

The Relationship Between Horsepower & Fuel Efficiency

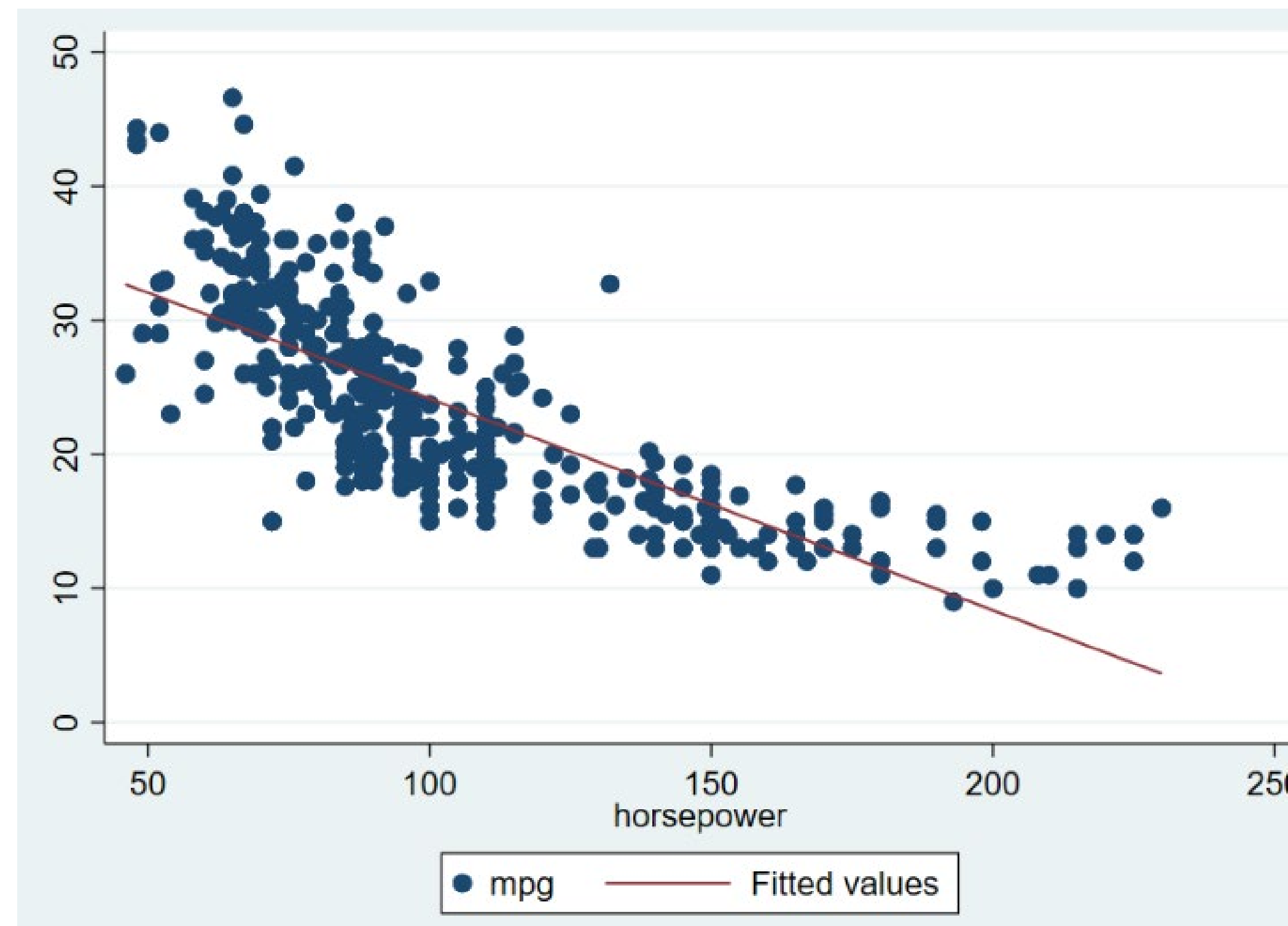
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Abstract:

As Environmental Protection Agency fuel economy standards are becoming increasingly stringent, automakers across the world are looking to increase miles per gallon without sacrificing vehicle performance. One of the most important metrics of vehicle performance is horsepower. This study uses regression analysis to obtain a better understanding of the relationship between horsepower and miles per gallon.

Introduction:

This study aims to analyze the relationship between horsepower and MPG while accounting for other important factors. The dependent variable in this study is combined city and highway miles per gallon (MPG). The independent variables used in this study are horsepower (HP), weight in LBS (LBS), and the number of cylinders in the engine (CYL).



Methodology & Model:

Data for this study originated from the StatLib Library (managed by Carnegie Mellon University). The data consists of 398 observations of foreign and domestic automobiles from the model years 1970 to 1982

Results:

The P-Values for weight, horsepower and the constant are 0, meaning their coefficients are statistically significant at any conventional level. The P-Value for cylinders is 0.028, meaning its coefficient is statistically significant at the 5% and 10% levels, but not 1%.

The coefficient of determination for my model is 0.791, which means that 79.1% of the variation in miles per gallon can be explained by this model. Weight also has some influence on miles per gallon. This model predicts that for every 1% increase in horsepower, miles per gallon will decrease by .0000227%.

VARIABLES	-1	-2	-3
	lmpg	lmpg	lmpg
horsepower	- 0.00733***	-0.00256***	-0.00227***
weight	-0.000249	-0.00041 - 0.000250***	-0.000428 - 0.000218***
cylinders		-1.86E-05	-2.37E-05 -0.0243**
Constant	3.864*** -0.0278	4.111*** -0.0294	-0.011 4.117***
Observations	392	392	392
R-squared	0.689	0.788	0.791
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Conclusion:

After using regression analysis on the dependent variable miles per gallon and independent variables horsepower, weight, and number of engine cylinders, we can conclude that there is a statistically significant relationship between miles per gallon, horsepower, and weight. The relationship between miles per gallon is negative for both horsepower and weight. This negative relationship means that for every increase in horsepower or weight, there will likely be a decrease in miles per gallon.

Variable	n	Mean	S.D.	----- Quantiles -----				
				Min	0.25	Mdn	0.75	Max
MPG	398	23.51	7.82	9	17.5	23	29	46.6
HP	392	104.47	38.49	46	75	93.5	127	230
LBS	398	2970.42	846.84	1613	2223	2803.5	3609	5140
CYL	398	5.45	1.7	3	4	4	8	8