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Abstract

This paper empirically examines the influence of firms' one-year lagged of total new products (t-1), one-year lagged profitability (t-1), and market share of new products to firms' amount of sales revenue in pharmaceutical generic companies in Indonesia. The data used in this study was panel dataset, gathered from six large pharmaceutical generic companies in Indonesia, during the period 2006 to 2010. The regression analysis method uses fixed effect models, with generalized least squares (GLS) method. The result shows that firms' one-year lagged of total new product (t-1), one-year lagged profitability (t-1), and market share of new products to be positive and affect significantly the firms' sales revenue in the pharmaceutical generic companies in Indonesia.

Keywords: Pharmaceutical Generic Companies, Profitability, New Generic Product, Market Share, Sales Revenue

JEL: A10, C23, G30, L21, M21

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1. Introduction

To protect new innovations in the pharmaceutical market, the patent is used to restrict competing firms from copying the innovation within a certain period. Generics are known as certified drugs equivalent to those brand-name medicines that are allowed to enter the market when the patents of original drugs expire (Moreno-Torres, Puig-Junoy, and Borrell-Arque, 2007). In Indonesia, generic drugs might be a key driver of competition and cost containment in pharmaceutical markets, because almost all pharmaceutical companies in Indonesia, produce generic drugs. In Indonesia, generics are authorized when twenty years have passed since the original brand-name drug was introduced in the market. Because of many pharmaceutical companies producing generic drugs, the price competition between generic competitors is stronger in Indonesia. Based on Moreno-Torres, Puig-Junoy, and Borrell-Arque (2007) a study was conducted in Spain, concluding that there are four driver keys for fostering generic entry, that being: 1) when the number of generic firms already in the market increases, there are more direct competitors and the average number of generic entries turn lower; 2) number of active ingredients per therapeutic subgroup that decreases the average number of generic entries; 3) market size in terms of revenues, which affects positively; and 4) the time trend has significant fostering effect on generic entry.

Several studies were focused on generic entry in pharmaceutical industries. Rudholm (2001), found that expected profits affected positively the number of generic entries, but the longer the exclusivity period of the brand-name product, the lower the likelihood of generic entry. However, Reiffen and Ward (2005) empirically suggested that the larger expected profits could be expected to occur with more and faster entry into the generic markets.

Profitability of the drug industry is an important issue because profits provide a way for pharmaceutical firms to gauge what types of product consumers value most (A Congressional Budget Office Study, 2006). Chen, Chang, and Lin (2006) empirical studies, found that larger firms must increase their profitability, in order to invest more in R&D resources, and then increase their innovation performance. In pharmaceutical business, profits are important stimuli and become a source of funding for research and development activity, which in turn leads to a stream of health-enhancing new products (F.M. Scherer, 2001). We have shown previously that one-year lagged profitability has a positive and significant effect on firms' amount of R&D expenditure in multinational R&D based pharmaceutical companies (Simanjuntak and Tjandrawinata, 2011). As time goes by, an increase in the number of new products that they produce will increase their sales revenue. More consumers use the new products, the more markets share of these products, and ultimately it will affect their sales revenue.

The main purpose of this study is to show the effect of profitability, total new products and market share of new product on firms' amount of sales revenue on pharmaceutical generic companies. In this paper, we expect to observe our hypothesis, that is:

Hypothesis 1: Firms' amount of profitability is positively associated with firms' amount of sales revenue.

Hypothesis 2: Firms' amount of total new products is positively associated with firms' amount of sales revenue.

Hypothesis 3: Market share of new products is positively associated with firms amount of sales revenue.

Following hypothesis formulation, a model was devised to investigate the relation of each hypothesis on the model of total sales in the generic pharmaceutical company. We found that firms' one-year lagged of total new product (t-1), one-year lagged profitability (t-1), and market share of new product have been positive and affect significantly the firms' sales revenue in the pharmaceutical generic companies in Indonesia.

2. Data and Methodology

2.1 Samples and Data Collection

This research was conducted in the generic firms of the pharmaceutical industry in Indonesia. Financial data used in this study, were obtained from annual financial reports of each pharmaceutical company as well as the IMS (Intercontinental Marketing Services) database. This study analyzed six Indonesia public pharmaceutical generic companies (which are owned by domestic companies), Kalbe, Tempo Scan Pacific, Kimia Farma, Indofarma, Pyridam, and Darya Varia as samples in this study. Data used in this study were taken from the period 2006 to 2010. Since there are one-year lags in the profitability (t-1) and total new product (t-1) variable, then the whole panel data observations become 24 observations. The definitions and measurements of these constructs were further defined as follows:

1. Sales Revenue

   Total sales revenue was used as the dependent variable in our model. Total sales revenue data was obtained from the income statement contained in the annual financial statement of each pharmaceutical company.

2. Profitability

   One-year lagged (t-1) profit after tax was used as the proxy data for profitability. The data was obtained from the income statement contained in the published annual financial statements of the pharmaceutical companies.

3. New Product

   The data used as a new product variable was obtained from total new generic products produced by each generic pharmaceutical company every year. This data was obtained from IMS (Intercontinental Marketing Services) database. New products are defined as those products launched within the past 24 months.

4. Market Share

   The data used as a proxy for market share of generic new products was obtained from IMS (Intercontinental Marketing Services) database.

2.2 Methodology and Models

This study was conducted by using regression analysis method using fixed effect model, with generalized least squares (GLS) method. In the fixed effect model, it is assumed that although the intercept may differ across individuals, each individual's intercept does not vary over time; it is time invariant (Gujarati, 2003). Each cross-sectional unit has its own (fixed) intercept value, in all N (observations) such values for N cross-sectional units in fixed effect model (Gujarati, 2003). GLS was necessary to correct for within-group and contemporaneous serial correlation (Vernon, Golec, Lutter, and Nardinelli, 2006). The purpose of this study is to examine that there is a positive

relationship between the firms' one-year lagged of total new product (t-1), one-year lagged profitability (t-1), and market share of a new product to the firms' amount of sales revenue in pharmaceutical companies, especially in pharmaceutical generic companies, during the period 2006 until 2010. The model equations used in this study is:

$$\ln Sales_{it} = \alpha_0 + \alpha_1 \ln NP_{it-1} + \alpha_2 \ln Profit_{it-1} + \alpha_3 MS_{it} + e_{it} \quad (1)$$

Logarithmic transformation is used for all variables contained in the model, except for market share, because with logarithmic value, elasticity value is obtained, making it easier for us to see clearly and interpret the relationship between the dependent and independent variables. Market share variable was represented as percentages value, and as such it does not need to be represented in logarithmic scale. In the model described above, the coefficient of each independent variable (slope) shows the elasticity of the firms' one-year lagged of total new product, one-year lagged probability, and market share to the firms' sales revenue, respectively. This shows the percentage change in the firms' sales revenue, for one percentage change in the firms' one-year lagged of total new product (t-1), one-year lagged profitability (t-1), and market share.

3. Result

As seen in Table 1 (based on Model 1), a positive and statistically significant relationship existed between log(NP?(-1)) and log(SALES?). The positive relationship between firms' one-year lagged of total new product and firms' sales means enhancement in firms' one-year lagged of total new product can increase their current sales revenue. Our elasticity estimates showed 0.25 percent, which means that a one percent increase

(decrease) in firms' one-year lagged of total new product will be accompanied by 0.25 percent increase (decrease) in firms' amount of sales revenue. This is caused when the total companies' new product increased, the value of sales revenue in the future would also indirectly increase. The Congressional Budget Office Study (2006) noted that successful new drugs will generate large cash flow that can be invested in R&D, and in turn will increase their innovation and also their sales revenue. This supports the hypothesis that the firms' amount of total new products is positively associated with the firms' amount of sales revenue.

A positive and statistically significant relationship between log(PROFIT?(-1)) and log(SALES?) has also been seen in our calculation (Table 1). This positive relationship between firms' one-year lagged profitability and sales means that enhancement in firms' one-year lagged profitability can increase their current sales revenue. Our elasticity estimates suggested that a one percent increase (decrease) in firms' one-year lagged profitability will be accompanied by 0.28 percent increase (decrease) in firms' amount of sales revenue. Chen, Chang, and Lin (2006) proposed that pharmaceutical companies should raise their profitability, so that they can invest more in the R&D resources to increase their innovation performance. When their innovation increased, more new products will be produced, and subsequently they will contribute to the increased sales revenue. This supports the hypothesis that the firms' profitability is positively correlated with the firms' total sales revenue.

Table 1: Model (1) Result of Regression Analysis Based on a Panel of Six Pharmaceutical Generic Companies in Indonesia, Period 2006 – 2010

Dependent Variable: LOG(SALES?)				
Total pool (balanced) observations: 24				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	14.91777	0.858092	17.38483***	0
LOG(NP?(-1))	0.259354	0.054599	4.750194***	0.0003
LOG(PROFIT?(-1))	0.282415	0.057548	4.907437***	0.0002
MS?	0.181022	0.076884	2.354463**	0.0326
R-squared	0.953576			
Adjusted R-squared	0.928816			
F-statistic	38.5132			
Durbin-Watson stat	1.804561			

Two-tail significance levels:
** Significant at level 10 %*
*** Significant at level 5 %*
**** Significant at level 1 %*

With regard to the market shares of total new products, a result depicted on Table 1 was seen following analysis based on Model 1. The results indicated a positive and statistically significant relationship between MS? and log(SALES?). The positive relationship between market share and sales means that enhancement in market share of total new products at present can increase their current sales revenue. Our elasticity estimate shows to be 0.18 percent, suggesting that one percent increase (decrease) in current market share of total new products will be accompanied by 0.18 percent increase (decrease) in firms' amount of sales revenue. When the market share of new products

increases, many consumers are expected to use the products, therefore increase in sales revenues, is seen to occur.

4. Conclusion

The purpose of this study was to examine the influence of total profitability, total new products, and market share of new products on the firms' amount of sales revenue on pharmaceutical generic companies in Indonesia. Regression analysis has shown a positive and statistically significant influence, thus, enhancement in the firms' one-year lagged of total new generic product, one-year lagged of total profitability, and market share of total new product can increase firms' amount of sales revenue on pharmaceutical generic companies. Thus it can be concluded that sales revenue on pharmaceutical generic companies in Indonesia, strongly influenced by their profitability, the total new generic product that they produce, and market share of their new generic products.

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