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Premium, pertalite or pertamax: an empirical study of Alchian-Allen phenomenon on gasoline consumer behavior

Nur Laila Widyastuti[1], Djoni Hartono[2*]

[1] *National Development Planning Agency, Jakarta, Indonesia*
[2] *Universitas Indonesia, Depok, West Java, Indonesia*

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A B S T R A C T

In Indonesia, consumers can choose to consume either high or low quality gasoline based on their preferences. Changing preference to a higher quality that is affected by the declining relative price can lead to an Alchian-Allen (A-A) phenomenon. This study aims to determine whether the A-A Phenomenon occurs on the behavior of consumers before and after the existence of Pertalite. The regression model used is the panel data regressions and the regression result proves that there is an A-A phenomenon in market share in Indonesia before and after Pertalite. This indicates that the high difference of relative prices between high and low quality gasolines has a negative impact towards their relative consumption. Prior to Pertalite, consumers continued changing preference into high quality gasoline in the 2nd and 3rd month intervals when relative price difference decreased. After the existing of Pertalite, consumers did not quickly transfer their preferences from Premium to Pertalite when the relative price declined, so that the A-A phenomenon did not occur in this low and middle grade gasoline consumption pattern. However, Pertamax's consumption to Pertalite increases when the relative price between them declines; thus raising the A-A phenomenon. This implies that the government of Indonesia could use their authority to make arrangements on price differences between gasoline qualities.

A B S T R A K

Di Indonesia, konsumen dapat memilih untuk mengkonsumsi bensin berkualitas tinggi atau rendah berdasarkan preferensi. Berubahnya preferensi ke kualitas yang lebih tinggi yang dipengaruhi oleh penurunan harga relatif dapat mengarah pada fenomena Alchian-Allen (A-A). Tujuan dari penelitian ini adalah untuk menganalisis perilaku konsumen sebelum dan sesudah adanya Pertalite. Model regresi yang digunakan adalah regresi panel data dan hasil regresi membuktikan bahwa ada fenomena A-A dalam pangsa pasar di Indonesia sebelum dan sesudah Pertalite. Hal ini menunjukkan bahwa tingginya perbedaan harga relatif antara bensin berkualitas tinggi dan rendah memiliki dampak negatif terhadap konsumsi relatif. Sebelum Pertalite, konsumen tetap mengubah preferensi ke bensin berkualitas tinggi dalam interval bulan ke-2 dan ke-3 ketika perbe-daan harga relatif menurun. Setelah Pertalite ada, konsumen tidak dengan cepat menga-lihkan preferensi dari Premium ke Pertalite ketika harga relatif menurun, sehingga fenomena A-A tidak terjadi dalam pola konsumsi bensin kelas rendah dan menengah ini. Namun, konsumsi Pertamax meningkat ketika harga relatif di antara Pertamax dan Pertalite menurun; sehingga fenomena A-A terjadi. Hal ini menyiratkan bahwa pemerintah Indonesia dapat menggunakan kewenanggannya untuk mengatur perbedaan harga antara kualitas bensin.

1. INTRODUCTION

In Indonesia, energy mix is still dominated by oil. Data from the National Energy Council (DEN) in 2016 show that oil consumption dominates total consumption of 33.8%, Coal 34.6%, Natural Gas 23.9% and EBT 7.7%. It can be concluded that fossil energy is still the main choice for energy consumers. The amount of oil consumption spreads to 24.8% for industry sector, 17% for commercial sector, and transportation sector by 97.8%. The high de-

* *Corresponding author, email address: djoni.hartono@ui.ac.id*

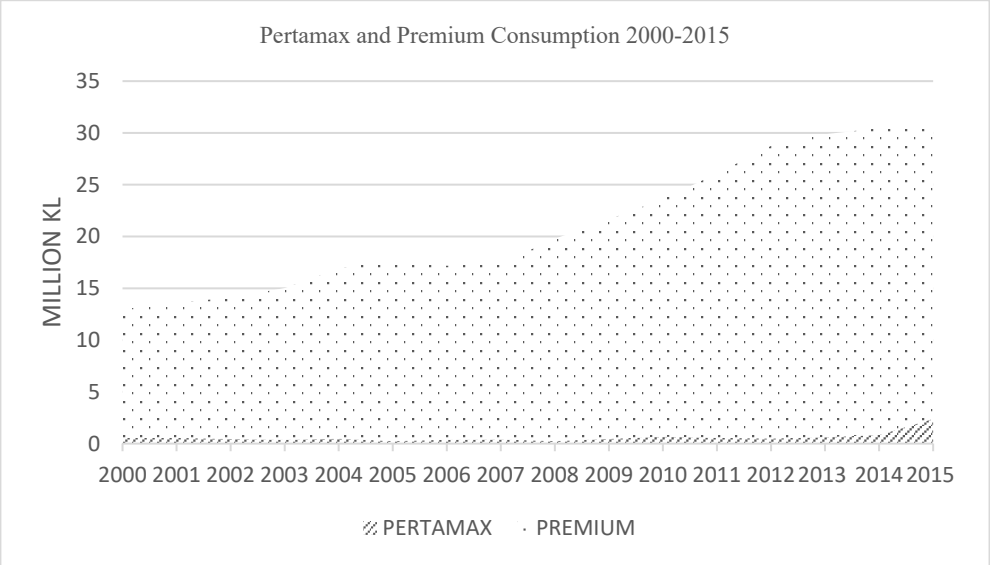
pendence of the transportation sector on gasoline causes the government must always consider both the supply and demand sides.

Gasoline in Indonesia was divided into two types of quality: low octane gasoline (Premium) and high-octane gasoline (Pertamax); and in 2015, the government added a new variant of medium-octane gasoline (Pertalite). Prices for Pertamax and Pertalite are determined by the crude oil market price and transportation costs, so that the prices in each province are different. In addition, for Premium, the price is controlled by the Upstream Oil and Gas Regulatory Agency (BPH Migas) under the Ministry of Energy and Mineral Resources (ESDM) to determine the amount of subsidies for both oil and transportation costs; so that, the prices in each province are the same. The low crude oil price in 2015 prompted the government to withdraw subsidies for Premium, but the same price is still applicable in all provinces.

In addition, Pertalite is expected to shift consumers' preferences in choosing gasoline. Before Pertalite was introduced in the gasoline market structure in Indonesia, Premium had become the main choice for gasoline con-sumption. Figure 1 shows that Premium consumption exceeded far from Pertamax consumption, however, in 2015 there was a significant increase in Pertamax con-sumption. The increase on Pertamax consumption might be caused by the subsidy removal on Premium. On the other side, the introduction of Pertalite as a new variant in some regions has a purpose to attract Pertamax and Premium consumers to change their preferences into Pertalite.

Substitution effects because of price changes have been widely debated. In demand theory, the relationship between the price and demand for goods is negative. However, this theory is not applicable if a substitution effect occurs in an item with varying qualities that have relative price changes on each level of quality caused by a change in one of the fixed component costs (Cobb and Olberding 2010). Consumers will choose goods that have better quality because the relative price between high quality to low quality goods decreases. Early concepts of relations on relative price and changes in quality prefer-ences are known as Alchian-Allen (A-A) phenomenon as it was analyzed by Alchian and Allen (1964).

Many researches on AA phenomenon have con-firmed that the high quality items will be chosen when the difference in relative prices between high and low quality goods is decreasing in various topics (Barzel 1976; Bertonazzi, Maloney, and McCormick 1993; Brown and Ressler 2017; Cowen and Tabarrok 1995; Emlinger and Lamani 2017; Gilpin and Kofoed 2015; Hummels and Skiba 2004; Larriviere and Biswas 2015; Lawson and Nesbit 2013; Lawson and Raymer 2006; Miljkovic and Gómez 2019; Minagawa and Upmann 2012; Sobel and Garrett 1997).



Source: Pertamina, processed

Figure 1. Premium and Pertamax Consumptions

However, some researchers disagree that consumers will move the preference to high-quality goods when there is a change in relative price for substitution goods with different qualities (Hastings and Shapiro 2012; Lawson and Raymer 2006; Sumner and Ward 1981). In addition, a research conducted by Razzolini, Shughart, and Tollison (2003) stated that in two substitute goods, the phenomenon of A-A should include supply and the demand sides, which were lately adopted by Coats, Pecquet, and Taylor (2005).

This paper is aimed to determine whether the A-A Phenomenon occurs on the consumption behavior of gasoline consumers before and after the availability of Pertalite. Research about The A-A Phenomenon in Indonesia has not ever done in Indonesia's gasoline market. Thus, knowing the existence of A-A phenomenon will make policymakers easier to maintain the price between high and low octane gasolines so that the government can control the market share. When the gasoline market share is controlled, the scarcity condition of one gasoline variety can be avoided and the government's subsidy for low-quality gasoline will be smaller. The decrease on subsidy for gasoline will reduce the burden of the state's finance. From all of those benefits from knowing the existence of A-A phenomenon, this research is important to be done for supporting energy security especially on gasoline fulfillment.

The structure of this paper is as follow. Section 2 reviews the A-A theory developed by Borcherding and Silberberg (1978) and Saito (2007) as a theoretical frame-work. Section 3 discusses the methodology to find the estimation model that will be used to calculate the data. Section 4 shows the empirical results and the analysis of the results. The last section concludes and suggests based on the results of the performed analysis.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

Theories that explain the relations between demand and relative goods prices, especially the A-A phenomenon, cannot be separated from consumption theories either marshallian or hicksian. The consumption theories can be used to perform both mathematically and graphically. Borcherding and Silberberg (1978) developed the mathematical approach on A-A Phenomenon while Saito (2007) developed the graphical approach. Saito's approach that is the development of Borcherding & Silberberg's (1978) is used in this research. The utility function is assumed as follows:

$$U = U[u(x_0, x_1), y] \text{ .... } (1)$$

where x_o and x_1 are two same items but different qualities. The goods quality x_0 is better than x_1. y is another item in Hicksian Composite. The next assumption is that every individual has limited constraints (budget constraint), namely:

$$P_0 x_0 + P_1 x_1 + y = \text{I} \text{ .... } (2)$$

Where P_0 and P_1 are prices for goods x_0 and x_1. In addition, $P_0 > P_1$ describes the quality of $x_0 > x_1$. I is the revenue measured by the total goods in the Hicksian and I is larger than 0.

From the equations (1) and (2), the equation to minimize the expenditure of x_0 and x_1 by ignoring y becomes:

$$\min_{x_o, x_1} P_0 x_0 + P_1 x_1 - \text{I} \quad \text{s.t}\, u(x_0, x_1) \text{..................} (3)$$

$$\mathcal{L} = P_o x_0 + P_1 x_1 + \lambda(u - u(x_0 - x_1)$$

The first derivative of equation (3) is:

$$\frac{P_0}{P_1} = \frac{u_0(x_0, x_1)}{u_1(x_0, x_1)} \text{...} (4)$$

Where u_0 and u_1 can be written to $u_i(.)$ as sub-utility function to x_i. Furthermore, it is assumed that the utility function in equation (2) has an indirect utility function $v(x_0, x_1)$ which is homogeneous of degree one. It indicates that every individual has a homothetic preference. In order to make sub-utility functions remain the same in preference, a monotonic transformation is required for sub-utility functions such as $x_1 \succcurlyeq x_2$ is equal to $ax_1 \succcurlyeq ax_2$. It is also assumed that g is a transformation function to $u_i(.)$ so that $u(x_0, x_1) = g \,.\, h(x_0, x_1)$. Equation (4) can be rewritten as follows:

$$\frac{P_0}{P_1} = \frac{h_0\left(\frac{x_0}{x_1}, \frac{x_1}{x_1}\right)}{h_1\left(\frac{x_0}{x_0}, \frac{x_0}{x_1}\right)} = \Phi^{-1} \frac{x_0}{x_1} \text{ ....} (5)$$

where h_0 and h_1 can be written to $h_i(.)$ as the first derivative ofx_i. The equation (5) has the inverse function and becomes:

$$\frac{x_0}{x_1} = \Phi^{-1} \frac{P_0}{P_1} \text{ ....} (6)$$

where Φ^{-1} is a relative demand function of high quality to low quality goods. The expectation of the value of Φ^{-1} is negative to $\frac{P_0}{P_1}$ because both items are normal. When fixed costs (t) are added to the cost

structure x_0 andx_1, then the assumption $P_0 > P_1$ will be:

$$\frac{\overline{P_0}}{\overline{P_1}} > \frac{\overline{P_0} + t}{\overline{P_1} + t}$$

where $\overline{P_0}$ and $\overline{P_1}$ are the prices of the goods before being added with the fixed cost. When the price is added with the fixed cost, the relative price becomes smaller than before which proves the existence of A-A phenomenon. Referring to Coats et al. (2005), Equation (6) can be rewritten into a relative consumption of gasoline to the relative price of gasoline difference as follows:

$$\frac{Q_a}{Q_b} = \alpha_0 + \alpha_1 \frac{P_a}{P_b}$$

$$\frac{Q_a - Q_{a-i}}{Q_b - Q_{b-i}} = \alpha_0 + \alpha_i \frac{P_a - P_{a-i}}{P_b - P_{b-i}} \quad \text{.....(7)}$$

where i = 1,2 and 3 illustrates the lag of month; Q_a is the amount of high-quality gasoline realization, and Q_b is the amount of low quality gasoline realization. Q_{a-i} is the amount of high quality gasoline realization in the previous month. Q_{b-i} is the amount of low quality gasoline realization in the previous month. P_a is the price of high quality gasoline realization, P_b is the price of low quality gasoline realization, P_{a-i} is the price of high quality gasoline realization in the previous month, P_{b-i} is price realization of low quality gasoline in the previous month i.

In examining consumers' behavior, time for adaptation is critical (Goodwin, Harris, Nelson, Roach, and Torras 2019). The existing of habits and commitments will limit consumers in responding to price changes in the short term. The use of lag on the estimation of short and long-term gasoline consumption patterns is an additional tool for analyzing the displacement of preferences in goods with different qualities such as gasoline. Hughes, Knittel, and Sperling (2008) concluded that consumers take more than 1.5 months to adapt after a price changing. In addition, Espey (1998) also stated that the more time lags used, the higher the elasticity.

3. RESEARCH METHOD

This study uses panel data approach with the cross section of 34 provinces in Indonesia. Before the existence of Pertalite, the time series data is divided in two: 1) data before the existence of Pertalite will use the monthly data from January 2010 (2010.m1) to December 2015 (2015.m12), and 2) data after the existence of Pertalite will be from January 2016 (2016.m1) to December 2016 (2016.m12). Moreover, the number of observations for the data before the existence of Pertalite is 2040 observations; and after the existence of Pertalite reaches 408 observations.

The used estimation method refers to a research conducted by Coats et al. (2005). The reason for choosing this research is that the study focuses on the relative consumption changes of high to low quality gasoline due to the relative price changes of high to low quality gasoline. In addition, consumption and relative prices use first differences to determine the difference between them and the A-A phenomenon. This is in line with the purpose of this study to look at relative price to relative consumption that affects the consumption movement from low to high quality gasoline. In a study conducted by Coats et al. (2005), they used 3SLS estimation model in order to reduce simultaneous effects on supply and demand models. However, this study uses panel data regression as the estimation model due to data unavailability for the supply model. This model uses lag variable 1 month, and 2 months. The use of lag variables in the model aims to predict the phenomenon of changes in demand after a price change in the previous months. The use of lag variables will be able to predict the consumers' behavior in responding to the relative price change to relative consumption for the short and long terms that will create the A-A phenomenon in the community.

The estimation uses two calculations from 2010.m1-2015.m12 and 2016.m1-2016.m12. In the 2010.m1-2015.m12 calculation, Pertamax is assumed as high quality goods while Premium is assumed as low quality goods. For calculation of 2016.m1-2016.m12, two phases of calculation are done: 1) Pertalite is assumed as high quality goods and Premium is assumed as low quality goods; 2) Pertamax is assumed as high quality goods and Pertalite is assumed as low quality goods. The Pertamax to Premium calculation in 2016.m1-2016.m12 is not analyzed because it is assumed that consumers will not move their preferences too broad in choosing the types of gasoline for consumption (jumping preference). The calculation of Pertalite is only done in 2016.m1-2016.m12 because this gasoline was newly released in mid-July 2015 in *Jakarta and the surrounding* rea and began to be marketed all over Indonesia at the end of 2015.

The demand function is used to determine the shifting of consumers' preferences from higher to low quality gasoline due to the relative price differences in the Indonesia's market share; and it

refers to equation (7) as follows:

$$demand = f(L1.prdiff, L_2.prdiff, L_3.prdiff, incdiff, pricecrudediff) \quad \ldots\ldots\ldots (8)$$

then the demand function (8) can be rewritten to the econometric model as follows:

$$demand = \alpha_o + \alpha_1 L_1.prdiff + \alpha_2 L_2.prdiff + \alpha_3 L_3.prdiff + a_4 incdiff + a_5 pricecrudediff + e \quad \ldots\ldots\ldots\ldots (9)$$

Where *demand* is the first differences of demand ratio between Pertamax and Premium. *Li* is the lag variable for the previous month. *prdiff* is the first differences of price ratio between Pertamax and Premium. *Incdiff* is the first difference of per capita income. The price of *CrudeDiff* is the first differences from the price of crude oil.

The consumers' behavior on gasoline consumption can be determined from the value α_m for m = 1,2, and 3. The α_m value will indicate how the consumers respond to the relative consumption of high to low quality gasoline when there is a relative price change between high and low quality gasoline. The expectation of the study is that the value of α_m <0 which indicates the A-A phenomenon. The value of α_m will vary depending on the lag variable used. However, if the values are positive, it can be concluded that the consumers do not change the consumption preference despite the declining of relative price.

In the analysis model, when there are 3 variants of gasoline – Premium, Pertalite and Pertamax - then Pertalite can be a high quality goods as well as low quality goods depending on the types of gasoline substitution. When Pertalite is substituted with Pertamax then Pertalite becomes the low-quality goods and Pertamax becomes the high-quality goods. However, when Pertalite is substituted with Premium then Pertalite becomes the high quality goods and Premium becomes the low quality goods.

The definitions of the dependent variables are as follows: *demand* variable is the ratio of demand for high quality goods to low quality goods within a certain time and certain provinces. The value of *demand* for goods is derived from the monthly realization value of each gasoline variant i.e. Pertamax, Pertalite and Premium at the provincial level. The ratio of *demand* for goods is in the form of difference, i.e. the value of the gasoline demand variant in the current period (t) is reduced by the amount of gasoline-demand variant in the previous period (t-1).

The second variable is the *prdiff* variable. *Prdiff* is the price ratio between high quality goods and low quality goods within a certain time in a particular province. PT. Pertamina sets the price of each variant of gasoline on the first and 15th of each month. To equalize the gasoline price taking point, the 15th is chosen for the research data. The prices of gasoline are different between different gasoline variants: Pertamax, Pertalite and Premium, where the highest average price is Pertamax while the lowest average price is Premium. The price ratio of the goods is also in the form of a difference, i.e. the price value of a certain variant of gasoline per liter in the current period (t) is reduced by the price value of a certain period (t-1). In addition, the 1-month, 2-months, and 3-months lags of relative prices are also taken into account as the process of adjusting consumers' behavior that indirectly affects the current period price in the following periods.

Besides the two main variables, *demand* and *prdiff*, this study uses other control variables which are Gross Regional Domestic Product (GRDP) and Crude Oil Price. For *GRDP* variable, it uses a certain period that has been divided by the number of residents of provinces to obtain the GRDP per capita. This per capita GRDP is used to determine per-capita average income of a province and the data are in a quarterly form. For the crude price variable, it uses the price of crude oil from the Mean of Platts Singapore (MOPS) in a certain period. The price of the bundled crude oil is converted to liters and multiplied by the exchange rate of the rupiah against the dollar during that period. The result of the multiplication is price of crude oil/litre in rupiah.

4. DATA ANALYSIS AND DISCUSSION

In the period of 2010-2015 on Table 1, it can be seen that the consumption of Pertamax to Premium responds nega-tively when relative price of Premium against Pertamax increases. The negative coefficient is significant at 1, 2 and 3-month intervals with a significance value of 1%. From the regression results, it can be concluded that before the existence of Pertalite, consumers quickly responded to the relative price changes between Premium and Pertamax. Consumers preferred to consume more Pertamax than Premium when a relative price of Pertamax to Premium declined and it changed the gasoline consumption pat-tern. This indicates that the A-A phenomenon occurred in the gasoline consumption in Indonesia. Furthermore, it shows that negative value also occurs in the current month but is not statistically significant.

Table 1. Fuel Consumption Regression Result during 2010-2015

Variable	A-A Phenomenon	
	OLS	Random Effect
	Pertamax to Premium Consumption Ratio Difference	
Pertamax to Premium Price Ratio Difference	- 0.001 (0.001)	- 0.001 (0.001)
Pertamax to Premium Price Ratio Difference 1 Month Lag	- 0.002** (0.001)	- 0.001* (0.001)
Pertamax to Premium Price Ratio Difference 2 Months Lag	- 0.001** [0.001]	- 0.001** [0.001]
Pertamax to Premium Price Ratio Difference 3 Months Lag	- 0.002*** [0.001]	- 0.001** [0.001]
Real Income Difference (in billion)	0.320 [0.394]	0.320 [0.315]
Crude Oil Price Difference	- 0.000*** [0.000]	- 0.000*** [0.000]
Cons	0.001*** [0.000)	0.001*** [0.000]

Standard errors in brackets
***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively

Table 2. Pertalite to Premium Fuel Regression Result on 2016

Variables	A-A Phenomenon	
	OLS	Fixed Effect
	Pertalite to Premium Consumption Ratio Difference	
Pertalite to Premium Price Ratio Difference	0.415* [0.212]	0.456 [0.323]
Pertalite to Premium Price Ratio Difference 1 month lag	0.361** [0.231]	0.385** [0.162]
Pertalite to Premium Price Ratio Difference 2 months lag	0.708 [0.131]	-0.0994 [0.185]
Pertalite to Premium Price Ratio Difference 3 months lag	-0.158** [0.0719]	-0.131 [0.102]
Real Income Difference (in billion)	-150.000* [8.400]	- 116.000 [8.400]
Crude Oil Price Difference	-0.006*** [0.001]	- 0.006*** [0.001]
Cons	0.074*** [0.020]	0.073*** [0.004]

Standard errors in brackets
***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively

While the second method using random effect shows the existence of A-A phenomenon at lag month 1, 2, and 3 with the significance value of 5%, 5% and 1%. The current month also shows the existence of A-A phenomenon but is not statistically significant. From the analysis, it can be seen that methods 1 and 2 have the same result that consumers prefer Pertamax to Premium when the relative price changes on Pertamax to Premium occurs. It can be indicated that the A-A phenomenon occurred in the market share of gasoline in Indonesia before Pertalite was introduced.

For control variables on Table 1, it can be seen that the Income variable has a positive value but is not statistically significant. The crude oil price difference variable has a negative result with 1% of significance value. When crude oil price increases, it will negatively affect the relative consumption of Pertamax to Premium. This is due to the fact that the price of Pertamax is following the world crude oil price and it makes the price of Pertamax significantly increase compared to the Premium price. It makes consumers lower their gasoline quality to maintain their utility.

Table 3. Pertamax to Pertalite Fuel Regression Result on 2016

Variable	A-A Phenomenon	
	OLS	Random Effect
	Pertamax to Pertalite Consumption Rasio Difference	
Pertamax to Pertalite Price Ratio Difference	-0.146 [0.252]	-0.112 [0.267]
Pertamax to Pertalite Price Ratio Difference 1 month lag	-0.182 [0.139]	-0.169 [0.146]
Pertamax to Pertalite Price Ratio Difference 2 months lag	-0.883*** [0.194]	-0.812*** [0.188]
Pertamax to Pertalite Price Ratio Difference 3 months lag	-0.366** [0.108]	-0.346** [0.107]
Real Income Difference (in billion)	-146.000 [192.000]	-175.000 [205.000]
Crude Oil Price Difference	-0.002 [0.003]	-0.002 [0.003]
Constanta	-0.085*** [0.018]	-0.083*** [0.017]

Standard errors in brackets
***, **, and * indicate significance at the 1%, 5%, and 10% level, respectively

The 2016 data testing uses the same method as 2010-2015 data but in two phases. Phase one is the regression on Pertamax to Pertalite gasoline consumption and the second phase is Pertalite to Premium gasoline consumption. Pertalite to Pertamax gasoline consumption on Table 2 shows that consumers do not change their preference from Premium to Pertalite when Pertalite is introduced in the current month, 1, 2 and 3 month respectively. So it can be concluded that the A-A phenomenon does not occur in Pertalite to Premium. It might be due to consumers' unfamiliarity with the new variant of gasoline or lack of socialization about Per-talite.

Other things can cause consumers' reluctance to change their preference from Premium to Pertalite even though the relative price difference has dropped. For example, 1) Lack of Pertalite supply on the market that forces consumers to stick on the low quality gasoline and 2) Lack of Premium supply in the market that forces consumers to choose Pertalite regardless of the relative price between those two types of gasoline. Another possibility is the limited time of data that has not reflected the A-A phenomenon. For the variable control, crude oil price difference is negatively significant at the level of 1%. The negative impact of crude oil price difference on the consumption of Pertalite to Premium indicates that the supply of Pertalite and Premium affects the relative consumption of Pertalite to Premium. In conclusion, the smooth

distribution is very important to make consumers shift their preferences in order to induce the A-A phenomenon.

Table 3. shows the regression result of Pertamax to Pertalite consumption in 2016. The Random Effect estimation method is used in accordance with the analysis test. The coefficient of the relative price is negative for the current month and the lagged months. It shows a displacement of consumers' preferences from Pertalite to Pertamax when there is a relative price difference on Pertamax to Pertalite. Therefore, it can be concluded that there is an A-A phenomenon in gasoline consumption for Pertamax to Pertalite. However, in the current month and one-lagged month, the negative coefficient cannot be used because it is not statistically significant.

The A-A phenomenon occurring after a 1-month lag is possibly because there is still not much Pertalite supply for all provinces in the level of General Fuel Station (SPBU). It caused the consumers' preference changing from Premium to Pertalite and Pertalite to Pertamax is still in small quantities. In addition, a wide price difference between these two types of gasoline possibly makes consumers very cautious when deciding to shift. The coefficient level of significance in the relative price of Pertamax to Pertalite is 1% for a 2-month and for 3 months at 0.5%. As for real income difference and crude oil price difference variables, they have negative value coefficients but are not statistically significant.

The results of this study are in line with previous re-searches analyzing the patterns of gasoline consumption on the market share of gasoline and inducing the A-A phenomenon. The same research was conducted by Coats et al. (2005) showing that changes in the relative price of high to low quality goods have a negative impact on the relative consumption of high to low quality goods. They also revealed that the existence of A-A phenomenon on the market share of gasoline was detected at the intervals of 1 month and 2 months. Consumers need time to adapt to price changes. In addition, the control variables in this study such as revenues and crude oil prices also have similar results with the research of Coats et al. (2005). The result of control variables shows a small effect on relative consumption changes.

Coats et al. (2005) stated that the effect of relative price changes of high to low quality goods is not very significant towards the impact of relative consumption changes of high to low quality goods. Coats et al. (2005) did not consider any medium quality gasoline variant. Meanwhile, the analysis of this study includes medium quality gasoline. The results obtained are similar to Lawson and Raymer (2006) that also accommodated medium quality gasoline in the market share of gasoline. Lawson and Raymer (2006) suggested that consumers for low quality goods do not switch to medium-quality goods when there is a relative price be-tween those different goods qualities. The difference is on the regression results of high-quality and medium-quality gasoline. In this study, the A-A phenomenon occurs when a relative price of Pertamax to Pertalite increases, and Pertamax's relative consumption to Pertalite decreases. However, Lawson and Raymer (2006) stated that when relative price increases between high and low quality gasolines; high-quality gasoline consumers change their consumption to medium and low quality gasolines.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

The result of the study shows there is an A-A phenomenon in market share in Indonesia. This indicates that the difference of relative-price between high and low quality gasolines affects negatively on the relative consumption of high to low quality gasoline. The results are in line with the aims and hypotheses of this study. Prior to Pertalite, consumers tended to change their preference from low to high quality gasoline when the relative price difference declined in the 2 and 3 month intervals. Pertamax price that follows crude oil price did not lower consumers' desire to consume better quality gasoline and it induced in A-A phenome-non. After the existence of Pertalite, consumers did not quickly shift their preferences from Premium to Pertalite when the relative price declined. Consumers stayed using Premium rather than Pertalite so that the A-A phenomenon did not occur in low and middle-grade gasoline consumption pattern. This is possibly due to supply, lack of socialization or short research data that makes the occurred phenomenon could not be understood. The relative consumption of Pertamax to Pertalite increases when relative price declines between them, causing the A-A phenomenon. The increase on relative consumption is caused by the relative prices occurring slowly in 2 and 3 months respectively. The delay in the displacement is due to the supply and price differences, which are quite wide.

The results of this study show that A-A phenomenon, affects gasoline market shares in Indonesia. The government of Indonesia, based on this research's result, could use their authority to make arrangements on price differences between

gasoline qualities. If Government can successfully determine the price between gasoline qualities, the market share of gasoline will be stable and consumers will not easily shift back to lower quality gasoline due to the price. In addition, if the market share is stable then the government does not have to be worried about the amount of gasoline subsidies when there is a surge in crude oil price that will affect the price of gasoline.

Another effect from the market stability is prevention for the scarcity of a specific gasoline type due to sudden changes in gasoline consumption. Further researches are expected to analyze the impacts of price differences on goods quality applying longer research data after the addition of Pertalite. In addition, further research can analyze changes in the pattern of gasoline consumption that raises the A-A phenomenon up to the provincial level even on district or city level so that consumers' behavior is illustrated more detailed in accordance with the characteristics of each region.

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