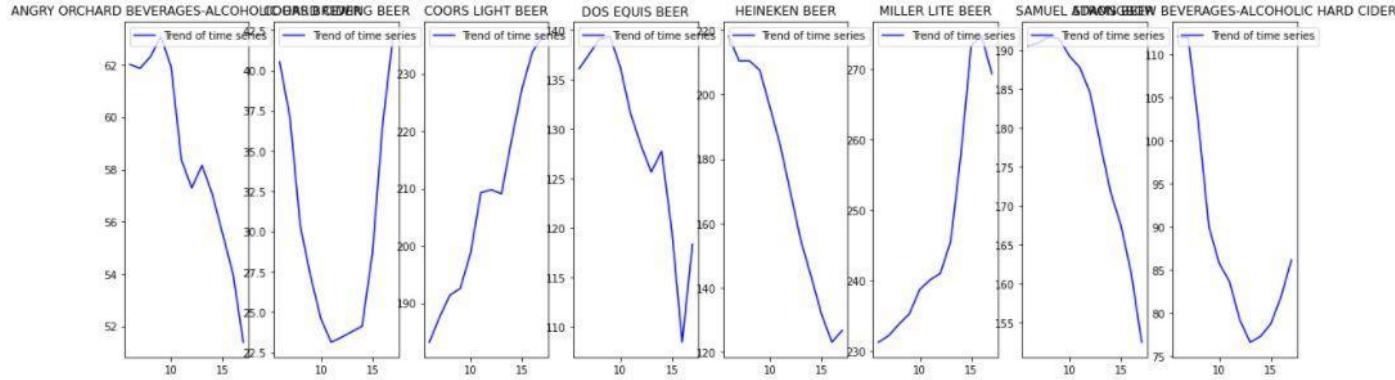
2019_20 Trends & Seasonality (Complete GRP)



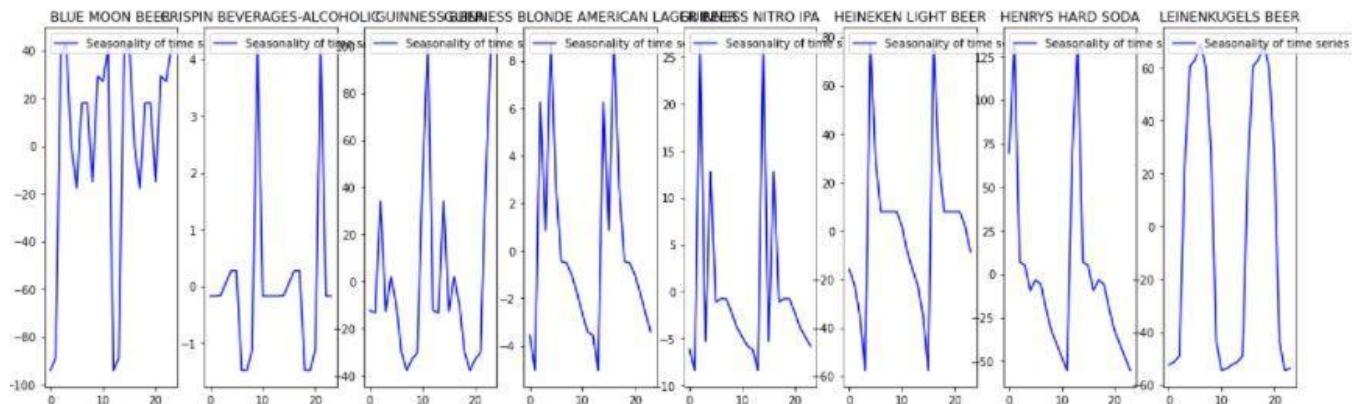
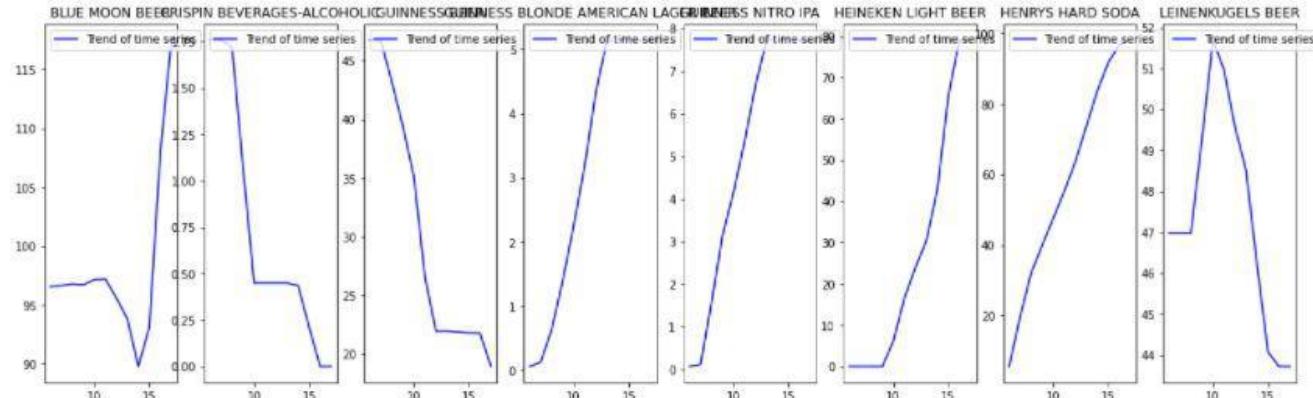
2019.6_2021.7 Trends & Seasonality (Complete GRP)



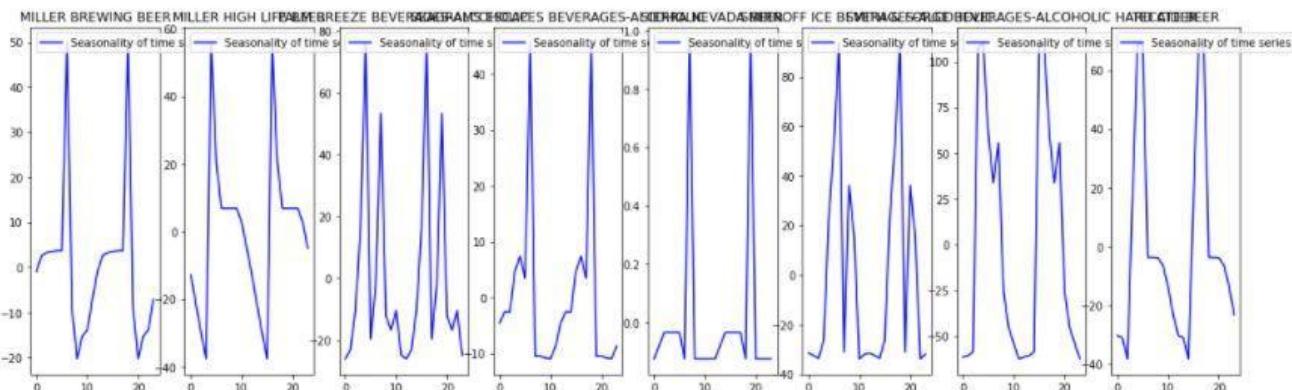
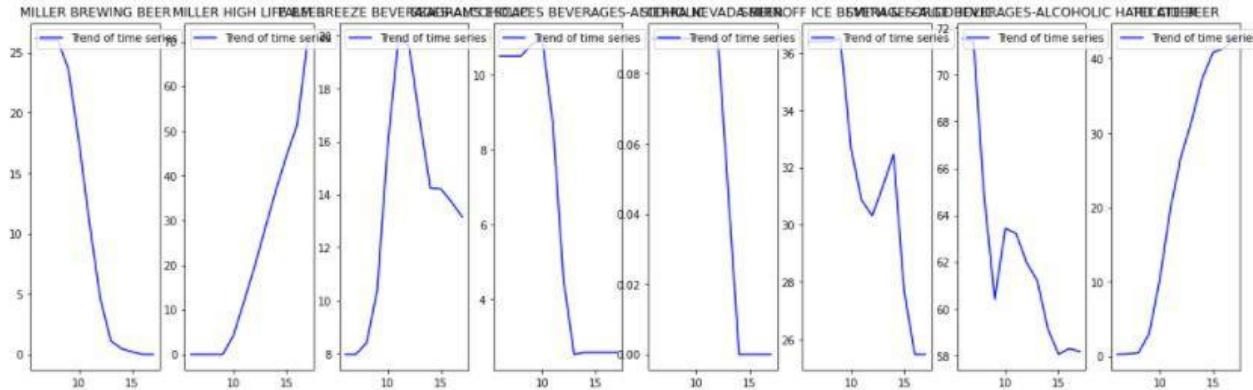
2015_16 Trends & Seasonality (All brands)



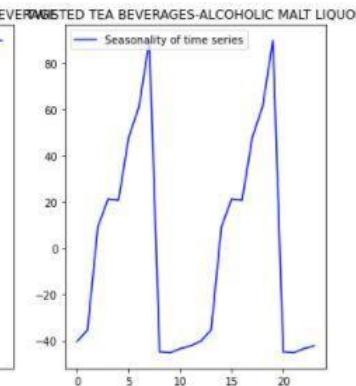
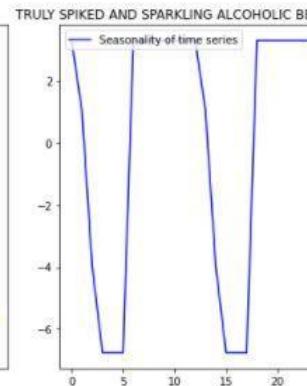
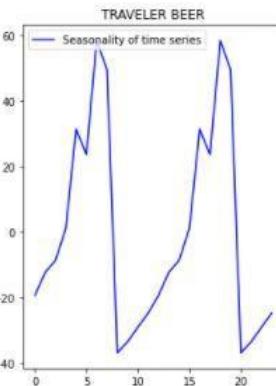
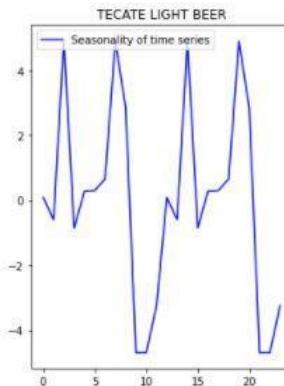
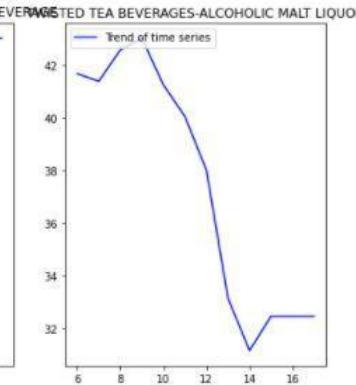
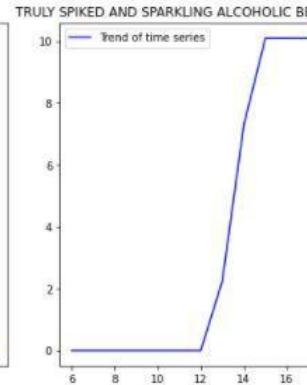
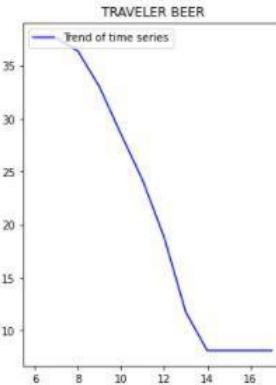
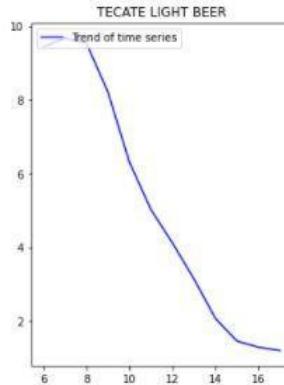
2015_16 Trends & Seasonality (All brands)



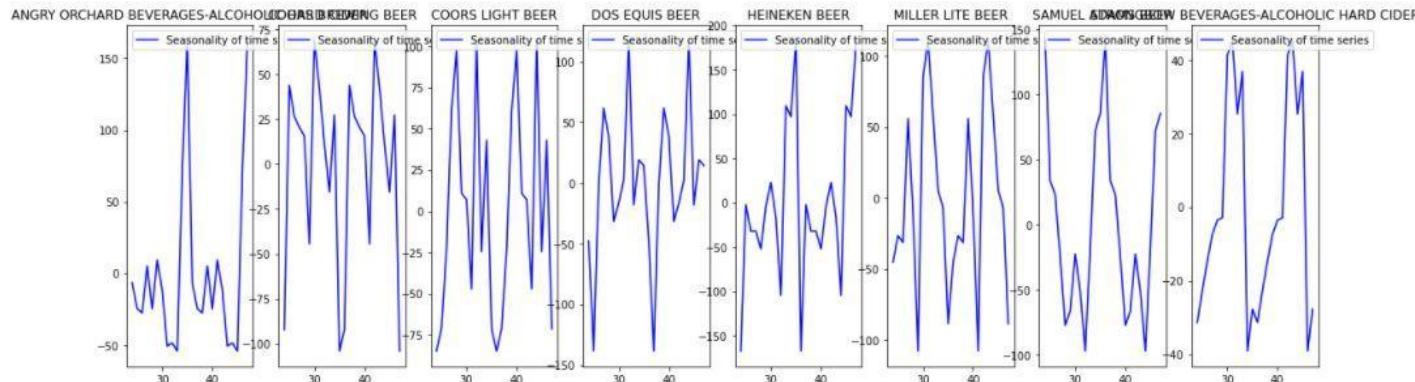
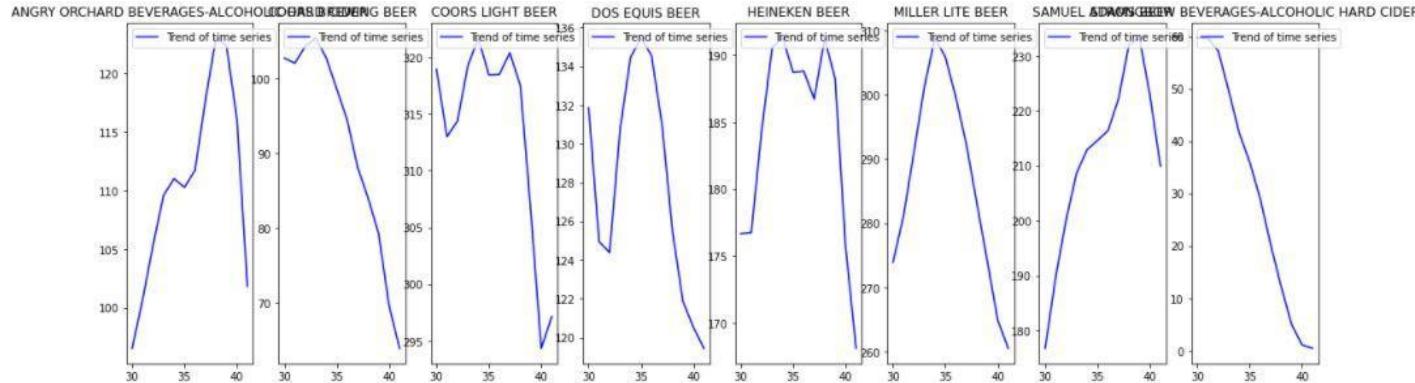
2015_16 Trends & Seasonality (All brands)



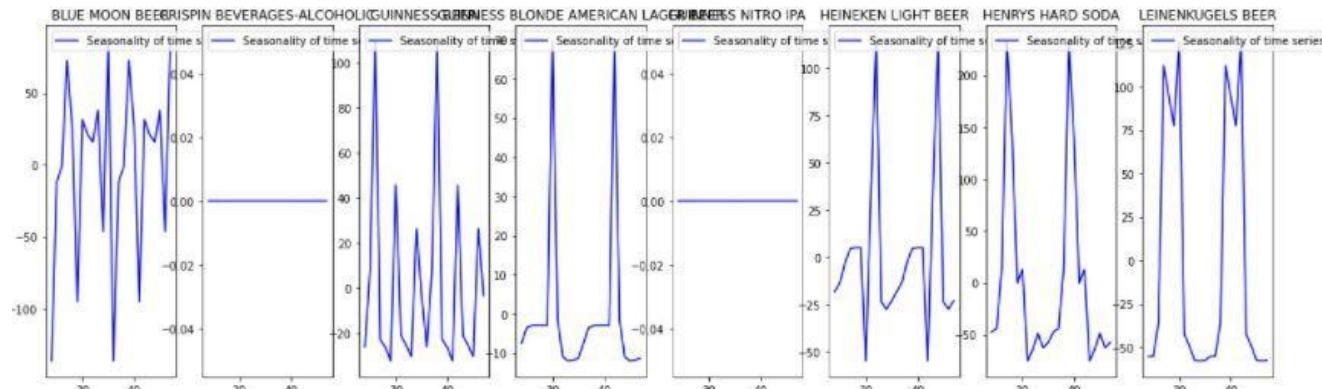
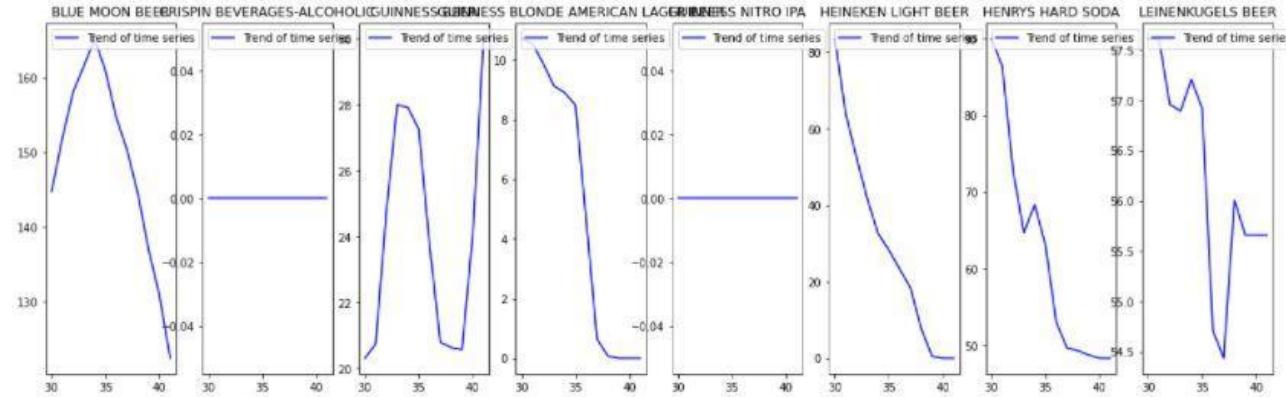
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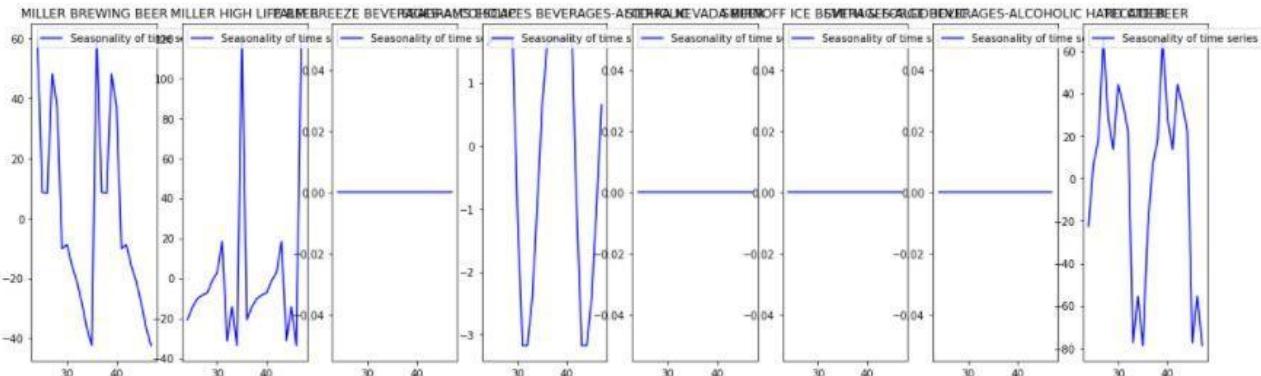
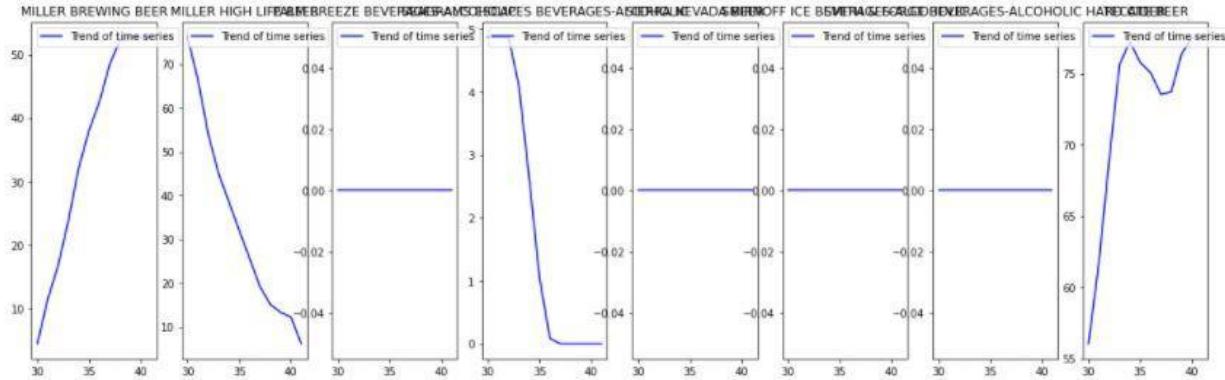
2017_18 Trends & Seasonality (All brands)



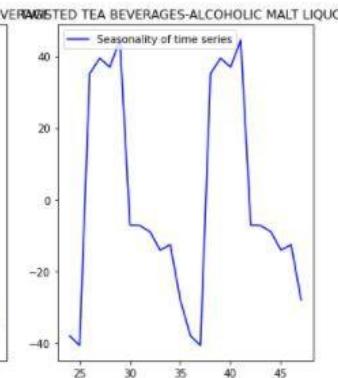
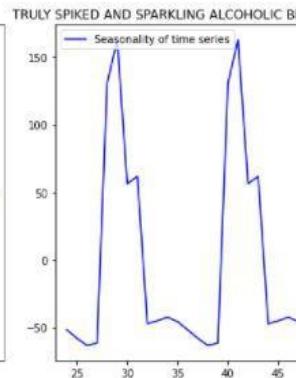
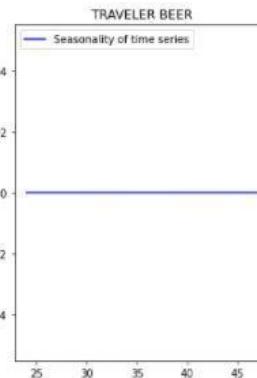
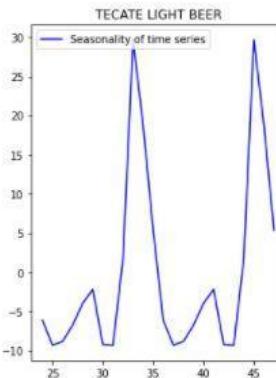
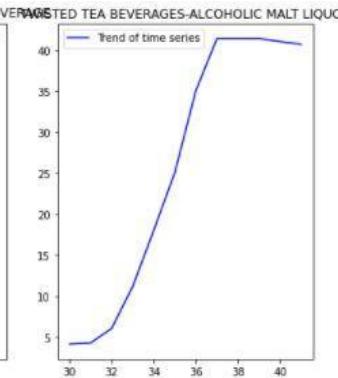
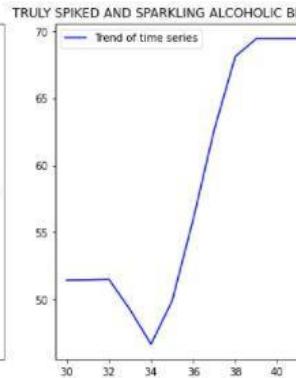
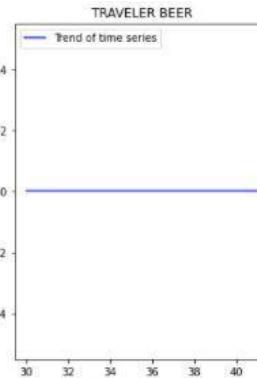
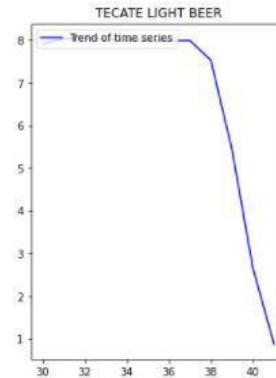
2017_18 Trends & Seasonality (All brands)



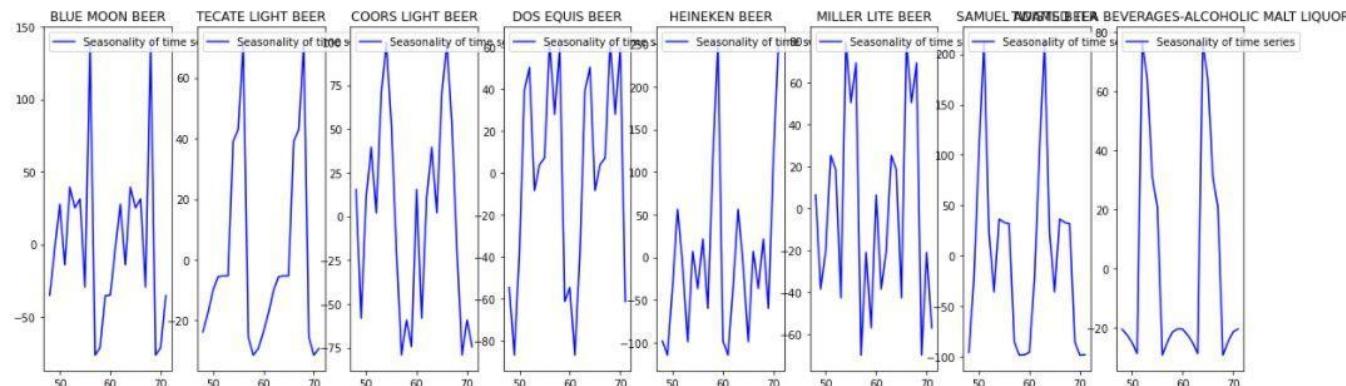
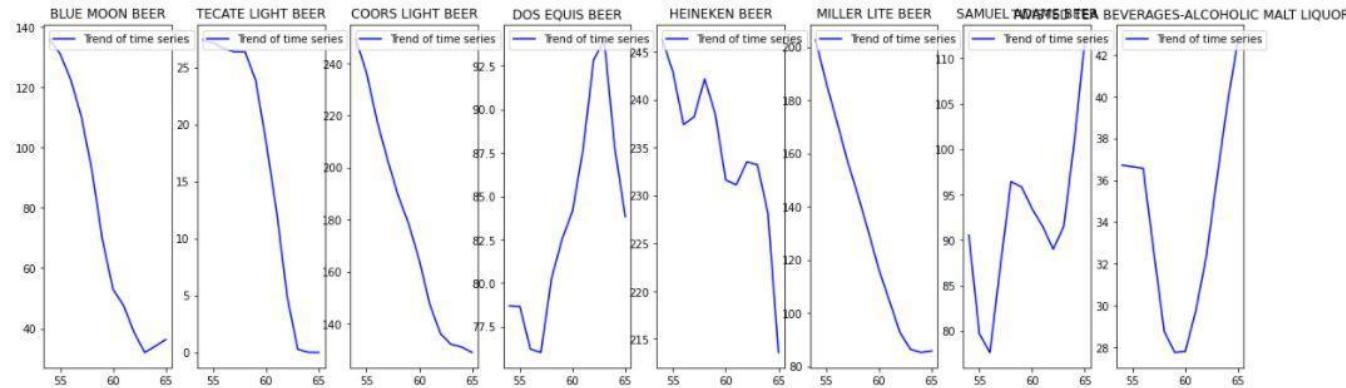
2017_18 Trends & Seasonality (All brands)



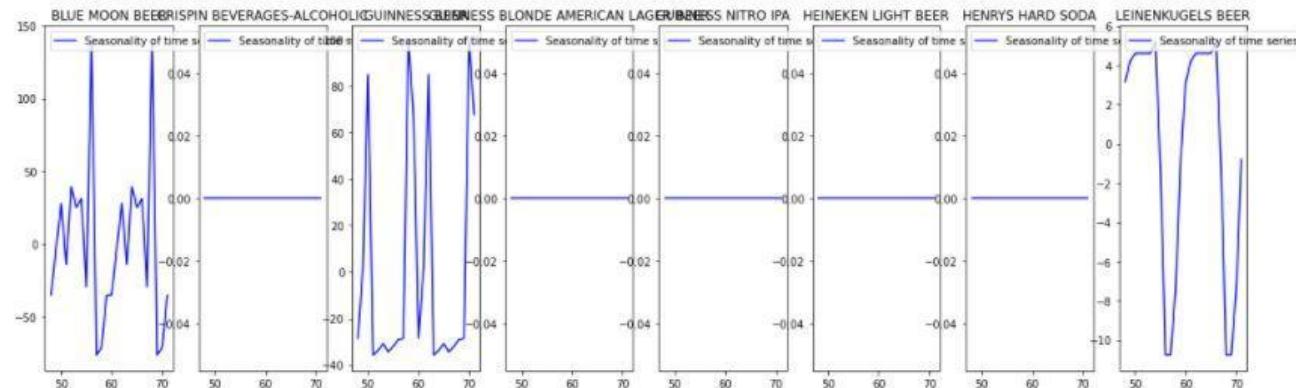
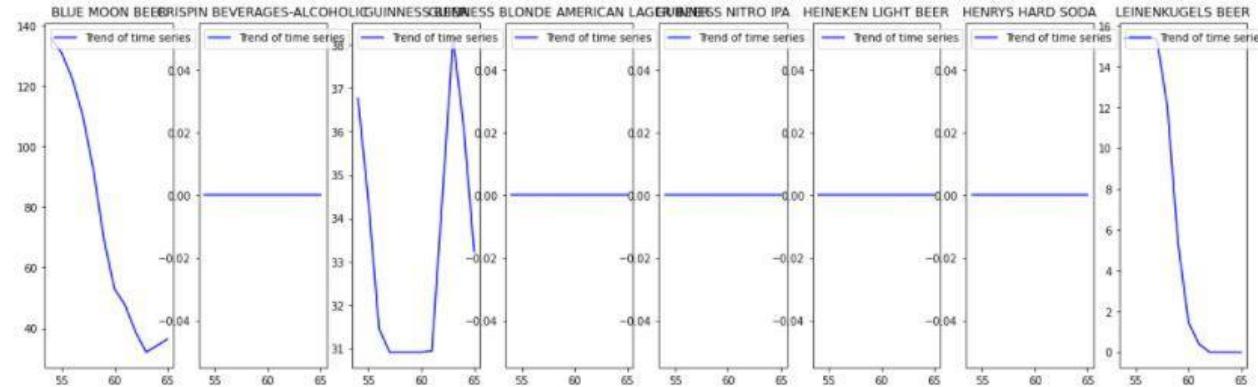
2017_18 Trends & Seasonality (All brands)



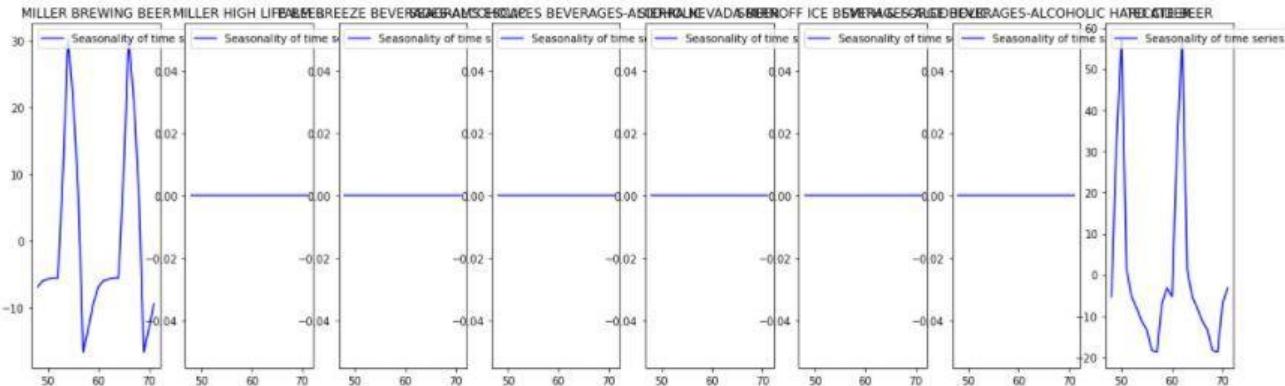
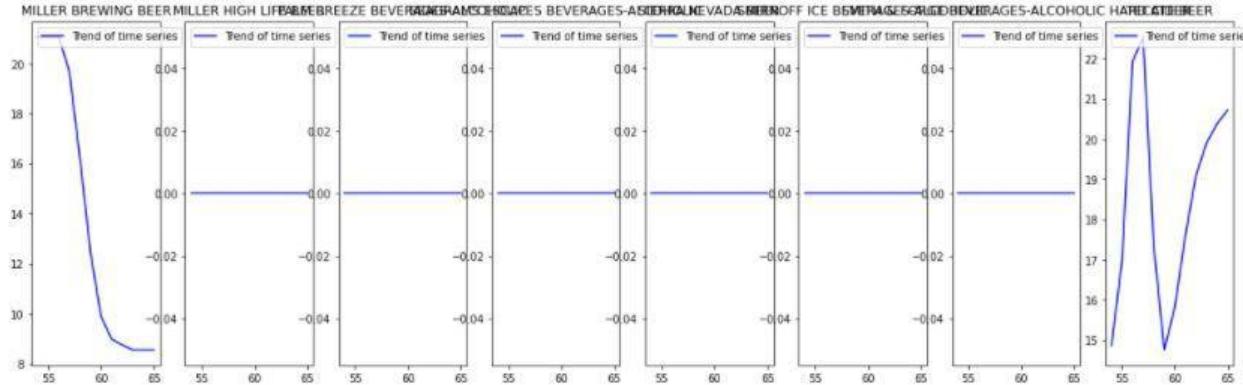
2019_20 Trends & Seasonality (All brands)



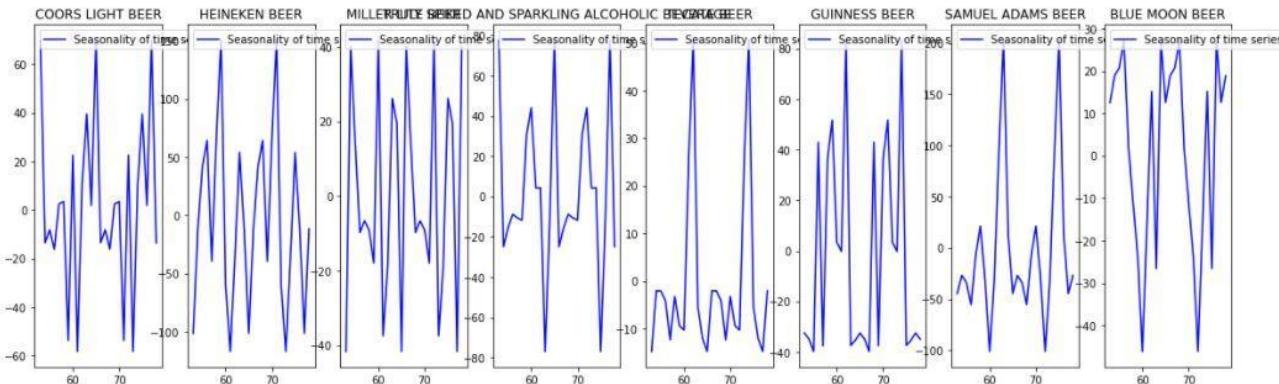
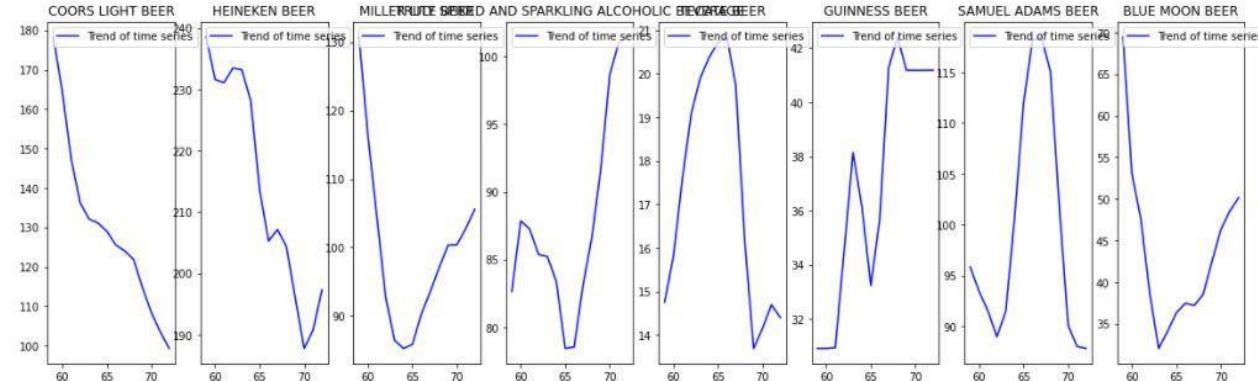
2019_20 Trends & Seasonality (All brands)



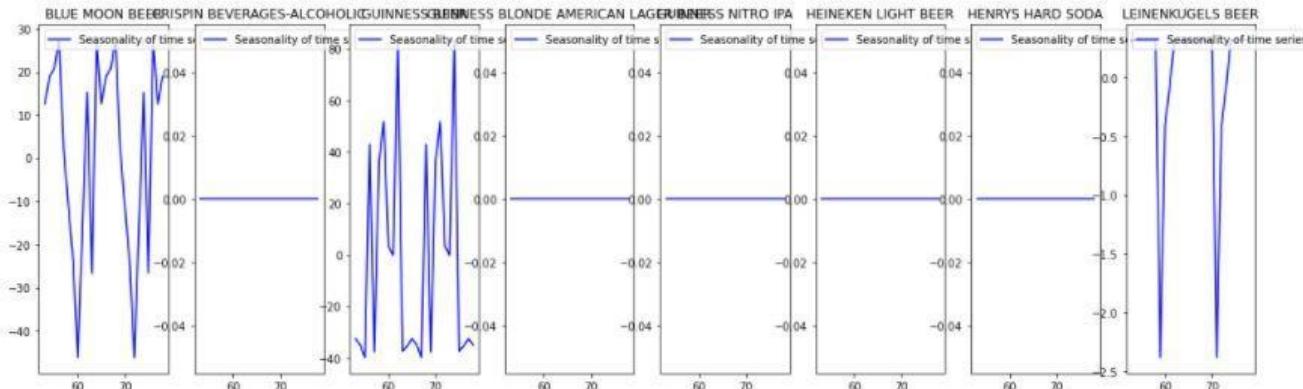
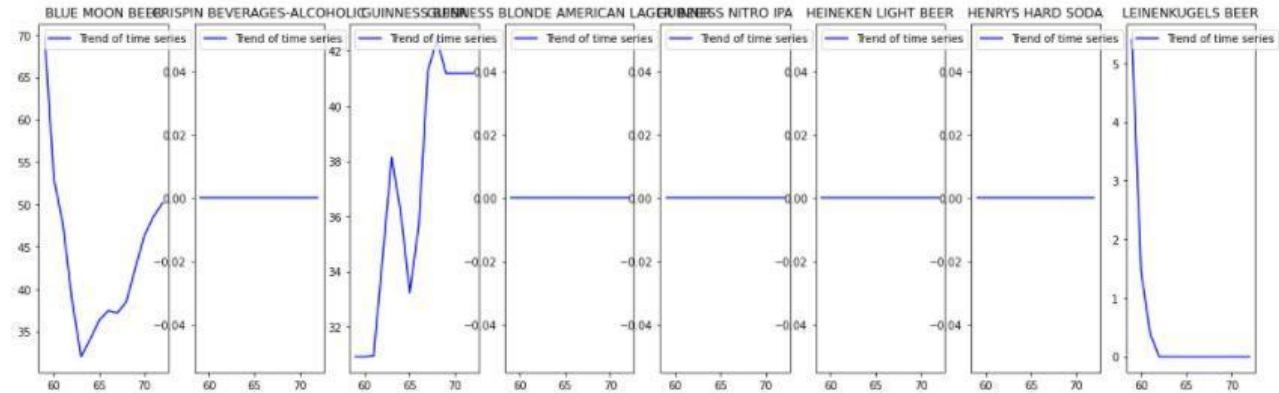
2019_20 Trends & Seasonality (All brands)



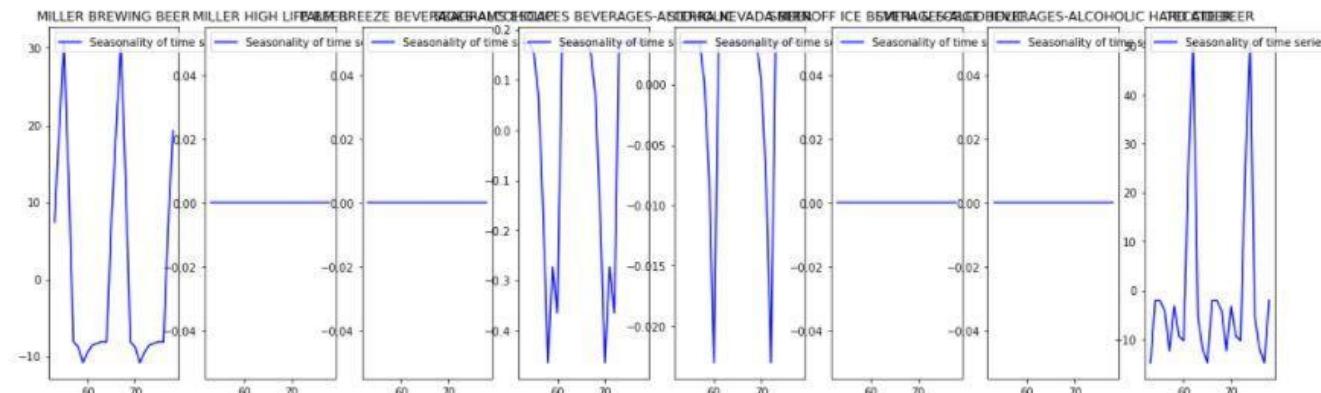
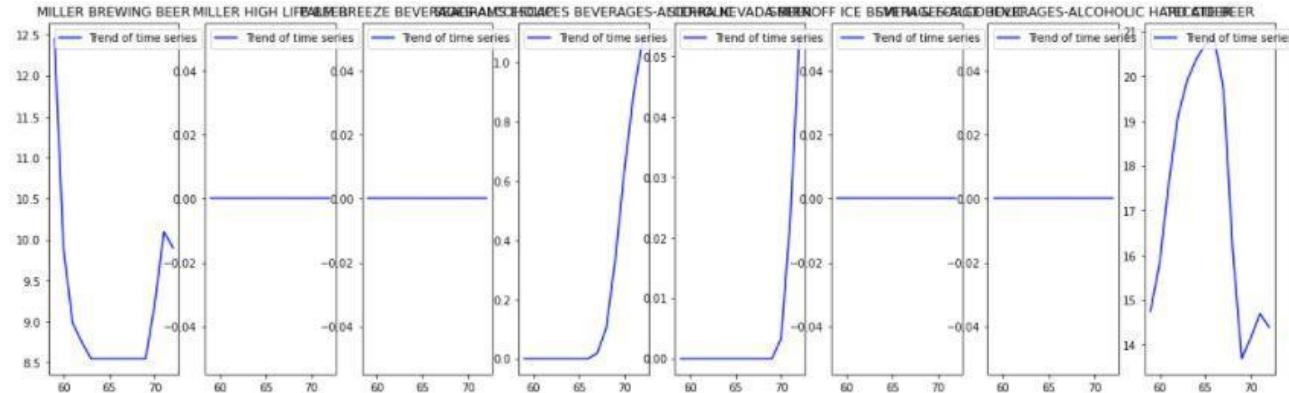
2019.6_2021.7 Trends & Seasonality (All brands)



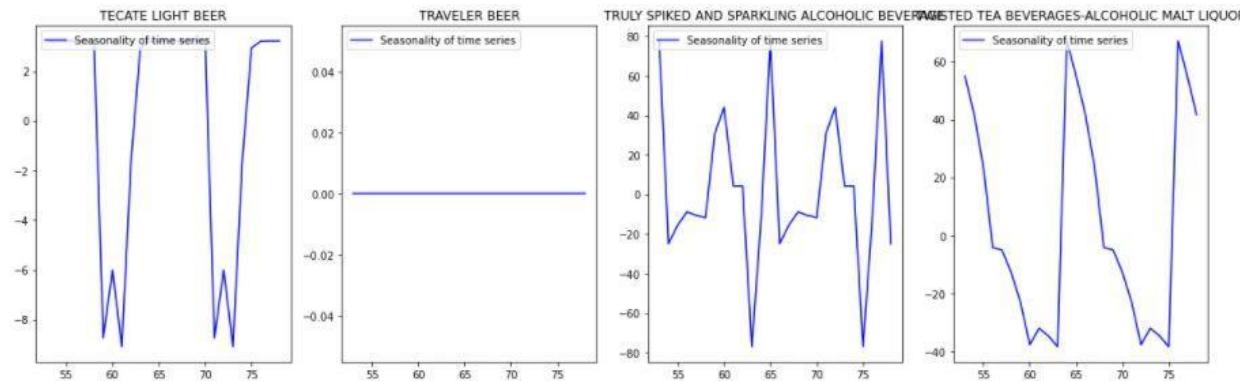
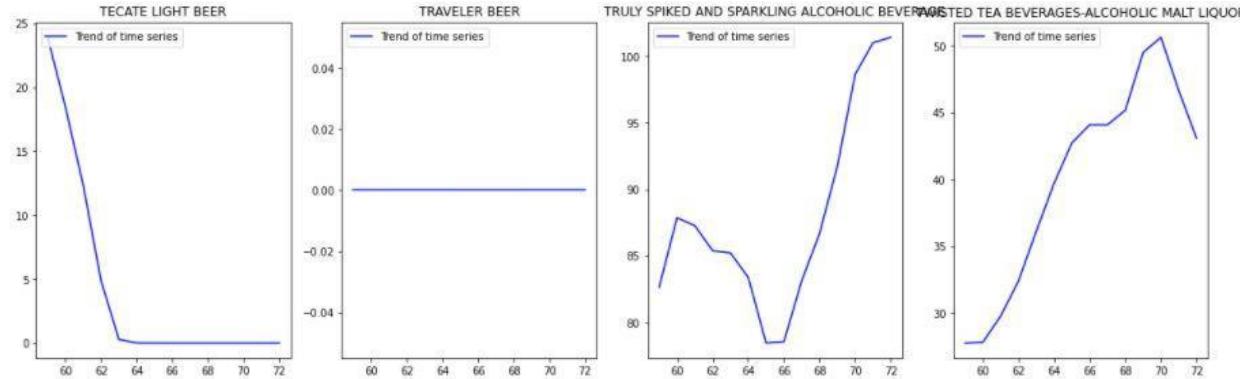
2019.6_2021.7 Trends & Seasonality (All brands)



2019.6_2021.7 Trends & Seasonality (All brands)



2019.6_2021.7 Trends & Seasonality (All brands)





BEER BRANDS

| BRANDS | Brewery | Category/Type | ABV(%) |
|---|--|---------------|---------|
| SHIPYARD BEER ISLAND TIME' | Shipyard Brewing Company | Ale | 4.5 |
| GOLD BUCKLE BEER' | Dean & Co. Brewery | beer | |
| DESCHUTES BREWERY BEER' | Deschutes Brewery | Beer | |
| GUINNESS COLD BREW' | Diageo | beer | 3 |
| GUINNESS BEER' | Diageo | beer | |
| FIRESTONE WALKER BEER' | Duvel Moortgat Brewery | beer | |
| DOS EQUIS BEER' | Heineken | beer | |
| LAGUNITAS BREWING CO BEER' | Heineken | beer | |
| ATHLETIC BREWING BEER' | John Walker and Bill Shufelt | Beer | |
| SIERRA NEVADA BEER' | Ken Grossman | beer | |
| BALLAST POINT BREWING CO BEER' | Kings & Convicts Brewery | Beer | |
| COORS BREWING BEER' | Molson Coors | Beer | |
| LEINENKUGELS BEER' | Molson Coors | Beer | |
| MILLER BREWING BEER' | Molson Coors | beer | |
| SAINT ARCHER BREWING' | Molson Coors | Beer | |
| KONA BREWING CO BEER' | PV Brewing | beer | |
| SAUCY BREW WORKS BEER' | Saucy Brew Works LLC | Beer | |
| ANGRY ORCHARD BEVERAGES-ALCOHOLIC HARD CIDER' | Boston Beer Company | Hard cider | 5 |
| STRONGBOW BEVERAGES-ALCOHOLIC HARD CIDER' | Heineken | Hard cider | 5 |
| CRISPIN BEVERAGES-ALCOHOLIC | Molson Coors | Hard cider | 4.5-5.5 |
| SMITH & FORGE BEVERAGES-ALCOHOLIC HARD CIDER' | Molson Coors | Hard cider | 5 |
| HIGH NOON SUN SIP'S | E. & J. Gallo | Hard Seltzer | 4.5 |
| SPINDRIFT HARD SELTZER' | Heineken | Hard Seltzer | 4.5 |
| WHITE CLAW HARD SELZER ICED TEA' | Mark Anthony Group | Hard Seltzer | 4 |
| WHITE CLAW HARD SELZER | Mark Anthony Group | Hard Seltzer | 4 |
| COORS HARD SELTZER' | Molson Coors | Hard Seltzer | 5 |
| VIZZY HARD SELTZER' | Molson Coors | Hard Seltzer | 5 |
| PABST BEER' | Blue Ribbon Intermediate Holdings, LLC | lager | 4.8 |
| SAMUEL ADAMS BEER' | Boston Beer Company | Lager | 5 |
| GUINNESS BLONDE AMERICAN LAGER BEER' | Diageo | Lager | 5 |
| AMSTEL BEER' | Heineken | Lager | 4.5 |
| TECATE BEER' | Heineken | Lager | 4.5 |
| CERVEZA SOL' | Molson Coors | Lager | 4.5 |
| MILLER HIGH LIFE BEER' | Molson Coors | Lager | 4.6 |
| PERONI BEER' | Molson Coors | Lager | 4.7 |
| SHINER BEER' | Shiner Brewing Association | Lager | 4.4 |
| HEINEKEN BEER' | Heineken | Lager | 5 |
| SEAGRAMS ESCAPES BEVERAGES-ALCOHOLIC' | Diageo | light beer | 3.2 |
| HEINEKEN LIGHT BEER' | Heineken | light beer | |
| TECATE LIGHT BEER' | Heineken | light beer | 4.5 |
| COORS LIGHT BEER' | Molson Coors | light beer | 4.2 |
| MILLER LITE BEER' | Molson Coors | light beer | 4.2 |

| | | | |
|--|---------------------|-----------|----------------|
| TWISTED TEA BEVERAGES-ALCOHOLIC MALT LIQUOR' | Boston Beer Company | malt | 5 |
| GUINNESS NITRO IPA' | Diageo | malt | 5.8 |
| SMIRNOFF ICE BEVERAGES-ALCOHOLIC' | Heineken | malt | 4.5 |
| MIKES BEVERAGES-ALCOHOLIC MALT COCKTAIL' | Mark Anthony Group | malt | 5 |
| MIKES HARD LEMONADE' | Mark Anthony Group | malt | 5 |
| HENRY'S HARD SODA' | MillerCoors | malt | 4.2 |
| "MICKEY'S FINE MALT LIQUOR" | Molson Coors | malt | 5.6 |
| FOUR LOCO BEVERAGES-ALCOHOLIC' | Phusion Projects | malt | 6-14 |
| FOUR LOCO CAFFEINATED BEVERAGES-ALCOHOLIC' | Phusion Projects | malt | 8, 10, 12or 14 |
| TRULY SPIKED AND SPARKLING ALCOHOLIC BEVERAGE' | Boston Beer Company | Seltzer | 5 |
| MIKES HARD LEMONADE SELTZER' | Mark Anthony Group | Seltzer | |
| CAPE LINE BEVERAGES-ALCOHOLIC' | Molson Coors | Seltzer | 4.5 |
| PALM BREEZE BEVERAGES-ALCOHOLIC' | Mark Anthony Group | sparkling | 4.5 |
| TRAVELER BEER' | Boston Beer Company | Wheat Ale | 4.4 |
| BLUE MOON BEER' | Molson Coors | Wheat Ale | 5.4 |