

Propane Grills vs Charcoal Grills.

To get started, I am providing a general description of the case and the datasets I have available to use

The main task of this report is to provide insights about the grills industry. We have four different datasets with information regarding the grill industry. The insights are be focus on the main things Americans look at the time to purchase a grill. In one hand, we have the Charcoal Grill and on the other hand we have the Propane Grill. These two types of grills have the majority of the market share in this industry.

The first dataset contained the grill's efficiency based on the pre-heating time, cost per meal, market share for each grill, how easy is each grill to use, life expectancy and the initial investment to purchase each grill.

The second dataset consisted of the user satisfaction for each grill depending on the item that was prepared, and the fuel cost to use the grill, and the device id.

Finally, the third dataset included the users score for the meal prepared with the additional information if the meal was frozen, which grill they used and if the user guessed the grill correctly.

The fourth dataset is the same than the third dataset, but instead of giving the data in csv format, this fourth dataset was given in json format.

The program I used to make the visualizations and work with the dataset was Python. The libraries used were Pandas, json, seaborn, and Mat Plot mainly.

Firstly, I wanted to see what's the distribution of the user's satisfaction with the grills and the score's distribution. The histograms are shown below:

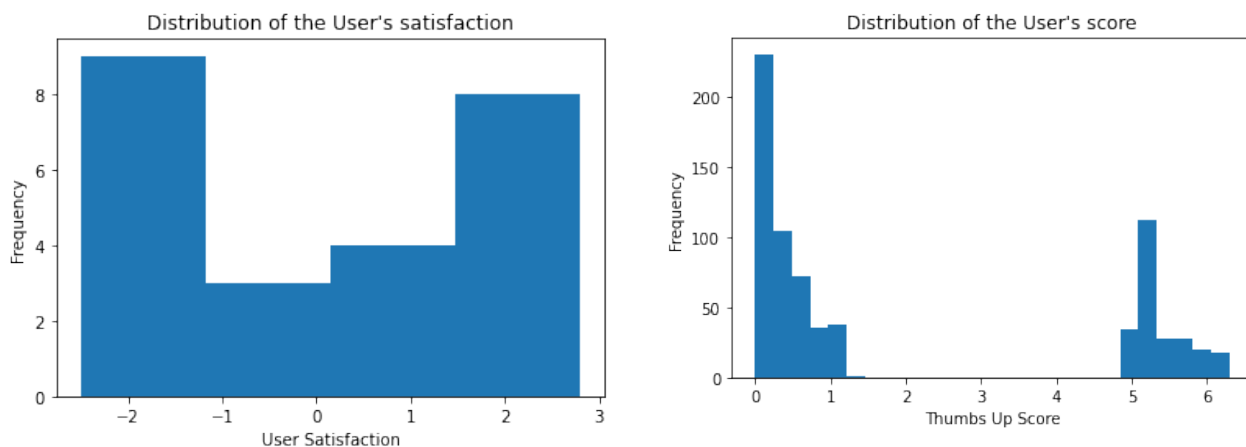


Exhibit 1. A) User's Satisfaction Distribution. B) User's Score Distribution

From the distributions, neither the user's satisfaction distribution nor the user's score distribution is normally distributed. Both are skewed to the rights. It is concerning because most of the samples are negatively rated according to the users. This is giving me an idea on the recommendations I will be making during the report

Process

To get insights, firstly, I made a visualization to know which grill type has more market share.

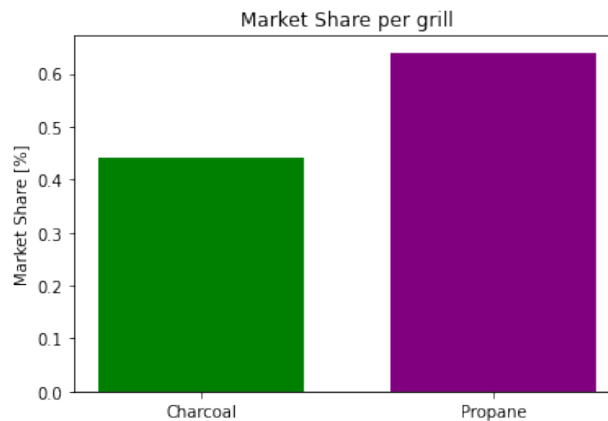


Exhibit 1. Market Share per grill type.

From the Exhibit 1, I can see that the Propane Grill has more market share with approximately 64% of the Market Share. I want to see the reason why the propane grill has more market share.

Let's see what we can find by making visualizations.

Firstly, I want to see which grill is easier to use based on the data we have available.

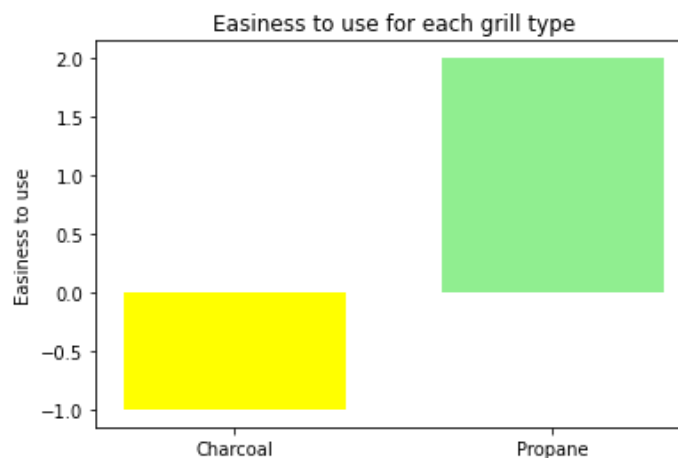


Exhibit 2. Easiness to use per grill type.

From this graphic, the conclusion is very clear. The Propane Grill is easier to use than the Charcoal Grill. This makes sense because the pre-heat time is less, and you do not need any expertise to control any temperature since these grills have a thermostat

Secondly, I want to see is the price. Is it the propane grill cheaper than the charcoal grill?

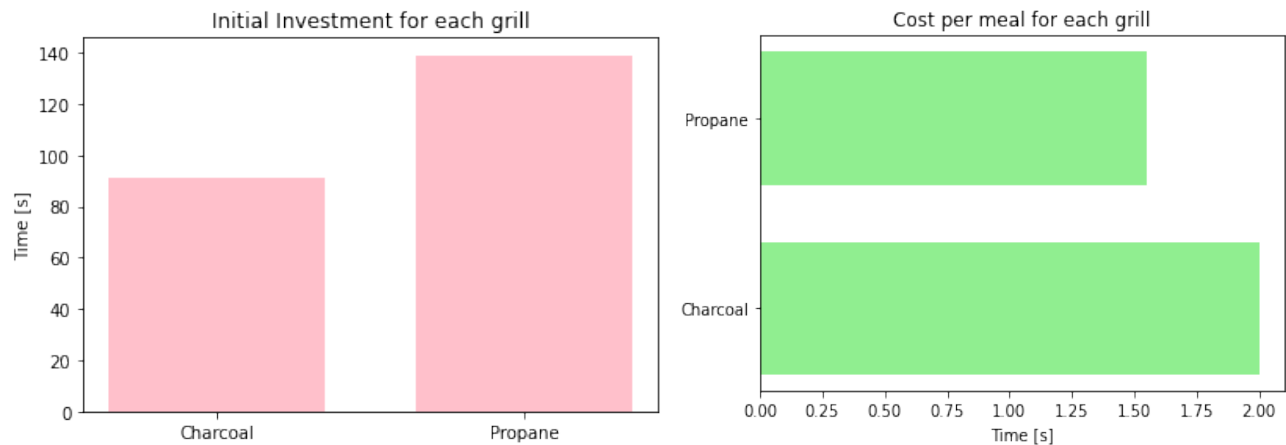


Exhibit 3. A) Initial investment for charcoal and propane grill. B) Cost per meal for charcoal and propane grill.

From the Exhibit 3 I can conclude that it is more expensive to initially purchase a propane grill, but the meal cost is lower for this one. Therefore, I need to go further and see the break-even point to finally say which grill is cheaper. To do so, I made a linear regression to check out the intercept.

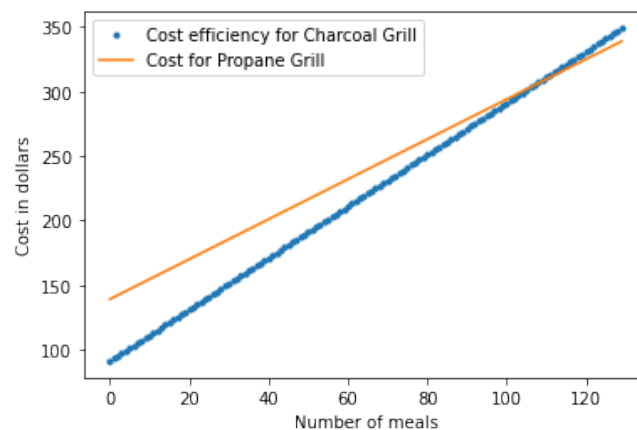


Exhibit 4. Costs of having Propane and Charcoal Grill

For the Exhibit 4, I can conclude that you need to prepare at least 100 meals to save more money with the propane grill. Since Americans use the grill in average 16 times per year, so cost savings is not the main reason why Americans prefer propane grill.

I want to see now the user satisfaction for each grill. To make this easier to visualize, I calculate the mean of the user satisfaction for the charcoal grill and for the propane grill. The results are shown below:

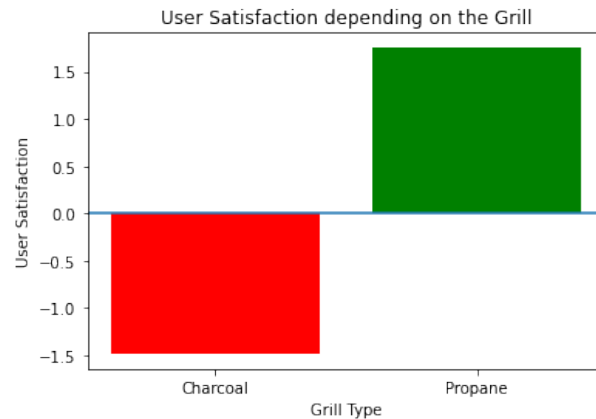
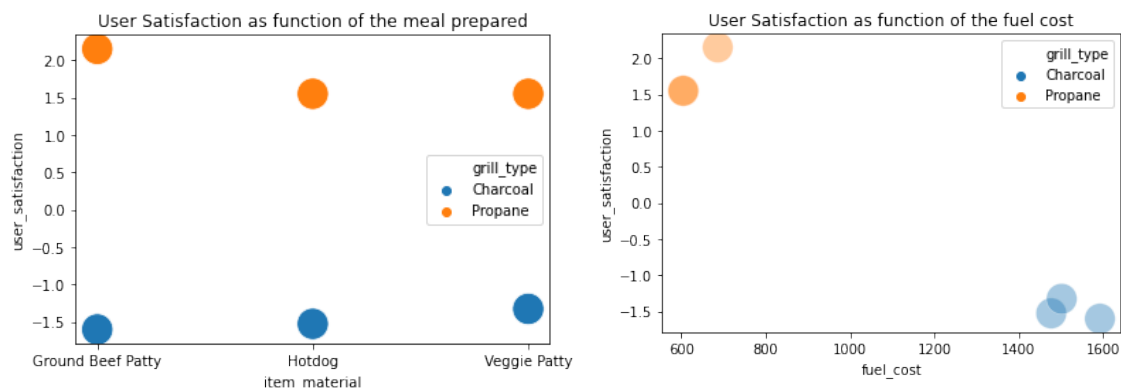


Exhibit 4. User Satisfaction for charcoal and propane grill

It is remarkable that the propane grill has so much higher user satisfaction. It makes sense since this propane grill has more market share.

However, it is necessary to look further. I want to see why the propane grill has higher customer satisfaction. Is it because of the meal that is being prepared? Fuel cost? Esiness to use?

I will be plotting some visualizations to have the final idea and share the insights from the datasets.



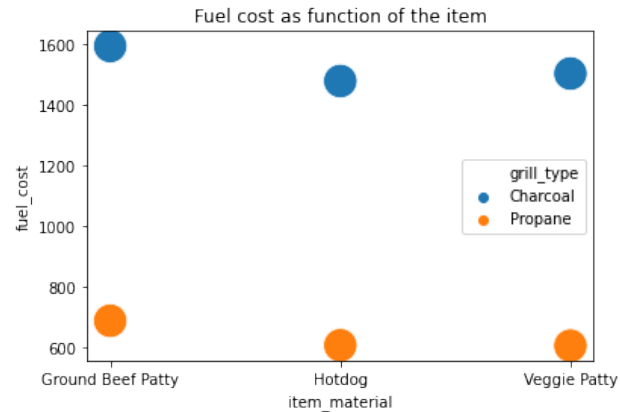


Exhibit 5. A) User satisfaction as function of the meal prepared. B) User Satisfaction as function of the fuel cost. C) Fuel cost as function of the meal prepared

Generally speaking, propane grills have higher user satisfaction no matter which meal was prepared, and additionally the fuel cost for propane is lower. However, as mentioned before, in overall propane grill is more expensive unless you are using the grill more than 100 times during the three years of life expectancy.

In the following aggregated table, I can see the users score for the meal prepared:

Meal Prepared	Grill Type	Is Frozen?	Guessed grill	Score
Ground Beef Patty	Charcoal	FALSE	FALSE	0.109090909
		FALSE	TRUE	0.212244898
		TRUE	FALSE	0.157142857
		TRUE	TRUE	0.166037736
	Propane	FALSE	FALSE	5.4
		FALSE	TRUE	5.577586207
		TRUE	FALSE	5.6
		TRUE	TRUE	5.601724138
Hotdog	Charcoal	FALSE	FALSE	5.083333333
		FALSE	TRUE	5.209259259
		TRUE	FALSE	5.3
		TRUE	TRUE	5.189830508
	Propane	FALSE	FALSE	0.4
		FALSE	TRUE	0.569230769
		TRUE	FALSE	0.438461538
		TRUE	TRUE	0.582978723

Veggie Patty	Charcoal	FALSE	FALSE	0.08
		FALSE	TRUE	0.16
		TRUE	FALSE	0.3
		TRUE	TRUE	0.148076923
	Propane	FALSE	FALSE	0.516666667
		FALSE	TRUE	0.533333333
		TRUE	FALSE	0.5125
		TRUE	TRUE	0.55

Table 1. Average Score based on the meal, grilled used, and frozen status

From this aggregate table, I can conclude that Ground Beef had better score with propane grills and Hot Dogs had better scores with charcoal grills. It did not matter if the meal was whether frozen or not and if the users guessed or not the type of grill used. For Veggie Patty, the scores were very similar.

Conclusions

At this point, we have all what we need to answer the main question. Why does the Propane Grill have so much higher user satisfaction than the charcoal grill?

It is not about costs. It is not about the flavor. It is not about Americans preferring Ground Beef over Hot Dogs. It is about easiness to use. I assume Americans do not like to clean the ashes the Charcoal grill leaves after-use, also Americans like how easy is to manage the temperature in the Propane Grill with the thermostat (the Charcoal grill requires more expertise), and finally, for Americans, the taste is better for Ground Beef and Veggie Patty. Better flavor, faster preparation, and easier to use is the best combination, so that's the main reason why they have more market share.

Recommendations

- Charcoal Manufacturer

Work how to make them easier to use. Maybe the option of a thermostat will increase user's satisfaction.

The ground beefs require more expertise. By making the grill easier to use, by default you would be increasing the ground beef scores with this grill.

- Propane Manufacturer

With a lower initial investment, this will make this grill have even more market share.

Also, if they improve the Hotdogs preparation with their grills, they may have more market share.

User's Recommendations

Based on the insights I just got, I would not see a reason why to have a Charcoal grill if I am a normal person with no deep knowledge on how to use the grill. For me, the propane grill it is easier to use, I don't have to clean the ashes, it takes less time and if I want to use it a lot, I will see future savings. I would probably have better ground beefs and veggie patty which is even better

If I am an experienced person who loves making Hot Dogs and does not mind cleaning after use, I would choose to have a Charcoal grill. Even though it would take me more time on the pre-heating, I would prepare better Hot Dogs rather than if I am using the Propane Grill.

Generally speaking, and important to point out, propane grill is better than the charcoal grill.