MPRA

Munich Personal RePEc Archive

Factors affecting productivity of research-based pharmaceutical companies following mergers and acquisitions

Raymond R. Tjandrawinata and Destrina Grace Simanjuntak

Department of Business Development and Dexa Laboratories of Biomolecular Sciences, Dexa Laboratories of Biomolecular Sciences, Dexa Medica Group

November 2012

Factors Affecting Productivity of Research-based Pharmaceutical Companies Following Mergers and Acquisitions

Raymond R. Tjandrawinata[1, 2, 3] and Destrina Grace Simanjuntak[2]
Department of Business Development[1] and
Dexa Laboratories of Biomolecular Sciences[2]
Dexa Medica Group
Tangerang, 15224

ABSTRACT

This paper analyzes the impact of mergers and acquisitions (M&A) activities in research-based pharmaceutical companies, specifically the impact of R&D expenditure, profitability, and sales revenue on firms' productivity, R&D intensity, in pharmaceutical industries following M&A activities. The model was estimated using annual data, gathered from seven large research-based pharmaceutical companies pre and post-M&A, during the period 2003 until 2010. The regression analysis method uses a fixed effect method with generalized least square (GLS) analysis. The result further shows that following M&A activities, firms' one-year lagged R&D expenditure (t-1) and lagged profitability (t-1) to be positive in increasing significantly the firms' amount of R&D intensity in research-based pharmaceutical industries, while, surprisingly firms' one-year lagged sales revenue (t-1) have a negative impact in increasing significantly the firms' amount of R&D intensity in research-based pharmaceutical industries.

Keywords: Mergers and Acquisitions (M&A), R&D Expenditure, Profitability, Sales Revenue, R&D Intensity

[3] Corresponding Author: Department of Business Development & Dexa Laboratories of Biomolecular Sciences, Dexa Medica, Tangerang, 15224, Indonesia. Phone (62)(21)7451777. Fax (62)(21)7452573. Email: raymond@dexa-medica.com

1.   **Introduction**

During the last decade, mergers and acquisitions have an increasing trend in pharmaceutical companies. There are many triggering factors why these M&A occur including the high competition in pharmaceutical industry, and driven by other factors such as patents expiration of blockbuster products, the slowing development of new therapeutic and the newest technology, expansion of market share, pressure of stock market among other things. Another common reason includes consolidation research and development, manufacturing, sales, and marketing, leading to more resource effectiveness and efficiency (Danzon, Epstein, and Nicholson, 2003).

In order to expand the business of pharmaceutical drugs and to generate new molecular entities, many research-based companies take the liberty of undergoing M&A. Using the M&A vehicle, research-based pharmaceutical companies, suddenly accumulate new resources that they can use to expand their pipeline products, as well as a means to enter and strengthen in newer therapeutic areas. Companies which have gone through M&A are expected to rapidly generate high return, so that they will be able to accumulate excess cash for further rapid growth (Davidson and Greblov, 2005). Clifford Kalb (2006) presented another three main point advantage of M&A activities in the pharmaceutical companies: 1) economics of scale, to include those aspects in sales/marketing power, financial power, production capacity, and market share; 2) the existence of synergies in research portfolio, geography, sales, and production; as well as 3) combined R&D budget of the respected to ease access of technologies, eliminate redundancies, and focus within therapeutic categories.

Table 1 shows several mergers and acquisitions conducted by research-based pharmaceutical companies from period 2003 until 2010. From that time period, one of the biggest M&As have been ones conducted by Roche. Roche acquired Genentech for $46.8 in 2009, and then decided to acquire the remaining 44 percent of the company (Shantikumar, 2009). By acquiring Genentech, Roche has a strategy that

it has no intentions of moving into generic drug or consumer product business, as Pfizer and Novartis (Shantikumar, 2009).

Table 1: Several M&A in Research-Based Pharmaceutical Companies,

Period 2003 - 2010

Company	Year	M&A
Roche	2009	Genentech
Sanofi-Aventis	2004	Aventis
	2005	Hoechst AG
	2009	BiPar Sciences Inc
	2010	Genzyme
Astrazeneca	2006	KuDOS Pharmaceuticals; Cambridge Antibody Tech. Grp.
	2007	Arrow Therapeutics Ltd; MedImmune Inc.
	2010	Novexel SA
Merck	2005	Aton Pharma Inc.
	2006	Sirna
	2009	Schering-Plough
Eli Lilly	2008	ImClone
	2010	Alnara Pharmaceuticals, Avid Radiopharmaceuticals
Takeda	2008	Millenium Pharmaceuticals
Teva	2004	SICOR, Inc.
	2006	Ivax Corporation
	2008	CoGenesys Inc.; Bentley Pharmaceuticals, Inc.
	2009	Barr Pharmaceuticals

Through M&A with Genentech, Roche was able to acquire biotechnology product as Rituxan, Avastin, Herceptin, and Tarceva. Other companies are also active in M&A activities; Sanofi-Aventis performed M&A with Hoechst, Synthelabo, and Aventis (which later changed their name) for $65.5 billion, followed by acquisition of biotech companies BiPar Sciences Inc, and Genzyme for $18.5 billion. Astrazeneca followed the acquisition with several biotechnology companies, as KuDOS

Pharmaceuticals which focuses on discovery and development of drugs based upon the science of DNA for cancer treatment; Cambridge Antibody Tech. Grp which focuses on antibody therapeutics, using phage display and ribosome display technology; Arrow Therapeutics Ltd engages in the discovery and development of anti-viral therapies; MedImmune Inc. which works to boost the immune systems of babies and grown-ups; and lastly, Novexel SA engages in the discovery and development of antibacterial and antifungal agents. Merck acquired Sirna in 2006 for $1.1 billion in order to get hold of new RNAi technology, and also acquired Schering-Plough for $41 billion in 2009, to strengthen them in pharmaceutical products. Lilly acquired ImClone in 2008 for $6 billion, to get access to the biotechnology product for oncology Erbitux. Bristol-Myers Squibb acquired Medarex to develop monoclonal antibodies for $2.4 billion, and continued with acquiring Zymogenetics Inc. Takeda also follow other large companies with the acquisition of Millenium Pharmaceuticals for $8.8 billion, and added their oncology product, Velcade, into their product portfolio. Lastly, Teva also acquired biopharmaceutical company, CoGenesys Inc., which engages in discovery and development of biopharmaceuticals and long-acting medicines for various therapeutic areas. At this time, the company is known as Teva Biopharmaceuticals USA, Inc.

Theoretically, productivity in pharmaceutical company's post M&A can be increased by the combined R&D expenditure and increasing the innovation activity in the company. This activity will increase the net profit of the combined company, and will also lead to an increase in new source of funds for R&D activities within the company. F. M. Scherer (2001) said that in pharmaceutical businesses, profits are important stimuli and become a source of funding for research and development activity, which in turn leads to a stream of new health-enhancing products. The strategies to increase R&D investment in pharmaceutical companies depend on the profitability they earned in the previous period, if the profits they earn in previous periods increase, then they can invest more in R&D activities, and if the profits they earned during the previous period decrease, then they cannot invest more in their

R&D activities, and expectations of profits to be earned in the future will be reduced. This result will be driving high R&D intensity of a firm. Kotabe (1990) stated that there is a positive relationship between R&D intensity and firm's performance (citing by Andras and Srinivasan, 2003).

There are several plausible reasons that describe why pharmaceutical companies need a lot of funds for R&D activities. Firstly, there is much patent expiration which in turn requires the company to soon provide fresh funds for R&D to boost their pipeline of innovative new drugs. Indeed, patent expiration was, in actual, one of the main reasons that prompted pharmaceutical companies to undergo M&A at the first place. In this regard, M&As were performed to compensate for the revenue loss (which will also result in reduced R&D funds and R&D intensity later) due to existing blockbuster drug patent expiration in the near future (Shantikumar, 2009). According to Shields (2011), between 2007 until 2012, the top 50 pharmaceutical companies are facing patent expiration on $115 billion worth of drugs. Second, the companies must have the access to fresh funds that allow them to pay for increased cost of doing research. According to Shantikumar (2009), the cost incurred to bringing a new drug to the market has increased to nearly $1 billion in 2008 from about $100 million in 1990.

After the drugs are marketed, the company could earn revenue from the drugs sales. More products are produced through R&D activities, and then the probability sales revenue obtained by the company would be greater. In fact previously, we reported that R&D intensity in pharmaceutical companies is always related to how much companies invest in R&D, relative to their sales revenue (Simanjuntak and Tjandrawinata, 2011). Chao and Kavadias (2009) found that a key metric for the assessment of innovative activity at the firm level is research and development intensity, defined as the ratio of a firm's R&D investment to its revenue. This is because when there was an increase in R&D spending, the increase was always associated with an increase in sales revenue. When the acquired company's profit increased by increasing the value of sales revenue, the company found that it is more

profitable for firms to invest their incremental dollars of sales revenue in their own drug research (A US Congressional Budget Office Study, 2006). Gee (1981) found that industries that devote a larger percentage of sales to R&D are generally more profitable and competitive. In addition, Davidson and Greblov (2005) proposed that when calculated based on R&D intensity of a pharmaceutical company, the amount of the investments conducted by pharmaceutical company against their R&D activities will determine the characteristic and the size of that company. Also from R&D intensity, innovation activities of a firm can be seen.

Every year, R&D spending has grown faster, because nowadays many companies choose to invest their money in R&D activity, to gain future revenue in appropriate to their expectation. This makes the R&D intensity to increase annually. Pharmaceutical companies that perform M&A expect consolidation in terms of sales and marketing will be able to obtain greater benefits through the enhancement on market share and this will result in greater sales revenue, thus they can invest more in research activities. Therefore, it can be concluded that such companies will get hold of new sources of funds that can be utilized to perform greater R&D activities. Besides that, by doing M&A, there is a consolidation of knowledge, human capital, and technology from different companies. Rogers (2001) suggest that the synergy between these activities will lead to higher productivity, thus the company will switch their funds to R&D, and will lead to an enhancement in R&D intensity.

Besides information mentioned above, there are still other pros and cons regarding mergers and acquisitions in the pharmaceutical industries. Jensen (1987) stated that total spending on R&D is increasing concurrent with the wave of mergers and acquisitions. Bronwyn Hall (1988) finds there is no difference in pre- and post-mergers R&D performance in firms who are involved in mergers, but for firms with the highest propensity to merge, those that did merge experienced more rapid post-merger growth that those that did not merge (citing by Danzon, Epstein, and Nicholson, 2003). Martynova, Oosting, and Renneboog (2006) said that the acquirer's leverage prior takeover seems to have no impact on the post-merger

performance of the combined firm. They also concluded that acquisitions of relatively large targets result in better profitability of the combined firm subsequent to the takeover, whereas acquisitions of a small target lead to a profitability decline. Maggon (2011) suggested that if a company was acquired for its R&D pipeline and development project or platform technology, it will impact on the failure of the acquiring company to derive full benefits and most of the projects would later be discontinued or terminated. This raises the question about the effectiveness of the mergers and acquisitions in the pharmaceutical industries.

The main purpose of this study is to examine the role of M&A in company productivity by looking at the influence of firms' lagged R&D expenditure, firms' lagged profitability, and firms' lagged sales revenue on firms' R&D intensity of research-based pharmaceutical companies, which have gone through mergers and acquisitions. In this paper, we expect to observe our hypotheses, as follows:

Hypothesis 1: Firms' amount of R&D expenditure is positively associated with firms' amount of R&D intensity.

Hypothesis 2: Firms' amount of profitability is positively associated with firms' amount of R&D intensity.

Hypothesis 3: Firms' amount of sales revenue is positively associated with firms' amount of R&D intensity.

Following hypothesis formulation, a model was devised to investigate the relation of each hypothesis on the model of the productivity in the research-based pharmaceutical companies that have gone through M&A, as measured by R&D intensity.

2. Methodology and Measurement

2. 1 Samples and Data Collection

Samples used in this study consist of seven multinational research-based pharmaceutical companies. This study used financial data obtained from annual financial reports of each research-based pharmaceutical company. The research-based

pharmaceutical companies included in this study were Roche, Sanofi-Aventis, AstraZeneca, Merck, Takeda, Lilly, and Teva. The variables included in the data collection were research and development expenditure, profitability, sales revenue, and research and development intensity. Since there are one-year lags in R&D expenditure (t-1), profitability (t-1), and sales revenue (t-1) variable, then the whole panel data observation becomes 48 observations and unbalanced, because of missing observations. The definitions and measurements of these constructs were further defined as follows:

1. R&D Expenditure

   This study uses total R&D expenditure data as the independent variable of our model. Total research and development expenditure data is obtained from the income statement contained in the published annual financial statements, from each research-based pharmaceutical company. The R&D expenditure data used in our model was one-year lagged (t-1) R&D expenditure.

2. Profitability

   The data used is the profit after tax as the proxy for profitability, which is obtained from the income statement contained in the annual financial statements. In this study, profitability variable uses the profitability data of each pharmaceutical company that is one-year lagged (t-1) profitability.

3. Sales Revenue (SR)

   Total sales revenue was also used, as the independent variable data was obtained from the income statement contained in the annual financial statement of each pharmaceutical company. The sales revenue data used in our model was one-year lagged (t-1) sales revenue.

4. R&D Intensity (RDI)

   Research and development intensity was the ratio of a company's investment in research and development compared to the firm's sales. According to Davidson and Greblov (2005), the magnitude of R&D intensity can determine the

characteristics of a pharmaceutical company. In this study, R&D intensity was derived as follows:

$$R\&D\ Intensity\ = \frac{current\ R\&D\ spending}{current\ Sales\ Revenue}$$

It is reasonable to use R&D intensity as a proxy of firm's productivity to see how big the research productivity is for a company.

2. 2   Methodology and Models

This study was conducted by using regression analysis methods using fixed effect models, with generalized least square (GLS) method. Because of the equation below containing heteroscedastic error, the GLS method (with White heteroscedasticity) was employed to transform it to homoscedastic error in order to satisfy the Gauss-Markov assumptions. 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 the relationship between firms' one-year lagged R&D expenditure (t-1), firms' one-year lagged profitability (t-1), firms' one-year lagged sales revenue, and firms' R&D intensity, in the period 2003 until 2010. The model equations used in this study was:

$$RDI_{it} = \alpha_0 + \alpha_1 \ln RD_{it-1} + \alpha_2 \ln Profit_{it-1} + \alpha_3 \ln SR_{it-1} + e_{it} \quad \text{(1)}$$

Logarithmic transformation is used for all the variables in the model, because with logarithmic value, an elasticity value is obtained, and therefore it would make it easier for us to see clearly and to interpret the correlation between the dependent and independent variables. In the model described above, the coefficient of each independent variable (slope) shows the elasticity of firms' one-year lagged R&D expenditure, one-year lagged profitability, and one-year lagged sales revenue to R&D intensity respectively. This shows the percentage change in the firms' R&D intensity, for one percentage change in the firms' one-year lagged R&D expenditure, profitability, and sales revenue.

3. Result

Through the estimation using pooled regression model, the values of the coefficient estimates have been obtained. Table 2 depicts the result of regression analysis.

Table 2: Result of Regression Analysis Based on a Panel Data of Seven Research-Based Pharmaceutical Companies, Period 2003 – 2010

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: RDI?				
Cross-sections included: 7				
Total pool (unbalanced) observations: 48				
C	0.270287	0.091304	2.960306***	0.0053
LOG(RD?(-1))	0.106928	0.018667	5.728109***	0.0000
LOG(PROFIT?(-1))	0.007047	0.002087	3.376620***	0.0017
LOG(SR?(-1))	-0.103154	0.021717	-4.749875***	0.0000
R-squared	0.947935			
Adjusted R-squared	0.935604			
F-statistic	76.8726			
Durbin-Watson stat	2.183543			

Source: The model was processed by Eviews5.1
Two-tail significance levels :
   * Significant at level 10 %
   ** Significant at level 5 %
   *** Significant at level 1 %

In this case, the coefficient of firms' one-year lagged R&D expenditure (t-1); firms' one-year lagged profitability (t-1), and firms' one-year lagged sales revenue (t-1) were transformed into logarithmic scale, in order to get an elasticity measurement within the coefficient value of the slopes, while firms' R&D intensity was not transformed into logarithmic scale, since the value is a result of the ratio of R&D expenditure to revenue.

The parameter estimates of the model are shown in Table 2. The fitness of the model as measured by R-squared measurement having a value of 0.94 is acceptable and the estimated coefficients are generally statistically significant. We have conducted and examined different models, varying on time period and found that this

particular model and period holds the best regressions throughout. As seen in Table 2 (based on our model above), a positive and statistically significant relationship existed between log(RD?(-1)) and RDI?. The reason of the use of past R&D expenditure is due to its effect on firm's capital stock, which in turn will affect the amount of current R&D expenditure and the productivity in firms. A positive relationship between firms' one-year lagged of R&D expenditure and firms' R&D intensity, suggesting that enhancement in firms' one-year lagged of R&D expenditure could increase their current R&D intensity. Our elasticity estimates showed an amount of 0.11 percent, which means that a one percent increase (decrease) in firms' one-year lagged of R&D expenditure, will be accompanied by 0.11 percent increase (decrease) in firms' ratio of R&D expenditure to total sales revenue. The result obtained by the regression, consistent with the assumption that the M&A companies will result in high productivity (because there is consolidation in research activity), therefore will result in increase in R&D spending in pharmaceutical companies. It is generally assumed that R&D expenditures are the source of funds for research, especially in research-based pharmaceutical companies. With R&D activities, firms can improve their performance by focusing on product design and development and by improving their manufacturing process, thus product differentiation can be obtained (Andras and Srinivasan, 2003). Along with the increasing of investment in R&D activity, it will be driving higher R&D intensity. This supports the hypothesis that firms' amount of R&D expenditure is positively associated with R&D intensity obtained by the research-based firms.

A positive and statistically significant relationship between log(PROFIT?(-1)) and RDI? has also been seen in our calculation (Table 2). This positive relationship between firms' one-year lagged profitability and firms' R&D intensity means that enhancement in firms' one-year lagged profitability can increase their current R&D intensity. Our elasticity estimates suggested that a one percent increase (decrease) in firms' one-year lagged profitability will be accompanied by 0.01 percent increase (decrease) in R&D intensity obtained by the firms, at the current year. Based on our

previous study (Simanjuntak and Tjandrawinata, 2011), increasing in profitability in the previous period may lead to an increase in R&D expenditure, because profitability can affect the company's strategy to invest more in R&D, which in turn will affect firm's expected revenue and further profitability. Based on Schumpeter's (1934) view, larger profit is the main force to stimulate R&D efforts and innovation activities, therefore determining the productivity level of the company. In addition, Hundley, Carol, and Park (1996) also stated that the allocation of profits into the research activities has an important role in a research-based company, which is, as one effort to improve R&D, to ensure the long-term viability of the company. Therefore, the size of R&D investment is affected by the amount of profitability obtained by the company, which will ultimately be affecting firms' R&D intensity. Hypothesis 2 that the firms' R&D intensity is positively associated with profitability obtained by the research-based firms, is therefore also supported.

For sales revenue, the results indicate a negative and statistically significant relationship between $\log(SR?(-1))$ and RDI?. A negative relationship between firms' one-year lagged of sales revenue and firms' R&D intensity means that enhancement in firms' one-year lagged sales revenue can increase their current R&D intensity. Our elasticity estimates suggested that a one percent increase (decrease) in firms' one-year lagged sales revenue will be accompanied by 0.10 percent decrease (increase) in R&D intensity, during the current year. Pharmaceutical companies which have gone through M&A expect consolidation of sales and marketing activities and that will lead to greater benefits, for example the enhancement of market share which results in greater sales revenue. With an increase in sales revenue, the profit obtained by the company will increase, and the source of funds for the research will further increase. Therefore, this can in turn lead to more investment in research activities to develop and produce new drugs of good quality, thus it will easier to get approval from regulatory authorities. From R&D intensity of a pharmaceutical company, the amounts of the investment spent by pharmaceutical companies for their R&D activities will determine the characteristics and the size of that company (Davidson

and Greblov, 2005). From the regression results above, the results obtained do not appropriate with the theory. The negative signs obtained from the regression above indicate two points: firstly, the size of investment in R&D expenditure is less than the amount of sales revenue acquired by the firm, and secondly, the acquired firms' sales revenue is greater than the firms' amount of R&D spending. LaMattina (2011) found that pharmaceutical companies which merge currently tend to invest funds smaller than before the mergers. Theoretically, it is supposed that companies conducting a merger can invest more funds, since there is consolidation in resources. But, according to LaMattina's observation, pharmaceutical companies always invest at least 20 percent of their revenue before, but in fact currently their investment into R&D has been decreased. It might have happened, due to when mergers were done, the fund derived from their revenue, which was supposed to be allocated to research activities, was used to finance their mergers. Hypothesis 3 that the firms' sales revenue is positively associated with firms' R&D intensity, obtained by the research-based firms, is therefore not supported.

4. Conclusion

The main purpose of this study is to examine the role of lagged R&D expenditure, lagged profitability, and lagged sales revenue of research-based companies on firms' amount of R&D intensity on pharmaceutical companies, which do M&A. The regression used R&D intensity as the dependent variable, and lagged R&D expenditure, lagged profitability, and lagged sales revenue as the independent variable. Based upon our fixed effect model specification, we estimate the elasticity of R&D intensity, obtained by the firms with respect to the determinants of R&D intensity, as the proxy of the firms' productivity.

Regression analysis showed that firms' one-year lagged R&D expenditure (t-1) and lagged profitability have been positive and affect significantly the firms' R&D intensity in the research-based pharmaceutical companies, except for firms' one-year lagged sales revenue which has been negative and affects significantly the firms'

R&D intensity in the research-based pharmaceutical companies. Thereby, hypotheses that firms' amount of R&D expenditure, profitability, and sales revenue has a positive impact on productivity firms which do M&A, are not all proven.

This model is far from being perfect, because there are many parameters which can also directly affect R&D intensity. Another factor that can affect R&D intensity according to Chao and Kavadias (2009) studies are R&D return, risk, and cost of sales, which lower R&D return, risk, and cost of sales will be driving higher R&D intensity, and lower competition intensity will be driving lower R&D intensity (consistent with the Schumpeterian Hypotheses). However, the availability of such data was strictly limited which hampered us to analyze such additional data. The present model is therefore sufficient at any rate, to show the relationship between R&D expenditure, profitability, and sales revenue on firms' productivity, on R&D intensity following M&A activities.

REFERENCES

A Congressional Budget Office Study. 2006. Research and Development in the Pharmaceutical Industry. Congress of The United States, Congressional Budget Office.

Andras, Tina Larsen and Srini S. Srinivasan. 2003. Advertising Intensity and R&D Intensiy: Differences across Industries and Their Impact on Firm's Performance. International Journal of Business and Economics, Vol.2, No. 2, 167-176.

Chao, Raul O. and Stylianos Kavadias (2009). R&D Intensity and NPD Portfolio. Charlottesville VA: University of Virginia, Darden School of Business. Atlanta GA: Georgia Institute of Technology, College of Management.

Danzon, Patricia M., Andrew Epstein, Sean Nicholson. 2003. Mergers and Acquisitions in the Pharmaceutical and Biotech Industries. The Wharton School, University of Pennsylvania. Health Care Systems Department; National Bureau of Economic Research (NBER).

Davidson, Larry and Gennadiv Greblov. 2005. The Pharmaceutical industry in the Global Economy. Indiana University Kelley School of Business, Bloomington, Indiana.

Retrieved from: http://www.digibooks.cn/wwf/digibooks.cn/pharmaceutical-industry/PharmaceuticalIndustry/Medicine-Merchants/The-Pharmaceutical-industry-in-the-Global-Economy.html

Griliches, Z. 1979. Issues in assessing the contribution of research and development to productivity growth. Bell Journal of Economics, 10(1), 92-116.

Gujarati, Damodar. 2003. Basic Econometrics Fourth Edition. McGraw-Hill.

Hall, Bronwyn H. 1988. The Effect of Takeover Activity on Corporate Research and Development. In Auerbach, Alan J., ed., Corporate Takeovers: Causes and Consequences. Chicago: University of Chicago Press. NBER Working Series Paper No. 2191.

Hundley, Greg, Carol K. Jacobson, Seung Ho Park. 1996. Effects of Profitability and Liquidity on R&D Intensity: Japanese and U.S. Companies Compared. Academy of Management Journal, Volume: 39, Issue: 6, Pages: 1659-74.

Jensen, Michael C. 1987. The Free Cash Flow Theory of Takeovers: A Financial Perspective on Mergers and Acquisitions and the Economy. Harvard Business School; Social Science Electronic Publishing (SSEP), Inc.; National Bureau of Economic Research (NBER); European Corporate Governance Institute (ECGI). Accepted Paper Series published on SSEP, Inc.

Kalb, Clifford. 2006. Mergers: Miracles or Madness?. Wood Mackenzie. Retrieved from: http://units.sla.org/division/dpht/meetings/spring2006/2006-kalb.pdf

LaMattina, Jhon. L. 2011. The Impact of Mergers on Pharmaceutical R&D. Nature Review: Drug Discovery, Volume 10, 559-560.

Magoon, Krishan. 2011. M&A Review: Pharmaceutical & Biotechnology Industry, Mergers & Acquisitions Review 2005-2011 Pharma Biotech. Knol, A Unit of Knowledge. Retrieved from: http://knol.google.com/k/m-a-review-pharmaceutical-biotechnology-industry#

Martynova, Marina, Sjoerd Oosting, and Luc Renneboog. 2006. The long-term operating performance of European mergers and acquisitions. The University of Sheffield Management School. Tilburg University and ECGI. Working Paper Series published on SSEP, Inc. Retrieved from: http://maint.ssrn.com/?abstract_id=944407

Rogers, Mark. 2001. The Influence of Diversification and Market Structure on the R&D Intensity of Large Australian Firms. Harris Manchester College, Oxford University and Melbourne Institute of Applied Economic and Social Research, The University of Melbourne.

Scherer, F.M. 2001. The Link Between Gross Profitability and Pharmaceutical Spending. Health Affairs 20(5), 216-220.

Shantikumar, Swetha. 2009. The M&A Trend Continues: An Analysis of the Key Mergers and Acquisitions of 2009. Frost & Sullivan Market Insight. Retrieved from:http://www.frost.com/prod/servlet/market-insight-top.pag?docid=185479087

Shields, Marie. 2011. Money for Nothing. Next Generation Pharmaceutical. Retrieved from: http://www.ngpharma.com/article/Money-for-Nothing/

Simanjuntak, Destrina Grace and Raymond R. Tjandrawinata. 2011. Factors Influencing Sales Revenue in the Multinational Pharmaceutical Companies. Department of Business Development, Dexa Medica Group, Tangerang, Indonesia. Retrieved from: http://maint.ssrn.com/?abstract_id=1898071

Simanjuntak, Destrina Grace and Raymond R. Tjandrawinata. 2011. Impact of Profitability, R&D Intensity, and Cash Flow on R&D Expenditure in Pharmaceutical Companies. Department of Business Development, Dexa Medica Group, Tangerang, Indonesia. Retrieved from: http://maint.ssrn.com/?abstract_id=1824267

Simanjuntak, Destrina Grace and Raymond R. Tjandrawinata. 2011. M&A of Generic Pharmaceutical Companies Increases Productivity. Department of Business Development, Dexa Medica Group, Tangerang, Indonesia. Retrieved from: http://maint.ssrn.com/?abstract_id=1946761

Tjandrawinata, Raymond and Destrina Grace Simanjuntak. 2012. The Impact of Mergers and Acquisitions in Research-Based Pharmaceutical Companies on Productivity. Department of Business Development, Dexa Medica Group, Tangerang, Indonesia. Retrieved from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1981889

Vernon, John A., Joseph H. Golec, Randal Lutter, and Clark Nardinelli. 2006. FDA New Drug User Fees, and R&D Spending. AEI-Brooking Joint Center For Regulatory Studies Working Paper 06-21.