

Macroeconomic Factors Determining Stock Market Development in Asia and Eastern Europe

Soutsaka, Bounmanit
Faculty of Economics, Kyushu University

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Macroeconomic Factors Determining Stock Market Development in Asia and Eastern Europe

Bounmanit Soutsaka[†]

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1 . Introduction

The world stock markets appear to be in a booming stage over the past two decades, the stock market capitalization has increased dramatically. It grew sharply from about US\$ 10.9 trillion in 1992 to US\$ 64.6 trillion in 2007, which implies an average annual growth rate of 31%. The stock markets in developing countries made up considerably large amount of this growth. Also, the surges in number of the stock markets in developing countries and the market capitalization have drawn attention of academics, practitioners and policy makers.

It is well understood that a well-functioning financial system is essential to the economic development. Earlier research focused on the role of banking sector in economic development. Recently, many studies have focused on the relationship between the stock markets development and economic growth. Theoretical work shows how stock market development might boost long-term economic growth and recent empirical evidence appears to support this view. For instance, Levine and Zervos (1998) find that stock market development plays an important role in predicting future economic growth. Demirguc-Kunt and Levine (1996) find that most stock market indicators are highly correlated with banking sector development. Countries with well-developed stock markets tend to have well-developed banking sector.

[†] Ph. D. Program 3rd Year, Graduate School of Economics, Kyushu University

Indeed, many countries in transition in Eastern Europe and Asia have established their own stock markets over the last two decades. Yet many of these markets have developed rapidly while others have not been active as expected, volatile and small in term of capitalization. Understanding factors determining a sound stock market development is crucial and will have policy implication for the government agencies in these countries as well as other developing nations.

The objective of this paper is to empirically study key macroeconomic factors determining the stock market development in Eastern European and Asian countries using panel dataset of 20 countries for the period 1996-2007. It measures the impact of income level, domestic savings, investment, stock market liquidity, macroeconomic stability, and private capital flows on stock market development. It also examines the effect of the public bond market and banking sector development on the stock market development.

In the earlier studies, the stock market development is usually measured by stock market capitalization, liquidity, volatility, concentration, integration with world stock markets, and the laws and regulations employed in the market¹⁾. For this study, the stock market capitalization as a percentage of GDP will be used to measure the stock market development. It is believed by many researchers²⁾ that the stock market capitalization as a percentage of GDP is a good proxy for such general development because it is less arbitrary than other individual measures and indexes of stock market development.

The rest of this paper is organized as follows. Section 2 discusses the literature on stock market development and economic growth. Section 3 examines the global stock market development. Section 4 describes the analytical framework used in this study. Section 5 discusses the empirical results. Section 6 concludes the main findings of this study.

2 . Related Literature Reviews

In theory, companies are able to externally finance their expansion through borrowing from commercial banks, issuing corporate bonds to public, and selling shares of ownership of the companies in a public market. As part of the financial system, the stock market is one of the

1) For detail and additional measures for the stock market development, see Asli Demirguc-Kunt and Ross Levine (1996b) and Thorsten Beck and Asli Demirguc-Kunt (2009).

2) Valeriano F. Garcia and Lin Liu (1999), Levine and Zervos (1998), and Thorsten Beck and Asli Demirguc-Kunt (2009).

most important sources for companies to raise money. The investors are able to buy and sell the securities in an efficient stock market easily and quickly with reasonable transaction costs. This permits the companies to finance long-term investment project with funds provided by individuals, who might not wish to hold the securities for a long period of time. The stock market also acts as the clearinghouse for each transaction, meaning that it collects and delivers the shares, and guarantees payment to the securities sellers. This eliminates the risk to individual buyers or sellers that the counterparty could default on the transaction. These favorable features of the stock market attract more and more investors to invest in the market, which tends to increase quantity and quality of the investment and boost domestic savings. As a result, companies are able to access to the funds with lower costs and invest in various projects, which accelerate the pace of economic development.

By having a wide and varied scope of owners, companies generally tend to improve on their management standards and efficiency in order to satisfy the demands of the shareholders and the more stringent rules for public corporations imposed by the stock exchanges and the government. Consequently, it is presumed that public companies tend to have better management records than privately-held companies. Further, the management is expected to maximize firm value, if not, another economic agent may take control of the company, replace incompetent management, and reap the gains from a more efficient firm. Murphy (1990) argue that in well developed stock markets tying managers' compensation to stocks is an incentive compatible design that aligns the interests of owners and managers, thereby spurring efficient resource allocation and economic growth. Despite this claim, some well-documented cases are known where it is alleged that there has been considerable problem in corporate governance on the part of some public companies. The subprime mortgage crisis in 2007-2008 shows the problem of corporate mismanagement; companies like American International Group (2008), Bear Stearns (2008), Lehman Brothers (2008), General Motors (2009) and Satyam Computer Services (2009) were among the most widely scrutinized firms by the related government agencies and media.

However, according to the recent study, Brian R. Cheffins (2009) studies this issue based on a sample of 37 firms that were removed from the iconic S&P 500 index during 2008 and found that institutional shareholders were largely mute as share prices fell and that boardroom practices and executive pay policies at various financial firms were problematic. Also, there apparently were no accounting frauds and there was little criticism of the corporate governance of companies that were not under severe financial stress. The fact was that corporate governance functioned tolerably well in companies removed from the S&P 500, which implies that the case is not yet made out for fundamental reform of current arrangements.

Critics of the stock market, however, argue that the actual operation of the pricing and takeover mechanism even in well functioning stock markets lead to short-termism and lower rates of long term investment particularly in firm specific human capital. It also generates perverse incentives, rewarding managers for their success in financial engineering rather than creating new wealth through organic growth (Singh, 1997). Further, empirical evidence shows that the takeover mechanism does not perform a disciplinary function and that competitive selection in the market for corporate control takes place much more on the basis of size rather than performance (Singh, 1971). Therefore, a large inefficient firm has a higher chance of survival than a small relatively efficient firm. The critics further argue that stock market liquidity may negatively influence corporate governance because very liquid stock market may encourage investor myopia. Since investors can easily sell their shares, more liquid stock markets may weaken investors' commitment and incentive to exert corporate control (Bhide, 1994). These problems are further magnified in emerging market countries with their weaker regulatory institutions and greater macroeconomic volatility. These serious limitations of the stock market have led many analysts to question the importance of the system in promoting economic growth in emerging markets. In addition, some studies show doubts on the contribution of stock markets and its liquidity to long-term economic growth.

However, recent empirical evidence shows positive relationship between the stock market development and economic growth. Demirguc-Kunt and Levine (1996a, b) have found that most stock market indicators are highly correlated with the financial intermediary development. Countries with well-developed stock markets tend to have well-developed financial intermediaries. Also, large stock markets are more liquid, less volatile, and more internationally integrated than smaller markets. Furthermore, institutionally developed markets with strong information disclosure laws, international accounting standards, and unrestricted capital flows are larger and more liquid markets. Levine and Zervos (1998) find that various measures of stock market activity are positively correlated with measures of real economic growth across countries, and that the association is particularly strong for developing countries. Their results also show that after controlling for initial conditions and economic and political factors, the measures of banking and stock market development are robustly correlated with current and future rates of economic growth and productivity improvement. Durham (2002) finds that the positive impact of stock market development is largely dependent on the inclusion of higher income countries in the regression samples, which limits the relevance for lower income countries. He provides evidence indicating that stock market development has a more positive impact on growth for greater levels of GDP per capita, lower levels of country credit risk, and higher levels of legal development.

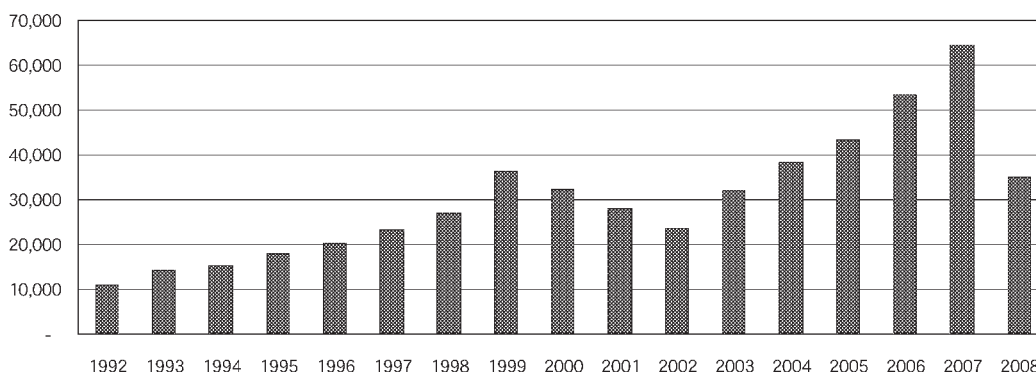
The existing theory relating to the view that the stock market development promotes economic growth appears to be inconclusive. However, recent empirical evidence has shifted in favor of the positive relationship between the stock market and growth. Recent studies have also shed light on the issues of factors driving the stock market development. For instance, Valeriano G. Garcia and Lin Liu (1999) examined the macroeconomic determinants of stock market development using dataset of 15 industrial and developing countries in Latin America and Asia. They found that 1) real income, saving rate, financial intermediary development, and stock market liquidity are important determinants of stock market capitalization; 2) macroeconomic volatility does not prove significant; and 3) stock market development and financial intermediary development are complements instead of substitutes. El-Wassal (2005) investigates the relationship between stock market growth and economic growth, financial liberalization, and foreign portfolio investment in 40 emerging markets between 1980 and 2000. The result shows that economic growth, financial liberalization policies, and foreign portfolio investments were the leading factors of the emerging stock markets growth. In addition, Samy B. Naceur, Samir Ghazouani and Mohamed Omran (2007) investigated the macroeconomic determinants of the stock market development using dataset of 12 Middle Eastern and North African countries for the period 1980s-1990s while Charles Amo Yartey (2008) examined similar issues using dataset of 42 emerging economies for the period 1990-2004 found that macroeconomic factors such as income level, gross domestic investment, banking sector development, private capital flows, and stock market liquidity are important determinants of stock market development in these countries. Further, the results of Yartey also show that political risk, law and order, and bureaucratic quality are important determinants of stock market development because they enhance the viability of external finance. Peter L. Rousseau and Paul Wachtel (2002) examined whether the strength of relationship between the size of country financial sector and the economic growth varies with inflation rate using dataset of 84 countries from 1960 to 1990. He found that there is an inflation threshold point between 13%-25%. When inflation exceeds the threshold point, financial sector stop promoting economic growth. He also found that the level of financial depth varies inversely with inflation in low inflation environment and that disinflation is associated with a positive effect of financial depth on growth.

3 . Global Stock Market Development

During the last two decades, robust global economic growth and a favorable financing environment contributed to the expansion of the world stock markets, especially the markets in the developing countries. Also, the stock market development appears to be central to the domestic financial liberalization program in most of developing countries or countries in transitions.

During this period, the world stock market capitalization has grown with unprecedented pace. It increased dramatically from US\$ 10.9 trillion in 1992 to US\$ 64.6 trillion in 2007 with annual average of 31% growth rate, before declining to US\$ 34.95 trillion in 2008 due to the subprime mortgage crisis in the United States (figure 1). The stock market in developing Asian and E. European countries have also experienced a considerable development since 1992, the market capitalization in these countries has increased from US\$ 430.6 billion in 1992 to US\$ 14.5 trillion in 2007 before downward adjustment due to the global financial crisis (figure 3). Although the stock market in developing countries have experienced rapid growth. However, the stock market activities appear to concentrate mainly in the developed countries such as the stock market capitalization in 8 largest economies constitute 67.9% in 2008 (figure 2). Further, many low-income countries still have little or no access to international private capital, and instead depend largely on official finance from bilateral and multilateral creditors to support their development objectives. In recent years, the governments in many low income countries have attempted to create their own securities markets enabling both local government and enterprises to access to financial resources with lower costs and to benefit from the global private capital.

Figure 1: World Stock Market Capitalization (Billion US\$)



Source: Development Indicators database, World Bank, April 2010.

During 2001-2007, there had been a surge in private capital flows to developing countries, which increased from US\$ 224.2 billion in 2001 to peak at US\$ 1.2 trillion in 2007 (table 1). In 2008, as a result of the global financial crisis, total net international flows of private capital to the developing world fell to US\$781 billion from the record-high level of US\$1.2 trillion in 2007.

The growing integration of the financial system of developing countries into the global financial system has brought enormous economic and financial benefits to these countries. However, the same developments have also widened the scope for economic turmoil when global conditions

Figure 2: 8 Countries with Largest Stock Market Capitalization

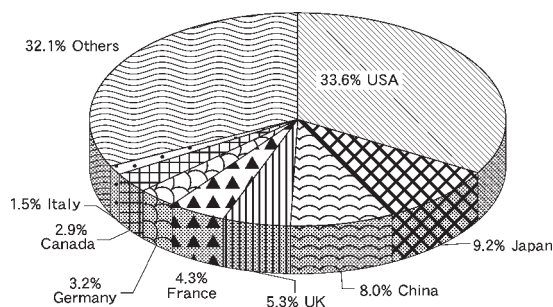
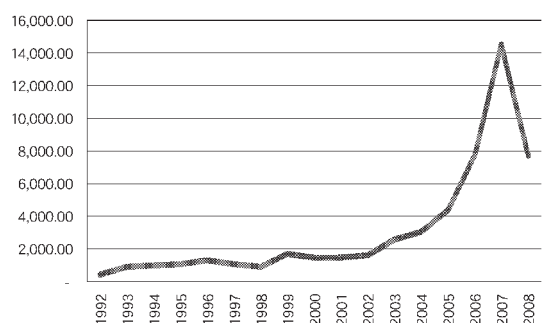


Figure 3: Stock Market Cap of Developing Asian and E. European Countries (Billion US\$)



Source: Computed using data from the World Development Indicators database, World Bank, April 2010.

Note: Asian countries here constitute countries in South East Asia, South Asia and East Asia (excluding Japan).

deteriorate. For instance, the global financial crisis negatively affects the capital flows to all the developing regions. The developing countries in Europe and Central Asia bore the impact of the financial crisis, accounting for 39.2% of the decline in capital flows. Also, the capital flow to East Asia and the Pacific region had experienced 63.1% decline in 2008 compared to the previous year. However, it is noticeable that the net capital inflow to the developing regions in 2008 is still higher than the figure in 2006, suggesting that the decline might be a temporary effect from the global financial crisis and be improved in the long run.

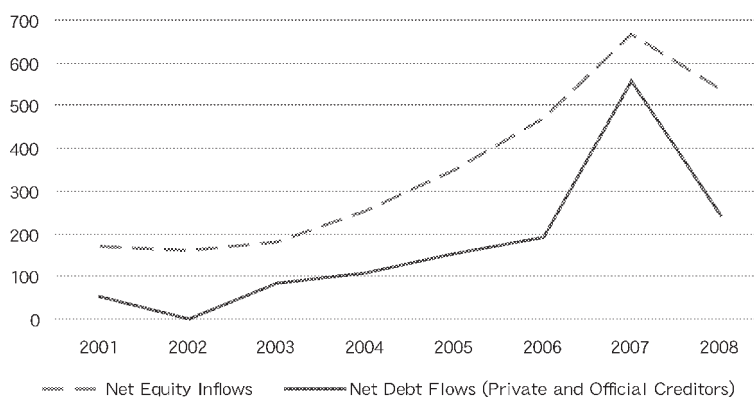
Table 1: Net Capital Inflows to Developing Regions

<i>in Billions USD</i>	2005	2006	2007	2008
East Asia and Pacific	184	194	292	179
Europe and Central Asia	155	280	486	313
Latin America and the Caribbean	84	69	231	173
Middle East and North Africa	16	12	26	19
South Asia	28	61	134	63
Sub Saharan Africa	33	42	53	34
Total	500	658	1222	781

Source: World Bank Debtor Reporting System

In recent year, the stock markets appear to be a crucial channel for directing foreign capital flows to developing countries. Net equity flows to the stock markets of the developing countries have grown from US\$ 170.9 billion in 2001 to US\$ 536.5 billion in 2008, and peaked at 663.8 US\$ billion in 2007 (figure 4), providing an important source of capital for economic development. The share of foreign direct investment and portfolio equity in the finance mix of many developing countries has also grown in recent years. Equity flows accounted for 72.3% of total external financing to developing nations during 2001–2008, compared with just 60% during 1993–1998³⁾.

Figure 4: Net Equity and Debt Flow (in Billions US\$)



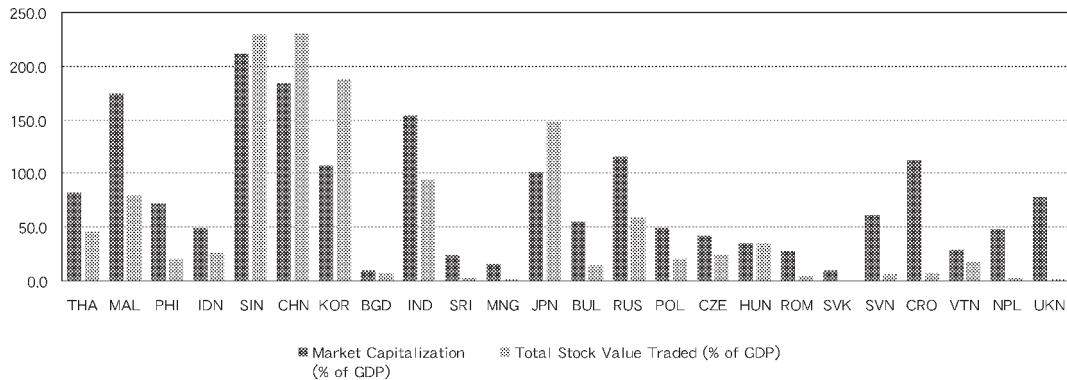
Source: Global Development Finance 2010, World Bank.

From figure 5, it appears that the stock market development is independent from the size of the economy, for instance, Singapore and Malaysia have higher market capitalization to GDP ratio than Korea, Japan and India. Also, stock markets in Asian countries appear to be more liquid than the markets in the Eastern European countries. Further, the stock markets in more developed countries like Singapore, Japan, Korea, and China are very liquid, while the stock markets in countries like Bangladesh, Nepal, Mongolia, Sri Lanka, Ukraine, Croatia, Slovak, and Estonia are inactive. Therefore, studies on factors determining the stock market development appear to be very important and have policy implication for both countries with established markets and planning to create a capital market.

The rapid development of stock markets in developing countries does not guarantee that the operational systems of these markets are well established. In most of these markets, trading tends to concentrate on a certain companies' stocks, constituting major portion of the total market capitalization. Beyond these actively traded stocks, there are serious informational and disclosure deficiencies for other stocks. Also, there appears to be weaknesses concerning transparency of transactions in these markets. It noticeable that less developed markets tend to suffer from a far wider range of such problems. As a result, the stock prices in these markets are expected to be arbitrary and volatile (Tirole, 1991). In addition, empirical evidence shows that stock prices in the stock markets of developing countries are more volatile than in the more developed markets (El-Erian and Kumar, 1995). Despite this volatility, large corporations in these countries have extensively financed their expansion through the equity markets, corre-

3) The Global Development Finance 2005, World Bank, p.7

Figure 5: Stock Market Cap and Total Value Traded Relative to GDP 2007 (Percentage)



Source: Computed using data from the World Development Indicators database, World Bank, April 2010.

sponding to the finding of Singh (1995). He investigated the corporate financing pattern in developing countries and found that contrary to general expectation, the corporations in developing countries rely heavily on external or equity finance to fund their long term investment projects. Also, the top 100 corporations in these countries have used substantial financial resources from the equity markets.

4 . Methodology and Data

4.1 Econometric Specification

Generally, there are two approaches in evaluating the stock market development, one is institutional and another one is macroeconomic. The institutional approach investigates the stock market development based on the institutional and regulatory factors such as property rights, clearance and settlement issues, transparency and the insider information problems, supervision, taxation issues, accounting standards and so forth. The macroeconomic approach looks at factors such as market capitalization, income level, savings and capital formation, macroeconomic stability, capital flows, banking sector development, stock market liquidity and so forth. Because we are not able to obtain sufficient institutional data on the countries of interest and these institutional factors appear to be reflected in the macroeconomic factors, for instance, Demirguc-Kunt and Levine (1996b) found that countries with well-developed regulatory and institutional systems tend to have large and liquid stock markets, which are reflected in the variables used in this study. Therefore, for this study, we employ the macroeconomic approach to examine the stock market development.

In this study, fixed effect and random effect panel data analysis techniques are used to examine the relationship between the stock market development and other macroeconomic factors, which will be described below. The Hausman specification test is performed to decide appropriate technique to be applied. Also the Panel Corrected Standard Error technique is used to correct the heteroskedasticity problem. The following regression model is used in this study:

$$Y_{it} = \alpha_i + \beta M_{it} + \varepsilon_{it}$$

Where Y is the stock market capitalization in percentage of GDP, α_i is the unobserved country specific fixed effect, and ε_{it} is the usual disturbance term. M is a matrix of macroeconomic variables comprised of GDP per capita, real interest rate, inflation rate, foreign direct investment as percentage of GDP, public bond market capitalization as percentage of GDP, bank credit to private sector as percentage of GDP, square of bank credit to private sector as percentage of GDP, net private capital flow as percentage of GDP, total stock value traded as percentage of GDP, gross domestic investment as percentage of GDP, and gross domestic savings as percentage of GDP. The reasons for including the above variables in the model are clarified below.

Stock Market Development: this study uses the stock market capitalization as percentage GDP as dependent variable. It is widely used as proxy for the stock market development as it appears to be less subjective than other measures such as stock market liquidity, number of listed companies, change in the stock market indexes, volatility, regulatory system, integration with world stock markets and so forth. Also, the presumption behind this measure is that overall market size is expected to be positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis.

Banking Sector Development: total credit to the private sector as percentage of GDP is used to measure the banking sector development, because it is considered as the most comprehensive indicator of the activity of commercial banks. As the stock market and banking sector play intermediary roles in directing the financial resources to the investment projects, so the two sectors could be either compliments or substitutes. To measure the relationship between these two sectors, the square of bank credit to private sector as percentage of GDP is included in the regression model. The credit to private sector is expected to have positive relationship with the stock market capitalization. However, very high expansion of lending to the private sector is expected to cause the slope coefficient of the square of the bank credit to the private sector becoming negative due to the substitution effect.

Public Bond Market Development: public bond market capitalization as percentage of GDP is used

to measure the government bond market development. It is expected that this market will have positive relationship with the stock market.

Income Level: real GDP per capita is used to measure the income level. As the income level increases, the new demand for the financial services will be created and drive the financial institutions to create new services in order to satisfy the demand. The income level is expected to have positive relationship with the stock market development.

Macroeconomic Stability: the macroeconomic stability appears to be an important factor driving the stock market development. During the stable economic situation, firms tend to invest more and are willing to finance their expansion through equity finance. Also, individuals are willing to invest in the stock market. Hence, macroeconomic stability is expected to have a positive relationship with the stock market development. For this study, the inflation rate and real interest rate are used to measure the macroeconomic stability.

Stock Market Liquidity: the total stock value traded in percentage of GDP is used to measure the stock market liquidity. It measures the value of equity transactions relative to the size of the economy. This measure does not directly measure how easily investors can buy and sell stocks at posted prices. However, it does measure the degree of trading relative to the size of the economy. It, therefore, reflects stock market liquidity on an economy wide (Levine and Zervos, 1998). A liquid stock market enables investors to modify their portfolios quickly at lower costs. It also facilitates the investment projects and reduces certain risks associated with the investments (Levine, 1991, Bencivenga et al., 1996). Further, it is believed that the more liquid the stock market, the larger the amount of savings that are channeled through the stock market. Thus, a more liquid stock market is expected to promote higher stock market development.

Private Capital Flows: in the last two decades, foreign investors have emerged as major investors in the stock markets of developing countries. Errunza (1982) argued that long-term impact of foreign capital inflows on the development of the stock market is broader than the benefits from initial flows and increased investor participation. Foreign investment is associated with institutional and regulatory reform, adequate disclosure and listing requirements and fair trading practices. The increase in informational and operational efficiency is expected to inspire greater confidence in domestic markets. This increases the investor's base and participation and leads to more capital flows. For this study, foreign direct investment as a percentage of GDP and net private capital flows as a percentage of GDP are used to measure the capital flows.

Savings and Investment: similar to the financial intermediaries, the stock market channels savings to the investment projects. Generally, the larger the savings, the higher the amount of capital flows through the stock market. Thus savings and investment are expected to have positive relationship with the stock market development. To measure this relationship, the gross domestic savings as percentage of GDP and gross domestic investment as a percentage of GDP are used.

4.2 Data Sources

This study uses a panel data of 20 countries in Eastern Europe (8 countries) and Asia for the period 1996-2007. The Asian countries here are comprised of 12 countries in East Asia, South East Asia, and South Asia (table 2). All the data employed in this study are taken from the World Bank’s World Economic Indicators Database with the exception of the net private capital flow, which is computed based on data taken from the International Monetary Fund’s International Financial Statistics 2010 and the public bond market capitalization data, which is taken from the financial institution and markets cross countries and over time (T. Beck and A. Demirguc-Kunt, 2009).

Table 2: List of Countries in the Sample

Asia	Thailand, Malaysia, Singapore, Indonesia, Philippines, China, Mongolia, Japan, Republic of Korea, India, Sri Lanka, Bangladesh
Eastern Europe	Bulgaria, Russia Federation, Poland, Czech Republic, Hungary, Romania, Slovenia, Croatia

5 . Empirical Results

5.1 Summary Statistics

From the table 3, it is noticeable that average of the means of the stock market capitalization relative to GDP during 1996-2007 in Asian countries is 60.8%, which is much higher than the same ratio of 24.1% in East European countries with the exception of Bangladesh and Mongolia whose market capitalization ratio is 4.69% and 4.13% respectively, indicating that the stock markets in these countries play a small role in channeling financial resources for investment projects. Interestingly, the average market capitalization ratio in Singapore and Malaysia is above 150%, which is much higher than China, India and Japan, suggesting that the stock market capitalization ratio does not depend on the size of economy.

The net private capital flows as percentage of GDP in the Eastern European countries appear

to be positive meaning that capital inflow is higher than the outflow. In contrast, the ratios are negative in countries like Japan, Malaysia, Singapore, Thailand, Indonesia and Russia, indicating that these countries have higher outflows of equity investment, as average FDI relative to GDP ratios is positive for all the countries.

The macroeconomic situation in most Asian countries is more stable than the environment in Eastern European countries. The average inflation is particularly high in Russia, Romania and Bulgaria. Also, the income level in Asia This might be one of the reasons why the stock market capitalization ratio in Asia is higher than the one in Eastern Europe, as the higher the macroeconomic stability the more incentive the firms and investors to participate in the stock market, resulting with better stock market development.

With the exception of Japan, South Korea, Singapore and Malaysia, the average income level of Asian countries is much lower than the Eastern European counter parts. However, when we look at the average stock market capitalization ratio, it is noticeable that countries like Thailand, Indonesia, Philippines, China and India possess much larger stock market capitalization than the Eastern European nations even with lower income level. This implies that country with low income level and fairly large economy might be able to have a pretty big stock market.

In addition, the table 3 shows that the savings and investment rates are much higher in most Asian countries than in Eastern European nations. The gross domestic savings rate is particularly high in countries like Singapore, China, Malaysia, South Korea, and Thailand, which is above 33%. Also, gross domestic investment is noticeably higher in Asian countries than Eastern European counter parts. As the gross domestic savings tend to be highly correlated with the stock market development, thus, it is further indicated the reason why the stock market development in Asia is much higher than the counter parts in Eastern Europe.

The bank credit to private sector relative to GDP is also much higher in Asian countries than European countries, suggesting that the banking sector in Asia plays an important intermediary role in directing financial resources from the households to the businesses. Especially, the financial depth in Japan, Malaysia, Thailand, China, Singapore and South Korea is extremely high compared to other countries in the same region and Eastern Europe. Further, with the exception of the stock markets in Bangladesh, Sri Lanka and Mongolia, the stock markets in most Asian countries are more liquid than the Eastern European counter parts, which appear to be dormant. Interestingly, all the Asian and Eastern European countries under the sample have a bank-based financial system with the exception of Singapore and Russia that have market-

Table 3: Summary Statistics of Valuables, 1996-2007

	MC/GDP		CF/GDP		Inflation		BCP/GDP		FDI/GDP		GPPC		GDI/GDP		RI-Rate		GDS/GDP		VT/GDP	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Asia																				
Thailand	52.24	24.40	-1.515	8.021	3.301	2.379	119.5	24.44	3.816	1.387	2155	241	27.46	6.259	6.007	3.350	33.06	2.115	38.85	18.22
Malaysia	154.7	53.01	-2.935	6.288	2.503	1.214	159.4	36.37	3.593	1.321	4212	419	26.52	7.629	3.649	3.252	43.91	2.250	66.07	47.90
Philippines	51.80	19.14	3.597	5.176	5.680	2.019	41.35	10.98	1.791	0.939	1021	90.6	18.64	3.409	5.200	1.683	15.18	3.447	13.40	9.819
Indonesia	27.98	12.59	-1.12	3.381	13.57	14.80	31.45	15.37	0.427	1.817	877	81.4	23.48	5.494	3.255	9.985	29.12	3.598	12.66	5.919
Singapore	184.6	57.72	-13.80	4.699	0.899	0.844	110.4	10.80	14.35	4.046	23619	3160	26.62	7.268	5.199	3.398	47.77	4.061	96.62	48.98
China	49.41	46.69	2.320	2.045	1.826	2.783	111.1	9.790	3.618	0.662	1140	348	39.82	3.372	3.549	2.729	43.88	5.261	52.86	57.24
South Korea	55.61	30.26	1.463	1.980	3.448	1.698	88.07	10.63	0.882	0.628	12157	1790	30.54	3.554	5.017	2.354	33.38	2.331	119.6	59.94
Bangladesh	4.692	3.074	0.098	0.647	5.632	2.638	28.61	5.479	0.567	0.414	356	47.6	22.90	1.510	10.41	1.936	16.99	1.802	1.934	1.639
India	52.04	37.93	3.744	2.994	5.843	2.843	32.47	8.266	0.989	0.477	502	94.3	28.05	5.778	7.174	1.286	26.27	4.968	56.81	24.78
Sri Lanka	14.94	6.675	1.177	1.923	10.07	3.721	30.13	2.114	1.364	0.543	902	124	25.02	2.274	4.329	3.144	16.90	1.489	2.323	1.278
Mongolia	4.127	3.743	6.728	4.951	13.28	13.82	19.49	12.83	5.439	3.098	509	83.9	32.82	4.723	22.52	21.82	23.94	10.83	0.552	0.540
Japan	77.48	21.39	-1.396	1.418	-0.03	0.724	197.5	22.17	0.145	0.160	37527	1588	24.90	2.027	2.992	0.585	26.27	1.830	66.24	43.83
East Europe																				
Bulgaria	12.77	16.10	23.25	29.81	104.5	302.2	30.29	20.74	9.983	7.229	1766	355	21.07	8.221	3.292	31.66	13.05	1.743	2.451	4.012
Russia	46.26	35.65	-0.844	8.957	24.15	22.15	19.79	9.149	1.743	1.065	2019	451	20.31	2.982	4.456	22.87	31.34	4.709	17.33	19.18
Poland	21.46	13.70	6.361	3.826	6.777	6.173	27.28	5.408	3.859	1.315	4663	686	21.71	2.554	8.109	3.796	18.59	1.638	7.679	5.304
Czech	25.07	7.885	8.072	3.874	4.228	3.308	47.26	14.08	6.294	3.365	5971	750	28.42	2.164	3.706	1.747	27.47	2.031	14.30	8.388
Hungary	26.79	7.699	11.99	7.597	9.764	6.152	37.68	13.33	8.857	6.735	5038	795	25.72	1.847	4.265	2.322	24.25	2.141	19.46	10.73
Romania	10.38	9.863	15.93	15.85	37.39	41.09	14.71	8.613	4.450	2.611	1961	332	22.01	3.539	2.748	11.00	13.92	2.276	1.584	1.495
Slovenia	21.24	16.10	3.443	2.504	6.225	2.628	43.31	16.35	2.011	1.822	10580	1530	26.42	2.323	6.556	2.667	25.22	2.219	3.112	1.154
Croatia	28.56	29.64	14.73	4.822	3.514	1.351	42.33	12.15	4.817	1.976	5276	763	24.00	3.475	8.282	3.443	17.06	3.049	1.626	1.923

MC/GDP = Stock Market Capitalization to GDP
 BCP/GDP = Bank credits to private sector to GDP
 FDI/GDP = Foreign Direct Investment to GDP
 GPPC = GDP per Capita
 GDI/GDP = Gross Domestic Investment to GDP

RI-Rate = Real Interest Rate
 CF/GDP = Net Private Capital Flow to GDP
 GDS/GDP = Gross Domestic savings to GDP
 VT/GDP = Total Stock Value Traded to GDP

Table 4: Macroeconomic Factors Determining the Stock Market Development

Panel Data Analysis: Random-Effect (RE) and Fixed-Effect (FE) Models
 Dependent variable: Stock market capitalization as a percentage of GDP

Variables	(1)RE	(2)RE	(3)FE	(4)FE	(5)FE	(6)RE	(7)RE	(8)RE	(9)RE	(10)RE
Total value traded/GDP	0.5577*** (0.0849)	0.5597*** (0.0804)	0.5604*** (0.0866)	0.4552*** (0.0831)	0.4549*** (0.0819)	0.5636*** (0.0861)	0.5557*** (0.0804)	0.5408*** (0.0515)	0.5641*** (0.0850)	0.4668*** (0.0841)
Net private capital flow/GDP			0.7564*** (0.1747)	0.6681*** (0.1097)	0.6768*** (0.1122)	0.4092** (0.1723)	0.6274*** (0.1183)	0.5018*** (0.1698)	0.4918*** (0.1698)	1.0313** (0.4213)
GDP per capita			0.0060*** (0.0026)							
Bank credit to private sector/GDP	0.6548*** (0.1706)	0.6537*** (0.1853)				0.6421*** (0.1804)		0.4310** (0.1869)	0.6671*** (0.1944)	
Square of bank credit to private sector/GDP	-0.0020** (0.0009)	-0.0020** (0.0009)				-0.0020** (0.0009)		-0.0015** (0.0007)	-0.0020** (0.0009)	
Real interest rate	-0.1301* (0.0755)		-0.1459* (0.0844)				-0.0719 (0.0673)		-0.1527** (0.0709)	
Inflation rate		0.0007 (0.0092)			0.00513 (0.00954)	0.0043 (0.0105)				0.0226 (0.2048)
Foreign direct investment/GDP	0.9931* (0.5043)	1.0859** (0.5367)								
Gross domestic investment/GDP			-0.1619 (0.6497)						-0.4322 (0.6452)	
Gross domestic savings/GDP							1.4833*** (0.3989)	1.2224*** (0.3615)		2.4022*** (0.5864)
Public bond market capitalization/GDP										0.3311** (0.1498)
Constant	-0.3146 (9.4632)	-1.5288 (6.0104)	31.4115* (16.5492)	-7.2284 (14.923)	-7.3953 (17.1693)	1.5101 (9.1237)	-11.6814 (10.8890)	-20.6898* (11.3966)	11.4147 (15.7443)	-44.2695** (17.1860)
Hausman test statistics	4.2636 [0.5121]	6.0282 [0.3035]	15.0945 [0.0045]	16.1178 [0.0011]	17.1833 [0.0018]	8.9146 [0.1125]	6.4423 [0.1685]	5.4720 [0.3610]	9.7224 [0.1368]	8.9255 [0.1121]
R ²	0.4242	0.4246	0.8482	0.8570	0.8570	0.4248	0.4398	0.4511	0.4314	0.4594
F-statistics	34.4899 [0.0000]	34.5350 [0.0000]	52.4877 [0.0000]	59.1296 [0.0000]	56.3158 [0.0000]	34.5720 [0.0000]	46.1289 [0.0000]	38.4732 [0.0000]	29.4742 [0.0000]	29.5743 [0.0000]
Number of observation	240	240	240	240	240	240	240	240	240	180
Number of cross section units (countries)	20	20	20	20	20	20	20	20	20	15

Note: Standard errors are in the parentheses and the p-value is in the square bracket. The significant level of 1%, 5% and 10% are indicated by ***, **, * respectively.

based financial system. It implies that business community in these two countries finance their investment projects largely through the equity markets.

5.2 Regression Results

This section presents the results of the macroeconomic factors determining the stock market development in Asian and Eastern European countries. Stock market development is measured by market capitalization as a percentage of GDP. The table 4 demonstrates the results of the fixed effect and random effect data estimation.

Model 1 includes variables such as total stock value traded, bank credit to private sector and its squared value, real interest rate and foreign direct investment in the regression. The result shows that the total stock value traded, bank credit to private sector and the foreign direct investment are significant and have positive relationship with the stock market development. Also, the real interest rate is significant and has negative impact on the stock market development, meaning that the increase in the real interest rate is associated with decrease in stock market development. Liquidity of the stock market appears to be an important factor determining the market growth. A percentage point increase in the stock value traded will lead to 0.56% increase in the stock market capitalization in percentage of GDP. Also, the banking sector development appears to promote the stock market development. On average, when the bank credit to private sector relative to GDP increases by one percentage point, the stock market capitalization relative to GDP will rise by 0.65%. However, the square of bank credit is negative and significant, indicating that a higher level of banking sector development is associated with lower growth of stock market, as domestic agents substitute debt for equity.

To test the effect of inflation on the stock market capitalization, the inflation is used to replace the real interest rate to form model 2. The result shows that total stock value traded, bank credit to private sector and the foreign direct investment are all significant and have positive impact on the stock market capitalization. The square of bank credit to private sector is again significant and negative, confirming the quadratic relationship between banking sector development and stock market development. Further, inflation is not statistically significant in explaining the relationship with the stock market development.

To examine the impact of the gross domestic investment and net private capital flow on the stock market development, model 3 uses the gross domestic investment, net capital flows, total value traded, and real interest rate as independent variables. The result shows that the gross domestic investment is not statistically significant. The total value traded and capital flows are

significant and have positive relationship with the stock market development. If the capital flows increases by one percentage point, the stock market capital will grow by about 0.76%. Also, the real interest rate is significant and again has expected negative coefficient, further confirming that it has negative impact on the stock market development.

Model 4-6 indicate that the total stock value traded, net private capital flows, GDP per capita, and bank credit to private sector are significant and have positive impact on the stock market development. Again, the inflation rate has positive coefficient but it is not statistically significant in explaining the positive relationship with the stock market development. Also, the square of bank credit to private sector has negative relationship with the stock market development, which further confirms that when the banking sector develops to reach a certain level, it will have negative effect on the stock market development due to the substitutability of debt for equity finance. Again, it appears that the inflation rate included in these models is not a good predictor of the stock market development as its coefficient is insignificant.

In model 7, the total stock value traded, net private capital flows and gross domestic savings are statistically significant and have positive effect on the stock market development. A percentage point increase in the gross domestic savings relative to GDP will lead to 1.48% increase in the stock market capitalization as percentage of GDP. Also, the real interest rate still has negative impact on the stock market development but it is not significant.

Model 8-10 show that the total stock value traded, net private capital flows, bank credit to private sector, and gross domestic savings are significant and have positive relationship with the stock market development. Again, the square of bank credit to private sector and real interest rate are statistically significant and have negative impact on the stock market development. Further, inflation rate and the gross domestic investment are not good predictors of the stock market development since their coefficients are not significant. To test the impact of the public bond market development on the stock market development, the public bond market capitalization as percentage of GDP is included in the model 10, the result shows that it is statistically significant and has positive effect on the development of the stock market. On average, one percentage point increase in the public bond market capitalization relative to GDP will drive the stock market capitalization as percentage of GDP up by 0.33%. This is not surprised as investors tend to manage their portfolio as a combination of equity and public debt securities to reduce the risks and increase return.

6 . Conclusion

It is well understood that a well-functioning stock market is essential to the economic development. It provides alternative financial channels to sustain growth momentum, complimenting the banking sector and plays key role in state-owned enterprise reforms in transition economies. Indeed, there are many countries including certain countries in transition have established formal stock markets since 1992. Yet many of these markets have not been very active as expected, volatile and small in term of capitalization compared to the markets in larger economies. Understanding of factors determining a sound stock market development is crucial and will have policy implication for the government agencies in these countries.

This paper examines empirically the macroeconomic factors influencing the stock market development using a panel data of 20 countries in Asia and Eastern Europe for the period 1996 to 2007. The results show that the factors such as income level, gross domestic savings, banking sector development, private capital flows, stock market liquidity, foreign direct investment, and public bond market capitalization are important predictors of the stock market development in these countries. Also, the relationship between banking sector development and the stock market development in these countries appears to be changing. The results suggest that at early stage of its development, the banking sector is a compliment to the stock market in financing investment projects. However, as they both develop, the banking sector and the stock market begin to compete with each other as vehicles for financing investment projects. The inflation and gross domestic investment are not statistically significant in explaining the growth of the stock markets in sample countries, which implies that these factors might not associate with the stock market growth. It is confirmed that the banking sector and the stock market appear to be complimentary rather than substitutes. Also, the public bond market development positively relates to the growth of stock market.

Further, it is noticeable that the stock markets in Asia are more developed than the counter parts in the Eastern European countries. The results of this study show that this is due to the higher savings rate, the more liquid stock market, and the more developed banking sector. These findings have essential policy implications for the stock market development in Eastern European countries as well as both developing countries having established markets and planning to create one.

It is important to initiate appropriate policies to promote the domestic savings, the liquidity of

the stock market and the private capital flow to ensure the sustained development of the stock market. This is particularly important for lower income countries, which tend to rely on external financial resources to boost the stock market development. As the stock market is a complement rather than a substitute for the banking sector, developing financial intermediaries can promote stock market development. Supporting services from the banking system contribute significantly to the development of the stock market. Also, as the public bond market is positively correlated with the stock market development, it implies that the related government agencies in developing countries should develop both the stock market and the public bond market, which appear to be complementary.

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