

# Stock Market Deregulation, Macroeconomic Variables and Stock Market Performances

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**Abstract**—The purpose of this paper is to explore the effects of subsequent stock market deregulations on stock market performances in ASEAN-3: Malaysia, Thailand and Indonesia. The study focuses on the impact of subsequent stock market deregulations instead of the first stock market deregulation. Subsequent stock market deregulation is defined as the percentage change in foreign ownership of local equities from 1997. The effects of subsequent stock market deregulation are analyzed with and without the inclusion of macroeconomic variables. Thus, this study also explores the effects of macroeconomic factors: exchange rates, interest rates, oil prices and market liquidity, on stock market performances. Univariate and multivariate regression analyses on weekly basis, with 53-trading week event window, are the applied methodology. The empirical findings support two conclusions: firstly, subsequent stock market deregulation policies implemented in and after 1997 are not significantly effective in improving stock market performances of liberalizing countries; and secondly, macroeconomic variables have significant impact on the performances of liberalizing countries' stock markets in some of these events. The results would assist government authorities in making their decisions related to stock market deregulation.

**Index Terms**—IAPM, macroeconomics, market deregulation, and market performances.

## I. INTRODUCTION

There is a need for Asian countries, specifically ASEAN, to strengthen its equity market, promote financial stability and create economic and political balance in line with EU and NAFTA of the developed country regions. In order to do so, ASEAN countries need to strengthen financial cooperation among member countries and thus, cross-border activities within the region need to be improved. One of the ways to improve cross-border activities is by removing legal or informal restrictions. Specifically, it is the government's decision on the removal of legal or informal restrictions on capital flows [1], which is termed stock market deregulation. Stock market deregulation, the main focus of this paper, would theoretically allow for greater capital inflows, which in return improve the performances of the liberalizing countries' stock markets in the region.

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Based on the theoretical prediction of standard International Asset Pricing Model (IAPM), the deregulation of foreign ownership on local equities would increase the equity price index of emerging markets and therefore results in an increase in equity market returns. Such result is expected due to an increase in efficiency and a decrease in the cost of equity capital upon the openness of the local equities to foreign investors. An increase in net capital inflows would reduce the risk-free rate, increase the stock market liquidity and facilitate risk sharing. Studies that analyze the impact of stock market deregulation find that their results are consistent with the prediction of the model [1], [2], [3].

This paper aims to investigate whether subsequent stock market deregulation would generate consistent results as the prediction of the model. Subsequent stock market deregulation is defined as deregulation that takes place after the first stock market deregulation. It is normally imposed on specific sector(s) and for a smaller percentage change of foreign ownership. In addition, macroeconomic variables are included in the analyses as controlling variables to further analyze any differences in the impact of deregulation. At the same time, the impact of those macroeconomic variables: exchange rate, interest rate and oil price, can be detected.

This paper also contributes to the literature by focusing on subsequent stock market deregulations that took place from June 1997, the start of Asian financial crisis. This is the time period where many affected countries, especially Malaysia, Thailand and Indonesia, have imposed numerous economic and financial reforms, which include changes in the percentage of foreign ownership on local equities, in order to reduce the impact of the crisis. Due to the crisis, as shown in Fig. 1, the stock markets indices of the three countries have been plummeted significantly by 65% (Indonesia) to 79% (Malaysia). The three countries touched the lowest indices in September 1998, before starting to slightly increase back at higher volatility. It took sometimes for the countries to recover. Malaysia and Thailand only managed to get back to their pre-crisis performance in 2007, which is nine years later. Indonesia managed to recover earlier, which is by year 2004, six years later.

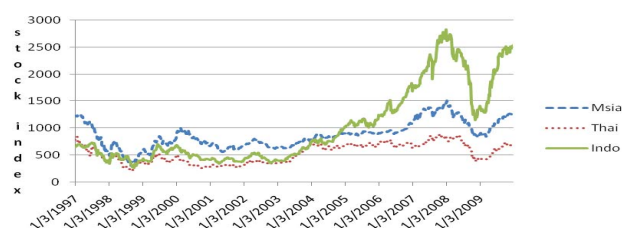


Fig. 1. Countries' weekly stock market main indices (Jan 1997 – Dec 2009).

Since the start of the crisis, numbers of measures have been implemented by the countries to fight through the crisis or at least to reduce the impact of it. In 1998, Indonesia and Thailand have sought for IMF supports and had gone through the IMF reforms. Malaysia has imposed capital control and pegged exchange rate. Those countries were also opened up their sectors or economy to foreign investors with the hope that it would boost up the stock markets which have dropped tremendously. Therefore this paper is to focus on how effective the stock market deregulation policy is in improving the performance of the stock markets.

Throughout the end of the period, among the three countries, Indonesia's stock market has shown significant improvement and has left Malaysia's and Thailand's far behind. Since 2004, Indonesia's stock market index has been increasing up to 269% in 2007. Thailand's stock market seems to be the market with the least improvement. The 2007 U.S. credit crisis, however, gives another significant impact on stock market performances of the three countries, especially Indonesia. These indicate that macroeconomic variables are the uncontrollable variables which may give significant impact on stock market performances too and thus to be the concern of this paper.

The results of the study reveal the effectiveness of stock market deregulation policy and significance of macroeconomic variables in affecting stock market performances. This would assist the ASEAN authorities and other similar developing economies in policy decision making on stock market deregulation and in finding the right path in strengthening financial cooperation that may result in stronger capital markets in the region. Authorities would also be able to make decisions on any modification or cancellation of the deregulation process if stock market deregulation policy fails to improve stock markets performances. They would be able to consider if there is a need to go for tighter global financial regulation as suggested by France and Germany at the recent G20 meeting in April 2009, especially after the 2007 credit crunch.

The objectives of this research are two folds. Firstly, to examine the effects of subsequent stock market deregulation on the performance of stock market indices in ASEAN, specifically: Malaysia, Thailand, and Indonesia. Secondly, to explore the impact of stock market deregulation with the inclusion of macroeconomic variables on stock market performances. The hypotheses include:

H<sub>1</sub>: There is significant relation between stock market deregulation and stock market performances in ASEAN (Malaysia, Indonesia, and Thailand) countries.

H<sub>2</sub>: There is significant relation between stock market deregulation, macroeconomic variables (exchange rate, interest rate, oil price and market liquidity) and stock market performances.

## II. LITERATURE REVIEW

Many previous studies provide evidence on the impact of official deregulation policy announcements, listing of country funds or the establishment of the first American Depository Receipt (ADR) [1]-[3], [5], [6], [9], [10]. Those studies compare the results before and after the

implementation of the first market deregulation. Moreover, many countries which have already opened up their stock markets to foreign investors need to understand its effects on the domestic economy before deciding whether they should open up more of their markets or reverse the policies. There is therefore a need to focus on the effects of subsequent deregulation of stock markets.

In analyzing the impact of stock market deregulation, numerous researchers focus on the impact of different areas such as real economy, investment, and market integration. In terms of the impact on stock market prices or returns, studies reveal that stock market deregulation imparts positive impact [1], [4], [8], [11], [12], [14]. It is also observed that stock market deregulation is more effective in economies with initially less active stock markets and higher trade costs [13]. On the other hand, deregulation may not improve the efficiency of emerging markets [10]. Indeed, it is also found that deregulation is negatively related to stock market development in the short-run [7].

The macroeconomic variables: exchange rate, interest rate, oil price, and market liquidity, are found to have significant relation with stock market returns [17] but with mixed direction. Instead of being positively related, exchange rate in Malaysia [16] and Nigeria [15] is negatively related to stock market returns. Interest rate is found to be negatively related due to inflationary or discounted factor effect [15], while, Bilson [17] finds it positive. There are also few studies state that there is no significant relationship between oil price and stock market returns.

## III. METHODOLOGY

This study focuses on stock markets and macroeconomic fundamentals of Malaysia, Indonesia, and Thailand from January 1997 to December 2009. Malaysia, Thailand, and Indonesia are the only three ASEAN emerging countries selected in this study as they were most directly affected by the Asian financial crisis in 1997 relative to others in the region.

This research uses stock market returns as a proxy for stock market performances. The stock market returns are measured by the main indices of individual country's stock exchanges, which are Kuala Lumpur Composite Index (KLCI), Stock Exchange of Thailand (SET) Composite Index, and Jakarta Composite Index (JCI) of the Indonesia Stock Exchange. All data collected are on a weekly basis based on the closing index of the week from DataStream. The weekly market returns of a country's index  $i$  at time  $t$  are measured as:

$$R_{it} = \ln(P_t) - \ln(P_0) \quad (1)$$

where  $\ln(P_t)$  is the natural log of current week price index;  $\ln(P_0)$  is the natural log of previous week price index; and  $R_{it}$  is the market returns of country  $i$  at time  $t$ .

Weekly data on macroeconomic variables for each country are obtained from Bloomberg, CEIC Data, DataStream, International Monetary Fund, individual country's statistical department and central bank. These macroeconomic factors include: foreign exchange rate of local currency per U.S.

dollar, three-month interbank offer rate, spot crude oil price of non-OPEC countries in U.S. dollar and countries' stock markets trade volume.

Stock market deregulation is the event when there is an increase percentage of foreign ownership in local companies. The implementation dates of the events from 1997 onwards are obtained mainly from Bekaert's and Harvey's data on major political and economic events in emerging markets and Lexis-Nexis as shown in Table 1. The following six major events are systematically analyzed in this study.

TABLE I: IMPLEMENTATION DATES OF SUBSEQUENT STOCK MARKET DEREGULATION

Country	Date	% Change in foreign ownership	Sources
Malaysia	3 Apr, 1998	49% to 61% for local telephone companies	BH
	1 June, 2003	Extension of 100% for manufacturing companies	BH
	18 Apr, 2005	30% to 49% for investment banks	LN
Thailand	13 Oct, 1997	Full ownership in financial institutions for up to 10 years	BH
Indonesia	4 Sep, 1997	49% for IPO and unlimited % for local shares except banks	BH
	31 Mar, 1999	Ceiling raised for nonstrategic corporations & 85% to 99% equity participation of foreign banks	BH

Note. BH is Bekaert's and Harvey's data on major political and economic events in emerging markets. LN is Lexis Nexis data.

In order to measure stock market performances surrounding the stock market deregulation events, a fifty-three (53) trading week event window is analyzed with 26 weeks prior to and 26 weeks after the implementation week T\*. The event time T\* denotes the implementation week of subsequent stock market deregulation. Fig. 2 and 3 portray the stock market performances behavior within 53 trading weeks of the stock market deregulation. The event week T\* is in week 27.

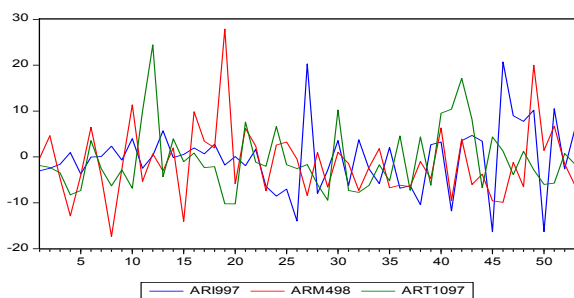


Fig. 2. Stock market returns within deregulation periods (T\*±26 weeks) during 1997 Asian financial crisis.

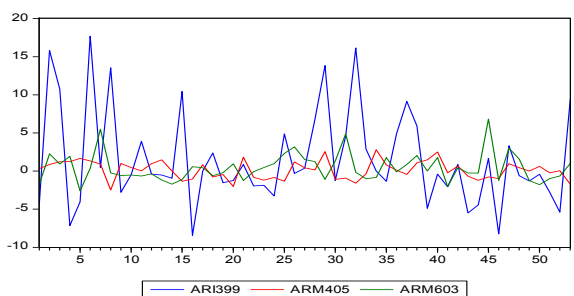


Fig. 3. Stock market returns within deregulation periods (T\*±26 weeks) after 1997 financial crisis.

Fig. 2 exhibits stock market performances of the events happened during 1997 Asian financial crisis and Fig. 3 exhibits stock market performances of the events happened after the crisis. There are not much differences portrayed by both graphs between the performances before and the performances after the implementation of the deregulation policy, regardless whether the policy is implemented during or after the crisis.

All time series variables are transformed by natural logarithm and tested for unit root. The augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests results show that all countries' stock markets main indices, interest rates and oil prices series are stationary at first difference. Only series on exchange rates and market liquidity are stationary at level. The stationary series are then applied in the regression models. There are two major regression models tested in the study. The first model is a study on the impact of stock market deregulation on stock market performances. The equation applied in the analyses is

$$R_{it} = \alpha_1 + \gamma_1 SMDreg_{it} + \epsilon_{it} \quad (2)$$

where  $R_{it}$  is the market returns of main index of country  $i$  at time  $t$ ;  $SMDreg_{it}$  is a dummy variable for stock market deregulation. It takes a value of 1, which begins 1 week before the implementation week of stock market deregulation and ends till 26 weeks after the implementation week of stock market deregulation;  $\epsilon_{it}$  is independently distributed random error term with zero mean and constant variance at time  $t$ ;  $\alpha_1$  and  $\gamma_1$  are the parameters to be estimated.

The second model is a study on the effects of macroeconomic variables and stock market deregulation on stock market performances. The equation applied in the analyses is

$$R_{it} = \alpha_2 + \rho_1 SMDreg_{it} + \rho_2 ExcR_{it} + \rho_3 IntR_{it} + \rho_4 Oil_t + \rho_5 MktLiq_{it} + v_{it} \quad (3)$$

where  $ExcR_{it}$  represents exchange rates of country  $i$  at time  $t$ ;  $IntR_{it}$  represents interest rates of country  $i$  at time  $t$ ;  $Oil_t$  represents oil prices at time  $t$ ;  $MktLiq_{it}$  represents market liquidity of a country's stock market;  $v_{it}$  is independently distributed random error term with zero mean and constant variance;  $\alpha_2, \rho_1, \dots, \rho_5$  are the parameters to be estimated.

The regressions are tested for serial correlation by applying Breusch-Godfrey Serial Correlation LM test and tested for heteroscedasticity by applying White heteroscedasticity test. The results reveal that all regressions are not serially correlated except for Indonesia's 1997 deregulation regression. The presence of heteroskedasticity is identified in all regressions except for Thailand's 1997 deregulation regression. As a result, all OLS regression estimations are done by applying White heteroskedasticity-consistent coefficient covariance, except for Thailand's 1997 deregulation regression estimation. Since Indonesia's 1997 deregulation regression is also serially correlated, then Newey-West heteroskedasticity-consistent coefficient covariance is applied in its regression model.

IV. FINDINGS

TABLE II portrays the impact of six events of stock market deregulation on stock market performances as in (2). The results reveal that stock market deregulation is not associated with stock market performances and the null hypothesis cannot be rejected. The stock market deregulation policy is thus not proven to be effective.

TABLE II: STOCK MARKET DEREGULATION AND STOCK MARKET PERFORMANCES

	Indo 4-Sep- 97	Thai 13-Oct- 97	Msia 3-Apr- 98	Indo 31-Mar- 99	Msia 1-Jun- 03	Msia 18-Apr- 05
Con stant	-0.764 <i>(0.663)</i>	-0.803 <i>(1.471)</i>	0.030 <i>(1.824)</i>	1.662 <i>(1.374)</i>	0.148 <i>(0.330)</i>	0.067 <i>(0.245)</i>
SM Dreg	0.809 <i>(1.954)</i>	0.231 <i>(1.960)</i>	-2.310 <i>(2.188)</i>	-0.207 <i>(1.756)</i>	0.551 <i>(0.506)</i>	0.124 <i>(0.333)</i>
Adj Rs	-0.017	-0.019	0.003	-0.019	0.003	-0.017
F-St at	0.157	0.014	1.159	0.014	1.163	0.139

Event window is T\*-26 to T\*+26 weeks. T\* is the implementation week. Regression model as:  
 $R_{it} = \alpha_1 + \gamma_1 Dreg_{it} + \epsilon_{it}$ . Data are stationary, heteroskedasticity-consistent (White) standard errors are in italic. \*, \*\*, and \*\*\* indicate significant difference at 10, 5 and 1 percent levels, respectively.

The findings from the second model, which is with the inclusion of macroeconomic variables, as in (3) are shown in TABLE III. The table reveals that there are three significant coefficients of stock market deregulation dummies. All the three significant coefficients happened during the 1997-1998 Asian crisis for all the three countries. Unfortunately, the significant coefficients are negative, which indicates that the implementation of the deregulation policy deteriorates the stock market performances further. Such declining effect may be due to the exposure of uncertainties abroad especially during the period of contagious financial crisis. The other two events, which happened after the crisis, still have negative coefficients even though they are not significant. Only Malaysia 2005 deregulation policy gives positive impact on stock market performances but the coefficient is not significant.

Generally, these findings on the impact of stock market deregulation are not consistent with the prediction of the IAPM. The deregulation of foreign ownership on local equities does not able to increase the equity price index and equity market returns of emerging ASEAN countries which contradicts the findings of [1], [4], [8], [11], [12], and [14]. This result is however supported by Naceur, Ghazouni and Omran [7] and Kawakatsu and Morray [10]. Therefore there is no reason for the authorities to implement such policies since it initiates a downfall of or no improvement on stock market performances.

The findings in TABLE III also exhibit evidence of relationship between macroeconomic variables and stock market performances. In terms of the impact of exchange rate on stock market performances, it seems that during the crisis period, Indonesia and Thailand have significant positive coefficients of exchange rate. The exchange rate coefficients remain positive in other events too except for Malaysia 2003

deregulation, but they are not significant. Such positive relationship between exchange rate and stock market performances is supported by Mukherjee and Naka [18], Kwon and Shin [19] and Kandir [20]. The positive impact of exchange rate on stock market performances may due to overwhelming volume of exports benefited by the firms when local currency depreciates, in which it would generate higher income to the firms and initiates greater height of stock market indices.

TABLE III: THE IMPACT OF STOCK MARKET DEREGULATION AND MACROECONOMIC VARIABLES ON STOCK MARKET PERFORMANCES

		Coefficient	Std. Error	Prob.
Indo 9/97	C	-60.158	51.869	0.252
	SMDreg	-6.068	2.113	0.006
	MktLiq	-0.258	2.281	0.910
	ExcR	8.455	1.650	0.000
	IntR	-23.256	8.090	0.006
	Oil	42.804	22.032	0.058
	Adj R <sup>2</sup>	0.143	D-W stat	2.977
Thai 10/97	C	-144.274	39.094	0.001
	SMDreg	-6.670	3.293	0.049
	Mkt Liq	5.311	1.833	0.006
	ExcR	12.187	7.207	0.098
	IntR	2.667	2.004	0.190
	Oil	12.414	23.302	0.597
	Adj R <sup>2</sup>	0.170	D-W stat	2.024
Msia 4/98	C	-77.503	61.130	0.212
	SMDreg	-3.804	2.172	0.087
	MktLiq	3.647	2.915	0.217
	ExcR	4.985	15.804	0.754
	IntR	-74.214	26.661	0.008
	Oil	13.392	12.449	0.288
	Adj R <sup>2</sup>	0.109	D-W stat	2.066
Indo 3/99	C	-237.341	129.526	0.074
	SMDreg	-1.242	2.629	0.639
	Mkt Liq	2.875	1.932	0.144
	ExcR	19.946	12.713	0.124
	IntR	16.284	36.849	0.661
	Oil	-24.095	21.194	0.262
	Adj R <sup>2</sup>	0.031	D-W stat	2.064
Msia 6/03	C	1165.049	5843.267	0.843
	SMDreg	-0.997	0.753	0.192
	MktLiq	1.962	0.910	0.036
	ExcR	-900.408	4375.158	0.838
	IntR	9.151	15.319	0.553
	Oil	3.673	4.201	0.387
	Adj R <sup>2</sup>	0.109	D-W stat	2.196
Msia 4/05	C	-91.149	57.279	0.118
	SMDreg	0.573	0.470	0.229
	MktLiq	0.191	0.642	0.767
	ExcR	65.492	40.109	0.109
	IntR	-90.440	43.912	0.045
	Oil	0.438	4.735	0.927
	Adj R <sup>2</sup>	-0.025	D-W stat	1.697
Prob(F-stat)	0.592			

Time period: T-26 to T+26, Dummy 1: T-1 to T+26; T is the implementation week. Regression model as  $R_{it} = \alpha_3 + \rho_1 Dreg_{it} + \rho_2 MktLiq_{it} + \rho_3 ExcR_{it} + \rho_4 IntR_{it} + \rho_5 Oil_{it} + v_{it}$ , where Data are stationary, Heteroskedasticity-consistent (White) standard errors are in italic. \*, \*\*, and \*\*\* indicate significant difference at 10, 5 and 1 percent levels, respectively.

On the other hand, it is expected that the depreciation of the currency would incur higher cost of production and

intermediate goods to most of the firms which highly dependent on international trade. Thus, this would result in negative relationship [16], but the relationship only presents in Malaysia's 2003 deregulation period. Generally, the results show that the countries are taking advantage of depreciating currencies to incur higher level of production, thus higher income and share prices.

There is also evidence that there is a significant relation between interest rate and stock market performances in Table 3. The significant coefficients of interest rates are negative for Indonesia's 1997 deregulation period and Malaysia's 1998 and 2005 deregulation periods. Negative relation indicates that the lower the interest rate, the better the performances of country's stock market. The result is consistent with other studies saying that interest rate is an alternative investment opportunities. The higher the interest rate, the lower the investment is. This is due to higher cost of fund and thus decreases the share price and its returns [15], [16], and [18].

On the other hand, the opposite but insignificant coefficients are found in other deregulation periods. The results indicate that the higher interest rate results in improved stock market performances. This condition is due to an increase in money supply backed by foreign reserves when there is an increase in interest rate. As a result, domestic investment and consumption would increase and would generate better stock market performances [17].

There is one event with significant coefficient of oil price, that is during Indonesia 1997 deregulation period. Therefore, there is an evidence to reject the null hypothesis where there is a significant relation between oil prices and stock market performances. The significant and other four insignificant coefficients show positive sign. This positive results are consistent with the theory that oil price in oil exporting countries should be positively related to stock market performances due to higher income generated through higher oil price [20]. Indonesia is a former OPEC member but since 2004 it has been the net importer country. Malaysia and Thailand seem to be joining Indonesia as net oil importing countries.

TABLE III also reveals that market liquidity is positively related to stock market performances. There are two events with significant and positive coefficients of market liquidity, which are Indonesia's 1997 and Malaysia's 2003 deregulation periods. Other insignificant coefficients are also having positive sign, except for Indonesia's 1997. The results, generally, supports the findings of Levine and Zervos [12], Mobarek and Mollah [21], and Jun [22].

## V. DISCUSSION AND CONCLUSION

The significant but negative findings on the impact of subsequent stock market deregulations of the three ASEAN countries may be due to the higher impact of the 1997 Asian financial crisis. However, even after the crisis, none of the events are having significant positive coefficients of stock market deregulation. These results may due to the smaller adjustment in percentage change of foreign ownership on local equities or the imposition of stock market deregulation on specific sector(s) only. The impact of such subsequent

stock market deregulation is not as great as the impact of the initial stock market deregulation. These impacts of subsequent stock market deregulation may have already been anticipated at the time of the first stock market deregulation where the rise in equity price index is only during the announcement or implementation of the first stock market deregulation [1]. If this is true, it clarifies that subsequent stock market deregulations would not be able to improve the performances of these stock markets since the impact has already been factored in since the first deregulation of the market.

Government authorities in emerging countries, especially ASEAN, are therefore recommended not to focus too much of their attention on the implementation of subsequent stock market deregulation due to its ineffectiveness. The effect of the changes in foreign ownership on local equities is not found to be statistically significant and therefore these changes do not bring about the desired effect. Other measures such as trade deregulation and other financial reforms may be more effective in strengthening a country's equity market.

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