Avocado Market Analysis

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This project examines the impact of rising vegetarianism on avocado prices over time, focusing on different varieties. It also analyzes how these price changes affect the total and specific sales volumes for avocados classified under the following PLU (Price Look-Up) codes:

PLU4046: Small Hass Avocado
PLU4225: Large Hass Avocado
PLU4770: Extra Large Hass Avocado

PLU codes are used in grocery stores to identify different types of produce and facilitate efficient pricing and inventory management. The Hass avocado, known for its rich flavor, creamy texture, and dark, bumpy skin, comes in various sizes, indicated by "small," "large," and "extra large."

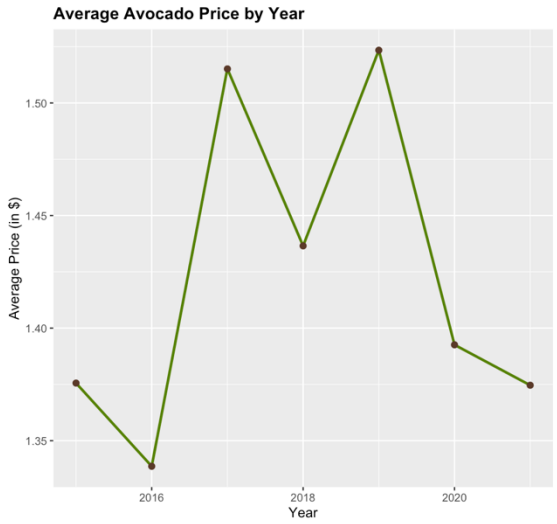
Questions to Ask:

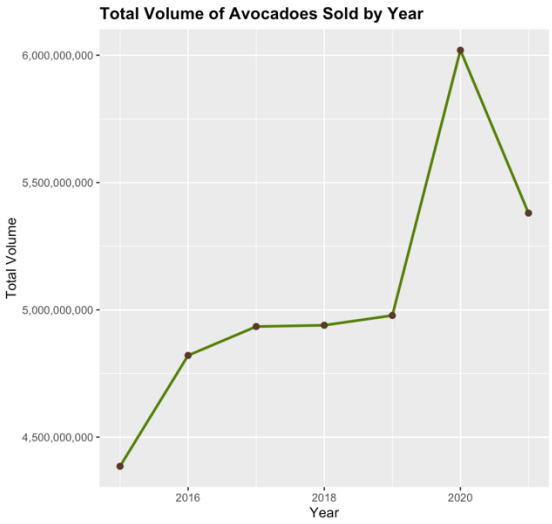
1. How does the price of avocados influence their sales volume?
2. Which regions consumed the most avocados from 2015 to 2021?
3. Given that PLU4770 represents the largest Hass avocados, is it also the most consumed variety?
4. Does the trend in avocado consumption in the top-consuming city reflect the overall trend in the U.S.?

By addressing these questions, the project aims to provide insights into how vegetarianism influences avocado prices and consumption patterns across different regions and size categories.

Exploratory Data Analysis

Question 1: How does the price of avocados influence their sales volume?





year	TotalVolume	AveragePrice
2015	4385468662.040010	1.3755903829029400
2016	4820889891.829990	1.3386396011396000
2017	4934305699.27	1.515127577770020
2018	4939447932.940000	1.436522448103490
2019	4977871483.660010	1.5234144208740200
2020	6019683291.989980	1.3925987693223600
2021	5379994918.140010	1.3746339651112300

Based on the graphs, the data shows fluctuations in both the average price of avocados and the total volume of avocados sold from 2016 to 2020.

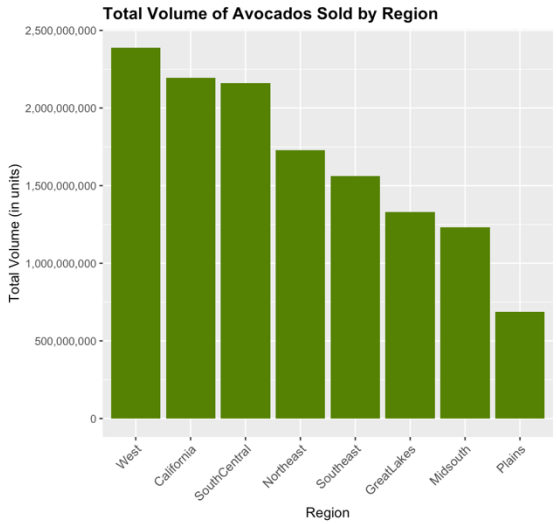
From 2016 to 2017, there was an increase in the average price of avocados from approximately $1.35 to around $1.50. During the same period, the total volume of avocados sold also increased slightly from about 4.6 billion to 4.8 billion units. From 2017 to 2018, the average price decreased to about $1.40, while the sales volume remained relatively stable at around 4.9 billion units.

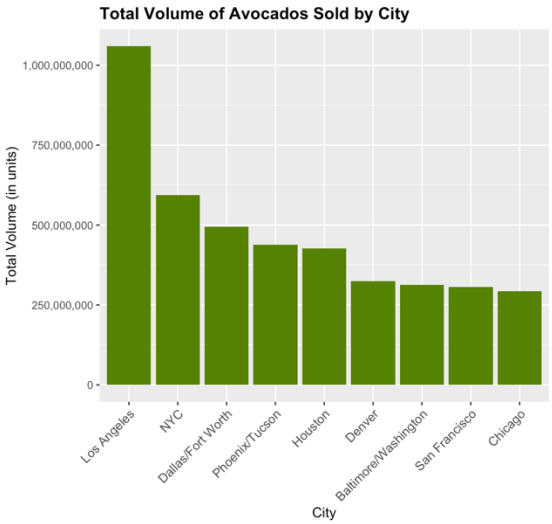
In the period from 2018 to 2019, the average price increased again to around $1.50, and the sales volume rose to about 5.0 billion units. The most significant changes occurred between 2019 and 2020. The average price dropped significantly from around $1.50 to about $1.35. In

contrast, the sales volume saw a substantial increase, peaking at approximately 6.0 billion units before decreasing slightly to around 5.5 billion units in 2020.

The data indicates that there are periods where changes in the average price of avocados are accompanied by changes in the sales volume. However, the exact nature of the relationship between price and sales volume, including potential causation and influencing factors, would require further detailed analysis.

Question 2: Which regions consumed the most avocados from 2015 to 2021?





region	TotalVolume
West	2386839262.36
California	2193436026.6500000
SouthCentral	2161540811.4400000
Northeast	1728008876.1600000
Southeast	1562577129.880000
GreatLakes	1328850131.1400000
Midsouth	1232041376.3600000
Plains	686279784.44

region	TotalVolume
LosAngeles	1058983719.7600000
NewYork	592936536.8300010
DallasFtWorth	495062636.22000000
PhoenixTucson	438501148.3500000
Houston	426676042.0400000
Denver	323935680.2600000
BaltimoreWashington	312666465.81
SanFrancisco	306141538.91000000
Chicago	292717351.0200000

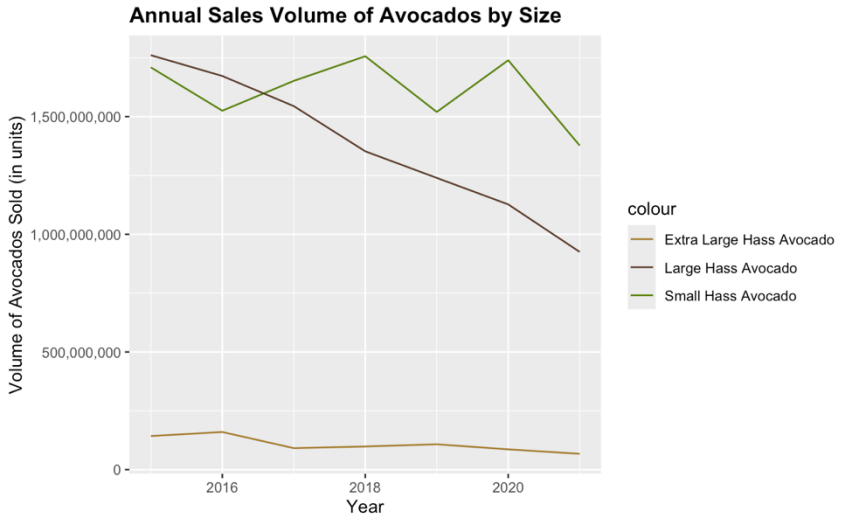
Based on the graphs, the data reveals the regions and cities that consumed the most avocados from 2015 to 2021. The West region stands out as the highest consumer of avocados, with a total volume nearing 2.5 billion units. California follows closely behind, contributing significantly to the overall avocado consumption in the United States. The South Central and Northeast regions also demonstrated substantial avocado consumption, with volumes comparable to California's. The Southeast region, while slightly behind the Northeast, still showed a considerable volume of avocado sales. The Great Lakes and Midsouth regions had notable

volumes, albeit lower than the Southeast. The Plains region had the lowest consumption among the listed regions, indicating a smaller market for avocados compared to other parts of the country.

On the city level, Los Angeles emerged as the leading consumer, with a total volume exceeding 1 billion units. New York City (NYC) followed as the second-highest consumer, with a volume just under 750 million units. Dallas/Fort Worth also showed high avocado consumption, closely trailing NYC. Other cities, including Phoenix/Tucson, Houston, Denver, Baltimore/Washington, San Francisco, and Chicago, exhibited similar consumption volumes, ranging from approximately 250 million to 500 million units.

From 2015 to 2021, the West and California regions were the top consumers of avocados, with significant contributions from the South Central, Northeast, and Southeast regions. Los Angeles, NYC, and Dallas/Fort Worth were the leading cities in avocado consumption, reflecting the strong demand for avocados in these urban areas.

Question 3: Given that PLU4770 represents the largest Hass avocados, is it also the most consumed variety?



year	SmallHassAvocado	LargeHassAvocado	ExtraLargeHassAvocado
2015	1709449981.340010	1761054036.1200000	142772394.55000000
2016	1525122892.3000000	1672728288.0000000	159879845.01000000
2017	1652038131.5200000	1544734719.5300000	91217507.77999990
2018	1756670209.560000	1352661682.7300000	98327910.63000010
2019	1519847465.6400000	1239682559.1400000	107696288.9100000
2020	1739521950.4800000	1127055228.8500000	86180113.56000030
2021	1377037618.340000	925121500.3400000	67254370.32000010

Based on the graph depicting the annual sales volume of avocados by size from 2015 to 2021, it is evident that the consumption patterns vary significantly across different sizes of Hass avocados. The graph categorizes avocados into three sizes: Extra Large Hass Avocado, Large Hass Avocado, and Small Hass Avocado.

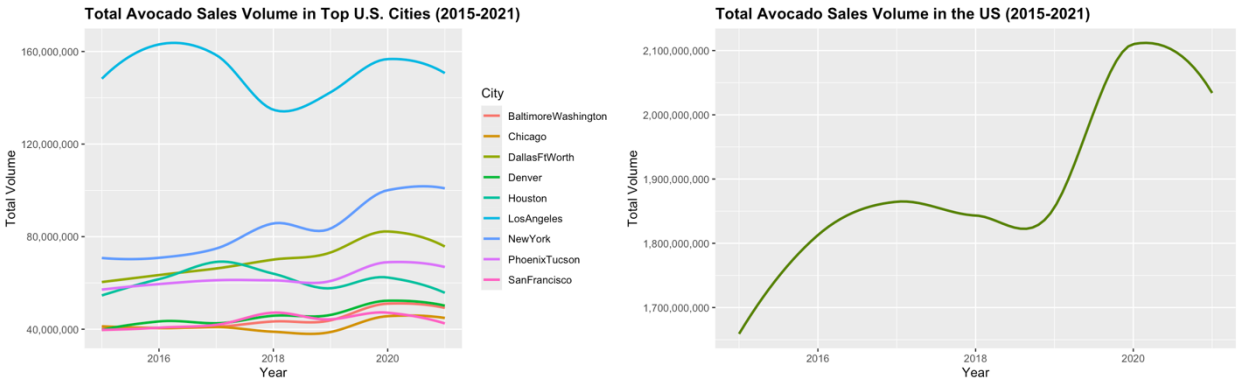
Throughout the observed period, the Large Hass Avocado consistently demonstrates the highest sales volume. Despite a gradual decline in recent years, it remains the most consumed variety, maintaining volumes significantly higher than the other two sizes. This trend highlights the popularity and preference for Large Hass Avocados among consumers.

In contrast, the Small Hass Avocado also shows substantial sales volumes, generally higher than those of the Extra Large Hass Avocados. The volume for Small Hass Avocados fluctuates over the years but consistently stays above 1 billion units, indicating a steady demand in the market.

The Extra Large Hass Avocado records the lowest sales volume among the three categories. Its sales volume remains relatively stable but is notably lower compared to the Large and Small Hass Avocados. This suggests that, despite being the largest in size, the Extra Large Hass Avocado is not the most preferred or consumed variety.

The data clearly indicates that the Extra Large Hass Avocado is not the most consumed variety. The Large Hass Avocado leads in terms of consumption, followed by the Small Hass Avocado, making the Extra Large Hass Avocado the least consumed among the three sizes. This trend reflects consumer preferences and purchasing behavior towards different sizes of Hass avocados over the years.

Question 4: Does the trend in avocado consumption in the top-consuming city reflect the overall trend in the U.S.?



Comparing the two graphs, it is evident that the pattern in Los Angeles, the top-consuming city, generally mirrors the overall trend in the U.S. Both the city and national trends exhibit an initial increase in sales volume, a dip around 2018, and a substantial rise from 2019 to 2020. While the magnitude and specific fluctuations differ, with Los Angeles peaking more prominently around 2016, the general direction of the trends aligns. This suggests that the avocado consumption patterns in Los Angeles are representative of broader national trends.

The trend in avocado consumption in Los Angeles reflects the overall trend in the U.S. to a significant extent. Both show similar patterns of increase, dip, and subsequent rise in sales volume over the years. The alignment of these trends indicates that the consumption patterns in the top-consuming city of Los Angeles are indicative of the broader national trends in avocado sales from 2015 to 2021.