

**The Analysis Of The Influence Of Exchange Rate, Bi  
Rate, Inflation, Dow Jones Industrial Average, Hang  
Seng Index, Nikkei 225,  
Straits Times Index On Composite  
Stock Price Index In Indonesia**

**Tan Tjun Hwa**

NIM: 0966390003

**ABSTRACT**

*This research is intended to investigate and analyze the influence of macroeconomics and major stock exchange indices on composite stock price index in Indonesia from July 2005 to December 2011. This research uses ex post facto method and Granger Causality Test, Johansen Co-integration Test, Impulse Response, Variance Decomposition. The research variables are exchange rate (Rupiah-USD), BI Rate, Inflation, Dow Jones Industrial Average (DJIA), Hang Seng Index (HSI), Nikkei 225 (N225), Straits Times Index (STI) and Indeks Harga Saham Gabungan (IHSG) in Indonesia. The data used in this research is monthly time series, which is secondary data downloaded from both domestic and foreign websites.*

*The theoretical concept which serves as the basis of this research is Multi Factor Model, International Financial Contagion Theory.*

*Granger Causality Test result shows that BI Rate has a bigger influence on inflation. Co-integration Test result shows that DJIA, HSI, N225, STI and IHSG are weakly co-integrated. Impulse Response Test and Variance Decomposition in Vector Error Correction Model method show that BI Rate has a negative influence on IHSG, while exchange rate and inflation do not have a big influence on IHSG. Impulse Response Test and Variance Decomposition in Vector Auto Regression*

method show that DJIA and HSI have a positive influence on IHSG, while Nikkei 225 and STI do not have a big influence on IHSG.

*Keywords: Macroeconomic variables, monthly stock price index, Co-integration, Granger Causality, Impulse Response Function, Variance Decomposition.*

---

## **A.Introduction**

The empirical studies which prove the co-integration of regional and global stock markets have been conducted since 1980s and they provide more evidence that international markets are integrated. Such studies are conducted by Taylor and Tonks (1989), Eun and Shim (1989), King and Wadhvani (1990), Arshanapalli, et al (1995), Hassan and Naka (1996), Lamba and Otchere (2001), Darrat and Zhong (2002), Bessler and Yang (2003), Phylaktis and Ravazzollo (2005), Shachmurove (2006).

The empirical studies investigate strong influence of global stock markets, especially the influence of the U.S. and Japanese stock markets on both regional and global stocks. The influence of the U.S. stock market on the stock markets in other countries both regionally and globally are provided

by Schollhammer and Sand (1987), Eun and Shim (1989), Hassan and Naka (1996), Janakiramanan and Lamba (1998), Masih and Masih (1999, 2001), Gilmore and McMannus (2002), Balio and Xanthakis (2003), Berument and Ince (2005), Berument, et al (2006).

Meanwhile, the strong influence of Japanese stock market in Asia region is proved by Cheung and Mak (1992), Wu and Su (1998), Awokuse, et al (2009). Choudry, et al (2007) showed that the U.S. and Japanese stock markets dominated the stock markets in Asian countries. Cha and Oh (2002) also provided evidence of the significant influence of the U.S. and Japanese stock markets on the stock markets in Hong Kong, Korea, Singapore and Taiwan. Ng (2000) showed how the U.S. and Japanese stock market innovation influenced the return and volatility of the Pacific Basin stock markets.

The empirical evidence from various studies which analyze the influence of macroeconomic variables such as exchange rate, interest rate and inflation on stock prices on the basis of broader literature study is still conflicting evidence and is still inconclusive. Some studies show evidence of a significant influence of macroeconomic variables on stock prices, while other studies prove otherwise. The difference in the empirical evidence is, among others, caused by observation data frequency (high or low frequency data) and the methodology used (simple or advanced statistic analysis).

Chen, Roll and Ross (1986), to be mentioned later as CRR, did their research by relating economic forces to stock market. CRR are the writers who, for the first time, included macroeconomic variables related to stock return. As they were the first to do research in the subject, there were no financial theories which explained the relationship between macroeconomic variables and stock market. Because of the absence of such theories, CRR attempted to look

for the variables which influence the stock market significantly.

In his research, Solnik (1983) divided it into two research periods, from 1973 to 1979 and from 1979 to 1983. The research used monthly data in eight countries, namely Canada, France, Germany, Japan, the Netherlands, Switzerland, the UK and the USA, whose markets made up 90 per cent of the world capitalization. Using Multivariate Regression technique, it was shown that in the second period (after 1979), when the Strict Monetary policy was implemented, there was a weak positive relation between domestic stock return and exchange rate changes.

Ma and Kao (1990) did their research on six major industrial countries, namely Canada, France, Germany, Italy, Japan and the UK using monthly currency exchange rates and stock price indices data. The result showed that in the country with dominant export, the currency appreciation had a negative correlation to the stock price index, whereas in the country with dominant import, it had a positive correlation to the stock price index.

Ajayi and Mougoue (1996) did a time series integration analysis study with Unit Root Test approach, Co-integration and Error Correction Model (ECM) to examine the dynamic relationship between exchange rates and stock price indices in eight developed countries, namely Germany, Italy, Japan, the Netherlands, the UK, Canada, France and the USA. The result showed that the time series of exchange rates and stock price indices for the eight countries were non-stationary and contained one unit root. The study also showed that the pair of stock price index and exchange rate for every country was co-integrated.

Granger, Huang and Yang (1998), in their worksheets, studied the Bivariate causality between stock prices and exchange rates for the markets in Hong Kong, Japan, Korea, Taiwan, Indonesia, Philippines, Malaysia, Singapore and Thailand (affected by crisis in Asia). Using daily from 1986 to 1997, the researchers divided the study into three periods, namely Period I: January 1986 to November 1987; Period II: December 1987 to

December 1994; and Period III: January 1995 to November 1997.

The research followed the following stages; Unit Root Test for all time series data, two-variable Co-integration Test for each country and Granger Causality Test. In this research it was assumed that the five-day optimal lag was in accordance with the five-day trading in a week in each country. In the first period, there was an insignificant interaction between currencies and stock markets, except in Hong Kong and Korea where the change in currency exchange rate leading Granger Cause (there was one-way causality) to the stock prices in Hong Kong market, whereas the stock prices were significant Granger Cause to the exchange rate in Korean market.

Nieh and Lee (2001) researched the dynamic relationship between stock prices and exchange rates for the countries belonging to the G-7. There were two major findings to the time series estimate. First, they found that there was no significant, long-term relationship between stock prices and exchange rates in G-7 countries.

This result contradicted the findings of Bahmani-Oskooee and Sohrabian (1992), who found otherwise that there was a significant relationship between the two variables. Second, it was found that the significant, short-term relationship only proved on the first day in G-7 countries. However, the appreciation of stock prices led to the depreciation of currency values in Italy and Japan on the next day. Besides, they also found that the stock price record and the value of the dollar could not depend on either short-term or long-term forecasts in the USA.

Murinde and Poshakwale (2004) researched the interaction between stock prices and exchange rates for the cases in European developing countries before and after adopting the Euro. Using bivariate VAR, it was shown that the causality intensity of the two variables was higher after the Euro period than before the Euro period. This was consistent with the dynamic characteristics of the transition process that causality and co-integration will be more easily

detected when the markets are integrated.

Kroon and Veen (2004) researched the influence of exchange rate on company stock prices. The research conducted on 1,691 stocks in 24 countries during the period of 1996-2002 revealed that in general, the stock markets in European countries were relatively sensitive to exchange rate fluctuation.

Stavarek (2005) researched the causal relationship between stock prices and exchange rate for the cases in European countries. He specifically compared the causality intensity between the two variables in the old and new member countries. The result showed that there was a stronger causality in old member countries which had more developed stock markets and money markets than the new member ones.

Saadah and Panjaitan (2006), using VAR method, tested the dynamic interaction between stock prices and the exchange rate of rupiah to US dollar in Indonesia from January 2001 to December 2004. The result showed that there was no significant dynamic interaction

between stock prices and exchange rate.

Pan, et al (2007) examined the dynamic connectivity between exchange rate and stock prices in seven East Asian countries, namely Hong Kong, Japan, Korea, Malaysia, Singapore, Taiwan and Thailand from January 1988 to October 1998. The empirical result of the research showed a significant causal relationship from exchange rate to stock prices for Hong Kong, Japan, Malaysia and Thailand before the Asia's financial crisis in 1997.

Peavy (1992) researched the S&P 500 stock price index and discovered the fact that the S&P 500 index was significantly influenced by both the earnings from each of the stock and interest rate.

Fama (1981) contended that the negative correlation between stock return and inflation rate was caused by money demand. Using the traditional money demand theory, Fama argued that the growth rate of real activity which could be anticipated was closely related to inflation. If money demand was static and real activity rate was low, prices

of goods would increase and inflation would occur. According to Fama (1981), the decrease in stock return was a sign of the decrease in real activity while the amount of money in circulation remained the same, which in turn increased the inflation rate.

Kwon, et al (1997) concluded that the variables of inflation, unexpected inflation and risk premium were not significant to stock price index. The variable of bond maturity was known to be able to influence 18 out of 22 stock price indices in the study significantly by 5 %. Production index had a significant influence only on two industrial stock price indices, i.e. mining and non-metal mineral mining.

Besides, dividend earnings significantly influenced the stock return by 1% with positive correlation between the two variables. Exchange rate influenced 8 stock price indices significantly by 5% and 2 stock price indices by 10% with negative correlation between the two variables. Moreover, the oil price significantly influenced the stock price indices for food and beverages industry, metal industry, machinery and tools industry, wholesale trading, delivery

and storage, but had a marginal influence on fishing industry.

Al-Khazali and Pyun (2004) researched the relationship between stock prices and inflation rate in Asia-Pacific region such as Australia, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Philippines, Singapore and Thailand from 1980 to 2001 by Regression analysis using Co-integration Test and Vector Auto Regression (VAR) as well as Vector Error Correction Model (ECM). The result showed that inflation rate had a negative short-term correlation with stock prices. However, there was a positive long-term correlation between inflation rate and stock prices after co-integration tests were conducted in those nine countries.

## **B.Methodology**

### **Research Population and Samples**

The population in this research is the global stock markets and the variables are domestic macroeconomic variables. The determination of sample selection in this research is done using purposive sampling technique, which is a sample collection technique using certain criteria.

The sample selection of interest rate, inflation and exchange rate is made because many previous researchers used the three variables. Meanwhile, the sample selection of DJIA, HSI, Nikkei 225, STI stock markets is made not only because many previous researchers used those variables, but also because the indices of those stock markets, especially DJIA and Nikkei 225 have been used as a benchmark by investors in financial sector and real sector. The easiness in obtaining the data is also a considered factor in the sample selection.

The data used in this research is monthly time series, from July 2005 to December 2011. The data of this research is secondary data which is obtained by downloading from both domestic and foreign websites.

### **Analysis Method**

#### **Empirical Model in VAR**

As the data used in this research is time series, it requires a stationary test so that the mean is stable and the random error  $=0$ , thus the regression model obtained has reliable predictability and is not spurious.

Johansen Co-integration Test is done to find whether the variables researched have a long-term correlation. Meanwhile, Granger Causality Test with a significance rate of 5% is done to find which variables have causal relationship (do not reject H0), which are then analyzed by using Vector Auto Regression method (VAR).

### **C. Discussion**

Based on the empirical findings from Table 1 and Table 2, it can be seen that the macroeconomic variable which has a strong influence on IHSG is BI Rate. It has a negative influence on IHSG, which is growing larger from the first month to the tenth month. Exchange rate does not have an influence in the first month, but starting from the second to the tenth month it has a growing negative influence. In the first month, inflation does not influence IHSG but starting from the second month it has a very weak yet fluctuating influence.

The strong influence of BI Rate on IHSG indicates that Bank of Indonesia plays an important role in controlling inflation and exchange rate movement directly, and also in controlling IHSG fluctuation indirectly. Exchange rate and inflation do not influence IHSG in the first month, but from the second to the tenth month they have a weak yet fluctuating influence.

Disc

The influence of DJIA on IHSG is stronger than that of HSI, N225 and STI. The strong influence of DJIA on IHSG in the first month tends to decrease until the tenth month. The positive influence of HSI on IHSG is decreasing from the first to the fifth month, and in the sixth month HSI even has a growing negative influence on IHSG. The Japanese stock market N225 and Singaporean STI do not have an influence in the first month, but begin to influence from the second to the tenth month. N225 and STI have a weak yet fluctuating influence in IHSG.)



Table 1

Impulse Response to Cholesky (d.t. adjusted) One S.D. Innovations With Method  
Random Effect Response of IHSG

Month	DEXCRATE	BIRATE	NFLATIO	DDJIA	DHSI	DN225	DSTI	DIHSG
1	0	32.243	0	101.837	40.568	0	0	117.308
2	-2.261	61.533	13.477	116.062	42.833	26.31	15.513	98.345
3	-6.041	-72.428	-2.021	106.142	33.614	15.714	56.379	81.032
4	-12.087	-80.974	0.913	88.273	22.005	11.177	59.115	79.008
5	-18.288	-88.26	-0.443	73.152	10.169	17.277	63.792	76.630
6	-25.021	-95.777	1.163	60.453	0.818	11.813	63.399	73.33
7	-29.55	-101.402	2.903	49.461	-9.878	10.507	60.249	69.59
8	-32.383	-105.958	3.354	39.004	-16.855	15.841	55.28	66.181
9	-33.807	-109.352	3.27	29.447	-21.761	15.8	49.345	63.534
10	-34.096	-110.5	3.174	20.971	-24.669	13.301	43.118	61.372

Table 2

Variance Decomposition of DIHSG

Month	DEXCRATE	B.RATE	NFLATIO	DDJIA	DHSI	DN225	DSTI	DIHSG
1	0	3.955	0	41.807	8.28	0	0	47.078
2	0.009	8.588	0.323	43.528	6.193	1.204	0.128	39.726
3	0.05	12.162	0.221	42.524	5.487	1.099	4.07	34.287
4	0.172	15.41	0.17	39.979	4.88	0.963	8.351	32.274
5	0.351	18.609	0.10	36.835	3.918	0.916	8.275	30.909
6	0.717	21.742	0.121	33.725	3.038	0.921	9.633	29.783
7	1.134	24.778	0.11	30.846	2.972	0.959	10.456	28.745
8	1.535	27.688	0.104	28.242	2.79	0.998	10.843	27.8
9	1.905	30.423	0.099	25.938	2.728	1.016	10.909	26.972
10	2.227	32.931	0.096	23.946	2.78	1.004	10.765	26.271

## D. Conclusion

The empirical conclusion of the research in general is as follows:

1. The macroeconomic variable which has a big influence on IHSG is BI Rate, while exchange rate and inflation do not have a big influence.
2. The global stock market which has a big influence on IHSG is DJIA and followed by HSI, while the Japanese stock market N225 and STI do not have a big influence.
3. The IHSG fluctuation has a strong positive influence on IHSG itself.
4. There is a co-integration among DJIA, HSI, N225, STI and IHSG, which means that there is a stability/balance relationship among them and a similarity in long-term fluctuation.

## References

- Ajayi, R. A., dan Mougoue, M. (Summer 1996). On the dynamic relation between stock prices and exchange rates, *The Journal of Financial Research*, 2, 193–207.
- Al-Khazali, O.M., and C.S. Pyun, (2004). Stock Prices and Inflation: New Evidence from the Pacific-Basin Countries, *Review of Quantitative Finance and Accounting*, 22 (2), 123-140
- Arshanapalli B, Doukas J dan Lang L. (1995). Pre and Post-October 1987 stock market linkages between U.S. and Asian Markets. *Pacific-Basin Finance Journal* 3:57-73
- Awokuse, O.T., Chopra, Aviral dan Bessler. A.D (2009). Structural change and international stock market interdependence: Evidence from Asian emerging markets. *Economics Modelling*, forthcoming.
- Bahmani-Oskooee, M., dan Sohrabian, A. (April 1992). Stock prices and the effective exchange rate of the dollar. *Applied Economics*, 24(4), 459–464.
- Berument, H., Ince, O. (2005). Effect of S&P 500's return on emerging markets: Turkish experience. *Applied Financial Economics Letters*, 1, 59-64.
- Berument, H., Dincer, N., Olgun, H. (2006). The center and periphery relations in international stock markets. *Applied Financial Economics Letters* 2, 365-370.
- Bessler A. David dan Yang, Jian. (2003). The Structure of Interdependence in International Stock Markets. *Journal of International Money and Finance* 22: 261-287.
- Cha, B., dan Oh, S. (2000). The relationship between developed equity markets and the Pacific Basin's emerging equity markets. *International Review Economics and Finance*, 9, 299-322.
- Chen, N. -F., Roll, R. and Ross, S. (1986) Economics forces and stock market, *Journal of Business*, 59, 583-603
- Cheung, YL dan SC Mak (1992) The international transmission of stock market fluctuation between the developed markets and the Asia Pacific markets. *Applied Financial Economics*, vol 2. No. 2.