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Investigating the efficiency of East Asian stock markets through booms and busts

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Abstract

The Efficient Market Hypothesis has been the subject of considerable debate over the past several decades with a recent surge in interest in East Asian markets. This study investigates the East Asian economies, which have experienced massive capital inflows, inviting the question of whether these markets are efficient enough for further investment and development. We endeavour to assess the volatility and business cycle phases, providing a unique aspect in weak form efficiency studies. We focus on Malaysia, Indonesia, Singapore and South Korea due to their economic and financial development. Using Multifractal Detrended Fluctuation Analysis to study efficiency, we determine first that overall efficiency has improved over the past two decades and second that markets are more efficient in growth phases in comparison to their preceding decline. Our results concur with those reported in the mainstream literature.

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Introduction

East Asia has assumed a more significant role in the global arena against the backdrop of rapid expansions of economies and the financial landscape, globally contributing up to 40% of the world's GDP growth. A factor that has contributed to this region's global rise to prominence is its emphasis on the development of

trade and liberalization of investment policies. This also led to an increase in the inflow of foreign direct investment (FDI), which was only affected during the various crisis periods, i.e., 1997 Asian crisis, the 2000 dot com crisis, and the recent 2008 global crisis [11].

The massive amounts of FDI coming into East Asia and the emerging nature of its stock markets, which are more prone to volatility, begs the question of whether the stock markets are efficient and how they perform during different business phases. The objective of this paper is to cultivate the weak-form efficiency ranking of four major East Asian markets and relate the rankings derived with the stage of business cycle movement.

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Since its introduction by Fama (1965) [6]; the weak form efficiency hypothesis has been tested for several emerging markets with rather inconclusive results. Furthermore, we find limited research on its efficiency; Guidi and Gupta (2011) [7] rejected the Efficient Market Hypothesis (EMH) for the stock markets of Indonesia, Malaysia, and only found Singapore to be weak form efficient. Hoque et al. (2007) [8] examined weak form efficiency for the periods before and after the Asian financial crisis in eight Asian countries and found that the crisis did not have any significant impact on the degree of efficiency in Hong Kong, Indonesia, Malaysia, the Philippines, Singapore and Thailand; hence, the inefficiency persisted even after the crisis. Faiq et al. (2010) [5] found that the subprime crisis had no impact on informational efficiency in the Chinese stock market. Kim and Abdul (2008) [10] also found the Asian crisis to be insignificant in terms of market efficiency for most East Asian countries; the exceptions were Singapore and Thailand, which achieved efficiency after the crisis.

The motivation behind this study arises from the economic eminence of these four East Asian economies as a global shift from the west to the east is being witnessed. The primarily reason for sticking to the four major ASEAN countries concerns their stage of economic development and the presence of capital markets and liberalization policies. The prominence of these countries arises from their rapid economic development and liberalized capital market policies. Since we plan to focus on the stock markets, these countries contributed nearly 85% of the market capitalization in the region. Furthermore, considering the crucial role of intra-industry trade and capital flows, our study lends credibility to the economic prominence of East Asia, providing policymakers with precarious details to avoid extensive misallocation of resources

that may have a negative impact on long-term economic growth. Likewise, understanding the relations between a market's efficiency and the different phases of the economy will allow investors to make more informed investment decisions.

Data and methodology

Our dataset comprises four East Asian economies, namely, Malaysia, Singapore, Indonesia and South Korea, which were selected based on their economic development stage, the size of their markets and exposure to both domestic and international crises over past two decades. A key consideration is the infamous Asian financial crisis of 1997–98.

The fundamental indicator for market development for our sample countries, as illustrated in Fig. 1, shows a relatively similar progression over the two decades.

We use the daily closing price of the MSCI (Morgan Stanley Composite Index) benchmark index of each individual market from 1/1/1990 until 31/7/2013 (MSCI Malaysia, MSCI Indonesia, MSCI South Korea, MSCI Singapore), which gives us 6153 observations for every country. The rationale behind selecting this time period is based on the revival of the east Asian region, which began in the 1990 s due to liberalization policies, with the next two decades seeing rapid growth, then the Asian financial crisis, and then the region's recovery.

To aid this study's investigation, the sample period is divided into economic booms and recessions using the Christiano-Fitzgerald filter (2003) [4] for each country's economic cycle determination over the sample period.

To measure the efficiency we employ the multi-fractal de-trended fluctuation analysis (MFDFA), as it allows us to rank successively the efficiency of the

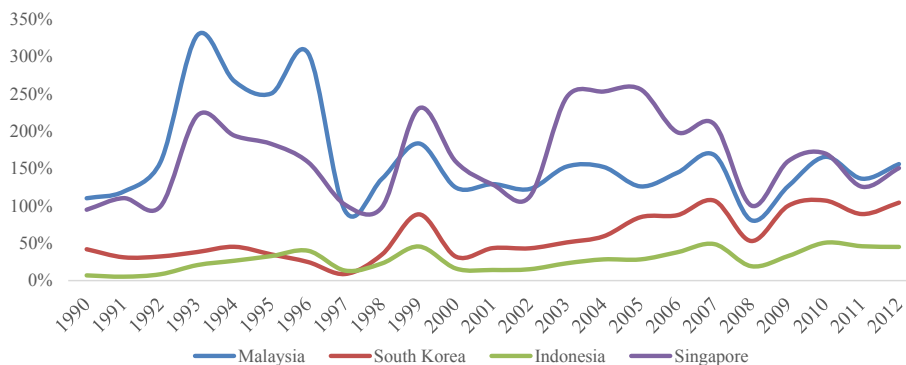


Fig. 1. Market Capitalization/GDP from 1990 to 2012.

markets and at the same time expresses the extent of inefficiency. From past studies, the existence of structural difference in emerging markets has been established and identified as highly sensitivity to capital flows, with languid responses to new information. Lastly, a larger effect of non-synchronous trading on price has been identified (Selçuk, 2004 [14]). The technicalities of the MFDDFA are borrowed from Kantelhardt et al. (2002) [9]; Rizvi et al. (2014) [13] and Arshad et al. (2014) [1].

Empirical results

In line with the earlier theory outlined above, for a market to be efficient, all types of fluctuations should follow random walk behaviour. This translates into $h(q)$'s related to different q 's being equal to 0.5. For our analysis, we define the market deficiency measure as:

$$D = \frac{1}{2(|h(-4) - 0.5| + |h(4) - 0.5|)} \quad (1)$$

For a market to be efficient, the value of D has to be close to 0, whereas a large value of D indicates a less efficient market. The focus of our study is on the general efficiency of the market; hence, the empirical analysis will focus on D in short term and long term.

Efficiency over two decades

Recently Rizvi et al. (2014) [13] furthered the argument that the market's development stage also plays a role in its relative efficiency. Our findings for the two-decade efficiency ranking confirm this argument. The Korean market represents the highest efficiency in both the short term and long term. The higher efficiency in the short term represents a higher level of adjustment to speculative activity, while long-term efficiency is mainly attributed to a higher level of adjustment and equilibrium to fundamental based shocks and activity. A surprising finding is the relatively lower efficiency of the Singaporean market in the long term. As an Asian financial hub, Singapore is relatively more developed economically and in terms of market development than Korea. In the interest of robustness, for over two decades, we also calculated the efficiency ranking for a two-decade period when q varies from -6 to 6 , and although the efficiency measure changes slightly, the ranking order is not affected (to keeping this article short, complete results of robustness are available from the authors) (see Table 1).

Table 1
Ranking according to the efficiency measure for full dataset.

Short term			Long term		
1	Korea	0.106	1	Korea	0.074
2	Singapore	0.113	2	Malaysia	0.146
3	Malaysia	0.232	3	Indonesia	0.147
4	Indonesia	0.233	4	Singapore	0.184

These results may be misleading, as the total span of our sample period spreads more than two decades, during which time the East Asian economies faced multiple economic cycles and changes in economic dynamics both internally and regionally. For this reason, a further country-specific analysis follows to shed more light on the actual efficiency of the equity markets in different economic states over these two decades.

Economic state and efficiency

Economic upswings and financial liberalizing policies positively influence efficiency. Cajueiro et al. (2009) [2] explored and deduced a positive impact of financial liberalization on market efficiency in Greece. Our results largely conform to this previous finding, with two distinct deviations from the pattern. First, the Malaysian market shows lower efficiency following the Asian financial crisis. During the Asian financial crisis, the Malaysian government took an unconventional method of implementing capital controls, which affected investor sentiment in the financial markets and reduced volume of trading substantially. Illiquidity in the market tends to create inefficiencies, which the Malaysian market experienced (see [3]). However, on a multi-horizon analysis, an interesting observation is the increase in inefficiency for long-term investors. This may be attributed to an increasing number of retail and shorter horizon investors. A surge in the shorter horizon investor base, on the other hand, may increase efficiency in the short term but may adversely affect long-term efficiency.

The second anomaly is the experience of Indonesia and Singapore from 2004 to 2007. While the Singaporean economy experienced phenomenal stability and growth along with the global and US boom, the financial markets faced a falling number of investors, which was primarily caused by the high yields available in the BRIC economies. The portfolio investment outflow during this regime may have contributed to creating relative illiquidity resulting in relative inefficiency in both the short and long term in comparison to previous periods. In the case of Indonesia,

stability in the country's economic growth and the addition of the Indonesian market in most global emerging markets watch lists brought hot money into the market. This primarily resulted in higher volatility and lower efficiency, as a bubble in the market began to be created.

An interesting anomaly is also observed in the case of South Korea during the 1993–1995 economic boom. The impact is similar to that of the liberalization effect. Until 1992, foreign participation in the Korean market was tightly restricted through special funds, such as the Korea fund, which was a closed-end fund listed on the national stock exchange. Due to strong interest by foreign investors the premium on this fund was as high as 52% in the beginning of 1992. The year 1993 onwards marks the liberalization of the capital markets, which attracted sudden hot money into the market, which in turn may have created bubbles and thus relative inefficiency. Another sign of relative inefficiency in the longer horizon can be observed in the boom of 2009 and 2010 in Korea. Although the local

economy was booming, from a long-term perspective there were still concerns on the viability of revival in the global economy. With the Korean industries heavily reliant on exports, negative or cautious sentiment over a longer horizon may have resulted in some inefficiencies, as observed in our results.

As a robustness check, we performed an efficiency analysis when q varies from -6 to 6 , and our earlier findings regarding the variance of efficiency across business cycles are confirmed (complete results are available from the authors) (see Table 2).

Conclusions

The results of our research advance the notion of improving efficiency over the last two decades for the East Asian stock markets. Interestingly, the efficiency level tends to improve in every economic boom as compared to a preceding recession. This can be explained by the financial liberalization that took place in the countries, which was covered in the earlier part of our study. Our findings are in line with Arshad and Rizvi (2015) [12] who have examined the East Asian markets in detail and found similar results.

From a policy standpoint, an efficient market is essential because it can play an important role in an economy's development via resource allocation and capital formation, as well as providing channels to distribute wealth. From the perspective of international investors, the equity market, by allowing for diversification across a variety of assets, helps to reduce the risk that investors must bear, thus reducing the cost of capital. This in turn spurs investment and economic growth. Our results imply that an economic boom influences resource allocation positively with an improvement in efficiency. The long-term components of the investor profile are generally assumed to be investors who enter the East Asian markets on the basis of fundamental economic growth; higher efficiency provides an additional source of attraction in that case.

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Table 2

Efficiency measure in country-specific economic states.

Malaysia		Short term	Long term
Recession	1991 M04-1993 M12	0.152	0.123
Boom	1994 M1-1997 M6	0.079	0.210
Recession	1997 M06-1998 M10	0.160	0.150
Boom	1998 M11-2000 M06	0.195	0.222
Recession	2008 M02-2009 M03	0.165	0.091
Boom	2011 M02-2013 M06	0.128	0.052
Singapore		Short term	Long term
Recession	1997 M07-1998 M05	0.124	0.212
Boom	1998 M06-2000 M07	0.110	0.114
Recession	2000 M08-2001 M08	0.025	0.105
Boom	2004 M11-2007 M02	0.084	0.134
Recession	2007 M03-2009 M01	0.061	0.195
Boom	2009 M02-2010 M06	0.041	0.136
Indonesia		Short term	Long term
Recession	1991 M04-1993 M10	0.402	0.319
Boom	1993 M11-1995 M02	0.338	0.300
Recession	1997 M04-1998 M08	0.269	0.471
Boom	1998 M09-2000 M07	0.185	0.157
Recession	2002 M02-2003 M02	0.112	0.238
Boom	2004 M09-2006 M05	0.141	0.156
Recession	2006 M06-2007 M06	0.190	0.100
Korea		Short term	Long term
Recession	1991 M10-1993 M03	0.097	0.046
Boom	1993 M04-1995 M09	0.109	0.075
Recession	1997 M02-1998 M05	0.241	0.232
Boom	1998 M06-2000 M02	0.106	0.064
Recession	2000 M03-2001 M08	0.103	0.050
Boom	2009 M01-2010 M02	0.078	0.180

Economic Booms are in Bold.

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