EFFECTS OF PRICE AND ECONOMIC FACTORS ON THE DEMAND OF PRIVATE CARS IN JAKARTA INDONESIA

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ABSTRACT

This study examines the factors that influence the demand of private passenger cars in Special Capital Region of Jakarta, Indonesia including price factors which includes average price of private passenger cars, premium fuel price, railway public transportation tariff. In addition, there are another economic variable, namely income factor per capita. This research was conducted in the province of Jakarta as the fastest growing province as well as the capital city of Indonesia. The study was conducted for one year from March 2013 until February 2014. By using multiple regression method as data analysis tool, the results of this research show the negative influence of price factors of average price of private passenger car and premium oil fuel price significant, and train public transportation tariff on the demand of private passenger cars. Moreover, the income factor per capita has a significant positive effect on the demand of private passenger cars in Jakarta.

Key words: Price Factors, Economic Factors, Price Elasticity, Law of Demand, Private Cars.

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1. INTRODUCTION

Indonesia is enjoying rapid growth in economy and the amount of the middle-class is increasing steadily in a few years (Garnaut, 2015; Anderson et al., 2016; Bhattacharyya, & Resosudarmo, 2015). The Asian development Bank report states that rapid growth in the Indonesian middle class reaches 7 million people per year. Of the total population, a large middle class has increased since 2003 to 2012, from 37.7 per cent to 56.5 per cent. Some analysts say that the middle class was the one who helped Indonesia in overcoming two crises in 1998 and 2008.

There is a common trend in developing countries, in which the growth of the middle class will increase the consumption of goods and services (Natsuda, Otsuka, & Thoburn, 2015).

Changes in consumption patterns in the middle class shifted from consumption of basic needs to consumption of durable goods and services, such as electronic goods and vehicles that experienced a sharp demand. Thus, the increased consumption will encourage economic growth (Kharas, 2010; Jones, 2010). Similarly, in recent years there has been an increase in the middle class consumption in Indonesia. This is evident from the increase in consumption credit banking, especially for mortgages.

Moreover, the rapid growth of Indonesia's middle society is positively correlated with the desire to own a private car. Especially, the upper middle class, buying a car for them is not just reasons of utility value of the product, but more of the sense of prestige and lifestyle. There are many determinants of demand of private passenger cars, including the price factors and economic factors (Wolfram, Shelef, & Gertler, 2012; Bohi, 2013). Hence, this study attempts to analyze the factors affecting the demand for private cars. Some determinants were examined: the price factors are proxied by the average price of private passenger cars, premium fuel price, railway public transportation tariff, while the economic factors were proxied by the income per capita. As the focal point of the research location, this study took the province of Jakarta as the research location considering that Jakarta, as the state capital as well as commonly becomes the overall projection of Indonesia's economy, including in terms of the demand and use of vehicles.

2. LITERATURE REVIEW AND HYPOTHESIS

In building the demand model, there ara a must to have several key factors such as the price of the goods itself, the price of substitutes, and the price of complementary goods, and the economic factors (Allen, 1934; Telser, 1979; Matutes, & Regibeau, 1992). If the relationship between X and Y goods is substitution, usually the price elasticity, or the percentage change in the quantity demanded due to the change in the price of the item by one percent, is positive. The increase in the price of the Y item results in a decrease in demand for goods Y and increase demand of goods X, due to the process of substitution Y by X. An instance is the substitution of use of private car by commuter train. However, if the relationship between Y and X is complementary, usually the price elasticity is negative. It means that the increase in the price of the Y item results in a decrease in demand for goods Y and decrease demand of goods X. An example is, the complementary function of premium fuel to cars.

Before further discussing the theories about factors that affect demand, the initial theory that build it all is the general theory equilibrium (Walras, 2008) which discusses the demand and supply. In Addition it is also explained also by Keynes on the importance of factors that influence aggregate demand in the macro economy and the demand side economic focusing on the demand side than the supply side. For factors affecting demand, in this case is the price of the goods itself that is the price of the car, the price of complementary goods in terms of the price of premium fuel, and the price of substitute goods in terms of the train tariff (Solow, 1956). Another determinant that is needed to examine is the economic factor in terms of the income level per capita. It is reasonable that the more the increase of income per capita, the more the demand for private cars.

Based on the theory of demand, the hypotheses can easily be modified:

H1. There is a negative influence between the price of premium fuel to the demand of private passenger cars in Indonesia.

As stated above, the relationship between the premium fuel and private passenger cars is complementary. Thus, the relationship is negative. It may be best defined that if there a decrease in the price of premium fuel, the demand of private passenger cars will decrease. This negative relationship is in accordance with the basic concept of demand law.

H2. There is a negative influence between the average price of private vehicles on private passenger car demand in Indonesia.

The relationship between the price of private vehicles and private passenger cars is determined by the price elasticity. Price elasticity is the percentage change in the quantity demanded by a change in the price of the item by one percent. Thus, the price increase of the item, such as in form of private passenger cars, will diminish the demand of private passenger car itself.

H3. There is a positive influence between the price of rail ticket on private passenger car demand in Indonesia.

Further hypothesis examines the relationship between the price of rail ticket on private passenger car demand. The relationship between two variables is substitution. Thus, there is a positive effect, since one another is substituted. It means that the increase in the price of rail ticket will increase the private passenger car demand. Conversely, the decrease in the price of the private passenger car will diminish the rail ticket demand, since it is assumed the people will buy or use the cars for their mobility.

H4. There is a positive influence between the income per capita on private passenger car demand in Indonesia.

Furthermore, per capita income variable, based on the law of demand, has a positive relationship with private passenger car demand which means higher per capita income and population, the higher the demand for personal passenger cars.

3. METHODOLOGY

Sampling

The research was conducted by collecting data of the variables examined in the range 1980 to 2012, from the Office of the Central Bureau of Statistics (BPS), the National Planning Agency (BAPENAS), the Ministry of Finance, the Ministry of Industry, the Ministry of Trade and the Indonesian Automotive Industries Association (GAIKINDO) of Jakarta. The implementation of the study takes 6 (six) months from March to August 2013, including designing, executing and preparing research results.

In collecting data on this research, sampling technique is done by taking all empirical data in Indonesia. Thus the secondary data obtained from BPS publication, reports of the Ministry of Finance, Ministry of Industry, Ministry of Commerce, BAPENAS and GAIKINDO were then selected in time series in accordance with the variables expressed in the period 1980 to 2012 (n = 33).

Measurements

Table 1 Operational Definition of Variables

Factors	Sign	Variables	Indicators	Measure	Scale
Price	X_1	Car	Car Price Index	Rupiah	Ratio
Price	X_2	Fuel premium	Subsidized fuel price	Rupiah	Ratio
Price	X_3	Train Tariff	Train Tariff Index	Rupiah	Ratio
Income	X_4	Income per capita	Income per capita	Rupiah	Ratio

The variable of the price of private car (X1) is taken from the entire base price of cars from various brand holder agent of cars in Indonesia including private passenger cars, excluding luxury cars, obtained from the sale price of cars according to BPS data. Then, it is obtained the value of Car Price Index (VPI: vehicle price index). The variable of car prices in Indonesia can be explained from the price table of private passenger car price index of Indonesia.

The variable of premium fuel price (X2) is based on year to year data because it is easily determined and monitored monthly by users of motor vehicles. The variable of rail tariff price (X3) is taken using the average price of train passengers or commuter line in the city of Jakarta and then processed statistically by the BPS, resulting in the rail rates index rate.The variable of income per capita (X4) is taken by using per capita income from year to year, obtained from Jakarta BPS data. For more detailed information of the indexes used, see Appendices.

Based on the previous hypothesis, the regression model can be formulated as follows:

$Y = f (X_1 X_2 X_3 X_4 X_5 X_6 X_{7,} \varepsilon_I)$

$Y = \beta_0 + \beta_1 X1 + \beta_2 X2 + \beta_3 X3 + \beta_4 X4 + \varepsilon$

Then after conversion to natural logarithm obtained equation as follows:

$Ln. Y = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \varepsilon_I$

in which $\beta_{1,} \beta_2 < 0$ and $\beta_{3,} \beta_{4>} 0$ and estimated $\varepsilon_i = 0,$

4. DATA ANALYSIS TECHNIQUE

This study used a quantitative analysis with multiple regression by SPSS analytical tool. Multiple regression method is one method in a regression analysis to determine the independent variables affect the dependent variable.

5. FINDINGS

Partial test between variables of price of private cars, of fuel premium, and of railway ticket, as well as the variable of income per capita is conducted by using the t_{value} of each variable in comparison with the value $t_{table.}$ T $_{table}$ for the number of observations n = 33 with a number of independent variables k = 4 with a value of $\alpha = 5\%$ is ± 1.70.

The statistical testing of hypothesis one stating the negative influence of the car price on private passenger car demand shows the value of t $_{value}$ for the variable of car price index (VPI) is equal to .053<t $_{table}$ 1.70 with a significance level of 0.958. This means that the variable of car price has no significant and negative effect on the independent variable of private passenger car demand. Thus, it can be declared that the hypothesis H $_1$ is rejected.

The testing of the effect of premium fuel price on private passenger car demand shows that the value of $_t$ for a variable premium fuel price is (-)2.388>t $_{table}$ 1.70 with a significance level of 0.024 meaning that the variable of premium fuel price has a significant and negative effect on the variable of private passenger car demand. It was declared that the H $_2$ is thus accepted.

Hypothesis three states that there are positive influence of rail ticket price on the private passenger car demand. The statistical result shows that this hypothesis is rejected, indicated by the value of of $_t$ for the variable of rail ticket price is approximately (-)0.144> t $_{table}$ 1.70 with a significance level of 0.887. It may means that the variable of rail ticket price, has no significant and positive effect on private passenger car demand.

The last hypothesis examines the effect of per capita income on private passenger car demand. Based on the results of the statistical processing, the value of $_t$ for variable of per capita income is approximately 5.842> t $_{table}$ 1.70 with a significance level of 0.000. This means that the variable of income per capita has a significant positive effect on private passenger car

demand. Therefore, the hypothesis four stating that there is a positive influence between the income per capita on private passenger car demand is accepted.

Table 2 Hypothesis Testing Results

Variable	Expected sign	B unstandardized	t_{value}	Sig.	Evaluation
Car Price	-	14.569	.053	.958	Rejected
Premium Price	-	-74.626	-2.388	.024	Accepted
Ticket Price	+	-17.242	-.144	.887	Rejected
Income Capita	+	.010	5.842	.000	Accepted

Dependent variable: demand
Constant (Unstandardized Coefficients) : 183442.403
t_{value}: 2.945
Sig. : .006
Adjusted R-square: .805
Std. Error of the Estimate: 1.02895E5
F (ANOVA): 34.098
Sig. : .000

Based on these results, the regression can be formulated as follows:

$$Y = 183442.403 + 14.569 - 74.626 - 17.242 + 0. .010 + \varepsilon$$

(0.958) (0.024) (0.887) (0.000)

Moreover, the test results forecasting ability, indicated by the value of R square or coefficient of determination, show that the model has a high level of predictability, as shown by the high value of adjusted R-square of 0.805. It means that the factors examined in this study is able to predict the 80.5 per cent of the demand of private passenger cars, while the remains were outside the variables tested.

6. CONCLUSION

Referring to demand theory, the price of the goods itself, the price of substitutes, and the price of complementary goods have contributed greatly to the model of demand of particular goods. This study aims to examine the influence of the price of the goods itself proxied by the price of private passenger cars, as a reflection of price elasticity law, and the price of complementary goods in terms of premium fuel price, as well as the price of train ticket as the proxy of substitute goods.

The results shows that the price of fuel energy and the income per capita have significant effects on the demand of private passenger cars. Contrastly, the car price and ticket price have no significant effects on the demand of this good. These results show that fuel energy price is a crucial factor in the demand of the cars. Moreover, the substitution goods in this study are represented by the demand for trains. Train fares variable proved to have no significant effect on the demand of private passenger cars. Lastly, per capita income contributed significantly to the demand of private passenger cars. The higher the income level allows the tendency to spend money will also be higher, including to own the private cars.

REFERENCES

[1]   Garnaut, R. (2015). Indonesia's resources boom in international perspective: policy dilemmas and options for continued strong growth. *Bulletin of Indonesian Economic Studies*, *51*(2), 189-212.

[2]   Natsuda, K., Otsuka, K., & Thoburn, J. (2015). Dawn of industrialisation? The Indonesian automotive industry. *Bulletin of Indonesian Economic Studies*, *51*(1), 47-68.

[3]   Anderson, Z. R., Kusters, K., McCarthy, J., & Obidzinski, K. (2016). Green growth rhetoric versus reality: Insights from Indonesia. *Global Environmental Change*, *38*, 30-40.

[4]   Bhattacharyya, S., & Resosudarmo, B. P. (2015). Growth, growth accelerations, and the poor: Lessons from Indonesia. *World Development*, *66*, 154-165.

[5]   Kharas, H. (2010). The emerging middle class in developing countries. OECD Development Centre Working Paper No. 285.

[6]   Jones, C. (2010). Materializing piety: Gendered anxieties about faithful consumption in contemporary urban Indonesia. *American Ethnologist*, *37*(4), 617-637.

[7]   Wolfram, C., Shelef, O., & Gertler, P. (2012). How will energy demand develop in the developing world?. *The Journal of Economic Perspectives*, *26*(1), 119-137.

[8]   Bohi, D. R. (2013). *Analyzing demand behavior: a study of energy elasticities*. Routledge.

[9]   Allen, R. G. (1934). A comparison between different definitions of complementary and competitive goods. *Econometrica: Journal of the Econometric Society*, 168-175.

[10]   Walras, L. (2008). *Studies in Applied Economics*. Routledge.

[11]   Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. Quarterly Journal of Economics (The MIT Press) 70, 65–94.

[12]   Telser, L. G. (1979). A theory of monopoly of complementary goods. *Journal of Business*, 211-230.

[13]   Hamid Nahla, Study of Chinese Commercial Positioning on The World Market: A Multidimensionality From The Conquest by The Price To Massive Implantation. International Journal of Advanced Research in Management, 7(1), 2016, pp. 72–87.

[14]   Dr. M. A. Shakila Banu and K. Saranya. A Study on Comparitive Analysis of Volatility of Equity Share Prices for Selected Steel Companies in India. International Journal of Management, 7(2), 2016, pp. 261-265.

[15]   Swati Vijay. A study of Economical impact of Entry of organized retailers on unorganized retailers with special reference to Maharashtra state. International Journal of Management, 7(4), 2016, pp. 01–16

[16]   Matutes, C., & Regibeau, P. (1992). Compatibility and bundling of complementary goods in a duopoly. *The Journal of Industrial Economics*, 37-54.

APPENDICES

A. Indexes of Variables

Year	X1 Vehicle price index /VPI	X2 Fuel Index	X3 Ticket index	X4 Income per capita
1980	56.12	150	63.46	551981
1981	62.14	150	73.85	696561.07
1982	88.08	240	85.94	762555.13
1983	100.00	320	1000	896410.17
1984	112.04	350	166.35	1182602
1985	124.08	385	140.79	1245716

Year	X1 Vehicle price index /VPI	X2 Fuel Index	X3 Ticket index	X4 Income per capita
1986	148.16	385	143.23	1338926
1987	160.02	385	160.44	1507252
1988	166.62	385	170.39	1691741.9
1989	189.62	385	184.71	2220961
1990	208.10	450	110.92	2503974
1991	224.50	550	160.74	2772506
1992	225.92	550	230.98	3621884
1993	247.15	700	103.12	5867834
1994	273.40	700	100.5	6617340
1995	286.18	700	144.05	7729992
1996	291.90	700	122.85	8975802
1997	300.53	700	146.31	10374425
1998	437.51	1200	174.73	14694116
1999	230.53	1000	180	19767326
2000	230.53	1150	180	27260390
2001	249.87	1450	186.30	31285380
2002	256.15	1750	251.70	35305631
2003	258.89	1810	304.47	39032580
2004	260.42	1810	317.55	42922396
2005	270.95	2400	337.33	48966320
2006	285.91	4500	345.09	55981204
2007	305.82	4500	353.06	62490337
2008	326.93	6000	393.06	74162360
2009	313.61	4500	436.89	82152943
2010	328.90	4500	494.31	89728232
2011	338.41	4500	543.20	100983410
2012	346.12	4500	581.87	110464473

B. Descriptive Statistics of Variable Indexes

	Car Price Index	Premium Fuel Index	Train Ticket Index	Income per capita
Mean	233,486472	1628,939394	254,1876	27144107,92
Standard Error	15,6894808	300,7285785	33,41206	5768060,805
Median	249,862994	700	180	8975802
Mode	230,5275	4500	180	#N/A
Standard Deviation	90,1292054	1727,554159	191,9377	33134986,64
Sample Variance	8123,27366	2984443,371	36840,07	1,09793E+15
Kurtosis	-0,2300873	0,136242531	6,112153	0,330230003
Skewness	-0,2711369	1,253487233	2,160908	1,212137493
Range	381,394167	5850	936,54	109912492
Minimum	56,12	150	63,46	551981
Maximum	437,514167	6000	1000	110464473
Sum	7705,05356	53755	8388,192	895755561,3
Count	33	33	33	33