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The effect of economic policies applied in Turkey to the sale of automobiles: multiple regression and neural network analysis

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Abstract

The main purpose of the present study is to reveal the effects of economic policies, as one of the macro environmental factors that affect the marketing, on the sale of automobiles. Eight different data sets, which include totally 72 months belonged to 2005-2010 years has been used. These data have analyzed by multiple regression and neural network method. The variables like as euro exchange, the vehicle loans rate presented by the banks and tax deduction made by the government for the automobile sector has affected the sale of automobiles; besides, the inflation rate, automobile and oil prices, income of the consumers and advertising expenditures of the businesses have no effects on the sales. In addition that multiple regression and neural network analysis was compared with each other. Finally, neural network has better performance in the selling prediction than regression model. It is an original study that measures the effects of the macro environmental factors on the sales of automobile enterprises in Turkey.

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Selection and peer-review under responsibility of the 2nd International Conference on Strategic Innovative Marketing.
Keywords: Economic Policy, New Car Selling, Neural Networks, Marketing, Macro Environment, Tax Cut.

1. Introduction

Selling a product for a company is not only related with the efforts of the marketing mix elements under company's own control but also it depends on the macro environmental factors that are out of its control. Macro environmental factors that are seen as opportunity or threat elements for the companies are accepted as the uncontrolled and unforeseen factors indeed. In addition to the factors such as socio-cultural and demographic environment, macro-economic factors, that have left within the economical environmental factor framework such as inflation, gross domestic product (GDP), exchange rate movement and oil prices, are important indicators that could not be controlled by the companies but are deemed to effect directly the sales of the products of the

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business. Macro economy is an important factor that could be directed by a country and directed by the laws and government policies and formalized the business policies as is mentioned. (Tek, Ö.B. 1999, Yükselen, C. 2010)

In this study, the purpose is to reveal the effects of economic policies, which are one of the macro environmental factors, which affect the marketing, on the sales of automobiles. It will be attempted to measure the effects of these two micro variables by adding Turkey automobile prices index and total advertising expenditures of the businesses to the regression equation to be devised, and besides, by using the artificial neural networks, it will be attempted to estimate the sales of the second half of 2011 accordingly.

2. Literature Reviews

There are many studies that emphasize the relations between inflation and expenditures in the literature. In the study of Fortuna and Ortmeyer (Fortune P. and D.L. Ortmeyer 1985), it was emphasized that the spending decision for the consumers towards future has affected inflation positively and negatively. In his study, Fischer (1979) indicated that inflation has negative effect on the expenditures. In the study of Schor (2005) that was carried out in America between 1993-2005 years regarding the reasons of low inflation, he determined that the consumers have much more consumed the cheap goods than others.

The raising and decreasing in the general level of inflation has affected the consumption demand. In the countries where the inflation has been slightly increasing (single digit) so that these are commonly developed countries, the consumers are very sensitive for the inflation and even small increase in the inflation has affected the buying behavior of the consumers immediately. On the other hand, positive or negative expectations of the consumers regarding the inflation in the future have very much affected the selling decision and behavior as well. When reviewing the studies in the developed countries, due to the fact that the discontinuous increasing in the inflation rate and inflation rising speed is minimal, it is indicated that there are positive and important relations between inflation and product selling. (Domberger, S. 1987, Hoomissen, V.T. 1988, Lach, S. and D. Tsiddon 1992, Tommasi, M. 1993, Parsley, D. 1996, Christian, A. and M. Shintani, 2007) On the other hand, in the countries where the inflation is chronic (double-digit), the consumers remain insensitive to the price changes so that it has not very much affected their consumption decisions. According to the Superneutrality of Money Hypothesis raised by Sidrauski (1967), inflation has short time effect on the consumer but it has no long time effect as is in Turkey. This hypothesis was supported by a study that was made by Faria and Cornerio (2001) for the period of 1980-1995 in Brazil where the inflation is always high. Until the beginning of 2000 years, Turkey had double-digit inflation but in the last years, the inflation has come into single digit numbers. The reflection of this situation in the consumption expenditures have been seen in the recent studies. In their study of Altan and Göktürk (2007) for Turkey, it was emphasized that the consumption expenditures of the individuals have been affected by the inflation but this effect is not very much important.

Due to the fact that oil is very important energy source for the developed countries, the changes in petroleum prices have resulted in the recession or extension in economy for all world economies particularly western countries. (Basher, S.A. and P. Sadorsky 2003) The rising petroleum prices have provided effect such as inflation tax for the consumers and producers. When the expendable income is decreased, the shares allocated for other goods and services consumption have also decreased. Because of the basic input in the production, by means of price rising, as a result of the cost increasing of the firms in the sectors out of oil, if the costs have not reflected to the consumer, it could decrease the profits and profit shares for the share price. (Bernanke, B.S., M. Gertler, M. Watson, C.A. Sims and B.M. Friedman 1997)

The sharp drops emergent in the interest rates have prompted the consumption expenditures that have delayed in the previous years and the sales have been increased in furnishing sector that is more durable. The positive expectations regarding the economic conjuncture and decreasing the interest rates have conducted toward increasing in the consumer credits and performing the consumption decisions that have delayed by the consumers or scheduling the consumption decision envisaged for the future. This reduction in the interest based on the local currency valuation has raised the import. Particularly, the sales have been increasing in durable goods and

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