

Analysis of the Effects of Economic Policy on Car Demand in Indonesia

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This study aims to analyze and to find out the impact of economy policy for demand for cars in Indonesia. The variables consist of this study such as GDP per kapita, length of road, price of BBM, interest rate for credit consumption and demand for cars. This study uses the secondary data through Badan Pusat Statistik analyzed by multiple linear regression and Eviews 8 program. The results showed that R Square value of 0.994, which means that 99% of demand for cars is jointly influenced by variables in the model. While the remaining is influenced by other factors outside the model. The partial result shows the GDP per kapita has not affect, length of road give a positive affect and significant, price BBM give a positive affect and significant, and interest rate of credit consumption has not affect to demand for cars in Indonesia during the periode of this study.

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1. Introduction

Economic development is an important part of national development with the ultimate goal of improving people's welfare. Therefore, economic growth is one of the main targets that must be achieved. Economic development basically includes the efforts of the community as a whole to develop economic activities and increase the level of welfare of the community (Sutawa, 2012). Therefore, the notion of economic development can be defined as a process that causes the per capita income of the population of a society to increase in the long term (Sutawa, 2012). High productivity will create high economic growth as well. In achieving the expected goals in the development, Therefore, development needs to be supported by various factors, both economic and non-economic so that the development process can run smoothly (Romeiro, 2012). One of the factors that strongly support and influence the course of the wheels of development is infrastructure (Brooks, 2013). Infrastructure refers to the physical system that provides transportation, irrigation, drainage, buildings and other public facilities needed to meet basic human needs in a social and economic context (Grigg, 1998). Transportation is one of the important elements in supporting the activities and the rotation of the wheels of national development, especially activities in the economic field such as trade activities and industrial activities (Mathias, 2013) (Conde, 2009). To create high productivity, adequate transportation facilities and infrastructure are needed (Deng, 2013). Transportation is one of the important needs in the development process of a country. Without adequate transportation, development in all fields can be hampered. Therefore, transportation has an important role in supporting the success of development (Lim & Lee, 2012) (Suzuki et al., 2013). Transportation in Indonesia has a very rapid development. It can be seen from the history of transportation in Indonesia (Paris et al., 2010) (Linsley et al., 2010) (Rothenberg, 2013) (Morichi & Acharya, 2012). In ancient times people carried out activities of moving from one place to another only by relying on walking, using animals and simple vehicles to help transport goods so that the number of goods transported was very limited and it took a very long time to get to the destination. But along with the development of technology, the means of transportation that exist today are far different from the past. The number of existing means of transportation continues to increase every year, has a large amount of carrying capacity and a shorter travel time. However, the development of these transportation facilities needs to be balanced with adequate infrastructure such as roads and bridges that are able to support the mobilization of the movement of people,

goods and services and are able to provide services to the increasing number of transportation facilities (Bhattacharyay, 2009)(Srinivasu & Rao, 2013). Transportation is one type of activity that plays a role in increasing human needs by changing geographical location goods and people more effectively and efficiently so that it has the potential to cause transactions (Chatman & Noland, 2011). Transportation is something that cannot be separated from motorized vehicles, be it two-wheeled or four-wheeled vehicles(Doucette & McCulloch, 2011). Transportation does not only consist of two-wheeled and four-wheeled motorized vehicles but also sea, air, and rail transportation. The most commonly used means of transportation and the most dominant number used by the community is motorized vehicles, both two-wheeled and four-wheeled(Noori, 2010)(Dobie et al., 2010). The car is one of the means of transportation that is very popular with the upper middle class in general. This can be seen in Table 1 of the number which has increased from year to year. In 2010 for example, the number of cars (passenger cars) was 8,891,041 units and in 2013 the number increased to 11,484,514 units. This increase is due to the increasing dependence of urban communities on private vehicles. The most commonly used means of transportation and the most dominant number used by the community is motorized vehicles, both two-wheeled and four-wheeled (Pendakur, 2011). The car is one of the means of transportation that is very popular with the upper middle class in general. This can be seen in Table 1 of the number which has increased from year to year. In 2010 for example, the number of cars (passenger cars) was 8,891,041 units and in 2013 the number increased to 11,484,514 units(Mokhtarian et al., 2011). This increase is due to the increasing dependence of urban communities on private vehicles. The most commonly used means of transportation and the most dominant number used by the community is motorized vehicles, both two-wheeled and four-wheeled. The car is one of the means of transportation that is very popular with the upper middle class in general. This can be seen in Table 1 of the number which has increased from year to year. In 2010 for example, the number of cars (passenger cars) was 8,891,041 units and in 2013 the number increased to 11,484,514 units. This increase is due to the increasing dependence of urban communities on private vehicles. This can be seen in Table 1 of the number which has increased from year to year. In 2010 for example, the number of cars (passenger cars) was 8,891,041 units and in 2013 the number increased to 11,484,514 units. This increase is due to the increasing dependence of urban communities on private vehicles. This can be seen in Table 1 of the number which has increased from year to year. In 2010 for example, the number of cars (passenger cars) was 8,891,041 units and in 2013 the number increased to 11,484,514 units. This increase is due to the increasing dependence of urban communities on private vehicles.

Today's transportation problem has become a very complex problem, mainly due to the increasing dependence of urban communities on private vehicles, both cars and motorbikes. As a result, the number of existing vehicles is not accommodated by the available road conditions(Dablanc, 2011)(Suzuki et al., 2013)(Ford, 2012). This causes congestion to become higher and seems to be accepted as a norm for the community. This is also influenced by the lack of good and adequate public transportation facilities provided by the government which makes people tend to use private vehicles. To meet the high needs of the community in the transportation sector, banks make it easier for consumers by lowering loan interest rates so that consumers can take credit to meet their needs(Rosenberg et al., 2009). The low interest rate provided by banks can lead to an uncontrolled number of vehicles in circulation as a result of the ease of obtaining credit. On the one hand, the increasing population in Indonesia is also directly proportional to the number of cars in circulation. Indonesia is currently showing a higher pace of economic development in various fields. This can be seen from the increase in investment, inflation and income per capita of the community which results in high levels of consumption and community needs(Schneider et al., 2010). The high level of community needs causes the need for transportation facilities to also increase, in this case four-wheeled motorized vehicles or commonly referred to as cars. The increasing number of cars makes the reserves of fuel oil (BBM) dwindle. This causes the government to increase imports of fuel and increase the price of fuel oil through its policies(De Gorter & Just, 2010). This policy was implemented in order to divert people's desire to use private vehicles whose numbers continue to increase rapidly.

2. Method

This framework is a concept to express and determine perceptions and the relationship between the variables to be studied described by the theoretical study above(Kellens et al., 2013). Referring to the existing theory, the outline of this research is to look at the effect of GDP per capita, road length, fuel prices (premium), and consumption credit interest rates on the demand for cars in Indonesia.

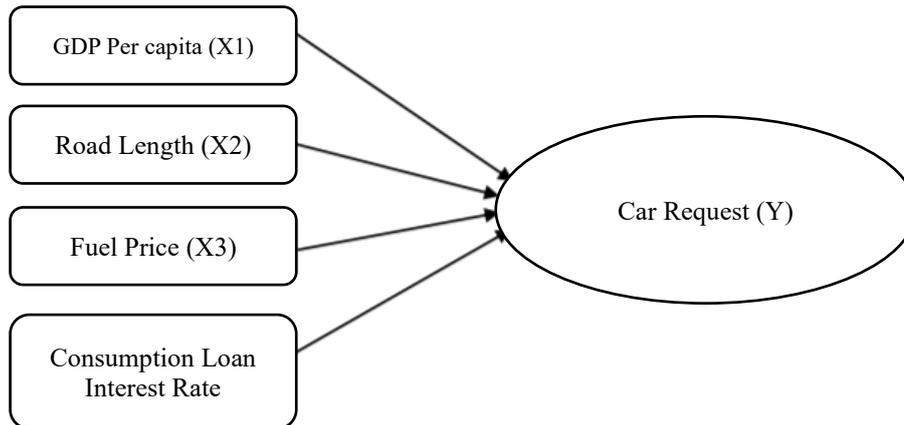


Figure 1. Conceptual Framework.

The hypothesis is an initial assumption that is still temporary which will be proven true after empirical data is obtained. In this study the hypotheses used to answer the questions are: (1). It is assumed that GDP per capita and road length have a positive and significant effect on the demand for cars. (2). It is suspected that the price of fuel and the interest rate on consumer loans have a negative and significant effect on the demand for cars in Indonesia.

The type of data used is secondary data, namely the type of data obtained through the processing of the second party from the results of field research and through library research, namely research through the library. The data used were obtained through the Central Statistics Agency (BPS) with a period from 2000-2013 so that the results of this study are the results of using data during that time period.

This study uses quantitative methods, namely analyzing data and matters relating to numbers or calculation formulas used to analyze the problem being studied. Data analysis using multiple linear regression. In regression analysis, the dependent variable is often influenced not only by quantitative variables according to the scale, but also by qualitative variables.(Flora et al., 2012)(Khalid et al., 2012).

$$Y = f(X_1, X_2, X_3, X_4) \dots\dots\dots (1)$$

Or it can be explicitly stated in the following non-linear function:

$$e Y = \alpha_0.X_1^{\alpha_1}.X_2^{\alpha_2}.X_3^{\alpha_3}.X_4^{\alpha_4}.e\mu \dots\dots\dots (2)$$

To estimate the regression coefficient, Feldstein (1999) transforms into a linear form using the natural logarithm (ln) into the model so that the following equation is obtained:

$$Y = \ln \alpha_0 + \alpha_1 \ln X_1 + \alpha_2 \ln X_2 + \alpha_3 \ln X_3 + \alpha_4 \ln X_4 + \mu \dots\dots\dots (3)$$

Where:

- Y = Demand for Cars in units
- X₁ = GDP per capita in rupiah
- X₂ = Road length in kilometers
- X₃ = fuel price in rupiah
- X₄ = Consumption Loan Interest Rate in percent
- α₀ = Constant
- α₁, α₂, α₃ = Parameters to be Estimated/Coefficient
- μ = Error Term

Equation (3) is calculated using the linear regression analysis method and the linear regression coefficients of each variable will be obtained using the Eviews 8 program.

After that, the Basic Statistical Test was carried out (Test Statistical Test, Analysis of the Coefficient of Determination (R₂), F Statistical Test).(Clarke et al., 2011)(Kang & Kvam, 2012)

3. Results and Discussion

Results of the Estimation of the Effect of Economic Policy on the Demand for Cars in Indonesia in 2000-2013.

The results of the regression of the effect of economic policy on the demand for cars in Indonesia in 2000-2013 using the Eviews 8 program obtained the following regression results:

Table 1. Estimation Results Through Least Square Model.

Independent Variable	Coefficient	T-Stats	Probability
GDP Per Capita (X1)	0.607330	1.505109	0.1666
Road Length (X2)	1.405037	3.292669	0.0093
Fuel Price (X3)	0.204818	5.585681	0.0003
Consumption Loan Interest Rate (X4)	-0.023264	-1.483571	0.1721
Constanta	-13.46452	-3.766337	0.0044

5% ; R-squared = 0.994856 ; Adjusted R-squared = 0.992570 F-statistic = 435.1781 ; Prob(F-statistic) = 0.000000

The regression results in Table 1 regarding the effect of economic policy on demand for cars in Indonesia in 2000-2013 where GDP per capita (x_1), road length (x_2), fuel prices (x_3), consumer credit interest rates (x_4), and demand for cars (x_4) y are:

$$Y = -13.46452 + 0.607330 \ln X_1 + 1.405037 \ln X_2 + 0.204818 \ln X_3$$

Interpretation of the Result of Estimating the Effect of Economic Policy on the Demand for Cars in Indonesia in 2000-2013.

Based on Table 1 by looking at each regression coefficient, it is known that GDP per capita has a coefficient value of 0.607330 and besides that, it can also be seen that the probability value is more than 5% (0.05) which is 0.1666. So it can be concluded that GDP per capita has no effect on the demand for cars in Indonesia in 2000-2013.

The Effect of Road Length on Car Demand in Indonesia in 2000-2013

Based on Table 1 by looking at each regression coefficient, it is known that the length of the road has a coefficient value of 1.405037 which means that every 1% increase in the X_2 variable (road length) will have a positive effect of 1.405037 on the increase in the Y variable (car demand). In addition, it can also be seen that the probability is less than 5% (0.05) which is 0.0093. So it can be concluded that the length of the road has a positive and significant effect on the demand for cars in Indonesia in 2000-2013.

The Effect of Fuel Prices on Car Demand in Indonesia in 2000-2013

Based on Table 1 by looking at each regression coefficient, it is known that the fuel price has a coefficient value of 0.204818 which means that every 1% increase in the X_3 variable (fuel price) will have a positive effect of 0.204818 on the increase in the Y variable (car demand). In addition, it can also be seen that the probability is less than 5% (0.05) which is 0.0003. So it can be concluded that the price of fuel has a positive and significant effect on the demand for cars in Indonesia in 2000-2013.

The Effect of Consumption Loan Interest Rate on Car Demand in Indonesia in 2000-2013

Based on Table 1 by looking at each of the regression coefficients, it is known that the interest rate on consumer loans has a coefficient value of -0.023264 and in addition it is known that the probability value is more than 5% (0.05) which is 0.1721. in 2000-2013.

Basic Statistical Test Result of Estimated Effect of Economic Policy on Car Demand in Indonesia in 2000-2013

Test Statistics t

Analysis of the effect of economic policy on demand for cars in Indonesia in 2000-2013 using the 95% confidence level ($\alpha=0.005$) and the degree of freedom ($df=nk=14-5=9$) obtained a t-table of 1.833. From Table 1 it can be seen that the length of the road (X_2) and fuel prices (X_3) significantly affect the demand for cars (Y) where the t-statistic is greater than table while GDP per capita (X_1) and the consumer credit interest rate (X_4) are not significant. affect economic growth (Y) because the t-statistic is less than t-table.

Coefficient of Determination Analysis (R^2)

From the regression results in Table 1 regarding the effect of economic policy on demand for cars in

Indonesia in 2000-2013, R^2 is obtained with a value of 0.994. This means that the independent variables, namely, GDP per capita (X_1), road length (X_2), fuel prices (X_3), and consumer credit interest rates (X_4) explain the large proportion of the contribution to the demand for cars (Y) in Indonesia is 99.4 %. The remaining influence of other variables is explained outside the model by 0.6%.

F Statistic Test

Testing on the effect of all independent variables in the model can be done with the F test. The effect of GDP per capita (X_1), road length (X_2), fuel prices (X_3), and consumer credit interest rates (X_4) on car demand (Y) in Indonesia using the 95% confidence level ($\alpha=0.05$) the F-table ($df_1=k-1=5-1$ and $df_2=nk=14-5=9$) obtained a value of 3.63 while the regression table 4.6 obtained the $F_{\text{statistic}}$ of 435.1781 so it can be seen that the estimation results in Table 1 are greater than F_{table} so that it can be concluded that together the variables of GDP per capita, road length, fuel prices, and interest rates on consumption loans have a significant effect on car demand or in other words this equation is overall fit.

Analysis of the Effects of Economic Policy on Car Demand in Indonesia in 2000-2013

The Effect of GDP Per Capita on Car Demand in Indonesia in 2000-2013, Based on the estimation results in equation (3) GDP per capita has an effect on car demand with a regression coefficient of 0.1666. And through the previous t-statistic test, it was also known that with a 95% confidence level ($\alpha=0.05$) t-table 1.833 and t-statistic 1.505109, GDP per capita has no effect on car demand. Per capita income is obtained by dividing the total GDP in a given year by the total population in that year. Per capita income is a description of the average income obtained by the population as a result of the production process. The higher a person's income level, the higher a person's ability to consume. The relatively high growth of Gross Domestic Product has not been able to reflect an increase in people's welfare, because this is highly dependent on population growth. Although GDP growth has increased significantly, if population growth cannot be suppressed, the result will be that economic growth cannot raise the prosperity of the people. Thus the hypothesis which states that GDP per capita has a positive and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1. Although GDP growth has increased significantly, if population growth cannot be suppressed, the result will be that economic growth cannot raise the prosperity of the people. Thus the hypothesis which states that GDP per capita has a positive and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1. Although GDP growth has increased significantly, if population growth cannot be suppressed, the result will be that economic growth cannot raise the prosperity of the people. Thus the hypothesis which states that GDP per capita has a positive and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1.

The Effect of Road Length on Car Demand in Indonesia in 2000-2013

Based on the estimation results in equation (3), the length of the road affects the demand for cars with a regression coefficient of 0.0093. And through the previous t-statistic test, it was also known that with a 95% confidence level ($\alpha=0.05$) t-table 1.833 and t-statistic 3.292669, the length of the road has a significant effect on car demand. Road infrastructure is one of the infrastructure that has an important role so that transportation facilities can run well. The road is a path where there is a movement or movement of people or goods and services from one place to another according to its purpose. The increasing number of motorized vehicles is an indicator of the increasing public demand for transportation facilities. In this case, The increase in the number of motorized vehicles must be accompanied by an increase in the growth of road infrastructure because if the growth of road infrastructure is not as fast as the growth of motorized vehicles, it will cause congestion. Thus the hypothesis which states that the length of the road has a positive and significant effect on the demand for cars in Indonesia in 2000-2013 is proven in accordance with the research through the regression results in Table 1.

The Effect of Fuel Prices on Car Demand in Indonesia in 2000-2013

Based on the estimation results in equation (3), the fuel price has an effect on car demand with a regression coefficient of 0.0003. Through the t-statistical test, it was previously known that with a confidence level of 95% ($\alpha=0.05$) ttable 1.833 and t-statistic 5.585681, the fuel price has a significant effect on car request. According to simple microeconomic theory, the demand for a good is influenced by the type of goods, whether they are substitutes or complementary. Substitute goods are when the price of one good increases, the demand for another good increases. Complementary goods are when the price of one good increases, the demand for other goods will decrease. In this case, fuel with motorized vehicles is complementary or complementary. The two items are interconnected. If the price of fuel increases, simply the demand for motorized vehicles will decrease and vice versa. In the short term as a result of rising fuel prices, inflation occurs. The effect of inflation

makes people reduce the use of vehicles so that sales decline. But the effect of inflation is only in the short run. In the long term inflation is one of the drivers of economic growth, and sales will return to normal. Thus the hypothesis which states that the price of fuel has a negative and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1. The effect of inflation makes people reduce the use of vehicles so that sales decline. But the effect of inflation is only in the short run. In the long term inflation is one of the drivers of economic growth, and sales will return to normal. Thus the hypothesis which states that the price of fuel has a negative and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1. The effect of inflation makes people reduce the use of vehicles so that sales decline. But the effect of inflation is only in the short run. In the long term inflation is one of the drivers of economic growth, and sales will return to normal. Thus the hypothesis which states that the price of fuel has a negative and significant effect on the demand for cars in Indonesia in 2000-2013 is not proven in accordance with the results of the study through the regression results in Table 1.

The Effect of Consumption Loan Interest Rate on Car Demand in Indonesia in 2000-2013

Based on the estimation results in equation (3) the interest rate on consumer credit has an effect on economic growth with a regression coefficient of 0.1721. And through the previous t-statistical test, it was also known that with a confidence level of 95% ($\alpha=0.05$) t-table 1.833 and t-statistic -1.483571, the interest rate on consumer credit has no effect on the demand for cars. Cars at this time are part of the needs of society. Primary needs are needs that absolutely must be met for human survival. Primary needs are also known as basic needs. If the primary needs are not met, human survival will be disrupted. Secondary needs are needs that are met after basic needs are met. Secondary needs are needs or complementary to basic needs. The secondary needs of each person can be different. Examples of secondary needs are radio, household furniture, education, bags, motorcycles, cars, tables, chairs, stationery, and sports equipment. Consumption credit is basically used to realize public or household consumption expenditures that have been urgently fulfilled. A low interest rate on consumer credit will lead to an increase in consumer credit. In this case, passenger cars have experienced a shift in needs that were originally a secondary need now become a primary need due to inadequate transportation facilities. This causes people in general to ignore the interest rate on consumption credit in order to meet their urgent need for transportation facilities.

4. Conclusion

Based on the results of the research and discussion that have been described previously, it is concluded as follows: (1). The demand for cars in Indonesia is influenced by GDP per capita, length of roads, fuel prices, and interest rates on consumer loans where the magnitude of these factors is 99% and the rest is influenced by other factors not included in the regression model. All independent variables together affect the demand for cars in Indonesia. (2). The variable GDP per capita (X_1) and the interest rate on consumer loans (X_4) have no effect on the demand for cars in Indonesia in 2000-2013. These results are based on the coefficient value of GDP per capita which is 0.60 and the interest rate on consumer loans is -0.02. This is because the high GDP per capita has not been able to reflect the level of public welfare in general and if the income level of the community is high, the tendency of people to ask for credit will decrease. (3). The variable length of road (X_2) and fuel price (X_3) have a positive and significant effect on the demand for cars in Indonesia in 2000-2013. These results are based on the coefficient value of the length of the road which is worth 1.40 and the price of fuel which is worth 0.2. This is because the growth of motorized vehicles, in this case passenger cars, must be accompanied by the growth of adequate road infrastructure so that there is no vehicle density, while the increase in fuel prices will only have an impact on the short term.

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