CHAPTER – III

Measuring Stock Markets Development

3.1 Introduction

Popular assertion that economic growth and efficiency largely depends on the maturity of financial system is at the center stage of voluminous research dated back to Bagehot (1873). Schumpeter (1912) Gurley and Shaw (1955) in their classical writings forcefully argued that one of the differences between developed and developing countries are that the financial system of former is more matured than the latter. Since then numerous studies by development economists delved to satisfy the queries — how financial sector contributes in economic growth or how corporations finance themselves?

Any definite answer to all these questions largely depends upon robustness of the technique followed to measure growth of financial sector and tools used to relate it with a well-accepted definition of economic development, while both are difficult tasks and susceptible to criticism. At a more basic level, economists may have neither a common concept nor a common measure of stock market development. Subsequently, we know little about how stock market development affects rest of the financial system and economic development.

The present chapter, however, attempts to calibrate a multifaceted model to measure stock market development, an important segment of financial system of both developed and developing economies. Past lesson is undeniably important. But it is important to initiate series of actions based on experiences to convert markets into more meaningful institutions in the changed regime. Present writing aims to satisfy these two objectives.

3.2 Scope of the chapter

The chapter aims at to measure the growth of stock markets around the world in general and Asian markets in particular with the help of a conglomerate index that comprises of various stock market development indicators. There is no denying since each indicator of stock market development suffers from statistical and conceptual shortcomings, using a number of indicators with all possibilities help us to develop a well defined model capable to measure immaculately stock market development across countries. Furthermore, stock market development like — the level of economic development — is a complex and multi-faceted concept and no single measure is awfully

inadequate to satisfy our requirement. Hence, we reject popular policy of 'pick and choose' a single variable as the most important one, instead relied on a more robust methodology to measure stock market growth to answer the following questions:

What is the pattern of growth of some major stock markets around the world? What is the performance of Asian markets vis-à-vis others of the world? Do countries at different stages of development have different looking financial system?

Based on the answer of above quires, present writing attempts to develop a sensible, well conceived policy for the development of capital market — a quintessential institution in a liberalized economy. Answer of the above questions will help us for a better understanding about the impact of stock market development on: capital accumulation and allocation, supply of external fund, cost of capital and finally, its role as "guardian of efficiency".

There are numerous studies since Bagehot (1873) and Schumpeter (1912) to Demetriades and Hussein (1996), Fishman and Love (2003), Prasad *et. al.* (2004), Bekaret *et. al.* (2001, 2002, and 2003) to investigate the issue— is there any relationship between financial sector development and growth. Studies are important that deserve serious attention of researchers in this area but the fact is findings of the studies are inconclusive. Hence, we know little about how financial system influences growth. Historical focus of finance and growth related studies were on banking sector [King and Levine (1993a), Stiglitz (1985), Boyd and Prescott (1986) and Arestis *et al.* (2001) etc.]. Implied assumption was, in the absence of a well-developed stock market particularly in developing country, it is non-securitized market that matters for growth of the economy, hence, it drew attention of researchers. Furthermore, impeccable theories supported by robust empirical findings helped to develop an impression that banks mitigate information asymmetries that foster better investment and faster growth which encouraged researchers to focus on bank neglecting stock market. However, debate on merit of "bank versus market" based financial system seems to be over. There is a growing feeling that it is not an "either–or" situation, both have definitive role in economic development that inspiring researchers to repudiate their earlier stand. Theorists also claim as financial system becomes more sophisticated intermediate finance becomes less important – thus development economists of modern times duly emphasizing role of organized equity-debt-derivative markets in the growth process.

Phenomenal growth of emerging markets and expanding literature to adjudge ties between stock market and economic growth reflects attitude change of researchers. Still our understanding about development implications of a well functioning equity market is unclear because varied definitions used by researchers while measuring market growth and the measures are not beyond criticism. Most of the studies used a single variable such as value-traded ratio (Atje and Jovannovic, 1993), liquidity ratio [Beck and Levine (2002), Bencivenga *et. al.* (1995)], or market integration [Devereux and Smith (1994), Obstfield (1994), Korajczyk (1996)] as an indicator of stock market development ignoring utility of a comprehensive measure.

Methodology used by researchers to test market – growth linkage also vary, it ranges from simple regression to co-integration [see, for example, Jung (1986), Demetriades and Hussein (1996), Wachtel *et. al.* (1995), Rousseau and Wachtel (2000)] and Granger type test of causality [see, Forbes and Rigobon (2002), Caporale, Howells, and Soliman (2004), Gursoy and Alovsat (2004), etc.]. If the theory "capital market influences economic growth" has any merit, it becomes imperative to suggest what fundamental changes to be initiated [see Shleifer and Vishny 1998 and Hasan *et. al.* 2006] so that poorly developed market can finally act as an agent of growth.

Most of the earlier studies suffer from the problem of data inadequacy; it is a formidable hurdle particularly when countries are less developed. Researchers thus were forced either to rely on small sample or to follow a methodology that caused huge loss of information. Present study also suffers from the same problem.

3.3 Data, Variables and Time period

Variables used in the present study to prepare a comprehensive index are not new and were considered by Demirguc-Kunt and Levine (1996) and Levine and Zervos (1998) and others, these are (a) market size (b) market liquidity (c) volatility, and (d) market integration. Justifications of using these variables are as follows: -

A. Stock Market Size

Number of listed companies and the market capitalisation ratio are two popular approaches broadly used to measure stock market size. Number of listed companies does not give any outstanding rationale to measure the size of the market. Ignoring few "dumb numbers", earlier researchers also rightly preferred to rely on alternative parameter to measure size of the market. Number of listed companies in Indian stock market is

ostensibly more that that of many developed markets such as Germany, France, Japan etc. but it would be highly impractical to assume that simply due to sheer numbers it is ahead than other developed markets. Large number of inactive shares symbolises weakness not strength of the market, hence we considered market capitalisation ratio as a measure of stock market size. The market capitalisation ratio equals the value of listed shares divided by GDP. Resource mobilisation and risk reduction capacity of market largely depends upon market capitalisation ratio and this is the prime reason of selecting this variable ignoring others.

B. Liquidity

Liquidity is the single most important variable considered by researchers interested to study stock market development and its impact on: savings [Levine, 1991; Holmstrom and Tirole, 1993; Levine and Zervos, 1993] quantity and quantity of investment, and corporate governance [Shleifer and Vishney 1986; Bhide, 1993] etc. Levine (1991) succinctly summarized importance of the stock market liquidity when he writes – "stock markets accelerate growth directly by eliminating premature capital liquidation which increases firm's productivity and indirectly by reducing liquidity risk which encourages firm investment." Surely, assertion of Levine (1991) is not beyond criticism but a wide range of debate centering around stock market liquidity and its multidimensional impact on economy, nonetheless suggests importance of this variable as a proxy of stock market development. While economists advance many theoretical definitions of "liquidity," analysts generally use the term "liquidity" to refer to the ability to easily buy and sell securities. A comprehensive measure of liquidity would of course quantify all the costs associated with trading, including the time costs and uncertainty of finding a counterpart and settling the trade. In absence of information of all these parameters for the country under study, we relied on two widely used measures - value traded ratio and turnover ratio for the present study.

Total value traded / GDP equals to value of trades of domestic shares traded on domestic exchange divided by GDP. Total value traded ratio measures the organised trading of equities as a share of national output and therefore should positively reflect liquidity on an economy-wide basis. Total value traded/GDP ratio complements the market capitalisation ratio. High market capitalisation along with little trading is a unique feature of some immature market. Thus, market capitalisation and total value traded/GDP taken together can truly measure market size and liquidity.

A second measure of liquidity is the turnover ratio. Turnover equals the value of total shares traded divided by market capitalisation. High turnover is often used as an indicator of low transactions costs. Turnover ratio complements total value traded/GDP ratio. While total value traded /GDP denotes trading compared with the size of the economy, turnover measures trading relative to the size of the market. Put differently, a small, liquid market will have a high turnover ratio but a small value traded ratio. Thus, market capitalisation, value traded, and turnover ratio taken provide together a more comprehensive picture about the state of development of any stock market than the information provided by any single indicator.

C. Market Risk

Early studies relied on standard deviation (S.D) of return to measure risk. We include Sharpe ratio as an indicator to measure risk. The Sharpe ratio expresses the excess return per unit of risk, where risk is measured by the standard deviation of the rate of return. Reason for selecting Sharpe ratio instead of S.D is simple – the ratio considers simultaneously both risk and return hence it is more meaningful. However, basic assumption of the ratio is, portfolio of most investors is not well diversified. Greater the Sharpe ratio better is the condition of the market in terms of its capability to attract savers to invest fund in more productive assets.

D. Market Integration

An integrated capital market, theorists assume, offer greater opportunity of risk reduction by efficient diversification of funds, lower the required rate of return demanded by the investors, increase competition in the local market, encourage the use of sophisticated financial technology, increase information processing capability of local market operators and strengthen financial services. Foreign investors pressure help to improve disclosure rules so as to enable them to monitor corporate performance and better capital allocation (see Kim, 1998). Thus, an integrated capital market by definition is an efficient and mature market and any attempt to measure development of stock market cannot afford to miss this variable.

A number of popular techniques widely used to measure openness of an economy such as foreign direct investment/GDP, import and export/GDP, portfolio investment liabilities/GDP etc. (El-Wassel, 2005). But the problem with all these widely used measure is, while these proxies can estimate degree of openness of an economy, it fails

to measure stock market integration directly. Undeniably, openness of economy and stock market integration to an extent co-dependent, however, we opted for a more direct measure. A group of researchers [Korajczyk, 1996], Levine and Zervos, 1998] relied International Capital Asset Pricing Model (ICAPM) and International Arbitrage Pricing Technique (IAPT) to measure integration. Obviously these are more robust and direct techniques to measure capital market integration. However, there is a current trend to use various forms of correlation [Bekaert, 1995; Bekaert, Harvey and Campbell, 1995; Bekaert, Harvey and Lumsdaine, 2002a, 2002b] to measure stock market integration; of late which has been substituted by econometric techniques known as co-integration. While using this technique researchers [Beakert and Hervey, 2000; Reid and Plummer 2005; Davies, 2006] argued that correlation as a measure of integration is not acceptable because of its limited forecasting ability-it's a static concept thus to be ignored. Hence, forecasting of co-movement of share price among markets is beyond the scope of the present study, we adopted simple but meaningful technique of correlation to measure year wise level of unification of a national market with global market.

Considering above variables we attempted to measure the level of stock market development of twenty-two sample countries for an eighteen years time period ranging from 1988 to 2005. It includes U.S, U.K, Germany, France, Australia, Hong Kong, Singapore, Malaysia, Indonesia, Philippines, India, Korea, Japan Thailand, Pakistan, Bangladesh, Sri Lanka, South Africa, Argentina, Brazil, Mexico, and Chile. As Asia is our main focus of attention, the countries belonging to the region dominate the sample, though some very active and developed markets of other continents have been considered for comparative analysis. Altogether, sample countries share nearly 47% of world market capitalization and Asian markets contribute roughly 90% market capitalization of the region.

The relevant data for the study are collected from the various sources like Emerging Stock Market Fact Book (Standard & Poor's), Database of International Financial Statistics (IFC), World Bank, World Federation of Exchanges, etc.

3.4 Stock Market Development Index – a cross-country analysis

We calculated the stock market development index applying various techniques to answer the question- does change in approach results in any havoc differences in measurement? Is it reasonable to assume that all the variables are equally important? If

not, what is the most scientific means to assign importance to each variable to construct a weighted average index?

(i) Simple Average Index

At the outset, we constructed a conglomerate index by taking into account simply the average of the above variables for the period 1988-2005. It's a simple and straightforward approach, also tried by Demirguc-Kunt and Levine, (1996).

Table 3.1: Simple Average Index Ranking (1988-2005)

Country	Simple Average Index[1]	Rank	S.D of the Year
Hong Kong	1.311	1	0.747
USA	1.270	2	0.832
Singapore	1.056	3	0.742
Korea	0.933	4	1.081
UK	0.858	5	0.720
Malay	0.857	6	0.992
Germany	0.785	7	0.685
Indonesia	0.781	8	0.551
France	0.776	9	0.717
Thailand	0.769	10	0.737
South Africa	0.554	11	0.793
Mexico	0.537	12	0.700
Australia	0.506	13	0.722
Japan	0.487	14	0.981
Philippines	0.475	15	0.638
India	0.457	16	0.705
Chile	0.392	17	0.861
Pakistan	0.370	18	0.968
Brazil	0.339	19	0.667
Argentina	0.192	20	0.055
Bangladesh	-0.061	21	0.972
Sri Lanka	-0.216	22	0.915

Simple average index shows Hong Kong tops the list with value 1.311 and Sri Lanka stands at 22nd position with index value -0.216 (See Table 3.1). Hong Kong is ahead of U.S, U.K, Germany, and France the countries that are usually considered as the epi-center of world financial market. India ranks 16th in the final index and value of its each variable nearly hover around its final ranking. While nearly all-South East Asian countries performances are encouraging, East Asian along with Latin American countries score is utterly frustrating. Does it indicate that gradually there is a shift of importance of international nerve center of financial system from western to south-eastern part of the

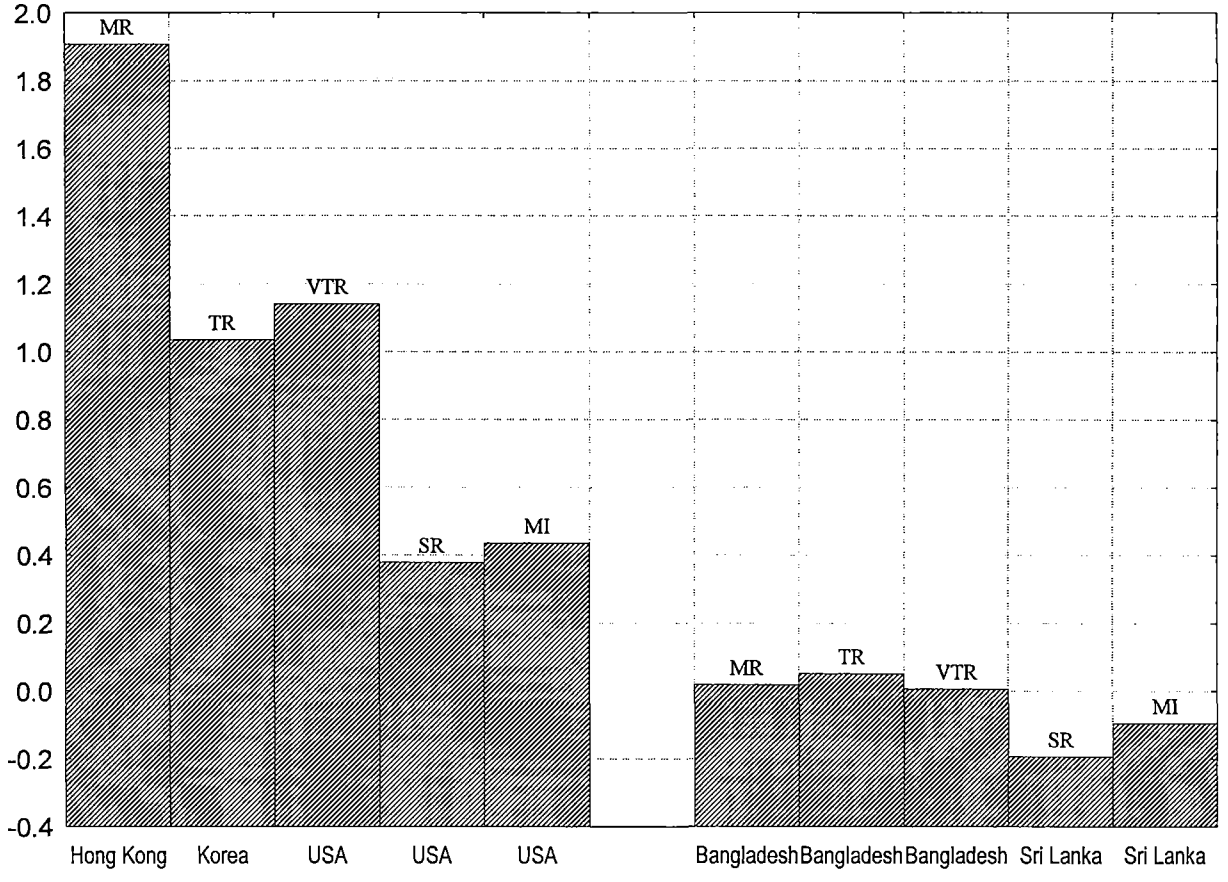
globe? The issue is interesting for further study but we abstain from making any serious comment on the topic, as it deserves rigorous empirical testing which is beyond the scope of the present writings. Financial sector development index that comprises both stock and banking sector also suggests that South East Asian countries particularly Malaysia, Korea have a robust financial system in comparison with many developed economies. Finance-growth literature suggests that a competitive financial system contributes to real sector development, promotes efficiency of the economy, encourage in innovative intermediate and final products, increase in capital-output ratio etc. If all these assertions are correct, then South East Asian economy will unhesitatingly be more stronger in future.

Virtually, assumption of frictionless growth of asset market is neither theoretically compatible nor achievable in practice. Among many, virtual and prospective change in the macroeconomic condition is one important factor that influences stock market growth of various regions. Latin America offers a formidable evidence of this hypothesis. Apart from fundamentals, other non-rational traits also influence functioning of the market and it can be reasonably assumed that emerging markets are more susceptible to this sort of unwarranted symptom.

Though sample differs, findings of the present research more or less confirm results of earlier studies (Demirguc-Kunt and Levine, 1996). Major exception is Japan[2]. The country tops the list in the earlier research of mid 1990's, since then it lost it's earlier glory and slipped in the ranking.

Variable wise performance (See Figure 3.1) of select countries will help us to analyze who leads and who lags on each count. We deliberately selected average value of each variable as a measure of performance simply because it will smoothen out year-to-year variation of each variable which is rampant for most of the cases.

Figure 3.1: Variable-wise High and Low



Notes: MR represents market capitalization ratio, TR equals turnover ratio, VTR refers to value-traded ratio, SR and MI equals Sharpe ratio and market integration respectively.

Out of five, U.S tops the list for three variables, namely, value-traded, Sharpe and market integration ratio, where as, Hong Kong and Korea enjoys this honour for one variable each i.e market capitalization and turnover ratio respectively. For all variables, as usual South Asian countries particularly Bangladesh, and Sri Lanka are at the bottom.

(ii) Means-Removed Values Index (SMDEX)

While variables remain same, we propose to develop an index called *SMDEX* (stock markets development index) by averaging the means-removed values (See Levine and Zervos, 1996) of each variable. The mean removed market capitalisation ratio for country *i* equals the market capitalization ratio for country *i* minus the mean of all countries, divided by mean for all countries. Then we took simple average of the mean-removed market capitalisation ratio, turnover ratio, value- traded ratio, Sharpe ratio and market integration to obtain a conglomerate index of stock market development, *SMDEX*. Formally, let M (i, j) equal the average value (over the relevant period) of

variable *j* for country *i*. Let M (j) equal the average value of variable *j* across all countries. So, mean-removed value may be shown as:

$$m(i,j) = [M(i,j) - M(j)] / M(j) \quad \text{..... Eq. 1}$$

Then *SMDEX* for country *i* is

$$SMDEX\ (i) = \sum_j m\ (i, j)$$

Where, we take the average across all the variables for country *i*.

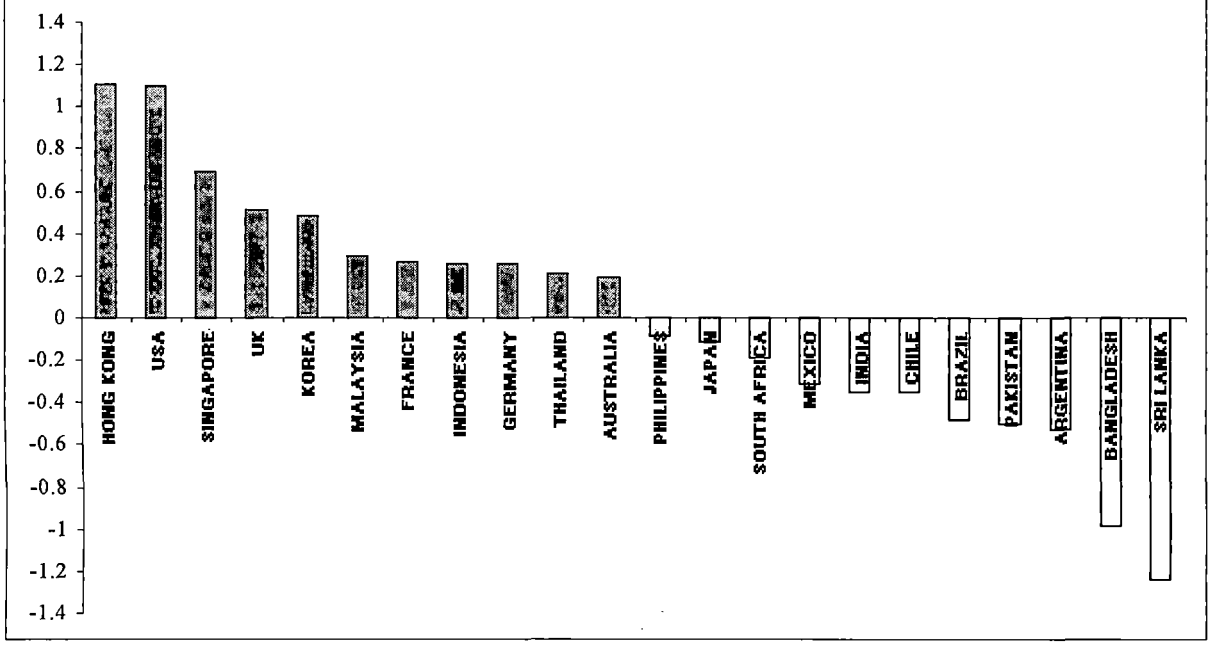
Findings of the means-removed values are shown in Table 3.2.

Table 3.2: Stock Market Development: Means-Removed Value (MRV) (1988-2005)

Country	MRV Average Index[1]	Rank
Hong Kong	1.107	1
USA	1.094	2
Singapore	0.690	3
UK	0.514	4
Korea	0.486	5
Malaysia	0.289	6
France	0.261	7
Indonesia	0.257	8
Germany	0.253	9
Thailand	0.205	10
Australia	0.189	11
Philippines	-0.089	12
Japan	-0.118	13
South Africa	-0.192	14
Mexico	-0.309	15
India	-0.349	16
Chile	-0.354	17
Brazil	-0.482	18
Pakistan	-0.499	19
Argentina	-0.528	20
Bangladesh	-0.985	21
Sri Lanka	-1.240	22

There is a marginal change in the ranking of the countries based on MRV. A large number of South east Asian countries enjoy positive MRV whereas all Latin American along with South Asian countries have negative MRV. Out of 11 countries with positive MRV, 6 belong to South East Asia, 3 European along with USA and Australia. A graphical representation of MRV may give us a clearer picture of country-wise position (See Figure 3.2).

Figure 3.2: Ranks under Means-Removed Value Method



Amidst fast growing south East Asian market, like earlier occasion Philippines stock market performance appears less attractive. South Asian markets particularly India, which has a highest number of listed companies in the world, enjoys a ranking that is far below the average. Wide difference in the level of stock market development is also evident from Figure 1 while Hong Kong has a positive value of 1.107, score of Sri Lanka is –1.24. Level of economic development of sample countries widely vary, this may be one plausible reason for huge differences in the stock market growth.

(iii) Weighted Index

Finally, we constructed the weighted average stock market development index of various variables used in this study. None of the previous studies by Demirguc-Kunt and Levine (1996) and Levine and Zervos (1998) considered relative importance of each variable while preparing the stock market development index. Presumably, earlier researches may have assumed that all the stock market development indicators such as market capitalisation ratio, turnover ratio, value-traded ratio etc. are equally important hence it is needless to assign any special emphasis to any variables. This is an a priori assumption, not defendable by any logic. Hence, we propose to measure importance of each variable objectively using the technique of Principal Component Analysis (PCA) so as to prepare Weighted Average Index.

The PCA analysis can be expressed summarily as:

$$z_j = a_{j1}F_1 + a_{j2}F_2 + \ldots. + a_{jn}F_n + d_j U_j \ldots\ldots\ldots\ldots \text{Eq. 2}$$

where each of the n observed variables (z_j) is described linearly in terms of n new uncorrelated components F_1, F_2, ..., F_n, each of which in turn is defined as a linear combination of the n original variables. The coefficient a_{ji} is the factor loading (regression weight) on the *ith* factor and U_j denotes a unique factor, i.e. it is the part that is influenced by idiosyncratic determinants, specific to each variables, z_j, with a loading of d_j. A factor loading is simply the correlation between the time series of observations on the market development indicator from a single country and the associated factor.

The method principal components analysis makes no particular assumption about the underlying structure of the variables. The central point is to obtain their best linear combination. Hence, the first component or factor may be viewed as the single best summary of the linear relationships exhibited in the data and is obtained by maximizing the variance which it explains. The second factor is defined as the second best linear combination of variables, under the condition that the second component is orthogonal to the first, which means that it accounts for most of the residual variance after the effect of the first factor is removed from the data.

The factors which have eigen values greater than one, contribute most to the total variance of the variables and hence describe more of the data than any other factor. As a result, these are examined more closely. In the present study, it is value-traded ratio that enjoys highest relative importance (0.908) (See Table 3.3 and 3.4). Finding is consistent with earlier studies [Demirguc-Kunt and Levine, 1996; Levine and Zervos, 1998; Beck and Levine, 2002] and historical evidence also supports validity of our findings. Sir John Hicks (1969) argued that critical new ingredient that ignited growth in 18th century England was capital market liquidity. Thus historical evidences and current experiences suggest that liquidity increases fraction of fund available for firm investment, discourages agents to invest in more liquid assets that do not augment growth, improves corporate efficiency that contributes in welfare and help economy to achieve a steady state of growth. Virtually value traded ratio is a much broader concept than turnover ratio, hence a more acceptable measure of liquidity.

Table 3.3: Results of Principal Component Analysis

Component	Initial Eigenvalues	Percentage of Variance	Cumulative Percentage of Variance
1	2.074	41.476	41.476
2	1.039	20.780	62.256
3	.953	19.067	81.323
4	.771	15.421	96.744
5	.163	3.256	100.000

Notes: Extraction Method: Principal Component Analysis.

Table 3.4: Relative Load and Coefficient of the variables

	Component 1	
	Load	Coefficient
Market Capitalisation Ratio	.757	.365
Turnover Ratio	.532	.257
Value-Traded Ratio	.908	.438
Sharpe Ratio	.169	.082
Market Integration	.603	.291

Notes: Extraction Method: Principal Component Analysis

The extent of stock market development based on five variables is assessed by the explanatory power of the most powerful factor- that is, by the first factor- and the numbers of the other significant factors extracted. Finally ranking of the countries based on weighted index is shown in Table 3.5.

Table 3.5: Stock Market Development: Weighted Average Index

Country	Weighted Index Value[1]	Rank	Level of Economic* Development[3]
USA	2.536	1	3
Hong Kong	2.295	2	3
Singapore	2.233	3	3
UK	2.048	4	3
Korea	1.978	5	2
Malaysia	1.722	6	2
Germany	1.639	7	3
France	1.570	8	3
Australia	1.549	9	3
Indonesia	1.530	10	1
Thailand	1.512	11	1
South Africa	1.346	12	2
Japan	1.346	13	3
Mexico	1.328	14	2
India	1.316	15	1
Chile	1.060	16	2
Philippines	0.883	17	1
Brazil	0.859	18	2
Pakistan	0.858	19	1
Argentina	0.083	20	1
Bangladesh	-0.661	21	1
Sri Lanka	-0.995	22	1

*Notes: we followed broad based classification by the World Bank where per capita GDP at Stage 1 = ≤$ 3000; Stage 2 = >$ 3000≤$ 17000; and Stage 3 =≥ $ 17000.

Rankings of the sample countries changed while measuring stock market development using weighted index. Index shows US tops the list with value 2.536 and Sri Lanka stands at 22nd position with index value -0.995. Performance of many South east Asian countries, namely, Hong Kong, Singapore, Korea, Malaysia, is exceptionally encouraging; in the sense, these countries outperformed many developed European markets. The scores East Asia along with Latin American countries is utterly disappointing. Our analysis suggests, with the opening up of the economy gradually there is a shift of importance of international epicenter of financial system from western to southeastern part of the globe. Issue deserves attention of scholars particularly interested to measure "gainer or loser" from an open economic world order. But we abstain from making any serious comment on this highly debatable issue as it deserves serious empirical testing which is beyond the scope of present writing. Financial sector development index that includes both stock and banking sector also suggests that south East Asian countries, particularly Malaysia and Korea, have a robust financial system in comparison with many developed economies. If "finance led growth" theoretic approach has any merit, it may be reasonably assumed that south East Asian economy will be stronger in future.

Sample countries of our study belong to different stages of economic development measured in terms of GDP per capita at market exchange rate. Most of the less developed markets belong to the countries that are at the first stage of economic development (GDP per capita < US $ 3000[3]) [See Rousseau and Wachtel, 2000; Beck and Levine, 2002] while markets of developed economy are more or less matured. Findings may incite the debate – does stock market development cause economic growth or vice versa? Despite numerous studies [Levine and Zervos, 1993; Atje and Jovanovic 1993; Levine and Zervos, 1998; Rousseau and Wachtel, 2000; Beck and Levine, 2002, Capasso, 2006 etc.] dilemma over nature of linkage between asset market and economic growth is still there. This confusion needs to be settled. We feel "finance led growth strategy" – the concept which is theoretically appealing and enjoy more empirical support can help developing economy to pursue a well conceived policy for growth of capital market and to reverse present trend of disappointing growth of many countries.

A comparison with earlier studies (Demirguc-Kunt and Levine, 1996) suggest even after a lapse of one decade, excepting Japan, there is no havoc change in the ranking of worlds most developed market (See Table 3.6).

Table 3.6: Stock Market Development – Demirguc-Kunt and Levine Study (Index 4: 1986-93)

Country	Score
Japan	1.41
U.S.A	.94
U.K	.89
Korea	.73
Malaysia	.60
Thailand	.31
India	-0.01
Mexico	-0.11
Brazil	-0.23
Pakistan	-0.33
Chile	-0.37
Philippines	-0.40
Argentina	-0.50

Note: Only the scores of those countries that are also included in the present study are shown above.

Source: Demirguc-Kunt and Levine, (1996).

Most notably, market in the bottom, like Argentina, Brazil, Chile, Philippines, India failed to improve its ranking sufficient enough to enter in the upper tier of world markets. Though our study and findings of Demirguc-Kunt and Levine (1996) are strictly not comparable as sample and methodology differs, yet comparative analysis gives some impression that within one decade the less developed markets failed to prepare itself for nest stage. It is a real problem that needs to be addressed – yet action based on sensible policy is still abegging.

(iv) Means-Removed Weighted Average Index (MRWI)

Having same variables, we have tried another rigorous and widely used alternative model for comparative analysis of the level of stock market development known as Means-Removed Weighted Average Index (MRWI). For instance, mean removed weighted market capitalization ratio for country *i* equal the weighted market capitalization ratio for country *i* minus the weighted mean of all countries, divided by weighted mean for all countries. Then we have considered the average of the mean-removed weighted values of the market capitalization ratio, turnover ratio, value- traded ratio, Sharpe ratio and market integration to obtain a conglomerate index (MRWI) of

stock market development. Formally, let M (i, j) equal the weighted average value (over the relevant period) of variable *j* for country *i*. Let M (j) equal the weighted average value of variable *j* across all countries. So, mean-removed weighted average value of country i for variables j [m(i,j)] may be shown as:

$$m(i,j) = [M(i,j) - M(j)] / M(j) \ldots\ldots\ldots \text{Eq. 3}$$

Then *MRWI* for country *i* is

$$MRWI\ (i) = \sum_j m(i,j)$$

Where, we take the average across all the variables for country *i*.

Rankings of Countries under *MRWI* has been shown in Table 3.7.

Table 3.7: Rankings under MRWI values (1988-2005)

Country (Above the Mean Value)	MRWI values	Ranks
USA	1.402814	1
Hong Kong	1.1715268	2
Singapore	0.9425609	3
UK	0.655058	4
Malaysia	0.4632317	5
Germany	0.4610821	6
France	0.4342811	7
Korea	0.2972219	8
Australia	0.1140041	9

Country (Below the Mean Value)	MRWI values	Ranks
South Africa	-0.0830571	10
Japan	-0.0902489	11
Thailand	-0.1232907	12
Mexico	-0.124305	13
India	-0.1458661	14
Pakistan	-0.3459931	15
Brazil	-0.4487912	16
Philippines	-0.6010292	17
Chile	-0.6518495	18
Argentina	-0.7790012	19
Bangladesh	-1.0154333	20
Sri Lanka	-1.2027423	21

In this method also there is not any havoc difference observed between the country rankings. Again, we find that the USA tops the list with a score of 1.402 and Sri Lanka is at the bottom enjoying a value of – 1.202. Out of nine countries that enjoy above the average score, four belongs to south East Asia. The robust asset market development of these four nations may have partly attributed to the efficiency of the countries finance related legal/institutional infrastructure as it is espoused by Ito (2005). All South Asian, Latin American and two South East Asian countries (e.g. Thailand and Philippines) stock markets' growth are awfully disappointing.

The wide gap in the scores of upper and lower tier countries suggest that there are some problems with the countries at the bottom. Macroeconomic instability, poor infrastructure, improper sequencing, inadequate integration, faulty fiscal policy etc. are the few among many reasons that are plausibly retarding the growth of these markets. Despite the poorly developed capital markets, rate of economic growth of many

countries e.g. India, Brazil, Mexico are quite encouraging. Financing pattern of industries of these countries and its impact on growth and efficiency deserve a close scrutiny.

Therefore, from the results of the various methodologies above, some nagging question are required to answer what makes the difference amongst the countries stock market development? Do countries at different stages of economic development have different looking financial system? Let us find the answers in the following section.

3.5. What makes the Difference? A Cross-country Analysis

Our second research question is: do countries at different stages of economic development have different looking financial system? Our earlier analysis provides a faint impression that rich countries more or less have a developed stock market. Many Asian and Latin American economies e.g. India, Chile, Argentina etc are far too well integrated with world economy yet, the countries failed to develop competitive markets that can alleviate information asymmetry such as adverse selection and moral hazards [Stiglitz, (2000), Claesens *et. al.* (2001)].

Till now we were involved in an analytical approach that can explain what happened in past, retrospectively, but offers few, if any, insights as to how changes can be implemented in these countries so as to make capital market a more rational and meaningful institutions in the changed regime. We propose to find solution of the problem following theory-"institutional development helps to promote a competitive system"- thesis duly emphasized in the literature of sequencing but often ignored by policy makers while trying to solve real world problem. Reason for different looking capital market in fast and slow moving economy can be partly traced in the theory that institutional development foster economic growth[4] and encourages in the development of capital market. While policy of financial liberalization cannot be aborted, "right way" or "right order" of implementing the policy is still an issue of research – because any bold policy without fundamentally altering existing institutional structure may fail to deliver desired results or even bring about economic turbulence [Kaminsky and Schmukler (2001), Kaminsky and Reinhart (2002)].

Measurement of institutional development essentially includes value of some basic elements that help to develop competitive economic system and increase capacity of controlled transformation of socio economic structure with minimum disturbances.

Broadly the variables are: independence of judicial system, cost of corruption, strength of property right, efficiency of financial institutional services, state of political condition, accounting standard and practices, macroeconomic stability[5] etc. In sum, institutional development contributes to a well functioning competitive system, where a large number of market participants operate freely and enjoy benefits of their merit while keeping economic distortions to a minimum. It's a standard theory endorsed by scores of researchers. Implication of this theory for growth and efficiency of capital market can be explained in a slightly different framework while basic philosophy remains same.

Finance theory suggests relevance of capital market in an economy largely depends on how it values information and equitably distributes wealth among market participants. An efficient market by definition continuously reward informed traders, punish ill-informed, in the process while former becomes richer, latter lose their money and at its extreme vanishes from the market. Operations, which are popularly known as risk arbitrage is at the core of the efficient, market theory. It further acclaims, "equilibrium price makes capital markets a superior allocator of resources than financial intermediaries that often make mistakes."

But the operation of risk arbitrage may be less rewarding and risky in an economy with inadequate institutional development. This insufficiency contributes in unwarranted events like macroeconomic instability, difficulties to predict and plan unexplainable asset price movements – the cases of course have some real cost. Inefficient legal system, inadequate accounting practices, opaque political system, high cost of corruption increases risk in participating asset market and discourage informed traders to act as "guardian of efficiency" of the market. Arbitragers who do make correct predictions and attempt to free the market from the clutches of ill-informed may feel that highly volatile and least supportive environment will not allow them to enjoy the benefits 'of being right'. Researchers (see Allen and Gale, 2000; Kyle and Xiong, 2001) argue that an insufficient level of informed trading 'can create space'[6] for noise trading – the trading that results from any irrelevant events excepting information (see Kurtzman, Yago and Phumiwasana, 2004). Once the proportion of noise traders in the market rises above a critical level, it might crowd out risk arbitragers who are more risk averse. A stock market with insufficient informed trading is essentially an unruly market that discourages long-term investors, foreign portfolio investors not to participate in it and its insufficiency finally adversely affects rest of the economy (see Kurtzman, Yago and Phumiwasana, 2004). Ultimate outcome of poorly developed capital market are – low

turnover, insignificant market capitalization higher cost of using funds, little market integration that retard growth of capital market and pull down country ranking of asset market[7].

However, findings of any robust statistical analysis will offer a detailed explication of why, how and under what condition even after a decade of earlier study many poorly developed markets failed to prepare themselves for higher stage of maturity.

We employed ANCOVA model to study i) whether stock market development differs with stages of overall economic development and ii) the linkage of foreign portfolio investments (FPI), foreign direct investments (FDI), and global competitiveness index of the sample countries that are at the different stages of economic development with stock market growth. Stages of overall economic development of sample countries has been measured by per capita GDP, and we followed World Bank classification and set the same as dummy variables. Quantitative variables like FPI, FDI and global competitiveness index (GCI)[5] are used as covariates of the regression equation. We intentionally ignored inflation, interest rates and openness of the economy as determinants of stock market growth to avoid the problem of double counting. A very comprehensive aggregate governance indicators index prepared by the World Bank to measure institutional development score includes effect of all those variables under the heading macroeconomic stability. Assuming the impact, if any, is deterministic one, we estimate the equation below in the additive form of the indicator variables:

$$Y_i = \beta_1 D_{1i} + \beta_2 D_{2i} + \beta_3 D_{3i} + \alpha_j \sum_{j=1}^{n} X_{ji} + u_i \quad \ldots\ldots\ldots\ldots \text{ Eq. 4}$$

where, Y_i is stock market development represented by VTR, $D_{1i} = 1$ for the countries with per capita GDP$\leq$ \$3000 and 0 for others, $D_{2i} = 1$ for the countries with per capita GDP > \$3000 but $\leq$ \$17000 and 0 for others, $D_{3i} = 1$ for the countries with per capita GDP> \$17000 and 0 for others, X_j the covariates like FPI, FDI and GCI; and u_i the error term ~ N (0, δ).

For the present study we relied on the data for a period of 11 years (1996 – 2006) for 21 countries. Selection of time period was guided by availability of information GCI in particular. Thus, the sample I consists of all 21 countries, Sample II includes 11 countries with the weighted index more than the average and Sample III consists of 10

countries with weighted index below the mean. The results are shown in Table V (See Table 3.8).

Table 3.8: Results of the Estimates with the Stages of Development as Dummy* (ANCOVA-Model)

[VTR =f (FPIL, FDI and GCI)]

	Sample-I (All Countries)				Sample-II (Above-Mean Countries)				Sample-III (Below-Mean Countries)			
Variable	*Coefficient*	*Std. Error*	*t-statistic*	*p-value*	*Coefficient*	*Std. Error*	*t-statistic*	*p-value*	*Coefficient*	*Std. Error*	*t-statistic*	*p-value*
FPIL	3.68916	0.956147	3.8584	0.00015	5.95098	1.63688	3.6356	0.00046	1.8275	0.482024	3.7913	0.00024
FDI	5.52554	1.73477	3.1852	0.00166	5.16317	2.4188	2.1346	0.03545	0.0146037	1.83446	0.0080	0.99366
GCI	0.352413	0.094481	3.7300	0.00025	0.250238	0.220973	1.1324	0.26039	0.118459	0.040166	2.9492	0.00385
D1	0.29155	0.077088	3.7820	0.00020	**	**	**	**	0.21943	0.026595	8.2506	<0.00001
D2	0.227067	0.077688	2.9228	0.00385	0.868642	0.209053	4.1551	0.00007	0.0797453	0.035139	2.2694	0.02509
D3	0.0981358	0.168342	0.5830	0.56054	0.129321	0.336694	0.3841	0.70180	***	***	***	***
Number of Observations 218					97				121			
Standard error of residuals = 0.584432 Unadjusted R^2 = 0.371306 Adjusted R^2 = 0.356478 F-statistic (5,212) =25.0413 (p-value < 0.00001)					Standard error of residuals = 0.751928 Unadjusted R^2 = 0.224017 Adjusted R^2 = 0.190279 F-statistic (4,92) = 6.63984 (p-value = 9.69e-005)				Standard error of residuals = 0.191191 Unadjusted R^2 = 0.189572 Adjusted R^2 = 0.161626 F-statistic (4, 116) = 6.78354 (p-value =6.09e-005)			

***Notes:** D1=1 for the 'countries with per capita GDP less than $3000 and 0 for others; D2=1 for 'the countries with per capita GDP $3000-$17000 and 0 for others; D3 =1 for 'the countries with per capita GDP $17000 or more' and 0 for others. **Sample II consists of no countries with per capita GDP less than $ 3000 *** Sample III consists of no countries with per capita GDP $17000 or more.

We believe that the relationship between stock market growth and a particular variable of interest to be robust if it remains statistically significant with theoretically predicted sign. In this sense, our findings are in the tune with the economic theory and are mostly statistically significant. Outcome of the estimation strongly supports that the level of stock market growth significantly differs across the countries belonging to different stages of economic development. In sample II all countries are developed and their per capita GDP is more than US $ 17,000. In sample III, nearly all countries are less developed with per capita GDP less than US $ 17,000 i.e., in the stage of eitherD_1 or D_2.

Hence, no results for D1 in the sample II and D3 in the sample III are expected. Out of the three covariates, both the FPI and FDI maintain a positive relationship with stock market development across sample I, II, and III. The findings are consistent with the economic theory. However, the relationship is more robust for the FPI than the FDI.

Another point of interest of the present study is whether the level of institutional development varies across the stages of economic development and to what extent it can explain the stock market growth. Findings suggest that nature of association between institutional development and stock market behavior is quite interesting. The market performance is positively and statistically significantly associated with sample I and III countries but, curiously, it maintains a weak but positive relationship with 'above the mean' countries. One plausible reason for the absence of any robust relationship is that, in less developed economy (sample III) where institutional development is virtually at a basic level any positive change of the same contributes in higher growth of stock market. Unless the change in the institutional development is radical in developed economy any marginal change may have little or no impact on the functioning of the market.

The empirical results strongly support theoretical underpinnings of our earlier analysis i.e. the look of the stock market (VTR) of the countries belonging to different stages of economic development vary, and the institutional development and flow of funds immensely influence market activities. International bank on several occasions reiterated that to allow competitive economic system and to keep its promise for higher growth particularly for less developed countries, there is a need to update and modify its institutions and practices. Failure of a large number of weak countries to develop their financial system and to attract foreign funds rests on their inability to develop a robust economic system that is free from corruption, inadequate regulations and without prudent economic activities.

3.6 Conclusion

Even after a decade of earlier study, why many emerging markets failed to improve its performance? A flat, stereotypical policy prescription for all economies ignoring its unique feature and stages of development may be ineffective to overcome inherent inadequacies of the markets. Economic structure of many less developed countries of Asia and Latin America is at an early stage of development through which advanced countries have already passed. Thus, the strategy which is effective for Sri Lanka, Bangladesh, India, Philippines etc, may not be appropriate for Thailand, again emphasis will be different for U.S, U.K, Hong Kong, Korea etc. Therefore, we prescribe

some policy for the asset market development depending on stages of economic development - an important ingredient that influences factors associated with the functioning of the market.

Table 3.9: Model of Policy Prescriptions

Stage I (Low-income and emerging markets[8])	Stage II (Middle-income and emerging markets[8])	Stage III (High income and developed markets)
Focus on Basic Requirement	Focus on Efficiency	Focus on Innovation
• Institutional development • Infrastructure development • Macro-economic stability • Training and education	• Higher education and skill enhancement • Market efficiency • Technological readiness	• Business sophistication • Innovation

Go for new concept, technology, and sophisticated means to manage the growing complexities of global finance - these are the few steps what developed markets (Stage III) should target to achieve. These measures with all possibilities will further enhance the capabilities of market to mobilize more domestic and foreign funds to be used for productive purpose.

On the other extreme, (Stage I) countries with low income, dissatisfactory institutional development, low scoring capital markets (such as Bangladesh, Sri Lanka, Pakistan) should primarily aim at to develop at least a threshold level of legal system and institution in absence of which benefits of free economy can not be achieved. Once this fundamental of the free economy is attained, a transition of the countries at higher level of development is highly expected.

In between these two extremes, there are countries with middle income (e.g. Thailand, Mexico, Chile, and Brazil etc.) and a few with low income like India where fuzzy condition prevails. Case by case analysis may help us for a better understanding of the finance-growth relationship which we failed to perform due to the limited availability of the data of these countries. Financial systems of most of the stage II countries belong to Latin America are widely known for their obscure behavior which is essentially destabilising. Hence, improve the 'market efficiency', 'discipline it', 'develop the

finance related skill of the participants', 'improve mundane affairs' etc, should be the primary focus of these countries. Successful implementation of all these tasks would surely improve the quantity and quality of investment and gradually the countries will move to the next stages of development.

End Notes:

1. The Sharpe ratio has been calculated on the basis of the monthly data of share price index and yield rate of T-Bills. The govt. bond yield rate has been used as surrogate to the yield rate of T-Bills when the later is not available for Japan, Australia (from 2002 onwards) and France (from 2003 onwards). Under extreme circumstances, Bank Rates/Discount Rates are used to calculate Sharpe ratio for Bangladesh, Chile, and Indonesia (data permitting from 1990 onwards) as neither the yield rate of T-Bills nor govt. bond yield rate are available.
   i. Sharpe ratio for the Argentina could not be calculated, as none of the yield rate of T-Bills, Govt. Bond Yield Rate and Bank Rates/Discount Rates is available.
   ii. For Pakistan and Brazil, the yield rates of T-Bills are available only from 1992 and1995 respectively. In the case of Sri Lanka the yield rate of T-Bills of 1997 is not available and for Pakistan the same is not available for 1998 and 1999.
   iii. For Hong Kong, data for market capitalization, turnover and monthly share price index are available from 1992.
2. To measure the level of economic development, the per capita GDP value (in US $) for 2005 has been taken into consideration.
3. Japan's deepest and longest postwar recession resulted in the doubling of land value prices and a 180% rise in the Nikkei. However, the Tokyo stock market had fallen 38% by the end of 1990, thus effectively wiping out 2.07 trillion dollars in value. In the aftermath of the bursting of the land and equity price bubbles in the early 1990s, persistently high non-performing loans and a declining value of banks' equity portfolios constrained bank credit and sapped household and business confidence. These imbalances combined to hold down both investment demand and household income (and thereby consumer spending). The depth of the problems and the gradual approaches in dealing with them, along with certain unforeseen external shocks, led to the vicious circle of falling demand and falling prices that persisted for long.
4. For a discussion on the role of institutional infrastructure and financial development [see Rajan and Zingales (1998), Claessens *et.al.* (2002), Caprio *et.al.* (2003)].
5. For a detailed discussion on variables and methodology see Global Competitiveness Index prepared by World Bank and Opacity index was initially launched in the late 2000 by a joint effort of PricewaterhouseCoopers and the Milken Institute. By the first quarter of 2001, first opacity index was complied and released to the public by the PricewaterhouseCoopers.
6. It will be relevant to mention some revealing findings of earlier studies that suggest 1% decline in institutional development index results: decrease in per capita GDP by $986, 1% fall in foreign direct investment as a percentage of GDP, 0.06-point decline in its Capital Access Index, 4% decrease in bank assets as a percentage of GDP, 0.9% fall in stock market capitalization and value traded ratio as a percentage of GDP, 0.46% increase in inflation rate (See Opacity index, 2005).
7. For an earlier discussion see Figlewiski (1982).
8. The concept of emerging markets is not well-defined; there are many emerging markets that are more developed than many developed markets.

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