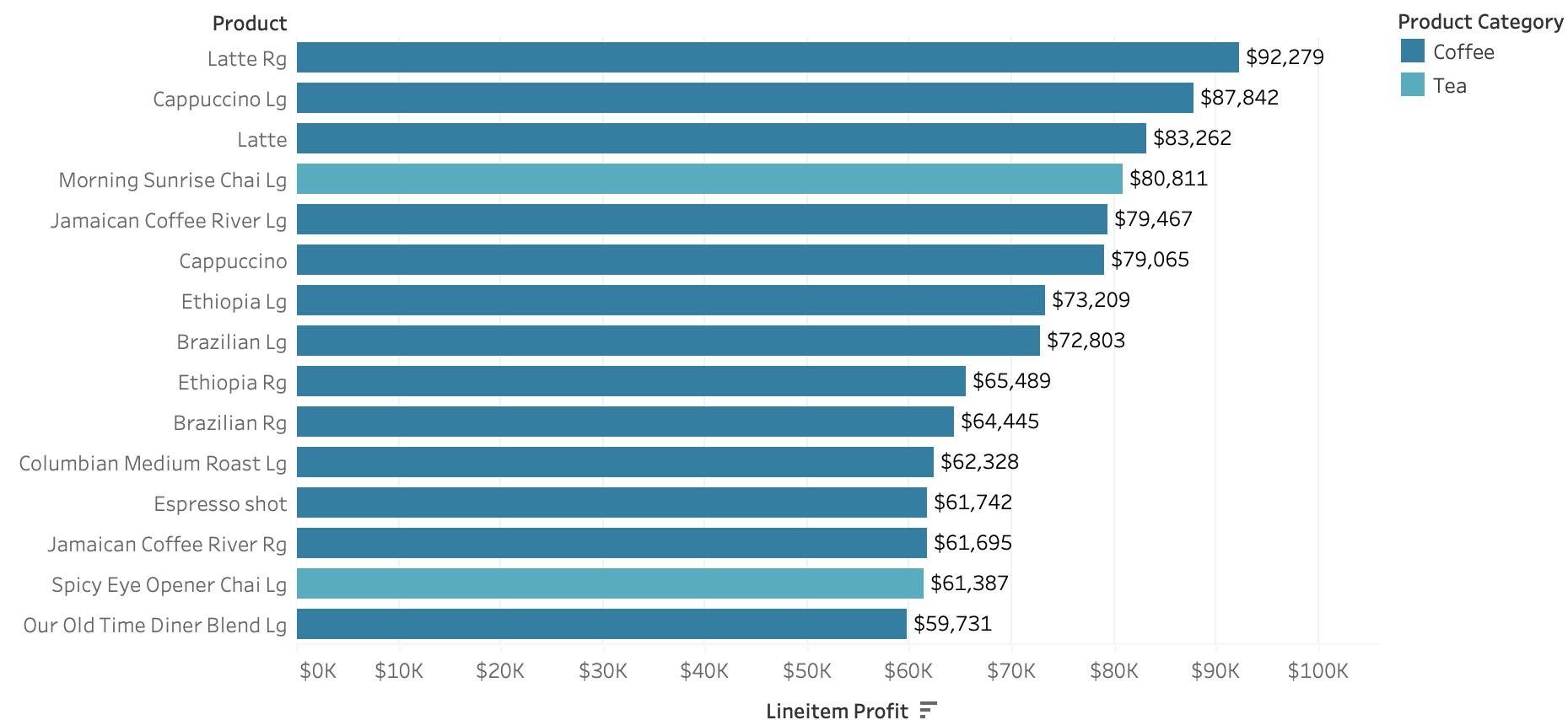


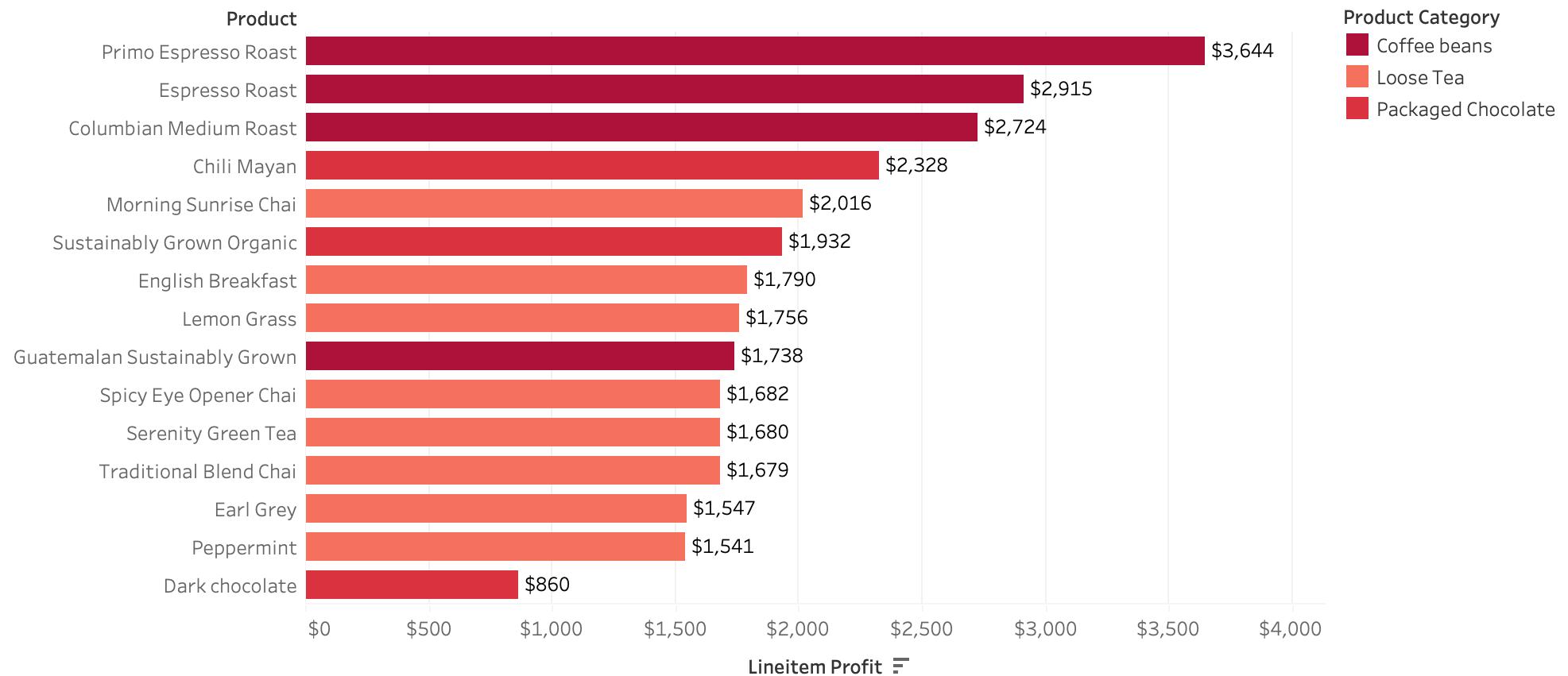
EDA and Data Visualizations for Maven Roasters Coffee Shops

Top 15 Products by Profit



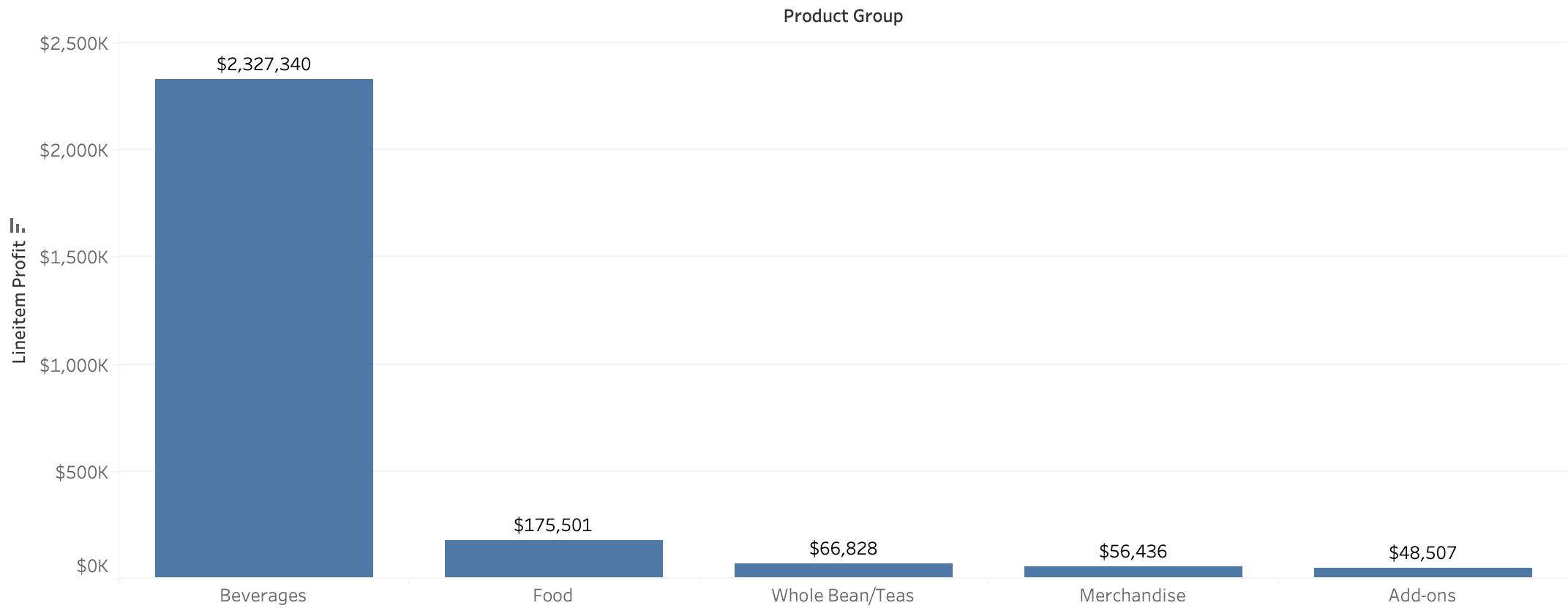
Top 15 products by the sum of profit, sorted largest to smallest, colored by product category. Notice that these items are predominantly coffee, but include some tea. This is anticipated as this *is* a coffee store.

Bottom 15 Products by Profit



Bottom 15 products by the sum of profit, sorted largest to smallest, colored by product category. Notice that the categories are coffee beans, loose tea, and packaged chocolate. Interestingly, coffee beans are some of the worst sellers. Apparently, most people want to have coffee made, not make it themselves.

Total Profit by Group



Total profit by group shows what you might expect for a coffee shop - lots of profit in beverages. But note that there is little profit in beans and teas - two orders of magnitude lower. This is significant as we'll see on the next worksheet (Retail Price vs. Profit by Unit).

Retail Price vs. Profit by Unit

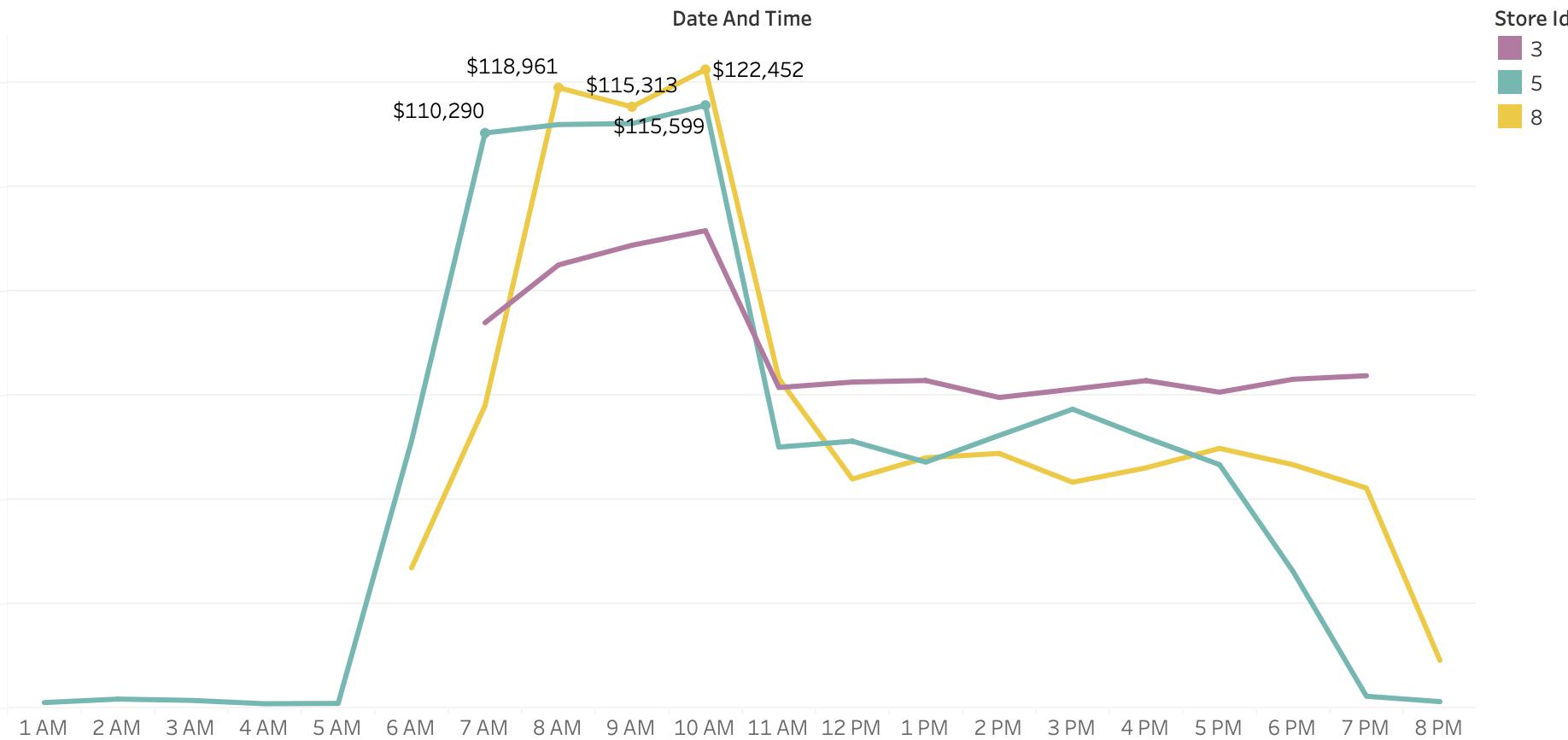


This chart shows the profit by unit against retail price. This is broken into each product category and includes the regression line associated with it. That being said, the lines with the steepest slope are the most profitable and the shops should try to sell more of them, and the lines with the shallowest slope are the least profitable. The coffee shop should consider getting rid of some (or all) of these products or slowly begin increasing the price to increase the profit. Of particular note, the least profitable items are loose tea, packaged chocolate, and coffee beans.

Thus, not only is there a smaller profit margin on these three categories of items, but not many are sold, relative to drinks (ref. previous worksheet).

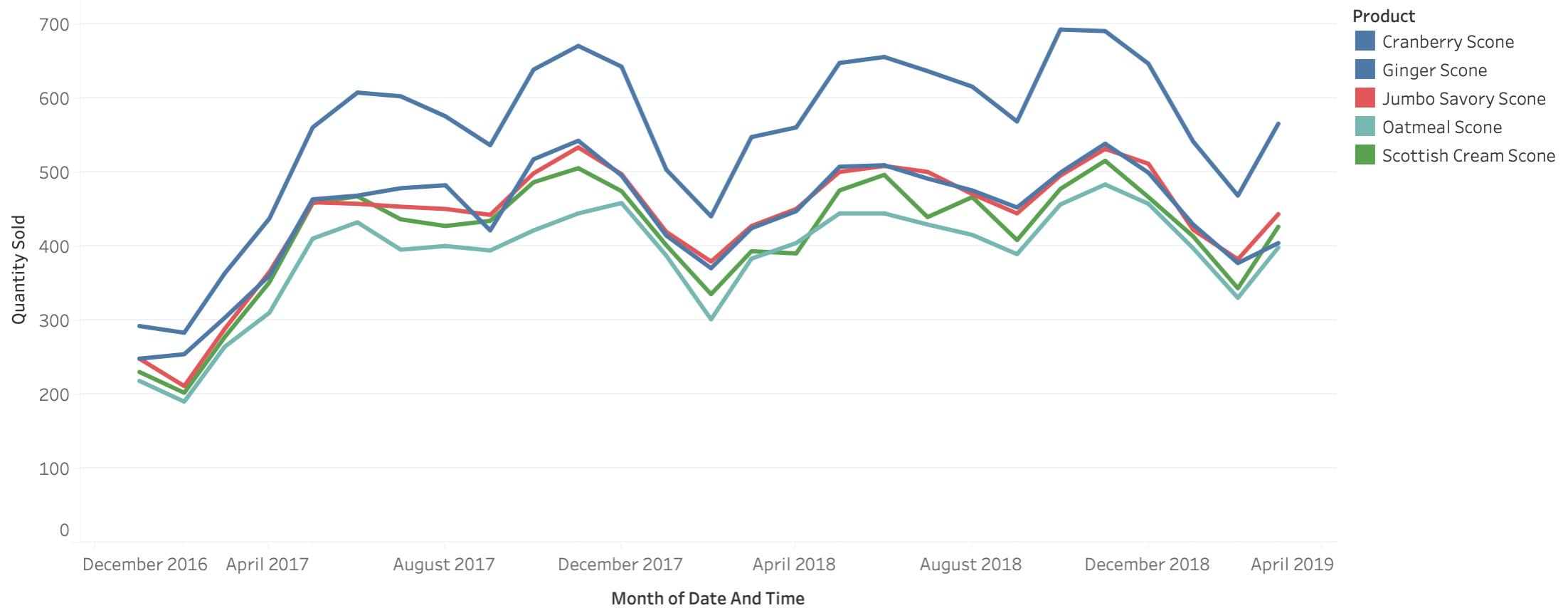
Therefore, consider dropping these items from the stores.

Profit by Hour of Day



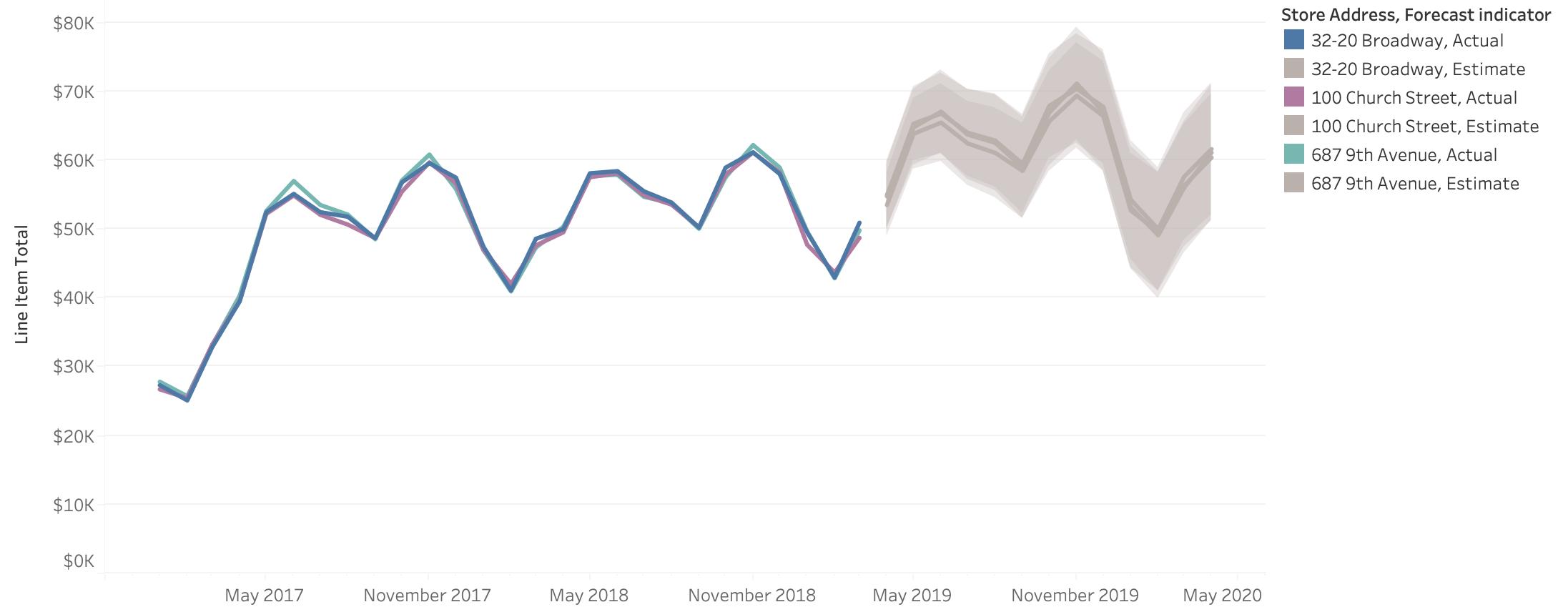
The profit by hour of the day is similar to the number of sales by hour of the day (previous chart). This shows that the most profitable hours by store were between 7am-11am (10am hour continues to almost 11am).

Scones Sold by Month



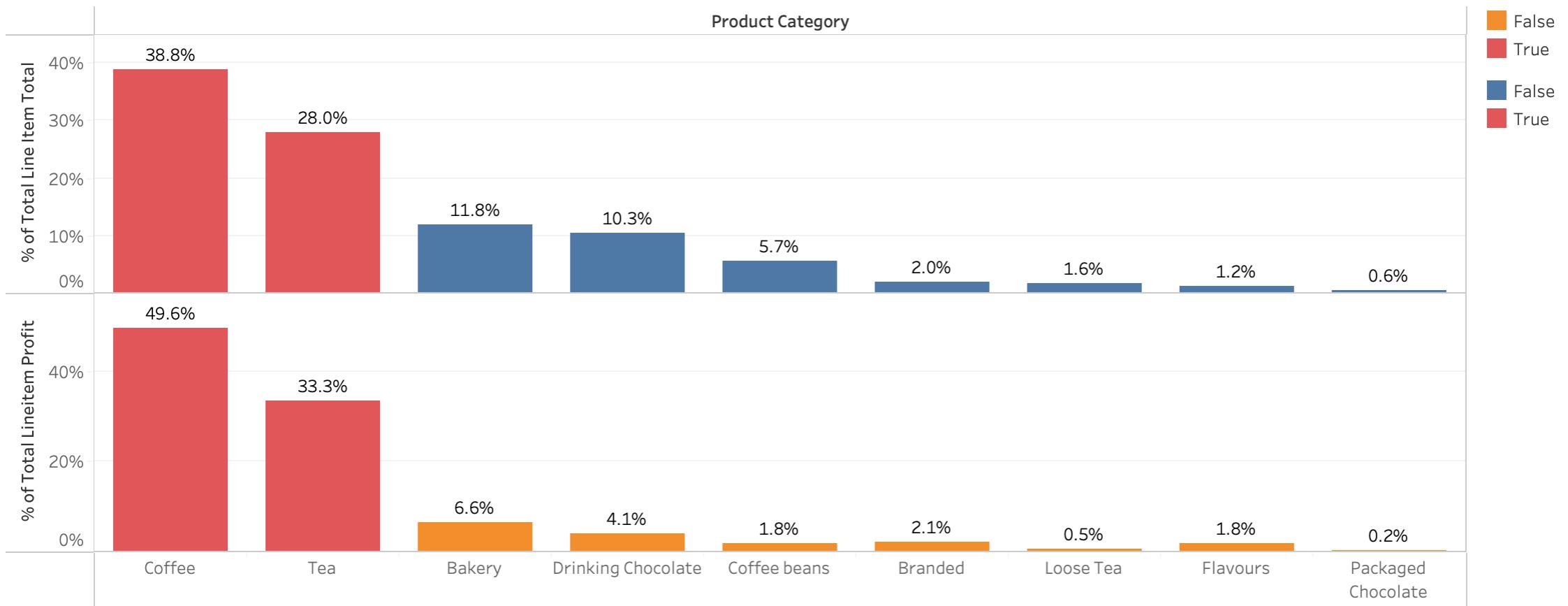
This chart shows the quantity of scones sold by month. Notice that the ginger scones are relatively hot commodities! They must be pretty tasty. The others seem to sell nearly the same.

Sales Forecast (by month and store)



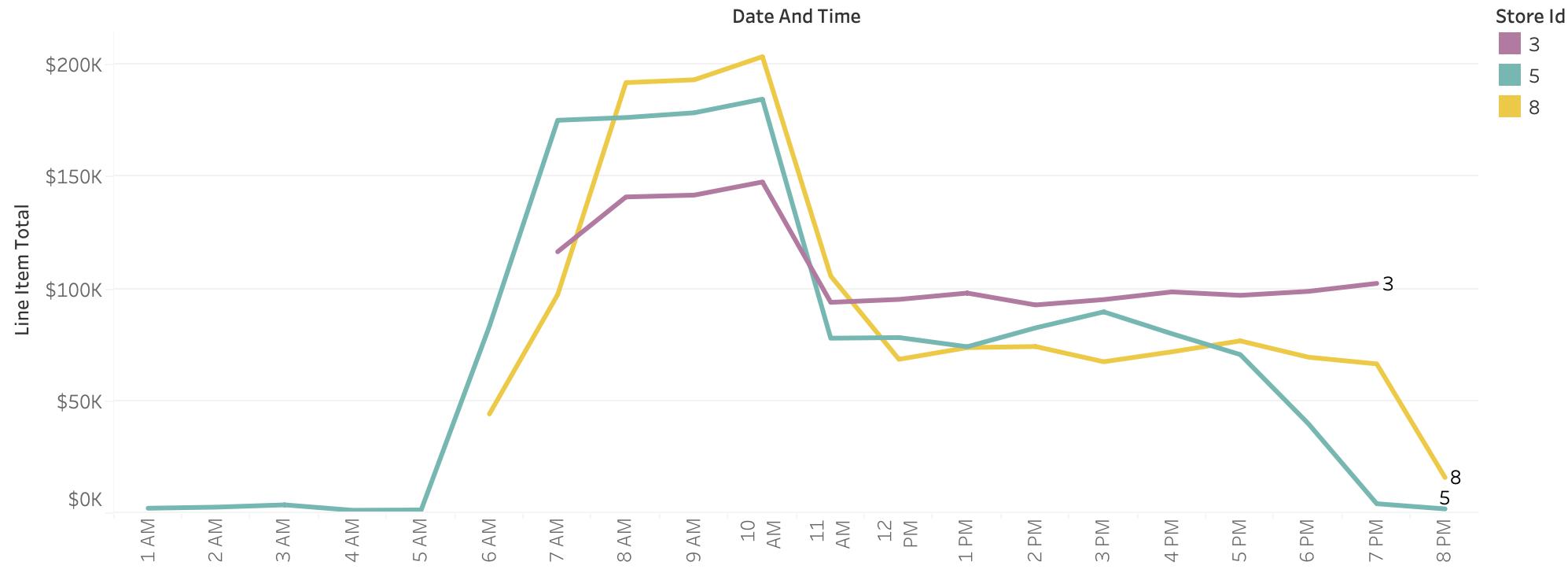
This plot shows a forecast of sales rates by month for each of the three marts we have data on. So that our client could estimate the value of future revenue to plan more effectively.

Sales and Profit by Product Category



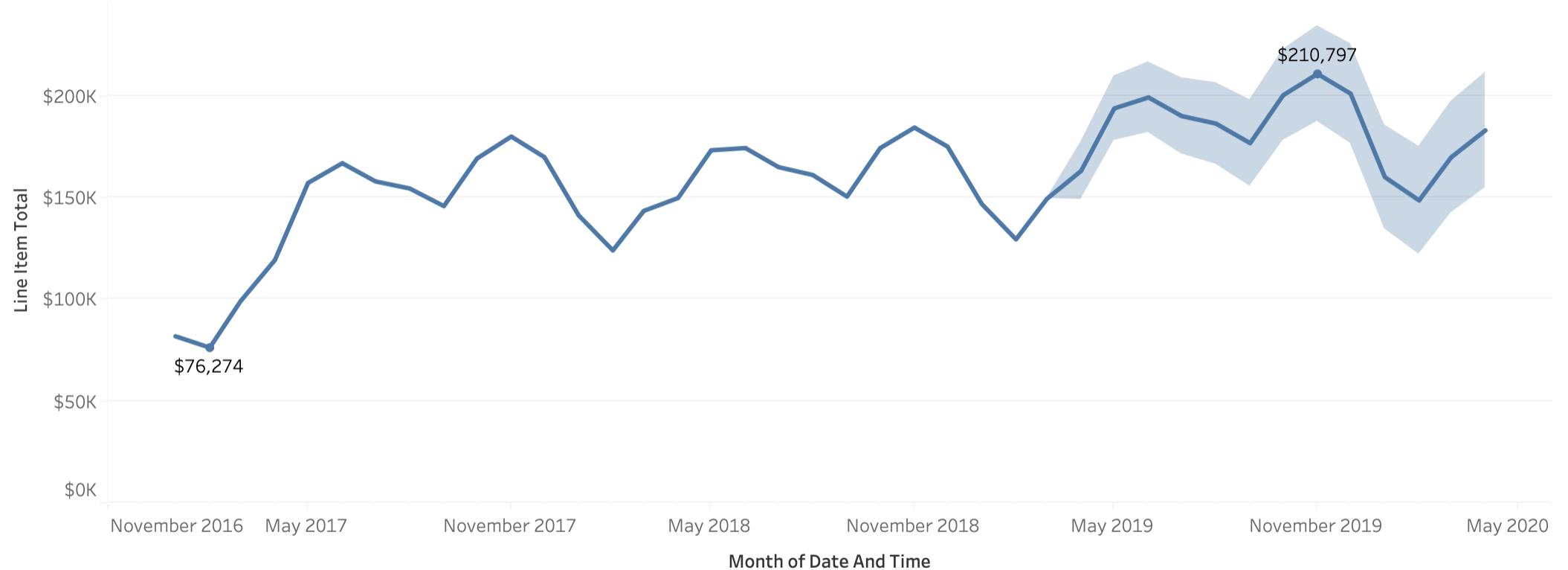
This chart shows the overall sales and profit by Product Category. Coffee and Tea are the top two categories that dominate nearly 70% of sales and 80% of profit.

Sales by Hour of Day and Store



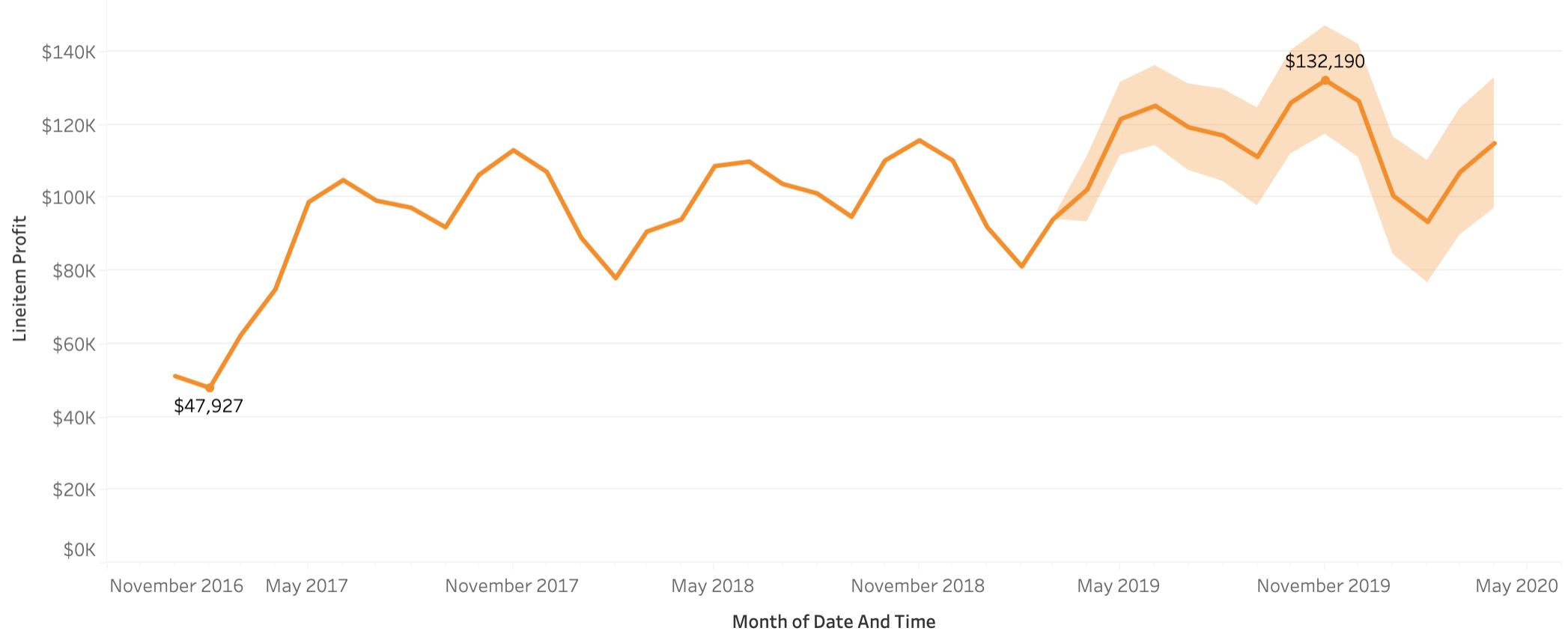
This chart shows the sales change by hour of day especially for store 3 that is obviously different from store 5 and 8. It is recommended that store 3 extends its current open/close time to 5am and 8pm at least to get more sales. Meanwhile, store 3 and 8 are closed between 1am and their open time. This could be a way to improve some sales - by encouraging stores 3 and 8 to open at 1am occasionally to attempt to increase profit. The assumption is a rotating schedule - one store takes one week and the others the next ones. The sales are meager in the mornings, so if the decision is made, it wouldn't be good to open all stores at 1am - only one at a time is sufficient.

Sales by Month and Forecast



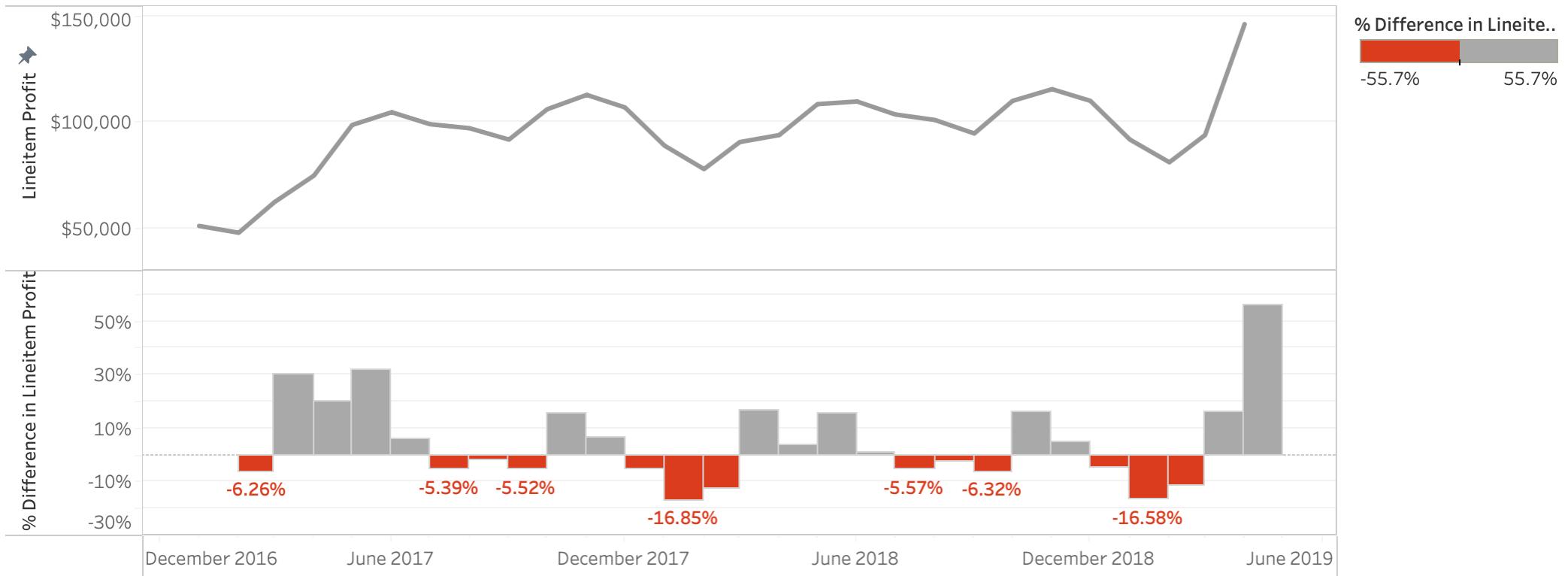
This chart shows the sales trend by Month in the past years. A yearly pattern is clear: A Feb Sales fell to the lowest point of a year and then started increasing until June. It dropped a little bit in the following months and then continued increasing until November. At the end of year it dropped to a low level.

Profit by Month and Forecast



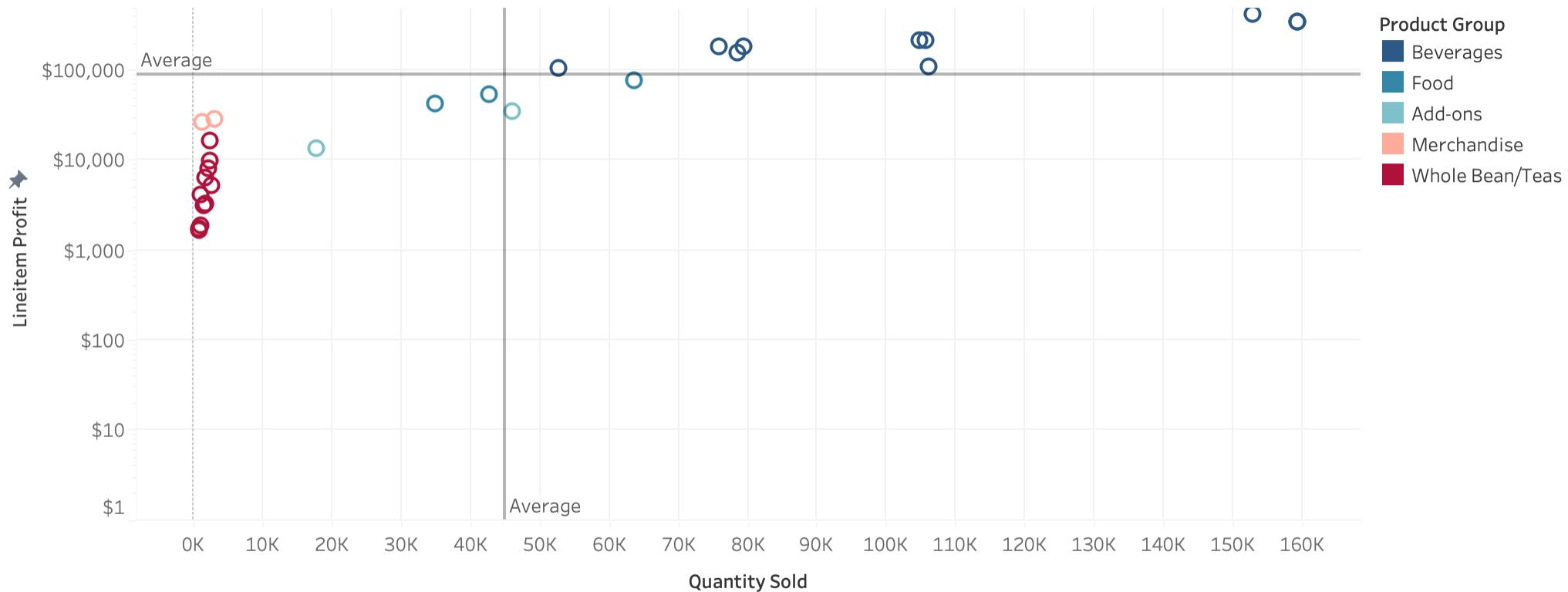
This chart shows the profit trend by Month in the past years. It has the same pattern as sales change in a year.

Profit % Diff (by month)



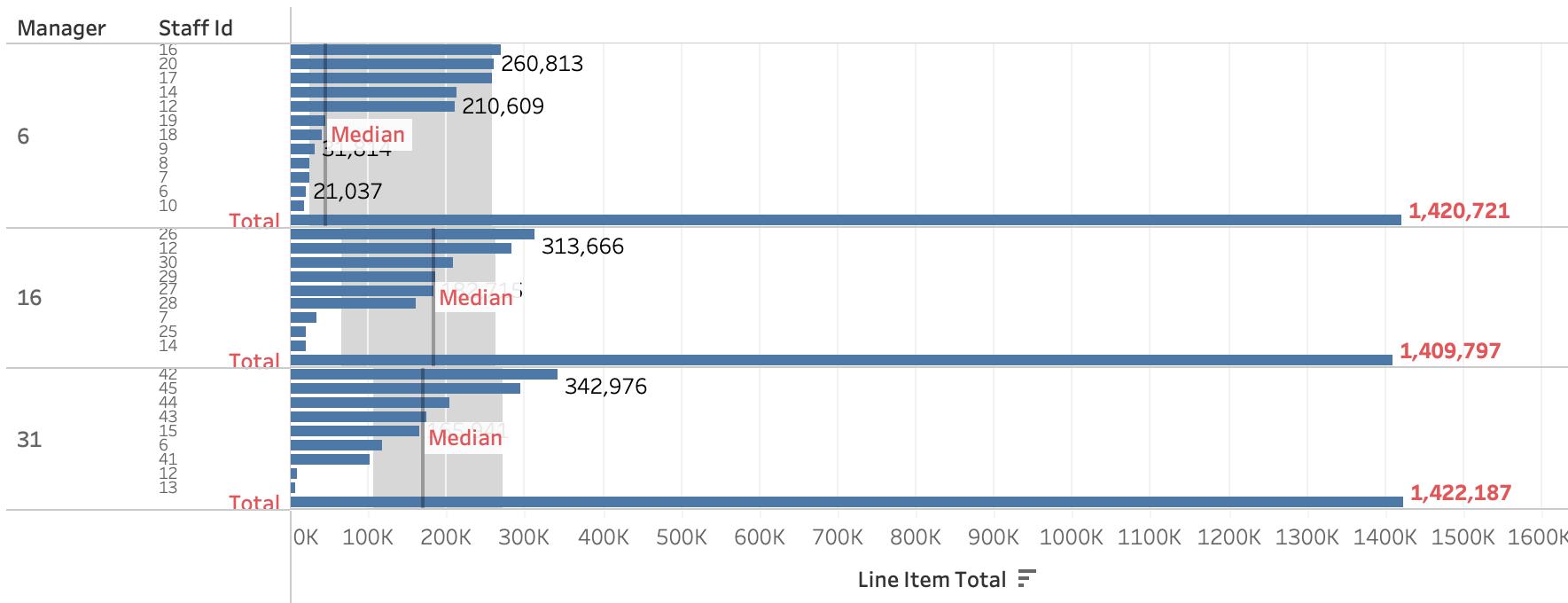
This plot shows the trend of the sales over time by month in the upper part and the rate of its change by month below. We can observe the pattern: the decrease takes place each year from July to September and from December to February. Therefore, these three months would be beneficial to cut back on staffing if the store can help it. This will save funds for future efforts when the stores need more staff.

Profit Distribution



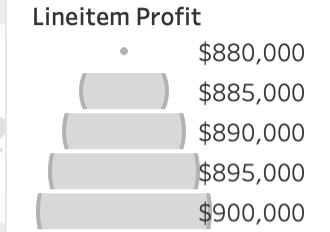
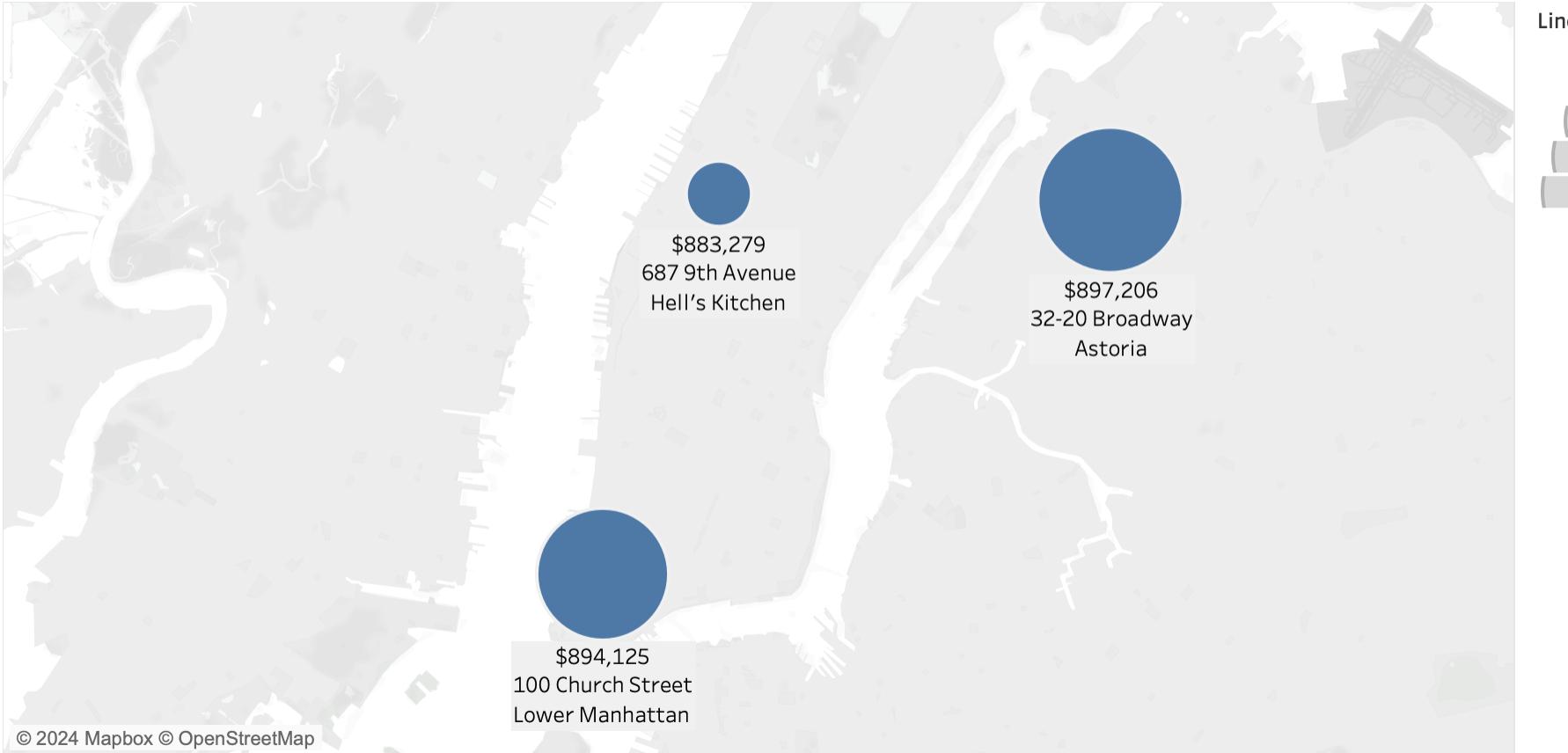
This scatter plot shows the distribution of product groups in terms of the sold number of items and overall profit by the respective product. This is another way to visualize the least profitable products. Again, these belong to the group 'Whole Bean/Teas'. This could help our client in terms of business optimization.

KPI by Managers



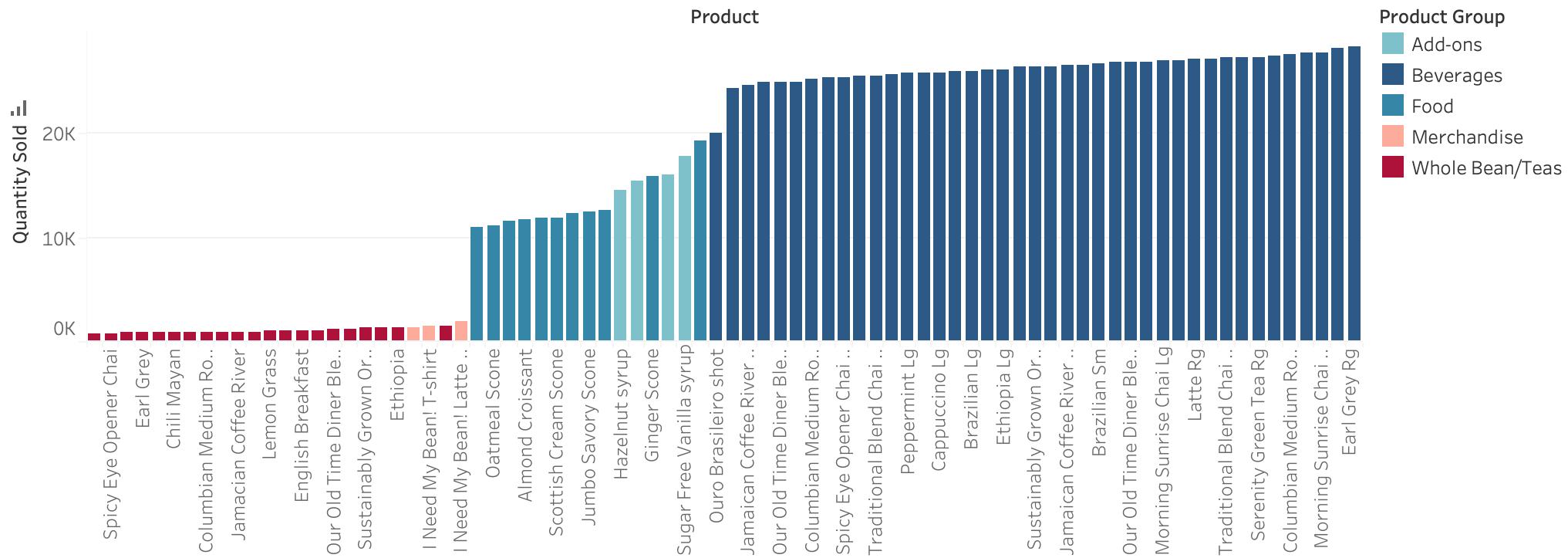
This bar plot shows the profit that each employee brought in for each store. There is a 'total' bar for each store manager which reflects the sum of all respective employees' profit rates so that we can find the manager with the greatest profits. However, by showing the median value, we are able to emphasize the managers with a larger median. This median value points out that a greater number of employees have higher revenue and profit under these managers. This is the metric we want instead of the average because of the skewness of the data. Our assumption is that there are both part-time and full time workers included in the plot.

Geo-Profit



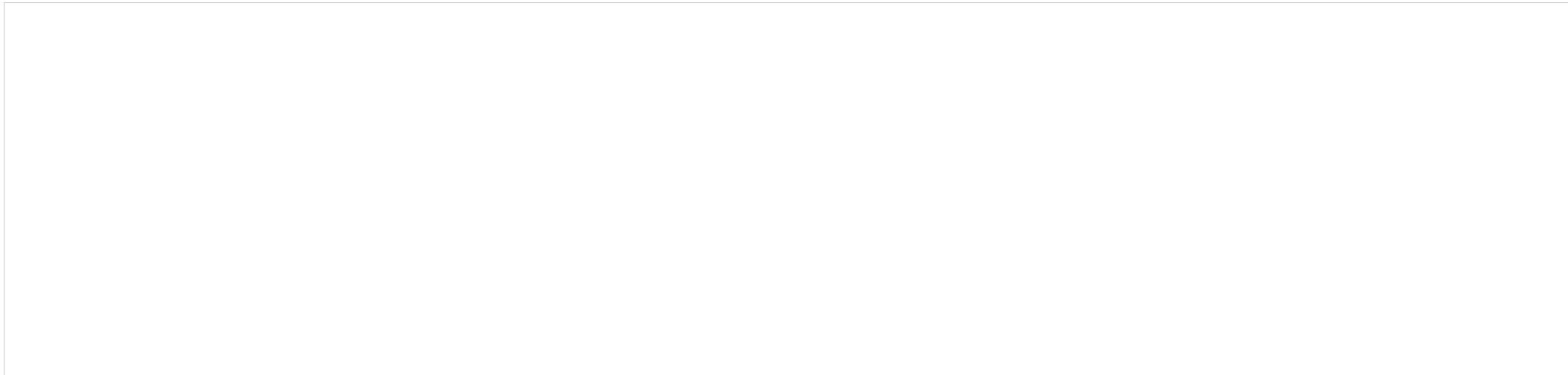
This is a map of marts with the reflection of the overall profit by each of them respectively.

Quantity Sold of Products



Here we can see the sum of quantity sold for each product. Color encodes the product group. As we can see, the lowest number of sold item is assosiated with the following product groups: 'Whole Bean/Teas' and 'Merchandise'.

Overview Maven_caption



This dashboard gives us an overview of Raven Roasters' operation, including the sales and profit change and trend in the past few years, sales distribution by product category, daily operation difference of the three stores involved. The filters on the right side help us check the operation data by store id or by instore or not.

-Sales and profit share the same pattern: both fell to their lowest point during February, increased from March to June, dropped from July to September, and increased through November before declining through February again.

-Coffee and Tea are the top two categories that dominate nearly 70% of sales and 80% of profit, which leads to our further analysis.

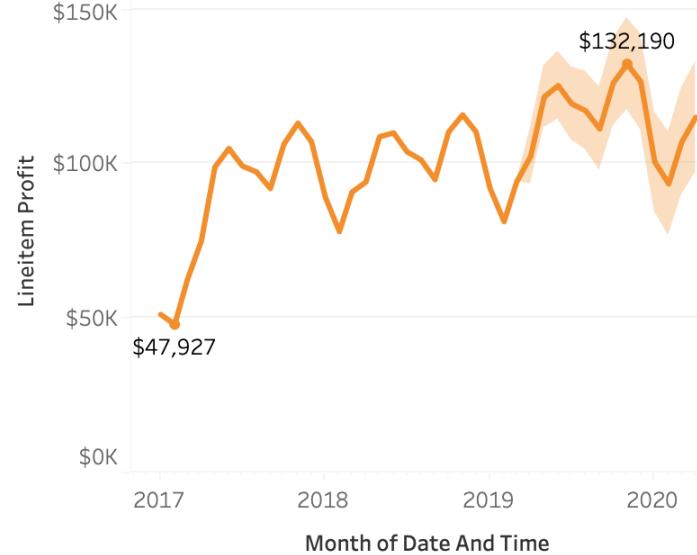
-Three stores operate differently in term of open/closed time, which leads to one of our key findings.

Overview of Maven Roasters' Operation

Sales by Month and Forecast



Profit by Month and Forecast



Store Id

- 3
- 5
- 8

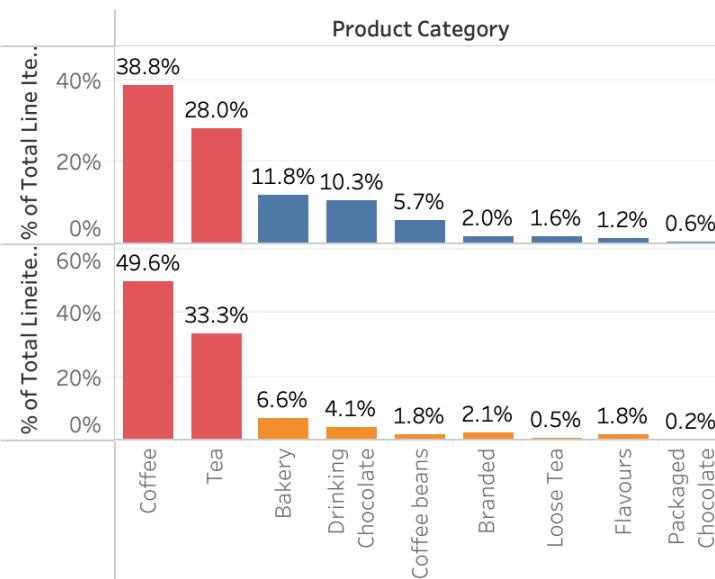
Instore Purchase Yn

- Null
- N
- Y

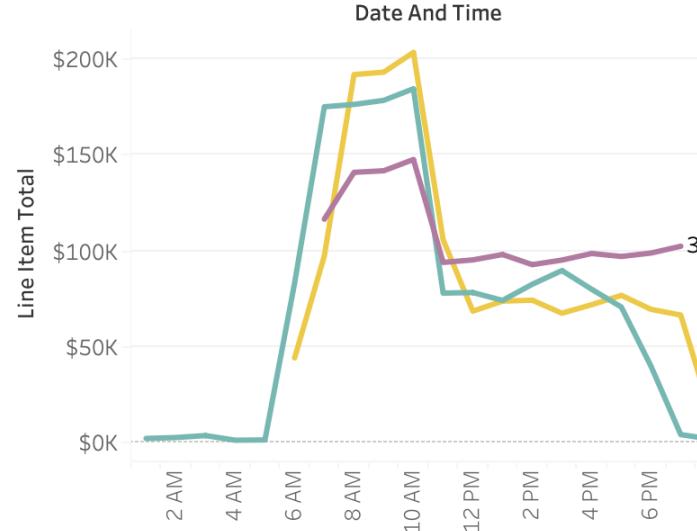
Store Id

- 3
- 5
- 8

Sales and Profit by Product Category



Sales by Hour of Day and Store



Product Profitability, Caption

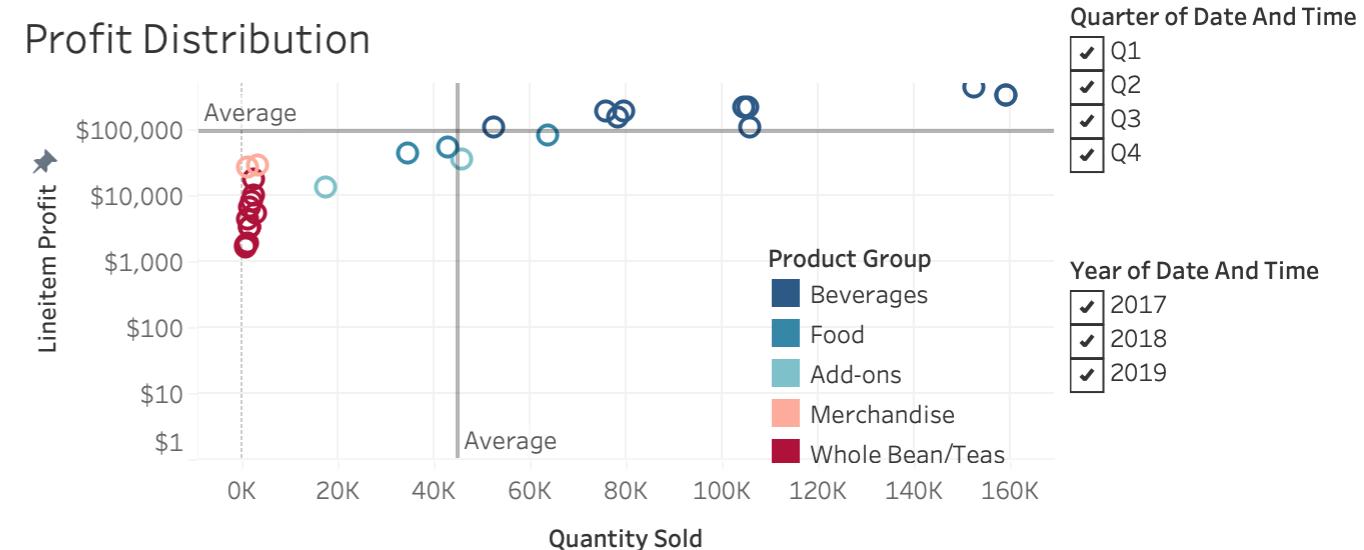
The purpose of this dashboard is to demonstrate Products Profitability in terms of a big time frame so that the business could distinguish products that act as drivers of profit and so should be selling larger amounts to increase the profit and what products the business could get rid of because of their low profitability. All plots on the dashboard are clickable and act as filters for each other. The filters are applied to all graphs on the dashboard as well.

Product Profitability

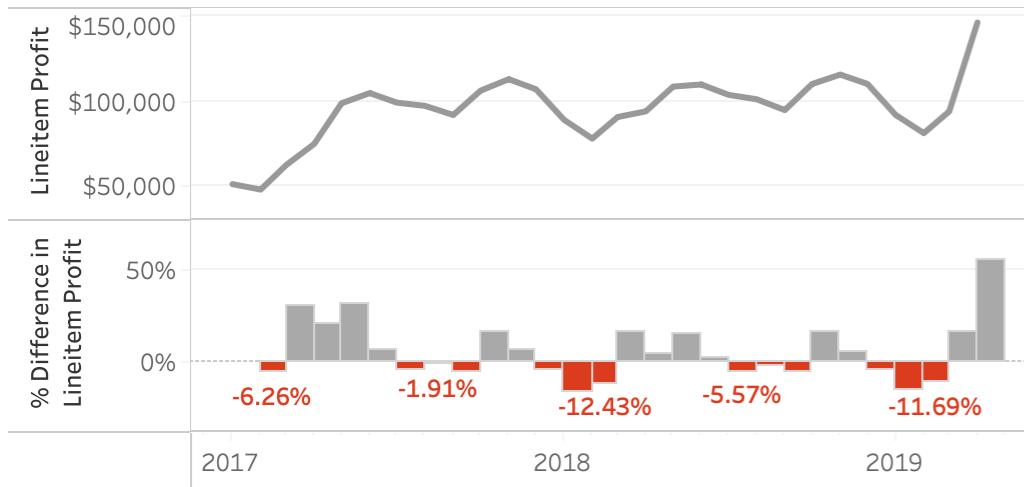
Retail Price vs. Profit by Unit



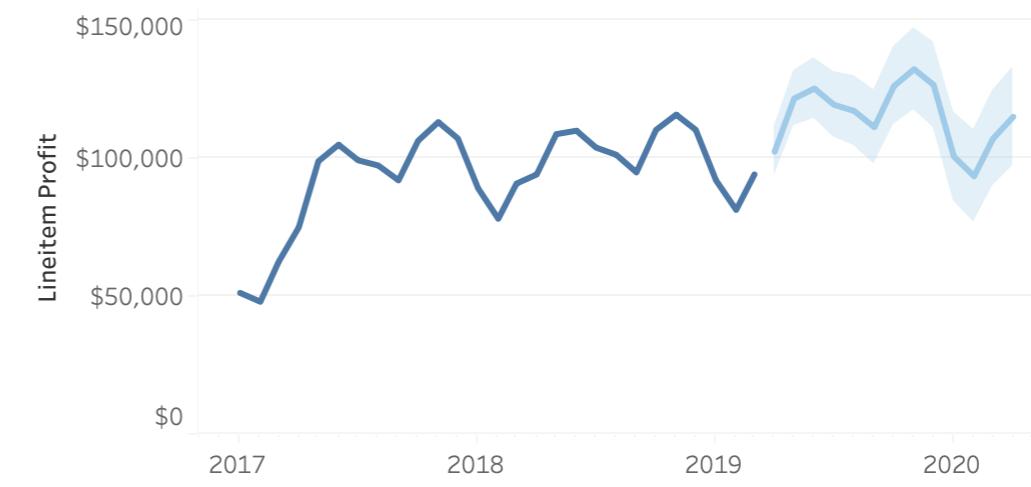
Profit Distribution



Profit % Diff (by month)



Profit Forecast (by month)



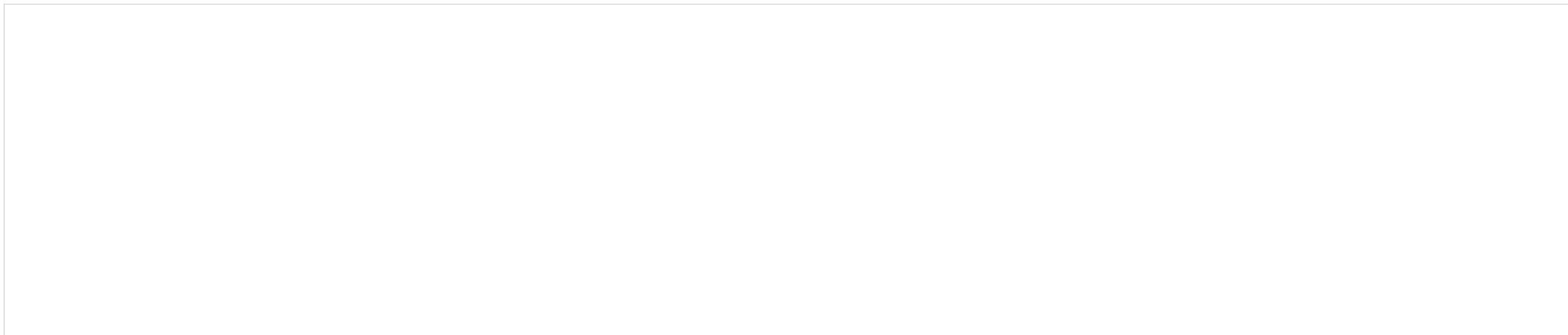
Quarter of Date And Time

- Q1
- Q2
- Q3
- Q4

Year of Date And Time

- 2017
- 2018
- 2019

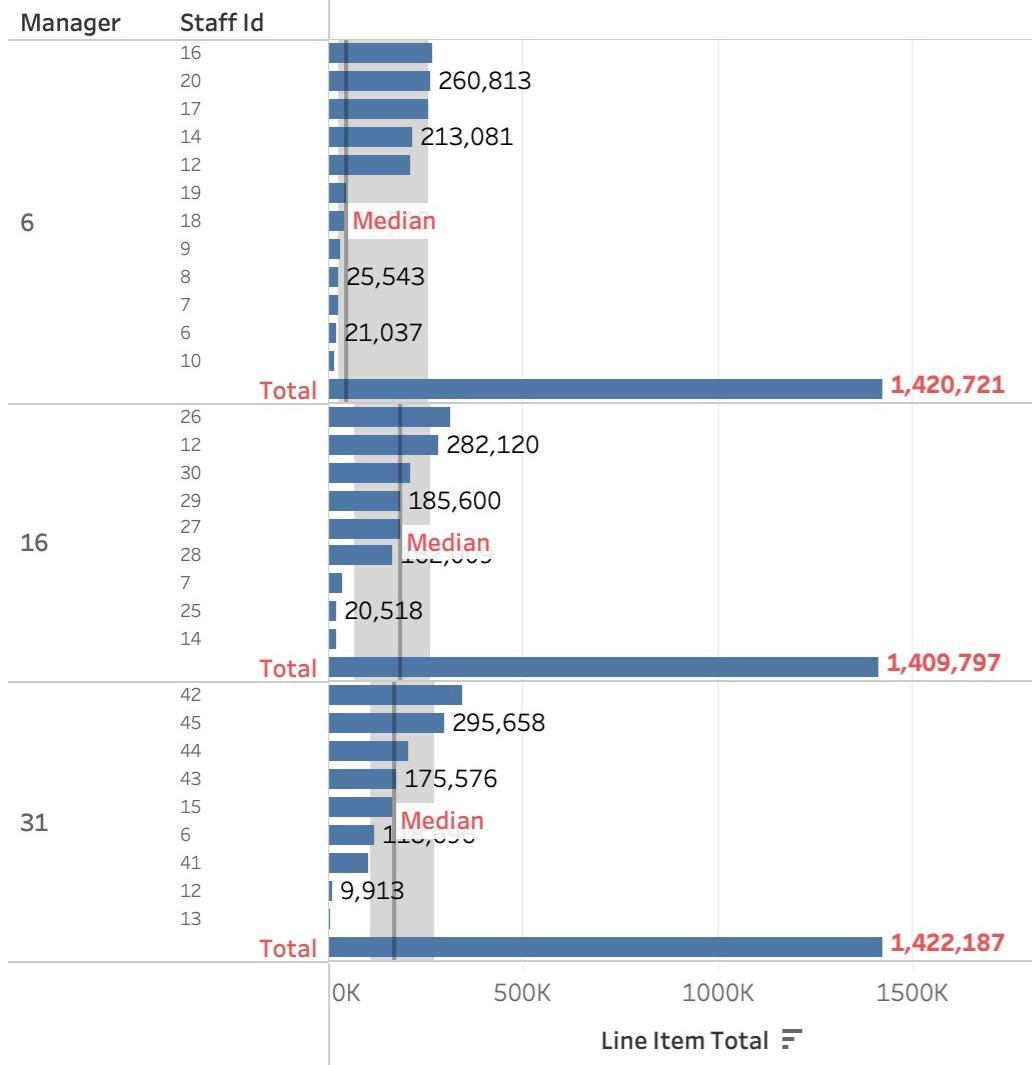
Sales by staff, Caption



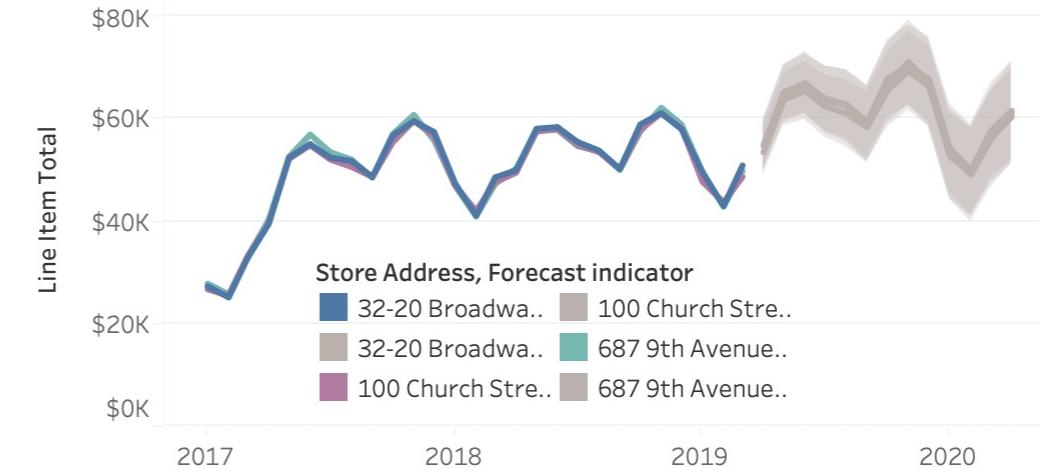
This dashboard aims to provide the business with a tool for emphasizing the most hardworking store staff and effective managers. This could be helpful in developing a reasonable bonus system. All plots on the dashboard are clickable and act as filters for each other. The filters are applied to all graphs on the dashboard as well.

Sales by staff

KPI by Managers



Sales Forecast (by month and store)



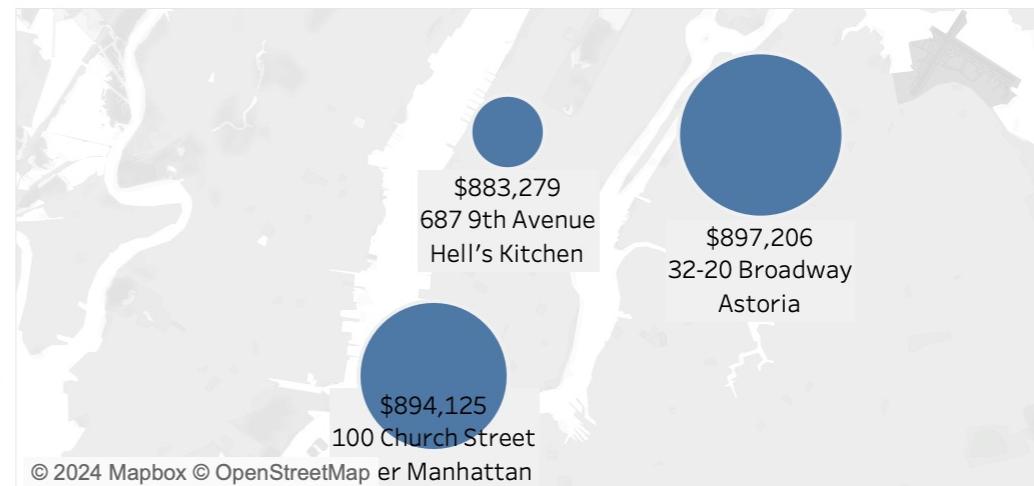
Quarter of Date And Time

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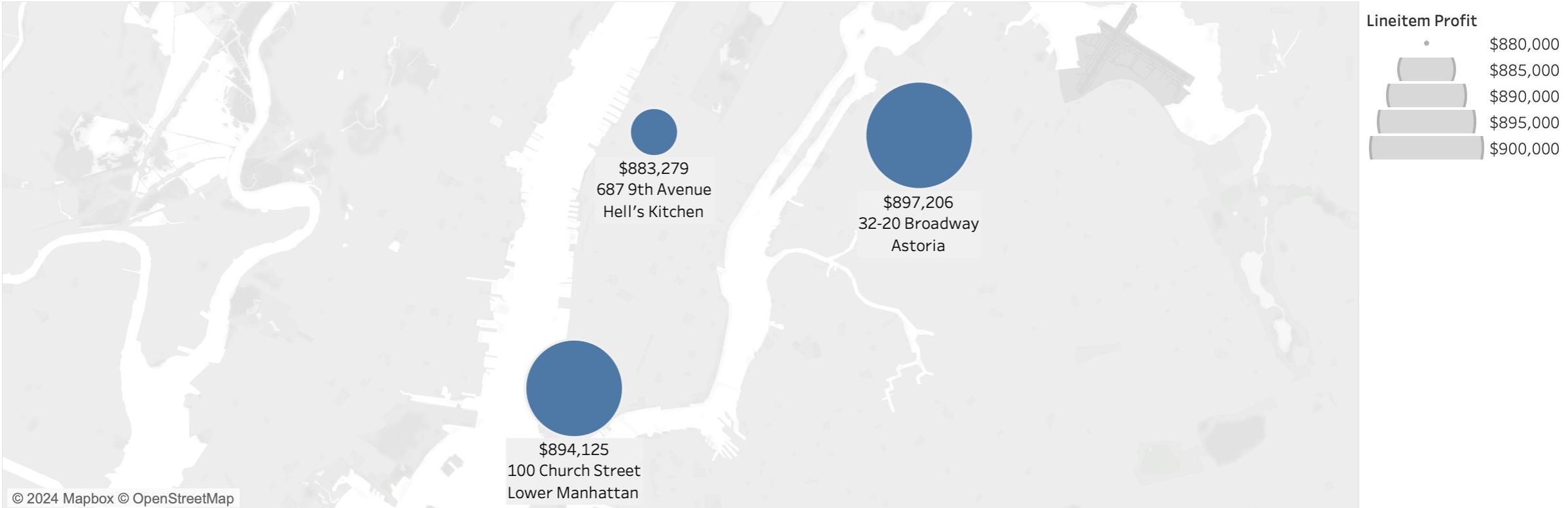
Geo-Profit



Increasing Profit in terms of products profitability (Growing Sales and Profit Further)

This isn't so much the story of three stores, but three locations of a single store. The Maven Roasters operate out of New York City at the below locations. Each location is moderately successful and has brought in nearly \$1M each from 2017-2020.

These three stores operate differently from each other in terms of open/close time. It's appropriate to ask which store has more potential to get more sales and profit? Considering each store has pulled in roughly the same profit over the last three years, extending store 3's hours of operation would be recommended to help it increase profits. Sales increase fast from 5am to 7am and start dropping after 7pm. However, with the relatively high business store 3 brings in throughout the afternoon, keeping it open an extra hour may prove very fruitful.

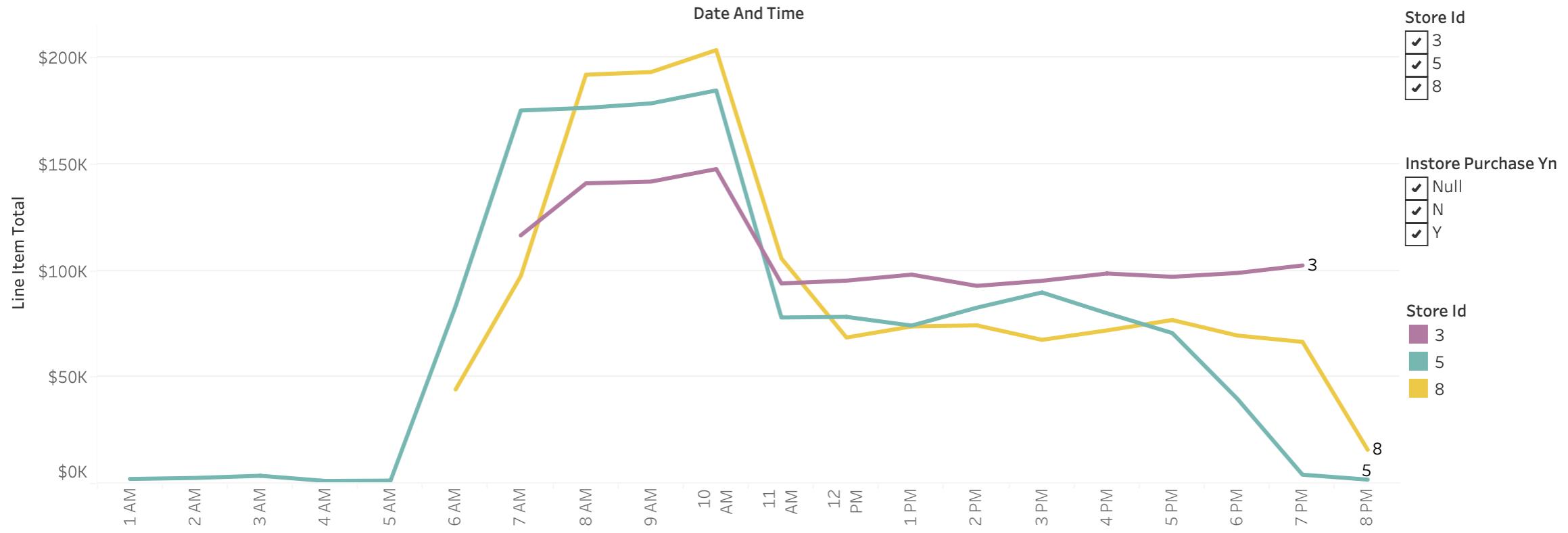


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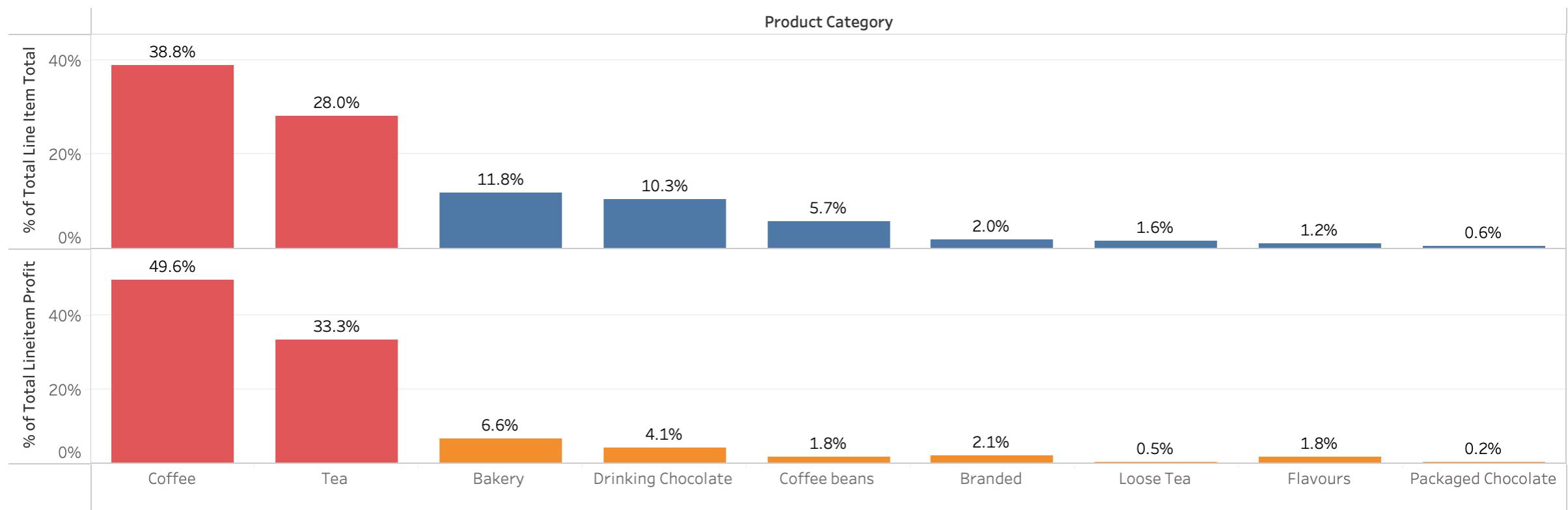


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The distribution of product groups in terms of earned profit. Notice that Beverages are the most profitable overall by an order of magnitude over food, and two orders of magnitude over everything else.

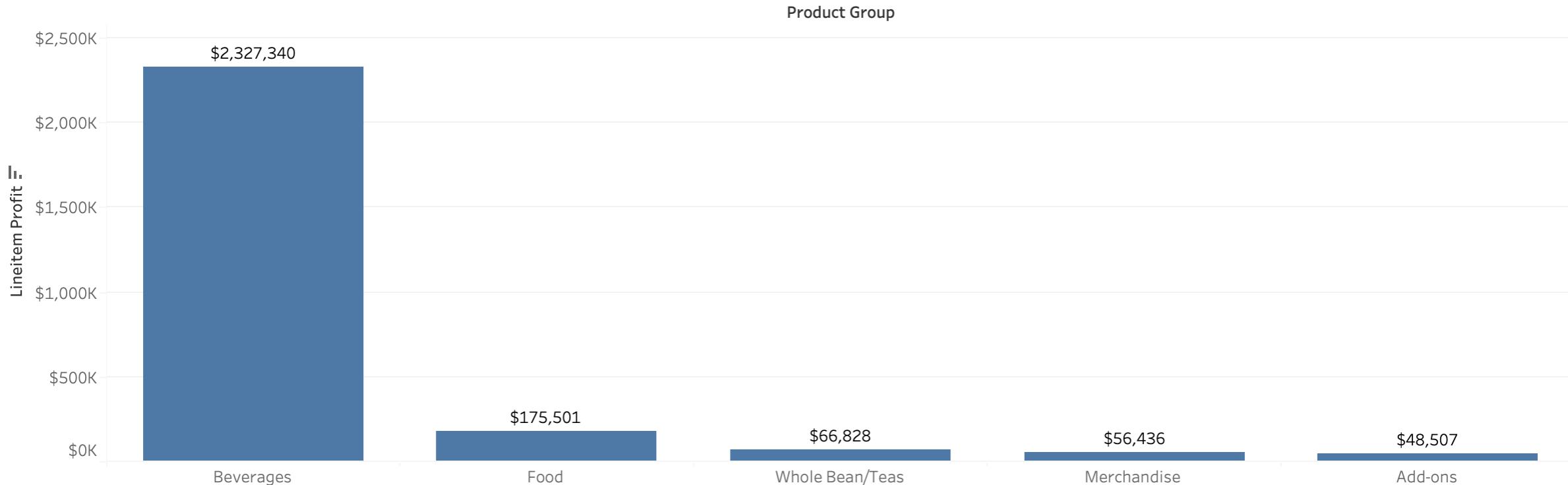


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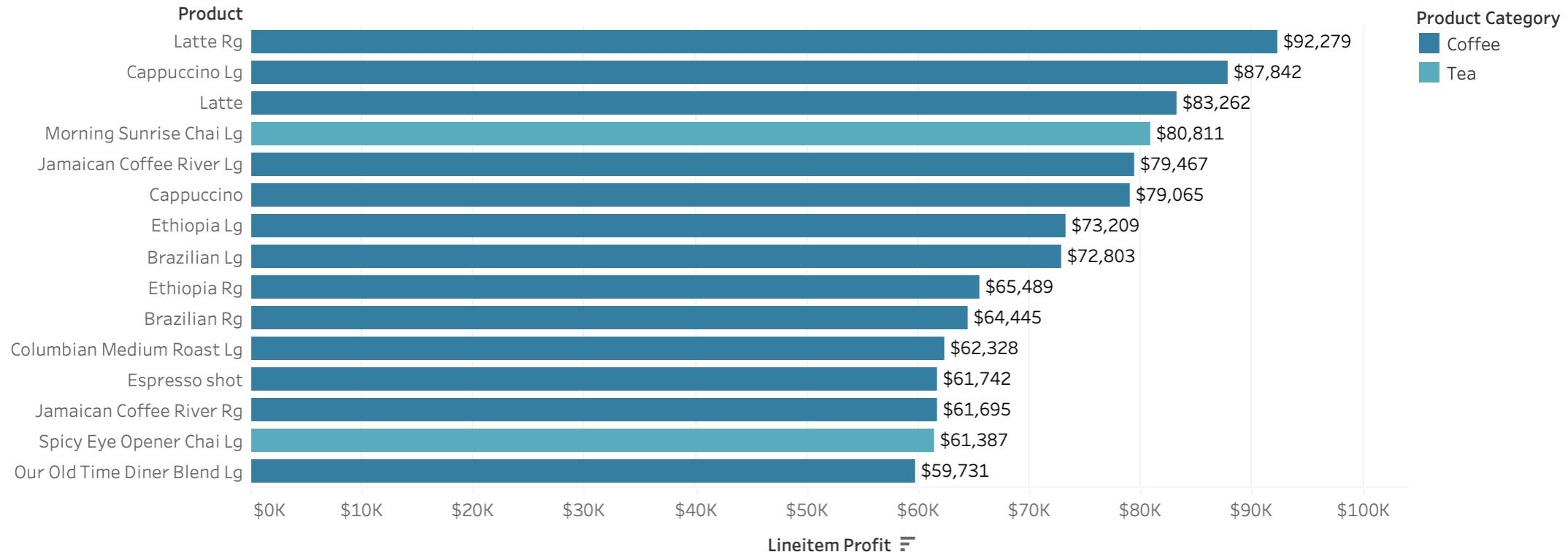


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Of the bottom 15 items ranked by profitability, four are coffee beans, eight are loose teas, and three are chocolates.

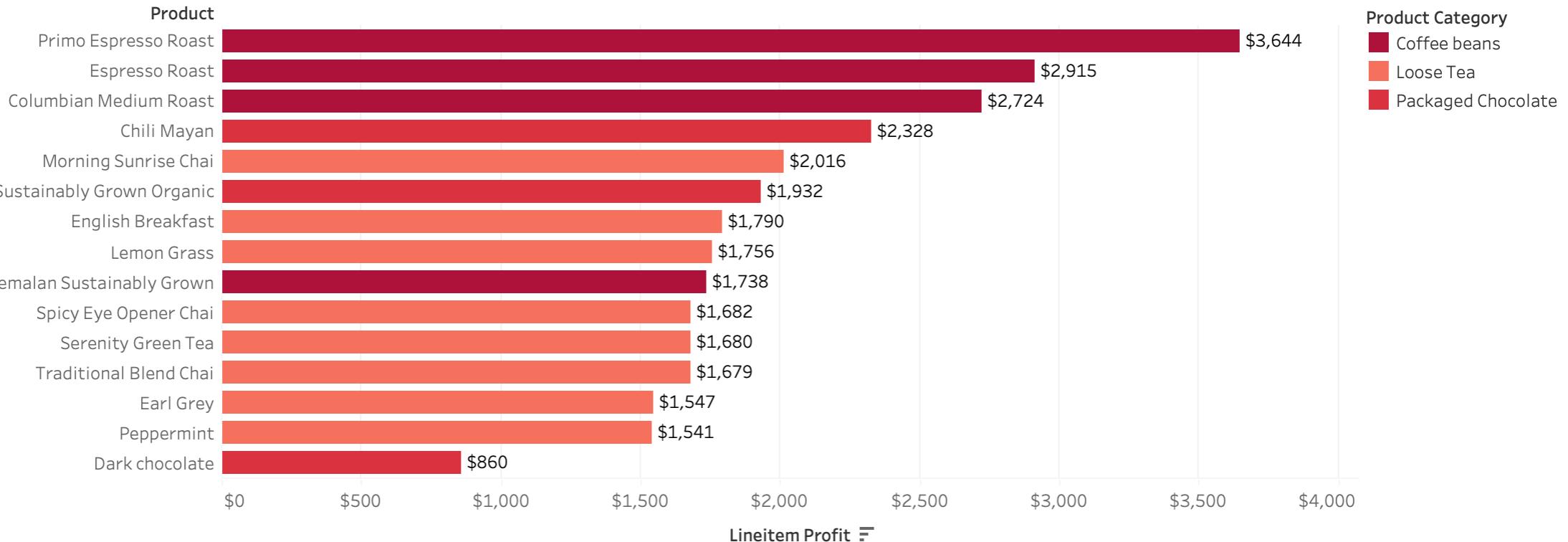


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Profitability of product categories (which are included in product groups).

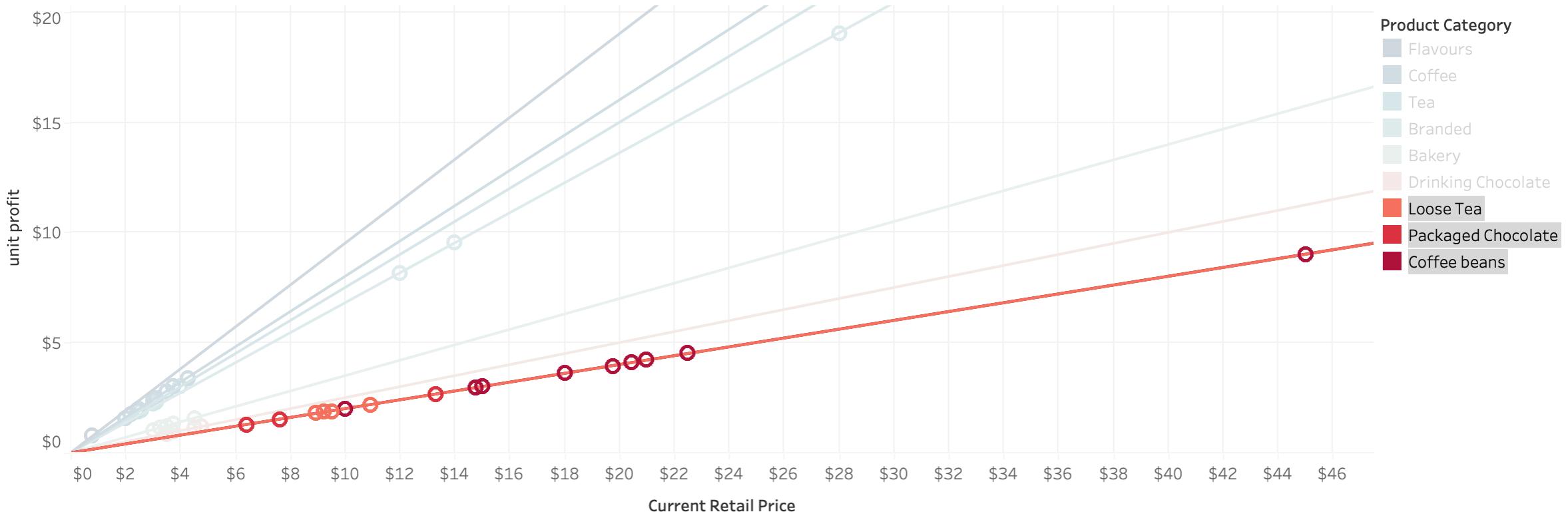


Increasing Profit in terms of products profitability (Growing Sales and Profit Further)

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Profitability of product categories (which are included in product groups).

The lowest quantity sold is associated with products from group 'Whole Beans/Teas'.

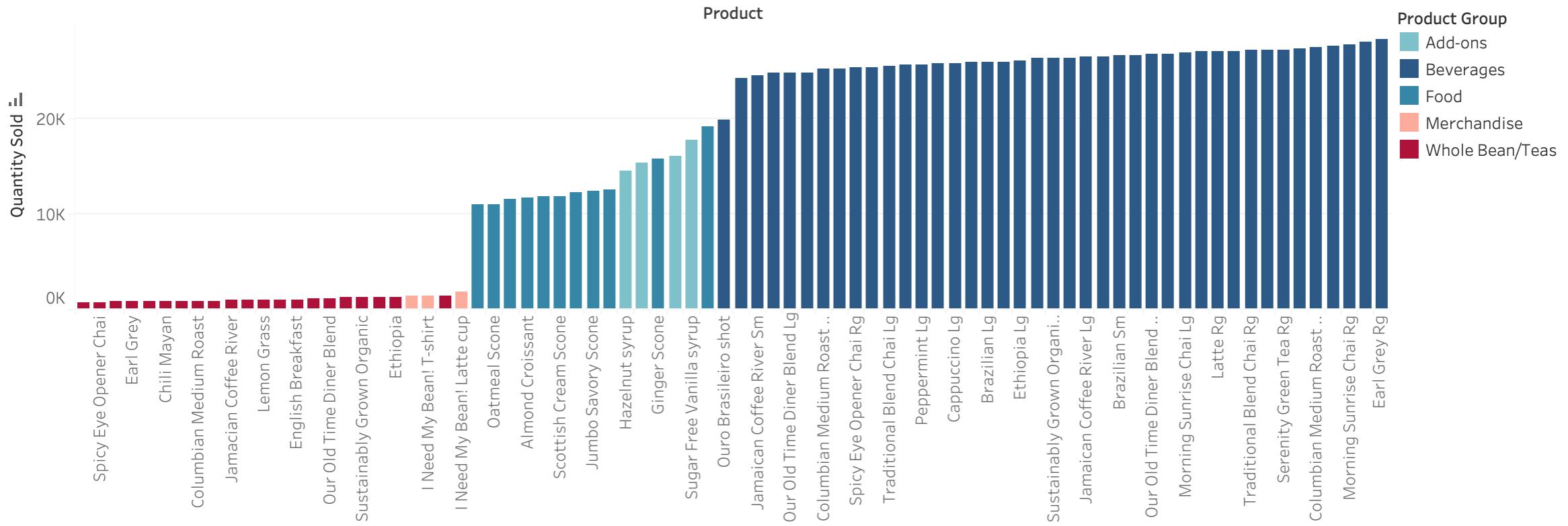


Increasing Profit in terms of products profitability (Growing Sales and Profit Further)

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Particular product types as drivers or burdens for each product group in terms of sold quantity and earned profit.

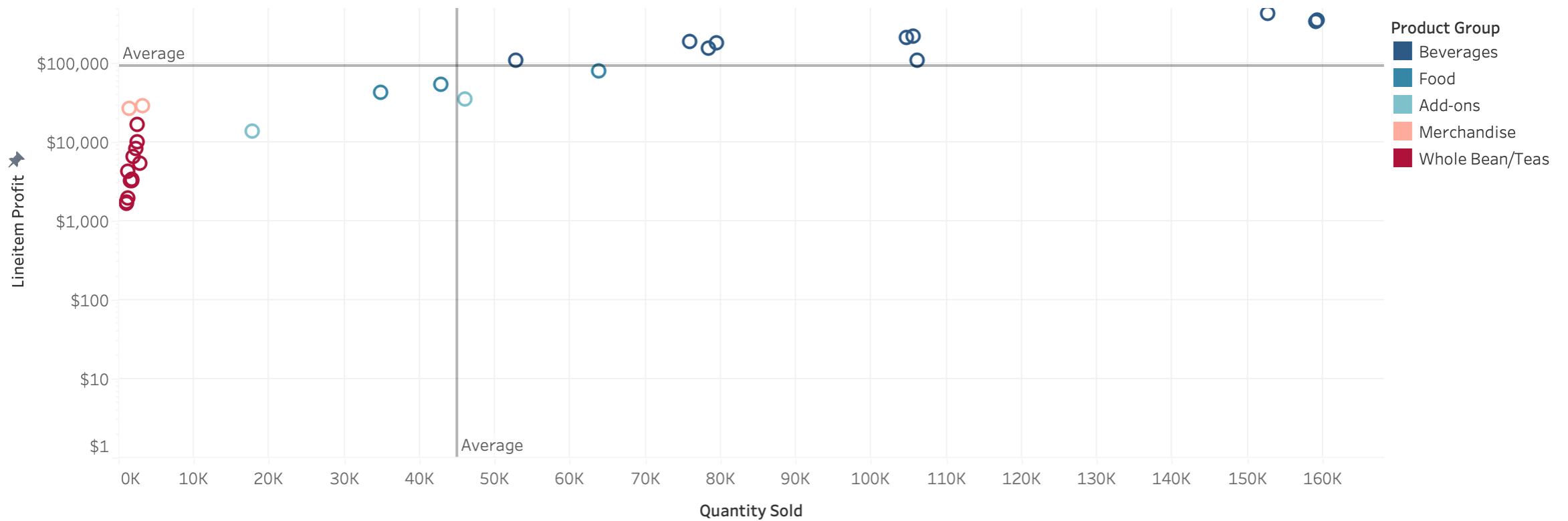


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This is the interactive dashboard for estimating product categories/types profitability.



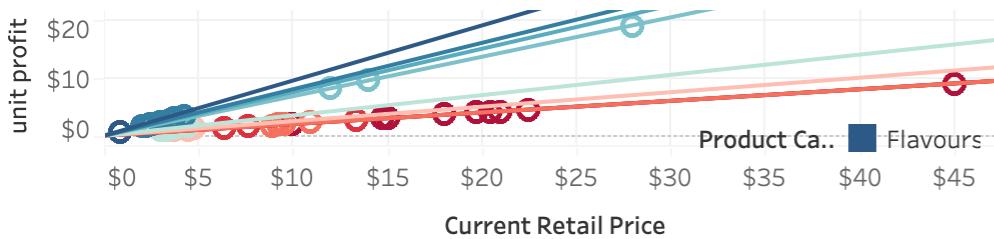
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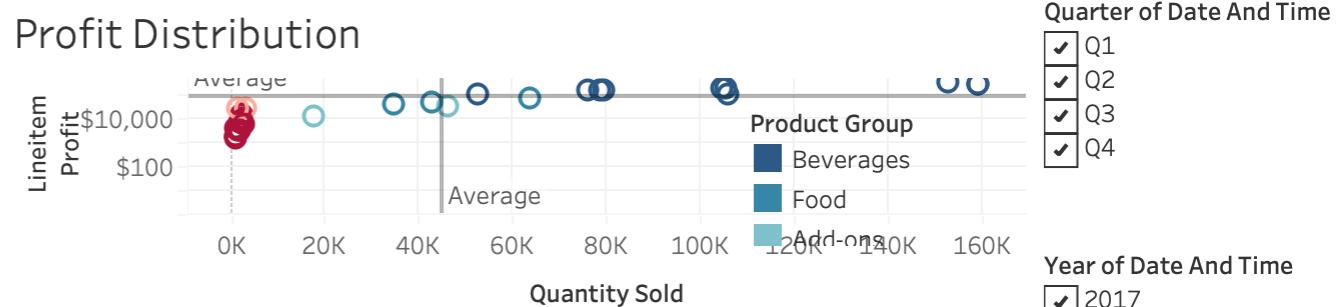
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Product Profitability

Retail Price vs. Profit by Unit



Profit Distribution



Profit % Diff (by month)



Profit Forecast (by month)

