Original Research   **Open Access**

Corruption and Stock Market Development: Evidence from Asian Countries

Kelvin Lee Yong Ming[*]
Kolej Sunway Kuching, Malaysia

Mohamad Bin Jais
Faculty of Economics and Business, Universiti Malaysia Sarawak, Malaysia

Rossazana Abd Rahim
Faculty of Economics and Business, Universiti Malaysia Sarawak, Malaysia

Ayoib Che-Ahmad
Universiti Utara Malaysia

Abstract

Stock market plays a significant role in corporate financing. However, stock market movements were highly affected by certain external factors such as economic, psychological and political factors. By using the sample of 10 Asian countries, this study intends to investigate the impacts of macroeconomic and corruption factors on the stock market development. The sample period covered from the year 2003 to 2015. The dependent variable used in this study was stock market development. Whilst, the variables of interest used in this study were i) income level, ii) savings, iii) foreign direct investment, iv) value of stocks traded, v) money supply and vi) corruption perception index (CPI). A panel data approach had been applied in testing the relationship between the variables due to the nature of data. As expected, the gross domestic savings, foreign direct investment, and money supply were found to have a significant relationship with stock market development. On the other hand, the income level found to have a significant negative relationship with the stock market development. Noteworthy, the results also indicated that lower corruption level could lead to the growth of stock market development. Thus, a change in corruption level was the important matter to be considered before making any investment decision as corruption level had a significant impact on the stock market development.

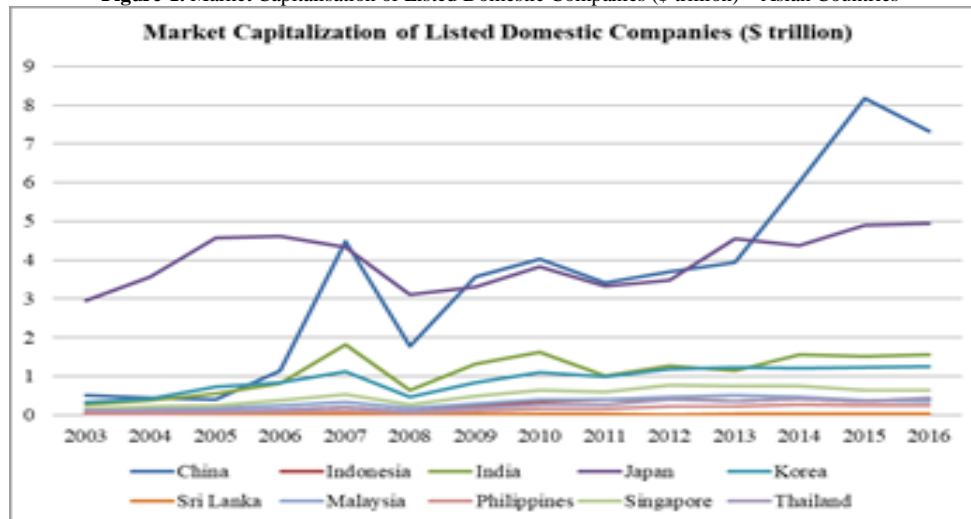**Keywords:** Stock market development; Macroeconomic factors; Corruption.

1.Introduction

The stock market acts as the heart of financial market and plays a significant role in elevating the economic growth (Levine and Zervos, 1988). There are two main functions of the stock market where it serves as a platform for the listed companies in raising equity funds and stock trading between the stock market participants. Thus, stock market performance always attracts the attention of investors, researchers and business or financial organizations. Intuitively, the stock market index will be used as the benchmark for the stock market performance. However, the stock market performance can be measured from different aspects of investments such as returns, development and liquidity. As stated by Ayaydın and Baltacı (2013), the development of financial system is greatly influenced by the stock market development.

This study focuses on the stock market development and aims to investigate the impact of macroeconomic and corruption factors towards the stock market development. As applied in the previous studies, stock market development is commonly measured by the ratio of stock market capitalization to the gross domestic product (GDP). As shown in figure 1, Asian stock market had developed in term of market capitalization in these recent years. Generally, there has been an upward trend in the market capitalisation of the Asian market over the last 14 years, except for the year 2008 and 2011. Undoubtedly, China had the highest increment of about 1,427 percent in terms of market capitalisation from the year 2003 to 2016. In 2003, the stock market capitalization of China was just $0.513 trillion in 2003 and increased dramatically to $8.188 trillion in 2015.

*Corresponding Author

Figure-1. Market Capitalisation of Listed Domestic Companies ($ trillion) – Asian Countries

Sources: World Bank Database

Based on the Arbitrage Pricing Theory developed by Ross (1976), a number of research had been conducted over the past decades to study the macroeconomic factors that affect the stock market development. For instances, Naceur et al. (2007) revealed that certain macroeconomic variables, such as saving rate, stock market liquidity and financial intermediary development play important roles for the development of stock market in the Middle-Eastern and North African regions. However, Yao et al. (1999) argued that the economic factor is not the only one that affects the stock market. Other factors such as political and psychological factors may also contribute to the development of stock market. Additionally, El-Wassal (2013) stated that stock market development could be affected by two major factors - macroeconomic factors and institutional factors.

To some extent, the evidence shows that the stock market is not only driven by the macroeconomic factors. This study intends to extend and investigate the role of non-macroeconomic factor (i.e. corruption) in affecting the stock market. Hence, this study aims to provide the evidence regarding to both the macroeconomic and corruption factors on the stock market development. The next section of the paper presents a review of related literatures. Section 3 presents the data and methodology used in this study. Section 4 and section 5 discuss the results and conclusion respectively.

2. Literature Review

This section reviews and discuss the previous studies that are related to the determinants of stock market development. Existing theory of Capital Asset Pricing Model (CAPM) states that the expected returns of the security are affected by the systematic risk and market risk premium (Reilly and Brown, 2012). Contradict to the CAPM, Arbitrage Pricing Theory (APT) developed by Ross (1976) states that the security returns are affected by multiple factors. Under the APT, numerous studies had been conducted over the past decades to examine the determinants of stock market development.

As one of the pioneer studies, Garcia and Liu (1999) examined the relationship between a set of macroeconomic variable and stock market development by using data of fifteen countries from Latin America and East Asia. They found that real income, saving rate, financial intermediary development, and stock market liquidity to have significant relationship with the stock market development. Besides, they also found that stock market development and financial intermediary development are complementary to each other instead of substitutionary.

Naceur et al. (2007) investigated the macroeconomic factors that influence the development of stock market in the Middle-Eastern and North African regions. Consistent with Garcia and Liu (1999), they found that saving rate, financial intermediary, stock market liquidity are the important determinants of stock market development. In addition, Naceur et al. (2007) also found that macroeconomic stability (*inflation change*) plays an important role in influencing the stock market development.

Besides, later study by Malik and Amjad (2013) found that foreign direct investment also plays an important role in affecting the development of Pakistan stock market. On the other hand, Tripathi and Seth (2014) investigated the macroeconomic factor that affecting the performance of Indian stock market. They found that inflation and exchange rate tend to be negatively related with the stock market capitalization.

Recent study by Ho and Iyke (2017) applied the ARDL bounds testing procedure to investigate the macroeconomic determinants of stock market development in South Africa. In both of the short run and long run, this study found that the economic growth has positive relationship, while inflation rate and trade openness have negative relationship with stock market development. However, the banking sector development has also been found to be positively related with stock market development in the short run only.

Other than macroeconomic factors, Yartey (2008) examined the impact of institutional factors on the stock market development. By applying the data of 42 countries over the period from 1990 to 2004, Yartey (2008) found that both of the macroeconomic factors and institutional factors play crucial roles in determining the development of stock market in the emerging markets. The macroeconomic factors used were income level, gross domestic

investment, banking sector development, private capital flows, and stock market liquidity. In addition, the institutional factors which included political risk, law and order, and bureaucratic quality had shown a significant relationship with stock market development.

Cherif and Gazdar (2010) used the data of 14 MENA countries to examine the impact of macroeconomic factors and institutional factors on the stock market development. Along with that, both of the panel data and instrumental variable techniques had been used and the study found that macroeconomic factors are still the important determinants of stock market development. Specifically, they found that income level, saving rate, stock market liquidity, and interest rate have the expected impact on the stock market development. In addition, the result obtained by them also shows that banking and stock market are complementary instead of being substitutes. Contradict with the findings of Yartey (2008), they found that the institutional environment does not show a significant relationship with stock market development in the MENA region.

Instead of solely examining the macroeconomic determinants of stock market development, Ayaydın and Baltacı (2013) examined the effect of banking sector development and corruption on stock market development. In doing so, panel data of 42 emerging markets which spans the period from 1996 to 2011 had been used. Similar with the previous studies, the macroeconomic factors were found to be the important determinants of stock market development. More importantly, the results shows corruption to be negatively related with the stock market development. In fact, findings of this study show that the effect of corruption to be more important than the effect of bank sector development as the level of corruption will cause adverse effect to the stock market development. On the contradictory, Aljazaerli et al. (2016) found that corruption positively related with the stock market development, and these were mainly due to the special characteristics of the six selected Gulf Cooperation Council (GCC) countries.

3. Data and Methodology

This study intends to examine the impact of corruption and macroeconomic factors on the stock market development in Asian countries. Along with that, panel data approach was employed in this study. This study extracted the yearly data of 10 Asian countries from various sources and the sample period covered from the year 2003 to 2015. The reason behind the selection of sample is due to the rapid economic development of Asian countries in the recent years. Information or data related to macroeconomics and stock exchange were extracted from World Development Indicator database. Meanwhile, the data related to corruption were extracted from Transparency International.

3.1. Dependent Variable and Independent Variable

Stock market development had been used as the dependent variable in this study. The ratio of stock market capitalization of domestic listed companies to the GDP had been used to measure the stock market development.

The independent variable used in this study are: i) income level (measured by the changes of GDP per capita in US dollars), ii) savings (as measured by the ratio of gross domestic savings to the GDP), iii) ratio of foreign direct investment to the GDP, v) ratio of stocks value traded to the GDP, vi) ratio of broad money to the GDP and vii) corruption perception index (CPI).

Note that Corruption Perception Index (CPI) is the scoring and ranking introduced by Transparency International. The scale of CPI ranged from 0 to 10, with 0 reflecting a high level of corruption in a country and 10 reflecting a low level of corruption in a country.

3.2. Regression Model

This study employed the panel data analysis approach to examine the impact of corruption and macroeconomic factors on the stock market development. The regression model used in this study is as follow:

$$SMD_{it} = \alpha + \beta_1 IL_{it} + \beta_2 SAV_{it} + \beta_3 FDI_{it} + \beta_4 ST_{it} + \beta_5 MS_{it} + \beta_5 CPI_{it} + \beta_5 E_{it}$$

Where,

α = Intercept of the regression model

SMD_{it} = Ratio of stock market capitalization to the gross domestic product of country i at year t.

IL_{it} = Ratio of GDP per capita in US dollars of country i at year t to GDP per capita in US dollars of country i at year t-1.

SAV_{it} = Ratio of gross domestic savings to the GDP of country i at year t.

FDI_{it} = Ratio of foreign direct investment to the GDP of country i at year t.

ST_{it} = Ratio of stocks value traded to the GDP of country i at year t.

MS_{it} = Ratio of broad money to the GDP of country i at year t.

CPI_{it} = Corruption perception index of country i at year t.

E_{it} = Error terms assumed to be normally distributed

4. Analysis

Firstly, the OLS regression analysis is applied to investigate the relationship between macroeconomic factor and corruption factors and the stock market development. Furthermore, the Hausman test and the Breusch Pagan Lagrange Multiplier (LM) test are carried out to examine the appropriateness of random effect model vis-a-vis fixed effect model. The Breusch Pagan LM test is employed first to determine whether OLS regression or random effect model is more appropriate. Next, the Hausman test is applied to decide whether fixed effect or random effect model

is more appropriate for the purpose of the analysis in this study. As well, the diagnostic analysis is carried out to detect whether the model is suffering from multicollinearity, heteroscedasticity and autocorrelation problems.

5. Results

This section presents and discusses the result obtained throughout this study. The dependent variable used in this study was stock market development. Meanwhile, income level, savings, foreign direct investment, stocks value traded, money supply and corruption level had been used as the independent variable in this study. The descriptive statistics of the dependent and independent variables used in this study are reported in table 1.

Table-1. Descriptive Statistics of the Variables, 2003 to 2015

Country	Description	SMD	IL	SAV	FDI	ST	MS	CPI
China	Mean	0.545	1.092	0.494	0.035	1.043	1.687	3.562
	Std Dev	0.277	0.021	0.022	0.008	0.910	0.181	0.222
Indonesia	Mean	0.395	1.041	0.295	0.018	0.118	0.403	2.723
	Std Dev	0.090	0.006	0.030	0.009	0.041	0.032	0.543
India	Mean	0.784	1.062	0.360	0.018	0.555	0.743	3.331
	Std Dev	0.266	0.017	0.028	0.008	0.215	0.058	0.345
Sri Lanka	Mean	0.245	1.054	0.254	0.013	0.038	0.413	3.415
	Std Dev	0.060	0.018	0.042	0.003	0.020	0.052	0.297
Malaysia	Mean	1.378	1.033	0.340	0.034	0.435	1.319	4.908
	Std Dev	0.216	0.027	0.037	0.013	0.116	0.061	0.304
Philippines	Mean	0.655	1.037	0.500	0.013	0.102	0.612	2.815
	Std Dev	0.219	0.017	0.055	0.006	0.047	0.071	0.540
Thailand	Mean	0.773	1.034	0.285	0.030	0.587	1.130	3.554
	Std Dev	0.198	0.027	0.016	0.011	0.145	0.100	0.181
Japan	Mean	0.816	1.009	0.263	0.002	0.941	2.150	7.462
	Std Dev	0.196	0.023	0.020	0.002	0.305	0.171	0.301
Korea	Mean	0.843	1.031	0.340	0.010	1.264	1.270	5.223
	Std Dev	0.160	0.016	0.011	0.004	0.368	0.115	0.415
Singapore	Mean	2.321	1.036	0.462	0.195	1.100	1.213	9.069
	Std Dev	0.419	0.045	0.033	0.058	0.380	0.104	0.373

Notes:
SMD = Ratio of stock market capitalization to the gross domestic product
IL = Ratio of GDP per capita in US dollars at year t to GDP per capita in US dollars at year t-1.
SAV = Ratio of gross domestic savings to the GDP
FDI = Ratio of foreign direct investment to the GDP
ST = Ratio of stocks value traded to the GDP
MS = Ratio of broad money to the GDP
CPI = Corruption Perception Index

Based on table 1, Singapore had the highest ratio of 2.321 for the stock market capitalization to the GDP. This indicated that the average stock market capitalization of Singapore is 232% of the GDP. Following, Malaysia had the second highest ratio of 1.378 for the stock market capitalization to the GDP. Meanwhile, Sri Lanka had the lowest ratio of 0.245 for the stock market capitalization to the GDP. This indicates that Sri Lanka had the least developed stock market among the ten Asian countries.

In terms of income level and savings rate, China had the highest average percentage changes of 9.2% in GDP per capita. On the other hand, Philippines had highest savings rate as their gross domestic savings was approximately 50% of the GDP, followed by China 49.4% and Singapore 46.2%. In contrast, Japan had the lowest average percentage changes of 0.9% in GDP per capita and lowest savings rate as their gross domestic product was just 26.3% of the GDP.

Besides that, Table 1 also reports that Singapore had the highest average ratio of 0.195 in FDI to the GDP over the year 2003-2015. This indicates that the average of foreign direct investment attracted by Singapore is 19.5% of the GDP. However, the other 9 countries had the lower average foreign direct investment to the GDP, which were below 5% of the GDP. As in the value of stock traded, Korea had the highest ratio of 1.264 as compared to the other Asian countries. This means that average value of stocks traded in Korea is 126.4% of their GDP.

In terms of money supply, only Japan had the ratio of broad money to the GDP for more than 2. This simply means only Japan had the average broad money that equivalent to 200% of their GDP. For the corruption level, Singapore had the highest average CPI of 9.069 over the year 2003 to 2015, whereas Indonesia had the lowest average CPI of 2.723 over the year 2003 to 2015.

5.1. Regression Analysis

First of all, the Pooled Ordinary Least Square (OLS) is employed in order to determine the relationship between the independent and dependent variables. The results of Pooled OLS were reported in Table 3. Thereafter, Hausman test and Breusch Pagan Lagrange Multiplier (LM) test were carried out to test the appropriateness of random effect model and fixed effect model. Based on Table 2, the results of Breusch-Pagan Lagrange multiplier (LM) test

indicated that random effect model was more appropriate as compared to pooled OLS. While, the result of Hausman test further support that random effect model was more appropriate as compared to fixed effect model.

Table-2. Result of Hausman Test and Breusch Pagan Lagrange Multiplier (LM) Test

Breusch-Pagan LM Test	Hausman Test
111.17	9.56
(0.000)***	(0.144)

Random effect model was found to be more appropriate based on the Hausman test and Breusch-Pagan Lagrange multiplier (LM) test results. Based on random effect model, income level was found to have a significant negative relationship with the stock market development. Meanwhile, the savings and corruption perception index found to have the significant positive relationships with stock market development. Besides that, foreign direct investment, value of stock traded and money supply do not shown a significant relationship with the stock market development. As mentioned in Section 3, diagnostic checking was also applied in this study. Table 4 reported the results for the diagnostic checking and it was found that the model suffers from heteroscedasticity and autocorrelation.

Table-3. Regression Analysis (Determinants of stock market development)

Dependent Variable: Stock Market Development				
Variables	**Pooled OLS**	**Random Effect**	**Fixed Effect**	**Feasible Generalized Least Square**
Income level	-4.401 (0.000)***	-2.001 (0.039)**	-0.869 (0.389)	-4.212 (0.000)***
Savings	1.229 (0.001)**	1.189 (0.048)**	1.029 (0.117)	1.113 (0.003)***
FDI	4.646 (0.000)***	-0.399 (0.708)	-2.120 (0.068)*	3.938 (0.001)***
Value (Stocks traded)	-0.001 (0.986)	-0.038 (0.531)	-0.047 (0.439)	-0.087 (0.178)
Money Supply	-0.015 (0.867)	0.202 (0.235)	0.484 (0.028)*	0.213 (0.043)**
CPI	0.117 (0.000)***	0.137 (0.003)***	0.057 (0.324)	0.099 (0.004)***
Constant	4.332 (0.104)	1.719 (0.111)	0.399 (0.732)	4.039 (0.000)***
R^2	0.726	0.514	0.097	0.495

Notes: ***, ** and * indicate significant at 1, 5 and 10 percent level respectively

Table-4. Result of Diagnostic Checking

Multicollinearity (vif)	Heteroskedasticity (White Test)	Serial Correlation (F-stat)
2.72	80.23 (0.000)***	8.58 (0.017)**

As a remedy, Feasible Generalized Least Square estimation was employed to investigate the relationship between the stock market development, several macroeconomic factors and corruption factor. Based on the Feasible Generalized Least Square estimation, the income level was found to have a significant negative relationship with the stock market development. As shown in Table 2, an increase of 1% in income level would lead to the decrease of 4.21% in the stock market development. Meanwhile, the savings, foreign direct investment and money supply found to have the significant positive relationships with stock market development.

Consistent with Ayaydın and Baltacı (2013), the corruption level found to have a significant positive relationship with stock market development. This simply means that the increment in corruption perception index (lower corruption level) could lift up the stock market development. Based on the coefficient obtained under the Feasible Generalized Least Square estimation, an increase of 1% in corruption perception index (CPI) would lead to the approximately increase of 0.10% in the stock market development. However, the results is contradictory with the findings of Aljazaerli *et al.* (2016) since their study was only focussed in the six gulf cooperation council (GCC) countries that are having the special characteristics of richness and high corruption level.

6. Conclusion

This paper examines the impacts of macroeconomic factors and corruption on the stock market development using a panel data of 10 Asian countries from the year 2003 to 2015. There were two main findings for this study. Firstly, this study found that income level, savings, foreign direct investment and money supply are important macroeconomic determinants of Asian stock market development. Secondly, this study also found that the level of corruption had significant effect on stock index development. Thus, it is important to lower down a country's

corruption level since corruption perception index (CPI) could influence the investors' perception to some extent and lead to the changes of stock market development. The results obtained throughout this study also have important implication on the economy policy regarding to the driving force for the stock market development.

Acknowledgments

Conflict of Interest: None
Ethical clearance: The study was approved by the institution.

References

Aljazaerli, M. A., Sirop, R. and Mouselli, S. (2016). Corruption and stock market development, New evidence from gcc countries. Business. *Theory and Practice,* 17: 117-27. Available: https://doi.org/10.3846/btp.2016.555

Ayaydın, H. and Baltacı, N. (2013). Corruption, banking sector, and stock market development, A panel data analysis. *European Journal of Research on Education,* 1(2): 94-99. Available: http://iassr2.org/rs/010411.pdf

Cherif, M. and Gazdar, K. (2010). Institutional and macroeconomic determinants of stock market development in mena region, New results from a panel data analysis. *International Journal of Banking and Finance,* 7(1): 139-59. Available: http://ijbf.uum.edu.my/images/ijbfvol7no1febmarch2010/8-INSTITUTIONAL-AND.pdf

El-Wassal, K. A. (2013). The development of stock market, In search of a theory. *International Journal of Economics and Financial Issues,* 3(3): 606-24. Available: http://www.econjournals.com/index.php/ijefi/article/view/489/pdf

Garcia, V. F. and Liu, L. (1999). Macroeconomic determinants of stock market development. *Journal of Applied Economics,* 2(1): 29-59. Available: https://ucema.edu.ar/publicaciones/download/volume2/garcia_liu.pdf

Ho, S. Y. and Iyke, B. N. (2017). Determinants of stock market development. *A Review of the Literature Studies in Economics and Finance,* 34: 1-24. Available: https://doi.org/10.1108/SEF-05-2016-0111

Levine, R. and Zervos, S. (1988). Stock markets, banks, and economic growth. *American Economic Review,* 88: 537–58. Available: https://www.jstor.org/stable/116848

Malik, I. A. and Amjad, S. (2013). Foreign direct investment and stock market development in pakistan. *Journal of International Trade Law,* 12: 226-42. Available: https://doi.org/10.1108/JITLP-02-2013-0002

Naceur, S. B., Ghazouani, S. and Omran, M. (2007). The determinants of stock market development in the middle-eastern and north african region. *Managerial Finance,* 33: 477-89. Available: https://doi.org/10.1108/03074350710753753

Reilly, F. K. and Brown, K. C. (2012). *Investment analysis and portfolio management.* 10th edn: South-Western Cengage Learning: United States of America.

Ross, S. A. (1976). The arbitrage theory of capital asset pricing. *Journal of Economic Theory,* 13: 341-60. Available: https://doi.org/10.1016/0022-0531(76)90046-6

Tripathi, V. and Seth, R. (2014). Stock market performance and macroeconomic factors, The study of indian equity market. *Global Business Review,* 15: 291-316. Available: https://doi.org/10.1177/0972150914523599

Yao, J., Tan, C. L. and Poh, H. L. (1999). Neural networks for technical analysis, A study on KLCI. *International Journal of Theoretical and Applied Finance,* 2: 221–41. Available: https://doi.org/10.1142/S0219024999000145

Yartey, C. A. (2008). *The determinants of stock market development in emerging economies: Is south africa different?* : International Monetary Fund: Washington DC. http://dx.doi.org/10.5089/9781451868944.001