ANALYZING THE IMPACT OF CAR FEATURES ON PRICE AND PROFITABILITY

Project Description

This project aims to analyze the impact of various car features on their pricing and profitability to help a car manufacturer optimize pricing and product development decisions. By understanding the factors that drive consumer demand and how different features correlate with a car's price and popularity, the manufacturer can make informed decisions to maximize profitability while meeting consumer preferences.

Business Problem

The key question is how a car manufacturer can optimize pricing and product development decisions to maximize profitability while meeting consumer demand.

Tech-Stack Used:

- **Microsoft Excel**: For data cleaning, analysis, visualization, and dashboard creation. Excel is a powerful tool for data analysis with robust features for visualization and statistical analysis.

Approach

1. **Descriptive Statistics**: To summarize the basic features of the dataset, providing a foundation for understanding the data.

2. **Visualization**: To uncover trends and relationships between variables, helping to identify patterns and trends.

3. **Regression Analysis**: To quantify the relationship between car features and prices, identifying the factors that most influence car prices.

4. **Market Segmentation**: To group cars into categories based on their features and market categories, aiding in understanding consumer preferences across different segments.

ANALYSIS

TASK 1

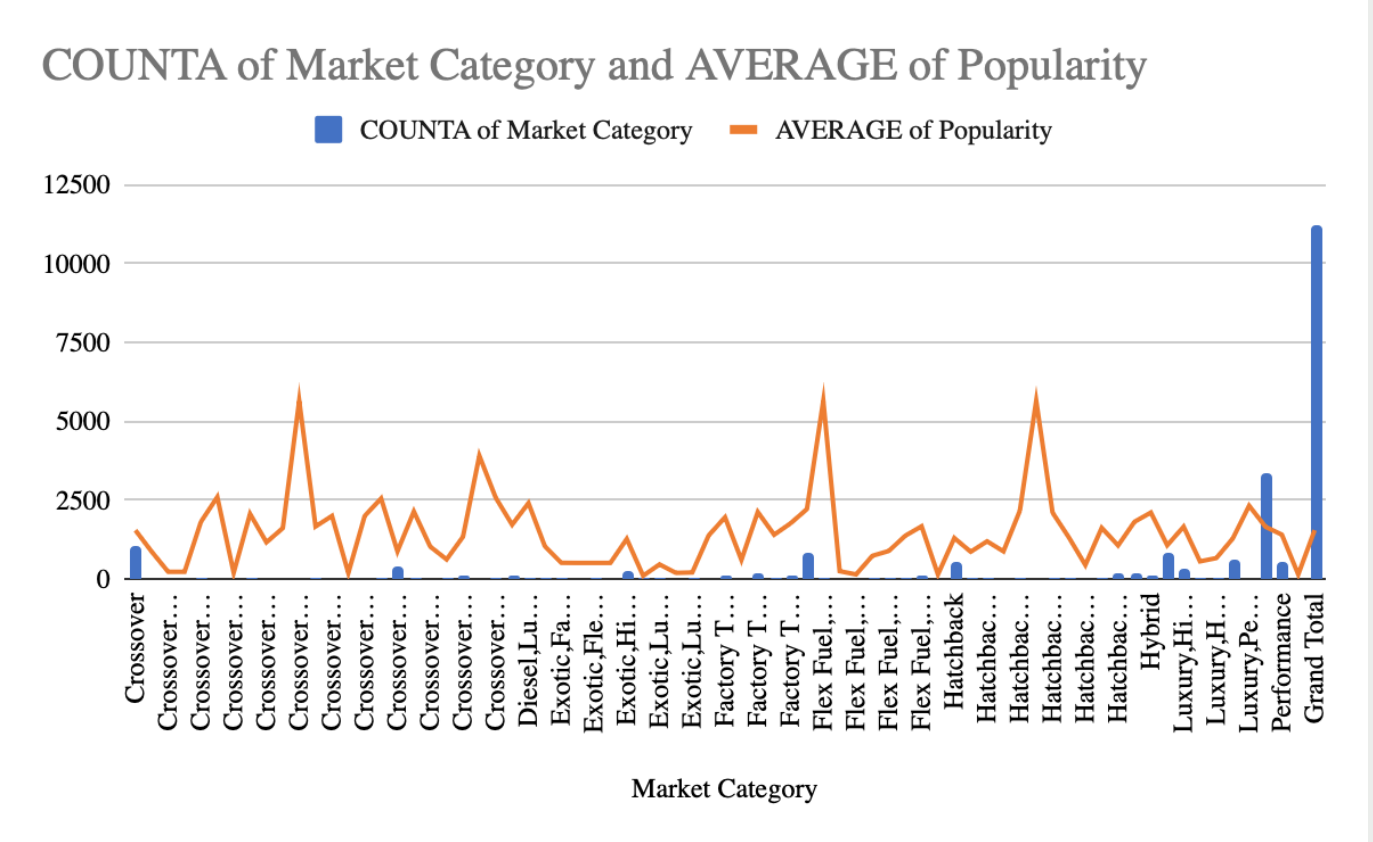
How does the popularity of a car model vary across different market categories?

1A

MARKET CATEGORY	COUNTA OF MARKET CATEGORY	AVERAGE OF POPULARITY
Crossover	1075	1556.17
Crossover, Diesel	7	873.00
Crossover, Exotic, Luxury, High-Performance	1	238.00
Crossover, Exotic, Luxury, Performance	1	238.00
Crossover, Factory Tuner, Luxury, High-Performance	26	1823.46
Crossover, Factory Tuner,Luxury,Performance	5	2607.40
Crossover,Factory Tuner,Performance	4	210.00
Crossover,Flex Fuel	64	2073.75
Crossover,Flex Fuel,Luxury	10	1173.20

1B

Flex Fuel, Diesel, Hatchback, Crossover, Performance are the most popular market category for car models.

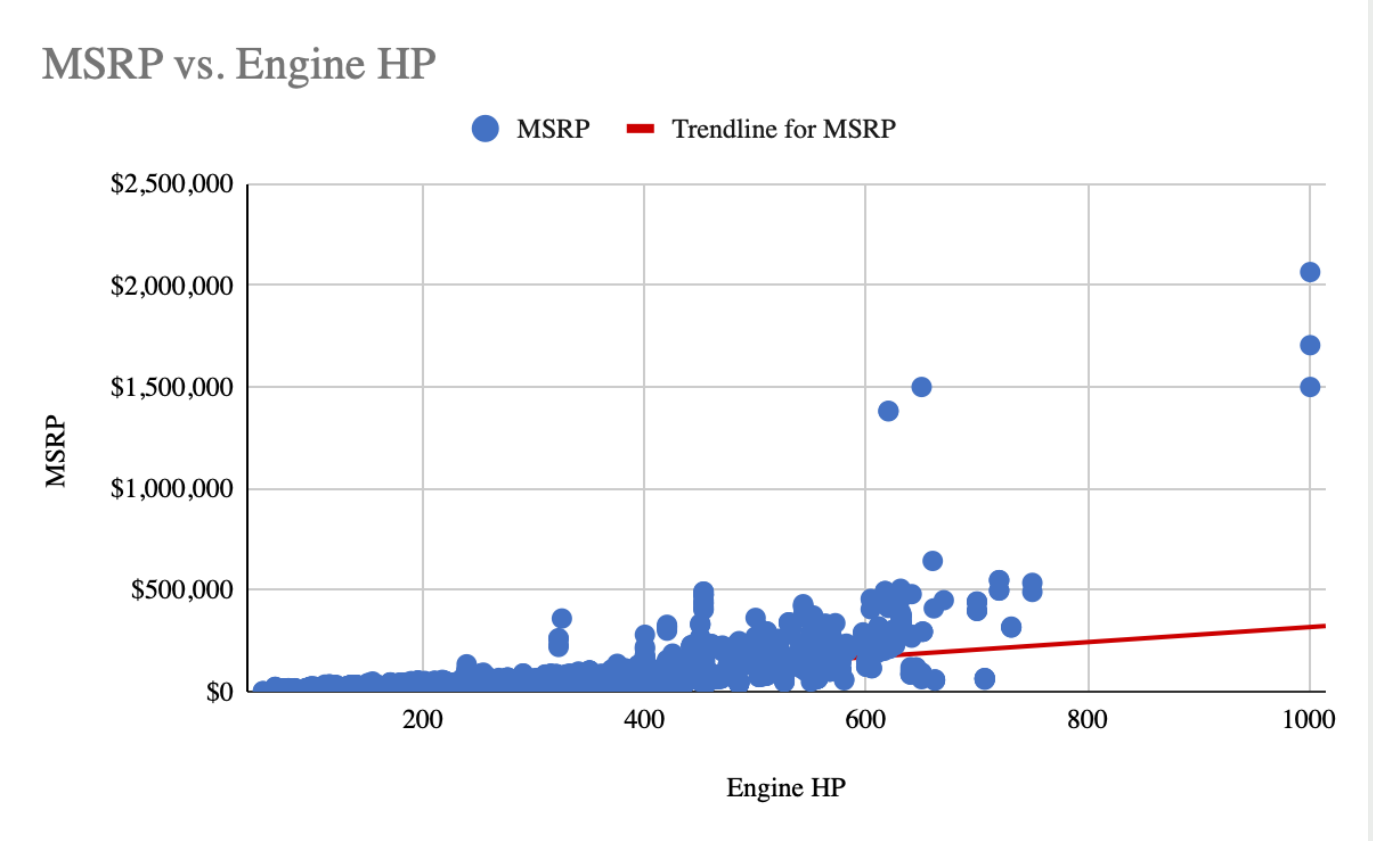


TASK 2

What is the relationship between a car's engine power and its price?

2

If engine power increases, the price will also increase, indicating a positive relationship between the two.

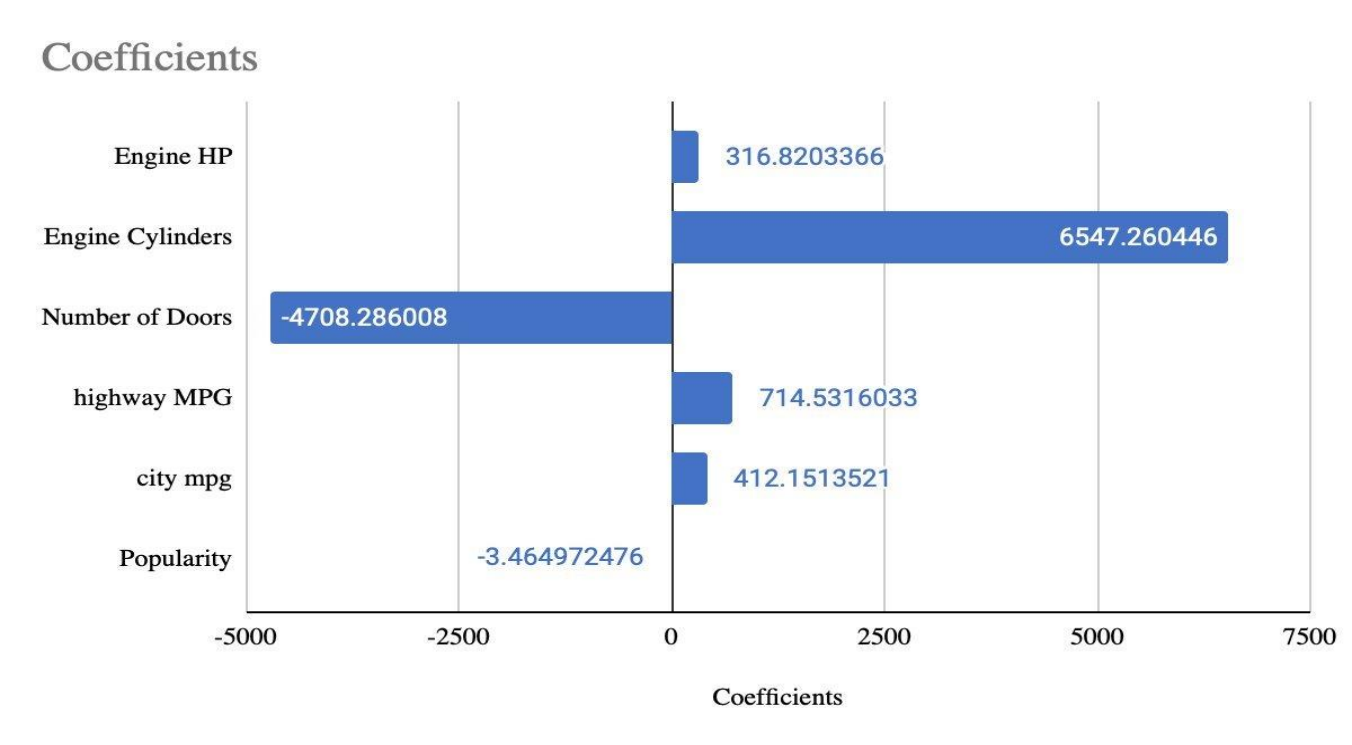


TASK 3

Which car features are most important in determining a car's price?

3

The number of engine cylinders is the most important factor in determining a car's price.



TASK 4

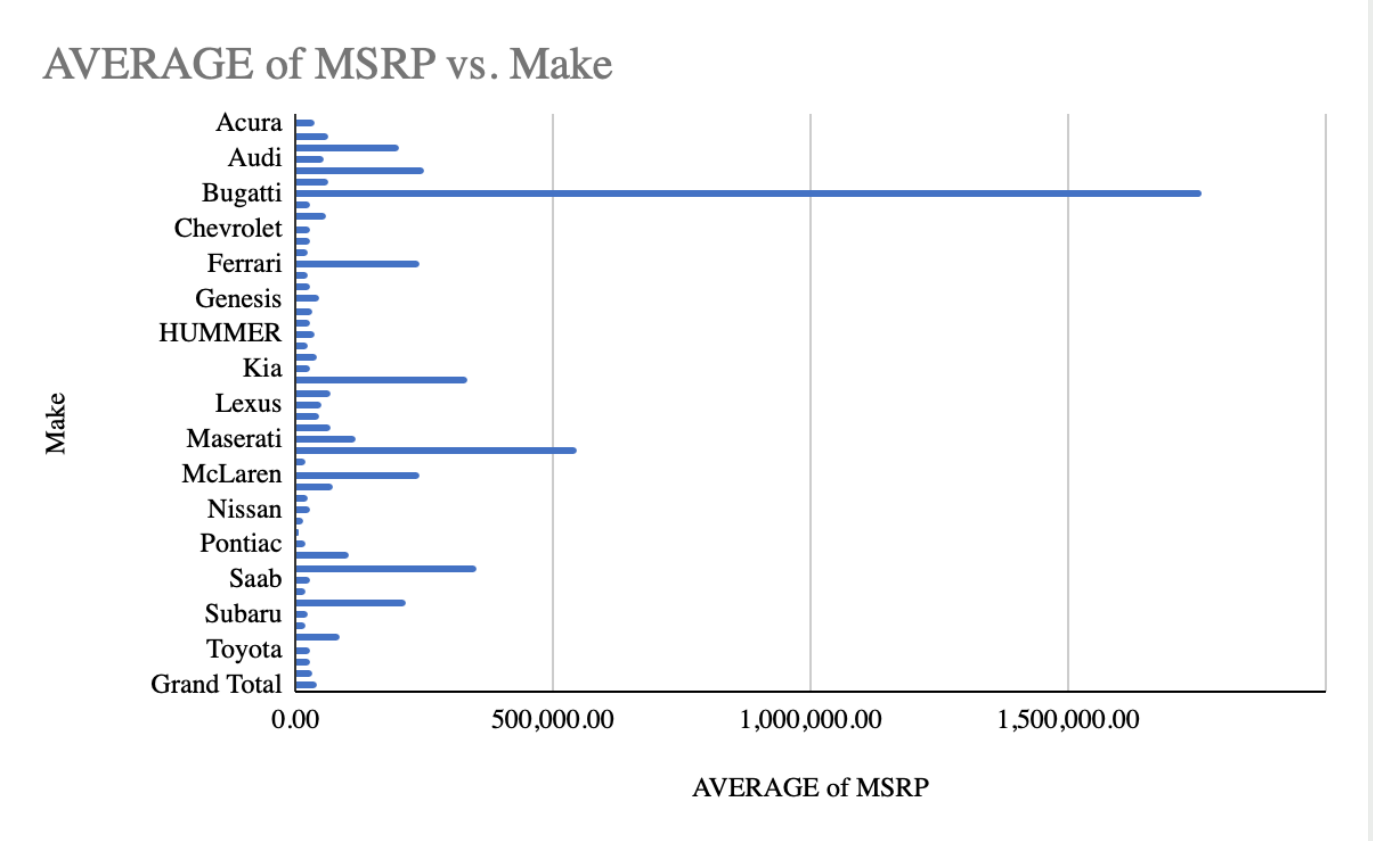
How does the average price of a car vary across different manufacturers?

4A

Make	AVERAGE of MSRP
Acura	35,087.49
Alfa Romeo	61,600.00
Aston Martin	198,123.46
Audi	54,574.12
Bentley	247,169.32
BMW	62,162.56
Bugatti	1,757,223.67
Buick	29,034.19
Cadillac	56,368.27

4B

Bugatti has the highest average price, whereas Plymouth has the lowest.

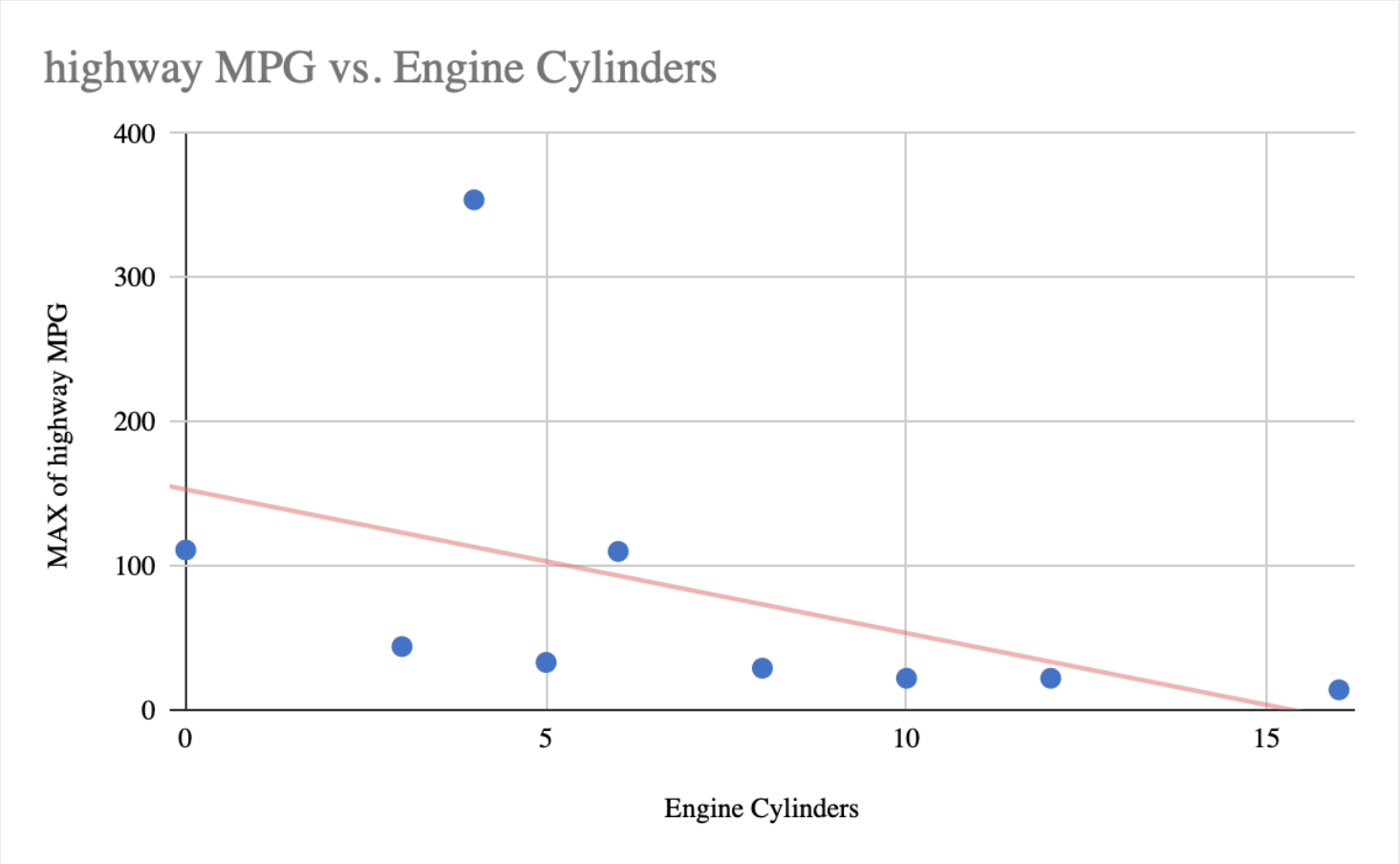


TASK 5

What is the relationship between fuel efficiency and the number of cylinders in a car's engine?

5A

Engine Cylinders	Highway MPG
0	111
3	44
4	354
5	33
6	110
8	29
10	22
12	22
16	14



5B

An increase in the number of cylinders leads to a decrease in highway MPG, reflecting a negative relationship between the two.

Correlation:

Using Formula-

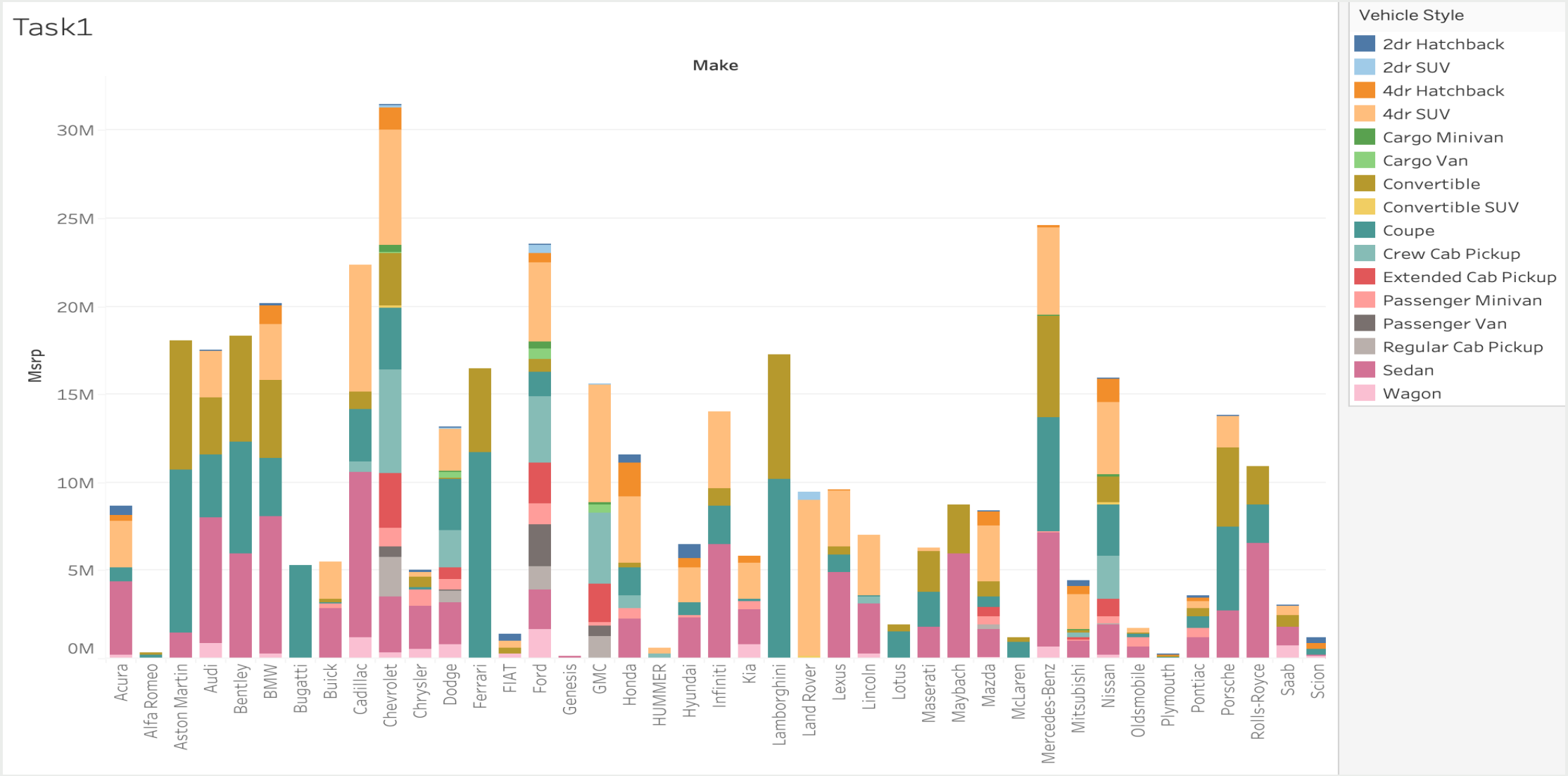
=CORREL(A2:A11200, B2:B11200)

-0.5962460188

BUILDING THE DASHBOARD

TASK 1

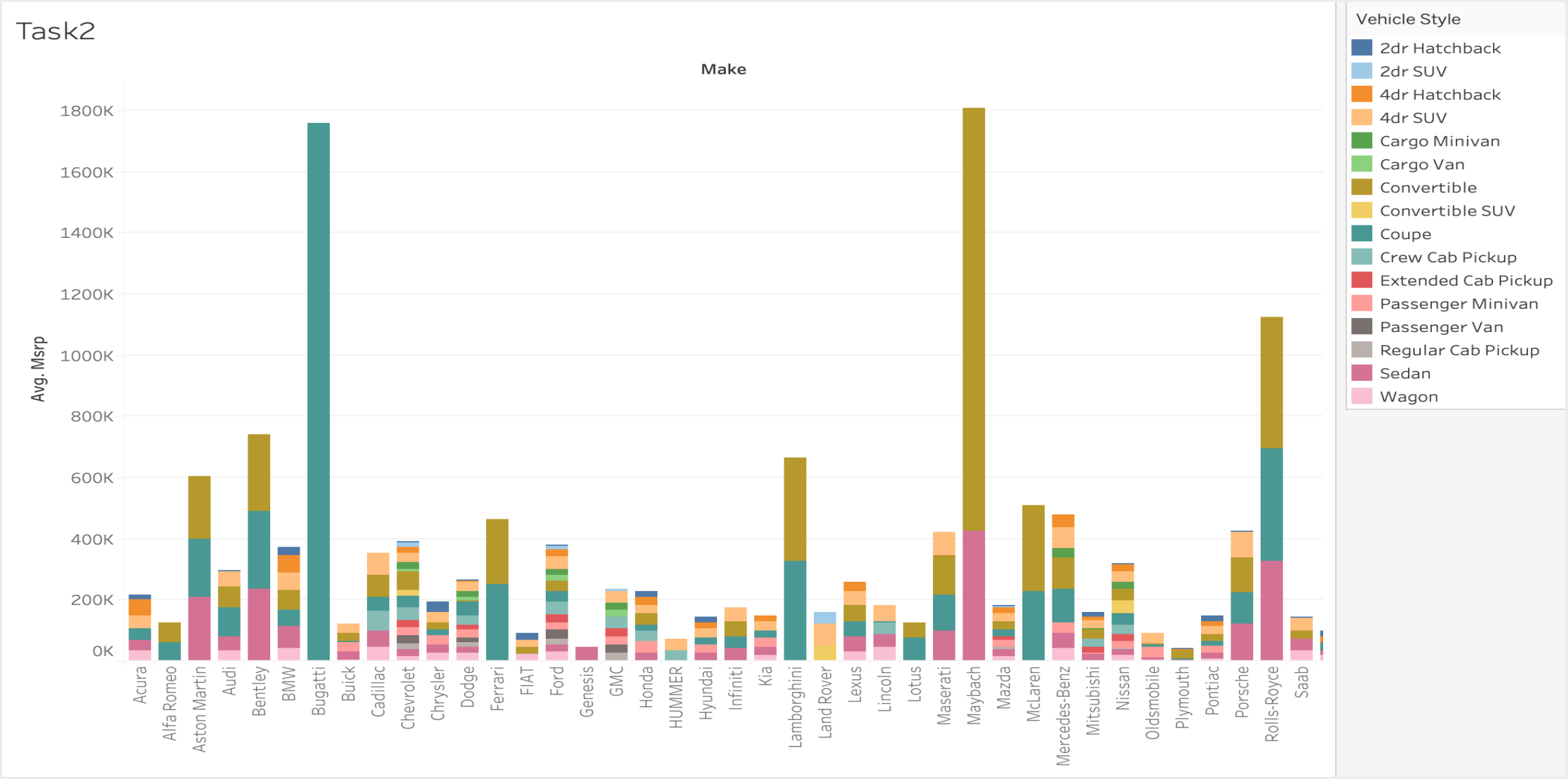
How does the distribution of car prices vary by brand and body style?


Task1
Make
Msrp
30M
25M
20M
15M
10M
5M
0M
Acura
Alfa Romeo
Aston Martin
Audi
Bentley
BMW
Bugatti
Buick
Cadillac
Chevrolet
Chrysler
Dodge
Ferrari
FIAT
Ford
Genesis
GMC
Honda
HUMMER
Hyundai
Infiniti
Kia
Lamborghini
Land Rover
Lexus
Lincoln
Lotus
Maserati
Maybach
Mazda
McLaren
Mercedes-Benz
Mitsubishi
Nissan
Oldsmobile
Plymouth
Pontiac
Porsche
Rolls-Royce
Saab
Scion
Vehicle Style
2dr Hatchback
2dr SUV
4dr Hatchback
4dr SUV
Cargo Minivan
Cargo Van
Convertible
Convertible SUV
Coupe
Crew Cab Pickup
Extended Cab Pickup
Passenger Minivan
Passenger Van
Regular Cab Pickup
Sedan
Wagon

TASK 2

Which car brands have the highest and lowest average MSRPs, and how does this vary by body style?

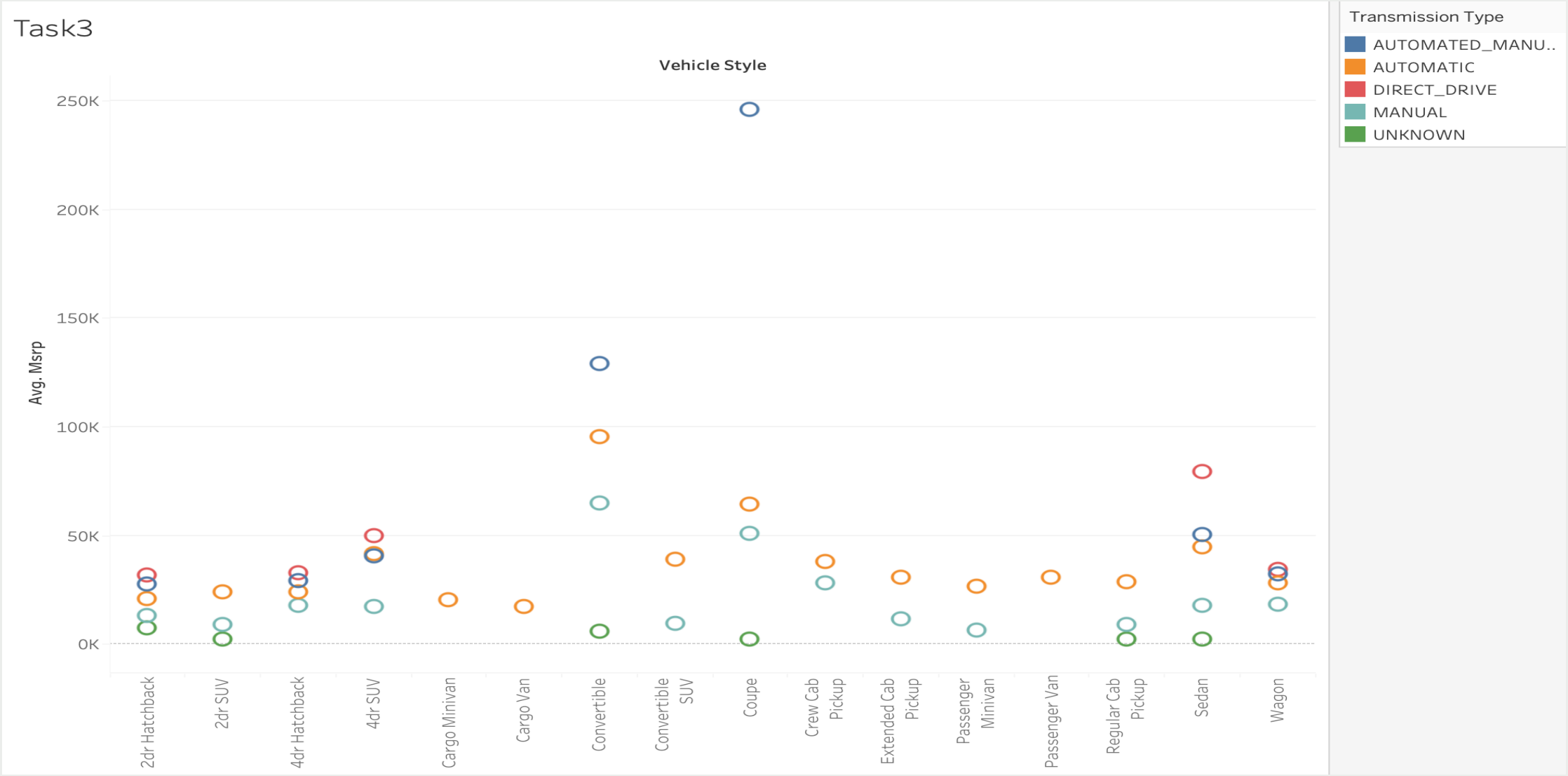
Task2


Make
Avg. Msrp
1800K
1600K
1400K
1200K
1000K
800K
600K
400K
200K
0K
Acura
Alfa Romeo
Aston Martin
Audi
Bentley
BMW
Bugatti
Buick
Cadillac
Chevrolet
Chrysler
Dodge
Ferrari
FIAT
Ford
Genesis
GMC
Honda
HUMMER
Hyundai
Infiniti
Kia
Lamborghini
Land Rover
Lexus
Lincoln
Lotus
Maserati
Maybach
Mazda
McLaren
Mercedes-Benz
Mitsubishi
Nissan
Oldsmobile
Plymouth
Pontiac
Porsche
Rolls-Royce
Saab
Vehicle Style
2dr Hatchback
2dr SUV
4dr Hatchback
4dr SUV
Cargo Minivan
Cargo Van
Convertible
Convertible SUV
Coupe
Crew Cab Pickup
Extended Cab Pickup
Passenger Minivan
Passenger Van
Regular Cab Pickup
Sedan
Wagon

TASK 3

How do the different feature such as transmission type affect the MSRP, and how does this vary by body style?

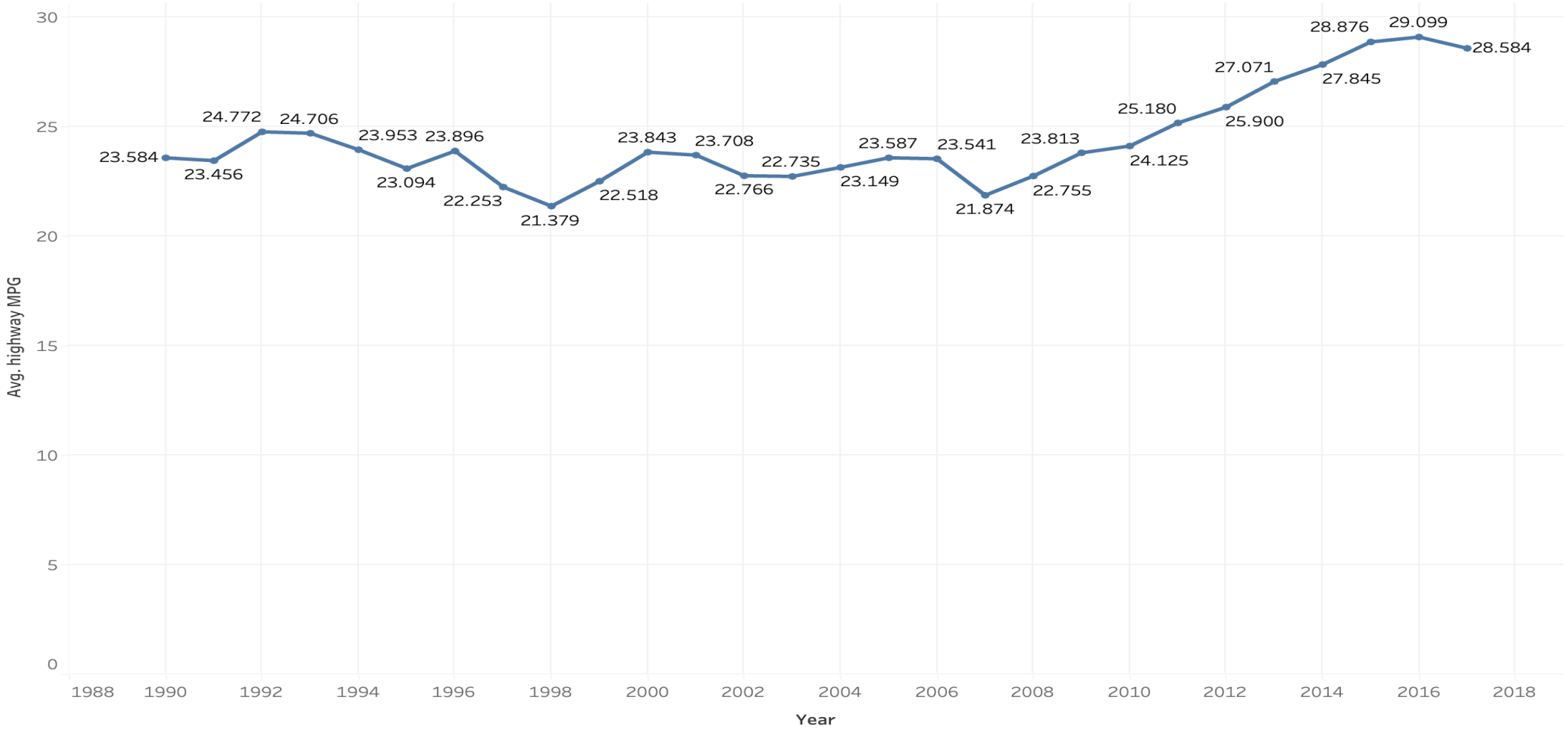
Task3


Vehicle Style
Avg. Msrp
250K
200K
150K
100K
50K
0K
2dr Hatchback
2dr SUV
4dr Hatchback
4dr SUV
Cargo Minivan
Cargo Van
Convertible
Convertible SUV
Coupe
Crew Cab Pickup
Extended Cab Pickup
Passenger Minivan
Passenger Van
Regular Cab Pickup
Sedan
Wagon
Transmission Type
AUTOMATED_MANU..
AUTOMATIC
DIRECT_DRIVE
MANUAL
UNKNOWN

TASK 4

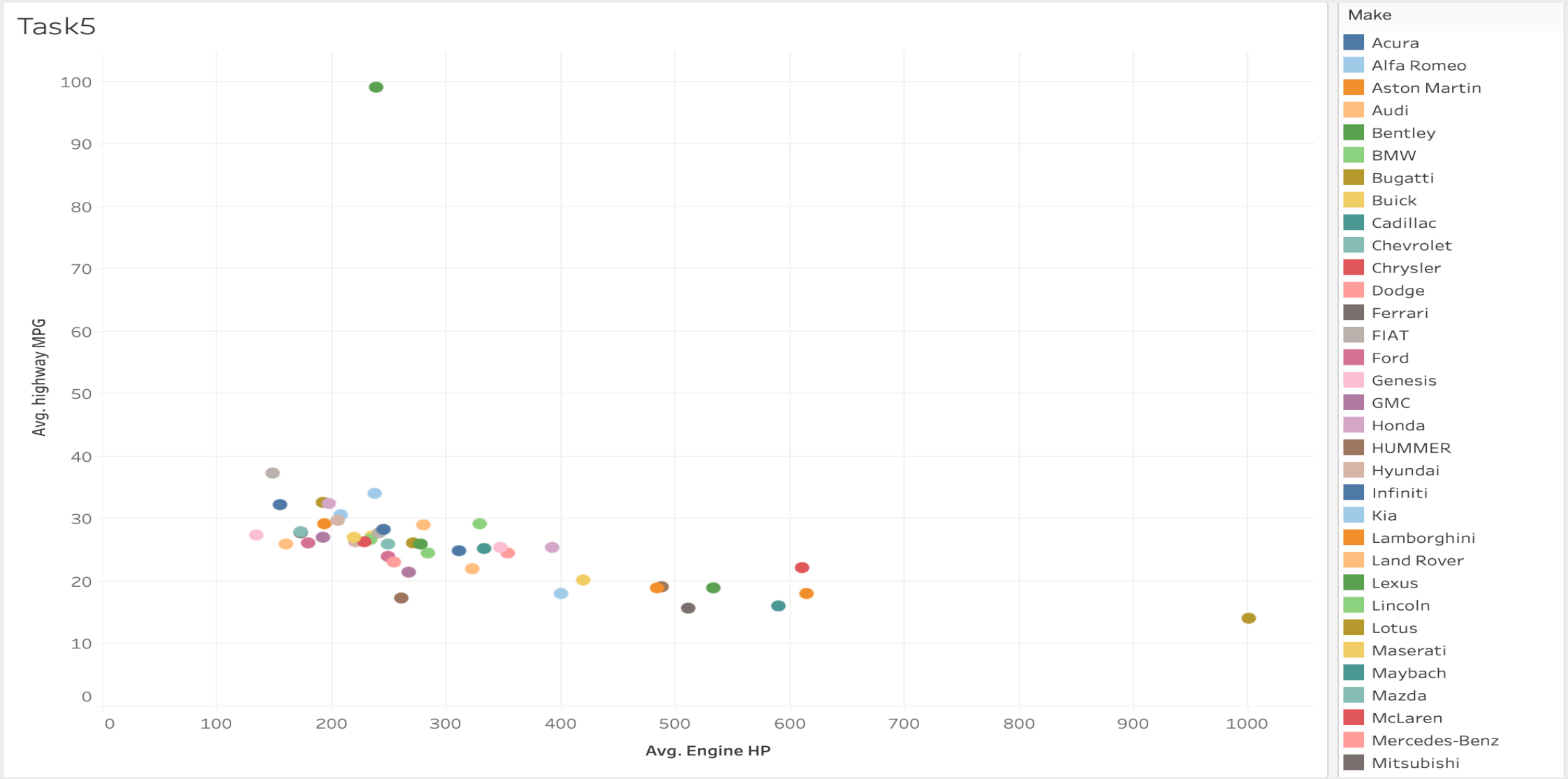
How does the fuel efficiency of cars vary across different body styles and model years?

Task4


30
25
20
15
10
5
0
Avg. highway MPG
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
Year
23.584
23.456
24.772
24.706
23.953
23.094
23.896
22.253
21.379
22.518
23.843
23.708
22.766
22.735
23.149
23.587
23.541
21.874
22.755
23.813
24.125
25.180
25.900
27.071
27.845
28.876
29.099
28.584

TASK 5

How does the car's horsepower, MPG, and price vary across different Brands?

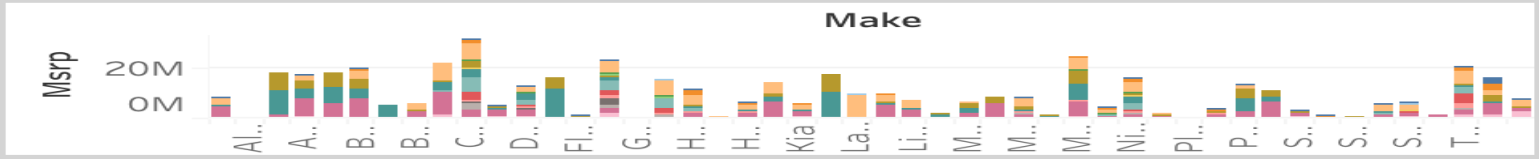

Task5
Avg. highway MPG
100
90
80
70
60
50
40
30
20
10
0
0
100
200
300
400
500
600
700
800
900
1000
Avg. Engine HP
Make
Acura
Alfa Romeo
Aston Martin
Audi
Bentley
BMW
Bugatti
Buick
Cadillac
Chevrolet
Chrysler
Dodge
Ferrari
FIAT
Ford
Genesis
GMC
Honda
HUMMER
Hyundai
Infiniti
Kia
Lamborghini
Land Rover
Lexus
Lincoln
Lotus
Maserati
Maybach
Mazda
McLaren
Mercedes-Benz
Mitsubishi

DASHBOARD

Link for Interactive Dashboard:

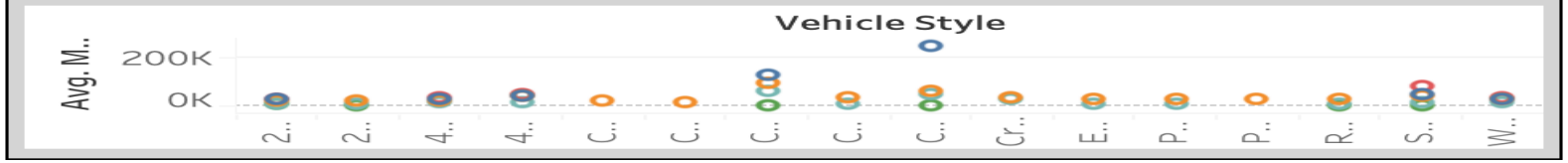
https://public.tableau.com/views/Task7_1721379834754O/Dashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Task1

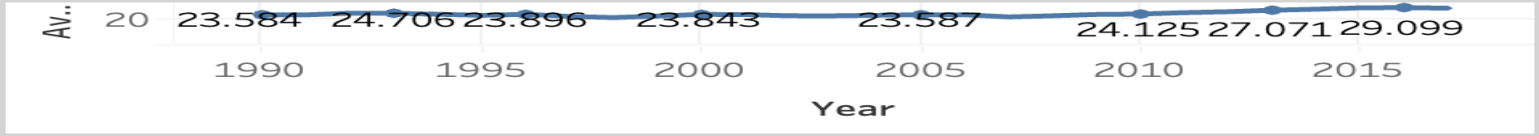


Task2

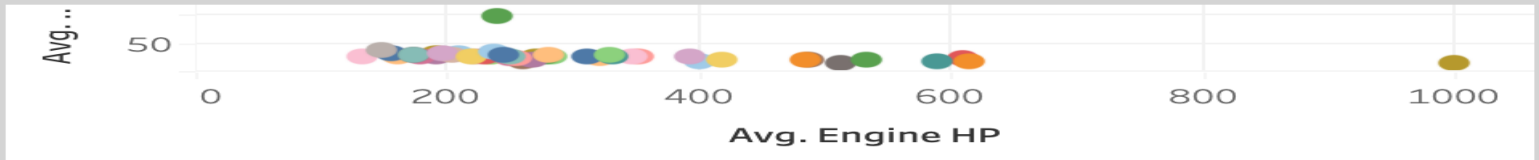
Task3

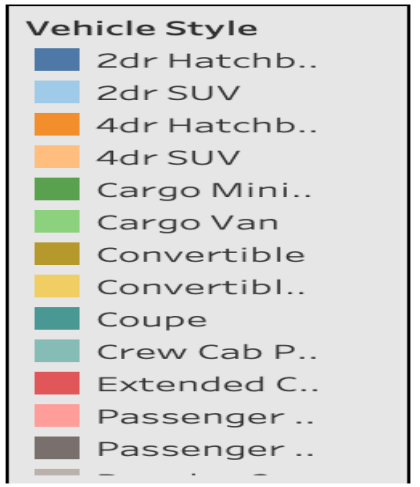


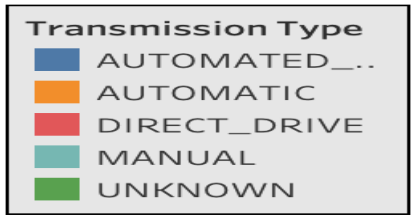
Task4



Task5







Insights

- Popularity varies significantly across different market categories, with luxury and performance cars generally being more popular.
- There is a positive correlation between engine power and price, indicating that higher horsepower often leads to a higher MSRP.
- Features such as engine power, market category, and brand significantly influence car prices.
- Average car prices vary widely among manufacturers, reflecting different market positioning and brand value.
- Fuel efficiency decreases as the number of cylinders increases, with a noticeable trade-off between performance and efficiency.

THANK YOU

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Link to Analysis Folder:

https://drive.google.com/drive/folders/1ZjGcUau3MF7TGVsjui6bg59336J5H7F_?usp=share_link