Stock Market Development
And Economic Growth:
The Case Of Mauritius

Baboo M Nowbutsing, University of Mauritius, Reduit, Mauritius
M. P. Odit, University of Technology, Mauritius

ABSTRACT

Stock market is an indicator of an economy financial health. It indicates the mood of investors in a country. As such, stock market development is an important ingredient for growth. The stock exchange of Mauritius is fairly new compared to many countries. This paper examines the impact of stock market development on growth in Mauritius. A time series econometric investigation is conducted over the period 1989 -20067. We analyse both the short run and long run relationship by constructing an ECM. Two measures of stock market development namely size and liquidity are used. We define size as the share of market capitalization over GDP and liquidity as volume of share traded over GDP. We found that stock market development positively affect economic growth in Mauritius both in the short run and long run.

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Keyword: Stock Market Development; Growth; Size and Liquidity

1.   INTRODUCTION

$\mathcal{T}$he growing importance of stock market around the world has reinforced the belief that finance is an important ingredient for growth. The focus is mainly on stock market development and economic growth. Levine and Zarkos (1998) argued that various measures of stock market development have explained part of the variation of economic growth. Many studies have concentrated on cross section regressions which as pointed by Levine and Renelt (1992) among others should be viewed with caution. Time series analysis can address the issue of endogeneity and causality. In the literature , it is accepted that time series studies of economic growth offer important advantages as compared to cross-country growth regression, see for example Jones (1995), Evans (1997) and Kocherlakota and Yi (1997).

In this paper, we explore the relationship between stock market development and economic growth in Mauritius for the period 1989 - 2006. Mauritius has experienced sustained and consistent growth over the years despite being affected by the disadvantages of a small country. The Stock Market of Mauritius (SEM) is fairly new, established in 1989. However, it is one of the best performing stock market in Africa. It is one of the seven stock markets which trade automatically in Africa. We use two measures of stock market development namely SIZE and LIQUIDITY. SIZE is denoted as market capitalization as a percentage of GDP. The assumption behind this measure is that overall market size is positively correlated with the ability to mobilize capital and diversify risk on an economy-wide basis. LIQUIDITY is calculated as value of shares traded on the stock market exchange divided by GDP. The total value traded ratio measures the organized trading of firm equity as a share of national output and therefore should positively reflect liquidity on an economy-wide basis. The total value traded ratio complements the market capitalization ratio: although a market may be large, there may be little trading.

The structure of this paper is as follows, section 2 presents a brief overview of the literature and we present a brief overview of SEM in section 3. The model and data is described in section 4. Section 5 depicts the estimation results and we conclude in section 6.

2.   A BRIEF OVERVIEW OF THE LITERATURE

Theoretically, a growing literature argues that stock market development boost economic growth. Greenwood and Smith (1997) show that large stock markets can decrease the cost of mobilizing savings, thus facilitating investment in most productive technologies. Bencivenga *et al* (1996) and Levine (1991) argue that stock market liquidity (the ability to trade equity easily) is crucial for growth. Although many profitable investments require a long run commitment of capital, savers do not like to relinquish control of their savings for long periods. Liquid equity markets ease this tension by providing an asset to savers that they can quickly and inexpensively sell. Simultaneously, firms have permanent access to capital raised through equity issues. Moreover, Kyle (1984) and Holmstrom and Tirole (1993) argue that liquid stock markets can increase incentives for investors to get information about firms and improve corporate governance. Finally, Obstfeld (1994) show that international risk sharing through internationally integrated stock markets improves resource allocation and can accelerate the rate of growth.

From the point of view of Greenwood and Jovanovic (1990); King and Levine (1993), a new stock exchange can increase economic growth by aggregating information about firms' prospects, thereby directing capital to investment with returns. These effects of a stock market opening result in a measured increase in productivity. Stock exchanges exist for the purpose of trading ownership rights in firms, and a new stock exchange may increase productivity growth for this reason as well.

According to North (1991), the creation of a stock exchange can increase economic growth by lowering the costs of exchanging ownership rights in firms, an important part of some institutional stories of economic growth. Furthermore, Bencivenga and Smith (1992) state that a new stock market also can increase economic growth by reducing holdings of liquid assets and increasing the growth rate of physical capital, at least in the long run. In the shortrun, however, the equilibrium response of the capital stock to a new stock exchange can be negative because the opening of an exchange can increase households' wealth and raise their contemporaneous consumption enough to temporarily lower the growth rate of capital.

In principle, a well-developed stock market should increase saving and efficiently allocate capital to productive investments, which leads to an increase in the rate of economic growth. Stock markets contribute to the mobilisation of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios. In doing so, they provide an important source of investment capital at relatively low cost (Dailami and Aktin, 1990). In a well-developed stock market share ownership provides individuals with a relatively liquid means of sharing risk when investing in promising projects. Stock markets help investors to cope with liquidity risk by allowing those who are hit by a liquidity shock to sell their shares to other investors who do not suffer from a liquidity shock. The result is that capital is not prematurely removed from firms to meet short-term liquidity needs.

Moreover, stock markets play a key role in allocating capital to the corporate sector, which will have a real effect on the economy on aggregate. Debt finance is likely to be unavailable in many countries, particularly in developing countries, where bank loans may be limited to a selected group of companies and individual investors. This limitation can also reflect constraints in credit markets (Mirakhor and Villanueva, 1990) arising from the possibility that a bank's return from lending to a specific group of borrowers does not increase as the interest rate it charges to borrowers rises (Stiglitz and Weiss, 1981 and Cho, 1986).

The arguments for stock market development were supported by various empirical studies, such as Levine and Zervos (1993); Atje and Jovanovic (1993); Levine and Zervos (1998). Although these studies emphasise the importance of stock market development in the growth process, they do not simultaneously examine banking sector development, stock market development, and economic growth in a unified framework. On the other hand Levine and Zervos (1993); Atje and Jovanovic (1993); Levine and Zervos (1998); Rousseau and Wachtel (2000) and Beck and Levine (2003) show that stock market development is strongly correlated with growth rates of real GDP per capita. More importantly, they found that stock market liquidity and banking development both predict the future growth rate of the economy when they both enter the growth regression. They concluded that stock markets provide different services from those provided by banks. This is also consistent with the work by Levine and Zervos (1995) and the argument by Demirguc-Kunt (1994) that stock markets can give a big boost to economic development.

Stock exchanges are expected to accelerate economic growth by increasing liquidity of financial assets, making global risk diversification easier for investors, promoting wiser investment decisions by saving-surplus units based on available information, forcing corporate managers to work harder for shareholders' interests, and channeling more savings to corporations. In accordance with Levine (1991), and Benchivenga and Smith and Starr (1996) they emphasized the positive role of liquidity provided by stock exchanges on the size of new real asset investments through common stock financing. Investors are more easily persuaded to invest in common stocks, when there is little doubt on their marketability in stock exchanges. This, in turn, motivates corporations to go to public when they need more finance to invest in capital goods.

Another important contribution of stock exchanges to economic growth is through global risk diversification opportunities they offer. However, Saint-Paul (1992); Deveraux and Smith (1994) and Obstfeld (1994) argue quite plausibly that opportunities for risk reduction through global diversification make high risk, high return domestic and international projects viable, and, consequently, allocate savings between investment opportunities more efficiently. Stock prices determined in exchanges, and other publicly available information help investors make better investment decisions. Better investment decisions by investors mean better allocation of funds among corporations and, as a result, a higher rate of economic growth. In efficient capital markets prices already reflect all available information, and this reduces the need for expensive and painstaking efforts to obtain additional information (Stiglitz, 1994). From the point of view of Schumpeter (1912), technological innovation is the force underlying long-run economic growth, and that the cause of innovation is the financial sector's ability to extend credit to the entrepreneur.

The study done by Levine and Zervos (1998), find a positive and significant correlation between stock market development and long run growth. Greenwood and Smith (1996) show that stock markets lower the cost of mobilizing savings, facilitating investments into the most productive technologies. Obstfeld (1994) shows that international risk sharing through internationally integrated stock markets improves resource allocation and accelerates growth. Bencivenga, *et al*. (1996) and Levine (1991) have argued that stock market liquidity, the ability to trade equity easily, plays a key role in economic growth; although profitable investments require long run commitment to capital, savers prefer not to relinquish control of their savings for long periods. Liquid equity markets ease this tension by providing assets to savers that are easily liquidated at any time.

Yet Kyle (1984) argues that, an investor can profit by researching a firm, before the information becomes widely available and prices change. Thus investors will be more likely to research and monitor firms. To the extent that larger, more liquid stock markets increase incentives to research firms, the improved information will improve resource allocation and accelerate economic growth. The role of stock markets in improving informational asymmetries has been questioned by Stiglitz (1985) who argues that stock markets reveal information through price changes rapidly, creating a free-rider problem that reduces investor incentives to conduct costly search. The contribution of liquidity itself to long-term growth has been questioned. Demirguc-Kunt and Levine (1996) point out that increased liquidity may deter growth via three channels. First, it may reduce saving rates through income and substitution effects; second, by reducing the uncertainty associated with investments, greater stock market liquidity may reduce saving rates because of the ambiguous effects of uncertainty on savings; third, stock market liquidity encourages investor myopia, adversely affecting corporate governance and thereby reducing growth.

The one important study mentioned earlier is one by Levine and Zervos (1998) who are among the first to ask whether stock markets are merely burgeoning casinos or a key to economic growth and to examine this issue empirically, finding a positive and significant correlation between stock market development and long run growth. However, Levine and Zervos's use of a cross-sectional approach limits the potential robustness of their findings with respects to country specific effects and time related effects. The legal liberalization of the stock market increased the importance of the stock market. It does not only link the importance of the stock market to economic growth over time, but also interpret it in relationship to the universal banking system. In a frictionless Arrow-Debreu world there is no room for financial intermediation. Explaining the role played by stock markets or banks requires building in frictions such as informational or transaction costs into the theory. Different frictions motivate different types of financial contracts, markets and institutions.

3.   AN OVERVIEW OF THE STOCK MARKET OF MAURITIUS

The Stock Market of Mauritius (SEM) was established in 1989 as a private limited company with public authorization. Originally, there were five listed companies and ten stock broking firms. It is a member of the World Federation of Exchanges (WFE) and the aim of the SEM is to become a World Class Stock Exchange. The SEM controls three markets: the Official Market, the Development & Enterprise Market (DEM) and the Over-The-Counter (OTC) Market.

In January 1997, the Central Depository System (CDS) was successfully executed, which added prompt, efficient clearing and settlement of trades and simultaneously abbreviated a number of the inherent risks in the process. In June 2001, SEM's Automated Trading System (SEMATS) was opened. In December 2003, the dealing of treasury bills on the market was introduced by the SEM. In November 2005, SEM joined the World Federation of Exchanges (WFE) as an active member.

At present, there are forty companies listed on the Official list, and around eighty companies quoted in the Over-The-Counter Market. At present the market indices for the Stock Market of Mauritius are the SEMDEX, SEMTRI and SEM-7.

Market Indices

Market movements and trends in the SEM are depicted by three market indices namely the SEMDEX, SEM – 7 and SEMTRI. This information is made available on the SEM's website in order to allow even foreign investors to have information on a real time basis. The SEMDEX is an index of process of all listed shares of the Official list computed as follows:

$$SEMDEX = \frac{Current\ Mkt\ Value\ of\ all\ listed\ shares}{Base\ Mkt\ Value\ of\ all\ listed\ shares} \, x \, 100$$

The SEMDEX is a broad-based index of prices of all listed shares and each stock is weighted according to its share in the total market capitalization. Changes in the SEMDEX are dominated by changes in the prices of shares with relatively higher market capitalization. The current value of the SEMDEX is always expressed in relation to the based year, 1989. The base value of listed shares is adjusted to reflect new listings, rights issues and other capital restructurings.

The SEM-7 is a specialized index of share prices of the seven largest companies, shares that qualify for certain criterion. Same principle as the SEMDEX applies for the calculation of the SEM-7. Finally, the SEMTRI provides domestic and foreign market participants with an index of total return, which combines both capital gains and losses on listed stocks and gross dividends obtained on these stocks.

Table 1: Listed Firms and its Features

Sector	Date of Listing	Ranking[1]
BANKS, INSURANCE & OTHER FINANCE		
The Mauritius Commercial Bank Ltd	Jul-89	2nd
Mauritian Eagle Insurance Co. Ltd	Dec-93	22nd
Mauritius Leasing Co. Ltd	Feb-04	32nd
Mauritius Union Assurance Co. Ltd	Dec-93	20th
State Bank of Mauritius Ltd	Jul-95	4th
Swan Insurance Co. Ltd		27th
COMMERCE		
Compagnie des Magasins Populaires Ltée	Mar-91	35th
Harel Mallac Ltd	Feb-91	28th
Innodis Ltd	Feb-95	38th
Ireland Blyth Ltd	Aug-94	33rd
Rogers & Co Ltd	Jun-90	3rd
Shell Mauritius Ltd	Nov-91	16th
INDUSTRY		
Gamma Civic Ltd	Nov-94	29th
Phoenix Beverages Ltd	Nov-97	31st
Mauritius Chemical & Fertilizer Industry Ltd	Dec-89	34th
Mauritius Oil Refineries Ltd	Feb-90	13th
Mauritius Stationery Manufacturers Ltd	Jul-89	37th
Plastic Industry (Mtius) Ltd	Jul-93	36th
United Basalt Products Ltd	Jul-89	21st
INVESTMENTS		
B A Investment Ltd	Jul-03	11th
Belle Mare Holding Ltd	Mar-94	17h
Caudan Development Co. Ltd	Jul-02	14th
Fincorp Investment Ltd	Aug-94	8th
General Investment &. Development. Co. Ltd	Jul-90	18th
Liberty Investment. Trust Ltd	Jun-93	26th
The Mauritius Development Investment Trust Co. Ltd	Jul-89	7th
National Investment Trust Ltd	Jul-93	25th
Promotion and Development Ltd	Jan-96	23rd
P. O. L .I .C. Y Ltd	Dec-92	10th
United Docks Ltd	Nov-91	24th
LEISURE & HOTELS		
Automatic Systems Ltd	Oct-94	39th
New Mauritius Hotels Ltd	Jun-96	6th
Naiade Resorts Ltd	Nov-05	1st
Sun Resorts Ltd	Jan-93	12th
SUGAR		
Harel Frères Ltd	Feb-91	15th
Mon Désert Alma Ltd	Jan-90	5th
The Mount Sugar Estates Ltd	Feb-91	30th
Mon Trésor Mon Désert Ltd	Jul-89	9th
The Savannah Sugar Estates Co.Ltd	Jan-90	19th
TRANSPORT		
Air Mauritius Ltd	Feb-95	40th
FOREIGN		
Dale Capital Partners Ltd	Dec-07	41st

4.   THE MODEL AND DATA

4.1   The Model

We consider two measure of stock market development namely size and liquidity: SIZE denotes market capitalization as a % of GDP at constant price whereas LIQUIDITY denotes total value of share traded as a % of GDP at constant price. We build our model based on the following augmented production.

$$Y_t = f(FDI_t, HUMAN_t, SMD_t)$$

Where Y_t denotes real GDP per capita; FDI denotes foreign direct investment, HUMAN denotes human capital and SMD denotes stock market development. The econometric model can write as reduced form logarithm equation for SIZE and LIQUIDITY;

$$\ln Y_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln HUMAN_t + \beta_3 \ln SIZE_t + u_t \tag{1}$$

$$\ln Y_t = \beta_0 + \beta_1 \ln FDI_t + \beta_2 \ln HUMAN_t + \beta_3 \ln LIQUIDITY_t + v_t \tag{2}$$

Over the years, the country has experienced sustain and consistent growth. Many factors have contributed to this namely successful trade liberalization, political stability, institutional factors among others. However, it can be argued two main factors that have help the country in the attainment of sustained growth is FDI and human capital.

FDI is increasingly being recognized as a major source of economic development. The general belief is that FDI facilitates the transfer of technology, organizational and managerial practices, skills and access to international market. Investors generally tend to adopt a two-stage process when evaluating countries as investment locations. First phase involve screening potential investors based on economic fundamentals. In the second phase, those countries which pass the first phase are evaluated based on the incentives they offer. Thus, as a factor in attracting FDI, incentives are secondary to the more fundamentals determinants such as market size, access to raw materials and availability of skilled labour. Over the years, successive governments have put considerable effort in attracting FDI. It is highly recognized that human capital is an important determinant of growth. Successive Mauritian government have invested a lot in human capital namely education. The literacy rate of Mauritius is one of the highest in Africa.

4.2   Data

Data was obtained from different source. FDI (expressed as a % of GDP) was obtained from UNCTAD; the data on stock development measures namely SIZE and LIQUIDITY was obtained from Stock Market of Mauritius various bulletin, HUMAN (proxied by secondary enrollment ratio was obtained from Central Statistical Office, Mauritius. These data are plotted in figure 1 to 6.

Figure 1: FDI as a % of GDP (1989 - 2006)
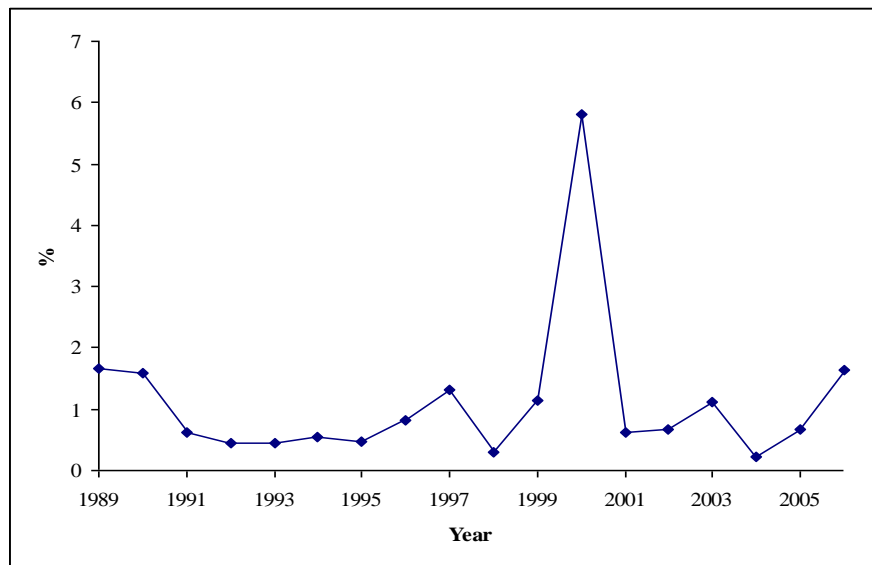
FDI as a % of GDP averages about 0.9% over the period of time 1989 to 2005. There was a hike in this figure in the year 2000 (5.7%).

Figure 2 depicts secondary enrollment for the period 1989 – 2006. The figure shows that the enrollment ratio has experienced a general increase over the years.

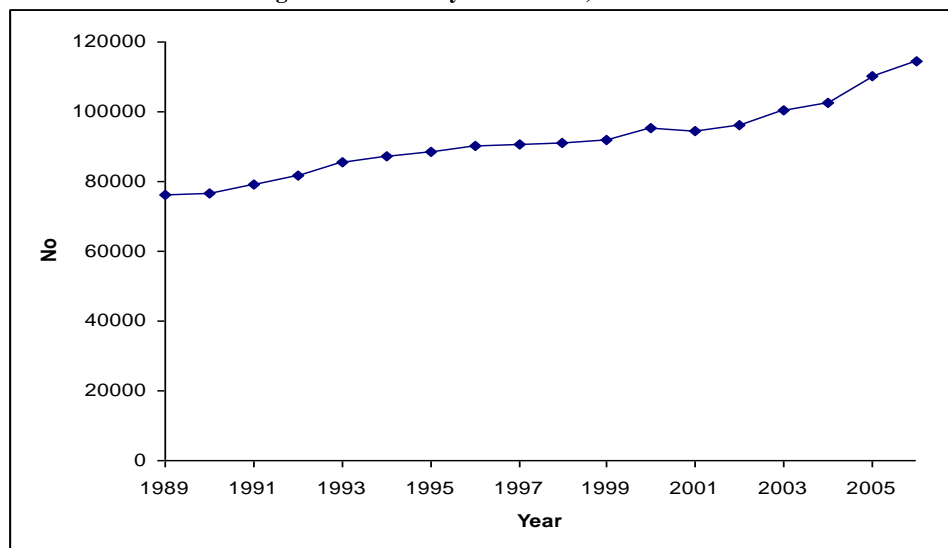**Figure 2: Secondary Enrollment, 1989 – 2006**

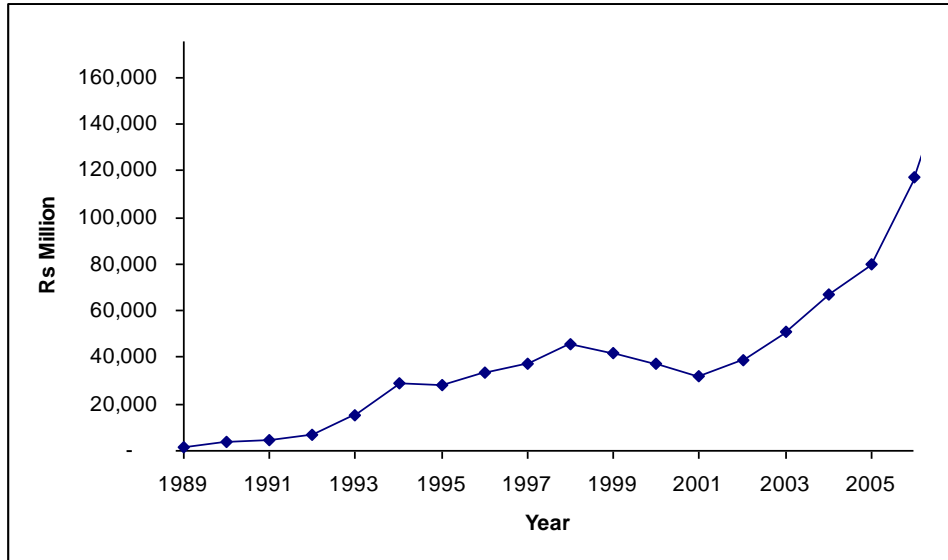**Figure 3: Market Capitalisation 1989 – 2006 (Rs million)**

Figure 3 plots market capitalization against time for the period 1989 to 2006. While the general trend is upward sloping there have been period of decline 1998 to 2001. This decline is also reflected in the variables SIZE (market capitalization as a percentage of GDP).
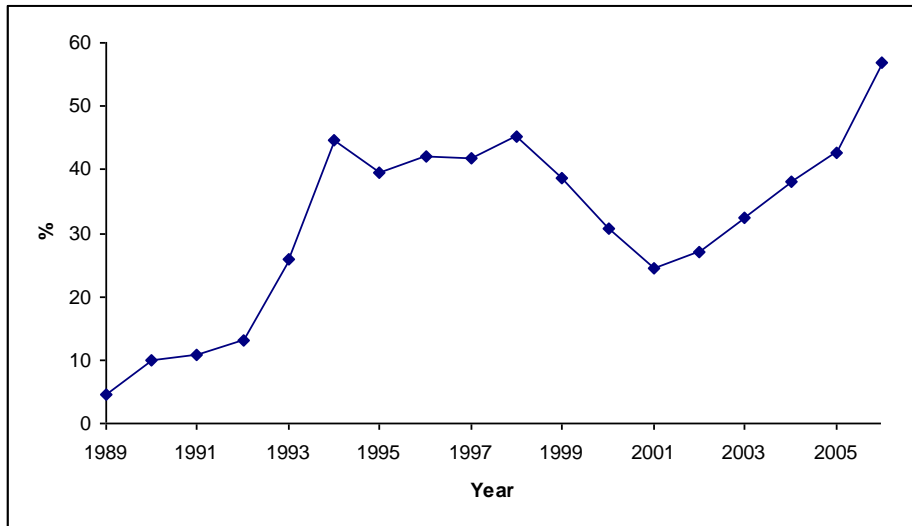
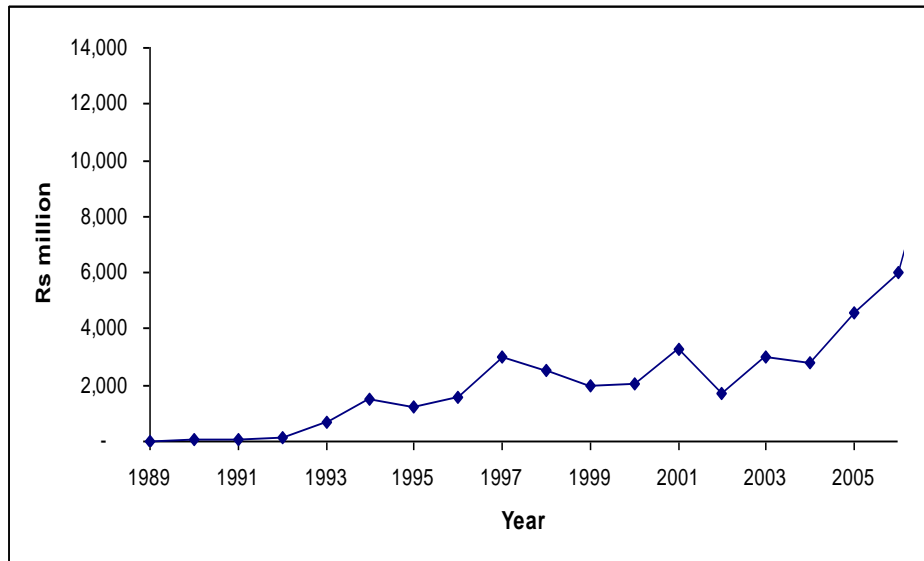**Figure 4: Market Capitalisation as a % of GDP**

Figure 5: Total Value of Share Traded, 1989 – 2006 (Rs million)

While market capitalization was at it lowest in the year 2001 for the period 1998 to 2001, total value of share traded was at its highest for this year for the same period. Figure 6 shows the total value of share traded as a share of GDP, i.e. LIQUIDITY. Compared to SIZE, the movement of LIQUIDITY is more like a random walk experiencing upward swings and downward swings.

Figure 6: Size: Total Value of Share Traded as a % of GDP, 1989 – 2006
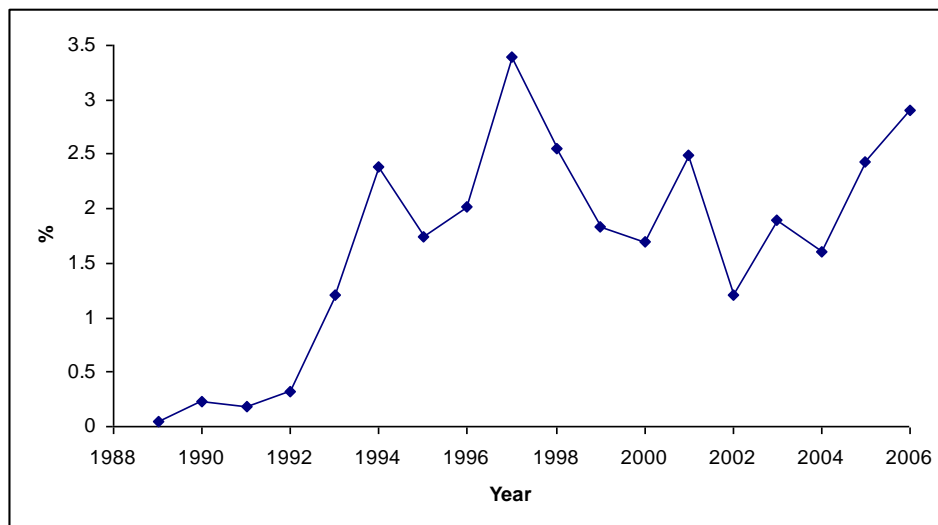
4.3   The ADF Test

It is crucial to check for stationarity as regression with non –stationary data may lead to spurious result. It was Granger and Newbold (1974) who first coined the term coined the term "spurious regression" to describe regression results, involving time series, that look good (the t-values suggest that there is a significant relationship between the two variables) when in fact the truth is that there can be no significant relationship between the two variables (hence their use of the word "spurious").

They expressed their concern when it comes to regression with non − stationary time series data. In their own words, "*In our opinion the econometrician can no longer ignore the time series properties of the variables with which he or she is concerned - except at their peril. The fact that many economic [and financial] 'levels' are random walks [or behave as if they were random walks] means that considerable care has to be taken in studying economic and financial variables.*"

To test for integration in our variables, we use the ADF test. The result is reported in Table 2. As it can be seen the variables are either I (0) i.e. stationary in level or I (1) i.e. stationery in first difference. Now that we have ascertained that our variables are I (0) or I (1), we can estimate the long run equation.

Table 2: ADF tests

Variable	ADF	Variable	ADF	Decision
LSIZE	-4.536	DLSIZE		I (0)
LLIQUIDITY	-3.737	DLLIQUIDITY		I (0)
DLRGDPC	-4.056	DLRGDPPC		I (0)
LHUMAN	0.843	DLHUMAN	-3.509	I (1)
LFDI	-3.501	DLFDI		I (0)

Note: Critical Values 1%: 2.624; 5%: -1.761; 10%: -1.345.

5.   ESTIMATION RESULT

5.1   The Long Run Equation

The results indicate that all the independent variables have the expected positive sign and are highly significant.

Table 3: The Long Run Equation

Dependent Variable: LRGDPPC

	Equation (1)				Equation (2)		
Variables	Coefficient	t-ratios	p-value	Variables	Coefficient	t-ratios	p-value
LFDI	0.227	6.881	0.000	LFDI	0.211	6.881	0.000
LSIZE	0.131	4.234	0.000	LLQUIDITY	0.673	4.234	0.011
LHUMAN	2.061	5.727	0.000	LHUMAN	2.611	5.727	0.000
Constant	-6.015	-3.534	0.000	Constant	-8.345	-3.534	0.000

Both measures of stock market development demonstrate the importance of stock market development to growth. A 10% increase in SIZE leads to a 1.3% increase in RGDPPC whereas a 10% increase in LIQUIDITY leads to a 6.73% increase in RGDPPC. These results suggest that development of the stock market is an important ingredient for economic growth. However, LIQUIDITY has a greater impact on growth rather than SIZE.

We check for the presence of multicollinearity using the variance inflation factor (VIF). As a rule of thumb, a variable whose VIF values are greater than 10 may merit further investigation when it comes to multicollinearity. Equation (1) produces a VIF of 4.88 and equation (2) 3.37. Thus, there was no presence of multicollinearity in both equations. Further, we apply the ovtest to check for model specification. Equation (1) produces a p-value of 0.1686 and equation (2) a p – value of 0.1937. The p-values indicate that the model do not suffer from omitted variables bias. Next, we perform the unit root test to check for the presence of cointegration. Note that if $X_{1t} \sim I\,(0)$ and $X_{2t} \sim I\,(1)$, then $Z_t = (X_{1t} + X_{2t}) = I\,(1)$; that is a linear combination or sum of stationary and nonstationary time series is nonstationary. All of our variables are either I (0) or I (1), cointegration requires that the error term of equation (1) and (2) is I (0). The residual test for equation 1 produces a value of – 4.162 and a value of 3.636 for equation 2 indicating that the error terms are I (0). Thus we can say that the variables act as cointegrating series.

5.2   The Short Run Equation

Table 4 depicts results from the short run equations. The results are replicated compared to the long run ones. The Adjusted R^2 is 0.7635 and 0.7954 which indicate the ability of the model to fit the data reasonably well. The lagged error terms have the required negative sign and are significant at 1%. This reinforces the finding of along run relationship among the variables.

Table 4: The Short Run Dynamic

Dependent Variable: DLRGDPPC

Equation (1)				Equation (2)			
Variables	*Coefficient*	*t-ratios*	*p-value*	*Variables*	*Coefficient*	*t-ratios*	*p-value*
DLFDI	0.106	2.451	0.029	DLFDI	0.095	2.351	0.000
DLSIZE	0.114	3.195	0.007	DLLQUIDITY	0.093	2.754	0.000
DLHUMAN	1.864	3.822	0.002	DLHUMAN	2.024	3.724	0.000
u_{t-1}	-0.760	-3.021	0.010	v_{t-1}	-0.633	-2.562	0.000

The results in table 4 indicate that the immediate effect of SIZE as well as LIQUIDITY is positive and significant. In fact, the immediate impact of all other variables namely HUMAN and FDI is positive and significant. The size of the coefficient of the error correction terms, namely -0760 and -0.633 for equation (1) and (2) suggests a high speed adjustment from the short run deviation to the long ruin equilibrium in RGDPPC. It indicates that 76% (for equation 1) and 63% (equation 2) of the deviation is corrected every year.

6.   CONCLUSION

This paper analyse the relationship between stock market development and economic growth in Mauritius over the period of time 1989 to 2006. Using two measures of stock market development namely SIZE and LIQUIDITY, we found that stock market development is an important ingredient for growth in Mauritius since the stock market gives a general idea of an economy health. We adopt the simple two step procedure of Engle and Granger when it comes to the econometric methodology. Given the small size of our sample and the number of parameters to be estimated, the Engle – Granger approach is more attractive than the Johansen approach which would require the estimation of a system of 3 equations, implicitly there is a loss of degree of freedoms. The positive relationship between stock market development and economic growth is replicated in both the long run and short run equations.

Our two controlling variables have the expected positive result and are highly significant. Both FDI and HUMAN are crucial determinants of growth in Mauritius. The implications of these results for Mauritius are as follows: (1) Mauritius need to continue the development of its stock market to facilitate investment. Given that the country aim to become a financial hub in the region, the continuing development of SEM is crucial (2) Both FDI and HUMAN are important determinants of growth. However, the current trend in FDI inflows in Mauritius is worrying.

The 1990s were years of limited FDI inflows. Both the EPZ and tourism saw the inflows of FDI decrease substantially, being close to nil in 2001. Banking witnessed increasing investment in the late 1990s, with a peak in 1997 of Rs.1, 122 million due to a single investment by a South-African bank in the State Bank of Mauritius, but fell back to no FDI inflows in the early 2000s. Similarly while the government is increasing investment in human capital, there seems to be a mismatch of jobs in the domestic market.

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