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How Banking Stock Prices Respond to Gross Domestic Products, Exchange Rate, and Inflation: An Empirical Study in Indonesia and Hong Kong Stock Exchanges

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ABSTRACT

The study aims to analyse how banking stock prices respond to GDP, inflation and exchange rate in the Indonesia Stock Exchange (IDX) and Hong Kong Stock Exchange (HKEX). For this purpose, panel data of of seven listed bank's companies in each country for the 2016Q1-2018Q4 period were used for the empirical analysis. The model of analysis employed static and dynamic panel regressions. Static regression used was Fixed Effect, Random Effect or Common Effect by the Chow test , while dynamic regression used was a Generalized Method of Moments (GMM). The results revealed that stock prices respond positively to GDP and negatively to exchange rates on both Stock exchanges. Furthermore, inflation was responded positively by stock prices on IDX, meanwhile inflation was responded negatively at HKEX. The differences in the values of the regression coefficients on the two stock exchanges revealed that the IDX is less responsive to the exchange rate and inflation variables than the HKEX. On the contrary, GDP was found to be more sensitive in Indonesia compared to Hong Kong. Dynamic regression proved that the HKEX is more efficient than the IDX. Investors in the IDX still responded to the prices of the previous period, while those in the HKEX responded immediately to macroeconomic variable information without considering stock prices in the previous period.

KEYWORDS: Macroeconomics; GDP; Inflation ; Exchange Rate; Market Efficiency

INTRODUCTION

Capital markets play important roles in transferring investors' long term funds to companies that need funds for their business expansion.. On the basis of the fact, an efficient market (Fama, 1970) will greatly support economic progresses, as signed by the stock prices that are able to respond all information expected as the indicator of stock performance. In the development of the capital price that has entered into the global era, the stock price is increasingly integrated so that it has impacts on the heavy flow of capital to the stock market considered to be beneficial for investors. The flow of fund in and out of a country occurs quickly when investors think that there are changes in profit opportunities among markets in various countries. Positive impacts of the integrated market is the companies' ability to offer their stock to the stock markets to obtain funds through the issuance of cheaper stock than debt. However, in a market which is inefficient or easily volatile when a certain event which is difficult to be expected by investors occurs, capital will be easily moved to other countries.

Increasing stock prices are an indication of return for investors oriented into the fulfillment of the either liquidity or dividend needs. Such increasing stock prices may be viewed from the side of strengthening demands for good performing stock, while at the the same time, an offer in the secondary market is not as strong as the demand. The estimation of the stock price is greatly needed by the investors related to the investment of selling, buying or holding stock they posses. If the investors are able to make a proper estimation, an evaluation of the price fairness may be made. If the stock is overvalued, it should be immediately released. But when it is undervalued, it should be held and released when the price reaches a balance or it is proper in accordance with the result of the stock price estimation.

Any effort to make an estimation in valuing the stock price fairness and investment portfolio is *Capital Asset Pricing Model introduced by* Treynor, Sharpe, Lintner dan Mossin from 1964-1966 (Jacob, Nancy & Pettit, 1989). This theory explains that the movement of a stock price is determined by market risks. The higher the market risk, the higher the return is conditioned by investors. An investment decision will be optimum if the return an investor obtains is linear with the systematic risk of a security, where the risk follows the movement of the market prices. When an investor is able to build a security portfolio perfectly in a market, the systemic risk will be perfect as a market systematic risk = 1. The portfolio of a market will not be able to lower a systematic risk except an inter-market portfolio is made.

Reasonable price changes reflected in the CAPM model will be shown by the SML (Security Market Line) or an equilibrium market condition. An investment decision is considered to be proper if the response of the percentage of the price change conditioned deals with the existence of the systemic risk and the level of the free-risk return is positively linear at the SML line. Apart from the superiority of the CAPM approach, some limitations cannot be avoided. The assumptions used are analogous with a perfect competition market where no tax and no transaction cost exist , the information is perfect, the security may be transacted in fractions/small sheets and the market actors individually cannot control the security prices if the markets move together. The assumptions are certainly difficult to be fulfilled except the last assumption. However, systemic risks have not been diversified by various explanatory factors(Hassan dan Awais, 2015).

The *Arbitrage Model* (APT) theory tries to fill in the limitations in the CAPM approach by integrating the *Market Model* and Markowitz (Jacob, Nancy & Pettit, 1989). The model

states that a security price will adapt until the portfolio cannot be built any more to obtain gain. Basically, the APT theory developed by (Ross, 1976) assumes a market balance as the the CAPM does.

But, the extension is on the return assumption coming from the price changes determined by a lot of factors which in this matter more greatly translate a diversification of the systemic and unique determinants of risk. . Copeland (1997) proposes that at least there are three factors that may be used to analyse the price changes in the APT model.. Systemic risk or market risk is a risk that cannot be avoided by investors dealing with the market price movements. Certainty, why such a price movement happening in the stock exchange is not separated from transaction activities in the stock exchange? Sluggish transactions will impact on the lower prices or on the way round. Identifying determinants driving the stock exchange with the impacts on the performance condition attracts the attention to the development of the financial literatures. The conception of the competition market and the market efficiency is greatly attached to this approach. This means that the systemic risks makers are the macroeconomic condition or the industrial environment in a stock exchange or inter-stock exchanges (Saeed & Akhter, 2012).

Efforts to develop APT literatures relating the macroeconomic variables and the stock prices have been made by using various macroeconomic indicators in various countries. The following will be presented the development of empirical studies as the bases for reinforcing the APT model that relates the macroeconomic variables and especially the stock prices since 1987 to 2018 in some countries. Hardouvelis (1987) Analyses the responses of the financial stock prices in *New York Stock Exchange* to the macro-economic information. Stock prices sensitively respond to the early announcement of monetary policies. Implicitly, it can be stated that the stock prices react to important policies made by the Central Bank in line with the investors' expectations dealing with the important roles played by the policies in the macro-economic development in the future.

A similar study made by Paul and Mallik (2003), with the object of the financial and banking stocks in the Australia Stock Exchange in the 1980-1999 period revealed that banking and financial stocks co-integrated (had a long term relationship) with macroeconomic variables, especially GDP, inflation and interest rates. GDP is positively responded by the stock prices, interest rates and significantly negative inflation. Furthermore, Talla (2013) studied the impacts of macroeconomic variables on the stock prices in *Stockholm stock exchange* using the monthly data during the 1993 - 2012 period. The results of the estimation of the ordinary least square regression and the Causality Granger test showed that interest rates, exchange rates, gave negative impacts on the changes in the stock prices and insignificantly positive inflation.
The newest study in the developed country was conducted by Fufa and Kim (2018) to test whether there is interrelationships among stock markets, banks, and economic growth. The Interpretation Method employed was the *general generalized method of moment* (GMM) method. The heterogeneity of the data was grouped into European and non European countries with high, middle up, and under average incomes for 5 years. The results showed that the relationship between the financial development and the economic growth depended on the stages of the countries' economic growth. In the developed countries, the relationship is very strong, while the countries with the under average incomes, the relationship between the financial markets and the economic growth is relatively weak.

The four empirical studies represent investors' responses in the stock exchanges that have developed. In the findings obtained since two decades ago, the new information especially

about the macro-economy has been responded by the market with the expectation that the macroeconomic variables are the determinants of the companies' performance in the future so that it would give impacts on the decrease in the stock prices or vice versa. Inflation has not yet given results with good consistency.

There are some differences in the results made in the researches conducted in the in the developed and newly developing stock exchanges as the findings Wu (2001). Both studied the Malaysia and Singapore Stock Exchanges dealing with the changes in the exchange rates at the financial asset prices. The exchange rates between the developed countries and the partner countries (Malaysia and Singapore) were conversed. The result showed that the currencies conversed with those in the developed countries negatively influenced the stock prices, while those conversed with the partner countries were positive. The asymmetry pattern was explained using the analysis model of Vector Autoregressive and distributed lag in the incomes and fiscal expenditure. It can be concluded that the two variables mentioned give positive effects on the stock prices.
Hussain, Rafique and Nawaz (2013) employed the data of the KSE-100 index in the 1992 period. .Q1- 2012.04 showed that the Pakistan Stock Exchange responded the macroeconomic variables in the form of Foreign Direct Investment (FDI), interest rates, exports, and unemployment in a significantly negative fashion. On the contrary, it responded money supply positively but insignificantly. The opposite findings are presented by (Elgiziry & Awad, 2017) Awad and less satisfactory finding is shown by the research made by Elgiziry (2017). The testing of the APT theory was made in Egypt Stock Exchange involving 30 stocks indexed with EGX30 using the monthly data from January 2007 to December 2013. Some economic variables studied were inflation, the amount of money distributed, and bond interest. The results were less convincing because of a small model contribution (less than 15%) and of a determination coefficient with minus value. Moreover, from the three variables, there it is just inflation which explains the change in the stock price.

Farouq and Ahmed (2018) analyzed the effects of the price sensitiveness on the change in inflation in the countries with emerging market by correcting the sample of observation into groups of countries with high and low inflation. The results indicated that investors in the countries with relatively high inflation thought that the stock prices are less sensitive to the increase in inflation compared with the countries with low inflation.

This present research would follow Paul and Mallik (2003), Talla (2013) andFufa and Kim, (2018) focusing on the object of banking stock. The objective of this research was to analyse how the banking stock prices respond the macroeconomic variables especially GDB, inflation and exchange rates. IDX and HKEX are stock exchanges that may represent the existence of the developing and developed stock exchanges. As described above, some researches have revealed the interrelationship between economic variables and stock prices.

Banking companies are interesting to study, especially their characteristics which are different from those of the manufacturing companies. The capital structure possessed by banking which more relies on the third party fund would give impacts that when a macroeconomic change occurs, it will be responsive than that of the manufacturing companies. The three main variables that would be studied would be GDP, inflation and exchange rate. The testing of the APT in banking stock is interesting to do since its behaviour could be different from the manufacturing stock.

The response of the stock prices to the GDP is positive. High GDP shows that the economic condition in a country is getting better. Aggregate requests and offers become stronger and need roles of the bank to fulfil the industrial or domestic credits. The condition is supported by a credit quality with the impact on the better bank performance. stock as the company 's representation will be appreciated by investors due to strong stock prices. The interrelationship between GDP and the stock prices is positive as strengthened by most researchers that have not only been described above, but also other researchers such as: Hsing, Budden and Phillips (2011), Giri and Joshi (2017) and Krchnivá (2016).

Inflation is the increase in the general prices continuously. At least there three theories explaining the relationship between inflation and stock prices. Fisher (1930) proposed an hypothesis that the correlation between inflation and stock prices is positive. It is argued that stock is equivalent with virtual asset. When an inflation occurs as signed by the increase in the real asset price, the stock representing the real asset will also result in the increase in price in its nominal value. But, the hypothesis is contradictory with the behaviour hypothesis offered by Modigliani and Cohn (1979) explaining the short term relationship known as the inflation illusion phenomenon. This hypothesis says that investors are wrong in valuing the future real cash flow by discounting the level of nominal return.

Finally, the proxy hypotheses proposed by Fama (1981) that since the return of the stock is positively correlated with the real economic growth in the future, when the inflation increases, the real economic growth decreases and becomes more unstable and this encourages investors to need premiums with higher risks to compensate the additional risk. Henceforth, the stock price starts decreasing. This hypothesis is also supported bySharpe & Taylor (1999). From the results of the previous researches, it seems that inflation is positively and negatively responded by the stock prices.

An explanation about the interrelation between the exchange rate and the stock prices is given by Chamberlain, Chamberlain, Howe and Popper (1997). They state that the exchange rate directly influences the banks' performance where their transactions and operations use foreign currency especially USD. Even, when a bank does not do the activity, the exchange rate will indirectly affect the bargaining position of the real sector, the demand for credit and the quality of credit which at last give impacts on banks' performance. Fluctuations of such an exchange rate may cause banks to get benefits or loss, depending on the position of the net exchange rate. Exposure to the change of the exchange rate may occur through three ways. The first is a short term exposure appearing from the trade of foreign currency. The second is a mid term exposure that happens due to incompatibility of the currency denomination between asset and liability. The third is a long term exposure where it might deal with any exposure coming from banks' investment in banks' business in other countries using different currency.

The response of the stock prices to the macroeconomic variables as shown in the findings from the previous researchers more greatly leads to the explanation of a long term balance. Meanwhile, the short term response is less explained. On the other hand, this present research would give additional evidence dealing with the extent to which the banking stock prices respond to the changes in the macroeconomic variables when a comparison is made between the developed and newly developing stock exchanges. The last is to prove the response of the banking stock prices to the macroeconomic variables and also to explain something dealing with the concept of an efficient market in responding

new information, whether the efficiency of developed stock exchanges is better than that of the newly developing stock ex

changes.

METHOD

The objective of this present research was to analyse how banking stock prices respond to the macroeconomic variables in the form of Gross Domestic Product, exchange rate, and inflation in Indonesia and Hong Kong Stock Exchanges. Seven most active bank stocks traded in the Indonesia Stock Exhange (IDX) that entered into the LQ45 index dan Hongkong Stock Exchanges (HKEX) in the Hang Seng index during 2016.Q1 until 2018.Q4 were used as the research sample. The consideration of choosing the most active stocks is that international investors prefer to choose liquid investment that may give short-term returns and may easily be transacted or transferred to more profitable stock exchanges.

As a whole, this research involved 78 observations in each stock exchange. The 7 (seven) bank samples chosen in the IDX are as follows BNI, BRI, BTN, Bank Mandiri, BCA dan BCB. While the samples in the HKEX are: Bank of East Asia, Bank of China, Hang Seng Bank, Industrial and Commercial Bank, Bank of Communication, China CITIC Bank Corporation. Quarterly data for the stock prices were collected from www.investing.com, while the macro-economic data were obtained from the source www.ceic.com.

Stock price is stated in the domestic currency, considering that the data would be used in the form of logarithm that may omit a nominal unit. While GDP, exchange rate is expressed in the USD unit. Inflation is the change in a consumer's price index stated in percent. The collected data were then analysed using a static panel regression by taking into account the choice of the model between fixed effect, random effect, or common effect through the Chow test. The panel regression equation is as follows:

$$Log\ P_{it} = \beta_0 + \beta_1 log\ ER_t + \beta_2 log\ GDPt + \beta_3\ Inf_t + e_{it} \quad \ldots\ldots\ldots \quad \text{(model 1)}$$

$$Log\ P_{it} = \beta_0 + \beta_2\ Log\ P_{it-1} + \beta_2 log\ ER_t + \quad + \beta_3 log\ GDPt + \beta_4\ Inf_t + e_{it} \quad \ldots \quad \text{(model 2)}$$

where: P_{it} : the stock price of Bank i in the period t

ER_t : the domestic exchange rate conversed in USD in the period t.

GDP_t : *Gross Domestic Product* in the period t expressed in USD unit.

Inf_t : the inflation of a country at the period measured from the change in the *Consumer Price Index (CPI)* expressed in percent.

β_0 : the intercept coefficient showing the stock price which is not explained by the macro-economic variable.

$\beta_1, \beta_2, \beta_3$: the variable coefficient in sequence for the exchange rate, GDP and inflation.

e_{it} : *error term* or *residual term* shows error of the interpretation.

P_{it-1} : is the stock price in bank i in the previous period.

Model 1 is the regression of the static panel data assuming that the dependent variable responds the independent variable in the steady state (equilibrium position), where the regression coefficient or βi is the long term elasticity of the stock price to the macroeconomic variables (exchange rate, GDP and inflation) that influence it. A regression analysis is conducted for IDX and HKEX . The results are interpreted and

compared in term of the sensitivity of each macro-economic variable for the stock price in the two stock exchanges.

A comparison of how responsive is the market to the change in the macro-economic variable is conducted in order to know whether in the more integrated market, there are still some opportunities for the inter-stock exchange investors (IDX to HKEK or vice versa) to have some mobilities in order to construct an optimum portfolio of stock investment performance (to obtain return). Moreover, a panel regression analysis of the two stock exchanges may be used as a reference by the two countries to evaluate the impacts of controlling the macroeconomic variables on the stock prices. As a follow up, the government authority (the stock exchange manager or the monetary authority) may make an intervention in order to strengthen the development of the stock market in the country. The international investors constructing the portfolio of the bank shares in the two stock exchanges may be used as the reference in the fairness valuation of stock prices in the banking sector. The estimators' results with the parameter βi are obtained using the software review 9.0. The accuracy of the results βi or the regression coefficient is reached through the *first order test* (statistical test) and the *second order test* (econometric test).

Model 2 (dynamic regression analysis) regresses the previous dependent variable. The lag regression coefficient of the dependent variable is also called as an auto-regressive equation. Each regression variable from the equation shows the investor's short term response reflected by the change in the stock price when a change of the macroeconomic variable occurs. The result of the estimation of this equation may answer how the short term investors respond to the change in the macroeconomic variables. The method used in this regression is *Generalized Methods of Moment (GMM)*

If the regression coefficient of the price lag variable is significantly positive, it means that the market has not possessed a strong efficiency, where the investors do not immediately respond to any change in the macroeconomic variable since they still pay attention to the historical information of the stock prices, especially that in the previous period. It means that when the regression equation of the panel data possesses a significantly positive lag coefficient, the investors' reaction may be differentiated between the short-term response (elasticity) and the response when a balance occurs. The short-term response will be shown by the regression coefficient in the equation, while the long-term elasticity will be counted with some adjustments namely: βnew is= $(\beta i/(1- \beta_i))$. In the *steady state position:* $\beta_{new} > \beta_i$ (Gujarati, 2003).

RESULTS AND DISCUSSION

Before analyzing the impacts of the macroeconomic variables on the Banking stock prices in Indonesia Stock Exchange and Hong Kong Stock Exchange, a descriptive statistic table of the dependent variable (banking stock price log) and the independent variable (macroeconomic variable in the form of log *GDP , log ER* and *Inf)* for Indonesia and Hong Kong is presented.

The table above presents the mean, median, maximum minimum, standard deviation of the stock prices and the macroeconomic variables. The total observation is 144 from 2016 Q1 -2018Q4. To the bank stock it may be seen that at average the stock price in Indonesia is lower than that in Hong Kong although it seems that the log value of the banking stock price in Indonesia is higher than that in Hong Kong. This is caused by the fact that the stock price is stated in the domestic currency, while the exchange rate in Hong Kong (HKD) is higher than in Indonesia, or at present (2019) 1 HKD = Rp.

1802,77. The variation of the stock price or risk in Hong Kong is higher than that in Indonesia. This means that the investment risks in Hong Kong Stock Exchange are higher than in IDX. Maximum and minimum stock price is the price difference range occurring during the observation period in the two stock exchanges.

Statistics	HONGKONG STOCK EXCHANGE (HKEX)			
	INF	***Log ER***	***Log GDP***	***Log Pi***
Mean	2.100333	-2.053698	11.35290	3.432553
Median	2.274500	-2.053674	11.36845	3.483083
Maximum	3.148000	-2.048467	11.47657	3.536602
Minimum	0.583000	-2.060259	11.23057	3.237501
Std. Dev.	0.699186	0.004367	0.074264	0.100224
INDONESIA STOCK EXCHANGE (IDX)				
Mean	3.512833	-4.134591	5.395820	3.823265
Median	3.382000	-4.128398	5.406333	3.839128
Maximum	4.335000	-4.118361	5.421256	3.966892
Minimum	3.025000	-4.169994	5.335470	3.686815
Std.Dev	0.420206	0.016207	0.025437	0.088118

Table 1. Stock Price and Macroeconomic Variable (2016Q1-2018Q4)

Viewed from the macroeconomic condition, Hong Kong possesses twice as high as the average GDP in the logarithm (namely 11.32529) than Indonesia does (5.395). The inflation in Hong Kong is lower (2,1%), while that in Indonesia is 3,51% and the exchange rate is stronger (logarithm ER -2,053608), while the logarithm of the exchange rate in Indonesia in average is -4,134591. The Standard Deviations reflecting the deviation of the macroeconomic data from average for Hong Kong are inflation*(INF) = 0,699186, exchange rate (ER)= 0,004367 and GDP= 0,074264. Meanwhile for Indonesia , they are INF=0,420206 , log ER =0,016207 and log GDP= 0,025437.*

Table 2 presents the results of the regression equation estimation of the data from panel model 1 or the static equation involving 72 observations in each stock exchange(IDX and HKEX) from the period 2016 Q1 to 2018Q.4.

Variable	Coefficient		
	Fixed Effect (FE)	***Random Effect (RE)***	***Common Effect (CE)***
Log GDP	3.361005 (10.58903)****	3.361005 (10.58903)****	3.361005 (1.774593)*
Inf	0.077031 (1.769045)*	0.077031 (1.769045)*	0.077031 (0.291458)
Log ER	-0.379360 (-0.783274)	-0.379360 (-0.783274)	-0.379360 (-0.129048)
C	-37.21501 (-7.186735)***	-37.21501 (-7.170458)***	-37.21501 (-1.184048)
Adjusted R Squared	0.973191	0.663896	0.012356
Chow test	Accept Ho	Refuse Ho	Refuse Ho

Table 2. Results of the Static Panel Regression Estimation : IDX

Note: ****, ***,**and * sequentially shows significance level of α= 0%, 1%, 5% and 10% ( ) statistic value

The static panel model above shows the response of the banking stock price to the macroeconomic variable: GDP, inflation and exchange rate in the position on balance. It means that the response will not change until there is a new information serving as the basis the investors' decisions. From the three regression estimations (*FE, RE and CE), the choice of the model based on the chow test is the FE model.* If noticed, the FE model has a determination coefficient that has been adjusted to the free level which is far higher than the two other models. FE has an R^2 *adjusted* 97,3%, while *RE* and *CE* are 66.39% and 1.235% respectively It means that the FE model is able to explain the response of the price to the stimulus variable, namely the macroeconomic variable of 97.3%, while the rest is explained out of the model.

The statistic testing proved that it is merely GDP which positively affects the banking stock prices. Whereas inflation gives insignificantly positive effects on the stock prices (error probability (α) > 5%). It also happens that the exchange rate gives insignificantly negative effects on the exchange rate. The result of the regression equation estimation above may be interpreted that each 1% of the economic growth will be responded by investors through the increase in price of 3.36%.

The banking stock prices are greatly responsive or sensitive to the economic growth. This research result support the previous findings made by Hsing dan Budden (2012), Giri and Pooja (2017) and Krcniva (2016). This may be understood, remembering that the banking stock prices reflect companies' intrinsic values. When an economic growth in a country improves, it is positively responded by international (domestic or foreign) investors since it is expected that the bank also has good performance. High economic growth means the prosperity improves, accompanied by high expenditures or high demands from the society for various products from the economic sector. As a result, strong demands are responded by activities of industries and economic households that need stronger bank funding. On the other hand in this position , not many problematic financing occurs, and this then will improve bank profitability.

In the Arbitrage Pricing theoretical perspective, any detection of the return asset reflected from the stock prices may be explained by many factors including macroeconomic variables. When investors are able to respond perfectly to the economic growth of 1%, the increase in the reasonable bank stock prices maximally reaches 3.36%. On the contrary, if the market response has not reached the number, it means that the price is still *overvalued* or *undervalued.* When the response is above 3.36%, the price will immediately be lower and vice versa.

Inflation is positively responded by the banking stock prices although its significance level is low (error probability, α =10%) . Theoretically, inflation may be positively or negatively responded by the real sector, it may also happen to the banking sector. The increase in price is a signal of profit for economic actors since in the price, there are profit incentives. As long as the increase in the inflation is not too high, it will not give negative impacts on the economic actors. The context of the increase in price which does not give negative effect on the macroeconomic condition will indirectly affect he performance of the banking sector.

Positive responses of the stock prices to inflation may also happen if the sources of the inflation are boosted by strong demands for the real sector followed by the intense production sector, the increase in the production side will be lower than the demand. In such a position, the performance of the banking sector will not be disturbed. If inflation becomes an indicator of the increase in prices of goods and services including the real asset

based on the Fisher Effects Hypothesis (1930) impacted on the asset protection into the stocks, it seems to be unrealistic for the banking stock. Positive response of the price to this inflation needs a deep explanation as if it will give some supports to the results of Talla's findings (2013). A positive relation between inflation and price is doubted in its validity since other theories (Fama, 1981 and Sharpe, 1999) argue that there is a hypothesis of a negative relationship between inflation and stock prices. Based on the position, the response of prices to inflation should be retested using a dynamic model (see Table 4).

The exchange rate is negatively responded by the banking stock prices although it is in a significant manner. When referring to the negative sign and the unit used in the exchange rate of 1 domestic currency/USD, it may be interpreted that strong domestic currency (Rupiah/USD) even lowers the stock prices. Viewed from the supply and demand theory, the decrease in price may be caused by actions of selling bank stocks in Indonesia. It seems contradictory with a theory that the strengthening of the domestic currency is able to improve the real sector with the impacts on the performance in the banking sector that then gives side effects on stronger stock prices.

At least, there are two theories that may be use to be able to explain this empirical fact. Firstly, the strengthening of the domestic currency will lower the prices of the imported products and weaken the demand for the real sectorKuwornu and Victor (2011). The banking sector playing to support the funding f the real sector is also affected namely the decrease in the demand for credits and profitability. At last, investors respond the event of the decrease in the stock prices. The explanation above certainly needs further proof. Secondly, the investors in the financial market always try to make their financial investment substitution in order to obtain optimal returns through international investment mobility.

The strengthening of the domestic currency is identical with the lowering of the USD currency. Investors in this position will do a lot of the selling actions with the aim to get more USD. The next step will transfer their funds to the financial market which gives higher potency of profits. At the same time, the American Central Bank, the Fed will make some monetary contractions by increasing the interest rate. It is thought that they prefer to make investments in obligations that promise high returns without any risks. At developing stock exchanges, international funds usually come and go quickly to capital markets or other financial markets expected to give higher returns to investors.

Variable	Coefficient		
	Fixed Effect Model	***Random Effect Model***	***Common Effect Model***
Log GDP	0.065247 (2.345561)**	0.065247 (0.301400)	0.065247 (0.020143)
Inf	-0.051686 (-3.002568)**	-0.051686 (-3.002568)***	-0.051686 (-0.200667)
Log ER	-3.47763 (-4.164636)***	-3.47763 (-4.164636)****	-3.47763 (-0.278329)
C	-29.94651 (-4.894794)****	-29.94651 (-4.870447)	-29.94651 (-0.327127)
Adjusted R Squared	0.995350	0.365296	0.041118
Chow test	Accept Ho	Refuse Ho	Refuse Ho

Table 3. Results of Static Panel Regression Estimation : HKEX

Notes: ****, ***,**and * sequentially shows significance level of α= 0%, 1%, 5% and 10% ( ) statistic value

As in the case of the Indonesian Stock Exchange, the choice of the estimation model of the panel data regression equation on the basis of Chow test in Hong Kong Stock Exchange is FE. In the chosen model, *R^2* is greatly high (0.995350) compared with those of two other models (*RE* and *CE*). It can be noticed that there is a real difference between the Indonesian and Hong Kong Stock Exchanges. Price fully responds to three economic variables significantly. It can be state that there is more new information responded by Hong Kong Stock Exchange. In the context of an efficient market, it can be stated that the efficiency of the Hong Kong Stock Exchange is stronger than that of the Indonesian Stock Exchange. This also applies to the speed of the response of the price to the changes in the macroeconomic variables (see Table 4). It greatly strengthens the conclusion. The lag coefficient *(Pit-1)* is insignificant in the Hong Kong Stock Exchange.

GDP is positively responded by Hong Kong banking stock prices with the coefficient of 0.065247 that may interpreted that each economy with the growth of 1% will be positively responded by investors by the increase in price of 0.065% or it is inelastic in nature. If it is compared with the condition in Indonesia, there is a great enough difference although it shows the same positive direction. Investors in the IDX more responsively respond to the bank prospect when the economy experiences a growth. The results of the findings of the positive relationship between GDP and prices more and more reinforce the results of findings of a lot of previous researchers such as: Paul and Malik (2001), Farouq and Ahmad (2018) and Fufa and Kim (2018) without any exception of what happens in the developed or newly developing stock exchanges. However, why the developing stock exchanges are more responsive than those the developed stock exchanges need further studies.

The response of price to negative inflation is 0.057 which is interpreted that each increase in 1% inflation will decrease 0.05% banking stock in HKEX . A negative relationship between inflation and stock supports findings: Farouq and Ahmad (2018). From the descriptive statistics presented in Table 1, it is known that the average number of inflation in Indonesia is higher than that of Korea. From this fact, temporarily it can be concluded that in countries with higher inflation, the stock prices give less responses to the increase in inflation. The strengthening to this statement open new opportunities to fathom how the price behaves to the inflation by involving a greater number of samples that enable to group between the stock exchanges with high, moderate and low inflations.

The interest rates were negatively responded by the stock prices with the regression coefficient of -0.45 which is higher than that in Indonesia. It means that the strengthening of 1% exchange rate even lowers banking stock prices. This result is consistent with those in other countries such as: Singapore and Malaysia byWu (2001), Australia byPaul and Mallik (2003) and argumentationKuwornu and Victor (2011). It must be that when the argument that the decrease in the exchange rates will affect the real sector and the withdrawal of bank funds is flowed abroad, the relationship between the exchange rates and prices is positive. This finding certainly is interesting to be examined, especially in the aspect of the explanation of its consistencies following the characteristics of the assets and Hong Kong Bank liability impacted on the performance. On the basis of the investors' perspectives, the strengthening of 1% Hong Kong Exchange rate will result in the selling action or be responded by the 3% decrease in the stock prices. Viewed from the side of the integration of the world financial stock exchanges, the difference of the price response between the Indonesian and Hong Kong Stock Exchanges to the exchange rates, so in the effort to lower any systemic risks, a portfolio of the bank stocks in both stock exchanges may be constructed.

Variable	*Coefficient (Short Term)*		*Coefficient (Long Term)**
	IDX INDONESIA	**: HKEX HONGKONG**	**: IDX :INDONESIA**
Log Pit(-1)	0.337160 (1.941760)**	0.307093 (0.862775)	-
Iog GDP	3.4303055 (4.548010)****	2.528410 (1.259538)	5.119806
Inf	0.143103 (6.392598)****	-0.125620 (-1.266909)	0.2135865
Log ER	-0.723976 (-0.290540)	55.42525 (1.026479)	-1.080561

Table 4. The Results of Dynamic Panel Regression Estimation

Note: * obtained from formulation : $\beta new = (\beta i/(1- \beta_i)$.

The Dynamic panel regression in Table 4 is intended to learn how the stock prices responds to the information of the macroeconomic variables. Whether a new adjustment of new prices or a lag occurs. As presented in model I, Table 2 presents the response of the stock prices in the IDX , and the result of the regression of the FE model reveals that GDP and inflation is responded by the stock prices. But the inflation coefficient is insignificantly positive.

Model 1 is perfected with a dynamic panel accompanying the price lag variables or previous periods. This model is the regression equation without intercept. Both stock exchanges are estimated as the response of the stock prices to the macroeconomic variables, and it turns out that it is merely Indonesia that possesses a significant lag coefficient. It means that the IDC stock prices will not immediately respond to new information but there will be some adjustments towards a point of balance or a steady state condition. It should be noted down that the dynamic model is more relevant for IDX, it is proved by the statistic testing (t-test) which is stronger than before especially for the inflation variables.

This dynamic model does not apply for Hong Kong Stock Exchange because the autoregressive lag coefficient is insignificant. It may be concluded that either the short- or long term response merely applies for IDX. As a result, from the dynamic model, there is an estimation of long term parameters in line with the results of the dynamic regression. Whereas, the long-term response is determined on the basis of the lag regression coefficient. The results of the dynamic regression of IDX reveal that all macroeconomic variables are responded as shown by the findings which are in line with Model 1 that has been explained before. But, it can be identified that investors of IDX respond the macroeconomic variables as quickly as those of Hong Kong Stock Exchange. The short-term response is lower than the balance position (its long-term response). Each 1% increase in GDP, the price gives positive response with the increase in price of 3, 43% and there will be some adjustments until the increase reaches 5,1198%. One percent increase in inflation is positively responded by the increase in price of 0.143% until it ends with 0,21%. At last, the exchange rate is immediately responded with the number of 0.723% until it does not have any change with the number reaching 1.08%.

The response of prices to the exchange rate in IDX shows the same direction with HKEX, namely negative direction. However, the negative response of IDX is insignificant before it is fully reacted negatively by the investors of IDX. This may meant that the appreciation of

rupiah exchange rate has not fully reacted by the investors of IDX negatively. Explanation why there are different reactions/responses between the two stock exchanges is interesting to study further. As Chamberline, Howe and Poper (1997) and Kuwomu (2011) ague, it is necessary to analyse the characteristics of banks in their transactions and operations dealing with the use of foreign exchange from the side of assets and liability..

The results of the dynamic regression equation of the IDX reinforce the consistency of findings that newly developed stock exchanges in terms of their efficiency is less strong than those developed stock exchanges like HKEX. There are two evidence of the statements: Stock exchanges responds to any information of the macroeconomic variables. But not all information is responded correctly. It is shown by the fact that insignificant exchange rates variables and inflation still exist in the static model . The second evidence is that the IDX still needs to time to make adjustments towards a balance in responding information on the macroeconomic variables. The dynamic panel regression merely applies for IDX instead of HKEX. Price adjustment in responding new information takes time as shown by its short-term elasticity (regression coefficient) which is lower than its long-term regression coefficient. But, the results of this present research should be retested especially by examining insignificant data variables whether they posses variations which are constant or which tend to be volatile. At the last mentioned condition, it can be meant that the banking stock prices in IDX respond to not only present macroeconomic variables but to also those expected or cannot be expected.

CONCLUSION

This research has tried to analyse the responses of the banking stock process to the changes in GDP, inflation, and exchange rates in IDX and HKEX. The results of the static panel regression analysis showed that the banking stock prices in the two stock exchanges positively responded to GDP and negatively to exchange rates. Meanwhile, inflation was positively responded bay the stock prices in IDX and negatively in HKEX.

In Hong Kong Stock Exchange, the banking stock prices significantly responded to GDP, stock rates, and inflation. Whereas, IDX significantly responded to merely GDP and inflation. Stock prices in HKEX immediately responded to information on GDP, stock rates and inflation, while banking stock prices in IDX needed time to adjust. The results of the dynamic panel regression analysis showed that stock rates still responded to prices in the previous period. Viewed from the behaviour of the stock prices, it is obtain two proofs to conclude that developed stock exchanges are more efficient than newly developed stock prices.

The findings of this present research have been able to strengthen the APT theory dealing with the responses of the Bank stock prices to GDP and exchange rates. However, the results have some limitations among others: First, although the estimator of the inflation parameters may be negative or positive to the stock prices, but the model of analysis has not been able to give explanations about the limitation of the inflation values that are positively or negatively responded by stock prices. Second, the exchange rates which are negatively responded in this research are still conversed into USD. It has not been proved when GDP is conversed with currency in some other stock exchanges especially HKD. Fourth, there is no proof yet of the characteristics of banks with large, medium, and relatively small transactions in foreign exchange USD. Last, the responses of the prices to insignificant exchange rates have not been tested in terms of data behaviors whether they tend to possess constant or volatile variations. The limitations in this present research may

be reduced in further researches to obtain accurate explanations to support the variations of the APT theory in the stocks in the banking sector.

The findings about the responses of stock prices to GDP, inflation and exchange values may be made use of by international investors in their efforts to value price fairness or to construct an international portfolio inter stock exchange in order to result in optimal return and to reduce systemic risks. Implementation of policies for international investors who portfolio financial assets in IDX obtain opportunities to get short-term benefits by making use of the slow responses to information. Whereas, the market which is less efficient will be difficult to raise long-term great funds to develop the real sector which does not easily move to other markets. For the authority, it is necessary to control macroeconomic variables which do not bother the performance of stock exchanges, especially the banking sector.

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