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CONTENT

MEASURING THE EFFECTS OF MARKETING EXPENSES AND EXTERNAL FACTORS ON HOUSING SALES TRANSACTIONS

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ABSTRACT

Purpose- In recent years, with the support of urban regeneration movements, the real estate sector has become one of the locomotive sectors in terms of economic and social development, particularly for the developing countries. When the real estate sector is examined, it is seen that the housing sector, which directly touches to the end user and is considered sometimes for use sometimes for the investment purposes, comes to the forefront. It is observed that the competition among the developer firms also increased in parallel with the investments made. In this study, the 2004-2017 period was examined, the statistical models were created to help the developers in developing the housing marketing strategies, the marketing strategies affecting the house sales trends and the external factors were highlighted. Our paper is the first academic study that identifies this relationship in Turkish housing market.

Methodology- Within the scope of this study; R programming language and Wilcoxon Rank was used to analyze the different housing marketing campaigns of one of the pioneer real estate firms in Turkey and their effect on the sales figures; the rank sum test was conducted; and, the VAR models were constructed and Impulse Response analysis, Pearson Correlation Coefficient were used for the relationship analyses.

Findings- According to the results of the study, it is seen that the social events, long-term holidays, rainfall and snowfall, campaigns of the competitors have no statistically significant effect on the net sales and gross income. However, it was determined that the Ramadan period and the digital marketing had a significant effect on the net sales and gross income. It is determined that the use of outdoor billboard, which is expected to affect the housing sales, was inversely proportional to the net sales and gross income, that is, it had a negative effect when applied.

Conclusion- It is thought that this study can be more improved as a result of including the followings into the model: more detailed classification of the social events, remodeling the Ramadan periods according to either they coincide with the summer month or the winter month, assessment of the effect of rainfall and snowfall considering the climate zone Turkey is in, more detailed analysis of the effect of the campaign of competitors, that the effect of digital marketing will be higher as the technology develops.

It is expected that the modeling of the findings reached in this study (or which will be detailed in later studies) by using an algorithm will provide a cost-benefit optimization.

Keywords: Housing sector, marketing costs, marketing, housing sales transaction, modelling.
JEL Codes: O18, M31, C52

1. INTRODUCTION

Breaking a record for the annual house sales with 936,215(TUIK, House Sales Statistics) house sales in 2017, the Turkish real estate sector has achieved a significant growth in the last 10 years despite the local and global fluctuations with the changing demographic structure of the country, the developing macroeconomic indicators, and the need for earthquake-oriented urban transformation. In Turkey, the population, of which was the third largest population of the Europe, grew 1.25% to reach 81 million in 2017(TUIK, Population Statistics), the population growth rate constitutes one of the most important dynamics of the

housing sector. With the effect of the household size falling to 3.5(TUIK, Household Statistics) in 2017, the number of the households increased by 5,5 million in the last 10 years. In other words, only these two factors caused the need for approximately 550,000 housing to arise per year. If the internal and external migrations received by the metropolises are considered together with the increasing urbanization rate, the calculated housing need will increase to over 550,000 per year.

Table 1: Population, Household Size, and the Number of Household by Years

Year	Population (Million)	Household Size	No. of Household (Million)
2017	81.0	3.5	23.4
2007	70.5	4.0	17.6
2004	68.0	4.0	17.0

Having an economic size of $392 billion in 2004 and reaching an economic size of $851 billion by increasing more than twofold in 2017, Turkey's economy was the 18th largest economy in the world and the 8th largest economy in Europe as of 2017(World Bank). According to the report of PwC titled "The World in 2050," it was estimated that Turkey would become the 14th largest economy in the world (PWC, 2015) At the same time, the national income per capita, which was $5,818 in 2004, has increased by nearly twofold in 2017 and reached to $ 10,540 (TUIK). Increased by the similar positive macroeconomic data, the level of welfare also caused an increase in demand in the housing sector between 2004 and 2017. After the Marmara earthquake in 1999, the better management of the disaster risk emerged as a necessity, consequently many construction specifications and building related codes were amended from 2001 onwards, and eventually in 2012 the urban transformation thrust came in force with "the Law on Transformation of the Disaster Risky Areas (Act. No. 6306)." In this context, 14 million houses were intended to be transformed in the next 20 years, and the construction cost of this transformation was estimated to be around $500 billion (TUIK). Given the dynamics in question, it is expected that in the long term the Turkish housing sector will continue to grow, and the housing demand will at least keep the current level because of the ongoing demand and need but with new housing companies entering the market the housing sales in the metropolises will be subject to a serious competition that increases every year. With this increased competition, the new technologies, and innovative marketing methods; on which fields the marketing budgets will be used has become a key issue in terms of both the project cost budgets and the sales and cash flow success. In the current situation, the housing developers are open to trying new methods, but they do not keep applications details and results of these practices in a data bank and do not carry out an optimization (or any other type of) modelling or analysis. The aim of this study was, in this competitive environment, to statistically measure the impact of the different marketing activities and external factors on the housing sales and to ensure that the marketing budget expenditures are optimized according to these factors. The housing developers and marketing consultants will be able to review the sample case and have an idea about how to approach the challenge and maybe also if the case matches their situation; on which marketing activity and in which proportion and how often they should allocate the budget.

2. LITERATURE REVIEW

Real estate development, including hosing development, is an idea that comes to completion and use the bricks and mortar put in place by the development team. This definition implies that the real estate development is not a single or a simple activity. It is a long-term continuing process including different types of activities such as marketing. "Marketing" is a social and managerial process by which individuals and groups obtain what they need and want through creating, offering, and exchanging products of value with others. The classic definition of marketing should be altered to the nature of real estate, it would be defined as marketing of real estate is a social and managerial process by which individuals and groups obtain what they need and want through offering and exchanging land; and creating, offering and exchanging buildings directly and indirectly to others. In literature, related to marketing, most studies analyze sales advertising in the housing market by selecting a correct method to target the consumer in a successful manner (Terri, 2003 and Miles et. al, 2001).

Especially literature review analyzing the relation between Turkish real estate market and marketing consists of important studies. For instance, Polat and Ferman (2015) presented the factors of marketing practice and applications of 'branded housing projects' around the Istanbul metropolitan area. They noted that customer satisfaction and corporate structure are perceived to be the most important factors resulting in marketing success when considering the importance of the factors. Competitive structure and market conditions are both determined as relatively less important factors leading to marketing performance. In addition, Cengel (2006) mentioned that for increasing sales construction firms should implement customer-oriented marketing strategies initially. In addition, image and prestige studies regarding the sector should be organized. In the long-run, as a tool to identify services from each other, the firms within the sector should move towards "branding". Komurlu et. al (2013) found that development and marketing strategies for residential construction depends on buyers' preferences. Their study focused on

developers' perceptions of buyers' preferences. Nine factors, including economic factors, developer brand, location, means of transportation, architectural functions, existence of social facilities, legal issues, quality of construction, and compliance with seismic codes, are investigated and ranked using the analytic hierarchy process (AHP). They indicated that developers perceive the price of the property, the quality of the developer, and the location of the property to be the three most important buyer preferences. On the other hand, Cizmeci and Ercan (2015) presented that for housing companies in Turkey, marketing tools that create "paid digital content" (corporate web site, search engine pages, e-mail communication, etc.) had a greater impact than those which created "proactive content" (social media, etc.). Researchers also found that there was consensus among the housing companies in the creation of brand awareness, digital marketing tools such as Facebook or Twitter which create the latter content will become more important in the future.

3. DATA AND METHODOLOGY

Within the scope of the study, the data belonging to the years between 2004 and 2017, which was recorded regularly by the sales directorate for the housing projects of a pioneer firm operating in the real estate and different sectors in Turkey, was used.

The following variables constitutes the inputs of the study:

Social events, The month of Ramadan, Long holidays, Exam periods, Present month, Square meter price, Average temperature, Precipitation situation, Campaigns of the competitors, Advertising in the main newspaper and its cost, Advertising on TV and its cost, Advertising on the thematic (news) TV channels and its cost, Digital advertising and its cost, Advertising on the billboard and its cost, and Total marketing cost.

The following variables was used as the output: Net housing sales and Gross income

Within this scope, first the preliminary analyses were made and then the modeling studies were conducted in line with the relationship analysis. All analyses were conducted in the R environment, an open source statistical programming language. Descriptive statistics and the Wilcoxon Rank Test were used for the preliminary analyses. The Wilcoxon Rank Test was developed by Frank Wilcoxon as a nonparametric test called rank-sum test. The test is assigned to all points evaluated as a group and then grades the ranks of each group. The null hypothesis is that two samples come from the same population, and so any difference in the two rank-sums arises from the sampling error only. The rank-sum test is generally defined as a non-parametric version of the t test for two independent groups (Kerby, 2014). For the relationship analyses, Vector Auto Regression (VAR) models were established and Impulse/Response analyses were made. Then, Pearson Correlation Coefficients were calculated to measure the power of the linear relationship between the variables. VAR models are easy to use for the analysis of multivariate time series. It is a dynamic multi-variable natural extension of the univariate autoregressive model. VAR models are often used to estimate the dynamic behavior of the econometric and financial time series (Pesaran, 1998). The impulse/response analysis is the measurement of the expected effect of the shocks in a variable at a given time on the other variables. The Pearson correlation coefficient, also called the Pearson r or Pearson product-moment correlation coefficient (PPMCC), is a measure of the linear dependence (correlation) between the X and Y variables. It has a value between +1 and -1, where 1 is total positive linear correlation, 0 is linear correlation, and -1 is total negative linear correlation (Stigler, 1989).

When the number of housing sales were modeled in the modeling studies, the count regression models were applied here. The classic Poisson and negative binomial regression models, which are used for the cases where the dependent variable is discrete, belong to the family of generalized linear models (Zeileis, 2008). The Poisson model assumes that the mean is equal to variance with an assumption that is often violated. The NB model has a greater built-in distribution parameter, variance of which can be calculated, than the mean value generated by the unobserved and/or temporal dependence (Chin, 2003).

4. FINDINGS AND DISCUSSIONS

When the average of net sales and gross income is examined according to whether there are social events, as it is understood from the Table 2, it can be stated that the social mobility does not create a negative effect on sales. The Wilcoxon Rank test was applied, and it was tested whether the difference between the two periods was statistically significant. According to the results in the Table 3, there is no statistically significant difference between the gross income and net sales between these two periods. These social events are not the events seriously affecting the clear majority of the population such as earthquakes, coups, and warfare but the temporary and local events such as election and terrorism. In the future studies, this analysis can be repeated by classifying the social events in detail.

Table 2: Effect of the Social Events on the Net Sales and Gross Income

Social Events	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,351,892	7.564103
Yes	2,822,962	8.153846

Table 3: Wilcoxon Rank Test for Measuring the Effect of the Social Events on the Net Sales and Gross Income

Social Events	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,351,892	7.564103
Yes	2,822,962	8.153846
Wilcoxon Rank Test		
W	285.5	323
P Value	0.4973	0.1463

When the effect of Ramadan on net sales and gross income average is examined, as it can be understood from the Table 4, it can be stated that the month of Ramadan period has a negative effect on the sales. The effect of the Ramadan period can vary depending on whether the month of Ramadan coincides with summer or winter. In the future studies, this analysis can be repeated by classifying this subject in detail. The effect of the Ramadan period should be considered along with the expectation of a long holiday and its preparation. Some housing firms tried to reduce the negative effect of this period by inviting to an iftar-meal (fast-breaking meal) or revising their working hours in the sales offices, but it did not provide any benefit.

Table 4: Effect of the Ramadan Period on the Net Sales and Gross Income

Month of Ramadan	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,581,558	8.104167
Yes	1,126,875	3

The Wilcoxon Rank test was applied, and it was tested whether the difference between the Ramadan period and the other periods was statistically significant. According to the results in the Table 5, it is possible to state that there is a statistically significant difference between the net sales in the Ramadan period and in the other periods. During the Ramadan period, the net sales decrease compared to the other periods. It cannot be indicated that there is a statistically significant difference between the Ramadan period and the other periods in terms of gross income.

Table 5: Wilcoxon Rank Test for measuring the Effect of the Ramadan Period on Net Sales and Gross Income

Month of Ramadan	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,581,558	8.104167
Yes	1,126,875	3
Wilcoxon Rank Test		
W	48	40
P Value	0.1045	0.05358

The effects of the long holiday periods on the net sales and gross income were examined and the results are shown in Table 6. Looking at the Table 6, it is seen that the long holiday periods do not have a significant effect on the gross income and net sales. However, it should be tested whether this difference is statistically significant. Therefore, the Wilcoxon Rank test was applied, and it was tested whether the change between the two periods was statistically significant.

Table 6: Effect of the Long Holidays on the Net Sales and Gross Income

Long Holidays	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,559,102	7.883721
Yes	2,042,319	6.888889

Looking at the Table 7, it can be stated that the long holiday periods do not influence the gross income and net sales. It is possible to state that there is no statistically significant difference between the net sales and gross sales during long holiday periods. With which season the long holidays coincide is an important factor. It is possible that the effect of the long holidays coinciding with to the summer season when the schools are on holiday may be different from the others.

Table 7: Wilcoxon Rank Test for measuring the Effect of the Long Holidays on the Net Sales and Gross Income

Long Holidays	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,559,102	7.883721
Yes	2,042,319	6.888889
Wilcoxon Rank Test		
W	177	182
P Value	0.7035	0.7801

When the effect of rainfall and snowfall on the net sales and gross income average is examined, according to the results in the Table 8, it can be stated that the rainfall and snowfall do not have a negative effect on the sales. The Wilcoxon Rank test was applied to test whether the difference in the gross income and net sales was statistically significant between the rainy or snowy days and the no rainfall days.

Table 8: Effect of the Rainfall and Snowfall on the Net Sales and Gross Income

Rainfall and Snowfall	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,139,722	6.64
Yes	2,775,156	8.703704

Looking at the Table 9, it is possible to state that there is no statistically significant difference between the snowy or rainy days and no rainfall days in terms of the net sales and gross income. These results should be interpreted by taking the climate zone Turkey is in and the examined years into consideration, it should be known that the pluvial periods last a short time and the precipitation intensity is not high.

Table 9: Wilcoxon Rank Test for Measuring the Effect of the Rainfall and Snowfall on the Net Sales and Gross Income

Rainfall and Snowfall	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,139,722	6.64
Yes	2,775,156	8.703704
Wilcoxon Rank Test		
W	418	411.5
P Value	0.1439	0.1737

The effect of the campaigns of competitors on the net sales and gross income averages was examined and the results in the Table 10 were obtained. It can be stated that the campaigns of competitors do not have a statistically significant negative effect on the net sales and gross income of the firm concerned.

Table 10: Effect of the Campaigns of Competitors on the Net Sales and Gross Income

Campaigns of Competitors	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2,494,937	8.1
Yes	2,463,640	7.619048

The Wilcoxon Rank test was applied and it was showed whether the difference in the gross income and net sales is statistically significant between the days when the competitors run a campaign and do not run a campaign. According to the Table 11, it is possible to state that the campaigns of competitors has no effect on the net sales and gross income of the firms concerned. This situation should be analyzed in the light of the fact that the advertisement of a firm has a boosting effect on the visits to the firms in the same region and that the firms can very quickly copy each other's campaigns with the intelligence.

Table 11: Wilcoxon Rank Test for Measuring the Effect of the Campaigns of Competitors on the Net Sales and Gross Income

Campaigns of Competitors	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	2494937	8,1
Yes	2463640	7,619048
Wilcoxon Rank Test		
W	219	220,5
P Value	0,846	0,8067

In the days when the digital marketing expenditures were made, it was examined whether the net sales and gross incomes have changed and the results in the Table 12 were obtained. As can be seen in the Table 12, the sales and gross income increased considerably during the days when the digital marketing expenditures were made. Especially in the light of recently developed artificial intelligence applications, that the smart phones can identify the consumer's preferences and profiles and offer appropriate products are highly effective. It should not be forgotten that the digital advertisements are dynamic in this framework, rather than static, and use the smart algorithm engines. Therefore, it is expected that the search engines havingthe developed software technology and the more efficient algorithms will be more effective and more preferred in the future.

Table 12: Effect of the Digital Marketing Expenditures on the Net Sales and Gross Income

Digital Marketing	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	1,920,402	6.3125
Yes	3,348,470	9.95

The Wilcoxon Rank test was applied, and it was tested whether the difference between the days when the digital marketing expenditures were made and not made was statistically significant. As seen in the Table 13, it is possible to state that there is a statistically significant difference in the digital marketing expenditures in terms of the net sales and gross income. Digital marketing campaigns create a boost effect on the net sales and gross income.

Table 13: Wilcoxon Rank Test for Measuring the Effect of the Digital Marketing Expenditures on the Net Sales and Gross Income

Digital Marketing	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	1,920,402	6.3125
Yes	3,348,470	9.95
Wilcoxon Rank Test		
W	485	473.5
P Value	0,001546	0.003756

It was desired to measure the difference between the net sales and gross income on the days when the billboard advertisements were made and the net sales and gross income on the other days, and the results in the Table 14 were obtained. As seen in the Table 14, the billboard advertisements did not have a boost effect on the net sales and gross income in the days when the billboards were posted. The Wilcoxon Rank test was applied to test whether this effect was statistically significant.

Table 14: Effect of the Billboard Expenditures on the Net Sales and Gross Income

Billboard Expenditures	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	3,806,111	11.28
Yes	1,232,204	4.407407

It is possible to state that the billboard expenditures make a statistically significant difference in terms of the net sales and gross income. Billboard advertisements alone were not able to increase the sales. It is possible to state that once the billboard advertisements are terminated and the other mediums are introduced the sales rise upwards. The explanation of this situation may be that the outdoor billboards are usually in such places where the traffic is heavy, they are overlooked when the traffic runs fast, and they are not within the consumer's psychological area of interest during the traffic congestion. Digital marketing, on the other hand, coincides with the time the consumer chooses and is most comfortable in terms of psychology and attention.

Table 15: Wilcoxon Rank Test for Measuring the Effect of the Billboard Expenditures on the Net Sales and Gross Income

Billboard Expenditures	Gross Income (Mean Value-TL)	Net Sales (Mean Value)
No	3,806,111	11.28
Yes	1,232,204	4.407407
Wilcoxon Rank Test		
W	29	63
P Value	0.000005	0.000005

As it is understood in the analysis above, the digital marketing campaigns have a significant effect on the sales and gross income. The fact that the digital marketing campaigns also support other marketing campaigns is inevitable. Therefore, the correlations between the total marketing expenditures and the net sales and gross income were examined. First, the relationship between two variables was visualized with scatter plots.

Figure 1: Relationship between the Total Marketing Expenditures and the Net Sales and Gross Income
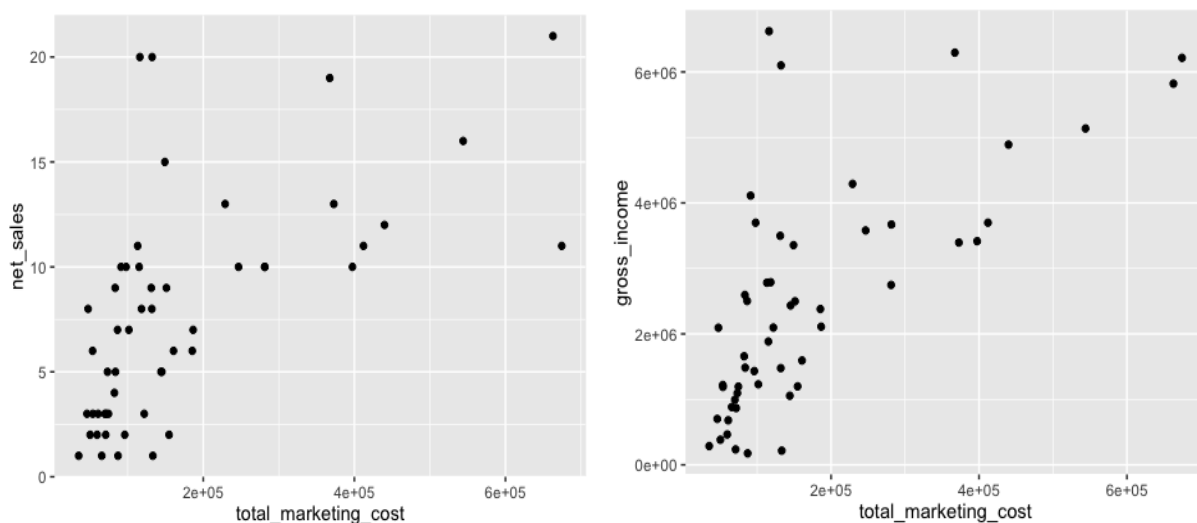
As seen in the Figure 1, it is possible to state that there was a very high and positive correlation between the two variables.

Table 16: Correlation Matrix for the Total Marketing Expenditures and the Net Sales and Gross Income

	Total Marketing Cost	Main Newspaper Brand Cost	Other Newspaper Brand Cost	Newspaper Brand Cost Total
Gross Income (Mean Value-TL)	0.7***	0.29**	0.45***	0.34**
Net Sales (Mean Value)	0.61***	0.28**	0.43***	0.35**
**0.05 significance level		***0.01 significance level		

According to the Table 16, it can be mentioned that there was a statistically significant correlation of 0.7 between the total marketing expenditures and the gross income and there was a strong positive correlation between the two variables. According to the Table 16, it can be mentioned that there was a statistically significant correlation of approximately 0.61 between the total marketing expenditures and the net sales and there was a strong positive correlation between the two variables. According to the correlation analysis, it can be mentioned that there was a statistically significant correlation of approximately 0.28 between the advertising expenses spent on the main newspaper and the net sales and there was a poor positive correlation between the two variables. Similarly, it can be mentioned that there was a statistically significant correlation of approximately 0.29 between the advertising expenses spent on the main newspaper and the gross income and there was a poor positive correlation between the two variables. It can be mentioned that there was a statistically significant correlation of approximately 0.43 between the advertising expenses spent on the other newspapers and the net sales and there was a medium positive correlation between the two variables. Similarly, it can be mentioned that there was a statistically significant correlation of approximately 0.45 between the advertising expenses spent on the other newspapers and the gross income and there was a medium positive correlation between the two variables. It can be mentioned that there was a statistically significant correlation of approximately 0.35 between the advertising expenses spent on all newspapers and the net sales and there was a medium positive correlation between the two variables. Similarly, it can be mentioned that there was a statistically significant correlation of approximately 0.34 between the advertising expenses spent on all newspapers and the gross income and there was a medium positive correlation between the two variables.

Impulse/response analyses were conducted to better examine the relationships between the dependent and independent variables. First, VAR models were created to conduct Impulse/ Response analyses. The selection of lag is important to create a VAR model. The following variables were included in the VAR model: "Square meter price, Average temperature, Cost of advertising in the main newspaper, Cost of advertising in the other newspapers, Advertising on TV and its cost, Cost of advertising on the thematic (news) TV channels, Digital advertising cost, Cost of advertising on the billboard, Total marketing cost, Net housing sales and Gross sales turnover."

The effect of digital marketing expenditures on the gross income is shown in the Figure 2. Digital marketing expenditures had a serious effect on the gross income until the 2nd week and then lost its effect. At this point, if the digital marketing expenditures are to be made, it will be advantageous to periodically change the digital marketing campaigns in maximum two weeks. The probable reason for this is that the digital marketing is very dynamic and that the consumer can only pay attention to the most current and new/different situations while spending time in the digital environment.

Figure 2: Response of the Gross Income to the Digital Marketing Expenditures
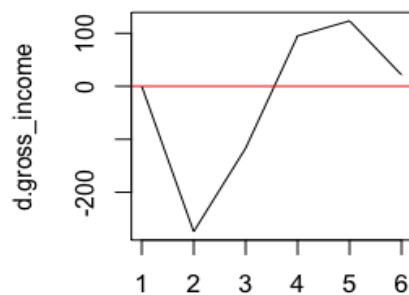
The effect of TV marketing expenditures on the gross income is shown in Figure 3.TV marketing expenditures had a serious effect on the gross income until the 2nd week and then lost its effect. At this point, it may be advisable that TV marketing expenditures are made in parallel times with the digital marketing, or that there is not too much time lag between them, and that the campaigns with parallel content are arranged in both mediums.

Figure 3: Response of the Gross Income to the TV and Marketing Expenditures
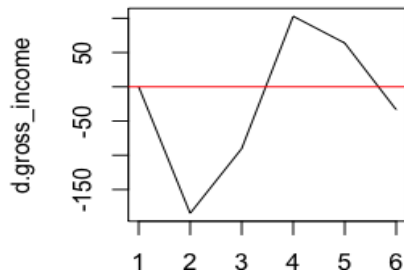
The effect of all marketing expenditures on the gross income is shown in the Figure 4. All marketing expenditures had a serious effect on the gross income until the 2nd week and then lost its effect. At this point, it is very important to optimize the time intervals when making the marketing expenditures.

Figure 4: Response of the Gross Income to the Total Marketing Expenditures
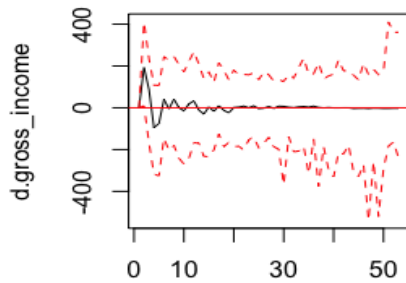
95 % Bootstrap CI, 100 runs

The effect of all marketing expenditures on the net sales is shown in the Figure 4. All marketing expenditures had a serious effect on the net sales until the 2nd week and then lost its effect. At this point, it is very important to optimize the time intervals when making the marketing expenditures.
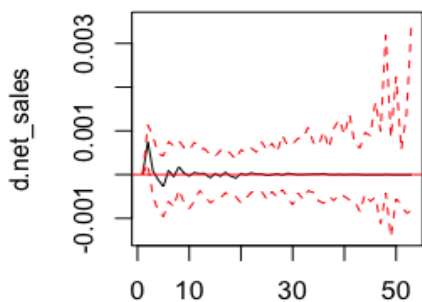
Figure 5: Response of the Net Sales to the Total Marketing Expenditures

95 % Bootstrap CI, 100 runs

After analyzing the relationship between the marketing expenditures and the sales, it was desired to model to what extent these expenditures affected the net sales. Because the net sales were a discrete variable, the generalized linear models were used and when the modeling is carried out, the distribution must come from the discrete distribution families. For this reason, it was tested whether the net sales comply with the two largest candidate Poisson and negative binomial distributions.

Figure 6: Q-Q Pot for the Net Sales
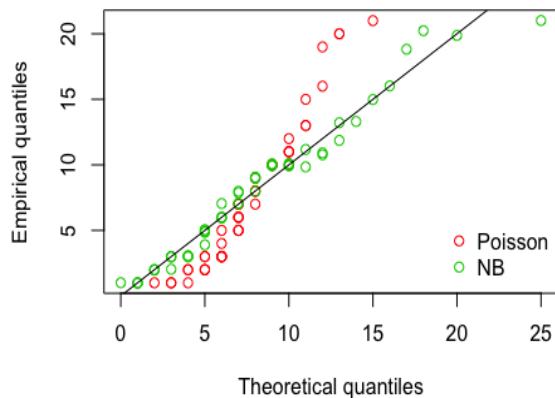
As seen in the Figure 6, the net sales seem to fit to the negative binomial distribution. Now, the generalized linear model can be constructed using the negative binomial distribution family. The model results are given below. The marketing expenditures on the main newspaper create more effect on the net sales than the other newspapers. The digital marketing expenditures are the most effective. They are followed by Hürriyet newspaper, other newspapers, and TV expenditures, respectively.

Table 17: Results of the Negative Binomial Regression Model Constructed for the Factors Affecting the Net Sales

	Digital Marketing Cost	TV Cost	Other Newspaper Brand Cost	Main Newspaper Brand Cost Total
Coeff.	0.0000425	0.0000322	0.0000124	0.00001891
Srd. Error	0.00000218	0.00000127	0.00000412	0.000003172
T	1.951	2.534	2.73	5.961
P Value	0.05686	0.01461	0.00882	0.0000

5. CONCLUSION

Due to its demographic structure, its need for urban transformation, and being a growing economy in the category of developing countries; Turkey is a market that has a continuous new housing demand/need. Although the basic dynamics are in favor of the producers in such markets, there are also times when the economy slows down and the competition rises. Especially in such times, in general at all times, the correctly selecting the marketing methods and the channels used by the housing firms (being optimal in terms of cost benefit) can highly affect the sales success of the firms. Therefore, the marketing strategies that the housing developers will implement at the right time and on the right channel will be able to positively distinguish their projects from the competitors. Within the scope of this study; R programming language and Wilcoxon Rank was used to analyze the different housing marketing campaigns of one of the pioneer real estate firms in Turkey and their effect on the sales figures; the rank sum test was conducted; and, the VAR models were constructed and Impulse Response analysis, Pearson Correlation Coefficient were used for the relationship analyses. According to the results of the study, it is seen that the social events, long-term holidays, rainfall and snowfall, campaigns of the competitors have no statistically significant effect on the net sales and gross income. However, it was determined that the Ramadan period and the digital marketing had a significant effect on the net sales and gross income. It is determined that the use of outdoor billboard, which is expected to affect the housing sales, was inversely proportional to the net sales and gross income, that is, it had a negative effect when applied. According to the correlation analysis, it was observed that there was a strong positive correlation between the total marketing expenditures and the gross income and net sales, that there was a poor positive correlation between the advertising expenses spent on the main newspaper and the net sales and gross income, that there was a medium positive correlation between the advertising expenses spent on the other newspapers and the net sales and gross income, that there was a medium positive correlation between the advertising expenses spent on all newspapers and the net sales and gross income. It was concluded that it would be advantageous that the digital marketing campaigns are launched in maximum two-week periods that the

advertisements appearing on TV are launched at the same or near time with the digital marketing campaigns, that the time intervals of all marketing expenditures are optimized.

In the last phase of the study, the binomial distributions were used, and it was determined that the most effective marketing channel was the digital marketing. This is followed by the main newspaper, other newspapers, and TV expenditures, respectively. It is thought that this study can be more improved as a result of including the followings into the model: more detailed classification of the social events, remodeling the Ramadan periods according to either they coincide with the summer month or the winter month, assessment of the effect of rainfall and snowfall considering the climate zone Turkey is in, more detailed analysis of the effect of the campaign of competitors, that the effect of digital marketing will be higher as the technology develops. It is expected that the modeling of the findings reached in this study (or which will be detailed in later studies) by using an algorithm will provide a cost-benefit optimization.

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THE IMPLEMENTATION OF CORPORATE SOCIAL RESPONSIBILITY IN INDONESIANN BANKING INDUSTRY

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ABSTRACT

Purpose- The purpose of this study is to evaluate the implementation of Corporate Social Responsibility (CSR) programs in Indonesiann banking industry especially banks categorized under *BUKU 3* which means the banks having the capital range of 5-30 trillions.
Methodology- The analysis refers to the classification of CSR programs based on the category falling into environment, health, education, disaster, donation, employee, and product; and on CSR benefit or impact covering philanthrophy, promotion, business impact, and mindset-change. Using content analysis and census sampling technique, data were explored 2015-2018 annual reports of 15 member banks
Findings- The result showed that based on the Category classification, the banks' CSR programs mostly were delivered to education, environment, and employees dominated taking 26%, 22%, 20% successively. The implication is that while those three categories are well supported, banks quite equally care of internal wealth. Anyhow, based on Benefit, the result showed that mindset change effect took only 7% leading to the implication that the level of CSR in banking industry is still low and this also refers that the community condition and country development are still relatively low.
Conclusion- The banks having good rank in the kind of CSR sectors are relatively also have good rank in CSR impacts which show good level in the CSR impact of promotion and business impact. By CSR sectors, the high coverage successively are education sector, environment, employees and donations. The impact of CSR dedicated for internal and external party are in balance. Specifically, by CSR impact, CSR is aware of promoting and caring for business impacts for the bank business sustainability. Anyhow, Indonesian banking industry show very weak role in helping change people mind set for better human quality

Keywords: Corporate social responsibility, CSR Category, CSR Benefit, stakeolders, company image
JEL Codes: C52, M14, O18

1. INTRODUCTION

All companies including banks must be aware of implementing Corporate Social Responsibility (CSR) (Krasodomska, 2015). In Indonesian, implementing CSR has been an obligation for those of public limited companies as set by the regulations of CSR namely Act No. 40/2007 on Limited Liability Companies, Act No. 25/2007 on Investment, Act No. 47/2012 on Social Responsibility and Environment of Limited Company, Act No. 32/2009 on the Protection and Environmental Management, Act No. 22/2001 on Oil and Gas, Minister Regulation No. PER-05 / MBU / 2007 on Partnership Program of State-owned Enterprises with Small and Community Development Program. CSR bank is an important aspect that should be designed appropriately based on the benefit for the stakeholders (benefits of CSR for customer). Therefore banks need to explore positive aspects that reflect the responsibilities of banks both internal and externally (Kansal, Joshi, & Batra, 2014; Khan, 2010; Virvilaite & Daubaraite, 2011; Yeo & Youssef, 2010). The Positive aspects strategically developed should be communicated to the public in an effort to enhance the positive image of public to the bank (Virvilaite & Daubaraite, 2011). CSR benefits for bank stakeholders

should receive attention because it will contribute to the bank's business continuity (Garriga & Mele, 2004; Pérez & Del Bosque, 2015). Therefore, making CSR as the obligation referred to regulation, needs to be designed in order to effectively and efficiently beneficial for the public and the banks.

The effects of CSR still varies from the simple one in which CSR is viewed as corporate phillantrophy, then viewed as an attempt to support societal marketing, and the utmost level of effect is viewed as a means of changing way of thinking (Solihin, 2009). There are three main reasons of why companies implement corporate social responsibility (CSR), which are to show concern for the people and environment of the company; as an activity of interaction with stakeholders; as well as a manifestation of the desire of companies to enable the continuity of businesses (Pérez & Lopez-Gutierrez, 2017). This notion refers to the assumption that the corporation is an instrument for wealth creation looking at the economic aspect of the interactions between business and society. So any supposed social activity is accepted if, and only if, it is consistent with wealth creation (Garriga & Mele, 2004). These considerations must flow down to changes in public behavior positively to the bank, especially customers and potential customers. Customers' behavior, as the result of CSR, show trust to the bank. This is very important since the bank's business is essentially based on customers trust (Krasodomska, 2015). Considering all of these reasons, it is important to know what CSR program the banks have been implementing, so the mapping of programs viewed from the perspectives of Category and Benefit may show what have been happening and what can be designed in the future.

2. LITERATURE REVIEW

2.1. Corporate Social Responsibility and Company's Image

CSR is a construct that develops the relationship between the company and its environment (Krasodomska, 2015). More specifically, CSR is defined as all activities of the company which shows programs that involve the community, the environment and the interaction between companies with all stakeholders (Jain, R., & Winner, 2016; Kansal et al., 2014). This notion refers to the assumption that the corporation is an instrument for wealth creation looking at the economic aspect of the interactions between business and society. So any supposed social activity is accepted if, and only if, it is consistent with wealth creation. This group of theories could be call instrumental theories because they understand CSR as a mere means to the end of profit

To counter the challenges of its business, the company must conduct a review of the activities that need to be done by involving the community and its stakeholders. Since stakeholders are not only those of external parties but also the internal one, CSR is effective in improving employee well-being and improving employee retention rate. Referring to its stakeholders, CSR has dimensions namely customer, employee, shareholder, government and the general public who each has the demands on the company's CSR. Thus, companies should be able to map where the stakeholders are in the priority implementation of Companies CSR that it can give positive impacts for both companies and for stakeholders (Pérez & Del Bosque, 2015).

Considering CSR into the strategic planning of a company will improve its performance, then it will enhance corporate image and reputation (Pérez & Del Bosque, 2015; Virvilaite & Daubaraite, 2011). Bank reputation must be maintained by setting up neccesary CSR programs involving activities leading to social welfare (Chaudhri, 2016). The activities are published through CSR report that is attempted to communicate the company's care to society . Some research studies explained that banks with high public profiles are more eager and better to present a positive social image through community (Khan, 2010). The disclosure of sustainability information serves to facilitate the projection of a socially accountable image (Michelon, 2011). Larger companies make more dan detail disclosures because they tend to attract more appreciation and attention from the authority and the general public (Kansal et al., 2014)

2.2. CSR in Banking Industry

Banks perform several responsible functions related their activities and their customers' groups and activities (Jain, R., & Winner, 2016). Those activities must support both the customers and the bank performance.Therefore, to conform this, banks must integrate their social activities as part of their strategic planning and activities (Krasodomska, 2015). Theories about CSR in banking industry are often preceded by an understanding of the banking industry's stakeholders that involve either directly or not directly with the bank business; or parties affected or affecting business purposes of the bank (Khan, 2010). Stakeholders of banking industry are customers, employees, suppliers, community, government and stockholders (Jain, R., & Winner, 2016). CSR is also defined as the company's efforts to meet its obligations to its stakeholders. Stakeholders of banking industry include internal and external, voluntary and involuntary, or primary and secondary. The dimensions of CSR are divided into the following): a) Customer-oriented CSR which refers to complete and honest information about bank products and services, as well as the management of complaints; b). Shareholders and the board of supervisors-oriented CSR which refers to transparency and access to information on company profit; c).Employee-oriented CSR which refers to job creation, job opportunities; d) Society /

community –oriented CSR which refers to donations, community development and environmental protection; Legal and ethics-oriented CSR which refer to legal and ethical issues (Pérez & del Bosque, 2013).

2.3. Sectors and Benefits of CSR

Sectors of CSR compiled altogether by the researches of R.E Hinson (2011); Jain, Keneley, & Thomson (2015); Kansal, Joshi, & Batra (2014), Khan (201), Oobik, (2013) are formulated into several sectors that measure in assessing CSR in which that CSR has contributions. The sectors are of health, education sector, support the impact of natural disasters, other donations, activities for employees, social problems, products, services, and reports.

Researches of CSR have been well developed (Krasodomska, 2015). Several studies on CSR banking conducted in Polish, India, Bangladesh, China, Japan, America and Australia were about have been measured ethical standards, CSR Reporting, environment, products, community, employees, and supply chain (Jain et al., 2015). Another thing that a lot of CSR banks examined are related to the categories of the banks (Khan, 2010; Krasodomska, 2015; Laidroo & Ööbik, 2014; Oobik, 2013,). Several studies were conducted to establish banking CSR instrument (Kansal et al., 2014). While CSR research associated with certain characteristics of financial and non-financial as well as the acquisition of award have been studied by Hinson (2011); Kansal et al.(2014). Quite many CSR banking researches are related to the perception of consumers (Adegbola, 2015; Crosby, Evans, & Cowles, 1990). CSR activities are not only activities that give donations, but it must also have an impact on positive things for the vendor in the short and medium term. That's why CSR design must be tailored to the company's strategic plan (Krasodomska, 2015). CSR program should not just be giving (philanthropy) but it must deliver impacts for the sustainability of the banks' business. The growth of the banking industry in Indonesian is considered good and if the banking CSR activities are aimed properly it will be a force to raise public awareness, to change the mindset of the people to perform better behavior, as well as to give impact for the sustainability of the banking business.

Meanwhile, based on the benefits of CSR, CSR activities in addition to types that are very diverse, the benefits also vary widely. However (Solihin, 2009) formulated that CSR has benefits that are beneficial for the company's internal and external environments as follows: 1) Philanthropy, 2) Promotion, 3) Business impact, 4) Mindset change. Philanthropy refer to any donation companies give away without considering of getting direct impact, such as helping the victims of natural disasters. Promotion refers to CSR activities that generally and widely help the strengthening and building image of the company. The impact for the business is not directly. Business Impact refers to the CSR impact that directly link to leverage the business performance of the company. Mindset change refers to the societal move of thought in line with their thinking change to improve life quality, such as giving up smoking, giving up drug, taking care better on rubbish and carbon usage, awareness of young generation on making investment rather than spending consumptively.

3. DATA AND METHODOLOGY

This research is a descriptive study that comprehensively characterize CSR activities of banks in Indonesian by analyzing the banks' annual reports focusing on their CSR reports. Descriptive research is research that describes a phenomenon with a specific purpose (Malhotra: 2010). The banks studied were conventional commercial banks especially banks categorized under *BUKU 3* which means that the banks have capital range of 5-30 trillion. Sourced from Financial Services Authority, the number of the banks under this group is fifteen banks namely OCBC-NISP, Mizuho, BJB, Danamon,PTPN, Bukoppin, Panin, CIMB Niaga, BTN, Sumitomo Mitsui, Mega, Permata, Maybank, DBS, UOB. Based on these banks' official website, data were got, which were from each annual report in which CSR report is available. These 15 banks are under the category of Commercial Bank Business (BUKU 3) which further goes to their annual report of 30 September, 2015-108 issued by the Financial Service Authority (*Otoritas Jasa Keuangan/ OJK*). OJK is the government authority controlling and managing Indonesiann financial service organization including banks. The collection of secondary data was performed by content analysis method for observing the contents of the banks' Annual Report of 2015-2018. Further analysis techniques performed by descriptive statistics by doing the categorization of the entire CSR activities of banks based on its sectors formulated by Khan (2010), namely: 1) Environment, 2) Health sector, 2) Education sector, 3) Natural disasters, 4) Other donations, 5) Activities for employees, 6) bank products.

The second categorization is based on the CSR impacts that CSR has benefits that are beneficial for the company's internal and for external environments as follows: 1) Philanthropy, 2) Promotion, 3) Business impact, 4) Mindset change. The counting of CSR activities of each bank was done by counting the kind or type of activities. The example of counting is as follows, if a bank gives a scholarship to twenty students of Senior high School, 5 students of university, the reported or the counted number of CSR activity in education sector is two, not twenty five. Broadly speaking, the analysis stage is as follows:
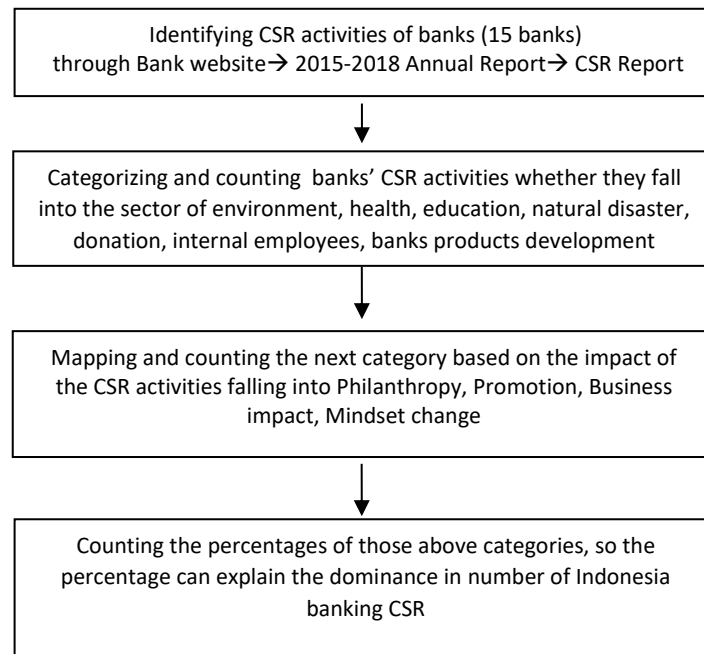
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┌─────────────────────────────────────────────────────┐
│            Identifying CSR activities of banks (15 banks)        │
│     through Bank website→ 2015-2018 Annual Report→ CSR Report   │
└─────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────┐
│   Categorizing and counting  banks' CSR activities whether they fall │
│   into the sector of environment, health, education, natural disaster, │
│      donation, internal employees, banks products development   │
└─────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────┐
│   Mapping and counting the next category based on the impact of │
│   the CSR activities falling into Philanthropy, Promotion, Business │
│                     impact, Mindset change                 │
└─────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────┐
│    Counting the percentages of those above categories, so the  │
│   percentage can explain the dominance in number of Indonesia │
│                       banking CSR                        │
└─────────────────────────────────────────────────────┘
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Figure 1
Stages of Content Analysis

4. FINDINGS AND DISCUSSIONS

Analysis on the CSR activities of banks that have been mapped by its category or sectors and its benefits reflects two areas which is the coverage of banks' strategy to sustain their business using CSR, and reflects the wider area which is condition of a country where the banks operate. The first area is evaluated so since the sectors that have been approached by the banks CSR tell how the banks have been considering and exposing themselves in the fields that strategically show their intention. The second area reflects the condition of a country since the benefit or impact of CSR might tell the level of community quality since the usefulness of the lowest CSR is philanthropy and the highest is the changing the mindset / mindset of the people. Thus, the analysis of the substance of the CSR depicts those two big areas. Along with these stages also emphasized that CSR should also support the sustainability of the company's business, because the company's business sustainability also means CSR sustainability. The results of the analysis of CSR programs of Indonesiann banks involving 15 banks under the category of Commercial Bank Business Group (BUKU 3: *Bank Umum Kelompok Usaha 3*) which further goes to their annual report of 30 September, 2015-2018 issued by the Financial Service Authority which is the government authority controlling and manage Indonesian financial service organization including banks.

The result of the analysis is based on two categories which are the sectors of CSR group and the impact or benefit of CSR. CSR activities are categorized based on its sectors/ category as follows: 1) Environment, 2) Health, 3) Education, 4) Disaster Assistance, 5) Donation, 6) Internal Interests (Bank Employees), 7) Banking Products. While the second categorization of banks CSR is based on the impacts or benefit of the bank's CSR programs as follows:1) Philanthropy (donation), 2) Promotion, 3) Business Impact (impact on the banking business), which is more specific than Promotion, 4) Mindset change (change of community mindset). The results of the identification is presented in Appendix 1.

Based on the above identification of CSR activities by its sectors, education takes the highest portion namely 26%, followed by environment 22%, employees 20%, donation 12% and health 11%. The least portion goes to disaster fictims assistance, bank product development and other which are the same percentage of 3%. The sectors that have been approached by the banks CSR explain how the banks have been considering and exposing themselves in the fields that strategically show their intention. For example, OCBC bank concerns a lot on helping to conserve environment (14 kinds of CSR programs on environment) and to supporting their employees development (23 kinds of CSR programs on environment). The data also helps to evaluate which banks having more CSR activities. Based on the data it is known that the banks having more varied CSR programs are OCBC-NISP,

Maybank, Bukopin, and BTN. Anyhow this ranking does not refer to the number of spending financially, since the lack of the analysis is that only a few number of the bank annual report that report id detail the money spent for each sector of CSR.

Looking into the impacts of CSR, the result shows that similar rank to the sector referring relatively the same banks which are OCBC-NISP, Bukopin, Maybank by giving different two banks in the rank namely BTN (better rank in term of CSR sector, and CIMB Niaga (better in term of CSR impacts).These four banks showing good rank in impact showed that they had good level for their CSR holding promotion impact and business impact. So, in the future, these banks may be predicted to have better image and stronger business sustainability. Anyhow if the identification of the CSR program are summed into a percentage, the result can be seen in graph 1 and graph 2.

Graph 1
CSR Implementation by Sectors
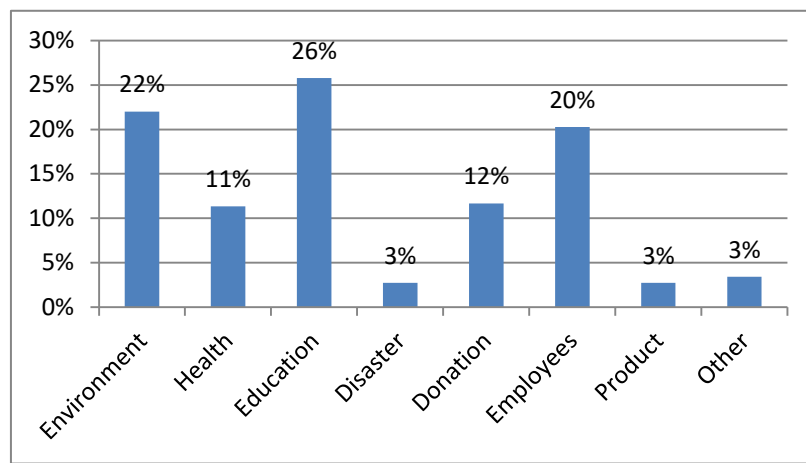
Source: Banks' Annual Report of 2015-2018 (Analyzed)

From the CSR program category it appears that education sector dominates the CSR coverage (26%), environment (22%), employees (20%) and donations (12%). CSR is not only activities caring people outside companies but also for internal employees to help develop them that in turn also benefit for the company and business sustainability.

Graph 2

CSR Implementation by Impacts
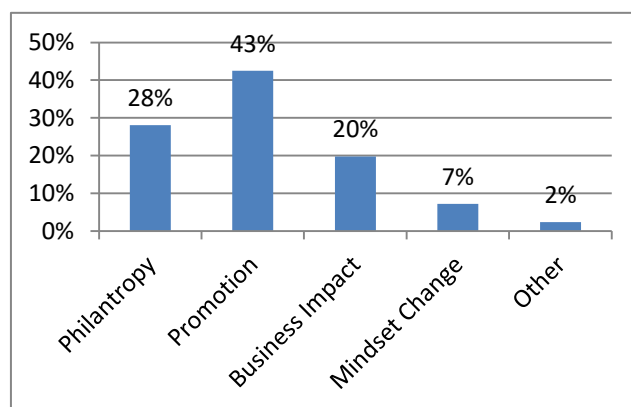
Source: Banks' Annual Report of 2015-2018 (Analyzed)

With the dominance designation of 20% of employees can be assessed that the bank has been good in allocating funds to develop their employees. This also shows that nationally, banking industry shows a balanced CSR programs that is not only for external but also for internal parties. Employees have the strength to support the sustainability of the bank's business. In the perspective of strategic management, the long-term strategic plan the company must consider aspects relating to employees in the form of employee development in the form of trainings and employee relations in the form of working conditions and employee welfare. In this case CSR study includes CSR activities, which it must take precede before the implementation of CSR to external parties.

In terms of the usefulness or impacts of CSR (CSR Benefits), it appears that CSR programs are charged Promotion Bank amounting to 43%, while charity (28%), which leads to a specific bank business impact 20%. However, the impact on the mindset change is still very small at only 7%. It can be interpreted that the banks in the developing country like Indonesian, the tendency of CSR implementation take this pattern because the banks will tend to help poor community groups, while from the perspective of CSR study, CSR impacting highest value is when it benefits to the change of mindset of the communities where it contributes to the quality and competitiveness of human beings. While the impact of promotion and business impact is the sustainability of the banking industry in the future.

4. CONCLUSION

The aims of this study are to evaluate and analyze the implementation of Corporate Social Responsibility (CSR) programs in Indonesiann banking industry. CSR benefits having been implemented for bank stakeholders should contribute to the bank's business continuity. The research result is presented by CSR sector and by CSR impacts. Thus, the research having been descriptively analyzied can be concluded based on these two categories. By CSR sectors, the basis sectors determined in banking industry are: 1) Environment, 2) Health, 3) Education, 4) Disaster Assistance, 5) Donation, 6) Internal Interests (Bank Employees), 7) Banking Products. The result showed that the high coverage sectors are successively education sector, environment, employees and donations. Indonesian banking industry has shown balanced sector of CSR implementation which was implemented for external parties and internal ones (employees). The banks having good rank in term of the kind/ variety of CSR sectors are relatively also have good rank in term of CSR impacts.

By impacts theoretically falling into four levels namely 1) Philanthropy (donation), 2) Promotion, 3) Business Impact (which is more specific than Promotion), 4) Mindset change. Banks having good rank in CSR impacts showed good level in CSR impact of promotion and business impact. By CSR impacts, Indonesian banking industry has shown good level to be aware of promoting and caring for business impacts for the bank business sustainability. Indonesian banking industry show very weak role in helping people change their mind set for gaining better human behavior.

Banks having good CSR impact level, which are mostly mix-bank (owned by domestic and foreign owners) have good point in CSR promotion impact and business impact. Good point in these two impacts means that it can be predicted that these banks have potential power for their sustainability. This is because they have started to have good efforts which are promotion and activities triggering people to be always aware of the banks' existence.

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Appendix 1
The Result of CSR Identification by Sectors and Impact

No	Banks	CSR Program Identification by Sectors										CSR Program Identification by Impacts					
		Environ ment	Health	Edu cation	Disaster	Donation	Employees	Product	Other	Total		Philantropy	Promotion	Business Impact	Mindset Change	Other	Total
1	OCBC	14	3	9	0	4	23	5	1	59		15	15	26	12	8	76
2	MIZUHO	4	1	0	0	0	0	0	0	5		3	4	0	1	0	8
3	BJB BANK	1	6	0	2	3	0	0	0	12		10	10	0	0	0	20
4	DANAMON	11	1	0	1	1	0	0	1	15		3	4	0	0	0	7
5	BTPN	0	1	5	0	0	0	0	0	6		0	6	0	0	0	6
6	BUKOPIN	7	3	6	2	6	14	3	0	41		14	14	24	2	0	54
7	PANIN	3	1	1	0	0	0	0	0	5		3	3	0	0	0	6
8	CIMB NIAGA	3	2	11	0	0	3	0	0	19		10	17	2	0	1	30
9	BTN	9	8	4	1	1	5	0	2	30		3	7	0	0	0	10
10	SUMITOMO MITSUI	0	0	3	0	0	0	0	0	3		2	3	0	0	0	5
11	MEGA	0	2	4	1	4	0	0	0	11		6	11	1	3	0	21
12	PERMATA	0	0	11	0	0	0	0	0	11		11	11	0	0	0	22
13	MAYBANK	10	3	6	1	12	14	0	6	52		21	33	20	5	0	79
14	DBS	1	0	13	0	0	0	0	0	14		1	14	1	2	0	18
15	UOB	1	2	2	0	3	0	0	0	8		3	7	0	2	0	12
	TOTAL	64	33	75	8	34	59	8	10	291		105	159	74	27	9	374
		22%	11%	26%	3%	12%	20%	3%	3%	100%		28%	43%	20%	7%	2%	100%

Source: Banks' Annual Report of 30 September, 2015-2018 (Analyzed)

THE IMPACT OF MANAGERIAL STOCK OPTION ON FIRM RISK TAKING: EVIDENCE FROM CHINA

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ABSTRACT

Purpose- This study is to investigate the firm risk-taking which influence by managerial of stock option.
Methodology- The empirical analysis of multiple regressions with a robustness test of OLS and STATA software were used in this study. In order to make our findings more practically and reliable, more robust tests have been applied, such as Fixed Effect Model with cluster standard error, Propensity Score Matching Model (PSM) and Dummy Effect Model.
Findings- stock option processing management has a significant positive impact on firm risk taking, market to book value, firm leverage, block-holder, asset turnover and portfolio have significant positive effects on firm risk taking. Firm size and state ownership have a significant negative impact on firm risk taking. Board does not influence on firm risk. It suggests top managers tend to use their power in managerial operation of stock option to manipulate earnings through employee stock option schemes, which causes companies to face high risk. Last result revealed that state ownership is helping to keep an eye on the corporation operation as a monitoring person.
Conclusion- Based on the results, this study delivered essential implication policy for investors, regulators, top manager as well as governance to take action in order to improve equity incentive system more effectively as well as to build healthier security markets in the world.

Keywords: managerial, stock option, firm risk, China
JEL Codes: G30, G32, M00

1.   INTRODUCTION

Employee stock options is characterized as one of equity compensation that companies granted to their employees, key personnel, executives and top management. Companies provide the holder the legal right to purchase companies' shares at a listed price to get a constrained time frame with amounts that can be explained in the agreement. Companies use stock option as a type of retaining highly qualified employees with the purpose of boosting the corporations' stock price as well as whole operating performances. However, countless arguments and questions arose which involves stock option outcome. As an example, (Abowd & Kaplan, 1999) questioned what is the consequences of employee stock option and how does it cost the firm. Alternatively, (Lambert, Larcker, & Verrecchia, 1991) criticized that stock option compensation offer to CEOs could lead to decrease in corporate dividends, such as, huge increases in stock option lead to decrease in dividend out, (Jolls, 1998). On the other hand, stock option caused dividend rate to fall, (Fama et al., 2001). In addition, the stock option may cause and influence

management decisions-making, (DeFusco, Zorn, & Johnson, 1991). Coinciding with the massive increase in the unique option, extensive academics literature seem to have emerged, one of them investigated by (Kevin J Murphy, 1999), process where management stock option and remuneration possessing affected the bureau relationship. Proof shows that the lower pay to performances association projected by (Jensen & Murphy, 1990) has substantially been increased via stock option explosion due to managers holdings stock option as well as corporations' shares within their own portfolios, (Hall & Liebman, 1998). Moreover, the relationship of result pay to performance is apparently in contract with agreement by using simple predictions concerning agent theory, (Aggarwal & Samwick, 2002). Basically, it seems to be clear that the specific stock option explosion delivers greater certain alignment amongst managements and shareholder interests. Therefore, it is lowering the agency conflict, although not everyone is able to agree with this specific conclusion, (Yermack, 1995).

This research comprises of companies listed in Shen Zhen and Shanghai Stock Exchanges including both State and Non-State Enterprises in mainland China. To the best of our knowledge, we provide the 1st empirical evidence outlining the market's reaction to stock option implementation in China. China started to apply the stock options mechanism in the late 1990s, (L. Ross & Zhou, 2005). It has matured its policy with time[1], although implementing extensively in developed countries. Chinese capital market presents a unique situation in the study of the economic factors related to stock options as the institutional context in China is extremely distinctive from others; legal protection is weakened since many restrictions on incentives were imposed. In addition, China stock option has many extraordinary characteristics such as required to showing good performance and annual vesting, etc. Since stock option is the expense of the firms, in terms of providing remuneration. There is a concern which frequently is feasible on those options, and this may not only lead to harmful pay outs, but also the typically worth reward furnished by much larger upon the entire managing equity stakes. In particular, stock option enjoys an incredible asymmetric reimbursement and usually do not pay any dividends.

Bryan et al (2000) suggest that stock options can be used to reduce, rather than induce, firms' risk-taking behavior because executives' personal portfolios become less diversified when stock-based compensation increases. It was considered that the real value of option goes up with organization's volatility, which tends to give benefits to top management which may raise firm's risk-taking. However, the direction of causation between employees' stock options and firm risk-taking (FRT) is not usually discussed in the literature. Thus, our study is aimed to fulfill this gap.

In this particular study, we evaluated the effect on organization risk taking of managerial stock option in China, which has been increasing since 2005; once the regulator-mandated shares reform, converting the sizable amount of earlier non-tradable share help by controlling shareholders into fully tradable shares. This study empirically assesses: 1) the relationship between the stock options granted to all employees and its increase in FRT. Concern with biases caused by self-selections, we used OLS models with robustness as the main identification strategy and with other robustness tests such as fixed effects and propensity score methods as well as Dependent variables' dummy's mean value. 2) How corporate governance and ownership structures affect the stock option incentives and FRT? The existing theories about the impact of worker's stock option and the unique characteristics of China, such as the corporate governance's body and companies' ownership structure were used to verify their impacts on FRT.

Our research contributes to the literatures around employee's stock option that granted effect on FRT in numerous approaches: firstly, to our awareness, it is the 1st research that dispatches the FRT influence by stock option management in various types of companies utilizing up-to-date huge sample in China. Secondly, while many of the existing research concentrate on American companies, we examine the issue in an emerging market like China. Aside from the discovering that stock option incentive effect FRT, we also revealed that ownership structures, especially state-owned enterprises (SOEs) are crucial towards the accomplishment of stock option granted. The remainder of the paper is prepared as below. Section 2 provides the literature review and hypotheses. Section 3 describes the design. While, Section 4 presents the results and discussion. Finally, Section 5 offers the conclusion.

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[1] In 2002, Ministry of Finance and Ministry of Science and Technology jointly promulgated several regulations with respect to the granting of stock option in state-owned high-tech companies. In January 2006, China Securities Regulatory Commission (CSRC) promulgated the measure for the administration of equity incentive of listed companies (trial). The measures, for the first time, systematically provide detailed guidelines for the implementation of stock option and stock-based incentive schemes for employees in listed companies.

2. RELATED LITERATURE AND HYPOTHESIS DEVELOPMENT

The effectiveness of stock option can broadly be characterized, (DeFusco et al., 1991; Easterbrook, 1984; Lewellen, Loderer, & Martin, 1987). They found that dividends tend to decrease for firm, while executive stock options were expected to increase. Thus, a managerial stock option plan selected by a manager may influence on the dividend policy. In addition, there exists an assumption that there is a cause and effect connection between stock option compensation and superior managerial decision making as proven in the study of (DeFusco et al., 1991). Their findings provide evidence that with the decrease in firm experiences, earning and cumulative abnormal return leads to increase in stock option incentive plan. It suggests that the related studies suffer from the dynamic endogeneity problem since poor performance may lead to subsequent changes in board composition. Moreover, when firms proposing changes in managerial stock option experience, there is a statistically significant decline in expenditure on research and development. Besides, selling and administrative costs were found to be increased. There is a belief that in order to get more advantages for themselves, managers decided to award stock option in potential period. This was found by (Yermack, 1997) who explains that stock option award time has a clear relationship with contemporaneous activities in firm share prices, while stock return is increased slightly in the trading day after following time of CEO option award and the new option award is not disclosed for several months even in a fiscal year end. He also observed that CEOs obtain stock option award before the opening of beneficial corporate news.

Risk is considered to be one of the main factors in managerial decision and strategic management research, (Ruefli, Collins, & Lacugna, 1999). Previous studies suggest that risk behavior measurement concentrates on the dispositional characteristics of people in charge of decision making[2], (Hambrick, Cho, & Chen, 1996) and the organizational and industrial contexts affecting managerial risk-taking behavior, (Bromiley, 1991; Palmer & Wiseman, 1999). For non-bank organizations such as stated ownership structure as endogenous, while firm-risk is viewed as exogenous, (Demsetz & Lehn, 1985). From researchers' perspective, the riskier environment and the larger incentives are for shareholders. Thus, they could change the managerial structure of the firm in order to convert it into shareholder-owned firms. As discussed by (Saunders, Strock, & Travlos, 1990), through the increment on directors' stock ownership in the company, their riskiness incentives develop into closer alignment to those of shareholders only if their ownership share is not as much as their assets proportion. Otherwise, it could bring more concern to shareholders over nonsystematic risk (risk aversion) of firms' performance. Evidence found that executives' stock boosts value to shareholders, which encourage them to deal with firms' risk, the increment in option hold by executives statistically increased risk taking, Cohen and Hall (2000). Therefore, we hypothesize the prediction as follows:

H_1: Stock option (in-term of a number of shares) which companies granted to all employees has a positive significant correlation with FRT.

Stock option normally needs to estimate its value.[3] Therefore, we propose our second hypothesis as follows:

H_2: Stock option (in-term of the market monitor) which companies granted to all employees is positively correlated with FRT.

In accordance with market-value theory, market circumstances determine and form the particular settlements of CEOs (Kevin J. Murphy & Zábojník, 2004). Once managers obtained option incentives it means they are same as stockholders, thus they will pursue strategies that increase firms' risk. Consequently, in order to maximize their option value the company will face additional risk.[4] Thus, we predict that stock option base compensation should have a positive impact on firms' risk and we propose our third hypothesis as follow:

H_3: Stock option based compensation (in term of monitoring value of cost[5] or stock option revenue, (Huddart & Lang, 1996)) is positive and significantly associated with FRT.

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[2] Mostly, managers are afraid to take riskiness decision since the backward incentives are limited. They are particularly focus on the employment and operational risk rather than shareholders' profit, (Baysinger & Hoskisson, 1990).

[3] Chinese firms are required to recognize the fair value of employee stock options according to China's accounting standard.

[4] Value of firm's risk and managers' risk aversion are the main determination of ownership shares impact on risk-taking. Stock options compensation can reduce total firm risk (Carpenter, 2000; Lambert et al., 1991; S. A. Ross, 2004).

[5] Compensation cost, including the estimated value of employee stock options, is properly included in measuring net income (Huddart & Lang, 1996).

3. RESEARCH DESIGN

3.1. SAMPLE DESCRIPTION

To test the above hypotheses, the data samples are acquired manually through stock option grant notices of every individual company. Data was collected from China Stock Market Accounting Research (CSMAR) and both websites of Shenzhen and Shanghai Stock Exchange. While, State control ownership data were obtained from Wind Database. CSMAR is the source of risk-taking determination and other financial data.

Following previous works, in order to get more effective results, we omitted missing data and excluded financial and banking sector firms from the sample. To ensure that the results are not motivated by means of outliers, dependent variable and some control variables data was winsorized at 1% (1 and 99 percentiles). The final unbalance sample is 221 firms and 482 (SOE=98 & Non-SOE=384) financial firm-year observations, which consist of eight years consecutively during the period of 2006 and 2013.

3.2. DETERMINANTS CONSTRUCTION

3.2.1. FIRM RISK-TAKING VARIABLES

In order to examine the particular FRT propensities of our tested managerial stock options, we employed accounting as well as market risk measures as an attempt to enhance the robustness regarding our study which follows (Wright, Kroll, Krug, & Pettus, 2007). According to their study, particularly, we used the lagged standard deviation of the firms' annual returns on assets (ROA), likewise the lagged standard deviation of regular annual total returns to shareholders (RTS).

3.2.2. MANAGERIAL STOCK OPTION INDICATORS

For managerial stock option measurement, we defined several variables such as options granted percentage (SOP), it is the measurement of stock option size, which is calculated by dividing between total number of options granted and total outstanding shares then multiply by 100, (Luo, 2015a; Triki & Ureche-Rangau, 2012) and one other variable is a stock option market value (SOM). A typical option in China will certainly vest within three equivalent installments; one-third upon every single subsequent three anniversaries regarding to the date of granted. Since, stock option is non-dividend option policy payment in China, thus we use Black-Scholes (1973) model to estimate the value of stock option. Total value of stock option is calculated by multiplying between Black-Scholes single value and total number of share of option granted (FischerBlack & MyronScholes, 1973).

Furthermore, we follow (Luo, 2015b; Triki & Ureche-Rangau, 2012) to calculate SOM by taking the total option value divided by the market value of equity. Last variable is the logarithm of stock option base compensation (SOC), stock option base compensation is to measure the volumes of stock option revenue, which is calculated by total stock option grant multiplied by stock price then multiplied by 1% (Li & Sanseau, 2013). As stock options have several opponent benefits upon managing added benefits. The initial one inseminating from the level of sensitivity connected with option to share gain volatility. Since, stock options have convex payoff structure; as a consequence, the value of stock option increase along with the movement of stock returns.

3.2.3. CONTROL VARIABLES

According to the previous studies on similar area, the wide range of predictors which was used to determine the effect of managerial stock option on FRT is introduced. Such control variables have been identified by prior studies, including firm size, independent director ratio, market book value, leverage, block-holders' shares, Herfindahl index, asset turnover, year and industry type dummy.

The extra awards and remunerations could influence the degree of company risk taking. For control variables, firm size (SIZE) is measured by the logarithm of a total number of each firm's employees. It is indicated that FRT might have a significant influence on company size, (Wright et al., 2007). In addition, the proportion of independent director (IDR) is calculated by the number of independent board member divided by the total number of board members, and the higher proportion of independent as board members, the further scrutiny in term of managerial action on behalf of investors occurs, (Wright et al., 2007).

Moreover, we included the proportion of block-holders' shares and outstanding shares (BLH) as another indicator. Since block-holders are those who owe five percent or more of outstanding shares, and have a tendency to press managers with regard to innovative management, (Wright et al., 2007). We also include a market-to-book value (MTV), it is the market value of assets over book values of assets as a proxy for the opportunity of growth, (Coles, Daniel, & Naveen, 2006; Rajgopal & Shevlin, 2002).

Additionally, firm leverage (LEV) is simply determined by the ratio of total interest bearing debts to equity. We made the calculation in order to control related actual impact of the existing liabilities amount on potential risk, (Faccio, Marchica, & Mura, 2011). Follow by their study; Herfindahl Index[6] is a measurement of wealth concentration for the portfolio owned by each firm's largest shareholder ($HHI = \sum_{j}^{J} = \omega_{ij}^2$). The index ranges from 0 to 1, that 0 demonstrates a total diversified portfolio and 1 indicates the total assets that is invested in one firm.

Where HHI[7] is calculated by summing the squared values percentage market shares held by respective firms (Faccio et al., 2011). From the review of various literatures, we adopt one of the operating costs to be our control variable; asset turnover (ATO). The measurement of asset turnover is the ratio of sales to assets. Where ATO[8] represents total asset turnover, sales represent net sales and assets equal total assets in a specific period (Singh, Davidson III, & Suchard, 2003). In addition, we include a state own enterprise (SOE) dummy variable to control between private and state owned firms, number 1 was assigned to the companies that are state owned and 0 are on the contrary. Finally, we also use YEAR and industry dummy variables (IND) to capture variations across industries and time period (Chourou, Abaoub, & Saadi, 2008).

3.3. EMPIRICAL MODELS

The empirical equation models for estimating the influence of managerial stock option on organizational risk are described as follows:

Equation 1 is used for multiple regressions with robustness to test whether firms with SOPs present greater ROAs.

$$ROA = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOP + \varepsilon \qquad (1)$$

Equation 2 is used for multiple regressions with robustness to test whether firms with SOMs present greater ROAs.

$$ROA = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOM + \varepsilon \qquad (2)$$

Equation 3 is used for multiple regressions with robustness to test whether firms with SOCs present greater ROAs.

$$ROA = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOC + \varepsilon \qquad (3)$$

Equation 4 is used for multiple regressions with robustness to test whether firms with SOPs present greater RTSs.

$$RTS = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOP + \varepsilon \qquad (4)$$

Equation 5 is used for multiple regressions with robustness to test whether firms with SOMs present greater RTSs.

$$RTS = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOM + \varepsilon \qquad (5)$$

Equation 6 is used for multiple regressions with robustness to test whether firms with SOCs present greater RTSs.

$$RTS = \alpha + \sum_{i=1}^{n} \beta_1 FC + \beta_2 SOC + \varepsilon \qquad (6)$$

Where FRT indicates firm risk, α is the intercept of each model, ROA is a dependent variable which demonstrates lagged standard deviation of the firms' annual returns on assets, RTS is a dependent variable which represents lagged standard deviation of regular annual total returns to shareholders. In addition, SOP is an independent variable which determines stock option size, SOM is an independent variable which represents the stock option market value, and SOC is an independent variable

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[6] Ownership structure in the organization tends to be in greater attention when Herfindahl index indicates greater values (Lacouture et al., 2008).

[7] In the study of (Faccio et al., 2011), HHI was used as an independent variable. As regressions results interpret that the higher value of the index denotes the more portfolios diversified.

[8] It is important to note that total asset turnover is the only inverse proxy variable for agency costs, meaning that agency costs increase as total asset turnover decreases.

which represents the stock option base compensation. While FC is control variable, *n* is the numbers of control variables, *i* stands for the specific control variable where *i=1~n*.

4. RESULTS AND DISCUSSION

4.1. DESCRIPTIVE STATISTICS

The descriptive statistics of stock option, ownership characteristics and control variables are demonstrated in Table 1. The table delivers insightful information about the 25th percentile, 50th percentile, 75th percentile, mean and standard deviation of important indicators. During 4 operation years, mean of ROA of 221 listed firms is 0.03, the standard deviation is 0.04, while mean of RTS is 0.48 and the standard deviation is 0.51. These numbers indicate that those firms have incompatible operating risk characteristics. For independent variables in this study, mean of SOP is 2.59 and its standard deviation is 1.88. In addition, mean of SOM is 0.88 and its standard deviation is 1.19, while mean of SOC is 5.92 and its standard deviation is 0.53.

Table 1. Descriptive Statistics

Variable	Mean	SD	P25	P50	P75	Min	Max
ROA	0.03	0.04	0.01	0.02	0.04	0.00	0.38
RTS	0.48	0.51	0.08	0.33	0.77	-0.10	2.71
SOP	2.59	1.88	1.31	2.14	3.35	0.18	10.00
SOM	0.88	1.19	0.22	0.50	1.03	0.01	9.63
SOC	5.92	0.53	5.56	5.94	6.26	3.94	7.38
IDR	0.38	0.05	0.33	0.36	0.43	0.25	0.67
MBV	1.01	1.00	0.36	0.62	1.34	0.07	7.93
LEV	0.44	0.24	0.25	0.43	0.59	0.00	1.25
BLH	8.26	0.55	7.88	8.22	8.60	6.92	9.95
SIZE	3.37	0.54	3.00	3.33	3.70	2.10	4.87
ATO	0.78	0.56	0.40	0.65	0.96	0.00	4.15
HHI	0.02	0.05	0.38	0.57	0.85	0.00	3.37

Note: This table illustrates the summary statistics of dependent, independent and control determinants

4.2. COEFFICIENT CORRELATION

Appendix 1 demonstrates the correlation between proposed variables. By using correlation analysis, the results indicate the interaction between dependent, independent and control variables. The results of ROA and RTS (dependent variables) were strongly positive significant correlation with SOM, SOP and SOC (independent variables). It means that stock options in term of a number of shares, market value and compensation increases in respect to FRT. Besides, it happens that there exist no significant relationship between dependent variables and the three control variables which are: IDR, SIZE and SOE. Moreover, most independent and control variables are statistically associated except LEV, SIZE, ATO and SOE.

4.3.   REGRESSION ANALYSIS

Table 2. Regression analysis of managerial stock options with FRT

	ROA			RTS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SOP	0.00498***			0.0767***		
	(5.48)			(6.33)		
SOM		0.00852***			0.126***	
		(5.54)			(6.15)	
SOC			0.0183***			0.207***
			(5.27)			(4.39)
IDR	0.0611**	0.0556*	0.0506*	0.689*	0.594	0.465
	(2.03)	(1.86)	(1.69)	(1.71)	(1.48)	(1.14)
MBV	0.0133***	0.0138***	0.0149***	0.0865**	0.0955***	0.118***
	(6.47)	(6.79)	(7.47)	(3.15)	(3.51)	(4.34)
LEV	0.0187**	0.0289***	0.0273***	0.175*	0.330***	0.303***
	(2.40)	(3.76)	(3.55)	(1.68)	(3.21)	(2.89)
BLH	0.0138***	0.0106***	0.00901***	0.157***	0.108**	0.0891**
	(4.31)	(3.38)	(2.85)	(3.68)	(2.57)	(2.07)
SIZE	-0.0232***	-0.0233***	-0.0305***	-0.181***	-0.183***	-0.276***
	(-6.51)	(-6.54)	(-8.43)	(-3.79)	(-3.85)	(-5.60)
ATO	0.00816**	0.00659*	0.00969***	0.155***	0.132***	0.177***
	(2.38)	(1.90)	(2.82)	(3.38)	(2.85)	(3.80)
HHI	0.152**	0.141***	0.107*	2.55***	2.419***	2.238***
	(2.82)	(2.61)	(1.92)	(3.56)	(3.35)	(2.94)
SOE	-0.00725*	-0.0106***	-0.00909**	-0.0517**	-0.104**	-0.0918*
	(-1.83)	(-2.74)	(-2.33)	(-1.98)	(-2.01)	(-1.73)
Year	YES	YES	YES	YES	YES	YES
IND	YES	YES	YES	YES	YES	YES
Constant	-0.0763**	-0.0483*	-0.106***	-0.729*	-0.285	-0.869*
	(-2.51)	(-1.65)	(-3.24)	(-1.80)	(-0.73)	(-1.95)
N	482	482	482	482	482	482
Adj. R^2	0.313	0.314	0.31	0.318	0.314	0.286
F	8.586	8.624	8.466	8.744	8.626	7.651

Notes: ROA is a dependent variable which is the measurement of firms' annual returns on assets; moreover, RTS is a dependent variable which is the determination of regular annual total returns to shareholders. T statistic in parentheses when * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2 illustrates logistic regressive estimation of the impact of stock option on FRT. By further investigation of the correlations, it does not show any multicollinearity issue[9] with the tested variables (Akinwande, Dikko, & Samson, 2015), but shows a mean

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[9] Studies reveal that Variance Inflation Factor (VIF) exceeding 5 is not good for regression model because it might render other significant variables redundant, while VIFs exceeding 10 are signs of serious multicollinearity in need of correction.

variance inflation element (VIF) of 1.4 and a maximum VIF of 1.466. This study uses multiple regressions with a robustness test to investigate whether stock option management influence firms' risk by using equation (1) up to (6). As clearly demonstrated in Table 2, Model from 1 to 6 tested the interaction between firms' risk and options in terms of share, market monitor and cost. The coefficients of the interaction terms are positive and strongly significant, (p >.001) proves those assigned hypotheses are supported. Both market munificence and complexity strengthen the relationship between options and FRT. Result suggests that all stock option variables are positively influenced by all dependent variables such as ROA, RTS which is identical to the pattern of stock option assigned purpose. In addition, the estimated coefficient on IDR shows no correlation with FRT, firms do not consider risk regardless of the number of board members. Result generates that LEV is positive and significant consistence, suggesting that highly levered firms appear to take on higher risk. The estimated coefficient on MBV, ATO and BLH are positively significant correlated with ROA and RTS. It claims that firms with larger market value and turnover tend to undertake greater exploration risk. Conversely, the coefficient on SIZE generates a negative significant relationship. This result suggested that risk taking incentives decrease when a number of employees increase. However, SOE shows a negative relationship with a coefficient. This result recommended that state ownership possesses greater power to manage firms' operation and restrict shareholders from manipulation which leads to reducing firms' risk. Thus, we can observe evidently that the influence of SOE on FRT is weakened. Moreover, state ownership is helping to monitor the expenses, such as stock option size, market value and revenue[10].

4.4.   ROBUSTNESS TEST

Table 3. Effects of stock option on FRT (Regression of Fixed Effect Model with cluster standard error)

	ROA			RTS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SOP	0.00903***			0.0682**		
	(2.78)			(2.30)		
SOM		0.00581*			0.111***	
		(1.65)			(2.68)	
SOC			0.0124*			0.276***
			(1.66)			(3.54)
IDR	0.180*	0.177*	0.170*	0.704	0.770	0.644
	(1.88)	(1.82)	(1.76)	(0.81)	(0.88)	(0.75)
MBV	0.0118***	0.0120***	0.0126***	0.0494	0.0435	0.0541
	(2.71)	(2.71)	(2.85)	(1.24)	(1.09)	(1.38)
LEV	0.00450	0.00982	0.00738	0.364**	0.440***	0.395**
	(0.25)	(0.54)	(0.41)	(2.22)	(2.68)	(2.45)
BLH	0.0194**	0.0149*	0.0183**	0.249***	0.204***	0.276***
	(2.57)	(1.97)	(2.37)	(3.62)	(3.00)	(4.03)
SIZE	0.0379	0.0333	0.0255	-0.271	-0.212	-0.360
	(1.25)	(1.08)	(0.84)	(-0.98)	(-0.77)	(-1.34)
ATO	0.00989	0.0106	0.0101	0.228**	0.226**	0.211**
	(0.89)	(0.94)	(0.89)	(2.24)	(2.22)	(2.10)
HHI	0.272	0.373	0.341	9.475***	10.07***	9.312***
	(1.06)	(1.45)	(1.32)	(4.04)	(4.36)	(4.05)
Cons.	-0.309**	-0.240**	-0.307**	-1.227	-1.042	-2.609**
	(-2.53)	(-1.99)	(-2.25)	(-1.10)	(-0.96)	(-2.16)
N	482	482	482	482	482	482
Within R²	0.2307	0.2102	0.2116	0.4144	0.4191	0.4321
F	5.72	5.08	5.12	13.51	13.77	14.52

Notes: ROA is a dependent variable which is the measurement of firms' annual returns on assets; moreover, RTS is a dependent variable which is the determination of regular annual total returns to shareholders. T statistic in parentheses when * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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[10] It is found that politically connected board chairs have greater excess compensation for non-state owned firms, but not for state owned firms.

In order to provide more supportive findings of this paper, we intend to repeatedly test the variables by using robustness test. In this section, we present the important robustness check of the results obtained from ordinary least squares (OLS) regression regarding the estimation of stock option influence on firm's risk taking by using three robustness analyses as: (a) Fixed Effect Model with cluster standard error instead of OLS model (We exclude SOE variable from this analysis), (b) Propensity Score matching Model (PSM) to find the most similar group of stock option, then we used match sample to run the regression again as resulting from a concern of possible endogeneity problem, and (c) the calculation of mean values of SOP_dummy, SOM_dummy and SOC_dummy in same industry and year as concerning the extreme values effect, if the original values are larger than the mean values, then we take value as 1, and 0 otherwise.

Table 3 delivers analytical results of regressions of stock option and FRT by Fixed Effect Model. It illustrates that all stock option variables generate as follows: SOP has positive significant with ROA (p<.01), while SOM and SOC present no significant correlation with ROA (p>.05). In addition, from Table 3, RTS exists to have a significant connection with SOP, SOM and SOC with a coefficient of (p<.01), (p<.001) and (P<.001) respectively.

Table 4 indicates results of stock option on FRT under Propensity Score matching Model regression. Results showed that SOP and SOC are positively connected with ROA (p<.01), while SOM shows insignificant influence. Besides, there exists a strong positive significant relationship between SOP, SOM and SOC with RTS (P<.001).

Table 4. Effects of stock option on FRT (Propensity Score matching Model Regression)

	ROA			RTS		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SOP	0.00523**			0.0785***		
	(2.59)			(4.98)		
SOM		0.00243*			0.133***	
		(1.65)			(3.82)	
SOC			0.0210**			0.271***
			(2.45)			(4.37)
IDR	0.122	0.128	0.123*	1.422**	1.257**	0.392
	(1.31)	(1.33)	(1.65)	(2.45)	(2.12)	(0.78)
MBV	0.00471	0.0106	0.00779	0.0723**	0.101***	0.108***
	(0.82)	(1.56)	(1.31)	(2.06)	(3.07)	(3.37)
LEV	-0.000853	0.0321	0.000853	0.272**	0.483***	0.432***
	(-0.05)	(1.54)	(0.05)	(1.99)	(3.70)	(3.51)
BLH	0.0317***	0.0154	0.0311***	0.213***	0.0170	0.0645
	(3.04)	(1.56)	(4.16)	(3.23)	(0.31)	(1.23)
SIZE	-0.0262***	-0.0325***	-0.0452***	-0.146**	-0.0305	-0.354***
	(-2.91)	(-3.14)	(-4.71)	(-2.23)	(-0.45)	(-5.42)
ATO	0.00517	0.0137	0.0128*	0.156**	0.0773	0.183***
	(0.69)	(1.56)	(1.86)	(2.34)	(1.26)	(3.20)
HHI	0.262	0.0561	0.203	4.010***	2.422***	3.662**
	(1.38)	(0.46)	(1.27)	(2.76)	(2.67)	(2.44)
SOE	-0.0133*	-0.0215	-0.00519*	-0.0338*	-0.261***	-0.158**
	(-1.65)	(-1.64)	(-0.65)	(-1.67)	(-3.62)	(-2.52)
Cons.	-0.209***	0.0145	-0.229***	-1.483**	-0.0121	-0.846*
	(-3.06)	(0.20)	(-3.14)	(-2.40)	(-0.02)	(-1.73)
N	260	226	327	260	226	327
R^2	0.3398	0.2418	0.2647	0.4205	0.4153	0.3439

Notes: ROA is a dependent variable which is the measurement of firms' annual returns on assets; moreover, RTS is a dependent variable which is the determination of regular annual total returns to shareholders. T statistic in parentheses when * p < 0.05, ** p < 0.01, *** p < 0.001

Table 5 indicates results of stock option on FRT by using regression dummy model. From the test, it is suggested that SOP is strongly associated with ROA (P<.001), SOC has a slight relationship with ROA (p<.05), while SOM has no significant result.

The results indicate that RTS coefficient is positively significant in each model which is maintaining the same main results without any changes, while ROA coefficient is still positive significantly, but the level is weaker compared to the main results.

Table 5. Effects of stock option on FRT (Regression of Dummy Model)

	ROA_dummy			RTS_dummy		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
SOP	0.0183***			0.252***		
	(3.19)			(5.18)		
SOM		0.00598*			0.260***	
		(1.86)			(5.43)	
SOC			0.0111*			0.181***
			(1.65)			(4.04)
IDR	0.0645	0.0405	0.0534	0.613	0.259	0.488
	(1.04)	(0.65)	(0.86)	(1.53)	(0.66)	(1.19)
MBV	0.00634	0.00852	0.00864	0.0925***	0.0910***	0.122***
	(1.24)	(1.55)	(1.61)	(3.60)	(3.65)	(4.78)
LEV	-0.000264	0.00831	0.00832	0.173	0.293***	0.292***
	(-0.02)	(0.58)	(0.57)	(1.55)	(2.68)	(2.64)
BLH	0.0370***	0.0344***	0.0333***	0.145***	0.119***	0.0917**
	(5.15)	(4.77)	(4.67)	(3.43)	(2.90)	(2.18)
SIZE	-0.0338***	-0.0366***	-0.0395***	-0.175***	-0.181***	-0.258***
	(-4.61)	(-4.84)	(-5.37)	(-3.68)	(-3.88)	(-5.20)
ATO	0.0133**	0.0131**	0.0133**	0.166***	0.136**	0.163***
	(2.32)	(2.24)	(2.27)	(3.32)	(2.57)	(3.04)
HHI	0.140*	0.185**	0.176**	2.365***	2.343***	2.788***
	(1.80)	(2.35)	(2.36)	(3.38)	(3.34)	(3.89)
SOE	-0.00503*	-0.00873	-0.00824*	-0.0606*	-0.0836*	-0.101**
	(-1.69)	(-1.03)	(-1.96)	(-1.69)	(-1.65)	(-1.97)
Year	Control	Control	Control	Control	Control	Control
IND	Control	Control	Control	Control	Control	Control
Cons.	-0.213***	-0.179***	-0.168***	-0.498	-0.169	0.145
	(-4.06)	(-3.44)	(-3.30)	(-1.24)	(-0.44)	(0.35)
N	482	482	482	482	482	482
R^2	0.2825	0.2704	0.2748	0.3431	0.3455	0.3248

Notes: We calculated the mean values of ROA_dummy and RTS_dummy in same industry and year, if the original values are larger than the mean values, then we take the value as 1, and 0 otherwise. T statistic in parentheses: * p < 0.05, ** p < 0.01, *** p < 0.001.

The above results establish the concrete evidence for supporting our findings, which illustrates the significant influence of stock option on FRT as demonstrated in Table 3, 4 and 5.

5. CONCLUSION

The motivation of our study is potentially determined by the lag of theoretical and empirical evidence upon the link between managerial incentives and FRT with research framework especially on a regulated market. As a transitional economy with relationship-based financial system in China, stock option influences and government involvement have a significant influence on FRT behavior. It shows that under Chinese-specific institution as well as surrounding regulation, stock options are likely to have a positive influence on FRT. Thus, stock option can be considered as a determining factor for top managers to use stock option managerial as profit earning mechanism. This finding shed light on the link of stock option to the companies and implemented it.

This research statistically examines significant and robust connection between option-based compensation and risk taking on proposed equations. The findings of the study show that firms dramatically increase their usage of option-based compensation followed by the increment in FRT. A higher proportion of incentives is likely to be positively associated with subsequent FRT. Apparently, in growth concentrated FRT, the firm value may increase, enhancing the worth of managerial incentives. The larger proportion of share, monitoring value and market monitor implements riskier policy choices, it could lead to riskier assets investment. This result supported various empirical studies, which generally found a positive relationship between stock options and different measurement of FRT, (DeFusco, Johnson, & Zorn, 1990; Guay, 1999; Schrand & Unal, 1998).

We anticipate that these findings contain important implications for both scholars and practitioners. From the viewpoints of researchers interested in stock option managerial, the results of this study should provide insightful information on how stock options have impacts on FRT behavior in particular.

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Appendix 1. Correlation analysis

	ROA	RTS	SOP	SOM	SOC	IDR	MBV	LEV	BLH	SIZE	ATO	HHI	SOE
ROA	1.000												
RTS	0.412***	1.000											
SOP	0.386***	0.389***	1.000										
SOM	0.362***	0.362***	0.492***	1.000									
SOC	0.270***	0.309***	0.434***	0.318***	1.000								
IDR	0.064	0.032	-0.134***	-0.126***	-0.095***	1.000							
MBV	0.186***	0.142***	0.166***	0.158***	0.267***	-0.043	1.000						
LEV	0.197***	0.230***	0.126***	0.045	0.203***	-0.041	0.338***	1.000					
BLH	0.113**	0.134***	-0.158***	-0.019	0.225***	0.035	0.184***	0.394***	1.000				
SIZE	-0.073	-0.011	-0.066	-0.001	0.349***	-0.068	0.341***	0.341***	0.352***	1.000			
ATO	0.120**	0.150***	0.070	0.158***	0.109**	-0.056	0.003	0.241***	0.166***	0.362***	1.000		
HHI	0.116**	0.151***	0.085*	0.113**	0.225***	-0.020	-0.041	0.174***	0.053	0.226***	0.248***	1.000	
SOE	-0.105**	-0.056	-0.161***	-0.032	-0.039	-0.090*	0.156***	0.173***	0.056	0.232***	0.118*	0.146***	1.000

t statistics in parentheses
Variable is significant at level $p<0.05$= *, $p<0.01$= **, $p<0.001$= *** respectively
Note: This table presents the correlation coefficients of the variables without raising any multicollinearity problem as its 'coefficients do not exceed 0.5 thus; variance influence factor also verified that there's no severe issue regarding multicollinearity. To ensure that the results are not motivated by means of outliers, we winsorized all dependent variable and some control variables at 1% (1 and 99 percentiles). White's examination intended for heteroscedasticity pointed out any heteroscedasticity issue. To be able to appropriate for heteroscedasticity, we use robust regression to repeatedly test the determinants.

EXPORT DETERMINANT ANALYSIS: INDONESIA'S EXPORT TO SINGAPORE AND JAPAN CASE STUDY

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ABSTRACT

Purpose- This study analyses the influence in Rupiah's exchange rate and the economic growth of trading partner country of Indonesia's export which are Singapore and Japan as the two biggest trading countries in Indonesia's export products in Asia region.
Methodology- Economy models used as analysis tools in this research are co-integration method and dynamic linear Error Correction Mechanism Model.
Findings- This study discovered that in long term, exchange rate has a negative impact to Indonesia's export, both for Singapore and Japan, while in short term the exchange rate does not have any correlation with export. Subsequently, economic growth of the trading partner country in long term has positive impact to export, while in short term it has no impact.
Conclusion- Findings of this empirical studies showed that in the long term, the effect of the exchange rate to Indonesia's export to Japan is greater compared to Singapore. Subsequently, the effect of Singapore's economic growth to Indonesia's export is greater compared to the effect of Japan's economic growth. The exchange rate has negative impact to Indonesia's export, both from Singapore and Japan. The result of this study has a probability to happen in Indonesia because Indonesia's export is still dominated by commodities with prices that tend to decrease, thus the effect of weakening rupiah is very small compared to export increase.

Keywords: Exchange rates, export, economic growth
**JEL Codes:** M20, M21, N10

1. INTRODUCTION

Indonesia's economy is an open economy that marked with the presence of economic relationship and relationship in other fields with many countries in the world. Currently, there are nearly no country that does not maintain a relationship with other countries in relation to the various needs of their people and the ever-increasing population in every country. This condition prompts inter-country transactions such as export and import activities. Indonesia's export opportunity to other countries has been present since the past, even from the formation of General Agreement on Tariffs and Trade (GATT) and World Trade Organization (WTO) which means the opportunity should become wider noting that various type of obstacles in WTO member countries has been minimised. Moreover, Indonesia has better export opportunity due to the abundancy in natural resource and plenty of labours. However, Indonesia has not wholly experience the positive impact from the free-trade system proposed by WTO.

Global monetary crisis in 2008 had given negative impact to world trade, including the impact to Indonesia's export where the growth of Indonesia's export on 2009 reached minus 17.27% which declined drastically from 2008 that reached 16.22%. Export's performance increased on 2010 with growth of 33.24%, where it was the highest record throughout Indonesia's export history. However, the export growth declined again on 2011. Moreover, in 2012, it reached minus 8.85% and in 2015 it reached 10.47%.

Although in 2016 and 2017 Indonesia's export experienced an increase, until November 2018 export returned to decline as shown in Figure 1 below.
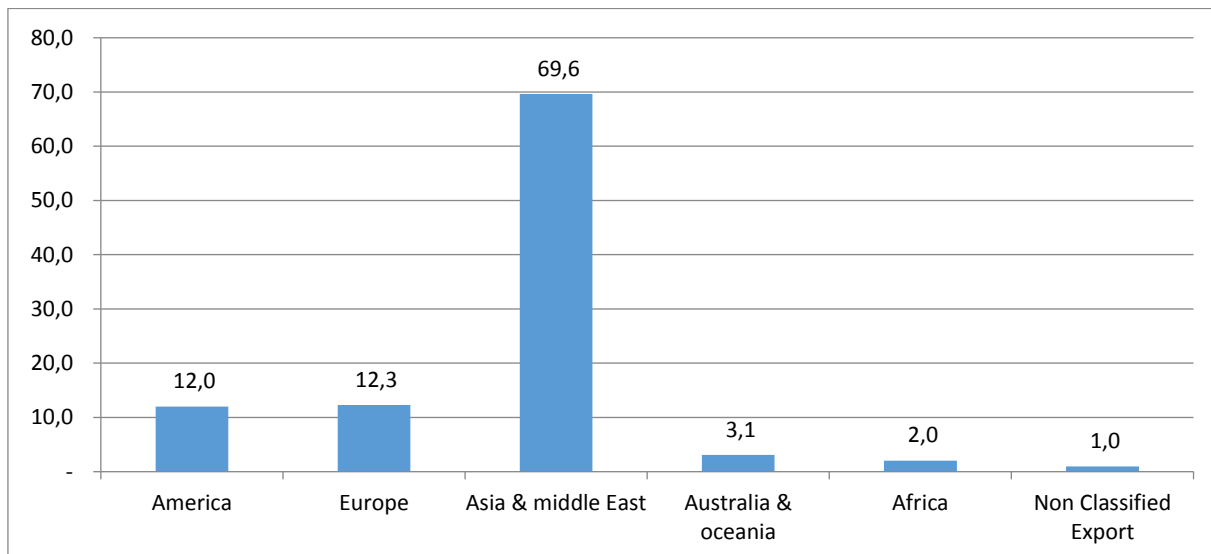
Figure 1: Growth of Indonesia's Export Value in Period of 2006 – 2018 (%)
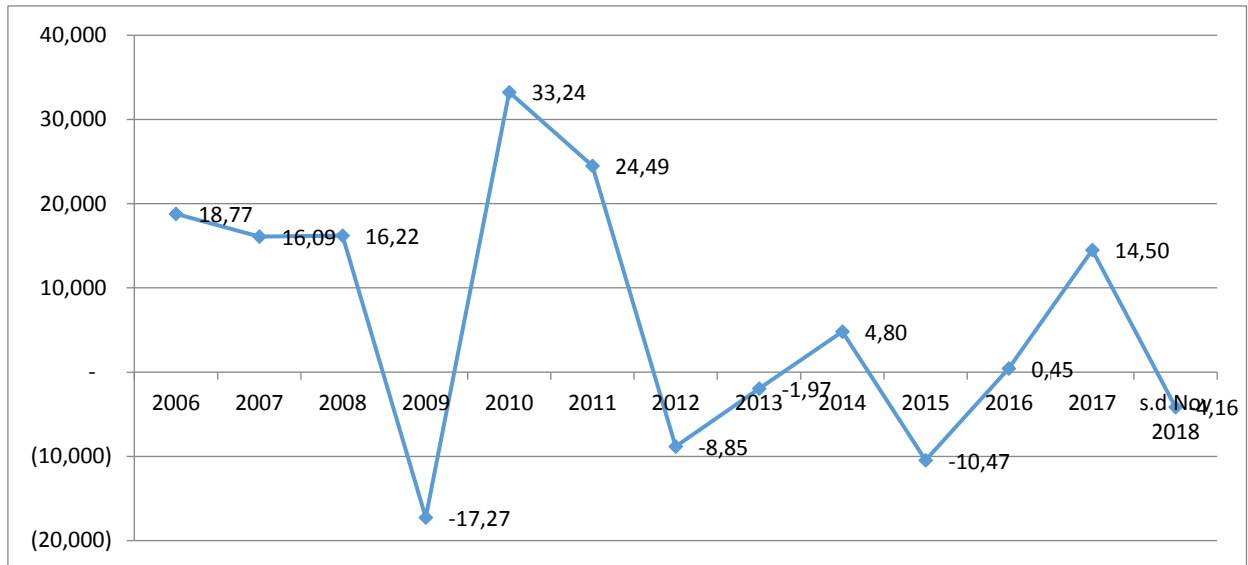
Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Majority of Indonesia's exports are aimed at main trading partner countries, such as the United States, Europe, East Asia (particularly Singapore, Japan and China). On 2006-2017, Asia and Middle East countries were ranked first as countries that traded with Indonesia's export product which reached 69.6% in average while the second and third ranks were European countries and the United States which were 12.3% and 12% respectively as shown in Figure 2 below.
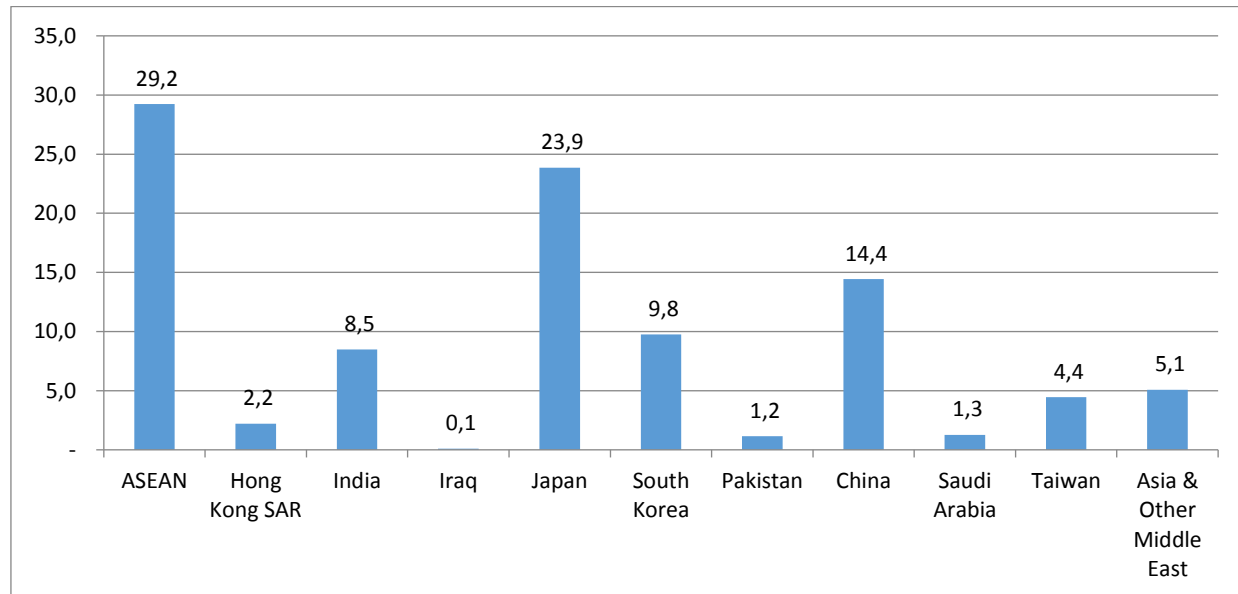
Figure 2: Average Distribution Percentage of Indonesia's Export Based on Country of Destination, Period of 2005 – 2017

Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

In Asia and Middle East region itself, the average of Indonesia's export on 2006-2017 generally went to ASEAN region of 29.2%, followed by Japan of 23.9% and People's Republic of China of 14.4% as shown in Figure 3 below. Thus, it can be concluded that Asia region is a highly potential market for Indonesia's export, particularly ASEAN region where Indonesia and other Southeast Asia countries are integrated in ASEAN Economic Community which aimed to be an effort to widen regional integration to achieve economic scale (International Directorate – Bank of Indonesia, 2015).

Figure 3: Average Distribution Percentage of Indonesia's Export to Asia and Middle East Countries in Period of 2005-2017

Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

In ASEAN region, the majority of Indonesia's export on 2005-2017 went to Singapore for 40.8%, followed by Malaysia for 24.9%, and Thailand for 15%. Moreover, the average growth of Indonesia's export to ASEAN region on 2006-2017 reached 8.7% as shown in Figure 4 below.
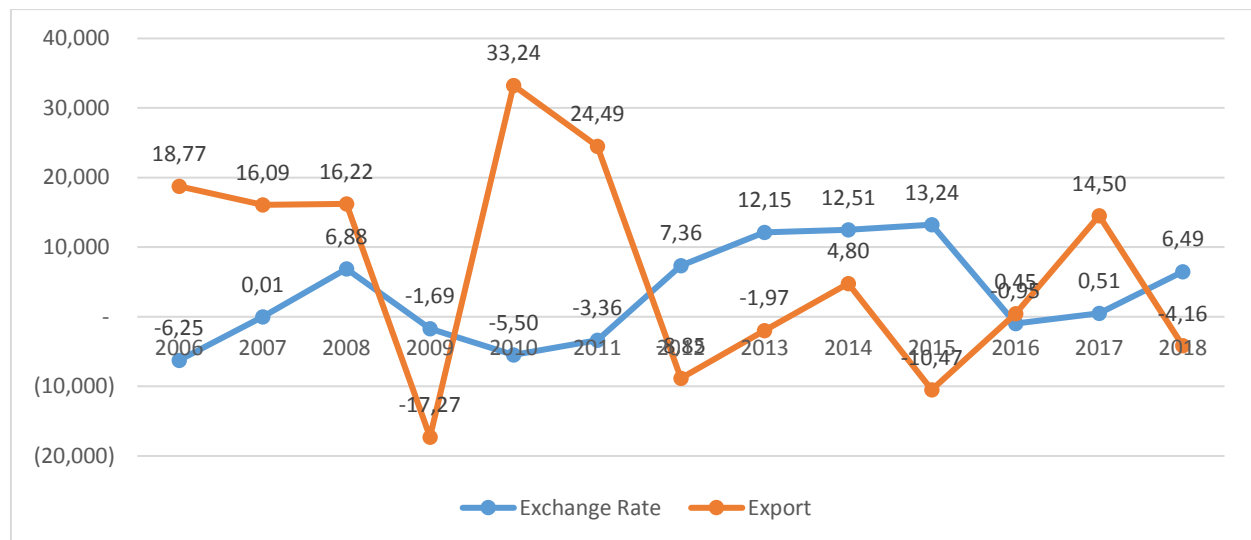
Figure 4: Average Distribution Percentage of Indonesia's Export to ASEAN in Period of 2005-2017
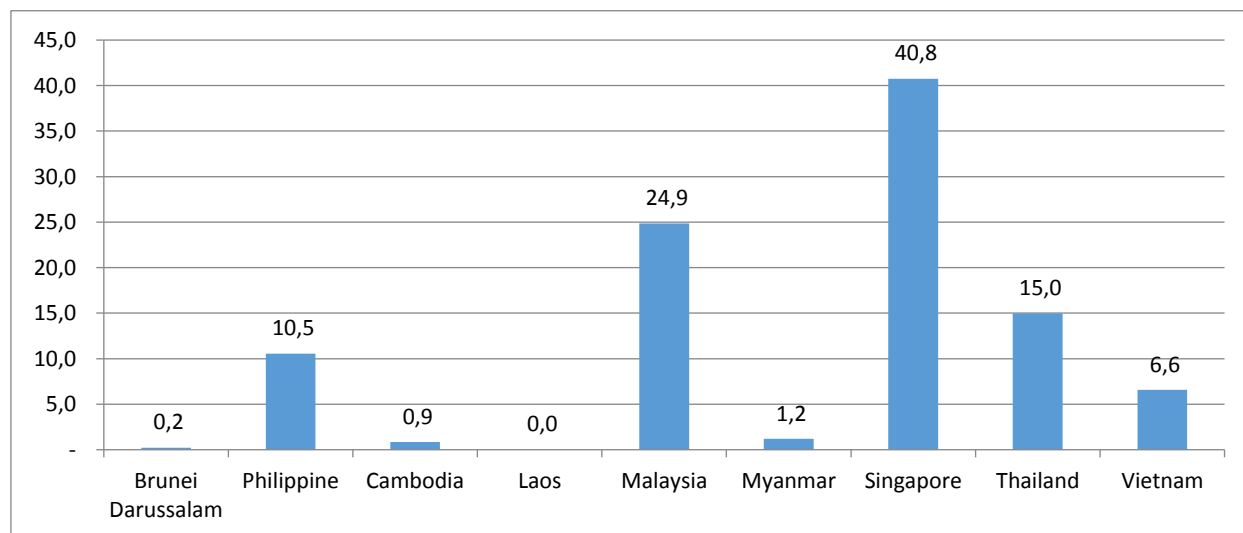
Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Indonesia's export fluctuation is closely related to various influence factors, such as fluctuation in exchange rate as one of the international factors. If the exchange rate is stated on direct term (Rupiah over USD), therefore when the exchange rate is high (rupiah strengthens), domestic products will become relatively more expensive compared to international products. This condition encourages domestic population to buy more import products whereas international population buys more domestic products in lesser amount and vice versa. Figure 5 below illustrates export growth and exchange rate change (Rp/USD $). It is interesting to note that on the period of 2009-2010 where rupiah experienced strengthening yet export increased drastically. Similarly, on period of 2010-2012, Rupiah weakened yet export was also decreased.
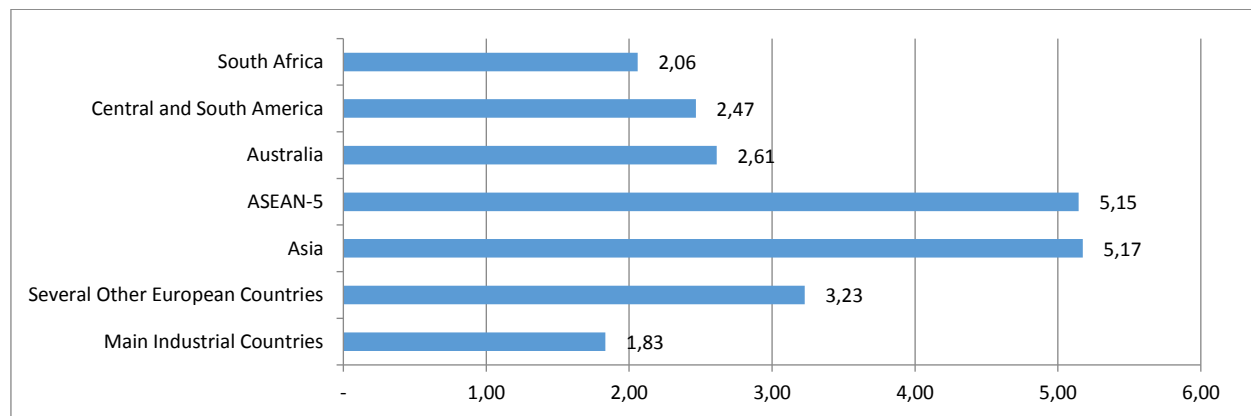
Figure 5: Growth of Indonesia's Export and Change of Nominal Exchange Rate on Period of 2006-2018

Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Other than exchange rate, the economic growth of export destination country (trading partner country) is another factor that influences export. The economic growth directly corresponds to the country's economic performance and the country's increasing ability to buy international products. Based on the exporting country, the economic condition of the trading partner country can be a consideration in performing export activity. Figure 6 below shows the average economy growth (PDB Growth) of a number of countries/regions on the period of 2010-2017. Countries/regions that have highest rank of average PDB growth are Asia region (PRC, South Korea, Hongkong, Taiwan and India) which reached 5.17%. It was then followed by ASEAN-5 region of 5.15%.
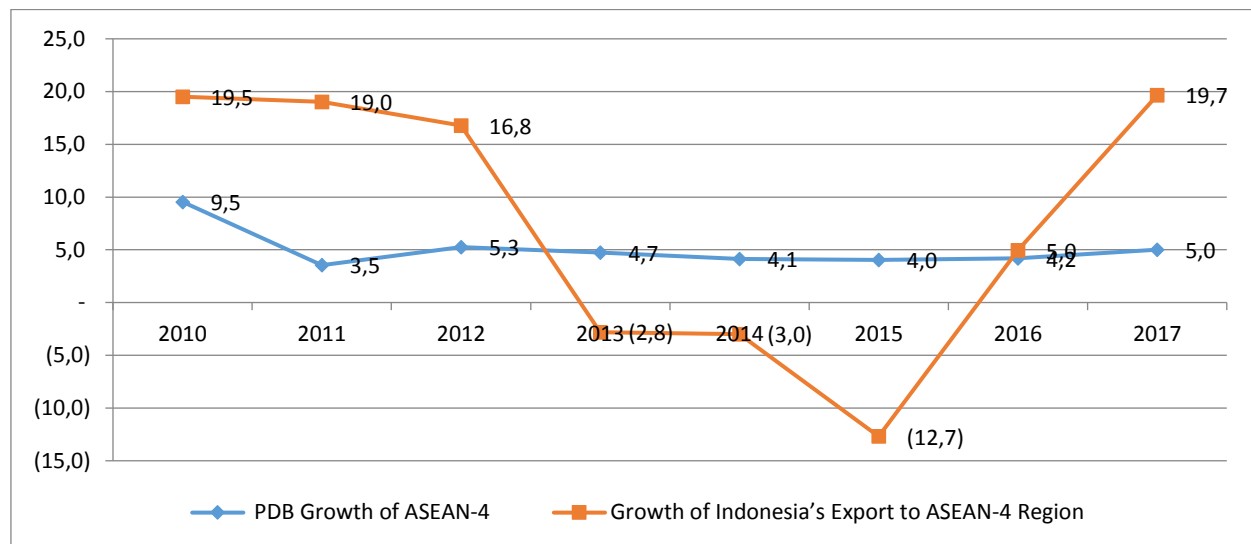
Figure 6: Average PDB Growth of Various Countries/Regions on Period of 2010-2017

Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Interestingly, on the period of 2011-2012, where the average economic growth of ASEAN countries excluding Indonesia experienced growth from 3.5% to 5.3%, Indonesia's export value experienced decrease from 19% to 16.8%. The relationship between exchange rate and export is expected to show a positive direction. The relationship between the two variables has gained interest of various economy researchers. Past studies that determined exchange rate as one of the factors that influence export are Hock-Tsen Wong and Hock Ann (2016), who reported the volatility of exchange rate has significant impact to real export and negative or positive impact on some types of export products. Chit, Myint M. (2008) studied the impact of exchange rate volatility to bilateral export in ASEAN–China Free Trade Area (ACFTA). Empirical result showed that the volatility of bilateral real exchange rate has statistically significant negative impact to bilateral export to ACFTA countries. Moreover, research by Solakoglu and Demirağ (2008) found that there is no negative nor positive relationship between volatility and real export. Cheung and Sengupta (2013) discovered significant and strong negative impact from the currency appreciation and currency volatility to company's export target in India. Companies that export services are more influenced by the fluctuating exchange rate compared to companies that export products. Grier and Smallwood (2013), found that the uncertainty of Real Exchange Rate (RER) has a negative impact to trading for less developing countries. Ginting, Ari Mulianta (2013) reported that exchange rate in both long and short term has a negative and significant impact to Indonesia's export.

Figure 7: Average PDB Growth of ASEAN-4 Region and Growth of Indonesia's Export to ASEAN-4 Region on Period of 2010-2017

Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Based on the explanation above, it is interesting to appreciate the factors that influence Indonesia's export to Asia region, particularly Singapore as the biggest export destination country in ASEAN countries and Japan as the second biggest export destination country after ASEAN in period of 2012 quartile I to 2018 quartile II. The time period was determined based on the consideration that Indonesia's export demand has recently increased again from 2012 after it experienced a significant decrease since 2010 due to the effect of global economy crisis. Whereas the title of this research is "Export Determinant Analysis: Indonesia's Export to Singapore and Japan Study Case".

Whereas the aim of this research is to understand how the exchange rate and economic growth of trading partner countries (Singapore and Japan) influence Indonesia's export, both partially and simultaneously.

2. LITERATURE REVIEW

2.1. Nominal Exchange Rate, Real Exchange Rate, and its Relationship with Balance of Trade

Exchange rate of a country's currency is divided to nominal exchange rate and real exchange rate. Nominal exchange rate is a relative price of both countries' currency (Mankiw, 2009). For example, USD 1 is valued at RP 13.000 in money market. Meanwhile, real exchange rate is related to the relative price of products in both countries. Real exchange rate indicates the grade, where economic agents can trade products from a country with products from another country. Real exchange rate

between two currencies of both countries is calculated from nominal exchange rate multiplied by the index price ratio of both countries. The relationship between real exchange rate and nominal exchange rate can be formulated as below:

REER = ER * (FP/DP)   (1)

Where:

REER   : Real Effective Exchange Rate

ER   : Nominal Exchange rate stated in direct term (in Rupiah/1 Dollar) or indirect term (Dollar/1 Rupiah)

FP   : Foreign Price Index of the trading partner price (foreign countries)

DP   : Domestic Price/Index of domestic price

Based on the equation above, it can be explained that generally the competitiveness of foreign trading is determined by two factors, which are ER and the ratio of price between two countries. If ER (direct term) increases (appreciated), with the assumption of constant price ratio, then a positive relationship is made on the balance of trade. This is because higher ER indicates the price of Indonesia's product (domestic) is relatively low compared to other products' price, because the same number of dollar will give more rupiah. Conversely, by assuming non-fluctuating currency, competitiveness is highly determined by the country's ability (domestic) or monetary authority in controlling the flow of price through various instruments under their obligation. In short, real exchange rate of a country will affect the microeconomic condition of a country, particularly with net export and balance of trade. This impact can be summarised in a relationship between real exchange rate and net export or balance of trade (Mankiw, 2009).

NX = f(e,Y,Y*)   (2)

The equation above means that the net export (balance of trade) is a function of real exchange rate. Where NX is net export, e is nominal exchange rate, Y is domestic GDP and Y* is combined GDP of trading partner countries. The relationship between real exchange rate and net export from Mundell – Flemming's idea is negative (currency rate measurement is approximated with indirect term). However, if the exchange rate is stated in direct term (Rupiah per USD), Flemming's idea can be drawn in an IS (Investment Saving) curve with positive slope coefficient. In other words, higher REER indicates an event where Rupiah exchange rate is decreased or depreciated. Low REER in context of direct term can be translated as domestic products being relatively expensive compared to foreign products, which means low competitiveness. Due to low competitiveness, export decreases and inversely import increases. This means the low REER (strengthens of domestic currency relative to trading partners) suppress the balance of trade, thus domestic people will only buy a small number of import products. Inversely when the currency rate is high, domestic products will become more expensive compared to overseas products. This condition encourages domestic people to buy more import products and overseas people to buy domestic products in smaller number.

2.2. Small Open Economy with Floating Exchange Rate System

There are two main factors on international trading theory (Salvatore, 2013), one is the basis for trade and the gains from trade. Second is the pattern of trade. The first reason countries are trading is because there is a difference between one country and another, such as difference in natural resources, climate and ability to produce goods. A country can only do trading if that country receives benefit from the trade. One of the benefits of international trade is getting access to goods that they cannot produce by themselves. The second reason why countries trade with each other is to achieve economies of scale in production. This means, if every country can limit their production activity to produce particular products in some number, then that country has an opportunity to centralise attention and every type of their resources to produce those particular products in bigger scale and subsequently become more efficient compared to the case where that country tried to produce various type of products simultaneously (Krugman and Obstefeld, 2004). The use of floating exchange rate system by a country's economy will produce fluctuating exchange rate that independently adjust with the change in economy condition. Thus, in a case where Central Bank increases their money offering, assuming that the price index is constant, this system will cause real balance increase.

In small open economy, the interest rate is determined by global interest rate. Increase of money offer will suppress domestic interest rate, thus capital outflow of investor will happen to gain higher reception. The presence of higher capital outflow impact the supply of domestic currency which further depreciate the exchange rate. The depreciation of exchange rate will decrease the price of domestic goods compared to overseas goods thus increases export. This means that in small open economy, monetary policy from exchange rate highly influences output and income. In floating exchange rate system, depreciation and appreciation of exchange rate will affect both import and export. If exchange rate experiences depreciation, then the domestic currency decreases relative to overseas currency, and subsequently export volume will increase.

The impact of fluctuating exchange rate to export gains interest of some economic researchers. Solakoglu and Demirağ (2008) estimated the effect of exchange rate volatility with 143 companies in Turkey on 2001-2003 as samples. The result showed that there is no negative nor positive impact between volatility of exchange rate and real export.

Cheung and Sengupta (2013) explored the effects of real effective exchange rate (REER) to companies in export segment of non-financial sector in India in 2010-2010. The result showed that there is a negative and significant impact from currency appreciation and exchange rate volatility to companies in export segment of non-financial sector in India. Moreover, it was discovered that those companies in non-financial sector responded asymmetrically to exchange rate. The effect of change in REER is negatively encouraged by the appreciation effect compared to depreciation effect, India's companies that has smaller export segment tends to give greater respond to change and volatility of REER. Service export companies are tend to be more influenced by the fluctuation of exchange rate compared to goods export companies.

Grier and Smallwood (2013) researched the uncertainty effect to trading by using approximation model of GARCH multivariate. By using the data from both developed and developing countries, the result shows that Real Exchange Rate (RER) has negative impact to trading on less developing countries. Moreover, it was deducted that the uncertainty in RER tends to be related with the real exchange rate appreciation. Positive shock produces negative response while positive response that is relatively smaller, particularly in developing countries.

Marilyne Hucher-Bourdon and Jane Korinek (2012) performed a research regarding volatility dynamics in Brazil, Chile, New Zealand and Uruguay for the period of 1990-2013. Estimation methods used were GARCH and IGARCH model. The research result showed that the raw material export depends on the demand and international price, yet the increase in real exchange rate volatility or real exchange rate (RER) gives variable impact to those four countries. The potential impact from the exchange rate volatility, global demand and international price to export used Johansen methodology and impulse respond. The result showed that export is positively influenced by global demand and international price, however RER volatility does not give significant impact except in Uruguay where RER volatility influenced export negatively both in short and long term.

Chit, Myint M. (2008) studied the impact of exchange rate volatility to bilateral export in ASEAN–China Free Trade Area (ACFTA) using general gravity model. Research was done using panel data with samples of 20 throughout period of 1982: Q1 to 2005: Q1 using fixed effect model and random effect model methods. Unit root test and panel co-integration were used to confirm the long term relationship between variables. Empirical result showed that the volatility of bilateral real exchange rate has a statistically significant negative impact to bilateral export of ACFTA countries.

Bustaman, A. & Jayanthakumaran, K. (2007) researched the long and short term impact of exchange rate volatility to main commodity export of Indonesia to the United States in monthly period of 1997-2005. The estimation of co-integration relationship was obtained by using ARDL test procedure. The estimation of short-run dynamics was obtained using error-correction model. The result indicated that there are significant negative and positive coefficients between various commodities. However, in long term, majority of commodity tends to support traditional view where higher exchange rate impacts to higher volatility and decreases international trading. The uncertainty of exchange rate in production and export depends on the risk index relative to various commodities.

Hock-Tsen Wong and Hock-Ann (2016) studied the effect of exchange rate volatility to bilateral export of manufacture goods from Malaysia to China. The result showed that exchange rate volatility has a significant impact to real export. Moreover, exchange rate volatility has both negative and positive impact to real export. Export will be more variable by focusing on intra-region trading which is the ASEAN Economic Community.

Shinta Fitrianti (2017) researched the long and short term impact of exchange rate volatility to real export of Indonesia to its main trading partners, which are Japan and the US. This study used monthly data from January 1998 to October 2015 with structural break of global economy crisis in 2008. Furthermore, commodity prices were also included as an independent variable. Long term co-integration was estimated using Autoregressive Distributed Lag (ARDL) limit test, while short-term dynamics was determined using Error Correction Model (ECM). The findings indicated that the Rupiah volatility to Japanese yen decreases Indonesia's export to Japan, both in short and long term. Fluctuation of Rupiah to US dollar increases Indonesia's export to the US in short term, however this impact does not occur in long term. On the other hand, there is no shock impact to commodity prices, except long term export to Japan.

3. DATA AND METHODOLOGY

This research used quarterly period of time series data from Q1. 2012 to Q2. 2018. Economy models used as an analysis tool in this research were co-integration method and dynamic linear Error Correction Mechanism (ECM) model. The basis of applying these analysis tool was the fact that data of time series of macroeconomic variables generally has a non-stationary trend. In relation to the forming of such dynamic linear model, there are some testing that need to be performed, such as stationarity test, co-integration test and error correction test (Ekananda, 2016).

3.1. Data Stationary Test

Stationary is one of the preconditions in econometric model for time series data. Stationary data is data that shows constant mean, variance and auto-covariance (in lag variation) every time data is used, which means with stationary data, time series model can be considered more stable (Gujarati, 2002: 798). If one of the data used in the model is not stationary, thus the validity and stability of the data should be re-considered because the regression result that originated from non-stationary data will cause spurious regression. Stationary test that will be done in this research is unit roots test (Augment Dickey-Fuller).

Unit roots test was developed by Dickey and Fuller and known as DF test or Augmented Dickey Fuller (ADF test), which is a method to test the degree of integration to test the stationary of the analysed data (Gujarati, 2003: 814-817). The unit roots test procedure is estimated in three auto-regressive equations (Gujarati, 2003: 815) as below:

$$Yt = \rho Yt\text{-}1 + \mu t \text{ (without intercept)} \tag{3}$$

$$Yt = \beta_1 + \rho Yt\text{-}1 + \mu t \text{ (with intercept)} \tag{4}$$

$$Yt = \beta_1 + \beta_2 T + \rho Yt\text{-}1 + \mu t \text{ (with intercept and trend)} \tag{5}$$

As explained above, data stationary test is needed to gain data validity. If one of the data used in the model is not stationary, then the validity and stability of that data need to be reconsidered because the regression result from non-stationary data will cause spurious regression. Thus, the procedure of empirical analysis in this research is started by stationary test on various economic variable data using data stationary test which used for every variable in research model based on Augmented Dickey Fuller Test (ADF test), in which the calculation was assisted using Eviews program. The result of stationary test calculation on first difference degree with equation of dYt = Yt -Yt-1 shows every variable is stationary, as shown in Table 3.1 below.

Table 3.1: Result of Data Stationary Test: Dickey-Fuller Test

Country	Variable	P-Value ADF Test Statistic		Stationary
		Level	First Difference	
	LNX_to SPR	0.6111	0	1stdifference
Singapore	EG_SPR	0.3486	0.0166	1stdifference
	LN ER	0.3207	0.0237	1stdifference
	LNX_to JPN	0.2564	0.0003	1stdifference
Japan	EG_JPN	0.0003	0.0004	Level& 1stdifference
	LN ER	0.3207	0.0237	1stdifference

Note: LNX_To SPR: Natural logarithm of export value to Singapore; LNX_To JPN: Natural logarithm of export value to Japan;
LN ER: Natural logarithm of nominal exchange rate (in direct term Rp/USD); EG_SPR: Singapore's economic growth; EG_JPN: Japan's economic growth

3.2. Co-integration Test

Co-integration test is a continuation of unit roots test and integration degree test. If two or more variables have different integration degree, such as X=I(1) and Y=I(2), then those two variables are not co-integrated. Co-integration test aims to determine whether there is a balance between observed variables. Co-integration concept is related to the presence of long-term balance where the economy system is convergent all the time as intended by the theory and a method to perform testing to theory. The method used to estimate long term relationship is Engle-Granger method (Gujarati, 2003:823) which is by testing the stationarity of the error term. The basis of co-integration test application is the fact that majority of macroeconomic data produce spurious regression relationship. Thus, co-integration method is a solution to such issue.

Co-integration test is one of the tests in dynamic model where the aim of this test is to determine whether a long term relationship exists between variables. Co-integration test uses Engle-Granger method, while Johansen Co-integration approximation was used to obtain long term equation on the research model proposed. The ADF test result from residual (ECT) for the research model can be seen from Table 3.2 and 3.3 below.

Table 3.2: The Result of ADF Test Error Correction Term (ECT) of Singapore

Null Hypothesis: RES1 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.013266	0.0051
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Table 3.3: The Result of ADF Test Error Correction Term (ECT) of Japan

Null Hypothesis: RES2 has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, max lag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.269741	0.0306
Test critical values:	1% level	-3.808546	
	5% level	-3.020686	
	10% level	-2.650413	

*MacKinnon (1996) one-sided p-values.

Based on table 3.2 and 3.3 above, it can be seen that ADF value for Error Correction Term (ECT) is a significant value which indicated by P-value that is smaller than significant level of 5%. Based on this condition, it can be concluded that observed variables in this research co-integrates in the same degree. This means that there is a long term balance between every variables. In other words, exchange rate and economic growth variables have a correlation and co-integrate with export variable.

3.3. Error Correction Mechanism (ECM) Dynamic Model

If the result of Engle-Granger test shows that researched variables are co-integrated, a model is needed for dynamic adapting process of variables in the model, which called Error Correction Mechanism (ECM). This model is used to determine how the disequilibrium in short term will be corrected or adjusted to reach long term balance which illustrated by error correction term variable. Furthermore, the model specification of this research is as below:

1. $LNX\_To\ SPR = \alpha_0 - \alpha_1 LN\ ER + \alpha_2\ EG\_SPR + \varepsilon$ (6)
2. $LNX\_To\ JPN = \beta_0 - \beta_1 LN\ ER + \beta_2 EG\_JPN + \varepsilon$ (7)

Where:

LNX_To SPR = Natural logarithm of export value to Singapore

LNX_To JPN =Natural logarithm of export value to Japan

LN ER   =Natural logarithm of nominal exchange rate (in direct term Rp/USD)

EG_SPR   = Singapore's economic growth

EG_JPN   = Japan's economic growth

4. FINDINGS AND DISCUSSIONS

4.1. Indonesia's Export Growth to Singapore and Japan

Indonesia's export growth to Singapore and Japan tends to decrease as shown in Figure 8. The dramatic decrease of export to Singapore happened in the period of 2012-2013 and 2014-2015 as well as 207-2018. While the huge decrease of export to Japan occurred in period of 2011-2012 and 2013-2014 as well as 2017-2018. The decrease in export influenced the general export growth as those two countries are considered as the top two countries in Asia region that also buy many export products of Indonesia. The decrease in export was probably happened due to the effect of the ever-increasing global economy crisis. The weakening of economic condition of destination country can also impact those countries to decrease their demand to goods and services from Indonesia.

Figure 8: Export growth to Singapore and Japan in the Period of 2011-2018 (%)
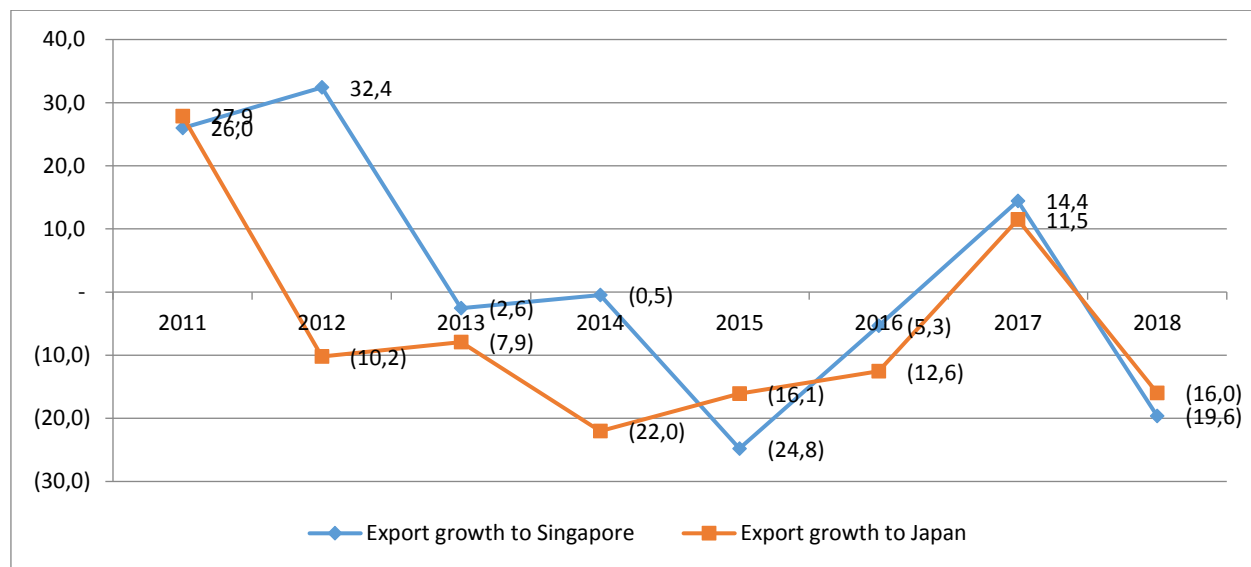
Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

4.2. Dynamic Model Analysis (Long Term Model Estimation)

Co-integration concept stated that in the case where one or more variables are not-stationary and co-integrated, then the linear combination between variables in the system will work in stationary nature, thus a stable long term equation system can be achieved. Table 4.1 below shows the model of long term equation for the model of Indonesia's export to Singapore and Japan. The specification of long term equation model for Indonesia's export model is as follows:

1. LNX_To SPR = 21.96939 - 0.746412 LN ER +0.033248 EG_SPR   (8)

2. LNX_To JPN = 29.52396 -1.503500 LN ER +0.029554 EG_JPN   (9)

Based on the equations above, it can be understood that in long term, the exchange rate in the form of direct term (Rp/USD) has negative impact to Indonesia's export, both for Singapore and Japan as the destination. This is shown by P value smaller than 1%. Moreover, by observing the coefficient value of Singapore as trading partner of -0.746412 and Japan of -1.5035, it can be perceived that by considering the constant economic growth, every 1% increase of exchange rate (which indicates Rupiah to be depreciated) impacts export decrease to Singapore of 0.75% and export decrease to Japan of 1.5%.

Table 4.1: Estimation Result of Long Term Export Model

Independen Variable	Singapore		Japan	
	Coefficient	Prob. (1- tailed)	Coefficient	Prob. (1-tailed)
LN ER	-0.746412	0.0000**	-1.503500	0.0000**
EG	0.033248	0.0071*	0.029554	0.0369*
C	21.96939	0.0000	29.52396	0.0000
R-squared	0.637605		0.855459	
Adjusted R-squared	0.606093		0.842890	
Prob(F-statistic)	0.000009		0.000000	

Noted: ** Significant at α 1%   * Significant at α 5%

This is not in agreement with the research hypothesis that theoretically, the weakening of Rupiah to US Dollar should be able to encourage export because products price is cheaper when converted to US Dollar thus become more competitive. The study result may happen for Indonesia's case because Indonesia's export is still dominated by commodity with price that still tend to be decreased thus the influence of the Rupiah's weakening is very small compared to increase in export as shown in Figure 9 below.

Figure 9: The Growth of Index Price of Commodities in World Market and Change in Exchange Rate (RP/USD) in Period of 2011-2016
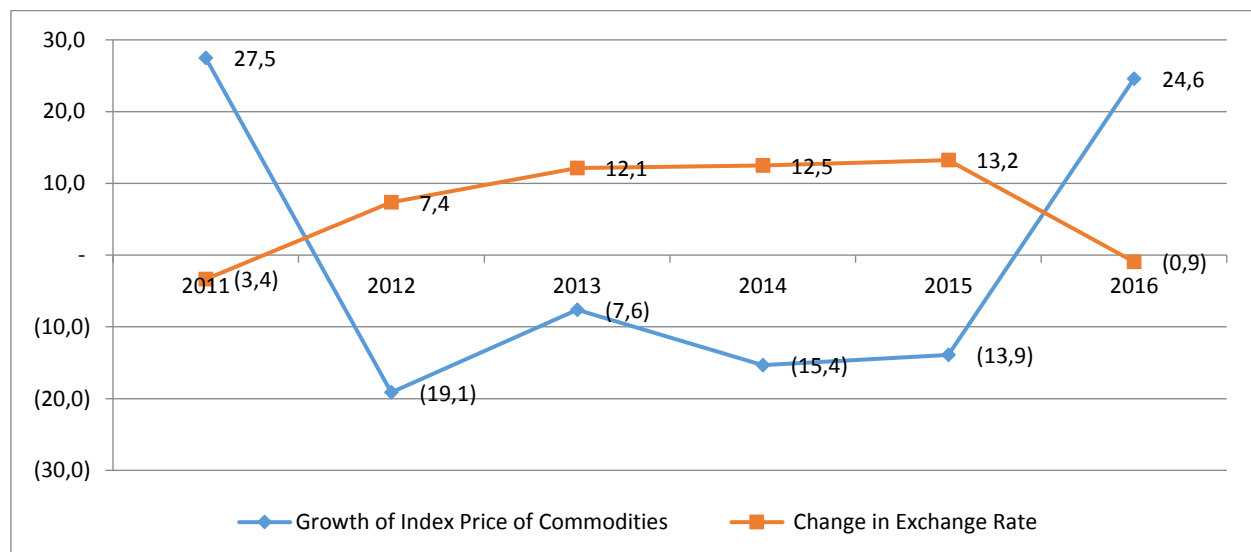
Source: Indonesia's Statistic of Economy and Financial, Bank of Indonesia (various periods), processed data

Moreover, the result of this research discovered that in long term, the economic growth of the trading partners of Indonesia (Singapore and Japan) has positive impact to Indonesia's export. This is indicated by P value smaller than 5%. From Table 4.1 and equation above, it can be concluded that by assuming constant exchange rate, in every 1% of economic growth increase of Singapore and Japan, export to Singapore and Japan will increase by 0.03%. This is in agreement with the research's hypothesis. The increasing overseas economic growth indicates the economic condition of that country is in good condition and can increase the demand of export goods from other countries.

After the regression of long term export equation above is determined, then the next step is to determine the residual from the equation. The result will show whether correction to export is due to disequilibrium of exchange rate and economic growth. Residual from export equation will be included as an ECT variable in short term equation. From the short term equation based on the estimation result using ECM, the estimation result is shown on Table 4.2 that demonstrates the coefficient value of Error Correction Term (ECT) on the model is significant and negative to estimate export in Indonesia. The estimation result of Error Correction Model (ECM) above shows that in short term, exchange rate and economic growth of trading partner countries have

no effect on export. This is shown by P value greater than 5%. However, the variation of two variables can simultaneously elaborate the variance of export variable of 39% and 61% of the rest can be elaborated by the variance of other variables outside the model. Based on the available data, the estimation model for Indonesia's short term export can be summarised in the equation below:

1.   D(LNX_ToSPR) = - 0.002245 - 0.339532D(LNKURS) + 0.009830D(PE_SPR) - 0.710213*ECT   (10)
2.   D(LNX_ToJPN) = - 0.025031- 0.028575D(LNKURS) + 0.003397D(PE_JPN) - 0.544135*ECT   (11)

Based on the short term equation using ECM method, ECT coefficient can be calculated. This coefficient measures regressand's respond in every period that deviate from equilibrium. According to Widarjono (2007), coefficient of non-equilibrium ECT correction is in a form of absolute value which elaborates the time needed to determine equilibrium value. The ECT coefficient of - 0.710213 means that the difference between export to Singapore and the equilibrium value of 0.710213 will be adjusted in the duration of 1 quartile. Thus, ECT coefficient of - 0.544135 means that the difference between export to Japan and the equilibrium value of 0.544135 will be adjusted in the duration of 1 quartile.

Table 4.2: Estimation Result of Indonesia's Export ECM

Independent Variable	Singapore		Japan	
	Coefficient	Prob.	Coefficient	Prob.
D(LN ER)	-0.339532	0.5770	-0.028575	0.9570
D(EG)	0.009830	0.3238	0.003397	0.8019
ECT	-0.710213	0.0015	-0.544135	0.0054
C	-0.002245	0.9148	-0.025031	0.1742
R-squared	0.390634		0.318152	
Adjusted R-squared	0.303582		0.220745	
Prob(F-statistic)	0.013874		0.041610	

Noted: ECT: Error Correction Term

5. CONCLUSION

Based on the result of long term regression analysis, it was found that exchange rate in the form of direct term (Rp/USD) has negative impact to Indonesia's export, both to Singapore and Japan. The result of this study may happen in Indonesia because Indonesia's export is still dominated by commodities with prices that tend to decrease, thus the effect of weakening rupiah is very small compared to export increase. In the short term regression analysis, it was found that exchange rate and economic growth of trading partner countries do not have any impact to Indonesia's export. Error Correction Term (ECT) coefficient produces negative and significant value which mean that the convergence of export variable to reach equilibrium will occur if there is a shock in economy. Simultaneously, currency and economic growth variables influence Indonesia's export to Singapore and Japan both in short and long term. Findings of this empirical study shows that in the long term, the effect of the exchange rate to Indonesia's export to Japan is greater compared to Singapore. Subsequently, the effect of Singapore's economic growth to Indonesia's export is greater than the effect of Japan's economic growth. The policy to maintain the exchange rate in the right level to increase Indonesia's export, structural issue that needs to be addressed related to the domination of export commodity, and diversification of Indonesia's export market to new countries need to be done in light of the export growth to Singapore and Japan that tends to decrease. The policy to provide incentive to exporters can encourage exporters to keep their spirit in performing export activities thus impact to increase in export. The effort for diversification of Indonesia's export market to new countries needs to always be done to anticipate the decrease of supply of goods and services from Indonesia to main trading partner countries.

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DYNAMICS OF KNOWLEDGE IN THE ECONOMIC SYSTEM FRAMEWORK: COGNITIVE APPROACH

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ABSTRACT
Purpose- This paper aims to explore how the role of knowledge shapes concepts in an economic system framework.
Methodology- Literature study
Findings- By using literature study within cognitive approaches based on management theory, it can be explained how knowledge is processed, what environmental conditions are needed, and which actors are related. Furthermore, the relationship between concepts is discussed and presented in the form of conceptual framework of economic system from knowledge perspective.
Conclusion- This paper confirms the importance of the role of knowledge as a key resource in economic system that can be adopted or developed in regional economic studies.

Keywords: knowledge dynamics, economic system framework, regional economic studies
JEL Codes: D83, P40, P48

1. INTRODUCTION

In the regional economic context, the discussion of knowledge as a resource is less prominent than the discussion of human resources especially when it is associated with competitiveness and economic growth (Cadil, 2014, p. 85), so that the accumulation of knowledge and innovation is at a slower rate than in infrastructure and human resources (Zao, 2011, p. 46). Even if we want to explore the main sources of business and management issues that develop, knowledge becomes a very important essence. In the development history of evolution chain in management thinking, knowledge has always been the trigger for all business transformation. Starting from the industrial revolution in the 18th century, innovations have changed the production by using machines and no longer using human power (Stevenson, 2012). The invention of PC (Personal Computer) in the 1980s (O'Brien, 2003) to the internet era, can be said to be the result of the development of knowledge. Therefore, it is reasonable if we place knowledge as an important resource not only in the context of regional economics but also in other contexts.

The history of Japan's success emerging as an Asian economic giant in the 1980s is quite clear evidence of how knowledge resources can be managed into competitiveness on a regional scale. Zao (2011, p. 46) in his paper said, "Practice has proven that the environment and infrastructure are the core of local enterprises' innovation." Similar to Zao, Jeannerat (2016, p. 2) said that

"... regional production systems may be competitive advantage in the global cumulative generation and exploitation of knowledge resources."

After being destroyed by a war and an atomic bomb by allies in 1945, Japan intensively developed a concept that we know as Total Quality Management (TQM), which originated from the thoughts of quality management teachers such as Edward Deming. Japan managed to combine the concept of quality management with Japanese philosophy which was elaborated from local culture such as working hard, never giving up and some others. Until the 1980s Japan with its steel production proved the efficiency and effectiveness of its industry by defeating American-made steel products (Gasperz, 2005).

As in corporate perspective, the nature of knowledge resources in regional contexts is not static but dynamic and always continues to evolve, adapt and renew itself at all times (Jeannerat, 2016, p. 4). Knowledge resources also have different characteristics because they do not experience any contraction unlike any other general resources (eg HR and capital) (Krumins, 2015, p. 117). With good regional knowledge management, it aims to create an innovative regional environment to create high competitiveness.

Most of the existing studies still focus on the corporate context. By looking at increasingly tight business competition it will be difficult for a company to achieve good competitiveness with its own strength. Synergy with the economic system surrounding is very important to strengthen its position. Thus, the need for study in the context of regional economic system is expected to answer these problems. The main concepts that will be discussed in this paper include; business environment, knowledge in the economic system and key actors in knowledge management.

2. BUSINESS ENVIRONMENT

The concept of a business environment must be well described, both from a vertical and horizontal perspective so that knowledge ecosystem can run well (Noennig, 2014, p. 1360-1362). Business environment itself also changes regularly or is so dynamic (Pachura, 2013). This is because (1) from the customer's perspective, market demands are always changing, (2) from its nature perspective, the knowledge itself is dynamic, which encourages the emergence of new innovations.

Although changes in the business environment are quite complex and can change with a scale that is difficult to predict, it can still be approached as a system (Noennig, 2014 and Jarvi, 2018). Noennig (2014) and Jarvi (2018) call the knowledge environment specifically as a system or 'ecosystem', which can be conceptually described in terms of relationships between entities in the ecosystem. In contrast, Jeannerat (2016) (figure 1) does not specifically describe the knowledge environment as a system, but only looking at the environment as limited to the concept of geography. Jeannerat focuses more on how knowledge proceeds through a system of production and consumption. However, Jeannerat can describe well how knowledge experiences its dynamics through renewals in a production and consumption system.

Figure 1: Conceptualizing an economic of knowledge valuation (Jeannerat, 2016)
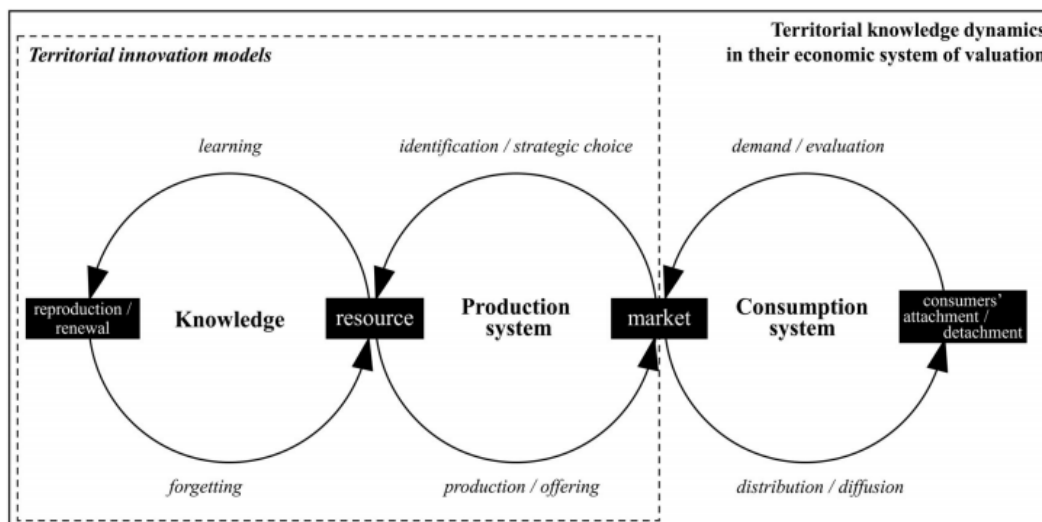
Business environment from regional perspective is also seen as an important aspect because it is a prerequisite for subsystems to work properly (Noennig, 2014) because environmental stability guarantees the effectiveness and efficiency of regional management (Zao, 2011). The relationship between the concept of environment and knowledge has often been observed and is a very important issue because knowledge ecosystem is considered as a driver of the birth of innovation. Disruptions to the environment because of the political situation and government regulations that are less supportive will disturb knowledge interactions (Gurvich, 2016).

From an internal-external point of view as a result of its regional scope, it is identical to the concept of the company. The difference is in a wider scale, where the level of uncertainty is high (Jeannerat, 2016) so that to realize it requires the organization and collectivity of the actors. It is different from the corporate context where internal-external boundaries are limited by production and consumption systems (Jeannerat, 2016).

The environment will influence strategy, both internal and externally. In principle, it is the same between company's economic system and regional economic system. Both can take the same approach using the I / O (Industrial Organization) and RBV (Resource-Based Model) models (Hitt, 2011) and Porter's 5 Forces Models (Williams, 2019; Hitt, 2011; O'Brien, 2003 and Laudon, 2012). But because of its wider scope, relations within the regional economic system are more complex. In complex relationships of dynamic environment, we must combine several approaches, not only one approach.

3. KNOWLEDGE IN REGIONAL ECONOMIC SYSTEM

Knowledge is key element in regional development and is an important content in regional management (Zao, 2011, p. 43-45). Continuity of regional development depends on the extent to which the effectiveness of the output of knowledge produced is able to follow changes in the environment. The nature of knowledge must also be understood as an environment that has high dynamics because it is always changing. Knowledge as a resource in an economic system can be understood as a cycle process where knowledge develops through the process. Using the TIM and TKD perspective, Jeannerat (2016) well illustrates how knowledge is absorbed into the production and consumption subsystems in a cycle within territorial area. Unfortunately, it does not discuss the environmental aspects.

In the regional context, the production system (Jeannerat, 2016, p. 3) can be compared with the interaction of 4 actors (Zao, 2010, p. 44) in an environment called the knowledge ecosystem (Noennig, 2014, p. 1360) so that it can form a conceptual framework. Knowledge ecosystems will become a production system that will result in the development of technology and innovation which will ultimately result in increasing regional competitive value (Zao, 2010; Pachura, 2013).

According to Jeannerat (2016) knowledge in an economic system will experience a process of co-evolution along with changes in the environment, so that to find the right strategy must be predictability (Zao, 2010). To simplify planning, Jeannerat (2016) categorizes Knowledge valuation according to its economic system into four; Knowledge Marketization, Knowledge Improvement, knowledge adaptation and knowledge co-development. Through different contexts, knowledge undergoes a renewal process due to market orientation, improvement and adaptation and development carried out collectively by all actors in the economic system.

Adopting the thought of Pachura (2013, p. 116), knowledge as a resource absorbed in production system (Jeannerat, 2016, p. 3) will be processed by actors in regional knowledge ecosystem where the process consists of "learning and transferring knowledge, sharing knowledge and creating innovation, interaction and trust arising from the cultural context and local environment. Similar to Pachura, Dirks and Ferrin (2001) in Keszey (2016, p. 3699) state the importance of trust. According to them, "trust is an essential element in positive human relationships and creates a collaborative environment by providing people with feelings of security and attachments."

The interaction between actors in regional knowledge system is considered as the most appropriate in the global era as it is today. Zao (2010) calls it "collective learning," while Jarvi (2018) calls it the "collectives knowledge ecosystem." Globalization causes the physical boundaries between systems to become increasingly blurred so that collective learning is not limited to internal (regional) information but can absorb information from global environment. Therefore, in the conceptual framework image (Figure 3), the regional boundary shows a dashed line illustrating that character. In fact, it does not rule out the possibility of collaboration between regions in the field of knowledge development (Zao, 2011; Jeannerat, 2016; Keszey, 2016; Pachura, 2013; Romanova et al., 2019; Vorontsov, 2015; Noennig, 2014).

4. KEY ACTORS

Key actors who play many important roles in knowledge ecosystem are: First, the government (Zao, 2011; Pachura, 2013; Jarvi, 2018 and Jeannerat, 2016) through its institutions. They have a very crucial role because they are responsible for the environmental situations and conditions in which business people and other actors interact to develop knowledge. The government are also responsible for system infrastructure which ensures that the knowledge process can run well. A number of barriers to the flow of capital, resources and labor; incentives for new companies (Gurvich, 2016); transportation infrastructure and public services (Krumins, 2015 and Nakamura, 2013) are examples of the role of government in an economic system. For this reason, the government must always refer to global trends in the development of knowledge so that they are not left behind.

Figure 2: Schematic representation of regional innovation (Zao, 2016)
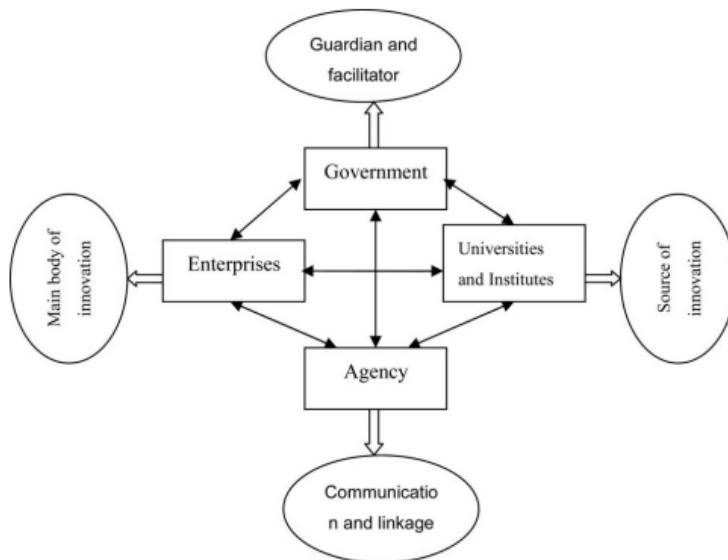
Second, academics include research institutions and universities (Zao, 2011; Pachura, 2013; Jarvi, 2018 and Jeannerat, 2016). As stated by Pachura (2013), "The scientific and research environment should also cooperate with companies." In this section Jarvi (2018, p. 1524) states that universities occupy key roles and central actors in the knowledge ecosystem.

Third, companies or business organizations (Zao, 2011; Pachura, 2013; Jarvi, 2018 and Jeannerat, 2016). Zao (2011) emphasizes the importance of companies as the spearhead in an economic system. Knowledge resources generated by research institutions and universities are absorbed and implemented by the company. Then the company embodies and delivers into the consumption system. Although its role is vital, but without a facilitator by other actors, it is impossible for a company to achieve optimal competitiveness.

The fourth is an intermediary agent (Zao, 2011), although it is not mentioned in other literature sources but this is quite interesting. In this regards, Zao (2011) appears to be so aware of the intermediation function represented by archives, museums, non-governmental institutions and others. Zao (2011) describes an intermediary agent as having an important role in strengthening the flow of communication and knowledge with the other three actors. Figure 2 shows four actors (Zao, 2011) that are different from the concept of 3 actors (Pachura, 2013; Jarvi, 2018 and Jeannerat, 2016).

4. CONCEPTUAL FRAMEWORK

From the discussion above, relationships between concepts can be arranged in the form of a conceptual framework (figure 3) as follows:

Figure 3: Regional Knowledge Value Chain (own elaboration from several sources)
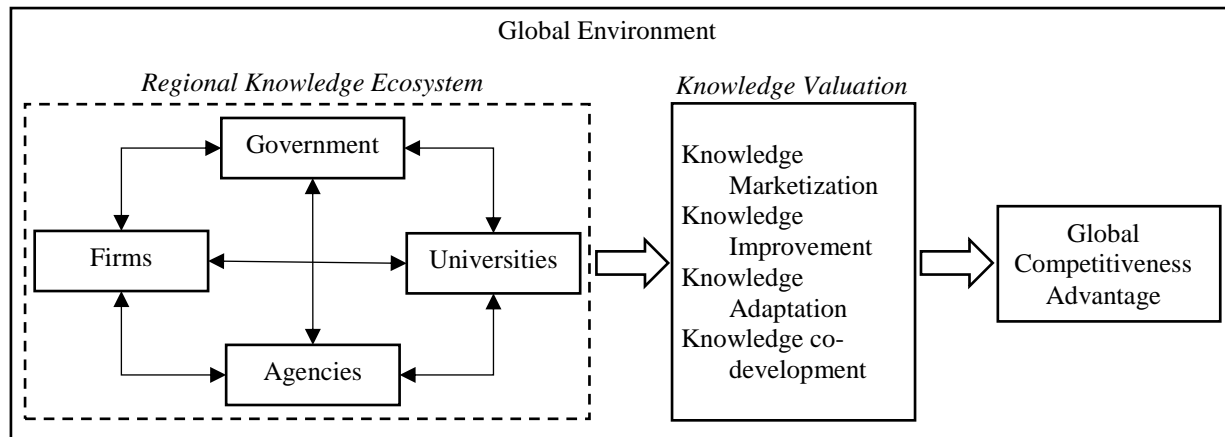
5. CONCLUSION

In the value chain context, the value of knowledge is not only important, but knowledge also becomes the core, or ranks first, in the value chain. Then good understanding of how knowledge is absorbed, how it is processed and developed, is also important because it will determine the quality of output that will be produced in a value chain.

The concept of "ecosystem" in the field of natural science turned out to be used also in the field of economics. Borrowing the term "ecosystem" can help explain how knowledge is absorbed, processed, and developed through the interaction of actors in regional economic system. Regional knowledge ecosystems are the key to whether creation, improvement, development of innovation can work well. In this case the government with its regulations and policies will determine the conductivity of the interaction of other actors in the knowledge value chain process.

In the regional knowledge context, the creation and development of competitive values depend on knowledge ecosystem in the region. Good collaboration between 4 actors (government, universities/research institution, agencies and firms) in the ecosystem is crucial for regional competitiveness.

This paper has not discussed the factors that can hinder the process of regional value chain knowledge. It is suggest that further analysis can deepen and broaden some more understandings of knowledge in the context of regional economics. Because the environment is always changing, new concepts and new propositions will continue to emerge in place of the old ones.

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THE EFFECT OF MANUFACTURING VALUE ADDED ON ECONOMIC GROWTH: EMPRICAL EVIDENCE FROM EUROPE

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ABSTRACT

Purpose- The purpose of this study is to examine the impact of manufacturing on economic growth in European economies during the period of deindustrialization. Moreover, the associations between capital, labor force, and technology with economic growth have been investigated.
Methodology- Econometric tests are performed based on a panel data for twenty-five of most competitive European economies for the period 1995 - 2016. To quantify the relationship between explanatory variables and economic growth, an eclectic model consists of both the Kaldor's first law of growth and the neoclassical growth model was estimated.
Findings- The result of this study revealed that the economic growth has a significantly positive association with manufacturing, labor force, and technology. The unexpected interesting result is that the association between economic growth and investment is significantly negative.
Conclusion- Research stated that policy makers should invest in those policies that can enhance the growth of the manufacturing sector by increases of manufacturing productivity and increases in the manufacturing employment share to create job opportunities in this sector in order to have a sustainable, healthy and competitive economic development in future.

Keywords: Kaldorian Approach, deindustrialization, economic growth, manufacturing value added, European Economy.
JEL Codes: L60, O47, O14, O52

1. INTRODUCTION

Historically, manufacturing has played essential role in economic development in any nation (Naudé, Szirmai, and Haraguchi, 2016). National economies that could quickly harness its power, had realized abundant wealth, productivity, and significant development in their countries through manufacturing (Oyati, 2010). The stories of the advanced nations and those of emerging economies like India, China, North Korea, Singapore, and Malaysia showed a positive connection between national economic growth and the growth of manufacturing sector (Banjoko, Iwuji, and Bagshaw, 2012).

According to European Central Bank (2015), with nearly 340 million people, the euro area is one of the biggest economies in terms of population. While in terms of its share of global GDP, it is the third-largest economy, coming after the United States of

America and the People's Republic of China (Table 1). The manufacturing sector engaged 29.9 million persons in gainful employment in the year 2014, generating €1.710 billion of added value. Using these measures, manufacturing was NACE's[1] second-biggest section within Europe's non-financial business economy in terms of what it contributes in job creation (22.1 %) and the major contributor to non-financial business economy value added, which accounts for more than one-quarter of the total (26.0 %) (Eurostat, 2018).

Table 1: Share of World GDP of the Euro Area in 2016

	Unit	Euro Area	U.S.	Japan	China
Population	Millions	340.2	323.4	127.0	1382.7
GDP (share of world GDP in PPP)	%	11.7	15.5	4.4	17.7

Source: European Central Bank, 2015

In spite of all well-known advantages of manufacturing sector, for a number of years now, Europe and some other parts of the world have moved into a deindustrialization process (Dhéret and Morosi, 2014). Deindustrialization in advanced economies, which is given away by the incessant decline in manufacturing sector's contribution to job creation and the GDP as well as the increase in contribution of service sector to the GDP, has not been generally viewed as a negative occurrence, but rather as an expected result in the process of economic development (Rowthorn and Ramaswamy, 1997). This process can somewhat be credited to shifts in policies and drastic economic reforms than to the maturity of economic structures (Arestis, Sawyer, and Palma, 2005).

A recent report of the European Commission (2014) has placed emphasis on the significance of the real economy, and robust industry as a driver of employment and economic development. In its policy vision, the targeted input of industry to the growth of GDP by 2020 has been raised up to 20%. For Europe's competitiveness and economic recovery, a robust industrial base is seen as fundamental.

Investigation of the long-standing correlation that exists between economic growth and manufacturing output for competitive European economies in the period of the phenomenon of deindustrialization has been rarely investigated in the literature. Therefore, based of Europe's future policies it is essential to study the role of manufacturing in economic growth for the future in the Europe's economic region.

The purpose of this research is to investigate the role that manufacturing sector has played in driving the growth in twenty-five most competitive European economies for the period between 1995-2016 by conducting a descriptive analysis, OLS regression, Pearson correlation, fixed and random effects model. To quantify the correlation between economic growth and manufacturing output, an eclectic model consisting of both the Kaldor's first law of growth and neoclassical growth model was estimated.

Aside this introduction, the second chapter aims to investigate the essence of the relationship between the manufacturing sector and economic development as well as to also discuss theories which have been used in previous related studies. The third chapter is research methodology which explains data collection, a model of the study and all estimation methods which have been conducted. Section 4 shows the findings of the study by outlining the results while section 5 discusses the results from the models, the implications, the contribution, as well as the limitations of this study. At the end, section 6 contains the conclusion of the study.

2. LITERATURE REVIEW

Based on theoretic and various empirical researches in the literature, manufacturing output, level of technology, investment, and labor force have played an essential role in any nation as the main important factors to influence the real gross domestic in long run. Kaldor's first law growth theory (Kaldor, 1966) and neoclassical growth theory (Solow, 1956) separately show the importance of the mentioned factors in long-run economic growth.

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1 Statistical Classification of Economic Activities in the European Community

2.1. Theoretical Literature

2.1.1. Kaldor Growth Theory

Nicholas Kaldor's paper was published in 1966, on the reasons for the United Kingdom's poor economic progress in that particular period .Kaldor carried out a structural, empirical and comparative study, concentrating on the part the manufacturing sector plays roles in economic development (Kaldor, 1966). This 1966 paper of Kaldor came to be an important reference as it contains the basis of the hypothetical formulation which was later acknowledged as Kaldor's growth laws. Kaldor's growth laws acclaim vital significance to the manufacturing industry for economic growth. He further posited that the growth passage of advanced nations in the post-war era (over the period 1952-54 to 1963-64) displayed the association between industrial development and the entire economic performance of a nation. This statement formed the basis for the first law of Kaldor which says that a close association exists between increasing in manufacturing output and increasing in gross domestic product (GDP). This first law can be expressed briefly as the manufacturing industry is the engine of economic growth. The linear specification of the first law of Kaldor is as follow:

$$\text{"gGDP} = a_0 + a_1 \text{ gMAN"}$$

Where:
gGDP: The growth of total output.
gMAN: The growth of the manufacturing output.

It is significant to be aware that the association these two variables have is not only as a result of the manufacturing output but represents a huge constituent of total output. The total rate at which the economy grows is connected to the excess rate of growth of the manufacturing output over the rate of growth of the non- manufacturing output. All this implies that good growth is typically found in circumstances where manufacturing industry's share in the GDP is increasing (Libanio and Moro, 2006). Kaldor's work turned out to be an essential turning point in the economic growth literature.

2.1.2. Neoclassical Growth Theory

The theory of economic growth has developed with an American economist Robert Solow (1956). Some are of the opinion that the theory of economic growth, developed in the middle of the twentieth century, recognizing the set of technological advancement as a significant element of the economic development of nations (Solow, 1956). He paid attention to the course of capital formation as well as presumed that production was a function of labor, technology, and capital. He observed that if the only drawback to economic development were capital, then producers will replace capital with labor. At that juncture, his input focused on the result that sustainable growth is influenced by changes in technology and not investment or savings. Saving only has an impact on growth temporarily, or growth on its way to sustainability, for the reason that the economy will trip into diminishing returns as the ratio of capital per worker rises.

The structure for the development of the total factor productivity (TFP) concept is provided by Solow's model where labor augmenting, technological change and the increase of capital per worker explain the long-term growth of the economy per worker. Of late, conditional convergence, a model which is a derivative of these models is widely in use. This empirical property is founded on the supposition of capital's diminishing return as a result economy with reasonably low capital per worker rates have a tendency to develop quicker owing to higher rates of return (Dragutinović, Filipović, and Cvetanović, 2005). The production function is the logical beginning point of Solow model. The linear specification of the Solow model is as follow:

$$Y = TF(K, L)$$

Where:
K: Physical capital
T: Technology
L: Amount of worker
Y: Production (GDP)

Neoclassical growth model reveals that, at the point of long-term steady equilibrium, technological changes effect on economic development.

2.2. Empirical Literature

2.2.1. Manufacturing and Economic Growth

It is well supported in development and growth literature that a strong causal relationship exists between the manufacturing growth and its GDP growth in any nation (Pacheco-López and Thirlwall, 2013). Szirmai and Verspagen (2015) analyzed the correlation between the manufacturing value added (MVA) and GDP for 92 countries in the period of 1950–1970, 1970–1990 and 1990–2005 using random effects, fixed effects and Hausman tests. They discovered that the manufacturing sector performances the role of a growth engine for low and a few middle-income economies if there is an adequate level of manpower. These kinds of growth engine characteristics are not applicable to the service sector. Szirmai and Verspagen (2015) re-examined the part that manufacturing plays as a growth driver in industrialized and emerging economies during 1950–2005 period using manufacturing value added (MVA) as indicator for manufacturing output. The examination reported that there is a reasonable positive effect of MVA on economic development.

Real growth rates of GDP were regressed on manufacturing growth rates by Fagerberg and Verspagen (1999). The regression results show that the manufacturing was an engine of economic development in East Asia's and Latin America's developing countries; nonetheless, there is no significant result of manufacturing in the developed countries. Subsequently, Fagerberg and Verspagen (2002) analyzed the effect of manufacturing and services on economic development in these three periods: 1966–1972, 1973–1983 and 1984–1995 for 76 countries. They discovered that before 1973 manufacturing had greater positive impacts than after 1973.

In case of on middle-income economies, Su and Yao (2017) by using analysis long-run Granger causality tests, cross-sectional regression and panel regression showed that manufacturing sector growth drives services sector growth. These findings have led the authors to conclude that manufacturing is indeed the growth engine of economies and, hence, that premature deindustrialization has negative effects on economic growth.

Chakravarty and Mitra (2009) also Kathuria and Natarajan (2013) tested the engine of development hypothesis in India, a place where the service sector plays a significant role in the economic growth. In a previous study by Chakravarty and Mitra (2009), covering the 1973 to 2004 period, it was found that manufacturing, services, and constructions have been the drivers of growth. Kathuria, Raj, and Sen (2013) examined the same hypothesis in India for 15 states in 1994-1995 to the 2005-2006 periods and came to the conclusion that manufacturing had strong effect in economic growth in India, in spite of its diminishing GDP share.

Szirmai (2012) reiterated no uncertainty about manufacturing being a significant growth driver in most emerging economies. He concluded that out of the 90 countries sample during the 1950–2005 periods, the statistical findings reveals that manufacturing's prominent role is uncertain and therefore questions if manufacturing will remain growth engine of economies.

Herman (2016) using statistical analysis of the Romanian economic data affirmed that the process of deindustrialization is demonstrated by the decrease in the share of manufacturing in job creation and GDP. Since the year 2000, the force of the process of deindustrialization decreased allowing manufacturing to continue as the backbone of the Romanian economy.

2.2.2. Investment and Economic Growth

An investment is an item or asset which is bought due to the desire to appreciate or to generate profit in the future. From the economic view, investment is the action of purchasing some goods which are not consumed today, but they would be utilized in the future to generate wealth instead. Investment in equipment and machinery is strongly associated with growth, using the Penn World Table and the United Nations Comparison Project between 1960 and 1985 (Long and Summers, 1991).

Dritsakis, Varelas, and Adamopoulos (2006) empirically investigated the causality among economic growth, gross capital formation, exports, and foreign direct investments for Greece over 1960-2002 period using a multivariate autoregressive VAR model. The results of co-integration test submitted that only one co-integrated vector exists between the examined variables,

whereas Granger causal relationship tests revealed a unidirectional causality between gross fixed capital formation and export, the unidirectional causal relationship also exists between economic growth and foreign direct investments.

Blomstrom, Lipsey, and Zejan (1993) showed that an increase in the formation rate of fixed capital would cause a rapid growth in per capita GDP via using the simple causality by working on 100 countries. Also, Kolmakov, Polyakova, and Shalaev (2015) showed that Venture Capital Investment (VCI) significantly affects GDP in Russia and US on a yearly basis during 1998-2011. Ibrahim and Okunade (2015) denoted that the data of the years between 1980 and 2013 of Nigeria conveys a significantly strong influence of domestic and foreign investment on economic development in a long and short run. Furthermore, Nasreen, Anwar, and Waqar (2015) showed that both human and physical capital investment has a positive impact on the growth of the economy via using data from 94 countries during 1985-2009.

2.2.3. Labor Force and Economic Growth

For many years, the association between economic development and job creation has been one of the broadly researched topics in economics. Seyfried (2011) examined the correlation between employment and economic growth from 1990 to 2003 in the biggest ten states. To estimate the employment strength of economic development as well as the timing of the association between economic development and employment, models were developed. Employment intensity was calculated to vary from 0.31-0.61 in particular states against the 0.47 estimate for the whole US. Likewise, results indicated that although economic development does have some direct effect on employment, its impacts remained for a number of quarters in most states examined.

Evangelista, Pianta, and Perani (1996) reported an indication that the reformation of key sectors of the economy reduces the relationship between economic growth and employment. Of all the G7 nations they examined (which excluded Canada), a significant and positive relationship exists between employment growth in value added was only reported for the US and Germany.

Boltho and Glyn (1995) investigated the correlation between economic growth and employment in a set of OECD economies. The results revealed that employment's intensity was 0.5 and 0.63 in the 1973 -1979 and 1982-1993 periods respectively while it was 0.49 in 1075-1982 periods. In this study the changes of elasticity clearly shows that the relationship between employment and economic growth are affected by economic situation of each country.

2.2.4. Technology and Economic Growth

For almost five decades, the association between economic growth and technology has been reported extensively in formal models. Gani (2009) examined the association between per capita economic growth in nations with advanced levels of technological success and high-tech exports. The panel regression results for 45 countries in the period of 1996-2004 shown that high-tech exports have a positive significant impact on the development of the technical leader category of nations and a statistically insignificant but positive impact on the potential leader category of nations.

Falk (2009) investigated the effect of the high-tech export on economic development. He calculated a growth model on panel data for 22 OECD nations in the period of 1980–2004. Employing the system GMM panel estimator that adjusts in case of simultaneity, he discovered that the share of high-tech exports and the intensity of RandD for business are positively and significantly linked to the GDP.

Bujari and Martínez (2016) analyzed the effect of technical improvement on the growth of the economy of twelve Latin American nations in the 1996-2008 periods. For the examination, he came up with a dynamic panel data model and estimated with Generalized Method of Moments (GMM) system. Their examination revealed that in the Latin American region, technological innovation processes have a positive impact on economic development.

2.3. HYPOTHESIS DEVELOPEMENT

Based on the above literature reviews it has been determined that manufacturing, investment, labor force, and technology influence GDP in the long-term. Previous literature reviews also demonstrated that because of the deindustrialization

phenomena, the impact of these factors on GDP has been changed. In this case, the following hypotheses have been proposed to account for the impact of each explanatory variable on GDP based on the majority results of previous studies:

H1: Manufacturing has a statistically positive and significant influence on GDP.

H2: Investment has a significant and positive influence on GDP.

H3: Labor force has a significant and positive influence on GDP.

H4: Technology has a positive and influence on GDP.

3. DATA AND METHODOLOGY

3.1. Collection of Data

The data for twenty-five countries which are classified as the most competitive economies in Europe (World Economic Forum, 2017) for the period 1995-2016 has been collected from the World Bank database. Moreover, the period was selected due to data availability for the chosen countries. As such, the panel data includes 551 country-year observations.

3.2. Variables and Model

Due to dispersion of variables means and in order to transfer the data to normal distribution form, the natural logarithm of variables has been used in this study, which shows the growth percentage in every unit of them. Furthermore, Gross Domestic Product (GDP) has been taken as the proxy of an economy size which plays the role of the response variable in the model. Additionally, manufacturing value added is used as an indicator of manufacturing output (Szirmai and Verspagen, 2015), gross fixed capital formation as a proxy for investment (Oburot and Ifere, 2017), employment ratio as proxy for labor force (Swane and Vistrand, 2006), and high-technology exports as a proxy for technology (Fagerberg and Verspagen, 2002; Lall, 2000; Kaderábková and Srholec, 2001; Srholec, 2007) . Table 2 denotes an abbreviation of the variables and their final forms which are used in the model specification. The In indicates the natural logarithm of the variable.

Table 2: Summary of the Variables

Variable Name	Measurement	Abbreviation
Economic Growth	Gross Domestic Products (constant 2010 US$)	InGDP
Manufacturing Output	Manufacturing Value Added (constant 2010 US$)	InMVA
Investment	Gross Fixed Capital Formation (% of GDP)	InCFCF
Labor Force	Employment to population ratio (% of population)	InEMP
Technology	High-Technology Exports (current US$)	InHTE

3.3. Model Specification

The theory employed to explore the connection that exists between variables and economic development is combination of Kaldor's first law and neoclassical growth theory. Accordingly, the model specification will be as follows:

$$\text{InGDP}_{it} = \beta_0 + \beta_1 \text{InMVA}_{it} + \beta_2 \text{InGFCF}_{it} + \beta_3 \text{InEMP}_{it} + \beta_4 \text{InHTE}_{it} + \varepsilon_{it}$$

Where:
InGDP_{it}: Economic growth determined by the ith country in period t ,

InMVA_{it}: Manufacturing output determined by the ith country in period ,
InGFCF_{it}: Capital determined by the ith country in period ,
InEMP_{it}: Labor force determined by the ith country in period ,
InHTE_{it}: Technology determined by the ith country in period ,
ε_{it} : Composite error term.

4. DATA ANALYSIS AND RESULTS

In this study, first of all, descriptive statistics has been analyzed. After that, correlation analysis and VIF test have been conducted to uncover the correlations and see whether multicollinearity exists among the variables (Gujarati and Porter, 2009). In addition, the Unit Root Test is used to see if the data is stationary which shows that the mean, variance, and covariance of each variables has not been changed over time (Maddala and Wu ,1999). To estimate the correlation between variables, the Ordinary Least Square (OLS) regression method has been used (Gujarati and Porter, 2009). In order to establish that no connection exists between the individual effect and any variables as dependents, random effects model is employed (Greene, 2008). In addition, to examine the differences in the intercept, the fixed effects model has been conducted (Greene, 2004). Finally, Hausman test has been used to examine the fixed or random effects model which is more suitable and significant for the study framework (Ahn and Low, 1996). Based on results of Hausman test, the fixed effects model is reported in this study. In order to run analysis, the E-views software has been used.

4.1. Descriptive Analysis

This analysis introduces an overall glance of variables which contains average, minimum, maximum, and standard deviation of them. The Table 3 contains results for 550 observations were employed in this study for all the variables.

Table 3: Descriptive Statistics

	Observation	Mean	Median	Minimum	Maximum	Std. Dev.
InGDP	550	26.075	26.233	21.725	28.961	1.704
InMVA	550	24.043	24.304	20.612	27.404	1.992
InGFCF	550	3.0812	3.0833	2.4342	3.6481	0.179
InEMP	550	3.9628	3.9815	3.5723	4.1820	0.124
InHTE	550	21.286	22.578	13.683	26.020	4.930

4.2. Correlation Analysis

Pearson correlation coefficients are calculated to study the connection among these variables as shown in Table 4.

Table 4: Pearson Correlation Matrix

	InGDP	InMVA	InGFCF	InEMP	InHTE
InGDP	1.000				
InMVA	0.833 (0.000)***	1.000			
InGFCF	-0.052 (0.216)	0.001 (0.979)	1.000		
InEMP	0.239 (0.000)***	0.132 (0.001)***	0.256 (0.000)***	1.000	
InHTE	0.669 (0.000)***	0.549 (0.000)***	0.233 (0.000)***	0.431 (0.000)***	1.000

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

The result of the correlation matrix demonstrates that the connection among lnGDP as dependent variables with three of the independent variables is significant. The correlation between lnGDP with lnMVA, lnEMP, and lnHTE is positive and significant. On the other hand, lnGFCF has a negative and non-significant association with lnGDP. The highest association is between lnGDP and lnMVA which is at 83 %. Also lnHTE correlation with lnGDP is high at 66 %.lnEMP has the lowest correlation between independent variables with lnGDP which is 23 %.

4.3. Multicollinearity

According to Kutner, Nachtsheim, Neter, and Li (2005), if the VIF exceed 10 or the tolerance surpasses 1, there is a sign of multicollinearity. The table below depicts the results of these tests (Table 5).

Table 5: Multicollinearity

	Tolerance	VIF
lnMVA	0.756	1.153
lnGFCF	0.965	1.036
lnEMP	0.593	1.552
lnHTE	0.454	1.334

As it is shown in Table 5, VIF for all variables is around one. On the other hand, tolerance for all variables is less than 1 which shows that there is no multicollinearity problem.

4.4. Unit Root Test

In this study, various unit root tests developed by Levin, Lin, and Chue (2002) as well as by Im, Pesaran, and Shin (2003) hereafter, IPS, Fisher-PP, and Fisher-ADF have been used. The output of this test is shown in Table 6. Clearly, it has been disclosed that some variables such as lnGDP, lnMVA, lnEMP, and lnGFCF are not stationary in their levels, while they are stationary in their first difference level. In addition, lnHTE is stationary both in their level and first difference level.

Table 6 : Unit Root Tests

Statistics	Level				First Differences			
	Levin, Lin and Chu	Fisher-ADF	Fisher-PP	IPS	Levin, Lin and Chu	Fisher-ADF	Fisher-PP	IPS
lnGDP								
Statistic	-6.203 (***)	61.615	133.820 (***)	-1.479 (*)	-9.423 (***)	138.084 (***)	155.656 (***)	-7.008 (***)
lnMVA								
Statistic	13.309	63.646 (*)	355.594 (***)	-1.536 (*)	63.785	204.206 (***)	570.645 (***)	-10.535 (***)
lnGFCF								
Statistic	-2.195 (**)	61.838	46.736	-1.704 (**)	-8.611 (***)	171.503 (***)	202.711 (***)	-8.605 (***)
lnEMP								
Statistic	-3.708 (***)	75.966 (**)	55.023	-2.698	-4.660 (***)	111.335 (***)	170.407 (***)	-5.409 (***)
lnHTE								
Statistic	-5.735 (***)	84.416 (***)	79.960 (***)	-2.626 (***)	-7.744 (***)	149.231 (***)	282.719 (***)	-7.631 (***)

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

4.5. OLS Regression

Table 7 depicts the results of OLS regression model to identify the association between dependent and independent variables.

Table 7: OLS Regression

Variable	Coefficient	Std. Error	t-Statistic
Constant	12.81796	1.571452	9.6424554 (***)
lnMVA	0.454699	0.034588	10.657438 (**)
lnGFCF	-1.868048	0.202577	-7.625738 (***)
lnEMP	0.537471	0.475515	3.1525414 (**)
lnHTE	0.162319	0.008774	12.882541 (***)
R2: 0.55711		**F-statistic:** 420.0425	
Adjusted R2: 0.555482		**Prob(F-statistic):** 0.000000(***)	

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

According to the results, all the variables are strongly significant at the 1% and 5% confidence level. While all variable effect the economic growth in a positive direction, the gross fixed capital formation (GFCF) influences the economic growth in opposite direction among them.

4.6. Hausman Test

The result of this test is presented in Table 8. Indeed in this test, the null hypothesis is such that the fixed effects model depicts

Table 8: The Hausman Test

Summary of Test	Chi-Sq. Statistic	d.f.	Prob.
Cross-section random	419.338384	4	0.0000

4.7. Fixed Effects Model

As a result, the Hausman test denotes the validity of fixed effect model. The table below (Table 9) displays the outcomes of fixed effect models from the dependent variable, lnGDP, and independent variables. The overall results are similar to the OLS's model.

Table 9: Fixed Effects Model

Variable	Coefficient	Std. Error	t-Statistic
Constant	18.64542	0.452144	38.52022 (***)
lnMVA	0.061542	0.008141	6.935021 (**)
lnGFCF	-0.132541	0.082411	4.19007 (**)
lnEMP	1.786124	0.263328	7.22146 (***)
lnHTE	0.028712	0.003414	8.02504 (***)
R2: 0.471215		**F-statistic:** 2467.287	
Adjusted R2: 0.572426		**Prob(F-statistic):** 0.000000(***)	

Note: *Significant at 10%, **Significant at 5%, ***Significant at 1%.

In this specification, a significant positive influence is exerted on the GDP by the manufacturing value added (MVA) at the 5% significance level. For GDP, the gross fixed capital formation has a negative influence at the 5% significance level based on the result. Employment ratio (EMP) has a positive significant influence on GDP but at the 1% significance level. Likewise, high tech export (HTE) has a positive significant impact on GDP at 1% level of significance. Based on the fixed effects estimation model, the resulting equation is as follows:

$$\text{InGDP}_{it} = 18.64 + 0.06\text{InMVA}_{it} - 0.13\text{InGFCF}_{it} + 1.78\text{InEMP}_{it} + 0.02\text{InHTE}_{it} + \varepsilon_{it}$$

Based on the output in the preceding table, the effects of manufacturing value added (MVA), employment ratio (EMP), and high-tech export (HTE) are positive, while the impact of gross fixed capital formation, is negative. Based on this analysis, the change in the rate of economic growth is about 0.06% by manufacturing value added in terms of every 1 % rise in the independent variables. Equally, this rate is 1.78 % by employment ratio, 0.02% by high-tech export and -0.13 % by gross fixed capital formation. Meanwhile, the p-value for the overall test in the total model denotes that it is generally significant.

5. FINDINGS AND DISCUSSIONS

5.1. Evaluations of Findings

According to OLS regression and fixed effects models, MVA is positively associated with GDP at the 5% significant level. Regarding the two regression models, the employment ratio has a significant positive association with GDP with the 1% significant level in OLS and fixed effects models. In addition, based on the regression models HTE is correspondingly positively associated with GDP with the 1% significant level. Based on this analysis, the results support Hypotheses 1, 3, and 4. The entire Hypotheses' results are illustrated in Table 10.

Table 10: Hypotheses Results

Hypotheses	Results
H1: Manufacturing has a statistically positive and significant influence on GDP.	Supported
H2: Investment has a significant and positive influence on GDP.	Rejected
H3: Labor force has a significant and positive influence on GDP.	Supported
H4: Technology has a positive and influence on GDP.	Supported

According to the empirical results, the relationship between manufacturing output and economic growth is significantly positive. It is applicable for policymakers, such that the manufacturing output attributes to an upside trend in economic growth, due to the fact that this nexus is not almost one to one; that is, in terms of a 6 % percentage rise in the manufacturing value added rate, the rate of increase in economic growth is about 1%. Therefore, they will be able to raise the level of economic development and enhancing European countries' competitiveness by increasing the manufacturing output.

Unfortunately, there is a significantly negative effect on economic growth by investment which shown by gross fixed capital formation in the model. After the financial crisis 2009 most of European countries reduced their domestic investment level (Ksantini and Boujelbène, 2014) and the European Commission debated over more investment in order to accelerate the recovery process of economic growth (European Commission report, 2009). The effects of those funds and increase in financial costs had a negative effect on economic growth (Andrade and Duarte, 2017). This negative effect is known as Dutch Disease which implies the causal relationship between the development of a specific sector and a decline in other sectors .Actually, the expansion of a sector (e.g. natural resources or truism) can play an important role in enhancing total foreign exchange earning which causes depreciation of domestic currency. Consequently, other sectors become less competitive in international market

and the export level of country decrease which can affect the GDP negatively .Furthermore the conducted research indicates that for countries that joined the European Union in the last years, the intensified investment process triggered an increased demand for working capital, due to the undercapitalization of companies during the transition period. At the same time, the greater demand for working capital could also be a result of a lower efficiency in using the production factors in comparison with West European countries (PAVELESCU, 2008). It clearly shows that policy makers should focus on investment policies to increase physical assets for recovering economic development in future.

Moreover, the other two explanatory variables, labor force, and technology, denotes a significantly positive growth effect on the economy. It shows that the government should decrease the unemployment rate by creating new job opportunities by several ways such as cutting tax rate, reducing prices, increasing employee salaries, and wages, hiring workers directly, etc. in order to accelerate the economic growth.

In addition to technology, effective investment and stimulus policies in the technology and innovation sector will help the countries to enhance the rate of economic growth. Of late, an emphasis has been placed on the role of a robust industry and real economy as a drive for employment and economic development by the European Commission.

5.2. Research Implications

Based on result of this study we know that industrialization acted as an engine of growth in Europe's competitive economies during the past decade. According to future European Commission objectives, the policies should now focus on the modalities by which industrialization takes place and, in particular, on the drivers of this process. It is recommended that policy makers should invest in those policies that can enhance the growth of the manufacturing sector by increases of manufacturing productivity and increases in the manufacturing employment share to create new job opportunities in this sector in order to have sustainable, healthy and competitive economic development in future. In other words, structural change towards the manufacturing sector and increased manufacturing productivity are the key policy variables to be prioritized by policymakers (Cantore, Clara, Lavopa, and Soare, 2017).

Based on results and positive role of technology growth on economic development, the European Commission should design the policies in order to open the doors for inventors and entrepreneurs by legislating incentive laws for registering new ideas, localize the inventions, monitoring the innovation policies and legislating new policies (Firth and Mellor, 1999; Borrus and Stowsky, 1997).

With regards to the negative effect of investment on economic growth in third biggest economic region in the world, it implies that not only the amount of fixed investments plays a significant role in countries' development process but also the structure of investment across economic activities matters as it affects the rates of economic growth (Tvaronavičius and Tvaronavičiene, 2008). The European Commission structural changes has focused more on investing in small markets (economic of scale) and according to this point that in the European economic region larger markets seem to attract capital of all types of sectors with a more even relative allocation (Stirböck, 2002), it might be more effective for European Union to allocate more expenditure to invest in large markets as well. Furthermore, main role in compounding parts of fixed investment in Europe region is being attributed to equipment and construction capital formation activities (Tvaronavičius and Tvaronavičiene, 2008). Thus, the policy makers should allocate more consideration to other sectors such as manufacturing in order to create a positive effect of investment on economic growth.

5.3. Research Limitations and Future Works

The most significant restriction of this research is the lack of statistical data for the variables in selected countries before 1995. Another remarkable limitation is that this study used only OLS regression which precludes the author from running a time series regression corresponding to each country so as to compare the connections that exist between the variables among cross-sections. Probably, future studies should focus on the other regressions models such as GMM (Generalized Method of Moments) dynamic model to make a comparison between the variables among cross-sections. Additionally, another limitation is that this study employed high-tech export as the proxy for technology. Again, future studies should focus on different types of

technology proxies as well as different activities such as expenditure on Research and Developed (RandD) as a factor that might influence GDP.

6. CONCLUSION

The study's goal is to probe the dynamics influencing economic growth in 25 of most competitive economies in Europe. The accelerating process of deindustrialization, due to the economic and financial crunch of 2008-2009, underscored the susceptibility of the European industry, particularly the manufacturing sector. Therefore, it's an imperative need to find other means of economic development (Dhéret and Morosi, 2014). A World Economic Forum Report emphasized that manufacturing is considered essential to the wealth of nations as more 70% of 128 nations' income (World Economic Forum, 2012). Based on Eurostat (2017), manufacturing was the second biggest economic sector (within Europe's non-financial business economy) of the NACE sections in Europe as per its biggest contribution to non-financial business economy value added and job creation. This topic has not been considered among the most competitive economies in Europe so far. However, managing economic growth and its determinants, specifically the manufacturing sector, is fundamentally important in any country. Therefore, this paper is an interesting area for research.

Twenty-five top European economies in the global competitive index have been chosen to specify the factors which affect the economic growth during 1995 - 2016. Furthermore, Gross Domestic Product (GDP) has been taken as the dependent variable and MAV, GFCF, EMP, and HTE are the independent variables. Thus, different regression models, such as OLS, fixed effects model, and random effects model are run to achieve study's goal. Additionally, the Hausman tests have been employed in determining the model that is most appropriate between the random effects model and the fixed effects model. The corresponding results specified that the random effects model is outperformed by the fixed effects model. As a result, it is explored that the explanatory variables have significant effects on economic growth.

The result of this study revealed that the economic growth has a significantly positive association with manufacturing, labor force, and technology. The unexpected interesting result is that the association between economic growth and investment is significantly negative.

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