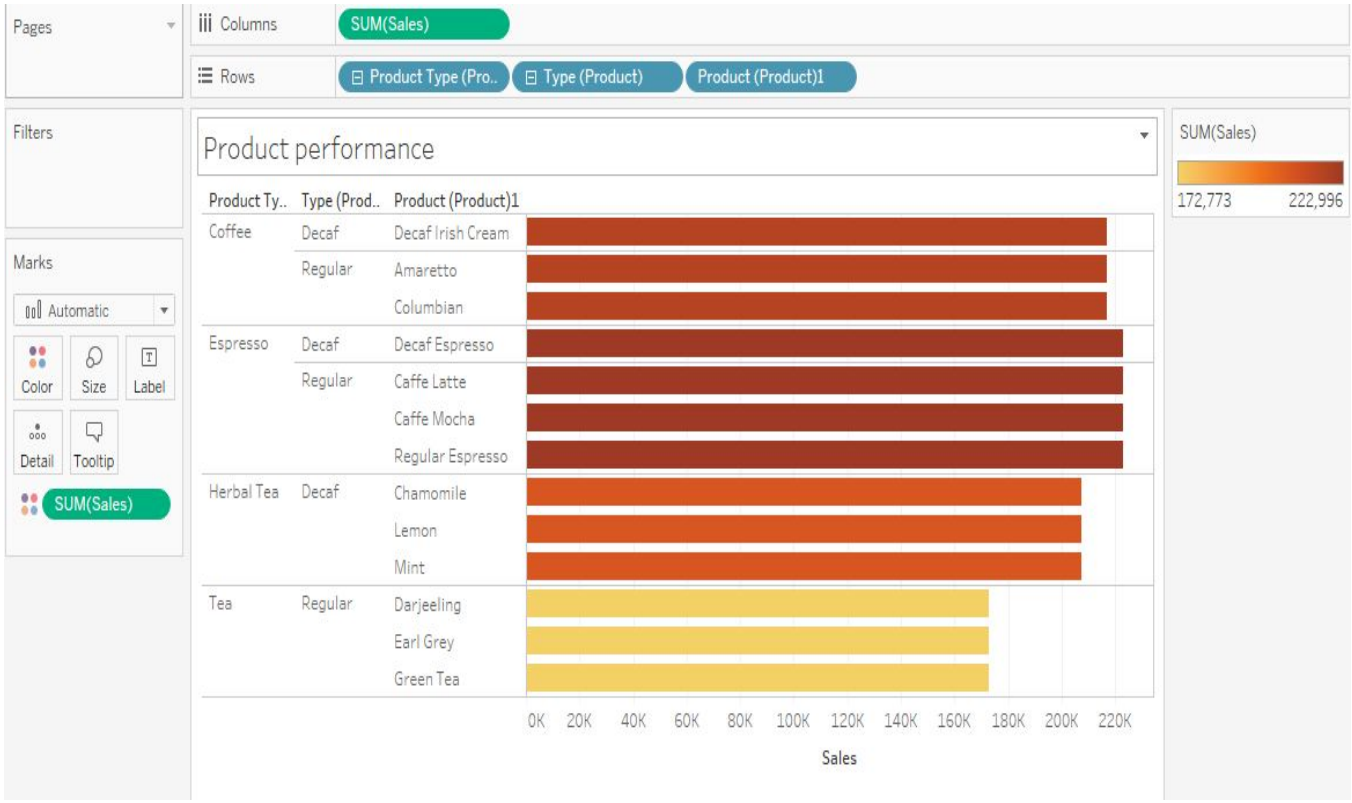
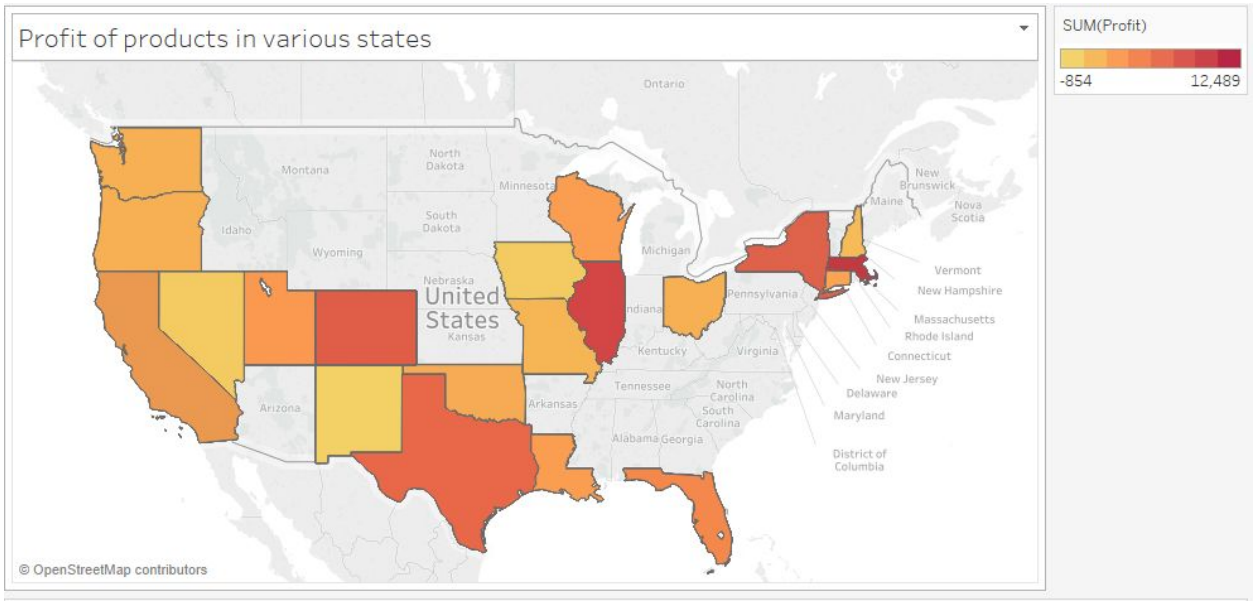
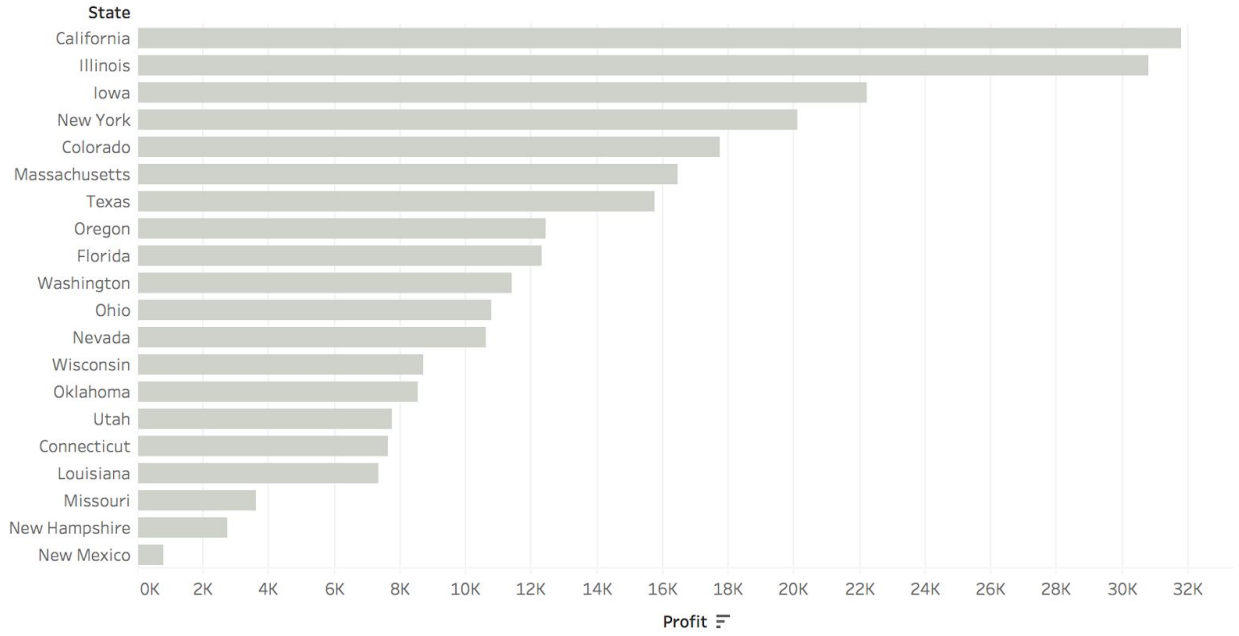
What products are underperforming?

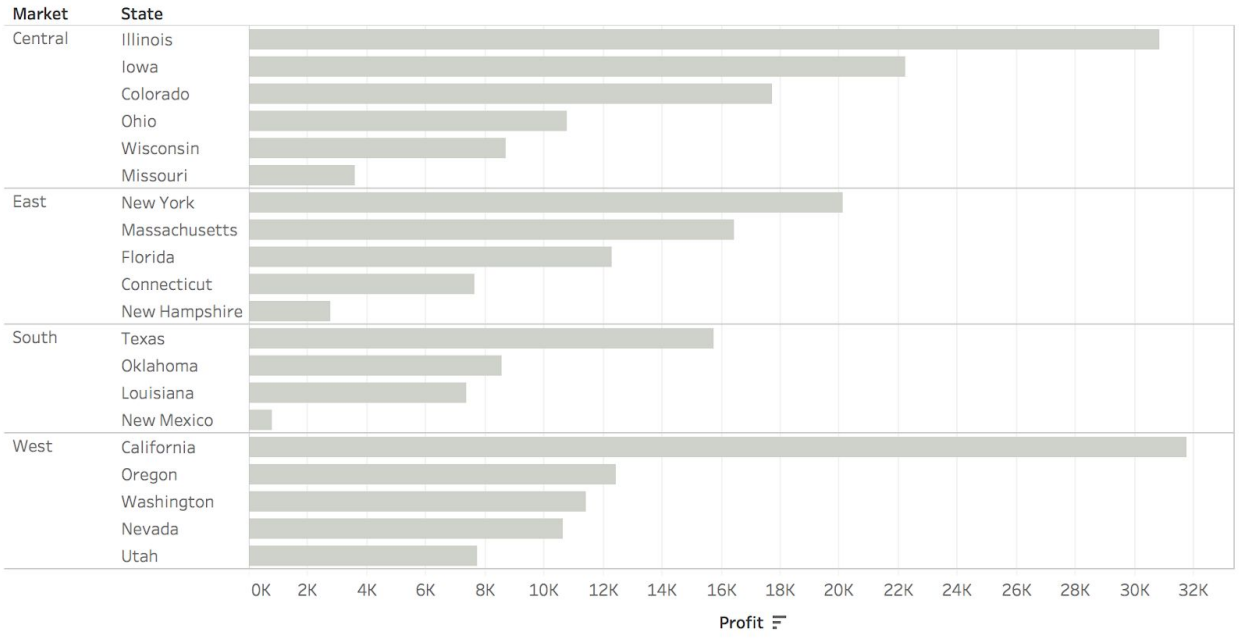


In the above figure, we can see that Tea is underperforming and we need to focus on sales of products such as Darjeeling, Green Tea, and Earl Grey.



The map above showcases the profit of various products in different states. Hence, we can concentrate on the states with





From the visualizations above, we can see that profit for all regions and states are positive. If we want to work with the lowest-profit states in each region, we would work with stores in Missouri,

New Hampshire, New Mexico, and Utah. If we wanted to focus on the lowest-profit states, we would look at New Mexico, New Hampshire, and Missouri.

Although profit is positive overall in every area, If we look at the zip code level, there are a few zip codes in California and New York where profit is negative (909, 925, 845,914), despite those states being the most profitable overall. Since profit is the difference between sales and cost of goods sold (COGS) and total expenses, we have the options of trying to increase sales, decrease expenses, or decrease cost of goods sold at those stores to tackle this issue.

Looking at California, sales, cogs, and total expenses are all fairly comparable between the zip codes that are profitable and the two which are not. In New York, however, we can see that both expenses and cost of goods are relatively high, while sales are low to average compared to the other zip codes in the state. There are no clear conclusions here, so we will look into product details.

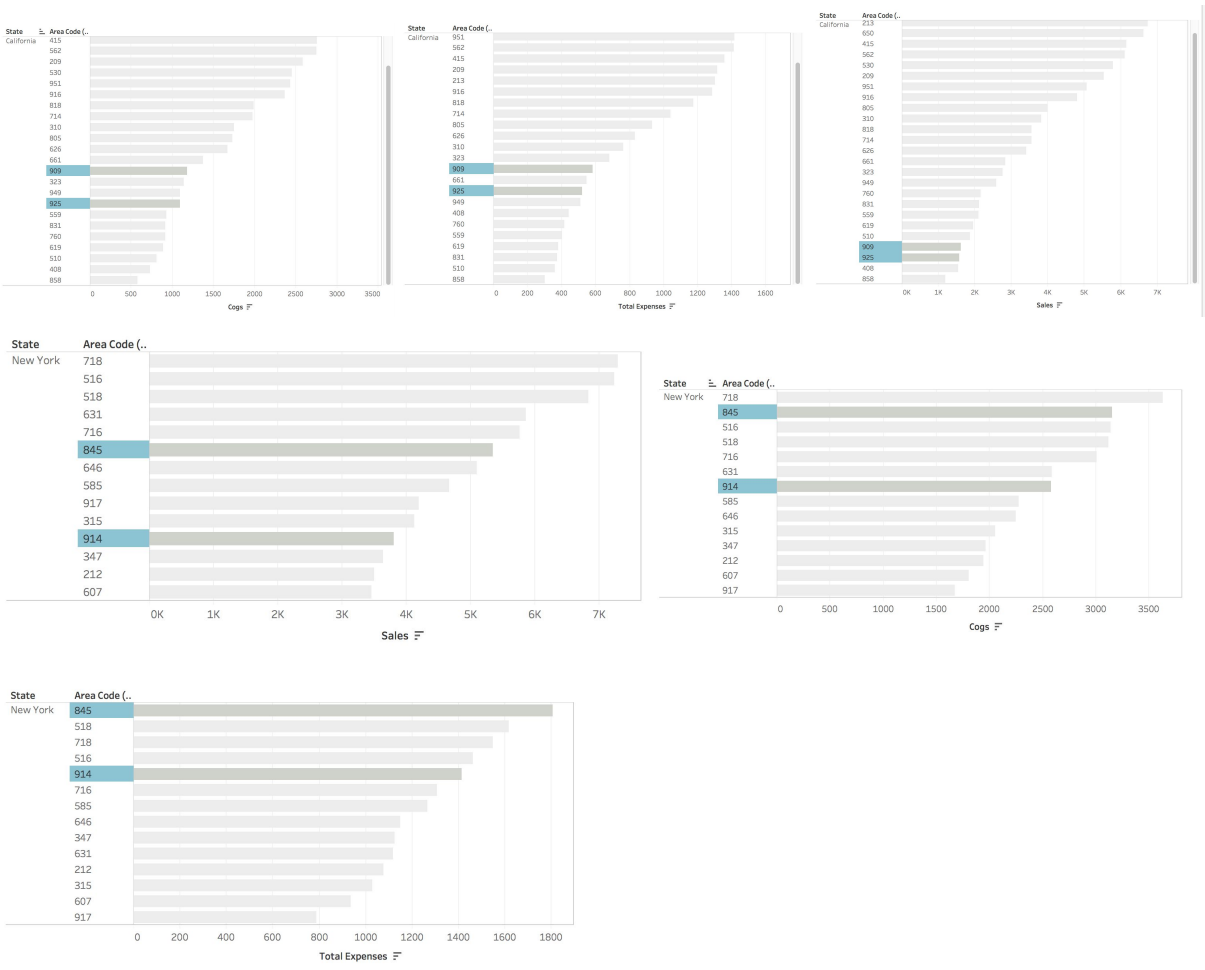


Figure (below) shows the overall profit by product. We can see that green tea is the only product where the coffee shop has a loss, and that amaretto and mint are both underperformers in terms of profit.

Product	
Amaretto	4,890
Caffe Latte	11,375
Caffe Mocha	17,678
Chamomile	27,231
Colombian	55,804
Darjeeling	29,053
Decaf Espresso	29,502
Decaf Irish Cream	13,989
Earl Grey	24,164
Green Tea	-231
Lemon	29,869
Mint	6,154
Regular Espresso	10,065

If we look at what products are underperforming on the aggregate, it looks like green tea is the only product where we have a major problem. However, looking at the market breakdown, we only have a negative profit on Green Tea in one region-the West. The market level also shows us negative profit points for other products besides Green Tea. At this level, it looks like profits are all positive across the board for the Central and South markets, but there are some pricing issues we can work out in the East and West regions.

	Product												
Market	Amaretto	Caffe Latte	Caffe Mocha	Chamom..	Colombi..	Darjeeling	Decaf Espresso	Decaf Irish Cre..	Earl Grey	Green Tea	Lemon	Mint	Regular Espresso
Central	5,104		14,642	14,435	8,525	10,769	8,859	9,635	10,334	1,227	6,253	4,069	
East	1,010		-6,232	764	27,256	6,500	2,411	2,726	3,404	5,654	7,902	-2,243	10,065
South		3,873	5,202	3,178	8,767		5,930	2,935			2,593		
West	-1,224	7,502	4,066	8,854	11,256	11,784	12,302	-1,307	10,426	-7,112	13,121	4,328	

If we look further at the state-by-state breakdown, we see that there are issues even in the Central and South regions that we missed looking at only the regional profits. Every single product except Decaf Espresso yields a negative profit in at least one state, and there are only a few states where we don't see any negative profits by product.

		Product												
Market	State	Amaretto	Caffe Latte	Caffe Mocha	Chamom..	Colombi..	Darjeeling	Decaf Espresso	Decaf Irish Cre..	Earl Grey	Green Tea	Lemon	Mint	Regular Espresso
Central	Colorado	3,410		2,339	2,678	1,566	366	1,362	3,250	826	1,272	-141	815	
	Illinois			6,575	3,404	4,362	2,332	4,494	3,463	1,368		1,569	3,254	
	Iowa	376		413	6,577	209	4,487	871	189	5,624		3,466		
	Missouri			1,225	-168	987	363	1,011	1,123	-209	-45	-686		
	Ohio	821		2,672	494	826	2,305	355	-131	2,724		707		
	Wisconsin	497		1,418	1,450	575	916	766	1,741	1		1,338		
East	Connecticut			3		2,999	1,220	673			612	988	1,126	
	Florida			582	764	2,305	941	1,738	2,726		1,346	497	1,411	
	Massachusetts			-297		12,489	708				491	366		2,685
	New Hampshire	1,010		-166		898	377				879	-41		-209
	New York			-6,354		8,565	3,254			3,404	2,326	6,092	-4,780	7,589
South	Louisiana		0	1,455	1,500	1,138		921	1,350			991		
	New Mexico		-207	-160	376	903		369	-683			201		
	Oklahoma		2,723	492	494	1,274		2,304	700			571		
	Texas		1,357	3,415	808	5,452		2,336	1,568			830		
West	California	-2,217	4,497	886	3,252	8,566	3,418	6,580	-3,891	2,334	1,355	5,450	1,555	
	Nevada		873	374	886	-45	6,580	409	208	4,498	-10,980	4,356	3,457	
	Oregon	-136	357	818	707	396	487	2,672	834	2,310	2,726	1,268		
	Utah	1,129	1,008	1,500	1,010	679	-155	1,222	978	365	-207	906	-684	
	Washington		767	488	2,999	1,660	1,454	1,419	564	919	-6	1,141		

If we go further and look at zip codes (not shown) we can see that there are some pricing issues in even certain parts of Connecticut, Florida, and Louisiana where the state-level visualization told us profits were positive. We can also see at the zip code level that in states where there were negative profits associated with a product, this was the case in every area of that state.

From the visuals above, we've established that we need to be looking at the state-level issues to see what the specific product issues are.

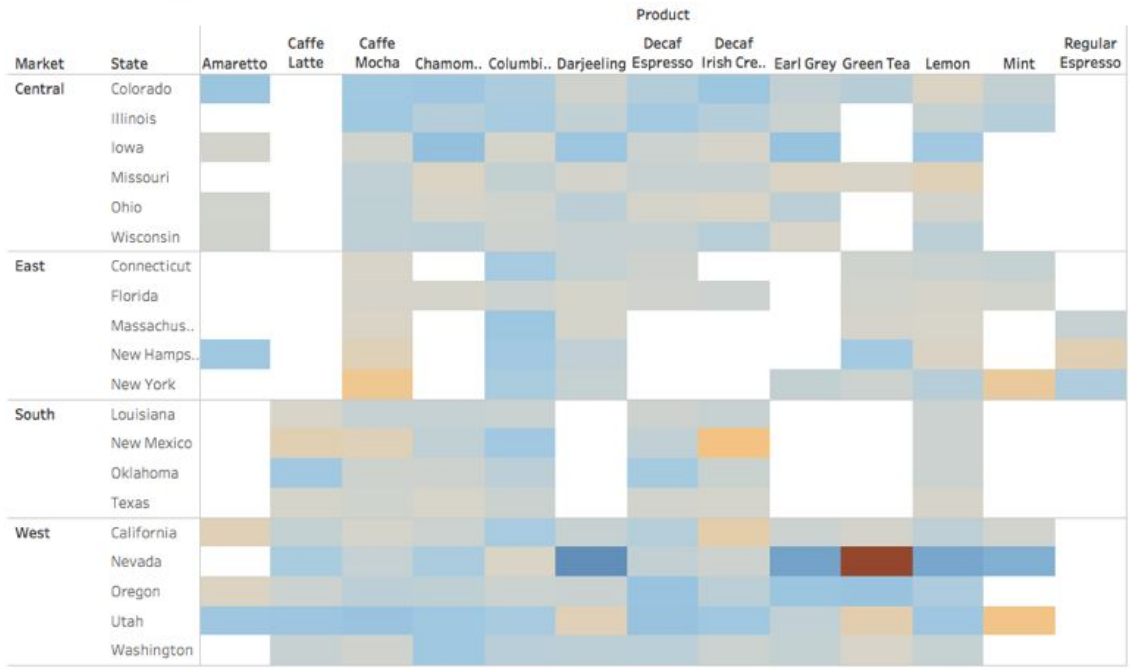
Next, we look at the average margins by product at the state-level. Comparing this visualization with the one above, we can attribute profitability issues in California for Amaretto and Decaf Irish Cream, In Nevada for Green ea, and in New York for Caffe Mocha and Mint on margin. To increase margin, we can either find new suppliers for these products in those states to decrease the cost of goods, or we can increase the price to consumers.

		Product												
Market	State	Amaretto	Caffe Latte	Caffe Mocha	Chamom..	Colombi..	Darjeeling	Decaf Espresso	Decaf Irish Cre..	Earl Grey	Green Tea	Lemon	Mint	Regular Espresso
Central	Colorado	157.2		112.3	159.0	87.5	65.4	98.5	150.8	66.2	74.1	69.8	72.5	
	Illinois			340.2	157.2	251.7	112.3	245.0	180.0	98.5		87.5	150.8	
	Iowa	29.7		30.8	340.2	37.6	245.0	41.6	24.2	324.3		180.0		
	Missouri			65.1	66.8	96.0	52.0	55.8	79.9	37.5	44.8	30.0		
	Ohio	72.5		159.0	33.8	64.1	140.3	65.4	69.8	148.8		43.0		
	Wisconsin	71.9		93.6	88.5	140.2	67.9	50.6	114.3	82.8		70.1		
East	Connecticut			82.8		169.2	65.1	66.2			38.8	96.0	79.9	
	Florida			140.2	50.6	140.3	53.2	114.3	148.8		70.1	71.9	93.6	
	Massachusetts			64.5		477.9	43.0				33.8	65.4		159.0
	New Hampshire	72.6		66.8		78.9	29.7				41.6	44.8		37.5
	New York			-63.9		447.3	150.8			157.2	112.3	341.3	-68.0	349.4
South	Louisiana		82.8	88.5	84.4	61.7		67.9	70.1			96.0		
	New Mexico		37.5	66.8	29.7	78.9		52.0	30.0			37.6		
	Oklahoma		148.8	33.8	71.9	74.1		140.3	43.0			140.2		
	Texas		98.5	157.2	72.5	280.1		112.3	87.5			64.1		
West	California	-13.9	245.0	182.5	150.8	447.3	157.2	340.2	-28.9	112.3	98.5	280.1	87.5	
	Nevada		41.6	29.7	182.5	44.8	340.2	30.8	37.6	245.0	-264.7	251.7	180.0	
	Oregon	69.8	65.4	72.5	43.5	74.3	33.8	159.0	64.1	140.3	148.8	74.1		
	Utah	79.9	55.8	84.4	72.6	66.2	66.8	65.1	96.0	52.0	37.5	78.9	30.0	
	Washington		50.6	71.9	169.2	101.1	88.5	93.6	140.2	67.9	82.8	61.7		

what else could be causing these unprofitable products in certain areas?
Should we look at the lowest-profit states to see why this is the case?

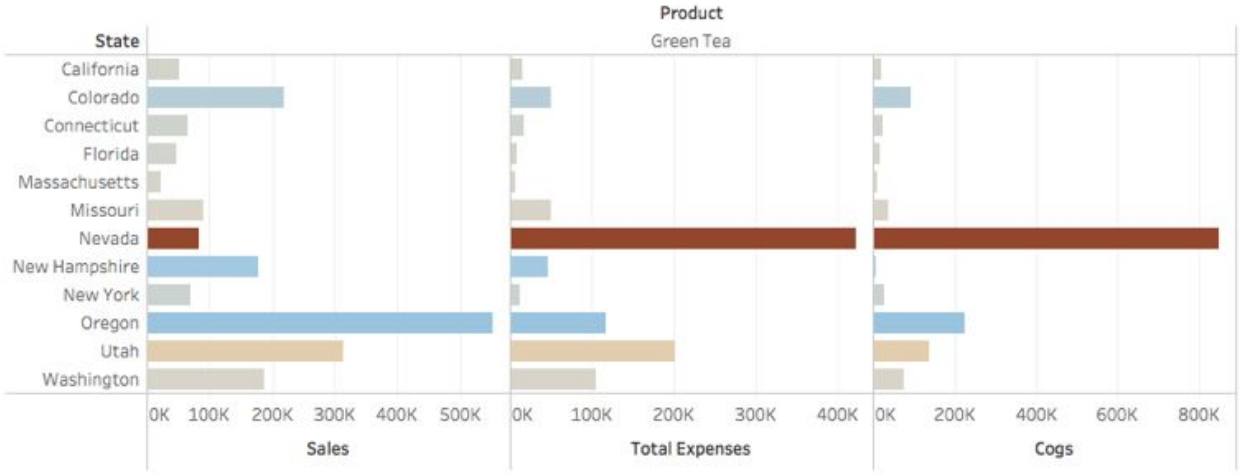
What correlates with profit?
Are there issues with certain product lines, products, markets, pricing structures (margins), costs, …?

Market/State profit

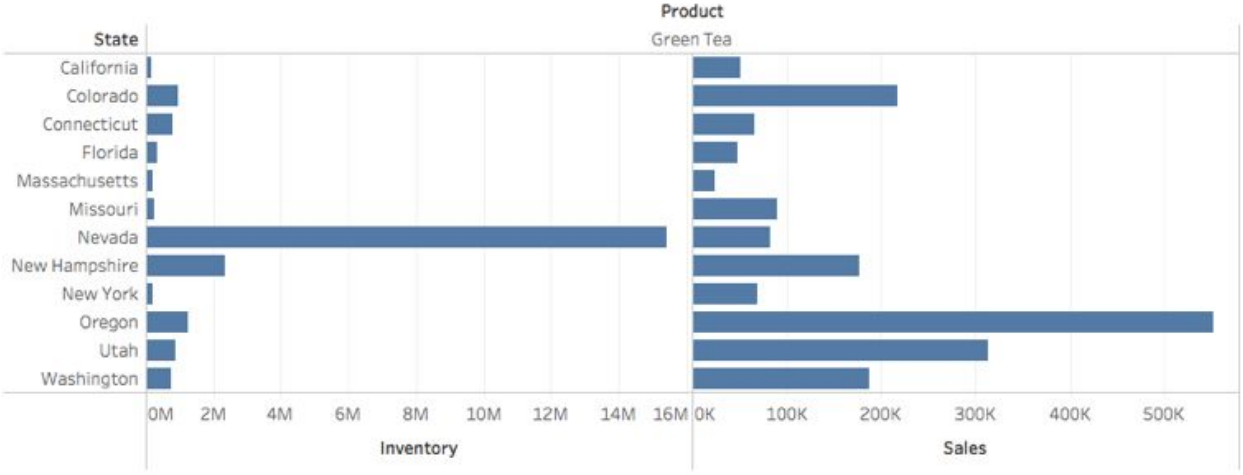


From this visualization, we can know that the green tea in Nevada suffered from the lowest profit. The profit of decaf Irish cream in New Mexico and Mint in Utah also have significantly low profit. But we are only going to find out what caused low profit in Nevada's green tea selling.

Green tea_Nevada

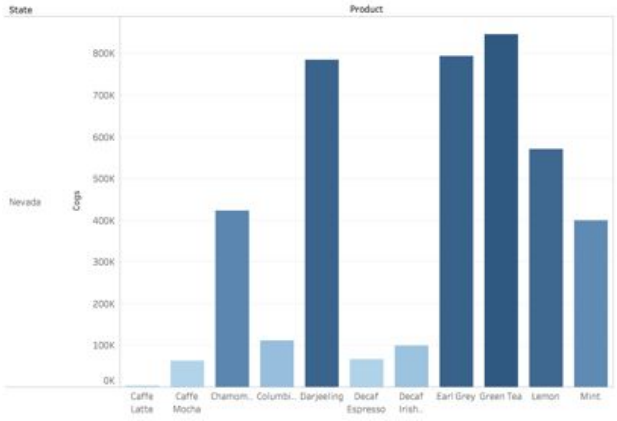


Green tea_Inventory vs Sales

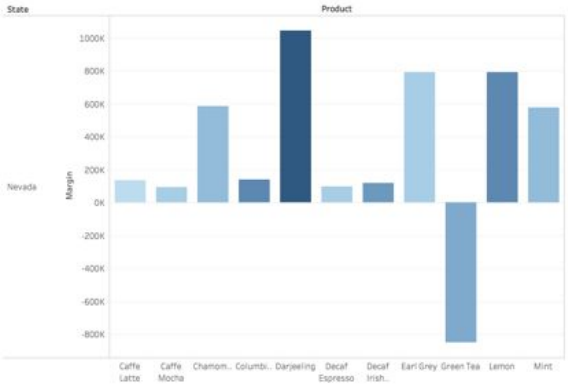


If we only focus on green tea in all states, we can see that in terms of sales, total expenses and cogs, Nevada's low profit is caused by extremely low sales and extremely high total expenses and cogs. The output is much more than input. Therefore, Nevada could not achieve profit in green tea selling. What's important is that the inventory of green tea in Nevada is the highest, but the sales is pretty low. It indicates that there might be some problems in distribution and stock arrangement in the stores in Nevada, which could be adjusted to reduce total expenses and other possible costs.

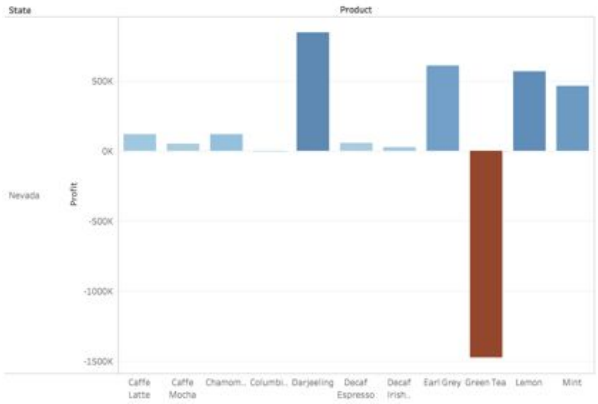
Nevada_cog



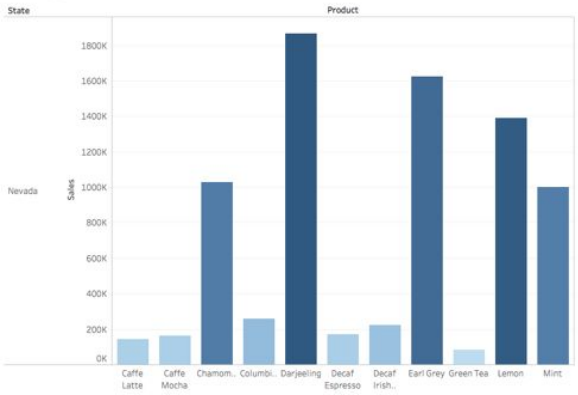
Nevada_margin



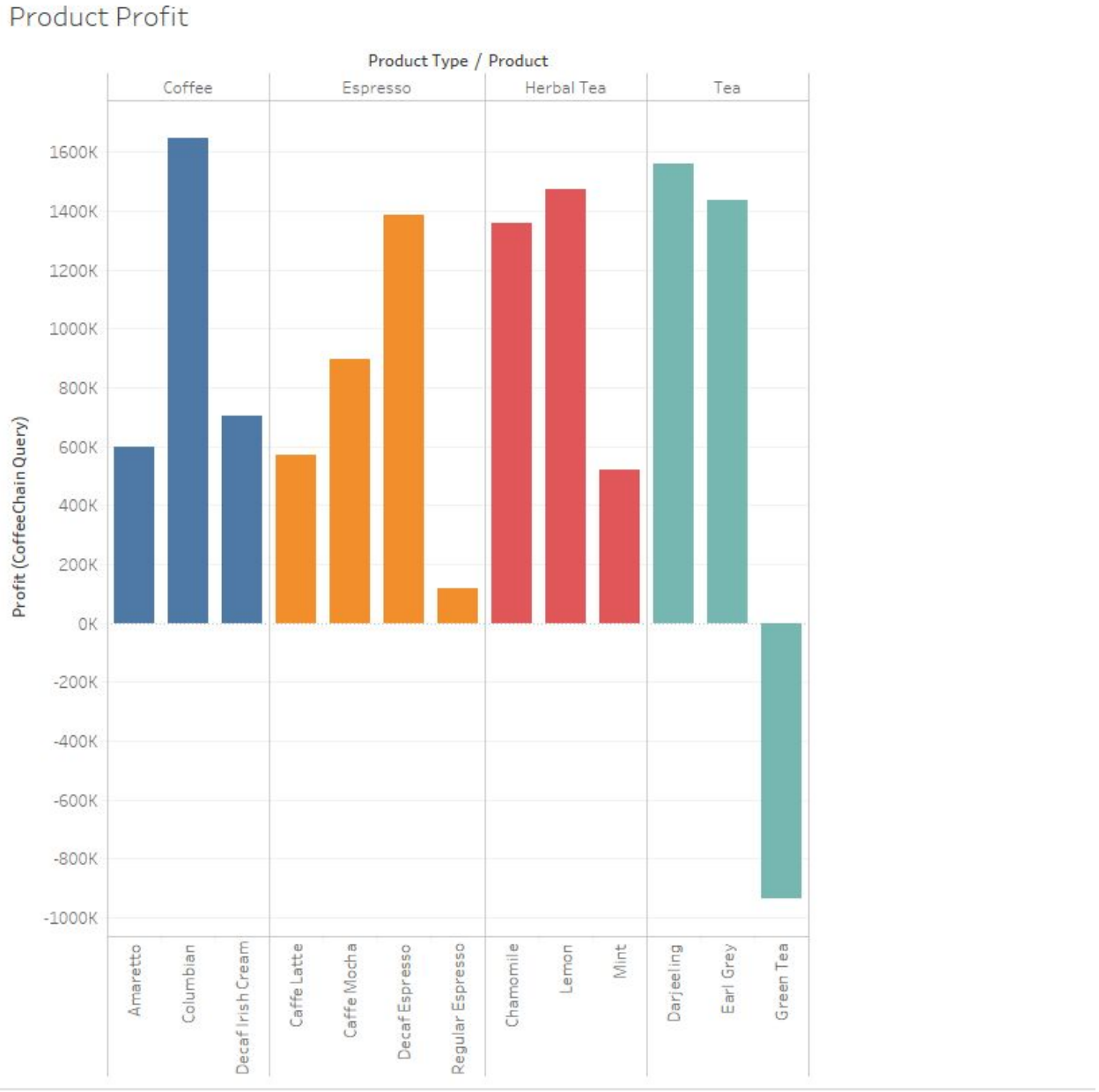
Nevada_profit



Nevada_sales

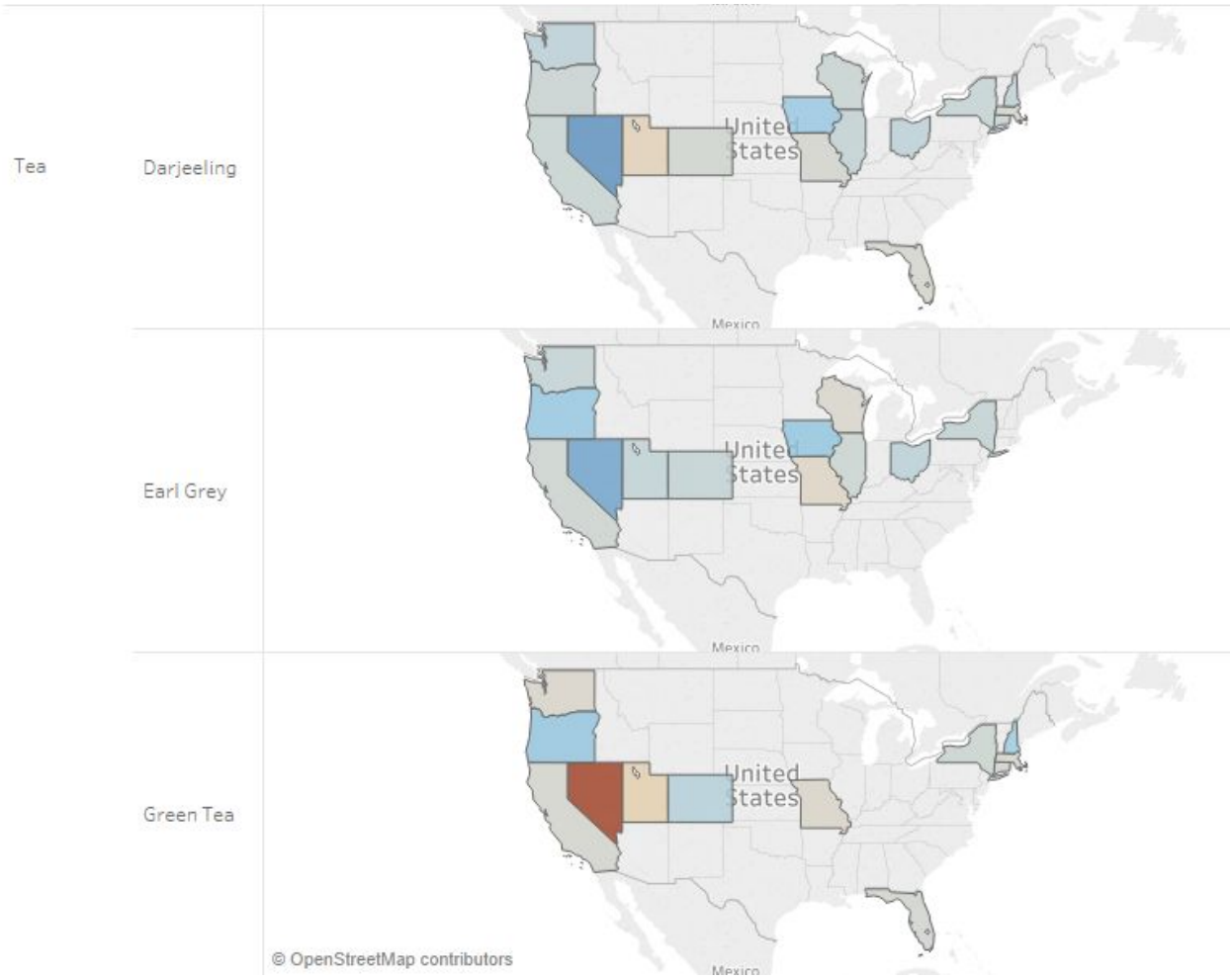


Through comparing 4 items with their corresponding budget-related ones in Nevada, which includes cogs, margins, profit and sales, it can be concluded that the margin of green tea has a great difference with its budget margin, while the other three have nearly quantities with their correspondents. It shows that the budget pricing structure (margin) of green tea in Nevada does not agree with the actual situation. The budget is not accurate, so it would be a significant factor causing low profit of green tea selling.

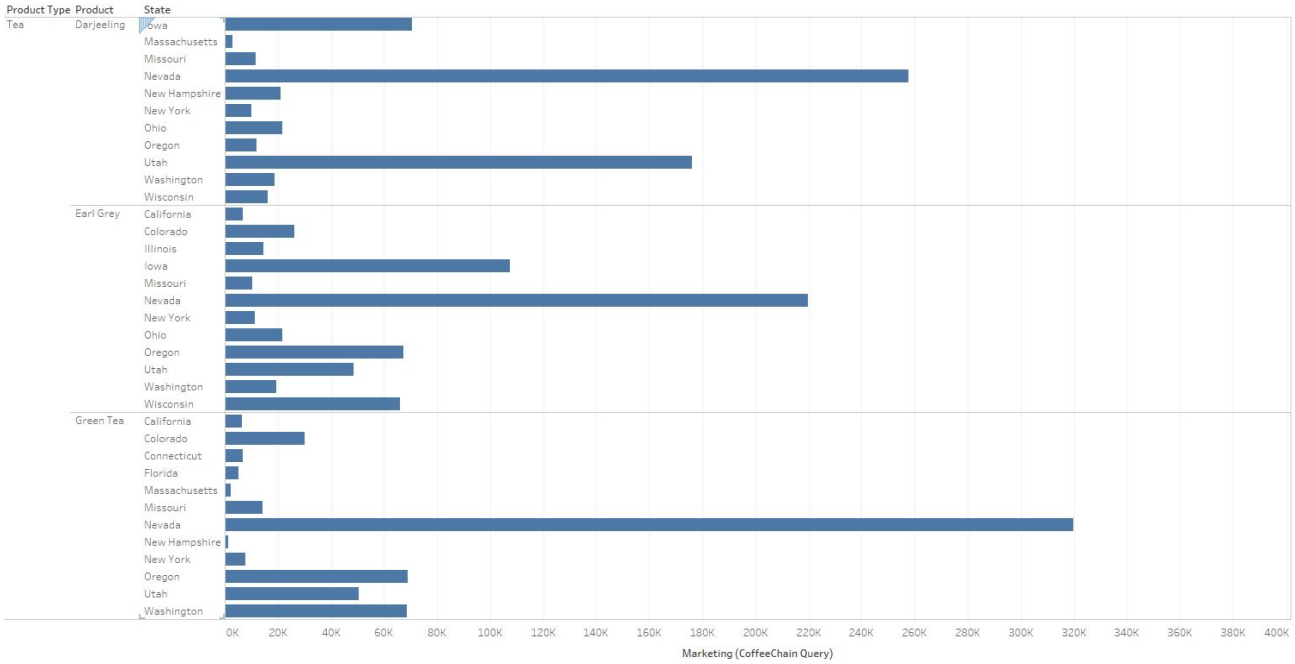


As seen from above, Columbian Coffe is outperforming other products; therefore, it is a profitable product type for the shop. However, coffee is not the most profitable product type amongst its competitors. Herbal Tea product type is earning the greatest profit of $3,354, 626. The least profitable product for the shop is Green Tea. It is bearing a loss of $934,740.

Total profit Coffee: 2,949,638
Total profit Espresso: 2,968,336
Total profit Herbal Tea: 3,354, 626
Total profit Tea: 2,062,043



Further confirming our assumption of underperformance of Green Tea, we examined the product location by state. Nevada is incurring the greatest loss of Green Tea; therefore, the shop should consider removing it from the menu.



Location is essential to making the shop profitable. As shown above, the shop invests heavily in marketing for the state of Nevada; however, it is no getting its return for selling Green Tea.