FINANCIAL SYSTEM INTEGRATION IN ECOWAS:

OPPORTUNITIES, CHALLENGES AND PROSPECTS

FREETOWN, DECEMBER, 2011

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1.0   INTRODUCTION

Global financial integration has substantially increased in recent decades. This was manifested initially in growing capital flows between developed countries and has subsequently spread to emerging market and developing countries. It involves the removal of capital controls, financial innovation and technological progress. Financial system integration is achieved when there is a perfect mobility of financial assets across the national boundaries of member States of a regional economic community. Cross-border financial transactions on the various stock exchanges should be guided by a common regulatory framework specifying common rules and ethics as well as accounting, clearing and settlement systems and standards. Identical securities are traded at essentially the same price across the markets in a region after adjustment for foreign exchange rates and investors can buy and sell securities without restrictions. In effect, all types of participants/operators can offer their services in any of the capital markets within a regional economic community without restrictions. Financial integration in the emerging and developing economies has been driven by a belief that in addition to enhancing the quality of macroeconomic management, it facilitates economic growth and reduces volatility owing to its tendency to pool risks across borders.

At the international level, capital markets are in a state of change driven by the current wave of globalization and consolidation amongst market stakeholders (particularly, investment banks, investors and issuers and the stock exchanges) as evidenced by the spate of deregulation and liberalization in most of the world's capital markets. This development is mainly due to the increasing demand and supply of capital by companies on a borderless basis, partly as a result of large privatization schemes and partly by emerging entrepreneurial companies. Another facilitating factor relates to the rapid technological advancement (in internet, e-business and wireless technology) and new software for market participants. These trends are creating intense pressures on all markets to lower cross-border transaction costs, to allow market participants to deliver services across borders and to reduce all forms of risks inherent in the international trading process.

At the ECOWAS level, the advancement of financial system integration has become widely perceived as critical, especially under regional economic community arrangements. Thus, it is expected that the integration of financial systems in ECOWAS would be useful as it would help address the limitations associated with market fragmentation. In the first instance, the possible liberalization and harmonization of the banking sector and financial markets regulatory principles would help widen the investment markets beyond the national boundaries, thereby, allowing the regional financial system to offer a single pool of liquidity to large investors. The resultant larger financial space and its consequential enhancement in investment opportunities would lead to increased competition, greater efficiency in the allocation of resources and higher production as productive units enjoy the benefits of economies of scale and improved performance. Efficient financial markets with broader regional scope would further lead to innovative financial products and services, cheaper corporate financing, higher returns on investment and lower prices for financial services. Other compelling reasons relate to reduced transaction costs, more liquid and broader securities market, better access to long-term funding and financing alternatives, more diversified investment opportunities and greater efficiency in the allocation of capital.

Financial System Integration in the region is a requirement under the ECOWAS Monetary Cooperation Programme. Specifically, Article 53 of the Revised 1993 ECOWAS Treaty provided for the establishment of appropriate mechanisms to encourage investments in enterprises located in the territories of other member States through cross-border dealings in stocks, shares and other securities. The objective of this provision was to ensure the unimpeded flow of capital within the community through the removal of controls on the transfer of capital among member states.

To achieve the above-mentioned objective, the Treaty further recommended for the establishment of a Capital Market Issues Committee, which shall among other responsibilities:

- Interconnect banks and Insurance companies in the sub-region
- Encourage the establishment of national and regional stock exchanges as well as the integration of these exchanges
- Ensure that nationals of member states are given the opportunity to invest and seek loans throughout the ECOWAS region, acquire stocks, shares and other securities or even the opportunity of investing in companies located in the territories of member states.
- Establish a mechanism for widespread dissemination of stock exchange quotations of each member state as well as the regulation of the capital market circulation to not only ensure its proper functioning but also the protection of investors.

The aforementioned provisions underscore the importance the Authority of ECOWAS Heads of State placed on the development of an integrated financial system.

There are currently five stock exchanges in ECOWAS, namely, the Bolsa de Valores de Cabo Verde, the Ghana Stock Exchange, the Nigeria Stock Exchange, the Sierra Leone Stock Exchange and the Bourse Régionale des Valeurs Mobilières (BRVM). Having been established under specific Acts of the countries concerned, a review shows that the existing stock exchanges are largely fragmented in nature. In addition to the fact that most of these stock exchanges are small in size with limited investment pool, variations in the regulatory principles place certain operational impediments on third party transactions. For instance, some of the countries concerned allow non-resident investors to deal in securities listed on their respective exchange whilst others do not allow this facility, depending on the extent of foreign exchange controls in place. In addition, some of the regulations forbid the cross-listing of companies unless the company concerned attains multinational status registered in accordance with the relevant laws. Furthermore, some of the investment laws forbid the repatriation of investment capital, dividends, interest payments and other related earnings.

To facilitate the economic integration process towards realization of a higher standard of living for its people, there is the need for accelerated growth through increased investment opportunities. One of the means for realizing this objective is for member States to pool their resources by integrating their financial systems.

Thus, the study will attempt to proffer appropriate policy recommendations to facilitate financial system integration in ECOWAS. Specifically, the study will first of all analyse the status of the existing financial systems in the sub-region and then use an econometric model to test the level of integration of the financial system of the region, if any. Finally, the study would also delve into the opportunities, challenges and prospects of an integrated regional financial system.

2.0 THEORETICAL CONCEPTS AND MEASURES OF FINANCIAL INTEGRATION

2.1 Concept of full financial integration

The financial system of the ECOWAS zone, made up of the banking sector and financial markets, is bound to undergo in the coming years transformations deeper than what it had already experienced. Despite the restructuring already carried out in the 1990s by many countries of the sub region both in the banking sector and stock markets, many observers are of the view that the ECOWAS market seem still too fragmented for some stakeholders. Over hundred banks and insurance companies and four stock exchanges make up the financial system within the ECOWAS space. In practice, the loss of efficiency which accompanies this situation is obvious and makes the integration of the ECOWAS financial system an imperative. While the debate remains open at this stage, it raises the prior question of how to assess the level of integration of a financial system.

According to a first broad definition based on the sector approach (Regniez 2001) " an integrated financial system at the regional level" means " a financial system where, thanks to the elimination of exchange risks and those related to various national monetary policies, the process of assets allocation for shares as well as "commercial papers" gives precedence to the sector logic to the detriment of the logic based on national markets and for that matter a more effective allocation of resource because it subject to fewer constraints that are not directly economic". This definition has the advantage of emphasizing the idea of inefficiencies relating to exchange risk while stressing the advantages of the efficiency logic which is essentially sector based. However, this definition does not cover explicitly the concept of convergence of prices which is generally at the centre of debates on economic integration.

There is also another broad definition in Juan Ayulo and Robert Blanc's article entitled « Has financial Market integration increased during the nineties? Banco de España, December 1999 »: a perfect integration of the financial system is reflected in the absence of an entry barrier that is likely to block the investment process, meaning no barriers to "cross-border financial transactions" such as taxation, prudential regulations as well as tariff conditions for market access. In this context, a perfect and balanced integration does not provide any opportunity for gains or arbitrage as the same prices prevail on all the market. The idea here is that of convergence of prices and especially interest rates which will gradually reduce arbitrage opportunities for investors. It is therefore the quest for this balance which generates potential efficiency gains instead of searching for imperfect equilibrium.

To ascertain the level of integration of the European financial system through nominal variables, various methodologies are naturally possible, namely the concept of covered and uncovered

interest rate parity, computation of the interest differential between two regions and macroeconomic shocks transmission tests to interest rate structures.

The concept of "uncovered interest rate parities" and "covered interest rate parity » is often used in Macroeconomics (Fränkel and Mac Arthur 1988, Fränkel 1991, Lemmen and Eijffinger 1996). The uncovered interest rate parity presupposes that the exchange risk premium is nil. This assumption may stem from one of the following: either the neutrality of agents with regard to risk or absence of risk. These are obviously strong assumptions and the uncovered interest rate parity should not be confused with covered interest rate parity, which presupposes the absence of arbitrage opportunity. In this context the uncovered interest rate parity is noted as follows:

$I_{t,s} = i_{ws} + E_t (\Delta_{st})$

$= [i_{ws} + (f_t - s_t)] + [E_t(\Delta_{st}) - (f_t - s_t)]$ (1)

With i being the nominal interest rate prevailing on the money market, f the forward exchange rate ; s the spot rate and w a reference country, while the covered interest rate parity is noted as follows:

$\mathbf{I_{ts} = i_{ws} + (f_t - s_t)}$ (2)

Claudia Buch, in her article on Financial Market Integration in the US: lessons for Europe, Kiel Institute of World Economics 2000, suggests a simple econometric analysis by calculating the interest differential ($\mathbf{i_i - i_j}$) where i_i and $i_{j\ are}$ interest rates of regions i and j. Though this method has some pedagogical merits, it is worth noting that a regional convergence of interest rates does not necessarily imply that the market is really more integrated. Bodenhorn (1995) et Eichengreen (1984) suggest that interest spreads reveal, in fact, only a convergence expressed in nominal terms on the various levels of risk and do not necessarily reflect the level of integration. Within this framework, economic and structural shocks in terms of interest rates are not taken into consideration. Jackson (1992) therefore created other tests to analyze the transmission of shocks to interest rate. Thus, for the various regions of the United States, changes in the rate structure is analyzed in relation to national reference rates of the money market (R) and a series of structural and regional economic characteristics (D)(for dummies).

$\Delta i_{it} = \alpha + \sum \beta_i \Delta R_{i-k} + \sum D_i + \varepsilon_{it}$ (3)

Other analyses suggest that prices can never be equal. To address this problem, it is said that in an integrated market, there must be a long term relationship between interest rates of the various countries and this implies the co-integration approach. In the short term, rates may deviate from this balance but the existence of a long term relation limits the disparities in rates and helps to determine the level of integration of the financial system. In this context, co-integration means that there is a long term relationship between two or several series of nominal rates.

The convergence of nominal variables may also no longer be enough to characterize the level of integration of the financial system since it doest not take into account the underlying behaviours

economic actors, especially savings and investment behaviours in response to nominal convergence through interest rates. At this point, the emphasis is on behaviours underlying nominal convergence. It is the macroeconomic behaviours in terms of savings and investment (transmission to the real sphere) that are likely to shed light on the issue of financial system integration. In this regard, Feldstein and Horioka, 1980 show that domestic investment should also not be subject to any particular constraints that are imposed by the internal savings behaviours. In other words, trends in national investments should not be linked exclusively to trends in national savings. There should be some inter regional mobility of capital. The degree of mobility can therefore be measured through a correlation between savings and investment:

$$\{I/Y\}_i = \alpha + \beta\{S/Y\}_i + \varepsilon_t \qquad\qquad (4)$$

Where I is investment, S savings, and Y the GNP of the region i. Within the framework of a perfect integration of the financial system and perfect mobility of capital, an increase of the savings rate in a region i, must be necessarily accompanied by an upward trend in investments in all the other regions and not only in region i. When β is close to 1, this means that the financial system is very fragmented. However, this measure has a disadvantage in terms of size: a reduction in the correlation between savings in region i and total investments of the various regions could point to a number of inter-temporal solvency constraints of some regions. Thus, one may sometimes turn to indicators known as "specific".

In this context, there are also indicators which vary depending on the compartment of the financial system: retail banking and financial markets.

The example of retail banking: Friedrich Heinemann and Mathias Jopp, in their article on "The benefits of a working European retail market for financial services, report to European Financial Services Round Table Berlin 2002", show that it is possible to analyse the level of integration of the banking compartment of the financial system through the market share of foreign banks within an economic community. Also, in Claudia Buch's article on Financial market integration in a Monetary Union, Kiel Institute of World Economics, July 2001, there are indicators of the integration of retail banking such as consolidation of banks, establishment of conglomerates, capitalistic and trade links as well as the capacity of commercial banks to offer cross-border services, abolition of local peculiarities in the area of banking regulations.

 -The example of financial markets: In this case the unavoidable points concern the Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory« (APT). The academic literature on international finance often uses CAPM to test the integration of financial markets (Bekaert and Harvey 1995, Dumas and Solnik 1995, Ferson and Harvey 2001, Hardouvelis and al. 1999, Levine and Zervos 1998…..). Indeed, the anticipated rates of return on assets at market equilibrium, meaning a balance of supply and demand for all assets are determined in closed economy by the Capital Asset Pricing Model (CAPM).

Within this framework:

$E_{t-1}, (ri_t) = \lambda_{it}B_{iw} + \lambda_{dt},B_{dw}$

With $r_{i,t}$ being the additional return on asset i in relation to the return on a market portfolio w; λ the market risk premium; $B_{i,w}$ the risk of asset i in relation to the reference portfolio w.

$B_{iw} = covi_{t-1}[r_{i,t} r_{w,t}]/ var_{t-1}[r_{i,t}]$

And B_{dw} in a similar way for the portfolio d on the domestic market. One condition for achieving a perfect integration on the capital market requires that $\lambda d = 0$. When $\lambda d = 0$, the asset i has a return similar to the reference portfolio w. When markets are supposed to be perfect, the idea is to say that a portfolio can be above or below a market line which is calculated as follows:

$$E_j = R_f + (E_m - E_f/\delta_m)[cov_{jm}/ \delta_m]$$

Where Rf is the return rate without risk, $E_{m \text{ the}}$ expected return of the market portfolio with

$[cov_{jm}/ \delta_m] = \beta_i$.

In a perfectly integrated world, securities are placed on the market line. If securities are placed above this market line, it means that "the factor to the left side" of the equation generate a return above what it should be in a perfectly integrated world.

The Arbitrage Pricing Theory (APT) is another method used in assessing the level of integration of capital markets through the assessment of the return on an asset in relation to a reference market portfolio. The idea is to say that two assets which have the same characteristics in terms of the couple return-risk must have the same price. A risk free asset refers backs to Rf. Otherwise, this means that there are possibilities of arbitrage without an initial investment leading to a positive profit with a sure probability. The idea is to assess securities until they do not offer any possibility of arbitrage. The profitability of an asset is therefore measured as follows:

$R_i = \alpha_i + \beta_{1i}I_1 + \beta_{2i}I_2 + \dots + \beta_{ji}I_j$

Where Ij is the value of jth return generating index and αi the profitability in the case where the values of market indices are nil.

2.2 Measures of Financial system integration

A. Direct Measures

	Identification of economic and regulatory barriers
a : Integration of financial markets Wholesale markets : relations between corporate actors on the financial market Big industries and institutions on the money market	Barriers such as capital control, regulatory restrictions, transaction costs, information costs
b. Integration of financial and banking services market Bank/customer relation	Entry barriers such as capital control, regulatory constraints, information costs and transaction costs
c. Integration of the banking sector	Consolidation of banks, establishment of conglomerates, capitalistic and trade links The ability of commercial banks to offer cross-border services Abolition of local peculiarities in the area of banking regulations

B. **Indirect Measures**

	Evaluation through prices	Evaluation through quantities
Integration of financial markets Wholesale markets : relations among corporate actors of the financial markets Big industries and institutions on the money market	Equalisation of prices for financial market assets: interest rate parity conditions (Frankel Mc Artur, 1988, Frankel, 1993. Lemmen/Eiffinger, 1995) Co-integration of interest rates (Centeno/Mello, 1999). Uncovered interest rate parity (Fratzschner, 2001). APT (Ferson/Harvey, 1999. Dumas/Solnik, 1995, Hardouvels et al. 1999)	Savings/investment correlations (Feldstein/Horioka, 1980, Feldstein, 1982. Obsteld, 1985, Summer, 1988, Sinn, 1992, Taylor, 1994, 1996, Lemmen/Eiiffinger, 1995). Correlations of consumption levels (Obsteld, 1989, 1994, 1995. Bayoumi/Mac Donald, 1995, Olivei, 2000).
Integration of the banking and financial services market Bank/customer relation	Equalisation of prices for financial services Cecchini Report Co-integration of real interest rates (Centeno/Mello, 1999. Kleimeier/Sander, 2000. Sander/Kleimeier, 2001)	Litterature on « micro home bias » : Tesar/Werner, 1992, Lewis, 1999, Hess/Shin, 2000).

3.0 The Financial System in ECOWAS

3.1 UEMOA zone

3.1.1 Banking sector

Developments in the UEMOA banking landscape were marked by a substantial increase in the number of authorized credit institutions and a growing diversification of institutions specialized in micro-finance with the launch of activities in the eight subsidiaries *of Banque Regionale de Solidarités and Banque des Institutions Mutualistes d'Afrique de l'Ouest* (BIMAO). The number of authorized institutions jumped from ninety three (72 banks and 21 financial establishments) in 2004 to one hundred and sixteen credit institutions (97 banks and 19 financial establishments) at the end of December 2010. Cote d'Ivoire and Senegal are the preferred destinations of financiers.

Table: State of the banking landscape in the UEMOA zone (2009)

	Number of Banks	
Benin	12	12.6%
Burkina Faso	12	11.2%
Côte d'Ivoire	19	28.1%
Guinea Bissau	4	0.7%
Mali	13	12.7%
Niger	10	4.4%
Senegal	16	24.0%
Togo	11	6.5%
UEMOA	97	100%

Source: UEMOA Banking Commission

All member countries of the West African Economic and Monetary Union (UEMOA) have the same legislation and have established a regional banking commission responsible for the strict supervision of banking activities within its purview. Indeed, financial institutions operate within a harmonized regulatory framework. In this regard, legal and regulatory texts are implemented by regional supervisory bodies. These instruments, which are   largely based on international regulations in force, aims to ensure the stability of the financial system. This supervisory framework is organized around several community institutions, namely: BCEAO, UEMOA Banking Commission, Regional Council for Public Saving and Financial Markets (CREPMF), Inter-African Conference of Insurance Markets (CIMA), and Inter-African Conference on Social Security (CIPRES). BCEAO and Ministries of Finance are represented at varying degrees in each of these institutions. In addition, these ministries are also mainly responsible for the supervision of the micro-finance sector with especially the support of BCEAO and the Banking Commission.

This supervision enabled banks and other financial establishments to withstand macroeconomic shocks and strengthen their financial soundness as evidenced by the appreciation of their equity capital by 50.3% between 2000 and 2004. Besides, their solvency has been consolidated and the risk coverage ratio of banks rose from 10.1% to 11.4% and that of financial establishments went up from 50% to 89.3%. The quality of credit institutions' portfolio in terms of gross values was

maintained in the last five years under review, with the deterioration rate falling from 20.2% to 19.7%. On the other hand, the net deterioration rate worsened by 0.8 percentage point to settle at 8.6% in 2004 due to the decline in the rate of provisioning for bad debts from 66.6% to 61.8%. The cumulative operating results of credit establishments settled at 417.9 billion and the profitability coefficient jumped from 4.5% to 14.2%. Liquidity and exchange risk were relatively under control. The operational risk was also contained thanks especially to the institutional machinery set up to ensure efficiency in internal control and corporate governance.

The sector was, however, still exposed to a strong concentration of activities (43.7% of assets) among ten institutions. Besides, the risks recorded in respect of the 50 biggest users of bank credits per country (400 companies within UEMOA) accounted for 52.2% of total uses of credit declared at the Risks Department at the end of December 2004. A good management of risks incurred by credit institutions requires, at the level of counterparts, the pursuit of structural reforms to mainly widen the production base, strengthen the legal framework and improve the business environment. The establishment of new banking institutions could also help reduce the oligopolistic nature of the banking sector.

In addition, problems relating to the low use banking services in UEMOA countries was observed and this is due to a combination of factors, including the crisis in the banking system a few years ago. This crisis led to a serious loss of credibility. The other factors behind the low use of banking services are, among others, low income, illiteracy, poor knowledge of the banking system, the remoteness of structures, lack of infrastructure, long procedures for opening an account, high cost of services and lack of information.

3.1.2   Microfinance Sector

The micro finance sector has become one of the most dynamic components of the financial system of UEMOA. Thus, compared to 1999, the number of decentralised financial system (DFS) recorded was multiplied by six to settle at 652 in 2004 and the amount of credits provided increased on the average by 33.4% per annum to settle at 295.1 billion. This rapid expansion of microfinance, which reflects significant changes, however, entails some serious risks that can undermine the stability of the sector. These risks stem from the inadequate capitalisation observed in a significant proportion of institutions (mostly small size) as well as the high concentration of DFS portfolios on the primary and tertiary sectors. On average, the capitalisation of these institutions was however above the minimum standard of 10% required in the sector. The ratio of equity capital excluding subvention over total assets was 19.4% in 1999 and 17.9% in 2003. The gross portfolio deterioration rate improved over the period, dropping from 10.1% to 5.2%, for a maximum standard of 5.1%. On the other hand, the profitability of DFS s seemed relatively weak in view of the weight of their operating costs. In fact, the profitability of equity capital was on the average 7.5%, below the internationally accepted standard of 15%. In addition, asset profitability remained below the standard of 3.0%, having ranged between 1.3% and 1.7%.

The supervision of DFS is the responsibility of Ministries of Finance and involves internal controls within the institutions as well as the external controls by supervisory authorities (Ministries of Finance, BCEAO and Banking Commission).

The enforcement of regulations and implementation of recommendations resulting from internal and external controls as well as sanctions applied in countries for non compliance with regulatory provisions contributed to boosting the soundness of the sector. However, in order to limit risks associated with DFS activities, the Central Bank drew up a Regional Support Programme for Decentralized Financial Systems (DFS) covering the period 2005 -2009. This programme was expected to contribute to the modernization of operations in these institutions to enable them improve their performance in terms of impact while strengthening their financial viability. Several seminars were organized in the first half of 2006 on the adoption of accounting standards for Decentralized Financial Systems and its application guide.

The commissioning of eight subsidiaries (one for each member country of the Union) of the *Banque Regionale de Solidarite* in 2005 marked an important stage in the implementation of poverty reduction mechanisms, especially in terms of financing projects of people hitherto excluded from the conventional credit distribution channels.

3.1.3   Insurance sector

The UEMOA insurance sector entered a phase of full growth after the implementation of streamlining measures from the mid 1990s. However, its share in the economies of Member States of the Union remained relatively low due mainly to low incomes, lack of insurance culture among the population and inadequate coverage of important segments like the informal and agricultural sectors. In 2003, the insurance penetration rate ranged between 0.6% and 1.6% in the countries of the Union compared to an overall average of 4.8% in Africa. This reality reveals potentials for growth in the insurance sector of the Union.

An analysis of major indicators of financial soundness as at 31st December 2003 showed that, the UEMOA insurance sector was solvent and had significant assets to face contractual obligations. Indeed, in 2003, their net profit jumped by 82% compared to 2002 and the solvency margin was 91.2 billion compared to a standard of 32 billion. However, premium payment arrears, which accounted for 43.6% of premiums recorded, affected their profitability. An analysis of vulnerability factor and financial indicators of insurance companies within UEMOA did not suggest any major risk for the financial system.

The supervision of insurance activities in the Union has been carried out since February 1995 by a supranational authority, CIMA to be precise, which brings together UEMOA Member States and those of the Central African Economic and Monetary Union (CEMAC). Within this framework, a legislation known as "CIMA Code" regulates the organization, operations and supervision of the insurance sector within this space. The Regional Commission of Insurance Control (CRCA), the body responsible for market surveillance, has the powers to carry out on-the-spot and record based audits of insurance companies.

The supra-national character of this mechanism is an additional element of autonomy required to ensure actions taken by these bodies are effective. Consequently, the implementation of control procedures and sanctions has contributed significantly to the reorganization of the insurance sector within the CIMA space.

3.1.4 Regional Stock Exchange (BRMV)

BRVM is a regional Stock Exchange composed of eight member countries of the Union économique et monétaire de l'Afrique de l'ouest (UEMOA). Founded in 1998, it is headquartered in Abidjan (Côte d'Ivoire) and has a branch in each of the member countries. BRVM is, to a large extent, a private company with a 13.4% contribution to the capital of the eight (8) states mentioned above.

Transactions at the BRVM are conducted through a satellite network to which each branch is connected, and where brokers and dealers s can transmit and execute commands from the central hub of Abidjan.

Since its inception, BRVM operates regularly and has always attracted public and private investors. The statistics below highlight the trend in the various markets (primary and secondary).

Table 3.1.4a: Primary market trend (in million FCFA)

Description	2005	2006	2007	2008	2009	Total	%
Bonds (a)	219 696	176 500	256 928	96 009	136 628	885 761	86,69%
Statements	131 131	120 500	161 070	61 416	107 328	581 445	56,91%
International & regional organizations	25 000	46 000	22 528	22 793	6 000	122 321	11,97%
Private sector	19 800	10 000	63 130	1 800	23 300	118 030	11,55%
Public Enterprises	43 765		10 200	10 000	0	63 965	6,26%
Capital securities operations (b)	433	2 562	1 197	51 190	80 620	136 002	13,31%
Public sale offer		2 150	561	50 076	79 669	132 456	12,96%
Public purchasing offer					5	5	0,00%
Public exchange offer						0	0,00%
Foreign investments	433	412	636	1 114	946	3 541	0,35%
Takeover bid						0	0,00%
Total mobilized (a) + (b)	220 128	179 062	258 125	147 198	217 248	1 021 763	100,0%

Source: BRVM

Table 3 .1.4b: Secondary market trend

Nature of operations	2005	2006	2007	2008	2009
Volume of transactions	1 330 416	2 781 033	9 717 973	35 468 951	37 732 630
Value of transactions (billion FCFA)	20.6	59.6	68.2	158.43	111.79
Market Capitalization (billion FCFA)	1 623.37	2 476.17	4 303.15	3 851,37	3 331,00
Market Capitalization in % GDP	6.27	9.05	14.78	12.02	10.03
Equity market (billion FCFA)	1 297.08	2 067,02	3 725.10	3 336.65	2 807.75
Bond market (billion FCFA)	326.29	409.15	578.05	514.72	523.25
BRVM index 10	149.87	130.95	224.85	192.08	143.6
BRVM composite index	112.68	112.65	199.45	178.17	132.05
Number of companies listed	39	40	38	38	38
Number of compulsory lines	18	21	28	29	33

Source: BRVM

From 2005 to 2009, the total amount mobilized was 1,021,763 billion FCFA. The value of transactions on the secondary market accounted for 111 billion in 2009, compared to 158.43 billion in 2008, making a drop of 29.4% compared to the previous year. This situation, which was caused by the buy-and-hold attitude of investors, mostly UEMOA residents, and by the absence of institutions capable of operating continuously on the market, contributes to breaking the interest of international investors whose presence could help improve market liquidity.

Moreover, the BRVM has not yet met the expectations of UEMOA monetary and financial authorities, given its geographical coverage. Although it covers eight (08) UEMOA countries, it is not able to achieve more than 12% percentage GDP capitalization. As for the number of listed companies, it has not increased since 2007.

Currently, various initiatives aimed at adopting a regional approach for the supervision of stock exchanges have been taken. UEMOA is a fully integrated unit in the sense that the countries in this sub region have the same currency, a single central bank and consistent accounting and sales rules and regulations. Reconciliations have been initiated among the stock exchanges of ECOWAS, namely the BRVM and the Ghana and Nigeria stock exchanges. This process is primarily intended to facilitate the development of cross-listings on the various stock exchanges in the region. Such operations have already been carried out but they are still limited to a handful of securities.

3.2 The West African Monetary Zone (WAMZ)
3.2.1 Banking Sector

Unlike UEMOA countries, the banking systems in the WAMZ are not uniform. Each country in the WAMZ has its own banking system, a determining factor for the weak financial sector integration in this zone. However, it is clear that the financial sectors in the WAMZ, especially the banking sectors in the various countries of the zone, continue to experience significant growth with an increase in the number of banks in these countries. Many local banks have correspondents with financial institutions around the world. These banks and other financial institutions perform almost all kinds of banking transactions. The most powerful banks in this zone are mostly Nigerian. This is due to its relative financial sector development in the country with over 30 banks, 866 microfinance institutions, 73 insurance companies, 108 financial companies, 1959 foreign exchange offices. In this country, we have First International Bank (FIB), United Bank for Africa (UBA) etc. operating in almost all the sub-region; UBA is now present in some UEMOA countries.

Table 3.2.1a: Status of the banking landscape in the WAMZ Zone in 2010

	Number of Banks	Microfinance Institutions	Number of Insurance Companies
Guinea	15	13	07
Gambia	13	5	11
Ghana	28	132	-
Liberia	8	na	24
Nigeria	30	866	73
Sierra Leone	13	-	10
WAMZ			

Source: WAMA

3.2.2 Major Stock Exchanges in WAMZ
In the WAMZ, there are two stock exchanges that work well: the Nigerian Stock Exchange (NSE) and the Ghana Stock Exchange (GSE).

3.2.2.1 The Ghana Stock Exchange

Since its establishment in 1990, the GSE has greatly helped companies to mobilize long-term capital for their operations, with its primary activities, i.e., securities and bonds. The number of companies listed on the GSE has grown constantly since its inception. In 2010, the GSE had 37 listed companies, compared to 11 when it started in 1990.

The volume of activities exchanged at the GSE from its inception to August 2010, is to the tune of 2013.28601 million shares; that is an annual average of 100 million shares during this period. These were evaluated at 950.61 billion Cedis, i.e. an average of 47.53 billion Cedis during the same period (Table 2.2).

Table 3.2.2a: Trends in some key performance indicators of the GSE

Period	Volume	Value	Year -end		Value of Listed Bonds	
			Market Cap-Equities	Market Capitalization	Government	Cooperate Bonds
	0.000	(GH c m)	(GH c m)	in % GDP	Bonds GH c m	US $ m.
2000	30,717.09	5.06	365.50	1.35	-	11.01
2001	55,295.87	9.23	390.40	1.03	100.37	10.20
2002	44,124.20	8.94	618.38	1.25	132.69	10.98
2003	96,330.00	38.93	1,261.68	1.91	144.24	8.98
2004	104,349.30	65.59	9,761.48	12.23	51.63	6.28
2005	81,400.00	46.44	9,185.73	9.44	22.50	8.78
2006	98,286.00	47.60	11,249.60	96.38	326.15	2.50
2007	287,221.70	140.71	12,368.60	88.06	1,333.07	6.40
2008	531,660.00	365.51	17,895.12	101.58	1,237.46	6.40
2009	96,767.39	74.19	15,941.92	74.50	1,039.14	3.90
2010	93.826.70	60.55	18,655.66	71.74	1,706.44	3.90
Total:	**2,013.286**	**905.61**				

Source: Ghana Stock Exchange and WAMA staff estimates

The Ghana Stock Exchange, like many other emerging ones, performed very well. The market size grew from 1.5 per cent of GDP in 1990 to over 85 per cent in 2010, making the GSE one of the major stock exchanges on the African continent (in terms of capitalization). From a little over 3 million cedis (1.5 percent of GDP) in 1990, the market capitalization had grown to 18,655.66 billion Cedis in August 2010.

The GSE was adjudged the "Most innovative African Stock Exchange in 2010" at the Africa investor (Ai) Index Series Awards held at the New York Stock Exchange (NYSE) on Friday, 17 September 2010.

However, just like other stock exchanges in the world, the GSE was hard hit by the 2008 financial meltdown which affected the finance world.

3.2.2.2 Lagos Stock Exchange
The NSE is the business centre of the LSE. It is a powerful means of mobilizing public and private sector savings and an effective instrument of redistributing these resources for mainly production purposes. It is divided into two compartments. The first compartment, which provides an important guarantee to the business operation, covers the funding needs for generally large size companies. While the first compartment is very selective in terms of access conditions, the second, the Second-tier Securities Market (SSM) is more flexible and it is the favorite intervention area for small and medium enterprises.

From 1960 to 2008, the number of companies listed rose from 19 to 300, and total capitalization was nearly 9,600 billion Naira (about 65 million dollars). The companies listed cut across all sectors - from agro-food to banking and oil. However, following the wave of concentrations that

came with the return of civilian rule, most capital transactions are in the banking sector (one-fourth of total capitalization at the end of 2008). About half of the listed companies are owned by foreign investors, with Nigerian investors (institutional and private) sharing the other half.

Table 3 .2.2b: Annual Market Capitalization of NSE (in billion Naira)

Year	Government Securities	Debt	Equities	Annual market capitalization	GDP	Annual market capitalization in % GDP
1981	3.1	0	1.9	5.0	47.61966	10.5
1982	3	1	1	5.0	49.06928	10.2
1983	3.5	0	2.2	5.7	53.10738	10.7
1984	2.9	0.2	2.4	5.5	59.62253	9.2
1985	3.5	0.4	2.7	6.6	67.90855	9.7
1986	2.7	0.4	3.7	6.8	69.14699	9.8
1987	4.2	0	4	8.2	105.2228	7.8
1988	4.5	0.4	5.1	10.0	139.0853	7.2
1989	4.2	0.6	8	12.8	216.7975	5.9
1990	3.4	0.8	12.1	16.3	267.55	6.1
1991	3.3	1.4	18.4	23.1	312.1397	7.4
1992	3.2	1.8	26.2	31.2	532.6138	5.9
1993	3.6	2.1	41.8	47.5	683.8698	6.9
1994	3.2	2.1	61	66.3	899.8632	7.4
1995	3.2	2.1	175.1	180.4	1933.212	9.3
1996	3	3	279.8	285.8	2702.719	10.6
1997	2.8	2.8	276.3	281.9	2801.973	10.1
1998	2.7	3.1	256.8	262.6	2708.431	9.7
1999	2.4	3.1	294.5	300.0	3194.015	9.4
2000	2.1	4.1	466.1	472.3	4582.127	10.3
2001	8.3	5.8	648.4	662.5	4725.086	14.0
2002	12.7	3.5	748.7	764.9	6912.381	11.1
2003	25.2	8.4	1,325,7	1,359.3	8487.032	16.0
2004	178.1	7.9	1,926,5	2,112.5	11411.07	18.5
2005	365.5	11.1	2,523,5	2,900.1	14572.24	19.9
2006	888.9	3.5	4,228,6	5,121.0	18564.59	27.6
2007	2,976,6	17	10,301.00	13,294.6	20657.32	64.4
2008	2529.6	29.1	6,957.50	9,516.2	23842.17	39.9

Source: Nigeria Stock Exchange and WAMA staff estimates

To boost investors' interest, the capital market was deregulated in 1993, and international investors were allowed on the market in 1995 to hold substantial shares in national companies. The trading system of the Nigerian stock exchange was fully automated in 1999.

The volume of traded shares rose from 334 million Naira in 1961 to 3,535.631 million Naira in 2008 (23.89 million dollars). The NSE has recorded one of the highest growths in sub-Saharan Africa, second in Africa in terms of capitalization. Transactions on the exchange are regulated by the Nigerian Stock Exchange, as a self-regulatory organization (SRO), and the Securities & Exchange Commission (SEC). Since 2009, the exchange has been hit by the international financial crisis. On 19 May 2009, the all-share index fell by 19 percent with 25,473 points, due to a drop in foreign capital.

One of the endemic difficulties of the Nigerian market is liquidity. In using liquidity as a measure of stock market expansion, the Nigerian market can be termed to be illiquid and contributes very little to the Nigerian economy. In any case, the Nigeria Stock Exchange is not sufficient as a unifying instrument for West African economies.

Since 1995, the Lagos stock exchange has undergone major reforms, as part of the capital markets deregulation programme adopted by the authorities in 1993, with the abolition of the act limiting foreign ownership in NSE. These reforms are clearly an important step for the integration of NSE in the international finance market.

In this zone, there is also a third stock exchange based in Freetown (Sierra Leone). This stock exchange which is called the Sierra Leone Stock Exchange (SSE) started activities officially in July 2009, with the help of advisors from the Nigerian Stock Exchange, who have demonstrated knowledge and expertise. Up until now, the Sierra Leone stock exchange has officially carried out 49 trading sessions. The SSE is short of staff and attracts very few investors, with only one listed company (Rokel Commercial bank); which justifies the low transactions carried out since its inception.

3.3 Cape Verde

3.3.1 Banks and Credit Institutions

In Cape Verde, there are commercial banks and credit institutions located in city centers and agricultural areas. In late December 2009, we counted five onshore commercial banks, 10 offshore commercial banks and eight credit institutions.

Thanks to the development of new tools and the quality of institutions, the implementation of international accounting standards has been accomplished since 2009. However, constraints have been identified, mainly in the classification of transactions and the development/production of financial information.

The policy of banks in the provision and distribution of financial products and services is improving with the proliferation of powerful electronic tools. This can be confirmed by the significant increase in the volume of transactions in the automated Teller Machines and payment terminals.

Table 3.3.1a: Volume of Transactions in Automated Banking Machines and Payment Terminals

	2006	2007	2008	2009	Variation
Cards used	42 174	41 720	62 551	65 119	4.10%
Vint 4 Cards	40 402	38 356	59 801	60 048	0.41%
Visa Cards	1 772	3 364	2 750	5 071	84.4%
ATM					
Number of automated machines	60	85	109	122	11.93%
Number of transactions	1 626 443	2 178 912	2 765 388	3 325 078	20.24%
Volume of transactions (in billion	11 491 317	14 887 426	18 283 982	21 036 612	15.05%
POS					
Number of payment terminals	386	699	1006	1396	38.77%
Number of transactions	428 576	642 418	923 042	1 198 828	29.88%
Volumes of transactions (in billion	2 395 410	3 480 445	4 896 319	6 131 243	25.22%

Sources: BCV ; SISP

Since 2006, the banking sector has been doing very well with efficiency profits measured by the indicator of income cost based on banking products. However, in 2009, this trend was reversed due to increases in operational costs and the simultaneous reduction of the banking products.

3.3.2 The Bolsa de Valores of Cape Verde

Established in the early nineties, the Cape Verde stock exchange never actually operated, because of the country's fragile economy and sluggish businesses climate. It was only in June 2005 that the Government appointed the Board of Directors of the Stock Exchange to start activities. This initiative of reviving the Bolsa occurred at a time when the Government was introducing reforms to turn the country into an international finance centre, by virtue of its exceptional geographical position, at the crossroads of links between Europe, the Americas and Africa, political stability, strengthened democratic institutions, a solid legal environment and a competitive tax system. The more favourable economic climate, which came with privatization of companies in the energy, telecommunications, banking and TACV (the national airline), and the ensuing economic stability should also foster the establishment of foreign firms, in the run up to the establishment of the future international market. After six months of functional restructuring, the stock exchange started operations in December 2005, with the issuance of six securities held by the BCA and Caixa Economica, la Cabo Verde Telecom and the Cape Verde tobacco company (SCT). At the end of October, it obtained the market identification code (MIC), which authorizes it to operate internationally and facilitate its communication with stock market players.

Between 2005 and 2009, several operations were carried out, proving that this stock exchange is among the most dynamic and attractive, compared to others in the sub region. Since its creation, the market capitalization increased from 8,000,000,000 ECV in 2005 to 27 106 158 315 ECV in 2009.

Table 3.3.1b: Total volume of transactions in the primary market from 2007 - 2009

Year	Offer	Description	Segments	Procura	RÁtio
2007	1.254.387.200.00	OPV 28.5% Enacol	Actions	7.787.067.200.00	6.2
2007	2.276.175.115.00	Sub Electra public offer	Bonds	8.185.295.000.00	3.6
2007	2.276.175.115.00	Sub Electra public offer	Bonds	2.276.176.115.00	1.0
2007	750.000.000.00	Sub Tecnicil private offer	Bonds	750.000.000.00	1.0
2007	600.000.000.00	Sub ASA private offer	Bonds	600.000.000.00	1.0
2008	500.000.000.00	Sub BIA private offer	Bonds	1.063.745.000.00	2.1
2009	420.000.000.00	Sub IFH public offer	Bonds	669.047.000.00	1.6
2009	1.500.000.000.00	Sub SOGEI public offer	Bonds	1.502.647.000.00	1.0
2009	324.765.000.00	Sub Aumento Capital BCA public offer	Shares	745.611.000.00	2.3
2009	150.000.000.00	Sub TECNICIL INDUSTRIA public offer	Bonds	234.841.000.00	1.6
2009	1.500.000.000.00	Sub CABO VERDE FAST FERRY public offer	Bonds	1.500.291.000.00	1.0
2009	1.044.000.000.00	Sub Aumento Capital CECV public offer	Shares	1.791.438.000.00	1.7
2009	1.102.650.000.00	Sub TECNICIL IMOBILIÁRIA public offer	Bonds	EM CURSO	
	13.698.152.430.00	GRAND TOTAL		27.106.158.315.00	2.0
	124.229.378.59	TOTAL EUR		245.827.400.49	

Source: La Bolsa de Valores of Cape Verde

Table 3.3.1c: Total volume of secondary market transactions 2007 – 2009 (CVE)

Securities	2009	2008	2007
BCA - Banco Comercial do Atlântico	30.041.040,00	8.149.900,00	22.980.945,00
CEC- Caixa Económica de Cabo Verde	4.248.000,00	1.820.000,00	701.500,00
SCT - Sociedade Cabo-verdiana de Tabacos	27.556.315,00	929.500,00	19.118.700,00
ENA - Enacol	72.337.804,00	853.091.241,00	701.306.896,00
ELEA - A da Electra Bond	86.110.884,90	6.200.113,00	205.658.384,00
ELEB - B da Electra Bond	75.016.050,40	0,00	268.157.616,00
ELEC- C da Electra Bond	0,00	40.000.000,00	728.681.738,00
TECC - C da Tecnicil Bond	0,00	0,00	50.000.000,00
ASAA EUR/TBA+2.25%	0,00	17.533.500,00	0,00
Dir Subscrição BCA	14.644.508,00	0,00	0,00
Dir Subscrição CECV	23.976.510,00	0,00	0,00
SOGEI 2014 Bond	129.584.985,00	0,00	0,00
BI 6% 2013 Bond	2.140.000,00	0,00	0,00
T.IND 7.5% Bond	1.675.000,00	0,00	0,00
CVFF 9% 2015 Bond	21.092.100,00	0,00	0,00
TOTAL	488.423.197,30	927.724.254,00	1.996.605.779,00

Source: La Bolsa de Valores du Cap Vert

Table 3.3.1d: Market capitalization in % GDP

Year	Market Capitalization	Market Capitalisation in % of GDP
2007	19.59853832	18.2
2008	1.063745	0.9
2009	6.443875	5.5

Source: La Bolsa de Valores of Cape Verde and WAMA staff Estimates

The Stock Exchange of Cape Verde is very dynamic considering the performances recorded during the period 2007-2009. However, it should open up to the sub-regional markets to fulfill its role of leader between Lusophone investors on the one hand and French and English investors on the other.

4.0 STATUS OF INTEGRATION OF THE FINANCIAL SYSTEM IN ECOWAS

4.1 METHODOLOGY

Given that the financial system is made up of the banking sector and financial markets, the integration of the system can be assessed through several economic models but for constraints related to the availability of data and characteristics of our financial markets, we will focus on the following two models:

- Savings-investment model

- Share price model

The first model will be used to test the level of integration of the financial system (banking sector and financial markets). The second one will deal solely with the level of integration of stock markets in the region.

4.1.1 Econometrics test on integration of the financial system

We shall estimate the macroeconomic model of savings and investment behaviour to assess the level of financial integration of ECOWAS countries, using the following equation:

$$\left(\frac{I}{Y}\right)_{it} = \alpha + \beta \left(\frac{S}{Y}\right)_{jt} + \varepsilon_{it}$$

Where $\left(\frac{I}{Y}\right)_{it}$ refers to the level of investment as a percentage of GDP of the country or region i

at a date t and $\left(\frac{S}{Y}\right)_{jt}$ the level of savings (in % of GD) of the country or region j at the date t.

In our context, we are considering three countries (Nigeria, Ghana and Cape Verde) and the UEMOA zone which have more or less active financial markets within the ECOWAS zone.

We are therefore estimating this equation for various pairs of country/zone to analyze the behaviour of savings and investments in a country/zone on the behaviour of the other and vice versa.

4.1.2 Econometric Test for Integration of Stock Markets

Stock exchange is the most important component of the financial market. To this end, the integration of that very market in ECOWAS countries is determined by testing the integration of the stock exchanges in the region. This is done by determining the existence of cointegration

among the share price indices of the existing stock markets in the region. The region has five stock markets: The Nigerian Stock Exchange, The Ghana Stock Exchange, The BRVM for UEMOA countries, Bolsa de Valores du Cap Vert and the Sierra Leone Stock Exchange.

However, owing to data unavailability and the fact that the Sierra Leone Stock Exchange was established recently, the test for the integration of capital markets of ECOWAS countries was done on the basis of the first three exchanges mentioned earlier.

The model is specified as follows:

Xit= Xit-1 + m + Vt. Where Xt (share price) is a linear combination of each of the components(Xit, i=1…k). Vt is a vector of the dimension k with stationary mean zero.

4.2 EMPIRICAL RESULTS

4.2.1 Integration of Financial System

The results of the test are presented in the appendix1 and showed that within UEMOA, the banking sectors were more or less integrated. By taking the case of the two major economies Cote d'Ivoire and Senegal, it can be said that investment in Senegal and savings in Cote d'Ivoire are integrated …with the existence of an important (long term) relation between investment in Senegal and savings in Cote d'Ivoire. On the other hand, the co-integration test showed that the two variables were not co-integrated in the short run. Any significant relation was only in the long term and could not be in the short term.

The relation indicated that an increase in the level of savings (as % of GDP) in Cote d'Ivoire had a positive impact on investment as a percentage of GDP in Senegal.

With regard to investment in Cote d'Ivoire and savings in Senegal, the unit-root test showed that the series of investment rate in Cote d'Ivoire was stationary while the savings rate in Senegal was integrated of order 1. Consequently, the two series could not be co-integrated. In addition, the estimation showed that the savings rate in Senegal did not affect the behaviour of investment in Cote d'Ivoire.

With regard to the financial relation between UEMOA and Nigeria, though   the series are integrated, the co-integration test indicated that they were not integrated. As result, the estimation of the equation was done by OLS directly on series in levels.

Concerning the relation between UEMOA and Ghana and Cape Verde, results proved the absence of co-integration and the estimation of the relation in levels (long term) indicated the absence of a relation between the level of investments within UEMOA and savings behaviour in the Ghanaian economy.

Between **Ghana and Nigeria**: the result showed the existence of a co-integrationing relationship between the level of investment in Nigeria and the behaviour of savings in Ghana. The long term

relation was significant with a negative coefficient above unity. This implied that a decline in the level of savings (as % of GDP) in Ghana was followed by an increase in the level of investment in Nigeria. (Investments as percentage of GDP expanded).

By introducing interest rates on the two markets into the model, the result showed that the level of interest rate in Ghana did not affect the level of investments in Nigeria. This result seems to clarify the assumption that capital movement between Ghana and Nigeria is not due to trends in interest rates on the Ghanaian money market. However, interest rates on the Nigerian money market influenced the investment rate in Nigeria. The higher the rate is, the lower the rate of investment in Nigeria. This relation was only valid for the long term.

Reciprocal relation (Ghana Nigeria): The behaviour of saving in the Nigerian economy did not in any way influence both in the short and long term the behaviour of investment in the Ghanaian economy. The behaviour of investment is a self regressive process with the presence of a unit-root and is not explained by the level of savings of a foreign economy.

4.2.2 Integration of Capital Markets

The existence of cointegration among the share price indices of the three markets implies that the three share price indices of the region move together and this is possible if they are cointegrated (that is, if they have a long run relationship) as the share price indices of integrated capital markets move together. Quarterly share indices are used for the period 2000Q1 to 2010Q3.

Before testing for cointegration, it is important to test for unit root in the variable. This informs us about the order of integration of the variables to be used in the cointegration test as the test does not support mixture of I(1) and I(2) variables. The Dickey-Fullller Test was employed for the cointegration test. The tests were done by first transforming the levels of the share prices to logarithms.

The result shows that the share price indices of the stock markets of Ghana and Nigeria have unit roots but are stationary after first difference while the share price index of the stock market of UEMOA is stationary only after second difference. Hence, in the test for cointegration, the first difference of the share price of BRVM was used (to have an I(1) series) along with the levels of the share indices of the other two markets, which are also I(1). We employed the Johansen Maximum Likelihood procedure in the cointegration test, which is based on the estimation of a vector error correction model (VAR). The advantage of this procedure is that it tests the number of cointegrating vector, which reveals information on which share price index is driven by changes in the others.

The estimation of the VAR, which should precede the test for cointegration was carried out by first testing for the appropriate lag length. The test for lag length is shown in Appendix Table 2. The result shows that the appropriate lag length is 2. The correlation between the actual and

fitted values of the VAR is shown in Table 4.1. It shows that the correlation is 0.90 for the BRVM and 0.99 for both Nigeria and Ghana.The vector diagnostic tests reveal that the VAR does not have white noise residuals, the large residual tests were done and 5 residuals were found to exceed 2.5. Appendix Table 3 shows the diagnostic tests. The VAR was therefore re-estimated using step dummies for the periods with large residuals. The periods with large residuals are 2007Q1, 2008Q1, 2006Q2 and 2009Q1 (occurring twice). With these step dummies introduced, the vector diagnostic tests on residuals reveal that the residuals are white noise, though there is still evidence of non-normal residuals. However, since the number of observations is greater than 30, breakdown of the residual normality assumption does note change the result of the estimation. We therefore carried out the cointegration test based on the result of the VAR model with these step dummies. Appendix Table 4 shows the result of the residual diagnostic tests from this VAR.

Table 4.1: Correlations between the Actual and Fitted Values of the VAR

BRVM	Ghanaian Stock Exchange	Nigerian Stock Exchange
0.9077	0.9917	0.9941

Table 4.2 shows the result of the cointegration test. The result shows that there is no cointegration among the share price indices of the three stock markets. This implies that these three stock markets in ECOWAS are not integrated.

Table 4.2: Result of the Cointegration Tests

```
I(1) cointegration analysis.
  eigenvalue    loglik for rank
                184.6075   0
   0.25369      190.6061   1
   0.21141      195.4751   2
   0.16318      199.1270   3

 H0:rank<=  Trace test [ Prob]
    0        29.039 [0.200]
    1        17.042 [0.132]
    2        7.3039 [0.114]
```

5.0   Stages of Regional Financial System Integration

The advancement toward the integration of financial systems in ECOWAS has been widely perceived as critical not just by market stakeholders but also appreciated at the highest political level, in particular by the Economics and Finance Ministers as well as the Authority of ECOWAS Heads of States and Governments under the ECOWAS Common Investment Market Initiative which was recently adopted.

Financial system integration within ECOWAS means free movement of capital across national borders of Member States in the region with minimum friction (transaction costs). Financial stakeholders (banks, investors etc.) and their intermediaries must be free to operate throughout the region and in all Member States. Intermediaries that operate in the financial market should be able to conduct businesses throughout the region. Since a convergence of accounting standards across countries in the region exists, the integration of clearing and settlement should therefore be achievable. For an integrated financial system in the ECOWAS zone, three main requirements are crucial. These relate to Financial Sector Development, Institutional Quality and Quality of Macroeconomic Policies as detailed below.

Financial Sector development is important for financial integration, because a larger and more efficient financial sector is more likely to channel capital inflows to its most productive uses. However, this channeling of capital inflows will be limited if the financial sector is poorly developed. Institutional quality is also important because it mainly affects "not just the outcomes of financial integration but the actual width and breadth of integration". Similarly, the quality of macroeconomic policies affects the composition of inflows, since sound policies tend to attract both foreign direct investment (FDI) as well as foreign portfolio investment (FPI). Both inflows require investors' confidence in the macroeconomic stability of the destination/recipient country.

Five sequencing stages could be identified for regional financial integration as follows:

5.1   Preparatory Stage

Under this stage member countries should modernize their financial systems by implementing essential parts of international financial standards as well as share basic information among themselves.

 Domestic measures

Member States should take steps to improve macroeconomic stability and banking system soundness through, improvement of their RTGS in order to reduce payment system delays and costs of transfers, strengthen banking system and the regulatory framework and improve accounting standards towards the adoption of International Financial Reporting Standards (IFRS)

Regional Measures

At the regional level, there is the need to finalize the agreement for effective implementation of FTA under ECOWAS Trade Liberalization Scheme (ETLS); enforce the various protocols for effective implementation of FTA; Exchange information as well as conduct regular meetings between monetary and financial authorities of Member States pointing out their functions at this stage; delineate areas and modalities of the financial integration process in the regional agenda; put in place bilateral and regional agreements so as to offer technical assistance to less developed Member States in the community to upgrade their financial systems.

5.2 Harmonization Stage

Member countries should continue the modernization of their financial systems. Practical steps should be in place at the national and regional levels to upgrade, harmonize and interlink regional financial policies/institutions, rules and regulations.

Domestic Measures

At the domestic level, the following measures should be taken: i) expand national payment systems to include electronic fund transfer, security deposit systems and payment switches; ii.) devise cost-effective system for small transfers; iii) further strengthen banking supervision with appropriate compliance mechanisms; iv) remove intra-regional exchange control; v) liberalize foreign capital inflows; vi) Strengthen existing stock exchanges' rules, regulations and their supervision; vii) substantially complete the modernization of the national financial systems by making them market based; viii) ensure central bank operational independence and reinforced supervisory authority; and ix) develop national credit database information systems

Regional Measures

At the regional level, ECOWAS Commission should ensure effective implementation of the FTA; ensure establishment of relevant convergence criteria; regular meetings between member states' regulatory authorities regarding inward the prevalent capital controls among Member and a sequencing strategy for total liberalization; linking of the national payment systems to the regional payment system; establish private financial sector consultative bodies as well as the requisite regional physical infrastructure.

5. 3. Cooperation Stage

Under the cooperation stage, there is need for Member countries to make substantial move towards harmonizing and linking their financial sector policies and strengthen and make more cooperative the regional surveillance and monitoring mechanism in the region

Domestic Measures

Each member country should gradually liberalize exchange controls vis-à-vis the rest of the world; implement regionally comprehensive convergence criteria following the regional road map; and ensure effective coordination between monetary and exchange rate policies among themselves.

Regional Measures

At the regional level there is the need to implement the agreements for the establishment of a customs union; liberalize foreign direct investment (FDI) flows among member states towards the ultimate implementation of the various measures in the ECOWAS Common Investment Market and Common Investment Code. In addition, comprehensive and mandatory convergence criteria with the appropriate monitoring mechanism should be established.

At this stage, it is also opportune to ensure full harmonization of regulatory, supervisory and accounting standards; establishment of a single licensing of bank procedure among Member States, with cross-border participation of regulators and bank supervisors; development of a centralized credit database information system established as well as a region-wide securities and exchange market regulations infrastructure

5.4 Integration Stage

At this integration stage Member States move to unify the Institutions in their domestic financial sector, rules and regulations under which these institutions operate as well as financial products of their banks and non-bank financial institutions.

Domestic Measures

Member States should adapt/modify domestic legislative and regulatory requirements as well as institutional set-up to conform to the requirements of this integration stage

Regional Measures

At this stage the **Customs Union** should be fully implemented and begin work towards the realization of a **Common Market;** unified regional stock exchange, partial pooling of external reserves and put in place a regional bond market and linking via the regional stock exchange to tap local savings for investment purposes

5. 5. Unification Stage

At this stage Member States abdicate sovereignty in monetary and financial policies to a regional authority.

Domestic Measures

There is the exchange of local currency for regional one as well as putting reserves of member states in common currency.

Regional Measures

At this final stage a regional monetary authority and common currency is achieved. The operationalization of this stage, especially if it is accompanied by the creation of a true economic community would entail the establishment of concrete institutional arrangements to facilitate the transition from national currencies, exchange rates and central banks to the unified monetary system. At this stage also a regional technical committees to provide inputs in the decision making processes are established.

6.0   Challenges and Prospects of Financial System Integration in ECOWAS

6.1 Challenges

As the region progresses towards the integration of its financial system, there is a need to take stock of the various challenges facing such an undertaking.

The first major challenge is for the financial system to be at the forefront of ensuring financial integrity in order to minimize the potential effects of the risk of contagion as well as reduce systemic risks. Thus, there is the compelling need to strengthen the regulatory framework and enhance corporate governance which is the cornerstones for promoting investor confidence as well as the promotion of sustained long-term growth of the financial system. In this regard, the proactive stance of the management of the Stock Exchange and the Regulatory Commission of various countries in their respective efforts at raising the standards of financial system should be sustained. The challenge for the financial system is to evolve comprehensive measures to strengthen, broaden and deepen the market to enhance its intermediary role in financing economic activities. The accelerated upgrade of systems needs to be sustained while the regulatory and prudential framework continuously reviewed to facilitate better disclosure standards and transparency of transactions.

Second, there is an obvious challenge to urgently develop a vibrant bonds market to allow the private sector access a larger number of debt instruments in order to enhance the management of their liabilities. As government securities become active in many ECOWAS countries the capital market would be in a position to play a crucial role in the pricing of credit risks, reducing the heavy concentration of credit risks in the banking sector. Taking Nigeria as an example, the floatation of the Federal Government bonds and National Savings Certificate as well as the recent implementation of the pensions Acts 2004 would support the further deepening of the financial system. Importantly, efforts should be made to study the securitization of other kinds of debt instruments with a view to further assisting the development of an active and vibrant private debt securities market to complement the market in equities and government securities.

Third, there is need to canvass for self-regulation of financial institutions as well as the cooperation and full commitment by operators towards the challenge of employing professionalism and

maintaining high ethical management standards. In this regard, the challenge to severely sanction market participants by the regulatory authorities of the financial system would be a commendable practice. Perhaps, this would encourage the sustainable growth of financial markets especially as the region is trying to liberalize the market so as to meet the globalizing effects of emerging regional and international capital markets.

Fourth, there is need to eliminate all the existing legal barriers: Removal of capital and exchange controls could increase cross-border capital flows and competition which will enable investors and firms to exploit regional markets and opportunities thus of achieving minimum cost of capital as well as reducing eminent risks.

Fifth, address the differences in laws, regulations, and tax treatment which continue to prevent the building of pan-African portfolios. Within a global perspective, it would also be necessary to move towards attainment of global standards/norms and best practices.

Another major challenge for the implementation of the financial system integration in ECOWAS member countries is the issue of investors' perception. The decision to invest in a financial instrument or indeed in a securities market or geographic region would attract investment into it, while a poor perception would undoubtedly impact negatively on the level of investment. International perception of a country's political and economic environments is often a strong influence on response of foreign investors to its security offering. Closely related to the above is the challenge of low awareness about the operations and benefits of the financial system and its impending integration in within the region. The level of awareness of the populace about the financial system and the opportunities available would enhance the level of their participation in the market.

6.2 Prospects

Financial system integration can bring about large benefits if strategically managed. Effective use of capital inflows transforms the investment environment; generate multiplier effects as well as enhance the level of output and domestic savings. The pre-conditions that would facilitate the process include:

-    A Stable and Liberalized Economy: Macroeconomic policies designed to avoid large external and internal imbalances are very important to avoid financial crises. These policies should aim to limit moral hazard and related abuses in the market. Importantly, there must be reserve accumulation during the period of high capital inflows which would be used to ensure the stability of the exchange rate and curb market uncertainty.

-    Investor Confidence: The lack of confidence, because of frequent reversals of economic policies in the past may hinder the elimination of capital controls even if all prerequisites are in place. Such a country should seek to change financial system perceptions prior to the proposed integration of the market by following a consistent policy capable of producing good economic results within a given timeframe.

-    With the expansion of the financial system, the real sector would have easy access to long-term funds at reduced interest rates. Other benefits derivable from consolidation of banks include: Greater efficiency and cost effectiveness; Enhanced ability to compete in the market place, both domestically and internationally; Leveraging on technology; and diversification of operations, controlling risks and provision of broader array of products.

With the ongoing wave of democratization in many ECOWAS member countries and the subsequent reforms in the economy, particularly in the banking sector coupled with the establishment of the Crime Commissions however, the confidence of both local and foreign investors in region is returning gradually. Consequently, the response of foreign investors to security offerings would improve.

7. Conclusion and Recommendations

In ECOWAS, the major existing financial markets (Stock Exchanges and Banks) are not integrated except for the UEMOA zone. The community stock exchanges, in addition to liquidity constraints, are not interconnected to allow investors in the sub-region to take advantage of the existing opportunities. To address this situation, the authorities in these capital markets have taken important initiatives in respect of the creation of an integrated regional capital market in ECOWAS and eventually at the level of Africa as a whole. In this regard, the MoU which was signed by the major stock exchanges should be accompanied by appropriate and coherent reforms and measures as well as risk management instruments in order to effectively attain the integration of financial markets in a dynamic global environment. Therefore, one major issue that would continuously be advocated for is the need for good governance particularly corporate governance.

To achieve an integrated financial system in ECOWAS and maximize the benefits of capital market integration while minimizing the risks, sequenced execution is critical. The conventional view of sequencing emphasizes the importance of achieving macroeconomic stability and developing domestic financial institutions, markets, and appropriate instruments, with a view to ultimately attaining a unified financial system. In fact, financial system integration should be part of a concurrent, integrated, and comprehensive approach to macroeconomic and structural reforms in ECOWAS member countries along with coordination of reforms of member countries in the domestic and external sectors.

Capital inflows thrive on international investor's confidence in an economy. An unstable economy resulting from frequent changes and incoherent policies, unfavorable macroeconomic indicators would result in capital flight. This is due to short-term capital movement that may abruptly change direction for speculative reasons which may bring about changes in the size of official foreign exchange reserves. For this reason it may be advisable to restrict volatile capital movements in growing economies, particularly in ECOWAS member countries.

Prudent financial regulation and supervision are essential to maintain capital market and the financial sector stability and growth. In particular, a weak and distorted capital market could lead to misallocation of resources and the creation of financial crisis. Prudential guidelines are aimed at promoting financial soundness of individual financial institution, and protect investors against fraud. International transactions may involve certain types of risk that are not present in domestic transactions, including transfer, sovereign and country risk. In an integrated capital market environment, local financial institutions may have limited capacity to assess and manage risks associated with large capital inflows, and regulatory authorities may have limited supervisory

capacity. For prudential reasons, such countries may need to develop their financial institutions, markets, and instruments before considering the possibility of integrating their financial markets.

The Government of ECOWAS member countries should embark on intensive human resource development relevant for IT standards to enhance the operations, development and integration of the financial system. Information technology requires technical skills especially the CSCS in Nigeria as an example. Government should embark on public awareness drive to enlighten the public on the potential benefits of financial system integration.

The issues of legal and regulatory framework cannot be compromised in the financial integration if the investors are to derive the full benefits. Credit must be given to the ECOWAS for the initiative to harmonize the existing laws in the region.

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ANNEXES

Table 1: Integration Test by OLS

Dependent Variable: UEMOA_I			
Method: Least Squares			
Sample: 1980 2010			
Included observations: 31			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.03620	1.220250	13.96124	0.0000
NIGERIA_S	-0.004429	0.038445	-0.115195	0.9091
R-squared	0.000457	Mean dependent var		16.90693
Adjusted R-squared	-0.034010	S.D. dependent var		2.623864
S.E. of regression	2.668109	Akaike info criterion		4.862958
Sum squared resid	206.4454	Schwarz criterion		4.955473
Log likelihood	-73.37585	F-statistic		0.013270
Durbin-Watson stat	0.233069	Prob(F-statistic)		0.909085

Dependent Variable: UEMOA_I			
Method: Least Squares			
Sample: 1980 2010			
Included observations: 31			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.29543	1.032514	14.81377	0.0000
GHANA_S	0.113867	0.065453	1.739688	0.0925
R-squared	0.094500	Mean dependent var		16.90693
Adjusted R-squared	0.063276	S.D. dependent var		2.623864
S.E. of regression	2.539493	Akaike info criterion		4.764147
Sum squared resid	187.0218	Schwarz criterion		4.856662
Log likelihood	-71.84428	F-statistic		3.026515
Durbin-Watson stat	0.341298	Prob(F-statistic)		0.092519

	Retard	Prob	Prob	ADF_Test_Statistic	Critical_Value_5%	Conclusion	Décision
En niveau	4.000000	0.046221				Avec tendance	Série non stationnaire
En différence 1ère	3.000000	0.155828	0.437609	-4.253255	-1.950000	Sans tendance, sans constante	Série stationnaire

Dependent Variable: UEMOA_I				
Method: Least Squares				
Sample: 1980 2010				
Included observations: 31				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	15.68584	1.105771	14.18544	0.0000
CAPE_S	0.048204	0.039559	1.218545	0.2328
R-squared	0.048708	Mean dependent var		16.90693
Adjusted R-squared	0.015905	S.D. dependent var		2.623864
S.E. of regression	2.602914	Akaike info criterion		4.813481
Sum squared resid	196.4797	Schwarz criterion		4.905997
Log likelihood	-72.60896	F-statistic		1.484851
Durbin-Watson stat	0.263762	Prob(F-statistic)		0.232838

	Retard	Prob	Prob	ADF_Test_Statistic	Critical_Value_5%	Conclusion	Décision
En niveau	4.0	0.019869				Avec tendance	Série non stationnaire
En différence 1ère	3.0	0.071933	0.1071	-5.082102	-1.950000	Sans tendance, sans constante	Série stationnaire

Dependent Variable: NIGERIA_I				
Method: Least Squares				
Sample: 1980 2010				
Included observations: 31				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	39.28837	4.418872	8.891040	0.0000
GHANA_S	-1.267837	0.280119	-4.526068	0.0001
R-squared	0.413967	Mean dependent var		21.34544
Adjusted R-squared	0.393759	S.D. dependent var		13.95854
S.E. of regression	10.86832	Akaike info criterion		7.671922
Sum squared resid	3425.492	Schwarz criterion		7.764438
Log likelihood	-116.9148	F-statistic		20.48529
Durbin-Watson stat	0.955424	Prob(F-statistic)		0.000094

	Retard	Prob	Prob	ADF_Test_Statistic	Critical_Value_5%	Conclusion	Décision
En niveau	0.000000	0.680607	0.919457	-2.951979	-1.950000	Sans tendance, sans constante	Série stationnaire

Dependent Variable: D(NIGERIA_I)				
Method: Least Squares				
Sample (adjusted): 1981 2010				
Included observations: 30 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.441695	1.548177	-0.285300	0.7776
D(GHANA_S)	-0.216720	0.356828	-0.607352	0.5487
RESID_N_G(-1)	-0.285651	0.159489	-1.791041	0.0845
R-squared	0.106703	Mean dependent var		-0.486143
Adjusted R-squared	0.040533	S.D. dependent var		8.572641
S.E. of regression	8.397105	Akaike info criterion		7.188291
Sum squared resid	1903.807	Schwarz criterion		7.328410
Log likelihood	-104.8244	F-statistic		1.612561
Durbin-Watson stat	1.668421	Prob(F-statistic)		0.217993

Dependent Variable: NIGERIA_I				
Method: Least Squares				
Sample: 1980 2010				
Included observations: 31				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	51.39110	6.001132	8.563569	0.0000
GHANA_S	-1.208112	0.233663	-5.170317	0.0000
T_NIGERIA	-1.590336	0.415806	-3.824711	0.0007
T_GHANA	0.314674	0.195260	1.611567	0.1187
R-squared	0.622087	Mean dependent var		21.34544
Adjusted R-squared	0.580097	S.D. dependent var		13.95854
S.E. of regression	9.045120	Akaike info criterion		7.362242
Sum squared resid	2208.983	Schwarz criterion		7.547273
Log likelihood	-110.1147	F-statistic		14.81503
Durbin-Watson stat	1.656939	Prob(F-statistic)		0.000007

Dependent Variable: GHANA_I				
Method: Least Squares				
Sample (adjusted): 1982 2010				
Included observations: 29 after adjustments				
Convergence achieved after 12 iterations				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
NIGERIA_S	0.030236	0.044658	0.677073	0.5043
AR(1)	0.533833	0.182165	2.930499	0.0070
AR(2)	0.532934	0.188777	2.823080	0.0090
R-squared	0.864397	Mean dependent var		20.54067
Adjusted R-squared	0.853966	S.D. dependent var		10.16186
S.E. of regression	3.883287	Akaike info criterion		5.648938
Sum squared resid	392.0779	Schwarz criterion		5.790383
Log likelihood	-78.90960	Durbin-Watson stat		2.240959
Inverted AR Roots	1.04	-.51		
Estimated AR process is nonstationary				

	Retard	Prob	Prob	ADF_Test_Statistic	Critical_Value_5%	Conclusion	Décision	
En niveau	1.000000	0.317997	0.192191	-4.882834	-1.950000	Sans tendance, sans constante	Série stationnaire	

Dependent Variable: SENEGAL_I				
Method: Least Squares				
Sample: 1980 2010				
Included observations: 31				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	18.60413	1.388525	13.39848	0.0000
RCI_S	0.347407	0.136619	2.542885	0.0166
R-squared	0.182322	Mean dependent var		21.45769
Adjusted R-squared	0.154126	S.D. dependent var		4.950526
S.E. of regression	4.553069	Akaike info criterion		5.931821
Sum squared resid	601.1827	Schwarz criterion		6.024336
Log likelihood	-89.94323	F-statistic		6.466263
Durbin-Watson stat	0.408292	Prob(F-statistic)		0.016590

	Retard	Prob	Prob	ADF_Test_Statistic	Critical_Value_5%	Conclusion	Décision
En niveau	4.000000	0.027396				Avec tendance	Série non stationnaire
En différence 1ère	3.000000	0.059027	0.151321	-4.453208	-1.950000	Sans tendance, sans constante	Série stationnaire

Table 2. Unit Root Test

ADF Test Statistic	-0.107955	1% Critical Value*	-3.4972
		5% Critical Value	-2.8906
		10% Critical Value	-2.5821

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(GSE))
Method: Least Squares
Date: 10/29/10   Time: 16:34
Sample(adjusted): 1986:2 2010:4
Included observations: 99 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GSE(-1))	-0.000556	0.005150	-0.107955	0.9143
D(LOG(GSE(-1)))	0.527504	0.097253	5.424027	0.0000
D(LOG(GSE(-2)))	0.225478	0.111127	2.029009	0.0453
D(LOG(GSE(-3)))	0.099788	0.111153	0.897753	0.3716
D(LOG(GSE(-4)))	-0.353256	0.098055	-3.602649	0.0005
C	0.028276	0.034082	0.829651	0.4089

R-squared	0.467426	Mean dependent var	0.048616
Adjusted R-squared	0.438793	S.D. dependent var	0.120676
S.E. of regression	0.090403	Akaike info criterion	-1.910383
Sum squared resid	0.760064	Schwarz criterion	-1.753103
Log likelihood	100.5640	F-statistic	16.32474
Durbin-Watson stat	1.942372	Prob(F-statistic)	0.000000

ADF Test Statistic	-4.148139	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(GSE),2)
Method: Least Squares
Date: 10/29/10   Time: 16:31
Sample(adjusted): 1986:3 2010:4
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GSE(-1)))	-0.463535	0.111745	-4.148139	0.0001
D(LOG(GSE(-1)),2)	0.018029	0.111410	0.161825	0.8718
D(LOG(GSE(-2)),2)	0.234698	0.110307	2.127673	0.0360
D(LOG(GSE(-3)),2)	0.315957	0.110298	2.864570	0.0052
D(LOG(GSE(-4)),2)	-0.079716	0.104737	-0.761101	0.4485
C	0.023256	0.010466	2.222109	0.0287

R-squared	0.308691	Mean dependent var	0.001889
Adjusted R-squared	0.271119	S.D. dependent var	0.106094
S.E. of regression	0.090577	Akaike info criterion	-1.905963
Sum squared resid	0.754786	Schwarz criterion	-1.747699
Log likelihood	99.39217	F-statistic	8.216158
Durbin-Watson stat	1.991406	Prob(F-statistic)	0.000002

ADF Test Statistic	-2.133273	1% Critical Value*	-3.4972
		5% Critical Value	-2.8906
		10% Critical Value	-2.5821

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(NSE))
Method: Least Squares
Date: 10/29/10   Time: 16:44
Sample(adjusted): 1986:2 2010:4
Included observations: 99 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NSE(-1))	-0.008508	0.003988	-2.133273	0.0355
D(LOG(NSE(-1)))	0.469892	0.093236	5.039800	0.0000
D(LOG(NSE(-2)))	0.218690	0.104313	2.096478	0.0388
D(LOG(NSE(-3)))	0.134761	0.104301	1.292036	0.1995
D(LOG(NSE(-4)))	-0.419969	0.092812	-4.524962	0.0000
C	0.103890	0.035705	2.909700	0.0045

R-squared	0.489531	Mean dependent var	0.053889
Adjusted R-squared	0.462086	S.D. dependent var	0.094661
S.E. of regression	0.069427	Akaike info criterion	-2.438392
Sum squared resid	0.448269	Schwarz criterion	-2.281112
Log likelihood	126.7004	F-statistic	17.83706
Durbin-Watson stat	1.761197	Prob(F-statistic)	0.000000

ADF Test Statistic	-3.460384	1% Critical Value*	-3.4979
		5% Critical Value	-2.8909
		10% Critical Value	-2.5822

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(NSE),2)
Method: Least Squares
Date: 10/29/10   Time: 16:41
Sample(adjusted): 1986:3 2010:4
Included observations: 98 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(NSE(-1)))	-0.382349	0.110493	-3.460384	0.0008
D(LOG(NSE(-1)),2)	0.001366	0.105447	0.012953	0.9897
D(LOG(NSE(-2)),2)	0.184493	0.104563	1.764411	0.0810
D(LOG(NSE(-3)),2)	0.253790	0.104205	2.435485	0.0168
D(LOG(NSE(-4)),2)	-0.303878	0.099685	-3.048390	0.0030
C	0.020310	0.009256	2.194245	0.0307

R-squared	0.410265	Mean dependent var	-0.000559
Adjusted R-squared	0.378214	S.D. dependent var	0.086402
S.E. of regression	0.068131	Akaike info criterion	-2.475510
Sum squared resid	0.427044	Schwarz criterion	-2.317246
Log likelihood	127.3000	F-statistic	12.80045
Durbin-Watson stat	2.011022	Prob(F-statistic)	0.000000

ADF Test Statistic	-1.679052	1%	Critical Value*	-3.5930
		5%	Critical Value	-2.9320
		10%	Critical Value	-2.6039

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(BRVM))
Method: Least Squares
Date: 10/29/10   Time: 16:50
Sample(adjusted): 2000:3 2010:4
Included observations: 42 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(BRVM(-1))	-0.019930	0.011870	-1.679052	0.1011
D(LOG(BRVM(-1)))	0.851104	0.096763	8.795736	0.0000
C	0.094010	0.056083	1.676257	0.1017
R-squared	0.671262	Mean dependent var		0.014385
Adjusted R-squared	0.654403	S.D. dependent var		0.051604
S.E. of regression	0.030337	Akaike info criterion		-4.084157
Sum squared resid	0.035893	Schwarz criterion		-3.960038
Log likelihood	88.76729	F-statistic		39.81772
Durbin-Watson stat	2.405445	Prob(F-statistic)		0.000000

ADF Test Statistic	-4.835696	1%	Critical Value*	-3.6019
		5%	Critical Value	-2.9358
		10%	Critical Value	-2.6059

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOG(BRVM),3)
Method: Least Squares
Date: 10/29/10   Time: 16:55
Sample(adjusted): 2001:1 2010:4
Included observations: 40 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(BRVM(-1)),2)	-1.263799	0.261348	-4.835696	0.0000
D(LOG(BRVM(-1)),3)	0.008213	0.164962	0.049785	0.9606
C	-0.002918	0.005103	-0.571895	0.5709
R-squared	0.625991	Mean dependent var		-0.000300
Adjusted R-squared	0.605775	S.D. dependent var		0.051139
S.E. of regression	0.032109	Akaike info criterion		-3.967319
Sum squared resid	0.038147	Schwarz criterion		-3.840653
Log likelihood	82.34638	F-statistic		30.96408
Durbin-Watson stat	1.992023	Prob(F-statistic)		0.000000

Dependent Variable: DLOG(NSE)
Method: Least Squares
Date: 10/29/10   Time: 17:07
Sample(adjusted): 2000:3 2010:4
Included observations: 42 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.032617	0.019096	1.708081	0.0956
DLOG(GSE)	0.007344	0.124067	0.059194	0.9531
DLOG(BRVM,2)	-0.134242	0.581656	-0.230793	0.8187
R-squared	0.001365	Mean dependent var		0.033336
Adjusted R-squared	-0.049847	S.D. dependent var		0.111631
S.E. of regression	0.114379	Akaike info criterion		-1.429845
Sum squared resid	0.510222	Schwarz criterion		-1.305726
Log likelihood	33.02674	F-statistic		0.026658
Durbin-Watson stat	0.940573	Prob(F-statistic)		0.973712

Dependent Variable: DLOG(NSE)
Method: Least Squares
Date: 10/29/10   Time: 17:10
Sample(adjusted): 1985:2 2010:4
Included observations: 103 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.057717	0.009863	5.851886	0.0000
DLOG(GSE)	-0.063000	0.077665	-0.811179	0.4192
R-squared	0.006473	Mean dependent var		0.054773
Adjusted R-squared	-0.003364	S.D. dependent var		0.092920
S.E. of regression	0.093076	Akaike info criterion		-1.891573
Sum squared resid	0.874979	Schwarz criterion		-1.840413
Log likelihood	99.41599	F-statistic		0.658012
Durbin-Watson stat	0.801480	Prob(F-statistic)		0.419170

APPENDIX TABLE 3: TESTS FOR LAG LENGTH OF VAR

VAR Lag Order Selection Criteria

Endogenous variables: DLBRVM LGSE LNSE

L g	LogL	LR	FPE	AIC	SC	HQ
0	17.52181	NA	9.71e-05	-0.726091	-0.599425	-0.680292
1	141.4370	223.0473	3.11e-07	-6.471849	-5.965185	-6.288655
2	165.7473	40.11208*	1.46e-07*	-7.237367*	-6.350705*	-6.916778*
3	169.9804	6.349607	1.89e-07	-6.999020	-5.732361	-6.541036

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

APPENDIX TABLE 4: TESTS FOR RESIDUAL DIAGNOSIS AND LARGE

RESIDUALS FROM INITIAL VAR

RESIDUAL DIAGNOSIS

Vector Portmanteau(5): 70.6853

Vector AR 1-3 test: F(27,67) =   2.8298 [0.0003]**

Vector Normality test: Chi^2(6) =   44.028 [0.0000]**

Vector Hetero test: F(72,92) = 0.61774 [0.9829]

LARGE RESIDUALS

Residuals exceeding 3 standard errors

Date	residual	scaled	
2007(1)	0.29896	3.0811	LnNSE
2008(1)	-0.31228	-3.2184	LnNSE
2006(2)	0.062291	2.5417	DLnBRVM
2009(1)	-0.061274	-2.5002	DLnBRVM
2009(1)	-0.32191	-2.9242	LnGSE

APPENDIX TABLE 5: TESTS FOR RESIDUAL DIAGNOSIS FROM VAR WITH

STEP DUMMIES

Vector Portmanteau(5): 55.1534

Vector AR 1-3 test: $F(27,56) = 0.89684$ [0.6124]

Vector Normality test: $Chi^2(6) = 42.872$ [0.0000]**

Vector Hetero test: $F(72,71) = 0.57532$ [0.9897]