

Testing the Causality between Consumers' Environmental Awareness and Fuel Efficiency of Private Automobiles: Case study on Japan and South Korea

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This research aims to illuminate the causal relationship between consumer environmental awareness level in and fuel efficiency of private automobiles in Japan and Korea. This research will specifically examine Japan and South Korea by in both countries and testing the causality relationship of consumers' environmental awareness level with the private automobile fuel efficiencies. Eventually, the contribution of this research will be providing one of the evidence through econometric tests as well as through comparative discussions, thus establishing a basis of in solving one of the environmental issues.

1. Introduction

This research seeks to improve the previous researches' foundations. While previous quantitative literature on the relationship between environmental awareness and fuel efficiency of passenger cars has illuminated positive relationship between the two, there is relatively less research on the causality. Taking note of this dearth of causal literature, this research will contribute to the discourse by demonstrating that increasing consumers' environmental awareness will accelerate, in other words cause the increase of, fuel efficiency in respective countries. The causal relationship depicted in this paper will shed more light on consumer needs that is critically lacking in corporate funded research. Such illumination is fruitful because an enhanced understanding of consumer needs is essential to better explain economic interaction between producers and consumers.

2. Methodology

To determine the causality between changes in the level of consumers' environmental awareness and the fuel efficiency of purchased private automobile in the market, time series analysis, Granger-causality (VAR), OLS and correlation analysis will be used. This research is based on time-series data of fuel efficiency of Toyota and Hyundai passenger vehicles under 2000cc engine displacement from 2002 to 2014 by month, gathered from US EPA. To estimate the level of environmental awareness, the Environmental Performance Index score published by Yale University was chosen. Variables representing respective countries such as GDP per capita, educational level and pollution levels were gathered from World Bank Data base. All variables were converted to log format in order to prevent distortion of interpretations due to the different units of coefficients. Degree of freedom of 4 was chosen because lag-order selection statistics test indicated that 4 was optimal.

3. Conclusion

When the null hypothesis "Environmental awareness increase does not cause increased fuel efficiency of passenger cars" is tested for both countries, it is rejected. Therefore, increased

environmental awareness of South Korea and Japan will increase fuel efficiencies of respective countries. Furthermore, the results indicate that the explanatory power of environmental awareness to predict the behavior of Japanese customers is significantly higher than that of Korean customers, since Japanese Chi² value is 56.39 and P-value was 0.000 where South Korea recorded 17.26 and 0.002 respectively. This result indicates the importance of increasing environmental awareness because doing so can increase the fuel efficiencies and, as a result, reduce the amount of greenhouse gas emissions in both countries.