CAPITAL CONTROLS, LEVEL OF LIQUIDITY AND STOCK RETURNS IN MALAYSIA

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Abstract

This paper examines whether the relationship between the level of liquidity and stock returns during this period in Bursa Malaysia (KLSE) are affected by the implementation of capital controls by the Malaysian government following the 1997 Asian financial crisis. The turnover ratio is used as a measure of the level of liquidity, with the control variables being beta, size, book-to-market ratio, and momentum. The examination of the interactions between beta, size, book-to-market, momentum, and turnover ratio with capital controls demonstrated that the impact of size became smaller, the impact of book-to-market became more positive, and the impact of the level of liquidity became larger after capital control implementation. Beta does not have a significant impact on returns, which remained unchanged even after the inclusion of the capital controls interaction term. The impact of two out of the three momentum terms became more positive. The reliability of the results was confirmed and verified through several robustness checks. The impact of the turnover ratio on returns or the mediating effect of capital controls on the impact of the turnover ratio on returns was not altered by the exclusion of the January data. The tests provide evidence of a nonlinear relationship between the level of liquidity and stock returns even with the inclusion of the capital controls interaction terms. When the level of liquidity is high, its impact on returns becomes significantly greater. In addition, the study demonstrates that while a high level of liquidity may contribute favorably to stock returns, the variation in the level of liquidity has a negative impact on returns, which becomes more negative following the implementation of capital controls.

Key Words: *stock returns, liquidity, capital controls, Asian crisis*

JEL: *F02, F32, G12, G15, G18, G28*

1. Introduction

Amid mixed findings on the association between financial market liberalization (de-liberalization) and liquidity in emerging markets, this paper seeks to examine whether the imposition of selective capital control measures in September 1998 influenced the relationship between the level of liquidity and stock returns in the Malaysian stock market (KLSE).

Previous studies present conflicting results on the relationship between the level of liquidity and stock returns in emerging markets. Although a number of studies report a positive relationship between level of liquidity and stock returns, others, such as Bekaert et al. (2003b), Jun et al. (2003), and Rouwenhorst (1999) demonstrate that liquidity levels do not account for returns. Research linking liquidity with equity market liberalization in emerging markets indicates that improved liquidity levels follow market liberalization (e.g., Bekaert et al., 2003b). The resulting expansion in opportunities for international investment portfolio diversification may have consequently altered the perception of the significance of liquidity in explaining stock returns in emerging markets.

In the Asian region, Bursa Malaysia (or KLSE) is one of the largest stock markets; one that has sustained market liberalization exercises since the late 1980s (see Henry, 2000 and Bekaert et al., 2003a for official liberalization dates). In a controversial move following the Asian crisis, selective capital control measures were imposed by the Malaysian government on September 1, 1998, to restrict foreign capital outflows and avert further crashes in the market (currency and equity). The pegging of the ringgit to the U.S. dollar (at RM3.80 to the dollar), and the stipulation that short-term capital stay onshore for at least twelve months after September 1998 were among the control measures undertaken by the Malaysian government.

Unlike Malaysia, countries such as Indonesia, Thailand, Korea, and the Philippines committed to floating their currencies, tightening fiscal policy, opening financial markets to foreigners, closing trouble banks, and undertaking other structural reforms as part of the requirements for accepting the International Monetary Fund (IMF) recovery package. Therefore, KLSE offers a valuable opportunity to investigate the impact of a (de-)liberalization given that the Malaysian government chose to implement selective capital control measures following the Asian financial crisis in 1998.

The move by the Malaysian government has reignited interest in the capital controls debate, giving birth to two opposing views on the effectiveness of capital control actions. On one hand, critics argue that capital control measures limit freer capital flows, which limits the use of productive resources in areas where they may be more in-demand and economically beneficial. Alternatively, proponents of capital controls claim that such control measures are justified in the face of increased vulnerability to financial crises due to free capital flows and market speculations and allows a crisis-hit country greater control in designing policies to navigate the period of instability.

The argument posed by critics appeared to be supported by various events that followed. Malaysian stocks were excluded by Morgan Stanley from its international index, reflecting the disapproval and lack of confidence in Malaysia's approach, as perceived from the response of the international financial community and investors. International rating agencies delivered a blow to the country's sovereign rating, imposing a downgrade, causing a rise in Malaysia's risk premium (i.e., increased cost of funding from foreign sources). In addition, the country faced a decline in net foreign direct investment inflows regardless of their exemption from imposed controls; and declining activity in the spot, forward, and futures markets that may have restricted hedging and risk management by market participants (Ariff and Abubakar, 1999).

The capital controls imposed by the Malaysian government in September 1998 are seen as a de-liberalization. Therefore, as opposed to market liberalization, capital controls may lower liquidity in the Malaysian stock market. Higher liquidity and positive stock price reactions are typically observed in financial market liberalization, as seen in previous studies (e.g., Bekaert et al., 2003b; Kim and Singal, 2000; Patro and Wald, 2005). Given that, investors should place greater concern on liquidity after the imposition of capital controls, which would be demonstrated by increased pricing of liquidity risk on KLSE in its relation to stock returns after the events of September 1998.

This paper utilizes the panel data regression analysis to evaluate the mediating effects of capital control on the association between the level of liquidity and stock returns on KLSE, controlling for other known stock characteristics such as market risk, firm size, book-to-market ratio, and momentums, and also test for the robustness of the study's findings against the January effect, non-linearity of liquidity, and variability of liquidity. The turnover ratio, which was originally adopted by Datar et al. (1998), is used as a measure of the level of liquidity.

The findings of this paper demonstrate a positive relationship between the level of market liquidity and stock returns post-capital controls. The coefficient for turnover ratio is higher after the capital controls implementation. Evidence implies higher priced liquidity premiums post-capital controls. Therefore, this study lends support to the argument laid down by critics of capital

controls, recognizing their unfavorable impact on the state of liquidity in the Malaysian stock market.

The remainder of this paper is organized as follows: Section 2 gives an overview of prior studies on the topic and lays out our hypotheses. Section 3 explains the data and the methodology. Section 4 shows the results of the empirical tests. Section 5 includes a discussion of the findings. Finally, Section 6 concludes.

2. Literature review and hypotheses development

Previous research on the impact of capital controls or market de-liberalization on financial markets has been widely inconclusive (see Forbes, 2007b; Magud, Reinhart, and Rogoff, 2011). While some studies (Schadler, 2010; Habermeier et al., 2011) argue that the composition of capital flows is significantly impacted by controls with no effect on the amount of flows, others do demonstrate the presence of an impact on capital flow volume (Edison and Warnock, 2008; Forbes, 2007a; Forbes et al., 2016; Vargas and Varela, 2008). Binici et al., 2010) find that both volume and composition of capital flows are affected by capital controls, although the impact is seen to vary from one country to another.

Alternatively, some papers suggest that controls have no discernable influence on capital flows. A study by Clements (2009) found that while controls in Colombia successfully reduced external borrowing, it had no significant impact on the volume of flows. In a study examining whether capital controls effectively insulate countries from U.S. monetary shocks, there was no evidence of a significant impact on the exchange rate or foreign country interest rates (Miniane and Rogers, 2007).

These variations in study findings indicate that the research on the impact of capital controls on financial markets is inconclusive, and that these differences can be attributed to country-specific factors (Edison and Warnock, 2008; Magud et al., 2011; Prasad and Rajan, 2008; Binici et al., 2010). According to Magud et al. (2011), insufficient standardization across several study factors contributes to these inconsistencies. This includes the lack of a unified theoretical framework, a standard measure of "success", a common methodology, and the heterogeneity of the control variables for each country and each time period.

Several additional studies consider the issue from alternative perspectives. For instance, Chinn and Ito (2006) show that it is only with the attainment of a certain level of legal systems and institutions that financial openness is beneficial to the development of stock markets. Desai et al. (2005) show that for U.S. multinational firms, the cost of attempting to circumvent capital controls, in addition to higher interest rates, deters investment in countries enforcing capital controls. Edwards (2007) finds that the probability of a capital flow contraction is related to capital mobility, although the magnitude of the impact appears to be minimal. Exchange rate flexibility helps, and the chance of a capital flow contraction is more probable with a higher current account deficit and/or a lower FDI to GDP ratio. Considering controls frequently remain in place for decades, Eichengreen and Rose (2014) state that new policies requiring regular shifts will lean heavily on theory. Prasad and Rajan (2008) argue that capital account liberalization indirectly affects emerging markets (i.e., helps build institutions), which places it on lower priority ranking for poor countries with weak policies and institutions. Ostry et al. (2012) finds that capital control policies can be helpful seeing as enforced policies strengthened the resilience of emerging markets during the global crisis of 2008-2009. Tai (2007) shows that in the majority of the examined emerging Asian stock markets, the cost of capital and price volatility was reduced by market liberalization.

This paper examines how the level of liquidity impacted stock returns in Bursa Malaysia (KLSE) in 1997 during the period of capital control implementation. We examine whether the relationship between the level of liquidity and stock returns is affected by capital controls, with the main concern being the impact of liquidity on stock returns and whether there is a change in this relationship after the implementation of capital controls. The impacts of firm-specific factors are

also examined, including beta, size, book-to-market, and momentum on returns and whether these are affected following capital control enforcement. The January effect is then evaluated, where we observe whether there is a change in results after including the capital controls interactions and excluding the January data. Next, we look at nonlinearity, where we assess whether there is a nonlinear relationship between the level of market liquidity and stock returns after including the capital controls interactions. Finally, we examine the impact of the variability of liquidity on returns and whether this impact had changed after the implementation of controls.

This paper conjectures that the decision of the Malaysian government to introduce capital control measures in September 1998 following the Asian financial crisis influenced liquidity in the Malaysian stock market, and therefore the relationship between liquidity and stock returns. In other words, is liquidity priced differently post-capital controls? The favorable impact of financial market liberalization on stock returns, liquidity, variability, and other stock characteristics has been documented across several studies (e.g., Kim and Singal, 2000; Patro and Wald, 2005). In viewing capital controls as a financial market de-liberalization, liquidity may be priced higher post-capital controls.

The impact of a shock or crisis on liquidity conditions and how it relates to stock returns is documented in a paper by Amihud et al. (1990), where it is demonstrated that after the 1987 U.S. stock crash, investors' expectations about the true state of liquidity in the New York, London, and Tokyo stock markets caused the liquidity premium to be revised and priced higher in these three stock exchanges. The liberalization of stock markets contributes to improved liquidity in emerging stock markets, typically resulting in reduced liquidity premiums (e.g., Bekaert et al., 2003b). Accordingly, one would anticipate an effect in the opposite direction in the event of market de-liberalization caused by capital controls, contributing to an increase in liquidity premiums. As such, the first hypothesis is presented as follows:

Hypothesis 1: Following the implementation of capital controls in Malaysia, the liquidity premium went up.

After the implementation of controls, the impact of liquidity on stock returns is anticipated to be higher. Meanwhile, for firm characteristics such as beta, size, book-to-market, and momentum, the opposite effect can be expected. Liquidity premium is expected to be higher after the implementation of capital controls as liquidity then becomes the main concern for most stocks at that stage. With that, it can be argued that the traditional drivers of returns such as beta, size, book-to-market, and momentum lose significance, in which case premiums associated with these stock characteristics are expected to become smaller after the implementation of control measures. Therefore, the next four hypotheses are presented as follows:

Hypothesis 2: Following the implementation of capital controls in Malaysia, the beta premium went down.

Hypothesis 3: Following the implementation of capital controls in Malaysia, the size premium went down.

Hypothesis 4: Following the implementation of capital controls in Malaysia, the book-to-market premium went down.

Hypothesis 5: Following the implementation of capital controls in Malaysia, the momentum premium went down.

The exclusion of January data has not been found to affect the relationship between liquidity levels and returns (e.g., Amihud, 2002; Chan and Faff, 2003; and Datar et al., 1998). At the same time, it is not expected for the existence of a January effect to be swayed by the mediating effects of capital controls. This can be collectively understood to mean that the relationship between the level of liquidity and stock returns is not affected by the exclusion of January data, even after considering capital control interactions. Therefore, the hypothesis is stated as:

Hypothesis 6: Following the implementation of capital controls in Malaysia, the January effect remained insignificant.

The relationship between the level of liquidity and returns has also been suggested to be nonlinear across several studies (e.g., Amihud and Mendelson, 1986; Chan and Faff, 2003; Chordia et al., 2001). Findings indicate that the observed expected return is a concave, increasing function of the bid-ask spread. This nonlinear relationship between the level of liquidity and stock returns is not expected to be influenced by the mediating effects of capital controls. Therefore, the seventh hypothesis is presented as:

Hypothesis 7: Following the implementation of capital controls in Malaysia, the nonlinearity between the level of liquidity and stock returns still exists.

Furthermore, research suggests a highly significant negative relationship between the variability of liquidity (i.e., the second moment of liquidity) and expected returns (Chordia et al., 2001). This effect is believed to be amplified in the presence of controls due to liquidity shock. Therefore, the final hypothesis is as stated below:

Hypothesis 8: The negative impact of the variation in the level of liquidity on returns became larger following the implementation of controls.

3. Data and methodology

Thomson Financial's DataStream database was used to collect the required information. A range of over 200 firms in 1996 to 557 firms in 2003 that were traded on the KLSE were included in our sample. The variables used in this study are as follows: *Beta (β)* – the systematic risk (i.e., beta) of the stock; *Size (SIZE)* – the natural log of market capitalization of the stock at the end of the month; *Book-to-market (BME)* – the natural log of the ratio of the book value of equity at the end of fiscal year *t* (December 31) to the market value of equity at the end of months after March year *t+1*, as December 31 is generally the end of the financial year for Malaysian firms; *MOM2* – the cumulative returns over the two months ending at the beginning of the preceding month; *MOM4* – the cumulative returns over the three months ending three months previously; *MOM7* – the cumulative returns over the six months ending six months previously; and *turnover ratio (LQTR)* – the natural log of the ratio of the monthly trading volume to market capitalization at the end of the month.

Univariate and multivariate regressions were used to test for the mediating effects of capital controls on the relationship between the level of market liquidity and stock returns on KLSE using the following model. Other variables known to affect stock returns including market risk (beta), firm size, book-to-market, and momentum were added as control variables. A dummy variable was then included for capital controls imposed by the Malaysian government (with 1 for periods after the control, i.e., from September 1998, and 0 otherwise), to investigate the effect of the controls on the above relationship. The cross-section and time-series fixed effects model, with *i-1* firm dummies and *t-1* time dummies, were employed in this model as shown below:

$$R_{i,t} = a_1 + b_1\beta_{i,t} + b_2\beta_{i,t} * cc_t + b_3 SIZE_{i,t} + b_4 SIZE_{i,t} * cc_t + b_5 BME_{i,t} + b_6 BME_{i,t} * cc_t + b_7 MOM2_{i,t} + b_8 MOM2_{i,t} * cc_t + b_9 MOM4_{i,t} + b_{10} MOM4_{i,t} * cc_t + b_{11} MOM7_{i,t} + b_{12} MOM7_{i,t} * cc_t + b_{13} LQTR_{i,t} + b_{14} LQTR_{i,t} * cc_t + a_1 firm_1 + \cdots + a_{i-1} firm_{i-1} + \gamma_1 month_1 + \cdots + \gamma_{t-1} month_{t-1} + \varepsilon_{i,t} \quad (1)$$

where $R_{i,t}$ is the (log) excess return over the risk-free rate on stock *i* in each month *t*; $\beta_{i,t}$ is the average portfolio beta estimate assigned to each stock *i* in portfolio *p*; $LQTR_{i,t}$ is the turnover ratio for stock *i* at the end of month *t*; cc_t is the dummy variable for the capital control imposition with *1* for periods after the control (i.e., from September 1998), and *0* otherwise; $firm_i$ is the firm dummy; $month_t$ is the time dummy from Mac 1996 – December 2003, and $\varepsilon_{i,t}$ is the error terms based on several common error structures.

4. Empirical results

Prior to conducting the primary analysis on the impact of capital controls on the relationship between market liquidity and stock returns, this paper begins by analyzing the differences between market liquidity measures before and after the implementation of capital controls. By conducting an initial assessment on the state of market liquidity on KLSE, the effect that it might have on the above relationship can be evaluated. Financial market liberalization has been predicted and documented in recent papers to produce positive price reactions (higher returns) in emerging stock markets due to lower cost of capital, lower (higher) exposure to local (global) market risk, and higher volatility (see e.g., Bekaert et al., 2003b; Kim and Singal, 2000; Patro and Wald, 2005). The opposite effect would be observed if capital controls were a de-liberalization, thus producing negative price reactions (lower returns) and higher market risk exposure. Lower market capitalization, higher book-to-market equity ratio, and lower liquidity for firms on KLSE would be additionally observed.

The summary statistics for all variables during the pre-capital controls period (i.e., before September 1998) can be seen in Table 1 – Panel A, where the results of the normality tests are displayed in the final column. The results demonstrate that in the pre-capital controls period, all of the variables, including *R* and *LQTR* have non-normal distributions ($p<0.01$ for all variables). The summary statistics for all variables during the post-capital controls period (i.e., after September 1998) are displayed in Table 1 – Panel B. Like the pre-capital controls period, all of the variables in the post-capital controls period, including *R* and *LQTR*, have non-normal distributions ($p<0.01$ for all variables).

In comparing between Panel A and Panel B, one can observe that returns were higher (i.e., mean *R*=0.0096 versus -0.0371) and systematic risks were lower (i.e., mean β=1.1430 versus 2.3027) after the initiation of capital controls. Compared to the pre-capital controls period, firms also became smaller (mean *SIZE*=4.9305 versus 5.7207) alongside a decline in market values (mean *BME*=6.8619 versus 6.1728). In addition, it can be seen that *MOM2* and *MOM4* variables increased after the implementation of capital controls. In other words, after the enforcement of controls, the cumulative returns over the preceding 2nd and 3rd months and over the preceding 4th, 5th, and 6th months went up. The mean of *MOM2* went up from -0.0579 to 0.0090, and the mean of *MOM4* went up from -0.0641 to -0.0077. The pre- and post-capital controls comparison of *MOM7* shows mixed results. While the mean of MOM7 increased from -0.0990 to -0.0531, the median was reduced from -0.0167 to -0.0391. Finally, in comparing the two panels, it can also be seen that *LQTR* went down (mean *LQTR*=1.8042 versus 1.9015) during the post-capital controls period.

These findings that align with existing literature providing predictions on the effects of financial market (de-)liberalization. The average means during the post-control period are lower for firm size or market capitalization (*SIZE*), higher for book-to-market equity (*BME*), and lower for turnover ratio (*LQTR)*. Lower stock returns and an increase in the importance of local market risk on stocks is expected to be observed due to a reduced degree of integration with the global market. However, in contradiction with (de)liberalization predictions, mean returns (*R*) are higher and market risk (β) is lower in the post-capital control period.

Table 1: Summary Statistics – Pre- and Post-Capital Controls

Panel A. Pre-Capital Controls

Variable	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Normality Test
R	19,024	-0.0371	-0.0211	0.2043	-1.0043	11.6350	.1045***
β	10,381	2.3027	1.1416	33.9085	29.3651	860.4812	.5094***
SIZE	19,034	5.7207	5.5834	1.3398	0.3151	0.0598	.0378***
BME	6,792	6.1728	6.1620	1.0962	-0.1588	0.1548	.0228***
MOM2	18,871	-0.0579	-0.0294	0.3042	-1.0006	6.1497	.0925***
MOM4	17,731	-0.0641	-0.0243	0.3605	-1.0616	4.2895	.1184***
MOM7	15,105	-0.0990	-0.0167	0.5147	-1.2382	3.0080	.1580***
LQTR	18,937	1.9015	1.9532	1.7530	-0.3540	0.6167	.0181***

Panel B. Post-Capital Controls

Variable	N	Mean	Median	Std. Dev.	Skewness	Kurtosis	Normality Test
R	34,131	0.0096	0.0000	0.1648	1.2307	14.7096	.1085***
β	32,695	1.1430	1.1416	0.1105	0.4245	0.0415	.1219***
SIZE	34,128	4.9305	4.6746	1.3414	0.8300	0.9903	.0822***
BME	24,914	6.8619	6.9331	0.8014	-1.0051	5.9119	.0579***
MOM2	34,078	0.0090	-0.0083	0.2373	0.7976	7.6703	.0818***
MOM4	33,979	-0.0077	-0.0269	0.3148	0.4667	6.6255	.0745***
MOM7	33,461	-0.0531	-0.0391	0.4330	-0.2352	3.3925	.0444***
LQTR	33,700	1.8042	1.7375	1.8212	-0.0184	0.4053	.0190***

*Note: This table provides the time-series averages of all stocks in the pre- and post-capital controls periods. The pre- and post-capital controls periods refer to the periods before and after September 1998. The normality test results reported are for the Kolmogorov-Smirnov test. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively.*

The results of univariate regressions looking at each variable and how they interact with capital controls are shown in Table 2. In examining the effect of β as well as its interaction with capital controls (β *cc) on returns, it can be observed that β has a negative and significant impact on returns (coef.= -0.054, $p<0.01$), while the interaction term β*cc has a positive and significant impact on returns (coef.=0.075, $p<0.01$). This indicates that while beta may hurt returns, its impact shifts to become increasingly positive following the implementation of capital controls.

Table 2: Univariate Regression Results (with Capital Controls interactions)

Independent Variable	*β*	*SIZE*	*BME*	*MOM2*	*MOM4*	*MOM7*	*LQTR*
Intercept	-0.028	-0.247***	0.197***	0.001	0.009	-0.000	-0.021
β	-0.054***						
*β*cc*	0.075***						
SIZE		0.067***					
*SIZE*cc*		-0.018***					
BME			-0.044***				
*BME*cc*			0.012***				
MOM2				-0.063***			
*MOM2*cc*				0.037***			
MOM4					0.033***		
*MOM4*cc*					-0.074***		
MOM7						-0.006	
*MOM7*cc*						-0.025***	
LQTR							-0.001
*LQTR*cc*							0.014***
MSE	0.014	0.014	0.014	0.014	0.014	0.014	0.014
R_square	0.518	0.533	0.522	0.520	0.520	0.520	0.526
F-test for no fixed effects	43.70***	47.94***	43.50***	51.80***	50.49***	47.59***	45.63***
White's test	567.23***	435.57***	301.59***	241.46***	261.90***	183.37***	958.99***

*Notes: This table presents the univariate panel regression results using individual security data (N = 557, T = 93). The dependent variable is the monthly excess returns of individual stocks. We report results from the two-way fixed effects model, based on the Mean Squared Error (MSE) and Buse (1973) R-squared for generalized least-squares regression (GLS) criteria. The two-way fixed effects model is a specification that depends on fixed effects of both the cross section and the time period to which the observation belongs. "cc" is the dummy variable for capital controls, where 0 refers to the periods before capital control implementation in September 1998, and 1 otherwise. β *cc, SIZE*cc, BME*cc, MOM2*cc, MOM4*cc, MOM7*cc, and LQTR*cc are the interaction terms between the capital controls dummy and the independent variables. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively, based on White (1980) heteroskedasticity-corrected t-statistics.*

Looking at both *SIZE* and *SIZE*cc* as independent variables, the data shows that *SIZE* has a significant positive impact on returns (coef. = 0.067, p<0.01), while the interaction term has a significant negative impact on returns (coef. = -0.018, p<0.01). This suggests that while size has a positive impact on returns, its effect becomes more negative following the implementation of controls.

Using both *BME* and *BME*cc* as independent variables, the data shows that BME has a significant negative impact on returns (coef. = -0.044, p<0.01), while the interaction term has a significant positive impact on returns (coef. = 0.012, p<0.01). This indicates that while BME has a negative impact on returns, its impact becomes more positive after the implementation of controls.

With the momentum variables, *MOM2* has a significant negative impact on returns, but this impact becomes increasingly positive after control implementation. *MOM4* has a significant positive impact on returns, but this impact shifts to become more negative after the implementation of controls. The impact of *MOM7* on returns is insignificant, but this impact takes a negative turn after controls were implemented.

When observing *LQTR* and its interaction with capital controls, LQTR can be seen to have an insignificant impact on returns, but this impact becomes larger after the implementation of controls. The coefficient of *LQTR* is -0.001 (p>0.10), while the coefficient of *LQTR*cc* is 0.014 (p<0.01).

In summary, the signs and significance of firm size, book-to-market ratio, and all momentum variables are generally maintained post-capital controls. However, when the capital controls effect is accounted for, the relationship between market risk (i.e., β) and stock returns is significant. Prior to capital controls, the effect is negative. However, post-capital controls, the effect turns positive (with a smaller coefficient – i.e., contrary to the de-liberalization prediction). The turnover ratio, the primary variable of interest, shows no statistically significant relationship with stock returns. However, its coefficient is significantly more positive post-capital controls. The sign for turnover ratio is seen to progress from negative pre-capital controls to positive post-capital controls.

The results of multivariate regressions are shown in Table 3. The first column shows results when only β, *LQTR*, and their interactions with capital controls are included in the first column, and the results of the full model that includes all variables as well as their interactions with capital controls are shown in the second column.

From the first column, when β, *LQTR*, and their interactions with capital controls are included, β, β *cc, and *LQTR* are insignificant, but *LQTR*cc* is positive and significant. That is to say that in this model, while the level of liquidity (i.e., *LQTR*) does not have a significant impact on stock returns, this impact shifts to become increasingly positive after the implementation of controls. The coefficient of *LQTR* is -0.001 (p>0.10), while the coefficient of *LQTR*cc* is 0.014 (p<0.01).

The results for the full model are seen in the second column, which displays all variables and their interactions with capital controls. The results show β to be insignificant. *SIZE* and *LQTR* are significantly positive, while all remaining variables are significantly negative.

While β is insignificant, its interaction with capital controls is also insignificant. The impact of *SIZE* on returns is positive, although its impact reduces after control implementation. The coefficient of *SIZE* is 0.091 (p<0.01), while the coefficient of *SIZE*cc* is -0.027 (p<0.01). The impact of *BME* on returns is negative, although its impact becomes increasingly positive after control implementation. The coefficient of *BME* is -0.041 (p<0.01), while the coefficient of *BME*cc* is 0.014 (p<0.01).

Table 3: Multivariate Regression Results

Independent Variable		
	[1]	[2]
Intercept	-0.011	-0.162***
β	-0.018	0.002
*β*cc*	0.009	0.012
SIZE		0.091***
*SIZE*cc*		-0.027***
BME		-0.041***
*BME*cc*		0.014***
MOM2		-0.139***
*MOM2*cc*		0.047***
MOM4		-0.059***
*MOM4*cc*		-0.035***
MOM7		-0.083***
*MOM7*cc*		0.015*
LQTR	-0.001	0.004***
*LQTR*cc*	0.014***	0.011***
MSE	0.014	0.013
R_square	0.525	0.564
F-test for no fixed effects	43.05***	41.97***
White's test	1,440.34***	1,923.59***

*Notes: This table presents the multivariate regression results using individual security data (N = 557, T = 93). The dependent variable is the monthly excess returns of individual stocks. Results are reported from the two-way fixed effect model, based on the Mean Squared Error (MSE) and Buse (1973) R-squared for generalized least-squares regression (GLS) criteria. The two-way fixed effects model is a specification that depends on fixed effects of both the cross section and the time period to which the observation belongs. cc is the dummy variable for capital controls, where 0 refers to the periods before capital control implementation in September 1998, and 1 otherwise. β*cc, SIZE*cc, BME*cc, MOM2*cc, MOM4*cc, MOM7*cc, and LQTR*cc are the interaction terms between the capital controls dummy and the independent variables. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively, based on White (1980) heteroskedasticity-corrected t-statistics.*

The three momentum variables each have a negative and significant impact on returns, but their interactions with capital controls are compelling to analyze. *MOM2* has a negative impact on returns, but its impact becomes increasingly positive after the implementation of controls. The coefficient of *MOM2* is -0.139 (p<0.01), while the coefficient of *MOM2*cc* is 0.047 (p<0.01). *MOM4* has a negative impact on returns, and its impact becomes increasingly negative with the implementation of controls. The coefficient of *MOM4* is -0.059 (p<0.01), while the coefficient of *MOM4*cc* is -0.035 (p<0.01). *MOM7* has a negative impact on returns, but its impact becomes increasingly positive after control implementation. The coefficient of *MOM7* is -0.083 (p<0.01), while the coefficient of *MOM7*cc* is 0.015 (p<0.10).

Finally, *LQTR* has a significantly positive impact on returns, which becomes more positive (i.e., increases) after control implementation. The coefficient of *LQTR* is 0.004 p<0.01), while the

coefficient of *LQTR*cc* is 0.011 (p<0.01). R-squared in this full model is 0.564; therefore, the full model explains 56.4% of the variation in returns.

The results of analysis involving only non-January months are shown in Table 4. The table accounts for results upon the inclusion of all variables, including interaction terms. When January data is excluded, there is no variation in the signs and significance levels of the variables. Thus, it can be said that our results are not driven by the January data. β is insignificant, *SIZE* and *LQTR* are positive and significant (at 1% level), and *BME, MOM2, MOM4*, and *MOM7* are negative and significant (at 1% level). The interaction term for β is insignificant. The interaction terms for *SIZE* and *MOM4* are negative and significant, while the interaction terms for *BME, MOM2, MOM7*, and *LQTR* are positive and significant.

Table 4: Multivariate Regression Results – Non-January Observations

Independent Variable	[2]
Intercept	-0.156***
β	-0.008
β*cc	0.019
SIZE	0.093***
*SIZE*cc*	-0.028***
BME	-0.041***
*BME*cc*	0.013***
MOM2	-0.123***
*MOM2*cc*	0.030**
MOM4	-0.060***
*MOM4*cc*	-0.033***
MOM7	-0.085***
*MOM7*cc*	0.016*
LQTR	0.004**
*LQTR*cc*	0.011***
MSE	0.013
R_square	0.578
F-test for no fixed effects	41.97***
White's test	1,855.43***

*Notes: This table presents the panel regression results using individual security data from non-January months (N = 557, T = 93). The dependent variable is the monthly excess returns of individual stocks. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively, based on White (1980) heteroskedasticity-corrected t-statistics.*

Results when nonlinearity of liquidity (i.e., *LQTR_squared*) is included are shown in Table 5. According to the results, it can be seen that that β is insignificant, *SIZE* is significantly positive, and *BME, MOM2, MOM4*, and *MOM7* are significantly negative. When observing *LQTR, LQTR*cc*, and *LQTR_squared*, the data reveals that *LQTR* is insignificant (coef. = -0.002, p>0.10), while *LQTR*cc* is significantly positive (coef. = 0.011, p<0.01), as is *LQTR_squared* (coef. = 0.002, p<0.01). This indicates that upon the inclusion of nonlinearity of liquidity, the level of liquidity becomes insignificant, but its effect on returns is more positive (larger) with the inclusion

of controls. The significantly positive coefficient for *LQTR_squared* suggests that when the level of liquidity is high, the effect of the level of liquidity on returns becomes significantly greater. Therefore, the evidence points towards the presence of a nonlinear relationship between the level of liquidity and stock returns.

Table 5: Multivariate Regression Results – Nonlinearity of Liquidity

Independent Variable	[2]
Intercept	-0.168***
β	-0.007
*β**cc	0.022
SIZE	0.093***
*SIZE*cc*	-0.028***
BME	-0.040***
*BME*cc*	0.012***
MOM2	-0.121***
*MOM2*cc*	0.025*
MOM4	-0.058***
*MOM4*cc*	-0.037***
MOM7	-0.084***
*MOM7*cc*	0.015
LQTR	-0.002
*LQTR*cc*	0.011***
LQTR_squared	0.002***
MSE	0.013
R_square	0.58
F-test for no fixed effects	42.13***
White's test	1,855.43***

*Notes: This table presents the panel regression results using individual security data from non-January months where the liquidity-squared term is added (N = 557, T = 93). The dependent variable is the monthly excess returns of individual stocks. LQTR_squared is the squared term of the turnover ratio. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively, based on White (1980) heteroskedasticity-corrected t-statistics.*

The results when variability (i.e., the second moment) of liquidity (i.e., *Var_LQTR*) and its interaction with capital controls (i.e., *Var_LQTR*cc*) are included are shown in Table 6. The data presented mirrors that of previous tables, whereby *β* is insignificant, *SIZE* is significantly positive, and *BME, MOM2, MOM4,* and *MOM7* are significantly negative.

Table 6: Multivariate Regression Results – Variability of Liquidity

Independent Variable	[2]
Intercept	-0.099***

β	0.005
*β*cc*	0.01
SIZE	0.094***
*SIZE*cc*	-0.028***
BME	-0.040***
*BME*cc*	0.012***
MOM2	-0.139***
*MOM2*cc*	0.044***
MOM4	-0.054***
*MOM4*cc*	-0.042***
MOM7	-0.083***
*MOM7*cc*	0.014
LQTR	0.005***
*LQTR*cc*	0.011***
Var_LQTR	-0.014**
*Var_LQTR*cc*	-0.018**
MSE	0.013
R_square	0.565
F-test for no fixed effects	41.25***
White's test	2,005.95***

*Notes: This table reports the panel regression results when the variability of liquidity is included in the model (N = 557, T = 93). The dependent variable is the monthly excess returns of individual stocks. Var_LQTR is the variability of the liquidity variable calculated over the past 24 months. β*cc, SIZE*cc, BME*afc, MOM2*cc, MOM4*cc, MOM7*cc, LQTR*cc, and Var_LQTR*cc are the interaction terms between the capital controls dummy and the independent variables. ***, **, and * denote significance at 1 percent, 5 percent, and 10 percent, respectively, based on White (1980) heteroskedasticity-corrected t-statistics.*

Between *LQTR, LQTR*cc, Var_LQTR*, and *Var_LQTR*cc*, it can be observed that *LQTR* is significantly positive (coef. = 0.005, p<0.01), and the same can be seen with *LQTR*cc* (coef. = 0.011, p<0.01). Seeing as both *LQTR* and *LQTR*cc* are significantly positive even after the inclusion of variability of liquidity and its interaction with capital controls, this study's previous findings of a positive *LQTR* and *LQTR*cc* may reasonably be considered as sound and reliable.

The table shows *Var_LQTR* to be significantly negative (coef.= -0.014, p<0.05) and *Var_LQTR*cc* to be significantly negative (coef. = -0.018, p<0.05). With this data, it is determined that the variation in the level of liquidity has a negative impact on returns, despite the high levels of liquidity contributing positively to stock returns. Moreover, the negative impact becomes more pronounced with the implementation of capital controls.

5. Discussion of findings

i. Liquidity Premium:

Statistical tests confirm that the coefficients of both the turnover ratio and its interaction with capital controls are significant. These findings appear to align with the opinions of critics of capital controls, who hold the view that capital control implementation would negatively affect liquidity, therefore increasing liquidity premiums post-capital controls.

This study's findings regarding these variables are unlike those of previous documentations in developed markets. However, they correspond more closely with several studies focusing on emerging markets. As documented by Claessens et al. (1998), this study similarly demonstrates that size and book-to-market have significant explanatory power.

Momentum being shown to have a negative effect on returns corresponds with various studies examining emerging markets, although contradictory to studies on developed markets. Chui et al.'s (2005) argument may offer explanation on these findings, where they suggest the momentum effect is brought about by overconfidence in these more individualistic cultures by investors, which encourages more aggressive trading, but may eventually result in losses for these investors.

The relationship between market liquidity and KLSE stock returns is generally found to be positive and significant in this study. The shifts in the slope of the turnover ratio after the implementation of controls are also identified as significant. After the introduction of capital controls in Malaysia, the coefficient for turnover ratio is shown to be higher, which implies a higher liquidity premium. In this study, the measures taken by the Malaysian government in navigating the Asian financial crisis are observed to have been met with negative responses from market participants, which supports earlier evidence of market liquidity being significantly lower post-capital controls.

ii. Beta and other stock characteristics:

As anticipated in existing literature on the topic of liberalization, the univariate regression demonstrates that the slope of market risk (i.e., beta) is higher following the implementation of capital controls. It is suggested that following liberalization exercises, the relevance of the local market risk diminishes in comparison to global market risk. Across all models, it is shown that the coefficients for firm size are significantly positive, the coefficients for book-to-market are significantly negative, and the coefficients for all momentum variables are significantly negative. The size, book-to-market, and momentum coefficients are smaller after the implementation of controls (except MOM_4, which is higher), which implies a lower premium for these variables.

iii. January Effect:

With regards to the January effect, the study findings indicate that results are unaffected by the exclusion of January data, which aligns with previous studies by Amihud (2002), Chan and Faff (2003), and Datar et al. (1998). The sign and significance of TR remains unchanged, as well as the effect of capital controls. The relationship between turnover ratio and stock returns remains significantly positive even upon exclusion of the January data. After capital control implementation, the slope of the turnover ratio is also shown to be higher, indicating a higher liquidity premium.

iv. Nonlinearity in Liquidity:

As for the non-linearity of liquidity, the study findings indicate that non-linearity of liquidity is evident (significant) for the turnover ratio, corresponding to studies by Amihud and Mendelson (1986), Chordia et al. (2001), and Chan and Faff (2003). In this study, the turnover ratio pre-capital controls is insignificant and negative, but positive post-capital controls, alongside a positively higher coefficient for turnover ratio. Otherwise, the coefficient for market liquidity remains significantly positive, and higher after the introduction of capital controls. Overall, while there may be a nonlinear relationship between liquidity and stock returns based on the turnover ratio, the relationship between turnover ratio and stock returns for KLSE stocks is positive and significant.

v. Variability of Liquidity:

Lastly, regarding the impact of the variability of turnover ratio on returns, the study findings indicate that although high liquidity levels positively impact stock returns, returns are negatively impacted by the variation in the level of liquidity. This negative impact is further amplified by the introduction of capital control measures. Similar to findings by Chordia et al. (2001), the coefficient for variability of liquidity is consistently higher than that of the level of liquidity. However, the coefficient of turnover ratio retains significance across all cases. Similarly, the interaction term is significant for the turnover ratio. The coefficient for turnover ratio is also larger after the implementation of capital controls. Therefore, the incorporation of the second moment of market liquidity into the model does not alter the findings, confirming the robustness of the results, and corroborate findings by Chordia et al. (2001) on the relation between variability of liquidity and stock returns for an emerging market.

6. Conclusion

This paper analyzes how the implementation of capital controls in Malaysia in 1998 affects and shapes the relationship between market liquidity and stock returns. Throughout the study, the results are consistent in demonstrating this relationship after capital control enforcement. The slope of the turnover ratio following capital controls experiences a significant shift, with the coefficient for turnover ratio being higher. That is to say that with the implementation of capital controls, the impact of the turnover ratio on returns is larger. As such, this supports the notion put forward by critics of capital controls whereby they describe the impact of capital controls on the state of market liquidity on KLSE as being unfavorable. It would also appear that the imposition of such measures was not well received by investors on KLSE, causing a higher premium for market liquidity.

The reliability of these results has been verified by several robustness checks. The examination of non-January data demonstrated no change in results: Both the turnover ratio (i.e., the level of liquidity) and the capital control interaction with the turnover ratio remain positive and significant. This indicates that the level of liquidity continues to have a positive impact on returns even with the exclusion of January data, while the effect of the turnover ratio on returns continues to become larger following the implementation of controls.

The examination of demonstrated that even after the inclusion of capital control interactions, nonlinearity continues to exist. The turnover ratio becomes insignificant upon the inclusion of the nonlinearity term and the capital controls interactions, but the interaction term remains positive and significant (i.e., after capital controls, the impact of the level of liquidity on returns increased).

The examination of variability in returns demonstrated that even after the inclusion of capital controls interactions, the negative impact of variability on returns persists. The negative impact of variability on returns becomes more pronounced after the implementation of capital controls. The turnover ratio and the interaction term remain positive and significant after including the variability term and the capital controls interactions, (i.e., after capital controls, the impact of the level of liquidity on returns increased).

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