

CAR FEATURE ANALYSIS

SOFTWARE USED:

MICROSOFT EXCEL & POWERPOINT



PROJECT DESCRIPTION

- The automotive industry has evolved significantly, focusing on fuel efficiency, sustainability, and technology amid intense competition and shifting consumer preferences.
- Electric and hybrid vehicles are gaining popularity, alongside interest in alternative fuels like hydrogen and natural gas, though gasoline cars remain dominant with diverse fuel options.
- As a Data Analyst for a car manufacturer, optimizing pricing and product development involves using data analysis to understand the relationships between car features, market categories, and pricing.
- Techniques such as regression analysis and market segmentation reveal which features and segments drive profitability and consumer interest, guiding pricing strategies and future product development decisions.
- This data-driven approach helps manufacturers stay competitive and profitable in a dynamic automotive market.

APPROACH AND CHALLENGES

- Pivot tables were used to summarize columns of data and compare them against each other
- Using value field settings, MSRP, HP and MPG of car engines' average were evaluated
- One of the challenges faced was using bubble charts for pivot tables, and then linking their slicer to the dashboard worksheet.
- How was this approached: The pivot table was copied and pasted with values and formatting maintaining cell references. By this way, the data was able to produce a bubble chart. The slicers used for the pivot table were hence linked to the copied one, thus allowing us to access the bubble chart and filtering its data.
- Regression analysis was used to analyse variations in Price as a result of car features like MPG, HP, MSRP, Number of doors, Popularity
- Correlation/Linear analysis was used to analysis the direct relationship between each variable
- Scatter plots, bar chart, line and bubble charts were used for data visualization
- Creating dashboard: The charts were organized in the sheet after unticking gridlines and borders. Slicers were inserted which are used to filter the data in the charts, by connecting it to every data chart

DATA CLEANING

- imputed data for horsepower from Edmunds
- imputed values of car fuel type
- Predicted values of number of doors from existing data
- deleted all values NA in market category (all corresponding rows)
- checked for null values and duplicates

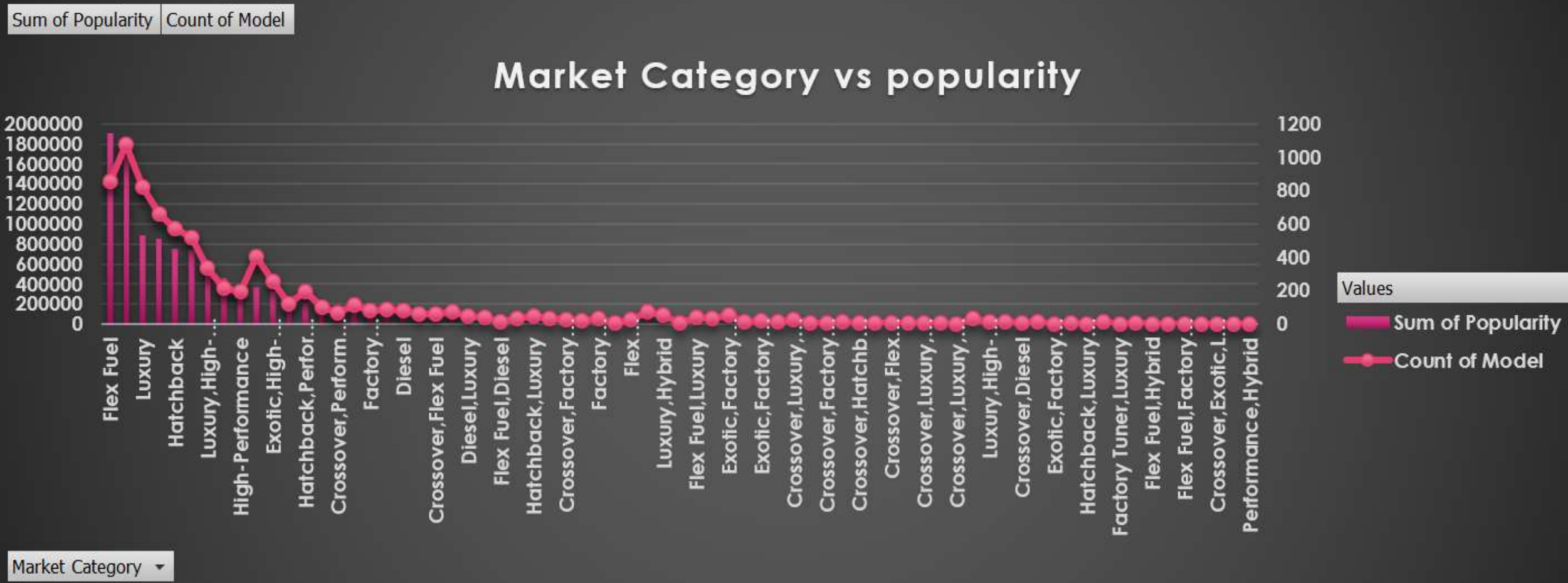
https://docs.google.com/spreadsheets/d/1BCXhD4awvn4Bq7S1az4NnU9hod2vEmfp/edit?usp=drive_link&oid=104301423844572907298&rtpof=true&sd=true



INDIVIDUAL DATA ANALYSIS AND INSIGHTS

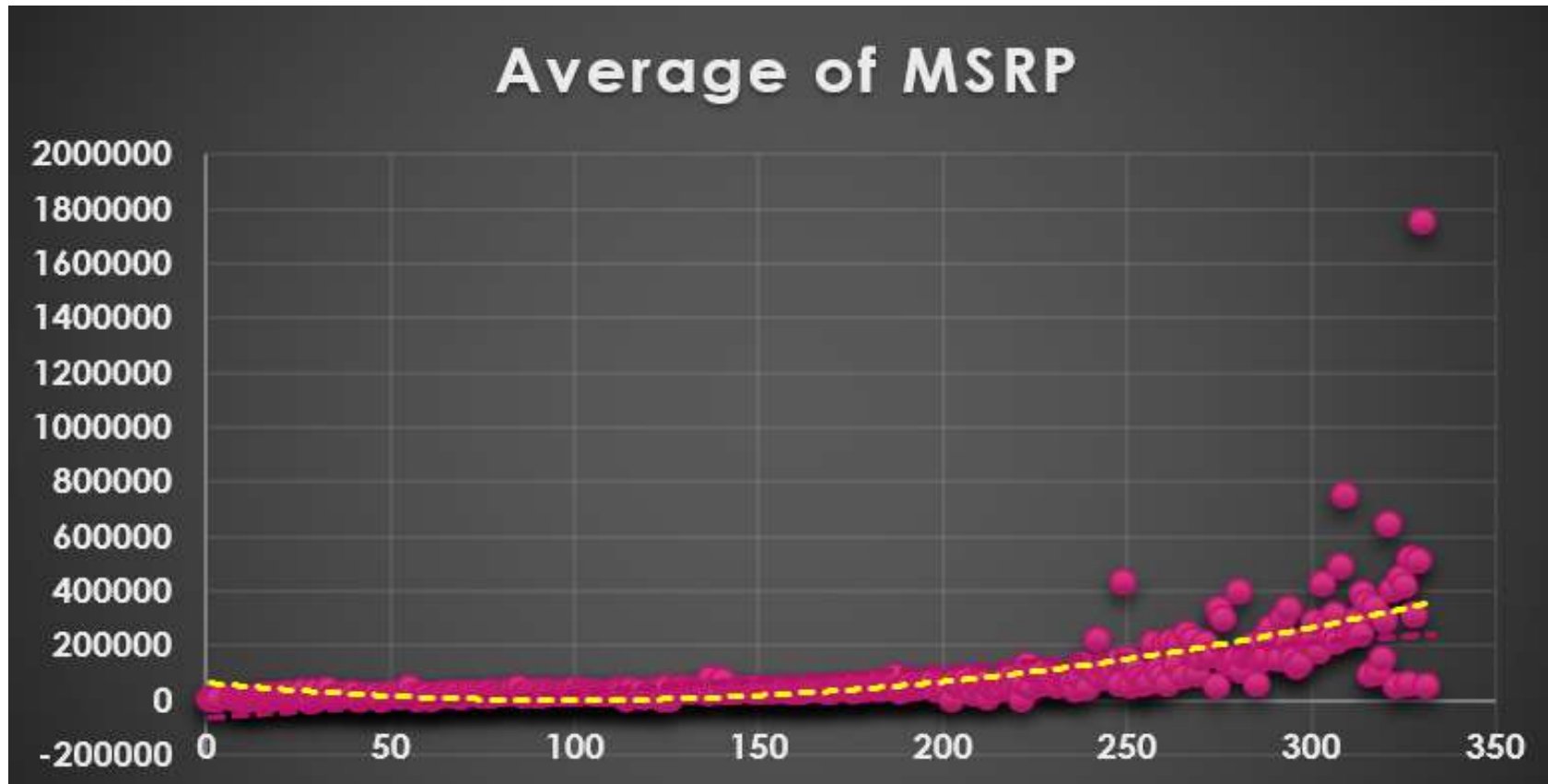
task 1.a: create a pivot table that shows the number of car models in each market category and their corresponding popularity scores.

task 1.b: create a combo chart that visualizes the relationship between market category and popularity.



Flex Fuel and Luxury are the most popular in market

task 2: create a scatter chart that plots engine power on the x-axis and price on the y-axis. add a trendline to the chart to visualize the relationship between these variables.



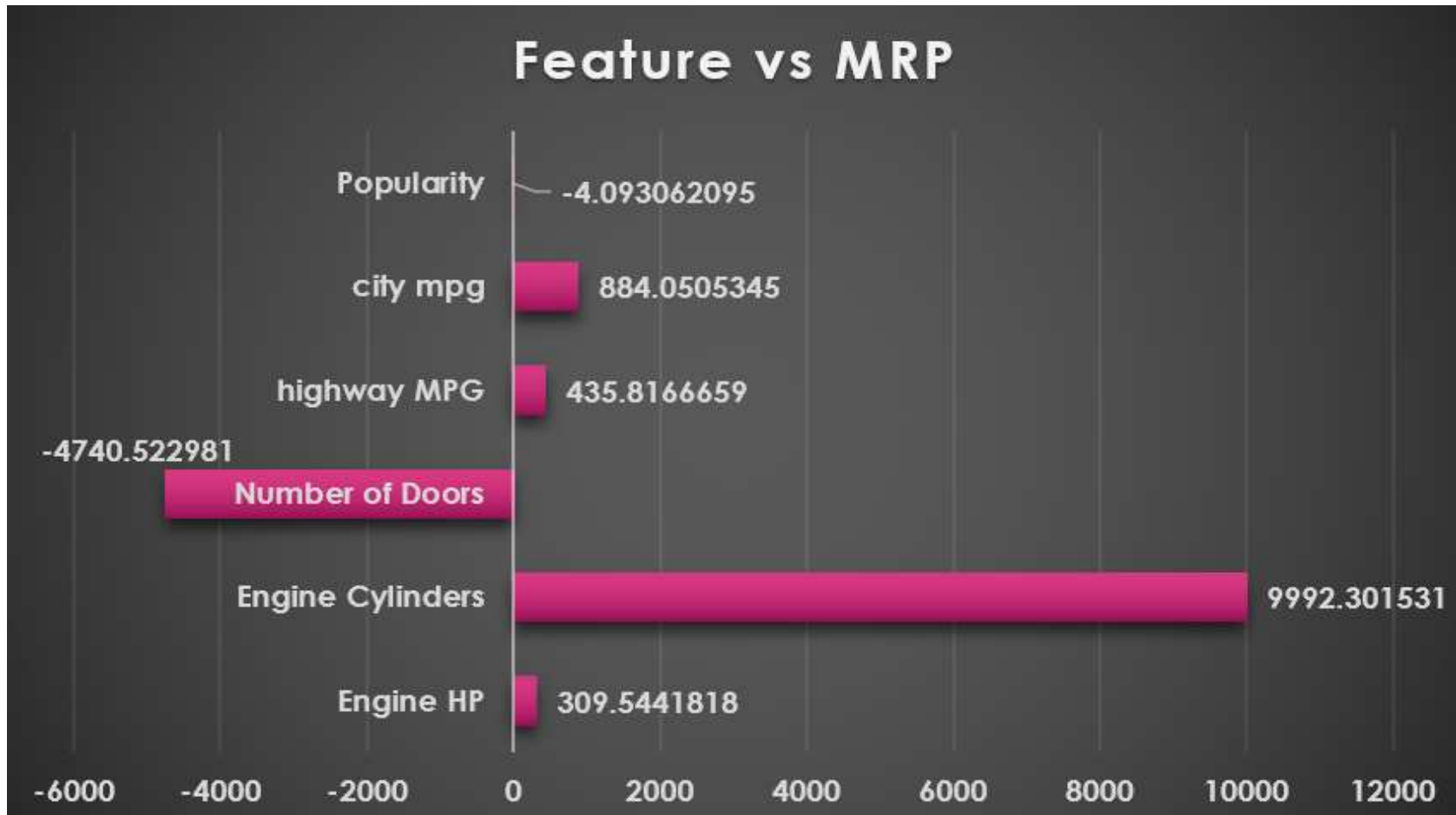
Engine Power and Average of price are directly proportional, the scatter plot trendline is curved upwards. The correlation is 0.72 that is closer to +1, hence they have a strong relationship

task 3: use regression analysis to identify the variables that have the strongest relationship with a car's price. then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.

	Engine HP	Engine Cylinders	Number of Doors	highway MPG	city mpg	Popularity	MSRP
Engine HP	1						
Engine Cylinders	0.793727911	1					
Number of Doors	-0.213345009	-0.195289191	1				
highway MPG	-0.398364274	-0.605225218	0.114834354	1			
city mpg	-0.394927025	-0.58390099	0.133187624	0.881653191	1		
Popularity	0.034725584	0.006850665	-0.041490201	0.033494809	0.033622008	1	
MSRP	0.654932161	0.572686452	-0.192775026	-0.204180125	-0.18976683	-0.054091482	1

	Coefficients
Intercept	-99631.69703
Engine HP	309.5441818
Engine Cylinders	9992.301531
Number of Doors	-4740.522981
highway MPG	435.8166659
city mpg	884.0505345
Popularity	-4.093062095

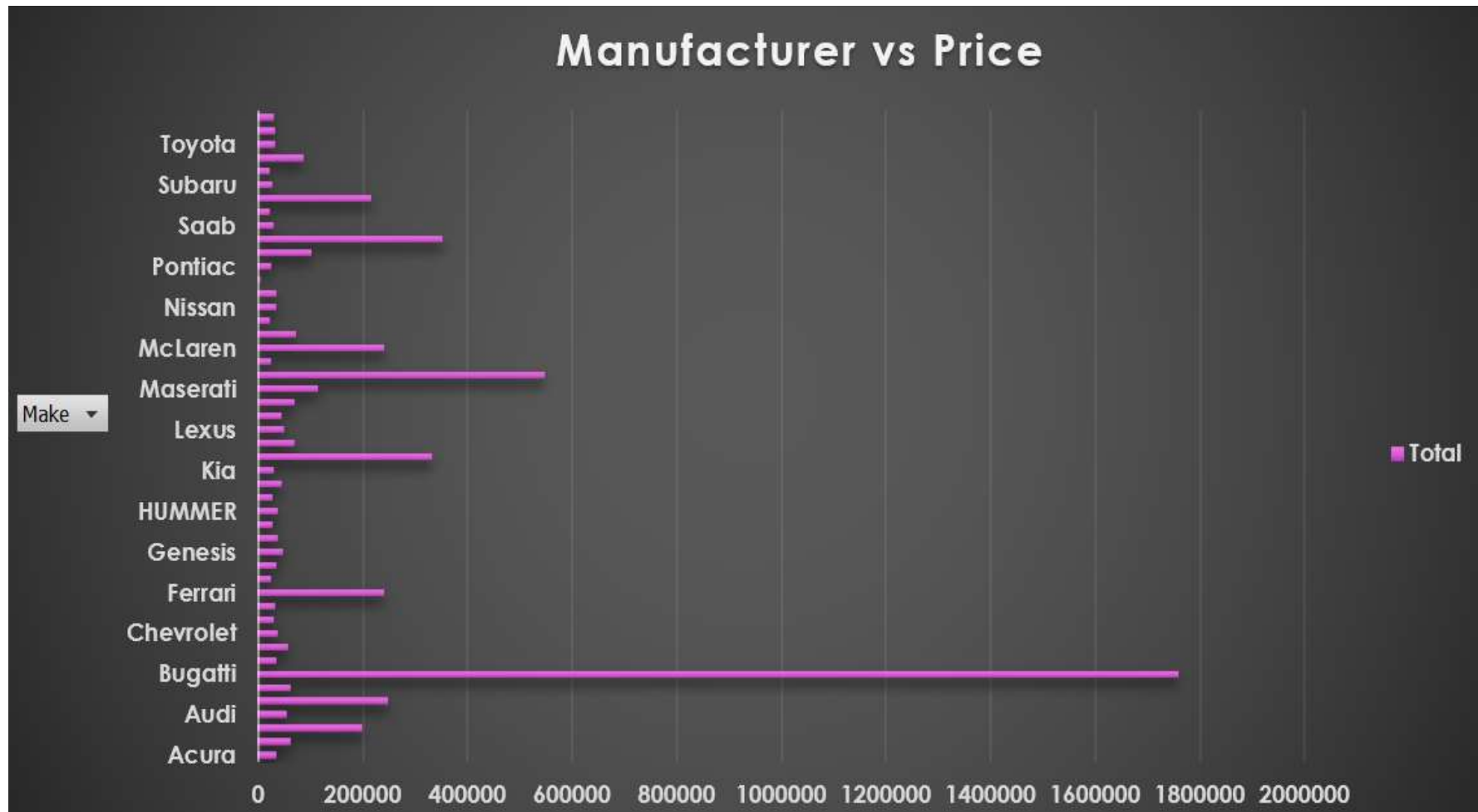
task 3: use regression analysis to identify the variables that have the strongest relationship with a car's price. then create a bar chart that shows the coefficient values for each variable to visualize their relative importance.



Engine Cylinders is the strongest factor for high price and Number of Doors is poorest factor affecting mrp

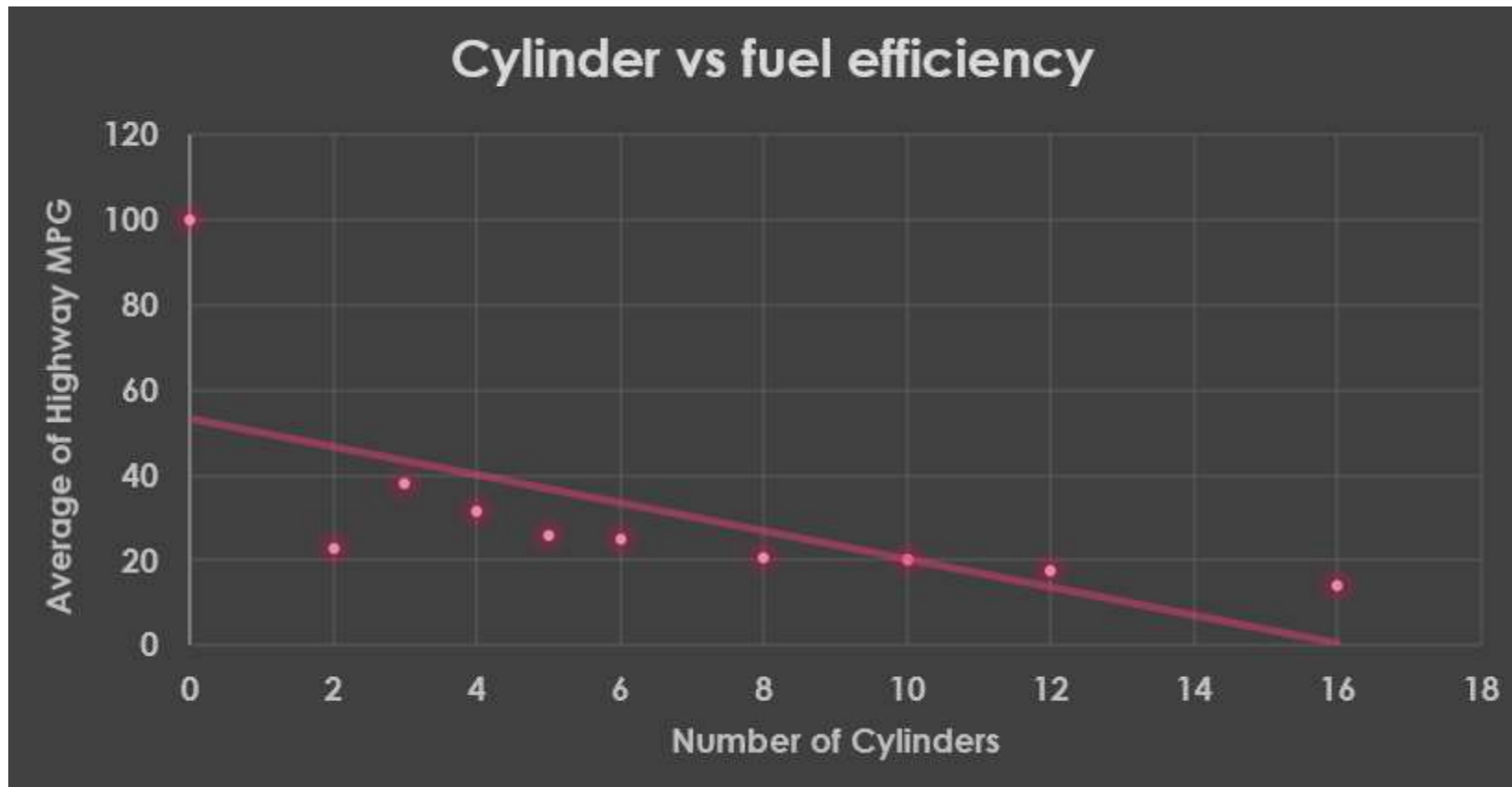
•**task 4.a:** create a pivot table that shows the average price of cars for each manufacturer.

task 4.b: create a bar chart or a horizontal stacked bar chart that visualizes the relationship between manufacturer and average price.



Bugatti is the most expensive car manufacturer

- task 5.a:** create a scatter plot with the number of cylinders on the x-axis and highway mpg on the y-axis. then create a trendline on the scatter plot to visually estimate the slope of the relationship and assess its significance.
- task 5.b:** calculate the correlation coefficient between the number of cylinders and highway mpg to quantify the strength and direction of the relationship.

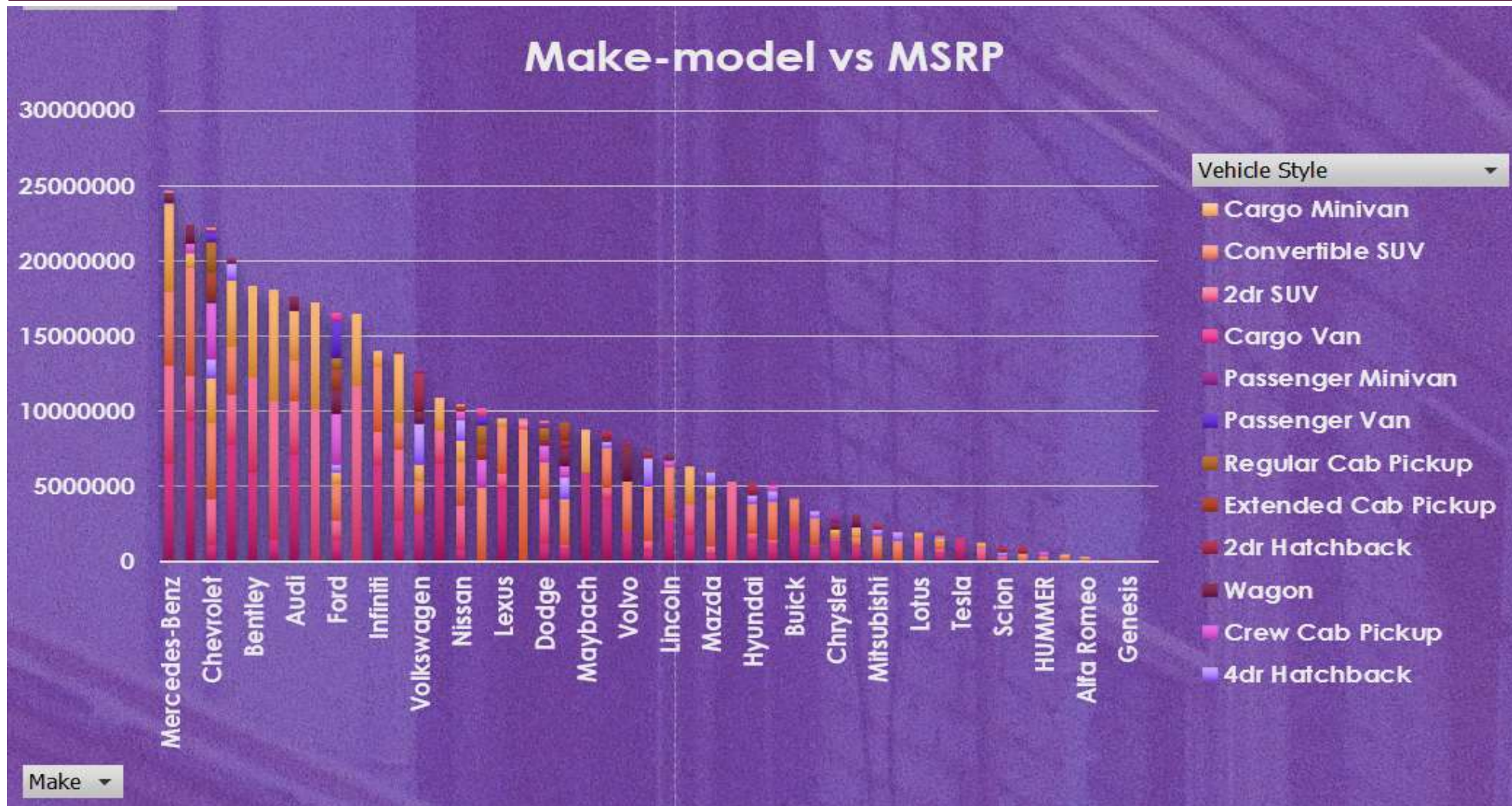


The correlation coefficient is -0.65 which is closer to -1 , hence number of cylinders is inversely proportional to Fuel efficiency, with a negative slope. If x-axis increases/decreases, y-axis decreases/increases



DASHBOARD DATA ANALYSIS AND INSIGHTS

task 1: how does the distribution of car prices vary by brand and body style?



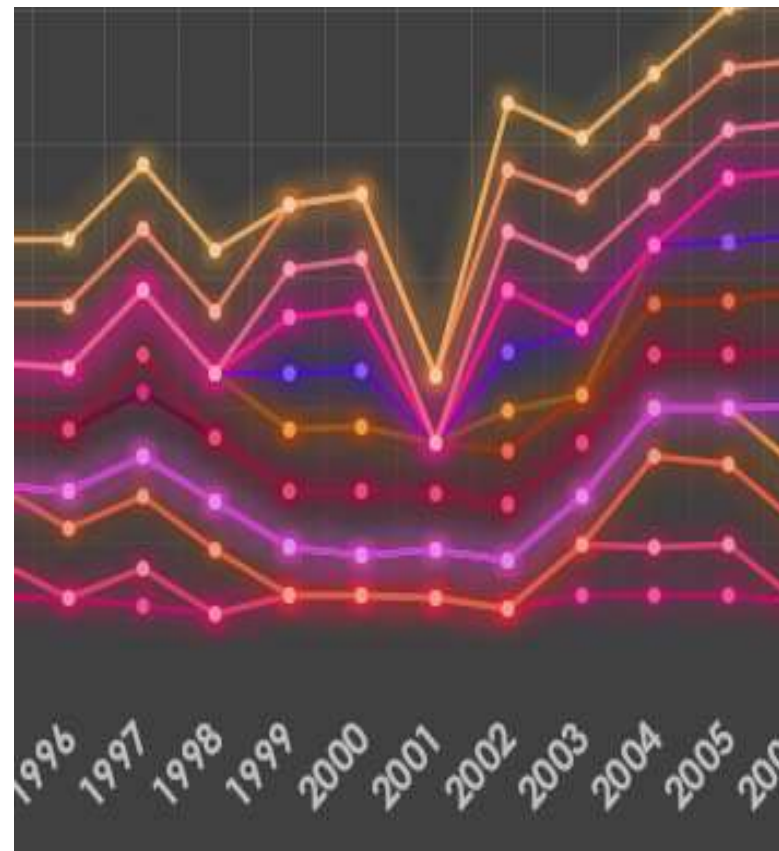
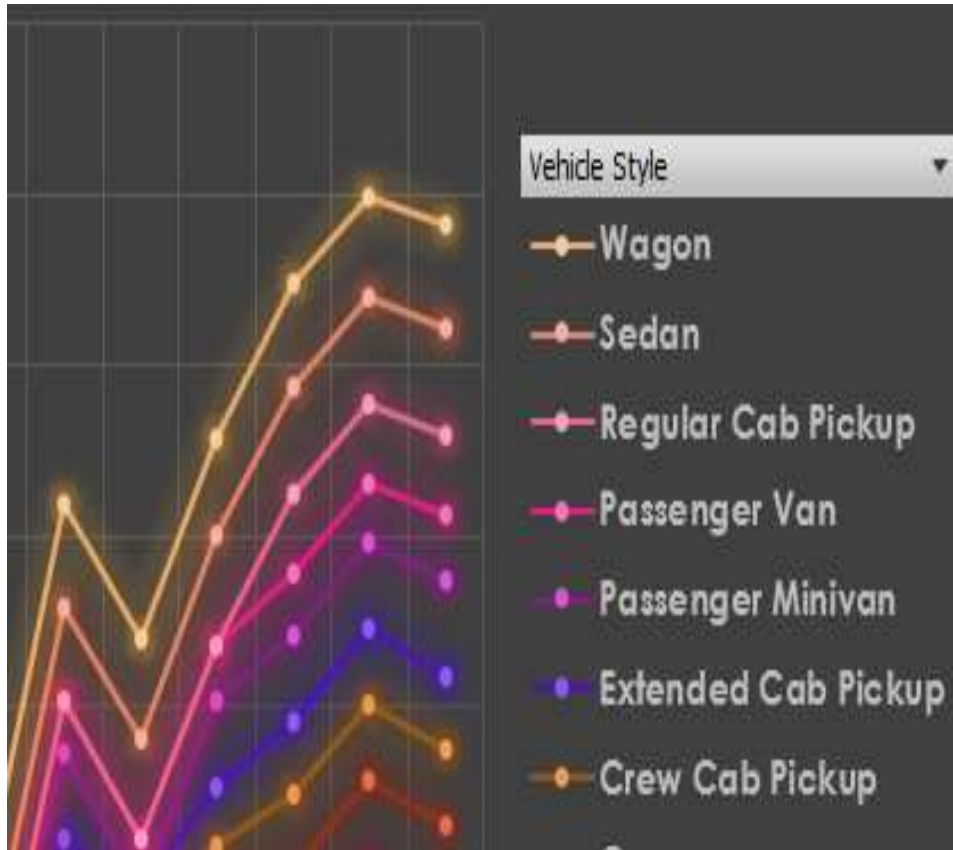
Mercedes has the most expensive car models, whereas Genesis manufacture the least

task 2: which car brands have the highest and lowest average msrps, and how does this vary by body style?



Bugatti Coupe has the maximum average price of 1757223.68 and Aston Martin, Chevrolet, Dodge Ford have the minimum average price of 2000.

task 4:how does the fuel efficiency of cars vary across different body styles and model years?



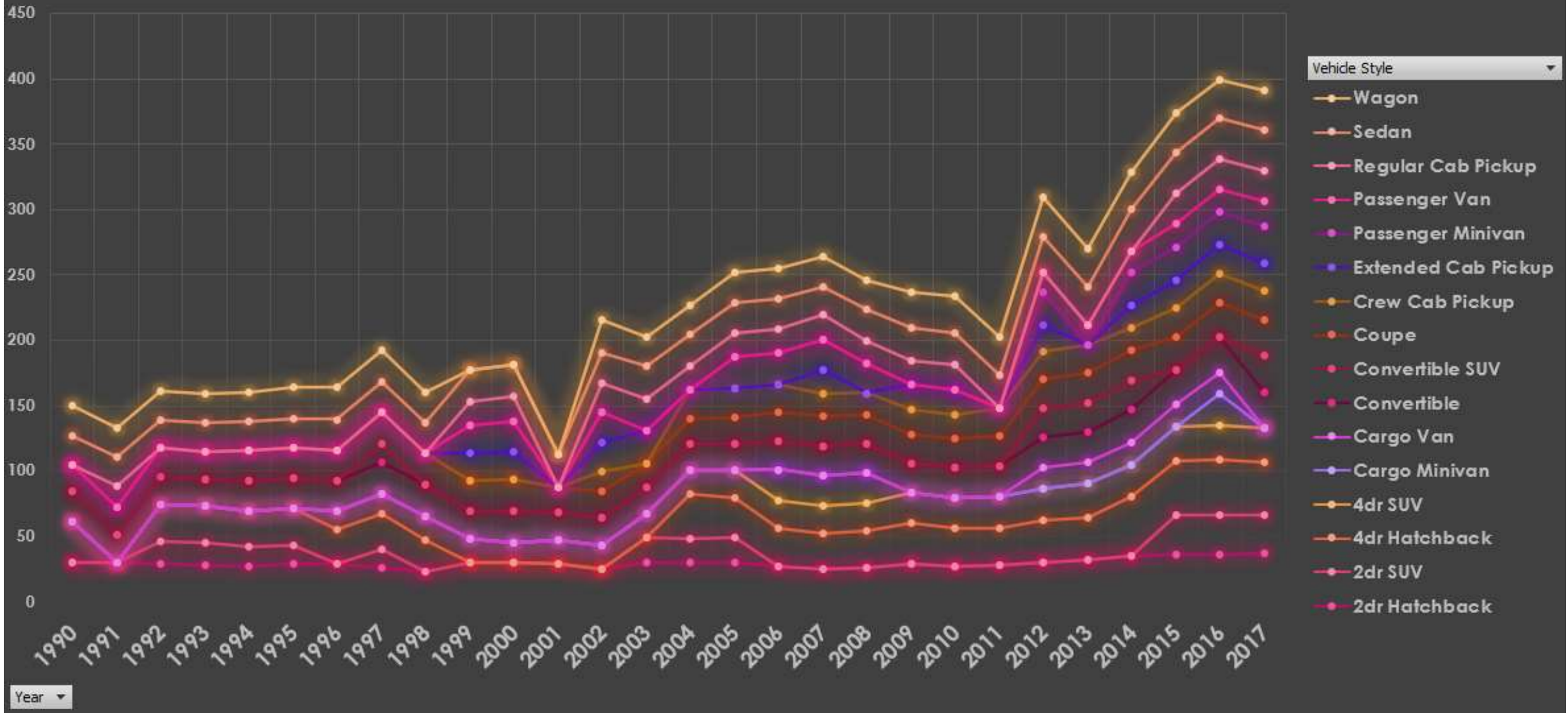
The fuel efficiency for different car models had a dip in 2001 then a gradual increase from 2013 to 2017.

Wagon had the highest fuel efficiency in 2016

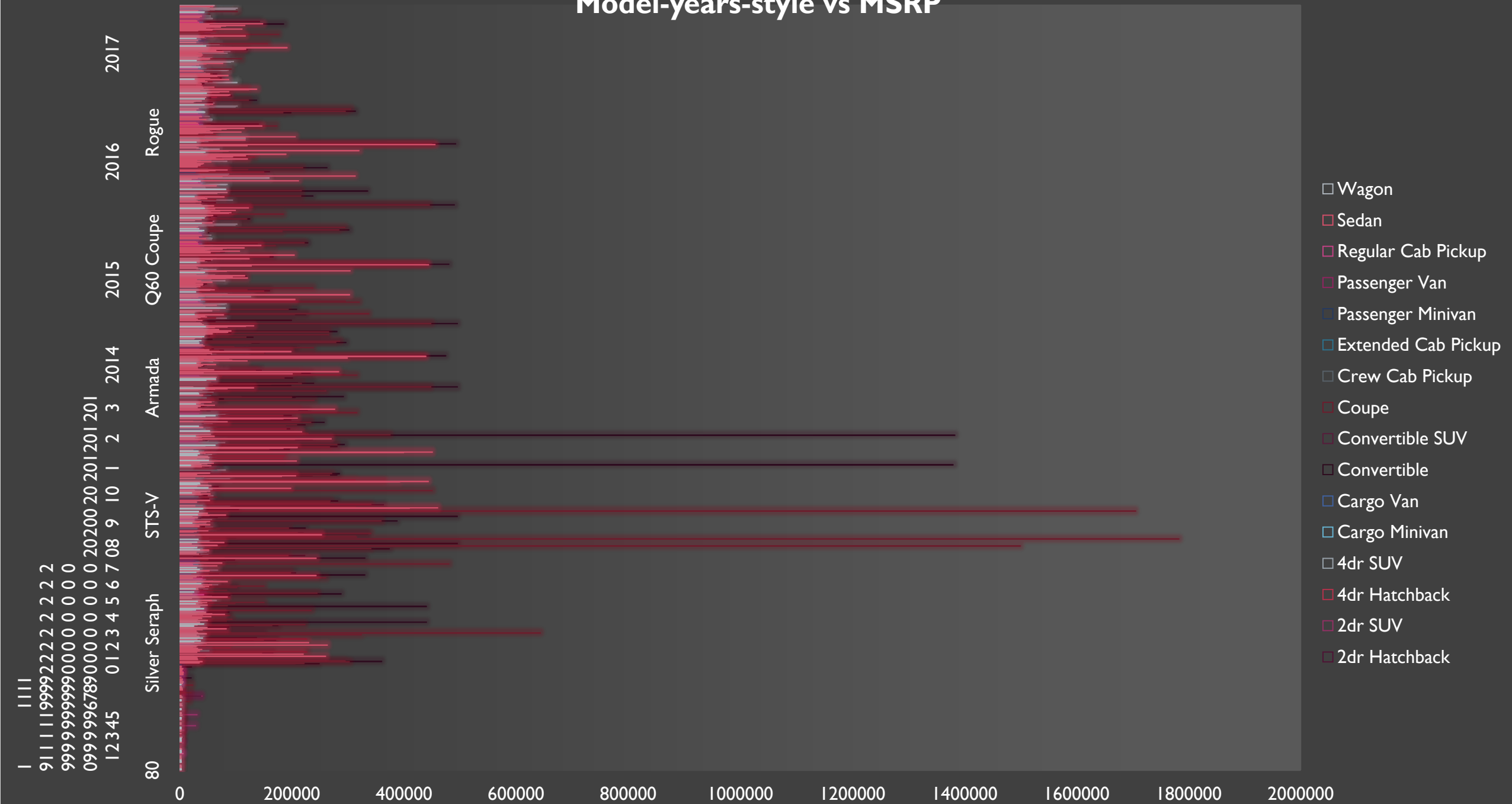
2dr hatchback had the lowest fuel efficiency in 1998

Average of highway MPG

Fuel Efficiency over time for car models



Model-years-style vs MSRP



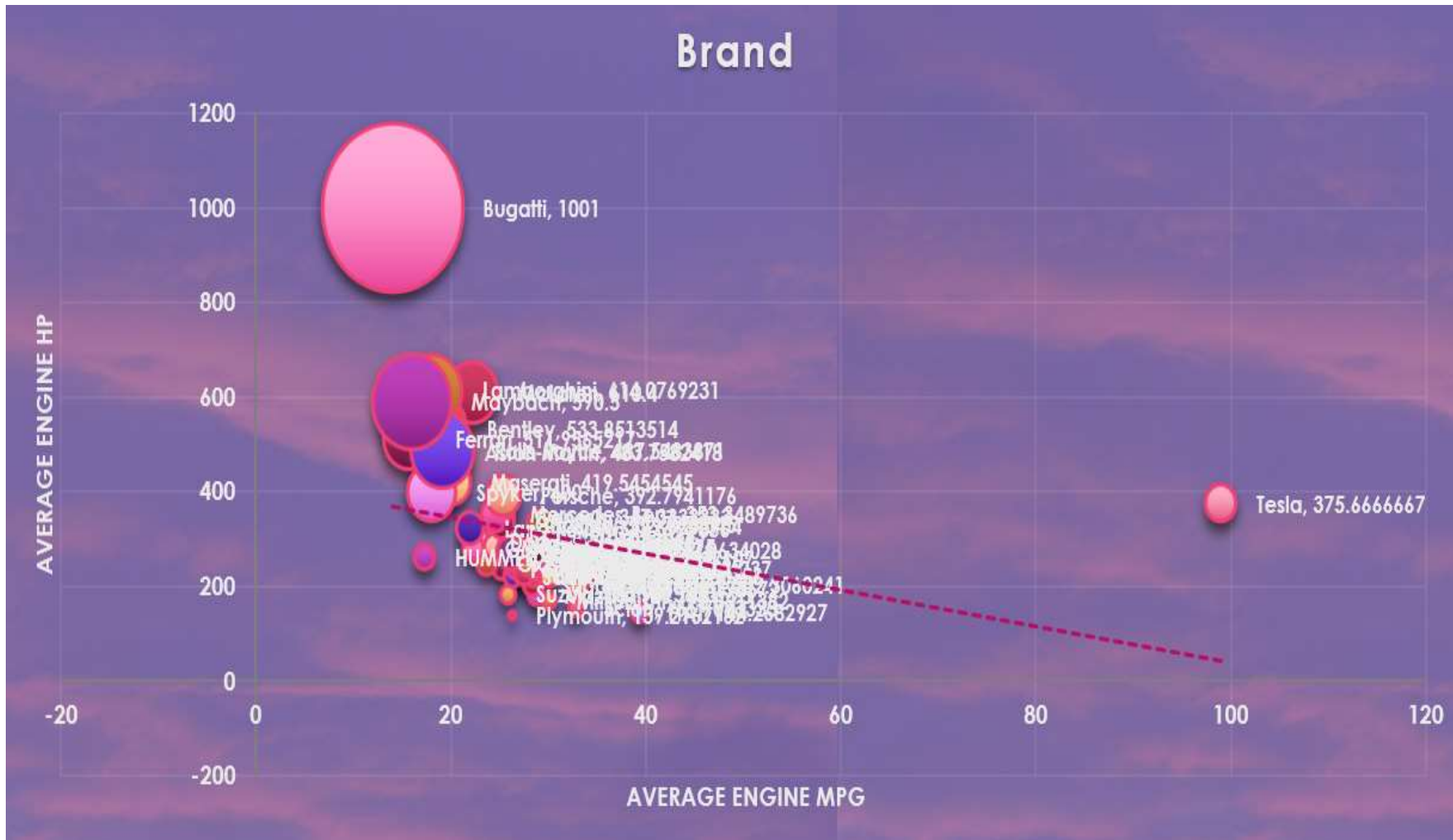
task 3: how do the different feature such as transmission type affect the msrp, and how does this vary by body style?



Automated_manual Coupe has
the highest MSRP

Series 1- automated Manual
Series 2- Automatic
Series 3- Direct_drive
Series 4 – Manual
Series 5 - Other

task 5: how does the car's horsepower, mpg, and price vary across different brands?



For different car brands, as Engine MPG increases the Engine HP decreases. This inversely proportional trendline indicates a negative slope.

Bugatti is the most expensive car manufacturer

Tesla has the highest MPG of 98.94

THANK YOU

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