Introduction to Conagra Brand:

Conagra Brands, Inc. (formerly ConAgra Foods) is an American consumer packaged goods holding company headquartered in Chicago, Illinois. Conagra makes and sells products under various brand names that are available in supermarkets, restaurants, and food service establishments. Based on its 2021 revenue, the company ranked 331st on the 2022 Fortune 500.

BRANDS:

Conagra's iconic brands, such as Birds Eye, Duncan Hines, Healthy Choice, Marie Callender's, Reddi-wip, and Slim Jim, as well as emerging brands, including Angie's BOOMCHICKAPOP, Duke's, Earth Balance, Gardein, and Frontera, offer choices for every occasion.

Table Spread:

Margarine/Table spread is a blend of oils that are mostly unsaturated fat. Butter is made from cream or milk. The type of fat found in animal products, such as cream, is mostly saturated fat. People look for a spread that has the least amount of saturated fat.
Margarine often tops butter when it comes to heart health and is slowly replacing it.

Conagra offers table spreads under various brands such as Blue Bonnet, Smart Balance, Earth Balance, Parkay.

Objective : To increase the sales of conagra table spreads.

The market size of table spread in the USA is 29.9 billion USD as per 2023 and the overall market value is expected to reach 53.2 billion USD by 2033.
The market size is near to doubling in the next ten years. So there is a high scope to capture the target customers. Some of the competitors of Conagra table spreads are Private label, Land O Lakes, Country Crock, Kerry gold, ICBINB, Challenge. We can also target the consumers of Cooking Spray and Cooking & Salad Oils to make conversions to table spreads.

Below are few observations regarding the sales of Conagra products:

- CAG's market share when compared to its competitors is 5.23 %(within food processing business)
- CAG yearly revenue as per 2022 is 12,575.90 million dollars
- The quarter growth rate of Conagra has always been positive
- The growth rate of customers has been positive

So we can conclude that though there is an increasing trend in sales, we need to accelerate the rate.

Conclusions inferred through Market Research:
- Land O Lakes, which has the highest sales is a community focussed company which focuses on only one product - butter.
- More products have been given as a trial and tester to the restaurants and stores which will lead to more sales in the long term which can be a strategy which can be implemented for promotion of Conagra products.
- The competitors are accessible and available in all online and offline stores.
- There are few products of Conagra like west coast spray not showing any info on google which indicates that it needs to be advertised and made easily available.
- Most of the competitor brands have focussed on one single product by investing more time and effort in making the product better.
- Conagra has many similar products which are difficult to differentiate like 4-5 spray products, butter products and margarine and plant based table spreads.

- Most of the customers when buying the product go by online reviews and it isobserved the competitor products have better reviews than conagra products.

Analysis:

Attribute Analysis:

1. **Region wise Analysis:** In most of the regions, we can observe that promotional sales tend to favor table spread over cooking oil and spray. Additionally, we can see that the south central and south east regions have lower unit sales with merchandising for table spreads. Additionally, we can see that the southeast region has the highest promotional sales of cooking spray. Therefore, in the southeast, we can try converting the spray sales to table spread.

Tablespread			
Geography_1	Unit Sales Any Merch	Unit Sales No Merch	Total Unit sales	Mech%
California	158,962,500	366,876,700	525,839,100	30%
Great Lakes	386,093,500	646,442,600	1,032,536,000	37%
Mid-South	236,098,300	644,788,200	880,886,500	27%
Northeast	435,610,300	841,586,600	1,277,197,000	34%
Plains	177,429,300	312,801,100	490,230,400	36%
South Central	148,048,500	568,659,900	716,708,400	21%
Southeast	255,729,500	755,348,600	1,011,078,000	25%
West	288,197,000	435,226,100	723,423,100	40%

Cooking and salad oil			
Geography_1	Unit Sales Any Merch	Unit Sales No Merch	Total Unit sales	Mech%
California	72,634,430	134,363,600	203,284,300	36%
Great Lakes	54,704,560	185,356,000	238,356,300	23%
Mid-South	59,015,000	239,048,800	297,125,700	20%
Northeast	74,654,920	222,140,700	294,201,300	25%
Plains	22,187,850	95,427,320	116,821,000	19%
South Central	75,798,580	259,936,000	333,595,000	23%
Southeast	107,776,900	300,954,900	407,207,300	26%
West	39,781,630	143,524,900	182,458,400	22%

Cooking spray				
Geography_1	Unit Sales Any Merch	Unit Sales No Merch	Total Unit sales	Mech%
California	9,002,911	37,911,800	46,361,970	19%
Great Lakes	17,284,400	74,726,370	91,595,420	19%
Mid-South	15,870,490	88,685,430	103,922,200	15%
Northeast	19,969,040	97,550,770	116,805,000	17%
Plains	7,773,952	40,923,280	48,347,060	16%
South Central	10,129,740	74,267,710	83,844,050	12%
Southeast	29,390,560	94,285,170	123,161,600	24%
West	11,776,100	55,137,090	66,561,650	18%

2. **Seasonal affects Analysis**: In general, the sales of butter and margarine may be influenced by seasonal factors such as holidays and weather patterns.

For instance, the demand for butter and margarine may increase during the holiday season like Christmas or winter break when people tend to do more baking and cooking. Additionally, butter sales may increase during colder months when people are more likely to bake pies and pastries, while margarine sales may increase during warmer months when people are more likely to use it as a spread.

However, it is worth nothing that there has been a shift in consumer preferences towards healthier alternatives to butter and margarine, such as cooking oils and sprays, which may have an impact on seasonal sales trends. Overall, the seasonal effect on the sales of Conagra products like butter and margarine would depend on various factors such as the timing of the seasons, consumer preferences, and marketing strategies, price and availability.

We can also above trends from our data as below:

Tablespread				
Quarter	Unit Sales Any Merch	Unit Sales No Merch	Total Unit sales	% share of quarter
Q1	897,375,300	2,266,160,000	2,977,527,000	24%
Q2	887,848,700	2,209,936,000	2,881,574,000	23%
Q3	761,064,000	2,248,059,000	2,809,515,000	23%
Q4	1,632,728,000	2,431,097,000	3,797,485,000	30%

Cooking oil				
Quarter	Unit Sales Any Merch	Unit Sales No Merch	Total Unit sales	% share of quarter
Q1	116,732,300	399,566,800	512,644,800	25%
Q2	105,119,300	402,818,200	504,042,500	24%

Q3	102,603,700	405,697,600	504,915,800	24%
Q4	182,098,600	372,669,800	551,446,400	27%

Cooking spray				
Quarter	**Unit Sales Any Merch**	**Unit Sales No Merch**	**Total Unit sales**	**% share of quarter**
Q1	25,611,150	143,378,000	167,829,900	25%
Q2	28,592,830	142,440,400	170,058,700	25%
Q3	20,452,550	143,000,200	162,507,000	24%
Q4	46,540,670	134,669,000	180,203,400	26%

Also we can observe that though Q4 quarter has the highest share for all the three products, the difference is high for table spread. So we can try targeting the customers more in the other quarters for possible conversions from cooking spray and oil to tablespread.

3. **Buyer Class distribution:** Segregating the Conagra vs Non-Conagra products as an average, we found below observations basis the class distribution of consumers

Class Distribution	Conagra	Non-Conagra
Lower (<$30k 1P + $5k per add`l Person)	27.20	27.49
Middle ($30-70k 1P + $5k per add`l Person)	39.62	39.16
Upper (>=$70k 1P + $30k all others)	33.17	37.00

we can observe there is variation in conagra and non-conagra brands for the upper income per capita people. So assuming the upper class looks for premium products, we can try working and promoting the premium products of our brand.

Price Analysis:

4. **Price range analysis:** One major finding is that the average price per unit is rising as the items are grouped into clusters based on market share, with cluster 1 housing the products with the majority market share. We can therefore conclude that the best sales are for products with moderate price ranges.

cluster	Average price per unit
Cluster 1	3.59
Cluster 2	3.91
Cluster 3	4.65
Cluster 4	5.37
Cluster 5	6.50
Conagra	3.55

5. **Category wise analysis:** We have checked the correlation between the features to avoid the multi-collinearity problem.

We can see which pairs of variables are highly correlated or no correlation, and which ones have lower or no connections by displaying the correlation matrix. With the aid of this knowledge, we can better comprehend how the various variables in the data connect to one another and spot any multicollinearity problems that might be present. Multicollinearity happens when two or more predictor variables have a strong correlation with one another.
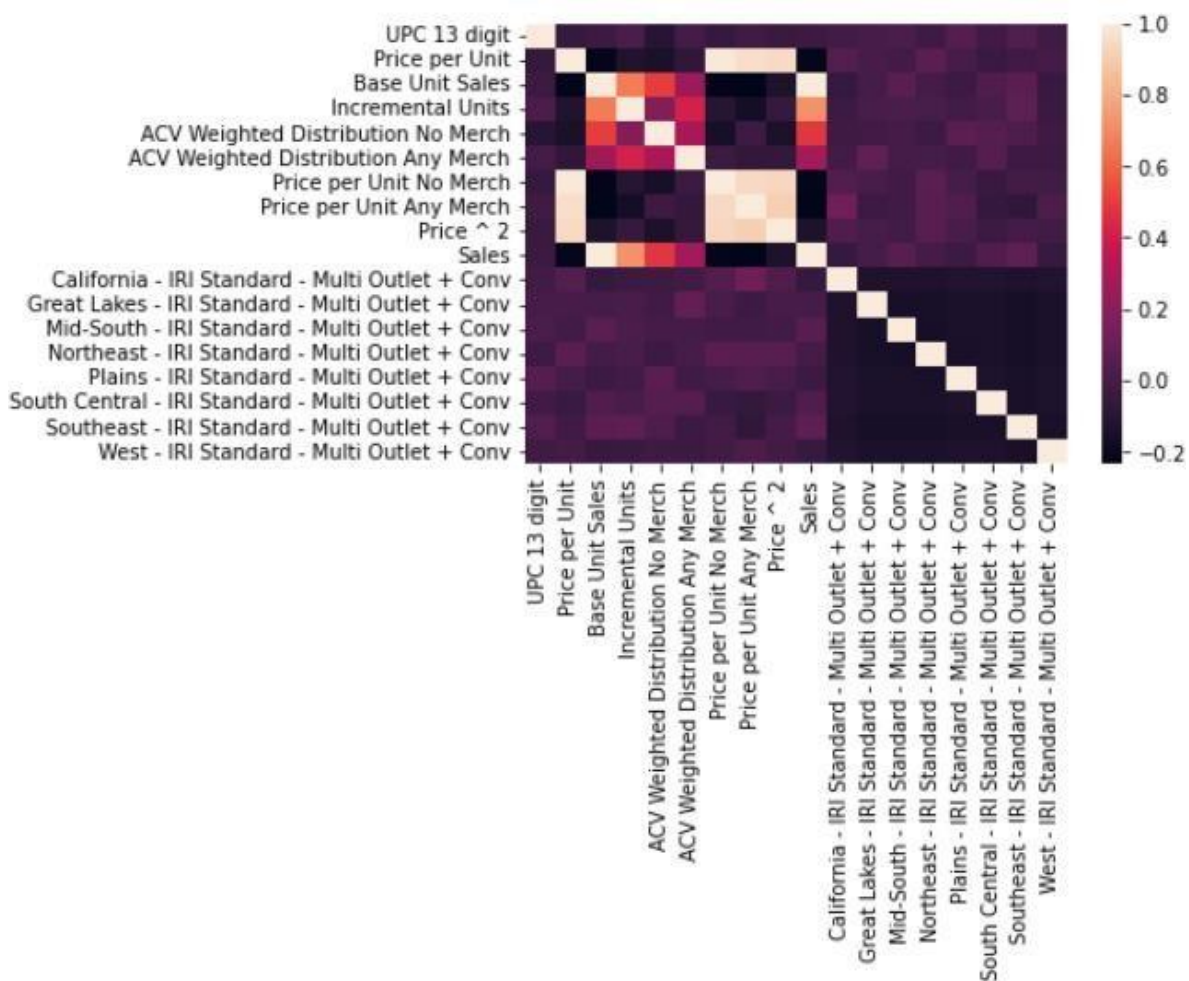
From the above plots, we can observe that incremental units and ACV distribution are correlated. That needs to be taken care of when training the model.

6. **Regression Analysis:** Upon training a linear regression model on table spread data, we have obtained the below results with an adjusted R-squared value of 35.6%

	coef	std err	t	P>|t|
Intercept	6.0869	0.094	64.991	0.000
CAGCountValue	-0.0063	0.003	-1.960	0.050
CAGOuncesValue	0.0077	0.002	3.969	0.000
log_price	-0.3991	0.070	-5.675	0.000
ACVWeightedDistributionNoMerch	0.1354	0.005	27.839	0.000
ACVWeightedDistributionAnyMerch	0.3096	0.021	14.440	0.000
California	0.6014	0.109	5.521	0.000
GreatLakes	0.8172	0.091	8.976	0.000
Mid_South	1.0667	0.091	11.715	0.000
Northeast	1.2558	0.085	14.820	0.000
Plains	0.3276	0.101	3.245	0.001
SouthCentral	0.6321	0.104	6.096	0.000
Southeast	0.8452	0.098	8.638	0.000
West	0.5408	0.101	5.368	0.000
ALLOTHERFORM	1.4644	0.101	14.554	0.000
SPRAY_SQUEEZE	0.3825	0.276	1.386	0.166
STICKS	2.6406	0.089	29.529	0.000
TUBS	1.5994	0.088	18.226	0.000

We can make below conclusions from our model:

- There is an inverse effect with count in each pack for sales.

- With 1% increase in price, sales are decreasing by 0.39%

- Northeast has the highest contribution to total sales in comparison to plains which is the lowest. So we can try increasing the promotions in plains and west regions to increase the overall sales for table spread.

- Sticks are the most popular form of table spread which has highest contribution to sales.

7. Product Attribute Analysis

In this section, we examine the effects of various product features on total sales using metrics like form, tier value, sub-category, count value, and ounces value.

7.1 Trend within the attributes in 2018

Below are the box plots for the attributes in all categories for the year 2018.
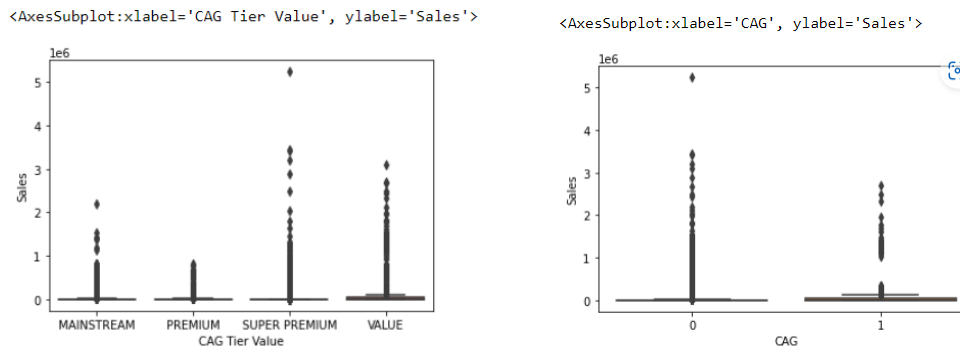
Here, the brands are represented by CAG value. Conagra brand sales are shown as 1, while sales of other brands are shown as 0. Sales of competing brands outpace those of Conagra by a wide margin. Mainstream, premium, super premium, and value are the four main categories within tier value. Sales for super premium are higher than for other grades.
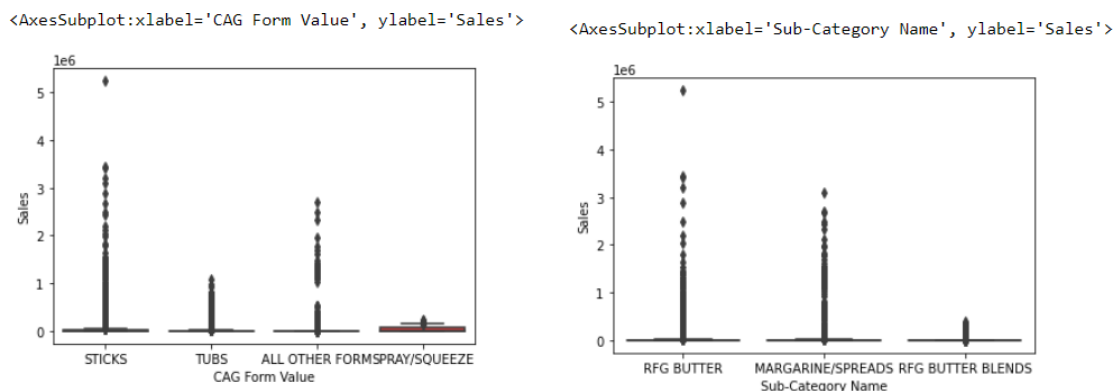
Sticks, tubs, spray/squeeze, and all other forms make up the four categories of the form. In every category, sticks have the highest sales, while sprays have lower sales. RFG butter mixes, margarine/spreads, and RFG butter are the subcategories. Compared to the other two sub-categories, RFG butter has stronger sales.

We now run a regression model using sales as the dependent variable and CAG as one of the independent variables. As all of the predictor variables in this model have p-values less than 0.05, they are all considered significant. We can see from the results in Figure 7.1.1 in the Appendix that merchandising has a bigger impact on

sales and that Conagra's overall sales are lower than those of its rivals. By setting the CAG value to 1, the output in Figure 7.1.2 excludes all other brands and only displays the findings for the Conagra brands. Here again, we see a tendency that is similar: merchandising has a bigger impact on sales, whereas price has a less impact.

7.2 CAG Count Value

For the purposes of convenience, we have only used the numbers 1, 2, 3, 5, 8, and 12 and ignored counts higher than 16 because they had less observations. For comparison with different count values, we use a 16 CT base. Figure 7.2.1 in the Appendix illustrates how, when all brands are taken into account, 16CT dominates sales across all categories more than other count values. However, we can clearly observe in the regression model in Figure 7.2.2 in the Appendix that for Conagra items, the 8CT generates greater Sales in comparison to other count values.

7.3 CAG Ounces value

In order to determine which group has the highest number of sales, we have divided the ounces into three categories: 1-16, 17-32, and 32-48, while maintaining 48 ounces or more as the baseline for comparison. The data revealed that the products with values between 1 and 16 ounces sold more than those in the other two bins. Figure 7.3.1 in the Appendix depicts the result. Conagra likewise generates greater sales from table spread goods in the 1-16 ounces category than from the 17-32 and the 32-48 ounces categories, as can be shown in Figure 7.3.2 in the Appendix.

7.4 Sub-category

We can see from the regression output in Figure 7.4.1 in the Appendix that RFG butter sells more than other sub-categories. RFG butter blends have been used as a baseline for comparison with other subcategories. According to the regression analysis, the coefficient for the independent variable "RFG BUTTER" appears to be 0 for Conagra goods. Python's calculating methods may have made mistakes as evidenced by the output in Figure 7.4.2 in the appendix.

7.5 CAG Tier Value

We have chosen 'Value', one of the CAG Tier values, as the baseline to compare with the other tier values from the regression model in Figure 7.5.1 in the Appendix. Sales in the 'Value' tier are generally higher than those in the other tiers. When only the statistics for Conagra brands and the tier 'Value' leads in Conagra products are considered, the results have hardly altered. Figure 7.5.2 in the Appendix depicts the result.

7.6 CAG Form Value

'All Other Forms' is used as the baseline in the regression model to compare other CAG form values. Sales of sticks seem to be higher than those of other kinds. In the appendix's Figure 7.6.1, the results are displayed.

 7.7 Combining all Attributes

In our next regression model, we included all the attributes in the model to remove bias and estimate the correct effects of all the attributes on sales. We have done this for all the brands together and for Conagra brands only. The coefficients have slightly changed by combining attributes and we see that the same attributes are contributing for the sales of the products as previously seen. The outputs can be seen in Figures 7.7.1 and 7.7.2 in the Appendix.

7.8 Interactions across Attributes

To compare performance across all categories and gain a general understanding of the array of traits that are working better than the others for both Conagra and other brands, we add the interaction terms in the last section of our research. In order to reduce bias and obtain the coefficients that were the closest to the true ones, we first included only the pertinent characteristic to the regression in an effort to see the individual impacts. Then, we added all the interactions for all the relevant attributes. According to the results shown below, Conagra's sales are higher when using 4Ct than when using 16Ct for other labels. At a 5% significance level, Conagra is also doing better in the 17-32 Ounces category, RFG Butter, and the customer tier of "Value."

CAG	8.786e+05	1.14e+04	77.188	0.000	8.56e+05	9.01e+05
1	-2.519e+04	7019.341	-3.589	0.000	-3.9e+04	-1.14e+04
2	-2.338e+04	6934.880	-3.371	0.001	-3.7e+04	-9786.108
3	-1.447e+04	8194.152	-1.766	0.077	-3.05e+04	1585.577
4	-3074.9949	6845.369	-0.449	0.653	-1.65e+04	1.03e+04
5	-1.809e+04	8365.216	-2.163	0.031	-3.45e+04	-1694.569
8	-3.983e+04	8056.347	-4.944	0.000	-5.56e+04	-2.4e+04
12	-1.604e+04	8183.574	-1.960	0.050	-3.21e+04	0.191
CAG * 1	2.12e+05	5733.981	36.964	0.000	2.01e+05	2.23e+05
CAG * 2	2.368e+05	5605.467	42.247	0.000	2.26e+05	2.48e+05
CAG * 3	-1.099e-09	1.5e-11	-73.389	0.000	-1.13e-09	-1.07e-09
CAG * 4	1.71e+05	7509.643	22.777	0.000	1.56e+05	1.86e+05
CAG * 5	7.897e-11	4.47e-12	17.668	0.000	7.02e-11	8.77e-11
CAG * 8	2.588e+05	1.21e+04	21.372	0.000	2.35e+05	2.83e+05
CAG * 12	-1.535e-10	1.39e-11	-11.060	0.000	-1.81e-10	-1.26e-10
1-16	-1.309e+04	2983.856	-4.386	0.000	-1.89e+04	-7238.969
17-32	-1.175e+04	3119.345	-3.765	0.000	-1.79e+04	-5631.429
32-48	-6090.7489	3063.826	-1.988	0.047	-1.21e+04	-85.650
CAG * (1-16)	-1.878e+04	8198.048	-2.291	0.022	-3.48e+04	-2710.282
CAG * (17-32)	4128.4748	1.13e+04	0.364	0.716	-1.81e+04	2.64e+04
CAG * (32-48)	-2.155e+04	9122.656	-2.362	0.018	-3.94e+04	-3671.483
MARGARINE/SPREADS	-5056.1198	1058.923	-4.775	0.000	-7131.608	-2980.632
RFG BUTTER	1.1e+04	1023.758	10.750	0.000	8998.433	1.3e+04
CAG * Margarine	-3.925e+04	5891.640	-6.663	0.000	-5.08e+04	-2.77e+04
CAG * RFG BUTTER	-4.121e-10	5.04e-12	-81.726	0.000	-4.22e-10	-4.02e-10
MAINSTREAM	-2.004e+04	1239.058	-16.176	0.000	-2.25e+04	-1.76e+04
PREMIUM	-3.207e+04	1375.557	-23.317	0.000	-3.48e+04	-2.94e+04
SUPER PREMIUM	-2.902e+04	1407.227	-20.625	0.000	-3.18e+04	-2.63e+04
CAG * MAINSTREAM	-8511.8169	4271.014	-1.993	0.046	-1.69e+04	-148.638
CAG * RFG PREMIUM	-9642.3025	3896.913	-2.474	0.013	-1.73e+04	-2004.353
CAG * SUPER PREMIUM	1.082e-12	1.14e-14	94.637	0.000	1.06e-12	1.1e-12
SPRAY/SQUEEZE	-3.314e+04	3127.648	-10.597	0.000	-3.93e+04	-2.7e+04
STICKS	-3233.2081	1551.870	-2.083	0.037	-6274.873	-191.543
TUBS	-2386.8335	782.853	-3.048	0.002	-3920.425	-851.642
CAG * SPRAY/SQUEEZE	-1.011e+06	1.11e+04	-91.472	0.000	-1.03e+06	-9.9e+05
CAG * STICKS	-1.017e+06	1.25e+04	-81.284	0.000	-1.04e+06	-9.93e+05
CAG * TUBS	-1.049e+06	9580.722	-109.510	0.000	-1.07e+06	-1.03e+06

----

8. Year wise Regression Analysis:

Below we run regression model for **impact of price** on brands quarterly for each year from 2018-2022.

Year 2018

```
                          OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.272
Model:                            OLS   Adj. R-squared:                  0.268
Method:                 Least Squares   F-statistic:                     66.91
Date:                Thu, 27 Apr 2023   Prob (F-statistic):          2.27e-206
Time:                        19:05:07   Log-Likelihood:                -6414.7
No. Observations:                3240   AIC:                         1.287e+04
Df Residuals:                    3221   BIC:                         1.298e+04
Df Model:                          18
Covariance Type:            nonrobust
==============================================================================
                            coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const                    14.1675      0.291     48.648      0.000      13.596      14.738
Price per Unit           -3.2899      0.254    -12.937      0.000      -3.789      -2.791
Price ^ 2                 5.8092      0.434     13.394      0.000       4.959       6.660
Quarter1                  0.0683      0.089      0.764      0.445      -0.107       0.244
Quarter2                  0.0423      0.088      0.482      0.630      -0.130       0.215
Quarter3                 -0.0244      0.086     -0.284      0.777      -0.193       0.144
EARTH BALANCE            -7.8372      0.595    -13.167      0.000      -9.004      -6.670
FLEISCHMANNS              0.8894      1.269      0.701      0.484      -1.599       3.378
MOVE OVER BUTTER          0.4518     33.099      0.014      0.989     -64.446      65.350
NUCOA                    -3.9545      6.773     -0.584      0.559     -17.234       9.325
PARKAY                   -1.8618      0.408     -4.558      0.000      -2.663      -1.061
SMART BALANCE            -7.3108      0.455    -16.055      0.000      -8.204      -6.418
SMART BEAT               -0.2884      0.052     -5.576      0.000      -0.390      -0.187
Price * EARTH BALANCE     1.9496      0.192     10.178      0.000       1.574       2.325
Price * FLEISCHMANNS     -1.3818      0.520     -2.656      0.008      -2.402      -0.362
Price * MOVE OVER BUTTER -0.4360     22.529     -0.019      0.985     -44.609      43.737
Price * NUCOA             0.3484      3.087      0.113      0.910      -5.704       6.401
Price * PARKAY            0.2634      0.163      1.615      0.106      -0.056       0.583
Price * SMART BALANCE     1.8963      0.168     11.313      0.000       1.568       2.225
Price * SMART BEAT       -0.8047      0.144     -5.576      0.000      -1.088      -0.522
==============================================================================
Omnibus:                      656.992   Durbin-Watson:                   0.369
Prob(Omnibus):                  0.000   Jarque-Bera (JB):             1878.990
Skew:                          -1.056   Prob(JB):                         0.00
Kurtosis:                       6.076   Cond. No.                     2.98e+17
------------------------------------------------------------------------------
```

The model's R-squared value is 0.272, which means that the predictor variables in the model can account for around 27.2% of the variation in the natural logarithm of sales. With the number of predictor variables in the model taken into account, the adjusted R-squared value is a little lower at 0.268.

When all other predictor variables are held constant, the brand indicator coefficients show the predicted difference in the natural logarithm of sales between each brand and the reference brand (BLUE BONNET). For instance, the coefficient for EARTH BALANCE is -7.8372, which indicates that EARTH BALANCE's estimated natural logarithm of sales is 7.8372 units lower than that of BLUE BONNET.

We would need to look at the coefficients for the price variables and the terms that interact between price and brand indicators to understand the pricing differences between the brands throughout the quarters and their impact on the dependent variable. Given that the p-values for the price variables and the majority of the interaction factors are more than 0.05, it suggests that the impact of price on the natural logarithm of sales is not significant for the majority of the brands. However, there are a few significant coefficients that indicate that changes in price for these brands may have a significant impact on sales, including the coefficients for Price^2 and PARKAY.

However, a $1 increase in price is linked to a bigger decline in sales for SMART BALANCE than for other brands, according to the positive and significant coefficient for Price * SMART BALANCE. This indicates that the price difference between SMART BALANCE and the reference brand is wider than we may anticipate, indicating that consumers are less ready to pay more for SMART BALANCE than for other brands. This might be the result of several things, like client brand loyalty or perceived quality.

Year 2019

```
                        OLS Regression Results
==============================================================================
Dep. Variable:                   y   R-squared:                       0.245
Model:                         OLS   Adj. R-squared:                  0.241
Method:              Least Squares   F-statistic:                     59.21
Date:             Thu, 27 Apr 2023   Prob (F-statistic):           6.91e-185
Time:                     19:05:37   Log-Likelihood:                 -6544.6
No. Observations:             3299   AIC:                         1.313e+04
Df Residuals:                 3280   BIC:                         1.324e+04
Df Model:                       18
Covariance Type:         nonrobust
==============================================================================
                          coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const                  13.4074      0.289     46.391      0.000      12.841      13.974
Price per Unit         -2.7828      0.250    -11.144      0.000      -3.272      -2.293
Price ^ 2               4.6578      0.417     11.168      0.000       3.840       5.476
Quarter1                0.1693      0.088      1.928      0.054      -0.003       0.341
Quarter2                0.0828      0.087      0.948      0.343      -0.089       0.254
Quarter3                0.0325      0.088      0.372      0.710      -0.139       0.204
EARTH BALANCE          -6.3160      0.591    -10.679      0.000      -7.476      -5.156
FLEISCHMANNS           -1.8769      1.342     -1.398      0.162      -4.509       0.755
MOVE OVER BUTTER        8.6286     11.398      0.757      0.449     -13.720      30.977
NUCOA                 -13.9481     20.316     -0.687      0.492     -53.780      25.884
PARKAY                 -1.0566      0.413     -2.557      0.011      -1.867      -0.246
SMART BALANCE          -6.6104      0.462    -14.301      0.000      -7.517      -5.704
SMART BEAT             -0.2413      0.059     -4.057      0.000      -0.358      -0.125
Price * EARTH BALANCE   1.6009      0.190      8.432      0.000       1.229       1.973
Price * FLEISCHMANNS   -0.0967      0.552     -0.175      0.861      -1.179       0.986
Price * MOVE OVER BUTTER -5.7606    7.494     -0.769      0.442     -20.454       8.933
Price * NUCOA           4.9470      9.044      0.547      0.584     -12.785      22.679
Price * PARKAY          0.0722      0.164      0.442      0.659      -0.248       0.393
Price * SMART BALANCE   1.7479      0.170     10.269      0.000       1.414       2.082
Price * SMART BEAT     -0.6732      0.166     -4.057      0.000      -0.999      -0.348
==============================================================================
Omnibus:                     620.541   Durbin-Watson:                   0.366
Prob(Omnibus):                 0.000   Jarque-Bera (JB):             1866.390
Skew:                         -0.966   Prob(JB):                         0.00
Kurtosis:                      6.137   Cond. No.                     2.12e+17
==============================================================================
```

Price * EARTH BALANCE's coefficient is positive and statistically significant, suggesting that the price difference between EARTH BALANCE and the reference brand (Price * BLUE BONNET) is less substantial than first assumed. This implies that although EARTH BALANCE may be more expensive than competing brands, consumers are still willing to pay the higher price for the product as evidenced by the sales numbers.

However, the coefficient for Price * SMART BALANCE is also significant and positive, suggesting that the price difference between SMART BALANCE and the reference brand (BLUE BONNET) is wider than initially thought. This shows that consumers would view SMART BALANCE as having a worse quality product overall than competing brands and be less ready to pay a higher price for it, which would lead to fewer sales.

Conagra can modify their pricing strategy for various brands based on these findings to better match customer opinions and preferences. For instance, a conagra may think about raising the price further if a brand like EARTH BALANCE is doing well in spite of its higher price to extract more value from the product. Alternatively, a business may think about lowering the price to make it more appealing to price-conscious customers if a brand like SMART BALANCE is experiencing lower sales as a result of its perceived lower quality.

Year 2020

```
                              OLS Regression Results
==============================================================================
Dep. Variable:                       y   R-squared:                       0.206
Model:                             OLS   Adj. R-squared:                  0.202
Method:                  Least Squares   F-statistic:                     49.87
Date:                 Thu, 27 Apr 2023  Prob (F-statistic):           1.34e-149
Time:                         19:06:19  Log-Likelihood:                 -6681.1
No. Observations:                 3289  AIC:                         1.340e+04
Df Residuals:                     3271  BIC:                         1.351e+04
Df Model:                           17
Covariance Type:             nonrobust
==============================================================================
                          coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const                  12.3341      0.362     34.096      0.000      11.625      13.043
Price per Unit         -1.6031      0.338     -4.743      0.000      -2.266      -0.940
Price ^ 2               2.5176      0.603      4.177      0.000       1.336       3.699
Quarter1                0.0372      0.092      0.405      0.685      -0.143       0.217
Quarter2                0.1762      0.092      1.919      0.055      -0.004       0.356
Quarter3               -0.0453      0.092     -0.495      0.621      -0.225       0.134
EARTH BALANCE          -4.6708      0.833     -5.607      0.000      -6.304      -3.037
FLEISCHMANNS           -2.5034      1.043     -2.400      0.016      -4.548      -0.459
MOVE OVER BUTTER        0.7470     23.742      0.031      0.975     -45.803      47.297
NUCOA                  -2.8945      4.069     -0.711      0.477     -10.872       5.083
PARKAY                  0.0848      0.491      0.173      0.863      -0.879       1.048
SMART BALANCE          -4.7262      0.629     -7.516      0.000      -5.959      -3.493
Price * EARTH BALANCE   0.9630      0.253      3.812      0.000       0.468       1.458
Price * FLEISCHMANNS    0.2257      0.406      0.556      0.578      -0.570       1.021
Price * MOVE OVER BUTTER -0.6482    15.026     -0.043      0.966     -30.110      28.814
Price * NUCOA           0.1362      1.811      0.075      0.940      -3.414       3.686
Price * PARKAY         -0.2129      0.188     -1.130      0.258      -0.582       0.156
Price * SMART BALANCE   1.0508      0.218      4.824      0.000       0.624       1.478
==============================================================================
Omnibus:                       280.891   Durbin-Watson:                   0.253
Prob(Omnibus):                   0.000   Jarque-Bera (JB):              499.974
Skew:                           -0.603   Prob(JB):                     2.70e-109
Kurtosis:                        4.482   Cond. No.                      4.39e+03
==============================================================================
```

The analysis of the coefficient values indicates that the impact of price on sales varies significantly across different brands. The coefficient for Price * EARTH BALANCE is positive (0.9630), implying that a higher price has a greater positive impact on sales of

EARTH BALANCE than the reference category. Similarly, the coefficient for Price * SMART BALANCE is also positive (1.0508), indicating that a higher price has a more positive impact on sales of SMART BALANCE compared to the reference category. However, the coefficient for Price * FLEISCHMANNS is positive (0.2257) but smaller than those of EARTH BALANCE and SMART BALANCE, suggesting that a higher price has a less positive impact on sales of FLEISCHMANNS than the reference category.

Moreover, the coefficient for Price * MOVE OVER BUTTER is negative (-0.6482), indicating that an increase in the price of MOVE OVER BUTTER may lead to a negative impact on sales compared to the reference category. However, the coefficient has a high standard error and a wide confidence interval, which suggests that this result is not statistically significant and requires further analysis.

In conclusion, the effect of price on sales varies significantly among different brands, and an increase in the price of EARTH BALANCE and SMART BALANCE may have a more positive impact on sales compared to the reference category. In contrast, an increase in the price of MOVE OVER BUTTER may have a negative impact on sales, but this finding is not statistically significant and requires further investigation.

Year 2021

```
                          OLS Regression Results
==============================================================================
Dep. Variable:                    y   R-squared:                       0.243
Model:                          OLS   Adj. R-squared:                  0.239
Method:               Least Squares   F-statistic:                     59.46
Date:              Thu, 27 Apr 2023   Prob (F-statistic):           8.48e-176
Time:                      19:06:38   Log-Likelihood:                 -6412.0
No. Observations:              3160   AIC:                         1.286e+04
Df Residuals:                  3142   BIC:                         1.297e+04
Df Model:                        17
Covariance Type:            nonrobust
===============================================================================
                            coef    std err          t      P>|t|      [0.025      0.975]
-------------------------------------------------------------------------------
const                    11.6442      0.341     34.181      0.000      10.976      12.312
Price per Unit           -1.3251      0.320     -4.145      0.000      -1.952      -0.698
Price ^ 2                 2.3993      0.579      4.145      0.000       1.264       3.534
Quarter1                  0.0787      0.094      0.833      0.405      -0.106       0.264
Quarter2                 -0.0261      0.095     -0.275      0.784      -0.213       0.160
Quarter3                 -0.0717      0.093     -0.769      0.442      -0.254       0.111
EARTH BALANCE            -4.1148      0.822     -5.004      0.000      -5.727      -2.502
FLEISCHMANNS              2.3643      1.182      2.000      0.046       0.047       4.682
MOVE OVER BUTTER          0.4338      6.844      0.063      0.949     -12.985      13.853
NUCOA                    -4.2105      2.092     -2.012      0.044      -8.313      -0.108
PARKAY                    0.9525      0.490      1.944      0.052      -0.008       1.913
SMART BALANCE            -4.1804      0.613     -6.820      0.000      -5.382      -2.979
Price * EARTH BALANCE     0.6988      0.243      2.877      0.004       0.223       1.175
Price * FLEISCHMANNS     -1.5788      0.447     -3.532      0.000      -2.455      -0.702
Price * MOVE OVER BUTTER -0.3818      4.141     -0.092      0.927      -8.502       7.738
Price * NUCOA             0.3731      0.945      0.395      0.693      -1.479       2.226
Price * PARKAY           -0.4949      0.182     -2.714      0.007      -0.853      -0.137
Price * SMART BALANCE     0.8430      0.207      4.076      0.000       0.437       1.248
==============================================================================
Omnibus:                       76.903   Durbin-Watson:                   0.217
Prob(Omnibus):                  0.000   Jarque-Bera (JB):               92.063
Skew:                          -0.322   Prob(JB):                     1.02e-20
Kurtosis:                       3.532   Cond. No.                     1.35e+03
==============================================================================
```

The regression output reveals that all butter brand coefficients, except for "MOVE OVER BUTTER," are statistically significant at a 95% confidence level. The intercept (const) coefficient represents the baseline sales when all other variables are at zero. The coefficient for "EARTH BALANCE" is negative, indicating that this brand's sales are

lower than the baseline sales, while "FLEISCHMANNS" has a positive coefficient, indicating that this brand's sales are higher than the baseline sales. Similarly, the coefficient for "NUCOA" is negative, indicating that this brand's sales are also lower than the baseline sales.

Moreover, the coefficient for "PARKAY" is positive, although marginally significant (p-value = 0.052), indicating that this brand's sales may not be significantly different from the baseline. The interaction between price and brand also significantly impacts sales, as demonstrated by the coefficients for "Price * EARTH BALANCE" and "Price * FLEISCHMANNS." The former is positive, indicating that a higher price for "EARTH BALANCE" results in higher sales, while the latter is negative, implying that a higher price for "FLEISCHMANNS" leads to lower sales.

However, the coefficients for the interactions with "MOVE OVER BUTTER" and "NUCOA" are not significant (p-values > 0.05), suggesting that the price of these brands does not significantly impact sales. Furthermore, the coefficient for "Price * PARKAY" is negative, indicating that a higher price for this brand results in lower sales. Lastly, the coefficient for "Price * SMART BALANCE" is positive, indicating that a higher price for this brand leads to higher sales.

In conclusion, the analysis shows that brand plays a significant role in determining sales, with some brands commanding a higher price premium than others. Additionally, the interaction between price and brand can significantly impact sales, with some brands benefiting from higher prices while others suffer from lower prices.

Year 2022

```
                        OLS Regression Results
=================================================================
Dep. Variable:                  y   R-squared:                  0.300
Model:                        OLS   Adj. R-squared:             0.296
Method:             Least Squares   F-statistic:                72.22
Date:            Thu, 27 Apr 2023   Prob (F-statistic):     6.39e-207
Time:                    19:06:59   Log-Likelihood:            -5769.6
No. Observations:            2878   AIC:                     1.158e+04
Df Residuals:                2860   BIC:                     1.168e+04
Df Model:                      17
Covariance Type:        nonrobust
=================================================================
                           coef   std err       t    P>|t|   [0.025   0.975]
-----------------------------------------------------------------
const                   13.0057     0.228  57.053   0.000   12.559   13.453
Price per Unit          -2.5177     0.161 -15.616   0.000   -2.834   -2.202
Price ^ 2                4.9807     0.352  14.135   0.000    4.290    5.672
Quarter1                -0.1711     0.100  -1.708   0.088   -0.367    0.025
Quarter2                -0.1435     0.098  -1.457   0.145   -0.337    0.050
Quarter3                -0.1011     0.098  -1.034   0.301   -0.293    0.091
EARTH BALANCE           -8.8772     0.503 -17.642   0.000   -9.864   -7.891
FLEISCHMANNS            -2.6087     1.157  -2.254   0.024   -4.878   -0.339
MOVE OVER BUTTER        -0.9324     3.255  -0.286   0.775   -7.315    5.450
NUCOA                   -4.9364     3.374  -1.463   0.144  -11.553    1.680
PARKAY                  -1.1911     0.402  -2.963   0.003   -1.979   -0.403
SMART BALANCE           -7.8466     0.426 -18.421   0.000   -8.682   -7.011
Price * EARTH BALANCE    1.7289     0.123  14.012   0.000    1.487    1.971
Price * FLEISCHMANNS     0.2997     0.358   0.838   0.402   -0.401    1.001
Price * MOVE OVER BUTTER 0.0461     1.604   0.029   0.977   -3.099    3.191
Price * NUCOA            0.7373     1.212   0.609   0.543   -1.638    3.113
Price * PARKAY           0.3277     0.118   2.782   0.005    0.097    0.559
Price * SMART BALANCE    1.7400     0.115  15.152   0.000    1.515    1.965
=================================================================
Omnibus:                   39.833   Durbin-Watson:              0.244
Prob(Omnibus):              0.000   Jarque-Bera (JB):          42.679
Skew:                     -0.259   Prob(JB):                5.40e-10
Kurtosis:                   3.294   Cond. No.                    721.
=================================================================
```

The regression coefficients reveal that Earth Balance and Smart Balance have a significant negative impact on sales, whereas Fleischmann's and Parkay have a smaller negative impact. Move Over Butter and Nucoa have non-significant coefficients, implying that their effect on sales is not statistically significant.

Furthermore, the coefficients for the interaction terms between price and each brand reveal insights into the relative pricing power of different brands. The Price * Earth Balance coefficient is positive and significant, indicating that higher prices for Earth Balance are associated with higher sales, implying that Earth Balance has a higher perceived value or quality compared to other brands.

The Price * Fleischmann's and Price * Parkay coefficients are both positive and significant but smaller than the Price * Earth Balance coefficient, indicating that these brands have a lower perceived value or quality compared to Earth Balance but still have some pricing power.

Finally, the Price * Move Over Butter and Price * Nucoa coefficients are not significant, suggesting that these brands are more price-sensitive and do not have significant pricing power.

In summary, the regression coefficients reveal that Earth Balance and Smart Balance have a significant negative impact on sales, while Fleischmann's and Parkay have a smaller negative impact. The interaction terms indicate that Earth Balance has a higher perceived value and pricing power compared to other brands, while Move Over Butter and Nucoa are more price sensitive.

9. **Cannibalization Analysis:**

Cooking oil and cooking sprays produced by Conagra, such as Wesson oil and PAM spray, are commonly used as a substitute for butter and margarine in cooking and baking. These products are often preferred by those who want to reduce their intake of saturated fat and calories.

While cooking oils and sprays can be used in a similar way to butter and margarine, they do not have the same taste and texture. Therefore, they are not considered a complement to table spreads like butter and margarine.

However, some people may use both cooking oils/sprays and butter/margarine in different ways in their cooking and baking. Overall, cooking oils and sprays are often seen as a healthier substitute for butter and margarine.
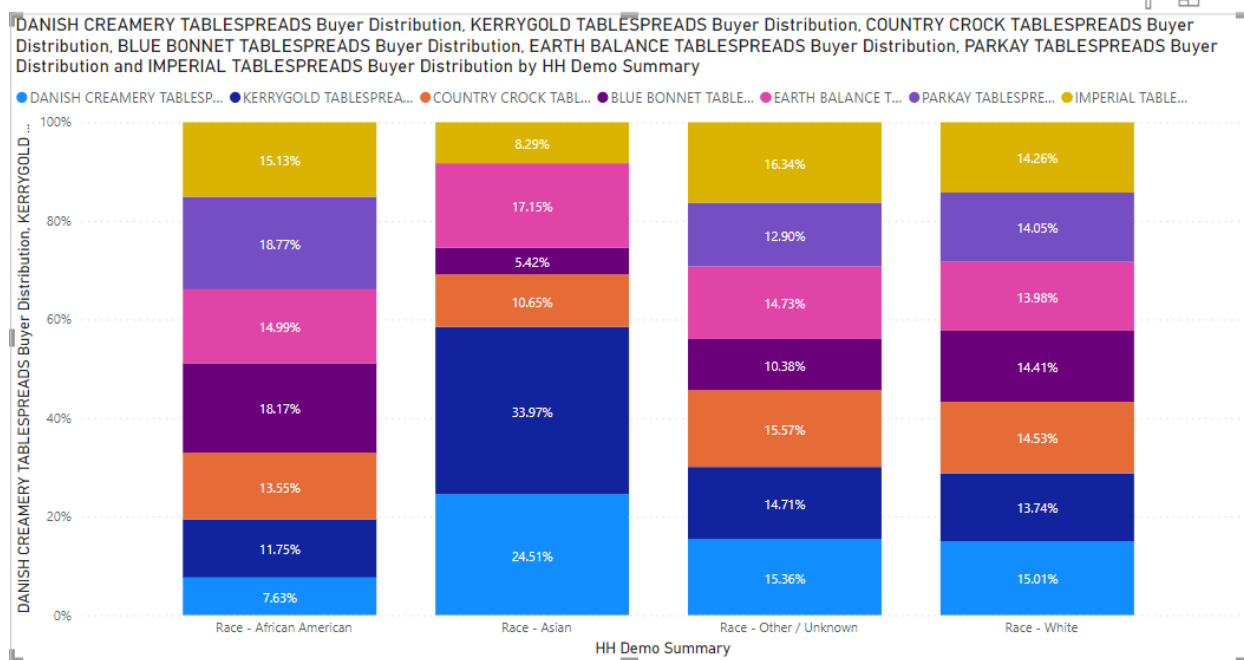
Conclusions:

We can draw below conclusions on the category **Table spread** and specifically Conagra brands:
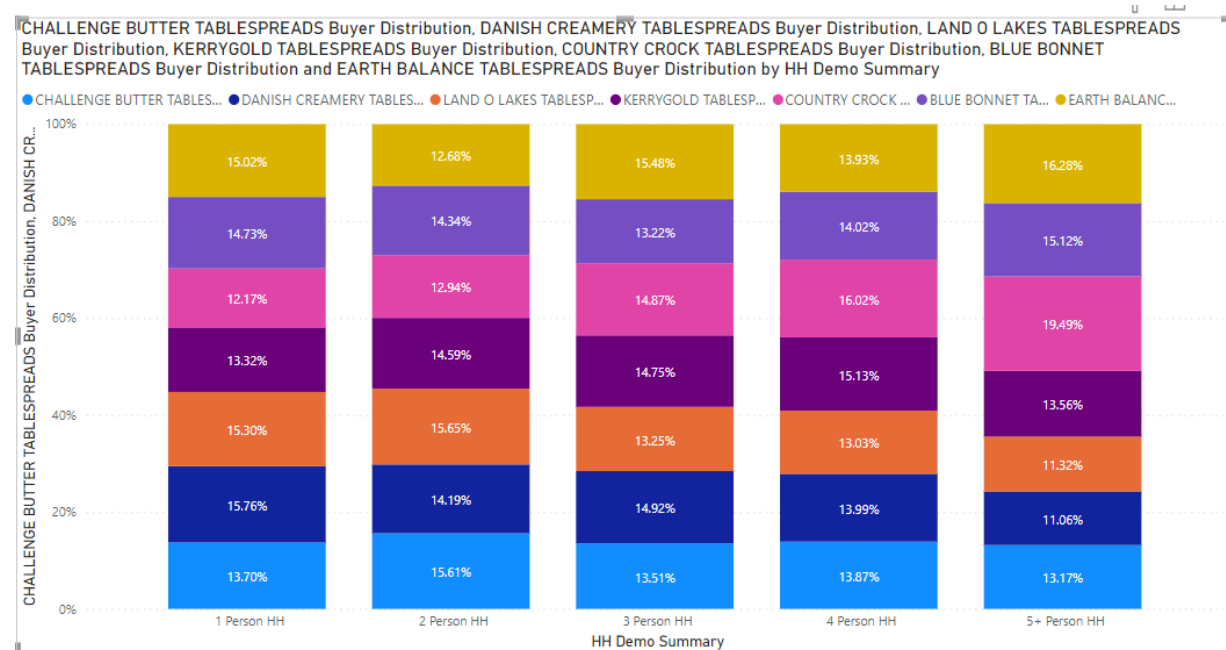
1. The south central and south-east regions, which have strong potential for table spreads but have less merchandising, can boost their merchandising. With merchandising, we can quantify the 2% of cooking oil and spray sales.

2. Compared to the Plains, which contribute the least to total sales, the Northeast Region contributes the most. To enhance the overall sales of table spread, we can attempt expanding the promotions in the plains and west regions.

3. Although the sales distribution for cooking oil and cooking spray is essentially consistent across all quarters, the trend for table spread is different. In comparison to other quarters, Q4 sales are high. Therefore, by improving marketing and deals, there is room to increase table spread sales in other areas as well.

4. Based on the distribution of classes, we can see that Conagra has a chance to convert sales of non-Conagra items for upper class consumers. To take 4% of that market, we might consider introducing premium products.

5. Conagra's product prices are moderate, which is perfect for boosting sales. With a 1% increase in price, sales decreases by 0.39%. So we can continue with the same.

6. Sticks are the most popular form of table spread and have the biggest sales contribution. Also, the number of items in each bundle has the opposite effect on sales. So, we can restrict the production of 12 CT and 16 CT products.

7. Another strategy we can implement is positioning the conagra products next to pricey products in places like Walmart so that customers will choose them since they are more affordable.

8. As another simple way to increase sales, we may also agree to have Conagra items placed at eye level at retail establishments.

9. The analysis shows the significant impact of product attributes on sales performance, including merchandising, tier value, form, count value, ounces value, and sub-category. Conagra's overall sales are lower than those of its competitors, however certain attributes, such as the 8CT count value and particular ounces and sub-category ranges, help Conagra goods sell better.

APPENDIX

Buyer Distribution based on Race Demographics

DANISH CREAMERY TABLESPREADS Buyer Distribution, KERRYGOLD TABLESPREADS Buyer Distribution, COUNTRY CROCK TABLESPREADS Buyer Distribution, BLUE BONNET TABLESPREADS Buyer Distribution, EARTH BALANCE TABLESPREADS Buyer Distribution, PARKAY TABLESPREADS Buyer Distribution and IMPERIAL TABLESPREADS Buyer Distribution by HH Demo Summary

Buyer Distribution based on no of persons in household.

CHALLENGE BUTTER TABLESPREADS Buyer Distribution, DANISH CREAMERY TABLESPREADS Buyer Distribution, LAND O LAKES TABLESPREADS Buyer Distribution, KERRYGOLD TABLESPREADS Buyer Distribution, COUNTRY CROCK TABLESPREADS Buyer Distribution, BLUE BONNET TABLESPREADS Buyer Distribution and EARTH BALANCE TABLESPREADS Buyer Distribution by HH Demo Summary

```
                           OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.376
Model:                            OLS   Adj. R-squared:                  0.376
Method:                 Least Squares   F-statistic:                     4994.
Date:                Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                        23:35:52   Log-Likelihood:            -8.3384e+05
No. Observations:               66222   AIC:                         1.668e+06
Df Residuals:                   66213   BIC:                         1.668e+06
Df Model:                           8
Covariance Type:            nonrobust
==============================================================================
                                     coef    std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                            1.606e+04   2840.646      5.653      0.000    1.05e+04    2.16e+04
Price per Unit                  -2315.0490    152.051    -15.225      0.000   -2613.069   -2017.029
ACV Weighted Distribution No Merch   4498.7913     33.072    136.031      0.000    4433.971    4563.612
ACV Weighted Distribution Any Merch  8220.1519    141.789     57.975      0.000    7942.245    8498.059
Price ^ 2(tablespread)             25.9546      2.434     10.665      0.000      21.185      30.724
CAG                             -1.697e+04   1331.066    -12.753      0.000   -1.96e+04   -1.44e+04
1-16                            -1.568e+04   2728.726     -5.744      0.000    -2.1e+04   -1.03e+04
17-32                           -1.924e+04   3018.130     -6.373      0.000   -2.52e+04   -1.33e+04
32-48                           -2.085e+04   2913.645     -7.157      0.000   -2.66e+04   -1.51e+04
==============================================================================
Omnibus:                   142788.325   Durbin-Watson:                   0.254
Prob(Omnibus):                  0.000   Jarque-Bera (JB):      1340256893.847
Skew:                          19.096   Prob(JB):                         0.00
Kurtosis:                     698.898   Cond. No.                     4.41e+03
==============================================================================
```

Figure 7.1.1

```
                           OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.391
Model:                            OLS   Adj. R-squared:                  0.390
Method:                 Least Squares   F-statistic:                     519.4
Date:                Sat, 22 Apr 2023   Prob (F-statistic):               0.00
Time:                        00:34:11   Log-Likelihood:                 -43011.
No. Observations:                3240   AIC:                         8.603e+04
Df Residuals:                    3235   BIC:                         8.606e+04
Df Model:                           4
Covariance Type:            nonrobust
==============================================================================
                                     coef    std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                            1.557e+05   9897.284     15.732      0.000    1.36e+05    1.75e+05
Price per Unit                  -8.577e+04   4421.710    -19.396      0.000   -9.44e+04   -7.71e+04
ACV Weighted Distribution No Merch   5061.5038    191.160     26.478      0.000    4686.697    5436.310
ACV Weighted Distribution Any Merch  5872.4641   1235.566      4.753      0.000    3449.893    8295.035
Price ^ 2(tablespread)           7200.7800    427.323     16.851      0.000    6362.929    8038.631
==============================================================================
Omnibus:                     4060.474   Durbin-Watson:                   0.119
Prob(Omnibus):                  0.000   Jarque-Bera (JB):          665234.961
Skew:                           6.767   Prob(JB):                         0.00
Kurtosis:                      71.880   Cond. No.                         114.
==============================================================================
```

Figure 7.1.2

```
                                   OLS Regression Results
==============================================================================
Dep. Variable:                     y   R-squared:                       0.391
Model:                           OLS   Adj. R-squared:                  0.391
Method:                Least Squares   F-statistic:                     3544.
Date:               Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                       23:22:59   Log-Likelihood:            -8.3304e+05
No. Observations:              66222   AIC:                         1.666e+06
Df Residuals:                  66209   BIC:                         1.666e+06
Df Model:                         12
Covariance Type:           nonrobust
====================================================================================================
                                        coef     std err          t      P>|t|      [0.025      0.975]
----------------------------------------------------------------------------------------------------
const                                4.031e+04    7041.259      5.725      0.000    2.65e+04    5.41e+04
Price per Unit                      -2534.7279     150.072    -16.890      0.000   -2828.869   -2240.587
ACV Weighted Distribution No Merch   4496.5122      32.839    136.924      0.000    4432.147    4560.877
ACV Weighted Distribution Any Merch  8754.0751     140.902     62.129      0.000    8477.907    9030.243
Price ^ 2(tablespread)                 33.1953       2.401     13.824      0.000      28.489      37.902
CAG                                 -1.325e+04    1320.052    -10.037      0.000   -1.58e+04   -1.07e+04
1                                   -4.838e+04    6963.512     -6.948      0.000    -6.2e+04   -3.47e+04
2                                   -4.575e+04    7059.775     -6.480      0.000   -5.96e+04   -3.19e+04
3                                   -3.405e+04    8289.382     -4.108      0.000   -5.03e+04   -1.78e+04
4                                   -2.402e+04    6971.632     -3.445      0.001   -3.77e+04   -1.04e+04
5                                   -4.918e+04    8515.678     -5.775      0.000   -6.59e+04   -3.25e+04
8                                   -5.142e+04    8156.855     -6.304      0.000   -6.74e+04   -3.54e+04
12                                   -2.57e+04    8460.339     -3.038      0.002   -4.23e+04   -9117.433
==============================================================================
Omnibus:                     143036.631   Durbin-Watson:                   0.259
Prob(Omnibus):                    0.000   Jarque-Bera (JB):    1372991431.530
Skew:                            19.167   Prob(JB):                         0.00
Kurtosis:                       707.362   Cond. No.                     1.62e+04
==============================================================================
```

Figure 7.2.1

```
                              OLS Regression Results
------------------------------------------------------------------------------
Dep. Variable:                     y   R-squared:                       0.396
Model:                           OLS   Adj. R-squared:                  0.395
Method:                Least Squares   F-statistic:                     302.5
Date:               Sat, 22 Apr 2023   Prob (F-statistic):               0.00
Time:                       00:34:11   Log-Likelihood:                -42998.
No. Observations:               3240   AIC:                         8.601e+04
Df Residuals:                   3232   BIC:                         8.606e+04
Df Model:                          7
Covariance Type:           nonrobust
------------------------------------------------------------------------------
                                        coef     std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const                                1.347e+05    8463.912     15.909      0.000    1.18e+05    1.51e+05
Price per Unit                      -8.695e+04    4458.597    -19.503      0.000   -9.57e+04   -7.82e+04
ACV Weighted Distribution No Merch   5128.9985     193.549     26.500      0.000    4749.500    5508.481
ACV Weighted Distribution Any Merch  5897.6165    1237.103      4.767      0.000    3472.030    8323.203
Price ^ 2(tablespread)               7225.5841     427.788     16.891      0.000    6386.821    8064.348
1                                    2.155e+04    5571.903      3.868      0.000    1.06e+04    3.25e+04
2                                    4.787e+04    7432.515      6.440      0.000    3.33e+04    6.24e+04
3                                   -3.255e-11    1.48e-11     -2.201      0.028   -6.16e-11   -3.55e-12
4                                    5076.7079    6899.779      0.736      0.462   -8451.677    1.86e+04
5                                           0           0        nan        nan           0           0
8                                    6.016e+04    1.58e+04      3.810      0.000    2.92e+04    9.11e+04
12                                          0           0        nan        nan           0           0
------------------------------------------------------------------------------
Omnibus:                       4070.419   Durbin-Watson:                   0.121
Prob(Omnibus):                    0.000   Jarque-Bera (JB):         673431.950
Skew:                             6.794   Prob(JB):                         0.00
Kurtosis:                        72.309   Cond. No.                          inf
------------------------------------------------------------------------------
```

Figure 7.2.2

```
                           OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.376
Model:                            OLS   Adj. R-squared:                  0.376
Method:                 Least Squares   F-statistic:                     4994.
Date:                Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                        23:35:52   Log-Likelihood:             -8.3384e+05
No. Observations:               66222   AIC:                         1.668e+06
Df Residuals:                   66213   BIC:                         1.668e+06
Df Model:                           8
Covariance Type:            nonrobust
==================================================================================================
                                        coef     std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                                1.606e+04   2840.646      5.653      0.000    1.05e+04    2.16e+04
Price per Unit                      -2315.0490    152.051    -15.225      0.000   -2613.069   -2017.029
ACV Weighted Distribution No Merch   4498.7913     33.072    136.031      0.000    4433.971    4563.612
ACV Weighted Distribution Any Merch  8220.1519    141.789     57.975      0.000    7942.245    8498.059
Price ^ 2(tablespread)                 25.9546      2.434     10.665      0.000      21.185      30.724
CAG                                 -1.697e+04   1331.066    -12.753      0.000   -1.96e+04   -1.44e+04
1-16                                -1.568e+04   2728.726     -5.744      0.000    -2.1e+04   -1.03e+04
17-32                               -1.924e+04   3018.130     -6.373      0.000   -2.52e+04   -1.33e+04
32-48                               -2.085e+04   2913.645     -7.157      0.000   -2.66e+04   -1.51e+04
==============================================================================
Omnibus:                    142788.325   Durbin-Watson:                   0.254
Prob(Omnibus):                   0.000   Jarque-Bera (JB):      1340256893.847
Skew:                           19.096   Prob(JB):                         0.00
Kurtosis:                      698.898   Cond. No.                     4.41e+03
==============================================================================
```

Figure 7.3.1

```
                           OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.375
Model:                            OLS   Adj. R-squared:                  0.375
Method:                 Least Squares   F-statistic:                     5671.
Date:                Sat, 22 Apr 2023   Prob (F-statistic):               0.00
Time:                        00:34:11   Log-Likelihood:             -8.3392e+05
No. Observations:               66222   AIC:                         1.668e+06
Df Residuals:                   66214   BIC:                         1.668e+06
Df Model:                           7
Covariance Type:            nonrobust
==================================================================================================
                                        coef     std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                                1.349e+04   2836.967      4.756      0.000    7931.854    1.91e+04
Price per Unit                      -2235.8664    152.110    -14.699      0.000   -2534.001   -1937.732
ACV Weighted Distribution No Merch   4395.0265     32.094    136.941      0.000    4332.122    4457.931
ACV Weighted Distribution Any Merch  8340.1341    141.649     58.879      0.000    8062.502    8617.766
Price ^ 2(tablespread)                 25.2837      2.436     10.379      0.000      20.509      30.058
1-16                                   -1.4e+04   2728.879     -5.129      0.000   -1.93e+04   -8649.000
17-32                               -1.767e+04   3019.316     -5.853      0.000    -2.36e+04   -1.18e+04
32-48                               -1.975e+04   2915.923     -6.775      0.000    -2.55e+04    -1.4e+04
==============================================================================
```

Figure 7.3.2

```
                        OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.383
Model:                            OLS   Adj. R-squared:                  0.383
Method:                 Least Squares   F-statistic:                     5873.
Date:                Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                        23:43:43   Log-Likelihood:             -8.3348e+05
No. Observations:               66222   AIC:                         1.667e+06
Df Residuals:                   66214   BIC:                         1.667e+06
Df Model:                           7
Covariance Type:            nonrobust
==================================================================================================
                                       coef    std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                             -9115.6032   1074.562     -8.483      0.000   -1.12e+04   -7009.462
Price per Unit                    -3988.7920    161.739    -24.662      0.000   -4305.800   -3671.784
ACV Weighted Distribution No Merch 4584.8280     33.018    138.859      0.000    4520.113    4649.543
ACV Weighted Distribution Any Merch 8250.3766   141.146     58.453      0.000    7973.730    8527.023
Price ^ 2(tablespread)               49.5970      2.525     19.642      0.000      44.648      54.546
CAG                               -8726.6523   1389.323     -6.281      0.000   -1.14e+04   -6003.579
MARGARINE/SPREADS                  5032.1900   1066.063      4.720      0.000    2942.706    7121.674
RFG BUTTER                         2.143e+04    986.926     21.711      0.000    1.95e+04    2.34e+04
==============================================================================
Omnibus:                   143127.940   Durbin-Watson:                   0.257
Prob(Omnibus):                  0.000   Jarque-Bera (JB):      1369307908.230
Skew:                          19.199   Prob(JB):                         0.00
Kurtosis:                     706.411   Cond. No.                     1.35e+03
==============================================================================
```

Figure 7.4.1

```
                        OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.392
Model:                            OLS   Adj. R-squared:                  0.391
Method:                 Least Squares   F-statistic:                     416.3
Date:                Sat, 22 Apr 2023   Prob (F-statistic):               0.00
Time:                        00:34:11   Log-Likelihood:                 -43009.
No. Observations:                3240   AIC:                         8.603e+04
Df Residuals:                    3234   BIC:                         8.607e+04
Df Model:                           5
Covariance Type:            nonrobust
==================================================================================================
                                       coef    std err          t      P>|t|      [0.025      0.975]
--------------------------------------------------------------------------------------------------
const                              1.763e+05   1.57e+04     11.261      0.000    1.46e+05    2.07e+05
Price per Unit                    -8.612e+04   4425.289    -19.460      0.000   -9.48e+04   -7.74e+04
ACV Weighted Distribution No Merch 5091.5580    191.922     26.529      0.000    4715.257    5467.859
ACV Weighted Distribution Any Merch 5930.3925  1235.677      4.799      0.000    3507.603    8353.182
Price ^ 2(tablespread)             7249.1321    428.147     16.931      0.000    6409.666    8088.598
MARGARINE/SPREADS                 -2.156e+04   1.27e+04     -1.698      0.090   -4.65e+04    3333.986
RFG BUTTER                                 0          0        nan        nan           0           0
==============================================================================
```

Figure 7.4.2

```
                          OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.386
Model:                            OLS   Adj. R-squared:                  0.386
Method:                 Least Squares   F-statistic:                     5210.
Date:                Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                        23:49:46   Log-Likelihood:             -8.3330e+05
No. Observations:               66222   AIC:                         1.667e+06
Df Residuals:                   66213   BIC:                         1.667e+06
Df Model:                           8
Covariance Type:            nonrobust
================================================================================================
                                       coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------------------------
const                               1.89e+04   1233.490     15.319      0.000    1.65e+04    2.13e+04
Price per Unit                       50.1184    165.182      0.303      0.762    -273.638     373.875
ACV Weighted Distribution No Merch  4441.6352     33.204    133.769      0.000    4376.556    4506.715
ACV Weighted Distribution Any Merch 8672.4461    142.154     61.008      0.000    8393.825    8951.067
Price ^ 2(tablespread)               -3.1146      2.590     -1.203      0.229      -8.191       1.962
CAG                                -1.709e+04   1352.117    -12.640      0.000   -1.97e+04   -1.44e+04
MAINSTREAM                         -2.194e+04   1213.025    -18.085      0.000   -2.43e+04   -1.96e+04
PREMIUM                            -3.754e+04   1300.633    -28.861      0.000   -4.01e+04    -3.5e+04
SUPER PREMIUM                      -3.742e+04   1329.465    -28.146      0.000      -4e+04   -3.48e+04
==============================================================================
Omnibus:                    143014.270   Durbin-Watson:                   0.258
Prob(Omnibus):                   0.000   Jarque-Bera (JB):    1384470653.873
Skew:                           19.155   Prob(JB):                         0.00
Kurtosis:                      710.311   Cond. No.                     1.89e+03
==============================================================================
```

Figure 7.5.1

```
                          OLS Regression Results
==============================================================================
Dep. Variable:                      y   R-squared:                       0.424
Model:                            OLS   Adj. R-squared:                  0.423
Method:                 Least Squares   F-statistic:                     397.3
Date:                Sat, 22 Apr 2023   Prob (F-statistic):               0.00
Time:                        00:34:11   Log-Likelihood:                 -42920.
No. Observations:                3240   AIC:                         8.585e+04
Df Residuals:                    3233   BIC:                         8.590e+04
Df Model:                           6
Covariance Type:            nonrobust
================================================================================================
                                       coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------------------------
const                              1.876e+05   1.06e+04     17.720      0.000    1.67e+05    2.08e+05
Price per Unit                    -6.746e+04   5242.166    -12.869      0.000   -7.77e+04   -5.72e+04
ACV Weighted Distribution No Merch  4824.4292    187.215     25.770      0.000    4457.358    5191.500
ACV Weighted Distribution Any Merch 6273.3420   1212.865      5.172      0.000    3895.279    8651.405
Price ^ 2(tablespread)             5761.7709    461.937     12.473      0.000    4856.052    6667.490
MAINSTREAM                        -1.01e+05    7441.767    -13.565      0.000   -1.16e+05   -8.64e+04
PREMIUM                           -7.93e+04    8144.421     -9.737      0.000   -9.53e+04   -6.33e+04
SUPER PREMIUM                              0          0        nan        nan           0           0
==============================================================================
```

Figure 7.5.2

```
                            OLS Regression Results
==============================================================================
Dep. Variable:                     y   R-squared:                       0.392
Model:                           OLS   Adj. R-squared:                  0.392
Method:                Least Squares   F-statistic:                     5327.
Date:               Fri, 21 Apr 2023   Prob (F-statistic):               0.00
Time:                       23:58:08   Log-Likelihood:             -8.3302e+05
No. Observations:              66222   AIC:                         1.666e+06
Df Residuals:                  66213   BIC:                         1.666e+06
Df Model:                          8
Covariance Type:            nonrobust
===================================================================================================
                                       coef    std err          t      P>|t|      [0.025      0.975]
---------------------------------------------------------------------------------------------------
const                               754.8367    881.657      0.856      0.392    -973.211    2482.884
Price per Unit                    -2814.6079    146.877    -19.163      0.000   -3102.486   -2526.730
ACV Weighted Distribution No Merch  4527.3454     32.904    137.592      0.000    4462.853    4591.838
ACV Weighted Distribution Any Merch 8732.6953    142.413     61.320      0.000    8453.566    9011.824
Price ^ 2(tablespread)               35.4713      2.361     15.022      0.000      30.843      40.099
CAG                               -8799.0165   1332.176     -6.605      0.000   -1.14e+04   -6187.951
SPRAY/SQUEEZE                     -4.415e+04   2946.901    -14.981      0.000   -4.99e+04   -3.84e+04
STICKS                             1.307e+04    747.123     17.494      0.000    1.16e+04    1.45e+04
TUBS                              -1.168e+04    754.831    -15.479      0.000   -1.32e+04   -1.02e+04
==============================================================================
Omnibus:                      142942.084   Durbin-Watson:                   0.260
Prob(Omnibus):                     0.000   Jarque-Bera (JB):       1374857451.239
Skew:                             19.134   Prob(JB):                         0.00
Kurtosis:                        707.846   Cond. No.                     2.41e+03
==============================================================================
```

Figure 7.6.1

```
                                       coef    std err          t      P>|t|      [0.025      0.975]
---------------------------------------------------------------------------------------------------
const                               7.159e+04   7393.122      9.683      0.000    5.71e+04    8.61e+04
Price per Unit                     -2564.0458    198.718    -12.903      0.000   -2953.534   -2174.558
ACV Weighted Distribution No Merch  4516.0953     33.347    135.426      0.000    4450.735    4581.456
ACV Weighted Distribution Any Merch 9333.0192    142.521     65.485      0.000    9053.678    9612.360
Price ^ 2(tablespread)               27.5128      2.874      9.572      0.000      21.879      33.147
CAG                                -868.1801   1416.565     -0.613      0.540   -3644.647    1908.287
1                                 -2.681e+04   7630.497     -3.513      0.000   -4.18e+04   -1.19e+04
2                                 -2.188e+04   7516.209     -2.911      0.004   -3.66e+04   -7148.944
3                                 -1.236e+04   8932.209     -1.384      0.166   -2.99e+04    5143.256
4                                 -4175.1888   7432.888     -0.562      0.574   -1.87e+04    1.04e+04
5                                 -2.323e+04   9129.309     -2.545      0.011   -4.11e+04   -5339.692
8                                 -3.462e+04   8563.865     -4.042      0.000   -5.14e+04   -1.78e+04
12                                -1.016e+04   8914.124     -1.140      0.254   -2.76e+04    7313.147
1-16                              -1.411e+04   3033.662     -4.651      0.000   -2.01e+04   -8164.140
17-32                             -1.167e+04   3197.163     -3.652      0.000   -1.79e+04   -5408.487
32-48                             -9545.3656   3117.416     -3.062      0.002   -1.57e+04   -3435.230
MARGARINE/SPREADS                 -8535.5248   1140.544     -7.484      0.000   -1.08e+04   -6300.058
RFG BUTTER                         1.069e+04   1112.954      9.607      0.000    8510.984    1.29e+04
MAINSTREAM                        -3.066e+04   1268.348    -24.173      0.000   -3.31e+04   -2.82e+04
PREMIUM                           -4.707e+04   1393.112    -33.787      0.000   -4.98e+04   -4.43e+04
SUPER PREMIUM                     -4.382e+04   1461.676    -29.979      0.000   -4.67e+04    -4.1e+04
SPRAY/SQUEEZE                     -3.503e+04   2932.619    -11.946      0.000   -4.08e+04   -2.93e+04
STICKS                            -1.053e+04   1613.560     -6.528      0.000   -1.37e+04   -7370.926
TUBS                              -1.032e+04    851.237    -12.119      0.000    -1.2e+04   -8647.384
==============================================================================
```

Figure 7.7.1

```
-------------------------------------------------------------------------------------
                                    coef    std err       t      P>|t|    [0.025    0.975]
-------------------------------------------------------------------------------------
const                            9.766e+05  9651.107   101.188   0.000    9.58e+05  9.96e+05
Price per Unit                  -9121.7544  2423.546    -3.764   0.000   -1.39e+04 -4369.907
ACV Weighted Distribution No Merch  2356.8713    72.335    32.583   0.000    2215.044  2498.699
ACV Weighted Distribution Any Merch 5375.8565   447.573    12.011   0.000    4498.300  6253.413
Price ^ 2(tablespread)            719.0593   182.660     3.937   0.000     360.917  1077.202
1                                2.393e+05  4629.026    51.694   0.000     2.3e+05  2.48e+05
2                                2.405e+05  4543.084    52.933   0.000    2.32e+05  2.49e+05
3                                 9.38e-10   7.72e-12   121.510   0.000    9.23e-10  9.53e-10
4                                2.107e+05  6248.546    33.722   0.000     1.98e+05  2.23e+05
5                                3.584e-10   3.57e-12   100.463   0.000    3.51e-10  3.65e-10
8                                2.861e+05  9381.323    30.496   0.000    2.68e+05  3.04e+05
12                              -8.54e-10   6.43e-12  -132.729   0.000   -8.67e-10 -8.41e-10
1-16                            -2.389e+04  6925.949    -3.449   0.001   -3.75e+04 -1.03e+04
17-32                           -6400.7779  8651.242    -0.740   0.459   -2.34e+04  1.06e+04
32-48                           -1.922e+04  6834.465    -2.813   0.005   -3.26e+04 -5822.067
MARGARINE/SPREADS               -1.234e+04  4704.463    -2.623   0.009   -2.16e+04 -3116.016
RFG BUTTER                       1.442e-10   1.44e-12   100.093   0.000    1.41e-10  1.47e-10
MAINSTREAM                      -2.582e+04  3500.365    -7.377   0.000   -3.27e+04  -1.9e+04
PREMIUM                         -3.647e+04  4475.302    -8.150   0.000   -4.52e+04 -2.77e+04
SUPER PREMIUM                           0         0       nan     nan          0        0
SPRAY/SQUEEZE                   -1.128e+06  8835.745  -127.719   0.000   -1.15e+06 -1.11e+06
STICKS                          -1.117e+06   1.01e+04  -110.374   0.000   -1.14e+06  -1.1e+06
TUBS                            -1.142e+06  8091.575  -141.157   0.000   -1.16e+06 -1.13e+06
=====================================================================================
```

Figure 7.7.2