Project 3: Population Proportions

Zack Garza

Math 142: Elementary Statistics
Effective Date of Report: July 19, 2014

CONTENTS

I. INTRODUCTION

THe objective of this project is to test a claim about two independent population proportions. Due to the ever-increasing cost of fuel and the intricate link between fossil fuels and international conflicts, the overall fuel efficiency in miles-per-gallon (MPG) has become increasingly important to both consumers and manufacturers. The question addressed in this project is whether or not spikes in global oil prices drive innovation by increasing the average miles per gallon rating in newly manufactured cars.

To analyze this hypothesis, we turn to the UCI Machine Learning Repository, which provides a data set of matching vehicles made between 1970 and 1982 and their efficiencies in MPG. The time period between 1978 and 1982 will be examined, as this time interval includes the 1979 Energy Crisis, during which the US price per barrel of crude oil spiked and purportedly led to increased fuel economy in the 1980s. We will take the null hypothesis to be that the mean MPG in 1978 was equal to the mean MPG in 1982, for which the alternative hypothesis is that they were not in fact equal. This is summarized as follows:

$$H_0 : p_1 = p_2$$
$$H_1 : p_1 \neq p_2$$

where p_1 is the average MPG in 1978 and p_2 is the average MPG in 1982.