Analysis of Factors Affecting Demand for LCGC Car in Indonesia

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A R T I C L E I N F O

ABSTRACT

In this thesis, the author takes the title of the research, namely "Analysis of Factors Affecting the Demand for LCGC Cars in Indonesia". The topic is taken based on the phenomenon that occurs in Indonesia that lately people are being served with cheap and environmentally friendly cars, in this case the car manufacturers are paying attention to the earth which is currently polluted with vehicles that produce excess fuel emissions that can cause pollution. destroy ecosystems on earth. By using the OLS (Ordinary Least Square) method in the E-Views 8.0 application program. This study explains the variables of LCGC car prices, competitor car prices, per capita income, interest rates, and advances that affect the demand for LCGC cars in Indonesia. The data used in this study is secondary data obtained from the Central Statistics Agency (BPS), and Gaikindo. The results of this study state that the LCGC car price variable, loan interest rate variable, and down payment variable have a negative and significant effect on the demand for LCGC cars in Indonesia. . Meanwhile, the competitor's car price variable, and the income variable per capita have a positive and significant impact on the demand for LCGC cars in Indonesia.

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1.   INTRODUCTION

At the beginning of the New Order, the manufacturing industry was relatively slow to develop. For example, based on BPS data, the production value of the manufacturing industry in 1969 was recorded at only 1.42 billion US dollars. One of the most important inhibiting factors is the country's limited foreign exchange. Because local indigenous industries are still few, almost all kinds of

machines have to be imported. During the New Order period, the Indonesian economy has undergone a major structural change from an economy where the agricultural sector plays a very dominant role in the formation/growth of Indonesia's GDP to an economy where the contribution of GDP from the sector has been greatly reduced. In 1965, agriculture's contribution was around 56 percent and in 1997 it was only 16 percent of GDP, or only a third of its share in 1965 (Figure 2). Meanwhile, the manufacturing industry grew very rapidly at an average of 13 percent per year during the 1975-97 period. This made the GDP share of the manufacturing industry increase from about 8 percent in 1965 through the agricultural sector in 1991, and in 1995 to about 24 percent of Indonesia's GDP, three times as much as its share in 1965.

The increasing trend has mainly started from 2008, although in 2009 there was a decline but in 2010 – 2013 it continued to increase in production and sales. In 2009 - 2010 there was an increase, for production by 51.18% from 465,000 units to 703,000 units and sales by 58.06% from 484,000 units to 765,000 units. In 2010 - 2011 also experienced an increase, for production by 19.49% from 703,000 units to 840,000 units and sales by 16.33% from 765,000 units to 890,000 units. In 2011 - 2012 production still experienced an increase of 19.05% from 840,000 units to 1,000,000 units and sales by 23.60% from 890,000 units to 1,100,000 units. And in 2012 – 2013 there was a very significant increase compared to the previous year, production and sales exceeded 1,000,000 units of LCGC cars, for production of 20% from 1,000,000 units to 1,200,000 units and sales of 18.18% from 1,100. 000 units to 1,300,000 units. From this data it can be concluded that starting from 2010 the demand for LCGC cars in Indonesia has increased every year and this is positively welcomed by companies that produce LCGC cars to increase production and sales. The life of modern society today also influences the pattern of people's behavior in purchasing. An established brand is usually used as a symbol as a successful product, so that brand equity also affects the emotional condition of consumers. for production of 20% from 1,000,000 units to 1,200,000 units and sales of 18.18% from 1,100,000 units to 1,300,000 units. From this data it can be concluded that starting from 2010 the demand for LCGC cars in Indonesia has increased every year and this is positively welcomed by companies that produce LCGC cars to increase production and sales. The life of modern society today also influences the pattern of people's behavior in purchasing. An established brand is usually used as a symbol as a successful product, so that brand equity also affects the emotional condition of consumers. for production of 20% from 1,000,000 units to 1,200,000 units and sales of 18.18% from 1,100,000 units to 1,300,000 units. From this data it can be concluded that starting from 2010 the demand for LCGC cars in Indonesia has increased every year and this is positively welcomed by companies that produce LCGC cars to increase production and sales. The life of modern society today also influences the pattern of people's behavior in purchasing. An established brand is usually used as a symbol as a successful product, so that brand equity also affects the emotional condition of consumers. From this data it can be concluded that starting from 2010 the demand for LCGC cars in Indonesia has increased every year and this is positively welcomed by companies that produce LCGC cars to increase production and sales. The life of modern society today also influences the pattern of people's behavior in purchasing. An established brand is usually used as a symbol as a successful product, so that brand equity also affects the emotional condition of consumers. From this data it can be concluded that starting from 2010 the demand for LCGC cars in Indonesia has increased every year and this is positively welcomed by companies that produce LCGC cars to increase production and sales. The life of modern society today also influences the pattern of people's behavior in purchasing. An established brand is usually used as a symbol as a successful product, so that brand equity also affects the emotional condition of consumers.

This LCGC car policy invites many pros and cons from various circles, both government and society. The parties who agreed stated that no one could stop people from buying cheap, economical and environmentally friendly cars, because this is a government program and the legal umbrella is clear. Meanwhile, those who disagree, stated that cheap cars will increase congestion because the population of cars operating on the road will increase, while roads and parking spaces are limited in number. Apart from the pros and cons of various parties regarding the LCGC car program, we need to look at it from two sides that may arise, namely the positive and negative impacts. The possible positive impact is that state tax revenue from automotive will increase, Middle-income people will feel that they have a new car at an affordable price, some motorcycle users may switch to cheap cars,

preventing the entry of cheap cars from abroad, such as from Thailand, which has already produced cheap cars. The negative impact that may arise is the increase in private car ownership which of course will also increase the use of private cars on the road which results in increased traffic density, increasing fuel consumption, public transport enthusiasts will decrease, the dominance of private transportation on Eid transportation will increase. Another issue that is no less important is public transportation facilities. Urban public transportation, which is currently dominated by bus and city transportation, still feels uncomfortable, unsafe and less efficient. Crowding in public transportation has become a daily view in a big city like Medan. Users of public transportation services are still limited to the lower class and some of the middle class. Because the convenience of public transportation is still considered low, most people prefer to use private vehicles.

The objectives of this research are as follows:
1. This study aims to determine the effect of price on demand for Low Cost Green Car (LCGC) cars in Indonesia in 2009-2013.
2. To find out the influence of competitor prices on demand for Low Cost Green Car (LCGC) cars in Indonesia in 2009 – 2013
3. To determine the effect of per capita income on demand for Low Cost Green Car (LCGC) cars in Indonesia in 2009-2013
4. To find out the effect of loan interest rates on demand for Low Cost Green Car (LCGC) cars in Indonesia in 2009-2013
5. To find out the effect of down payment on demand for Low Cost Green Car (LCGC) cars in Indonesia in 2009-2013

2. RESEARCH METHOD

2.1 Research Approach
This study uses a quantitative approach that aims to analyze and estimate the relationship between variables that have been determined to answer the formulation of the problem. The data presented is time series data. The variables that will be observed are the Production and Sales of LCGC cars in Indonesia. Variables that will also be analyzed later are LCGC car prices, competitor car prices, per capita income, population, loan interest rates and down payments.

2.2 Operational definition
It is a reference for the theoretical basis used to conduct research where one variable can be connected to another so that it can be adjusted to the desired data.

2.3 Place of Research, Time of Research and Types and Sources of Data
The research location is in North Sumatra Province and the time of the research is from December 2016 to January 2017. The type of data in this study is quantitative data. Data obtained from secondary sources and data presented based on time is time series data. Data were obtained directly from official publications, namely from the Central Statistics Agency (BPS) and the Indonesian Automotive Industry Association (Gaikindo), journals and websites related to this research.

2.4 Data Collection Techniques and Estimation Models
The data collection technique used in this research is to collect and record secondary data in the form of documents available from various sources, namely the Central Statistics Agency and the Indonesian Automotive Industry Association (Gaikindo). The analytical model used by the author is to use Linear Regression analysis with the formula:

$$Qdm = 0 + 1\ Pm + 2\ Pv + 3\ GNP/K + 4\ SBK + 5\ DP + t$$

Where:
Qdm = LCGC Car Request (unit)
0 = Intercept
1-5 = Parameters
t = Term Error
Pm = Car Price LCGC (Million Rupiah)
Pav = Avanza Car Price / Competitor (Million Rupiah)
GNP/K = Gross National Product / Income per capita (Millions of Rupiah)

SBK = Credit Interest Rate
DP = Downpayment / Down payment

2.5 Estimation Method

In analyzing the trend in that period, it can be analyzed using a trend regression model in that period, it can be analyzed using a linear regression model for the ordinary least squares method or OLS (Ordinary Least Square Method) in the form of a multiple regression model which is presented more simply and easy to understand. . The main assumptions in the OLS-BLUE (Best Linear Unbiased Estimator) method that must be met include:

a. Average value : disturbance term = 0.
b. There is no serial auto correlation between the disturbance terms COV (εi, j) = 0 ; i = j
c. The momocidencitecity property of the disturbance term Var (εi) = 2.
d. Covariance between of each independent variable (x) = 0.
e. There is nothing unusual in the specification of the regression model. That is, the regression model being tested has been properly specified or formulated.
f. There is no collinearity between the independent variables. That is, the independent variables do not contain a certain linear relationship between each other.

2.6 Research Procedure

Because this study wants to answer the formulation of the problem that has been determined previously, the research procedure is as follows:

a. Descriptive Analysis of LCGC Car Demand Patterns in Indonesia
b. Multiple Linear Regression Method on the Factors Affecting the Demand for LCGC Cars in Indonesia

Because this research is a time series using data for 5 years (2009-2013) and this research will be analyzed using multiple linear regression analysis (Ordinary Least Square).

2.7 Assessment

1) Coefficient of Determination (R2)

This measure of Goodness of Fit reflects how much the regressor variable (Y) can be explained by the regressor (X). The value of Goodness of Fit is 0 and 1 (0 R2 1). A small value of R2 means that the ability of the independent variables in explaining the variation of the dependent variable is very limited. A value close to one means that the independent variables provide almost all the information needed to predict the dependent variables.

$$R^2 = \frac{ESS}{TSS}$$

Where :
R2 = Coefficient of Goodness of Fit
ESS = Explained of Sum Explained
TSS = Total Sum of Squares

2) Correlation (R)

Pearson correlation coefficient or Product Moment Coefficient of Corrlation is a value that shows the close linear relationship between two variables with interval or ratio data scale. The formula used is:

$$r = \frac{n \sum_{i=1}^{n} XiYi - \sum \sum_{i-1}^{n} Yi}{\sqrt{n \sum_{i=1}^{n} X_i^2 - (\sum_{i-1}^{n} X_1)^2} \sqrt{n \sum_{i=1}^{n} X_i^2 - (\sum_{i-1}^{n} X_1)^2}}$$

Spearman rank correlation coefficient or Spearman rank correlation coeficient is a value that shows the close linear relationship between two variables with the Spearman coefficient ordinal data scale usually denoted by the formula rs. The formula used is:

$$r_s = 1 - \frac{6 \sum d\frac{2}{1}}{n(n^2 - 1)}$$

Where :
di = difference of the i-th pair or Xi − Yi
n = number of rank pairs

If the variables X and Y are independent then the value of r = 0, but if the value of r = 0, X and Y are not always independent. The variables X and Y are simply not associated.

2.8   Testing (Test Diagnostics)

1)   Statistical t test / Partial test

In this case, the tests carried out are as follows:

2)   Hypothesis Formulation

H0   :₁ 0 (LCGC price does not affect the demand for LCGC cars in Indonesia).
Ha : 1 0 (Price *LCGC* affect the demand for LCGC cars in Indonesia).

a)   Formation of critical value

The critical value in testing the hypothesis on the regression coefficient can be determined using a normal distribution table by looking at the significant level (α) 5% and the number of samples used.

b)   Value t-count

$$t = \frac{\beta_1}{se(\beta_{1)})}$$

Where :
β_1 = Regression Coefficient
se = Standard Error

2.9   Decision

This is done by comparing the t-count value of each regression coefficient with the t-table value (critical value) according to the significance level used.

a.   If ; t-count < t-table, then the decision will accept the null hypothesis (H0). This means that the independent variable has no effect on the value of the dependent variable.

b.   If ; t-count > t-table, then the decision will reject the null hypothesis (H0) and accept (Ha). This means that the independent variable affects the value of the dependent variable.

2.10   Conclusion

Give a conclusion whether the independent variable affects the dependent variable and how far the influence is in the same way hypothesis testing is carried out on other variables.

2.11   Classic Assumption Test

a.   Multicolonearity

The similarity between independent variables in one model will cause a correlation (relationship) between an independent variable and other independent variables. The regression model is Multicolonearity and Multicolonearity Test

b.   Heteroscedasticity

The assumption of heteroscedasticity from the disturbance term error is that the difference or spread (scedacity) is the same or the variance of the variable (σ2), or is symbolized

c.   Autocorrelation

Autocorrelation is an analysis used to test whether the estimation results of a linear regression model contain a serial correlation between the disturbance error term.

3.   RESULT AND DISCUSSION

3.1   Results of Regression Analysis

Table 1
Summary of Model Data Processing Results:
Analysis of Factors Affecting Demand for LCGC Cars in Indonesia

Variable	OLS (Ordinary Least Square)	
	Model-1	Model-1
LCGC Car Price (Pm)	-0.000121 (0.002899)	-0.365673** (0.365453)
Competitor Price (Pv)	0.001249 (0.001132)	0.667241** (0.248744)
Income per capita (GNP/capita)	0.061261 (0.007162)	0.844280** (0.227021)
	-3392,182	-0.785892**

Variable	OLS (Ordinary Least Square)	
	Model-1	Model-1
Loan Interest Rate (SBK)	(58617.98)	(0.486975)
Down Payment (DP)	-0.003239 (0.008822)	-0.692669** (0.290538)
Constant	-1000363. (556249.1)	-26.07918** (5.289717)
N-Timeseries-Mont	20	20
Adj R Square	0.973863	0.965163
R	98.68	98.24
F-test	142.5854 (0.000000)	106.2803** (0.000000)

From the table above by using 2 simulations of the factor analysis model that affects the demand for LCGC cars in Indonesia, it can be explained that in the simulation model 1-2 variables of LCGC car prices, competitor prices, per capita income, credit interest rates, down payments, we You can see from the significant level that has the ability to have, it will show R, which is a correlation coefficient of 98.68%, which means that it has a very strong relationship between the independent variable and the dependent variable, in other words, the rise and fall of the index value of one stock will depend on all variables. free, namely the price of LCGC cars, competitor prices, per capita income, credit interest rates, down payments. The remainder is 1, 32% is the relationship with the dependent variable outside the independent variable used in this model Adjusted R2 in model 1 with 97.38% in the conclusion that the independent variable is the price of LCGC cars, competitor prices, income per capita, interest rates, advances while the remaining 2 ,62% can be explained through other variables. Judging from the independent variables above, the competitor's car price variable and the income variable per capita with a positive sign are in accordance with the existing hypothesis and are significant at 5%. Meanwhile, the LCGC car price variable, loan interest rate and down payment are negative, which is not in accordance with the hypothesis, and is significant at 5%. In this case, it means that all these variables also affect the value of LCGC Car Demand,

Then in the second model (after logs), it can be seen that R (correlation coefficient) is 98.24%, which means that it has a very strong relationship between the independent variable and the dependent variable, in other words the rise and fall of LCGC Car Demand will depend on all independent variables, namely , LCGC car prices, competitor prices, per capita income, interest rates, and down payments. The remaining 1.76% is the relationship with the dependent variable outside the independent variables used in this model. Adjusted by 96.51%, it was concluded that the independent variables (LCGC car prices, competitor prices, per capita income, credit interest rates, and down payments) were able to explain the dependent variable (LCGC car demand). While the remaining 3.49% can be explained through other variables. Judging from the independent variables above, the variable price of competitor's cars and the income variable per capita with a positive sign corresponds to the existing hypothesis and is significant at 5%. Meanwhile, the LCGC car price variable, loan interest rate and down payment are negative, which is not in accordance with the hypothesis, and is significant at 5%. In this case, it means that all these variables also affect the value of LCGC Car Demand, but do not necessarily become a benchmark in influencing the value of LCGC Car Demand in Indonesia.

3.2   Appraisal
a.   Coefficient of Determination (R2)
Based on the first estimation model, namely the variables that affect the demand for LCGC cars in Indonesia, it can be seen that R2 is 96.51%, meaning that together the variables Pm, Pv, GNP/capita, SBK, DP, and provide a variety of explanations for The demand for LCGC cars from the result of R2 is 96.51%, so it has a remaining t of 3.49% which from this result it is possible that several other variables have an influence on the increase in the demand for LCGC cars in Indonesia.

b.   Correlation (R)
From the results of the regression of the degree of relationship (variables that affect the demand for LCGC cars in Indonesia) 98.24% means the variables Pm (the price of LCGC cars), Pv (competitor prices), GNP / capita (income per capita), SBK (credit interest rates) , and DP (advance),

and (Previous year's LCGC Car Demand) can explain the dependent variable (Qm) significantly and in accordance with the empirical, because the degree of correlation is 98.24%.

3.3   Test Results

From the data that has been obtained, the following regression equation will then be analyzed using the results of the Autocorregression Model as follows:

$$Qm_t = -26{,}080 - 0{,}365PM_t + 0{,}667Pv_t + \frac{0{,}844GNP}{kapita_t} = +0{,}786SBK_t\,0{,}693DP_t$$

From the estimation results obtained, it can be made to test the results of the model or hypothesis taken through the results of this regression, namely:

a.   LCGC Car Price (Pm)

From the regression results, the coefficient value for the variable (Pm) is -0.365673 where this variable has no significant effect on the demand for LCGC cars in Indonesia. This is indicated by the value = -5.179 and the probability value is 0.036 (above 5%). This shows that the relationship between Pm and the demand for LCGC cars in Indonesia is negative and significant. So it can be said that the price of LCGC cars increased by 1%, so the demand for LCGC cars decreased by 0.366%.

b.   Competitor Price (Pv)

From the regression results, the coefficient value for the variable (Pv) is 0.667241 where this variable has a significant effect on the demand for LCGC cars in Indonesia. This is indicated by the value = 7.270 and the probability value is 0.0009% (below 5%). This shows that the relationship between Pv and the demand for LCGC cars in Indonesia is positive and significant. So that it can be said that the price of LCGC cars increased by 1%, then the demand for LCGC cars increased by 0.667%.

c.   Per capita income (GNP/capita)

From the regression results, the coefficient value for the variable (GNP/capita) is 0.844280 where the variable has a significant effect on the demand for LCGC cars in Indonesia. This is indicated by the value = 9.445 and the probability value is 0.0000 (below 5%). This shows that the relationship between GNP/capita with LCGC Car Demand in Indonesia is positive and significant. So it can be said that the price of LCGC cars increased by 1%, so the demand for LCGC cars increased by 0.844%.

d.   Loan Interest Rate (SBK)

From the regression results, the coefficient value for the variable (SBK) is -0.785892 where this variable has no significant effect on the demand for LCGC cars in Indonesia. This is indicated by the value = -10.176 and the probability value is 0.0000 (above 5%). This shows that the relationship between SBK and the demand for LCGC cars in Indonesia is negative and significant. So it can be said that the value of the price of LCGC cars increased by 1%, then the demand for LCGC cars decreased by 0.786%.

e.   Down Payment (DP)

From the regression results, the coefficient value for the variable (DP) is -0.692669 where this variable has no significant effect on the demand for LCGC cars in Indonesia. This is indicated by the value = -8.663 and the probability value is 0.0001 (above 5%). This shows that the relationship between DP and LCGC Car Demand in Indonesia is negative and significant. So it can be said that the value of the price of LCGC cars increased by 1%, then the demand for LCGC cars decreased by 0.693%.

3.4   Classical Assumption Test

a.   Multicollinearity

The requirement for a good regression model is that it should be free from multicollinearity, and it can be seen from the results of the model analysis that multicollinearity is still found.

b.   Heteroscedasticity

Heteroscedasticity test with the Breusch-Pagan-Godfrey test shows that the value of Prob.Chi-Square (5) on the R-Squared Obs is 0.4200 or greater than 5% (0.05), it can be concluded that the data in this study are homoscedastic or free. of heteroscedasticity.

c.   Autocorrelation

In the model completed in the regression, Durbin Watson obtained 1.83747, meaning that the model used was free from autocorrelation.

4.　CONCLUSION

From research on the analysis of factors that influence the demand for LCGC cars in Indonesia, the following conclusions can be drawn:
1. Based on the Regression/Estimated model of Pm, Pv, GNP/capita, SBK, and DP, it produces R^2 of 98.68% which means that it has a very strong relationship between the independent variable and the dependent variable, in other words the ups and downs of LCGC Car Demand in Indonesia will depend on on all independent variables. The remaining 1.32% is related to other variables.
2. The factors that influence the demand for LCGC cars in Indonesia are LCGC car prices, competitor car prices, per capita income, credit interest rates, and cash advances that have a significant effect in 2011-2015.
3. The factors that influence the demand for LCGC cars in Indonesia are LCGC car prices, competitor car prices, per capita income, credit interest rates, and cash advances that have a significant effect in 2011-2015.
4. Partially, the variable price of competitors' cars, and the variable of income per capita have a positive and significant effect on the demand for cars in Indonesia, while the variable prices for LCGC cars, loan interest rates and down payments have a negative and significant effect on the demand for LCGC cars in Indonesia.

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