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The Role of Uganda Securities Exchange in the Economic Growth of Uganda: An Econometric Analysis

Mshilla Maghanga[1,*], William Quisenberry[2]

[1]Faculty of Business and Development Studies, Gulu University, P. O. Box 166 Gulu, Uganda
[2]Department of Management, SMC University, Zug, Switzerland
*Corresponding author: mshilla2000@gmail.com

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Abstract This study focused on the role of the Uganda Securities Exchange (USE) in stimulating economic growth in Uganda based on the premise that its contribution is not evident and yet is has been documented that economic growth is accelerated once a stock exchange opens, and that, securities markets support economic growth and can increase economic efficiency, investment and growth of real gross domestic product (GDP) of a country. This quantitative study focused on a period of twenty five years (1986-2010). Autoregressive distributed lag (ARDL) bounds testing procedure was adopted because the Uganda's stock market is not only small but also very young. The study variables included real GDP as a proxy of economic growth; while the proxies for the stock exchange development were shares traded, market turnover, and market capitalization. The sources of these data included Uganda Bureau os Statictics, Bank of Uganda, USE, Ministry of Finance and Economic Development, International Monetary Fund, and World Bank databases. Analyses were carried out using SPSS and SHAZAM computer softwares. Real GDP was established to be more closely correlated to market capitalisation [Pearson's r = .973, Sig. (2-tail) = .000] than it is with the turnover [Pearson's r = .634, Sig. (2-tail) = .036] and the shares traded [Pearson's r = .730, Sig. (2-tail) = .011]. While a strong and statistically significant correlation was established between the economic growth and the Exchange, the Granger causality relationship findings were inconclusive further affirming that stock markets are not a *sine qua non* of economic growth. It was recommended that the government should support USE to attract more investors and become more vibrant. Also, USE should take advantage of the East African Stock Markets Association (EASEA) to grow its operations and market base.

Keywords: *stock markets, economic growth, Uganda Securities Exchange, econometric analysis, Autoregressive distributed lag (ARDL)*

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1. Introduction

1.1. Background Information

The USE was founded in 1997 and became operational in January 1998, making it the 17th stock exchange in Africa. It is a non-profit making body that was established as a result of the Government policy of transforming the economy of Uganda from a public sector-based to a private sector-driven basis. USE operates under Uganda's Capital Market Authority (CMA) and the Bank of Uganda (BOU). Its roles include providing a facility for raising funds for investment in long-term assets, mobilizing savings for investment, improving access to finance for new and smaller companies, and assisting in the divestiture of government-owned companies [36].

The theoretical concepts that underpin this study were drawn from the many studies that have been conducted in the area of stock markets and economic growth. For example, Baier, Dywer and Tamura [9] established that economic growth increases after a stock exchange opens; Ilmolelian [20] demonstrated that stock markets are important for raising external funding; and Wolassa [38] proved that liquid markets improve the allocation of capital and enhances prospects for long-term economic growth. For their part, Yartey and Adjasi [40] established that since stock markets encourage savings at both individual and firm levels, they positively influence economic growth. Yet again, Ilmolelian [20] indicated that listing on stock markets improves accounting standards and management transparency, since there is disclosure of information to investors. In the same vein, Cole, Moshirian, and Wu [11] indicated that there is a positive and significant relationship between bank stock returns and future GDP growth, hence, future economic growth, Similarly, Agarwal [5], Cole, Moshirian and Wu [11] indicated that capital market development is correlated to real GDP growth, while Baier, Dywer, and Tamara [9] suggest that well functioning capital or securities markets can increase economic growth. Finally, Hondroyiannis, Lolos, and Papapetru [17] and Wolassa [38] indicate that

both banks and stock market financing can promote economic growth.

Although Agarwal [5] and Cole, Moshirian, and Wu [11] indicate that capital market development is correlated to real GDP growth, no studies seem to be conclusive about this issue [10]. Indeed, Shliefer and Summers, and Singh as quoted by Nurudeen [26], indicate that "stock market development may hinder economic growth by promoting counter-productive corporate takeovers" or "the stock market may not be important in attaining higher economic growth" respectively. Similarly, although Uganda's economy has been growing since 2000 [31] at an average of 8.9% in real terms [31], no study has linked this growth to USE. Therefore, while one can postulate that the USE has played a contributory role in the economic growth of Uganda, the nature and extent of this role have not been described or quantified respectively.

1.2. Problem Statement

Despite the considerable number of researches that have been conducted in the areas of stock markets, and economic growth, it is not yet conclusive that there is a definite correlation between these phenomena. In support of the correlations, Baier, Dywer and Tamura [9] established that economic growth increases after a stock exchange opens, and that a stock exchange increases economic efficiency, investment, and growth. For Yartey and Adjasi [40] concurred that since stock markets encourage both individuals and firms to save, they positively influence economic growth. However, Cole, Moshirian, and Wu [11] and Agarwal [5] state that as much as a number of studies have further indicated that there is a positive correlation between stock markets and economic growth of any country and the growth of real GDP, this may not have been conclusively established. It is also not clear as to what extent the USE is contributing towards Uganda's economic growth as much stock markets have been associated with economic growth, especially in developed economies. Literature on this matter is scanty, and it is partly for this reason that this study was undertaken.

1.3. Purpose and Scope of the Study

This study was meant to establish the relationship between the performance of the USE and the economic growth of Uganda, hence, establish the economic growth contribution of the Exchange. This was done by carrying out econometric analyses using the proxies of both stock market performance and economic growth. The study covered a period of twenty five (25) years from 1986 to 2010, which translated into twelve years before and twelve after the USE became operational in 1998.

1.4. Conceptual Framework

Since stock markets can influence economic growth, as already established [5,11], USE was considered to be the independent variable whereas the economic growth of Uganda was the dependent variable. Other markets such as commodity markets, money markets, derivative markets, and capital markets within the financial market were the control or restricting variables. Economic and non-economic growth factors were confounders as illustrated in Figure 1.

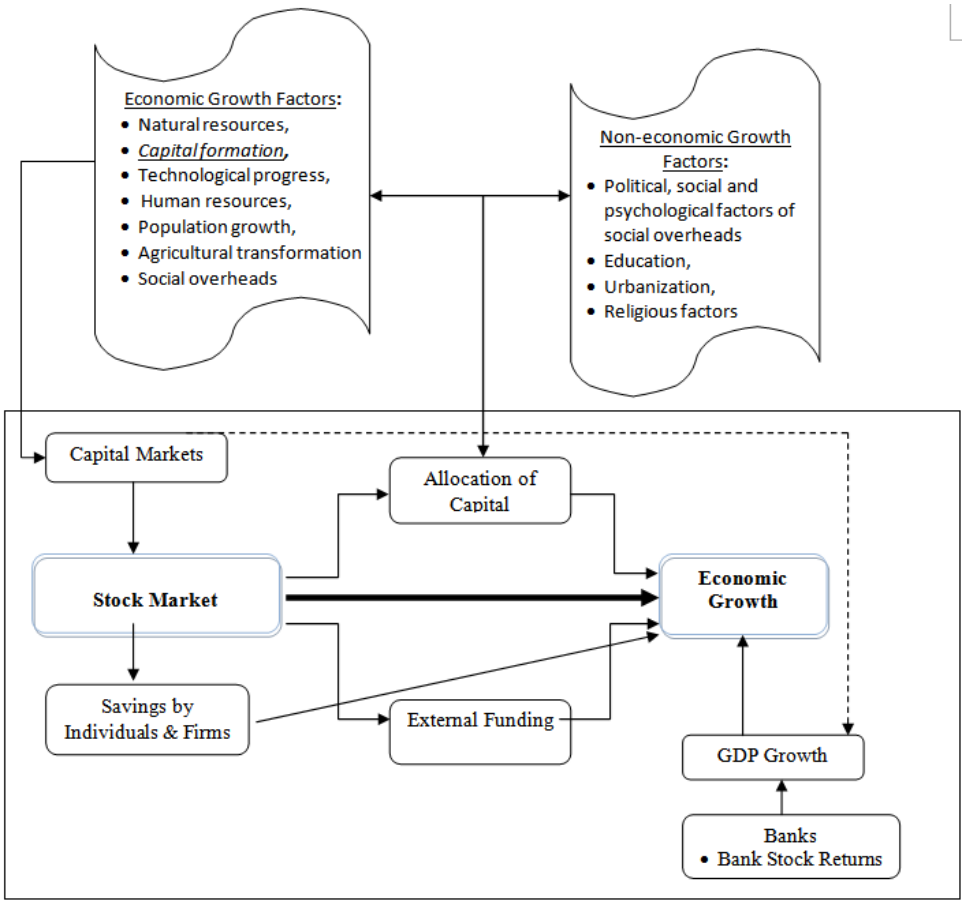

Figure 1. The conceptual framework of stock markets and economic growth

2. Literature Review

2.1. The Stock Market-economic Growth Debate

The debate about the causality relationship between stock markets and economic growth has ranged on for a long time. Many studies have attempted to establish the relationship between the two and also to find out which one has an effect on the other. While some studies have reported a unidirectional relationship from the stock market to economic growth, others have established a bidirectional relationship. Most of these studies have been carried out in either developed or developing countries, with very few on the underdeveloped countries. Further to that, in most cases, bank development has been used as a proxy for financial development while studies focusing mainly on the causal relationship between stock markets and economic growth are very few [27]. While some researchers have studied the causal relationship between stock market development and economic growth, others investigated the correlation between the two, instead. For instance, Nurudeen [3] reports that Gursoy and Muslumov, Khan, and Hondroyiannis et al. [18] established a bi-directional relationship, while Ted Arzarmi et al investigated the correlation aspect.

While majority of the studies on stock markets and economic growth are cross-country, a few have been country-specific. The cross-country studies have a limitation in that errors arise from the fact that the different countries used in a study may be at different stages of financial development. With all this, and considering that it is not possible to directly measure economic growth and stock market development other than through proxies, most findings are inconclusive. Based on the aims of different studies, different models have been employed to test the relationship between these variables –stock market development and economic growth.

Also, different studies on stock market development and economic growth have used different sets of data (cross-country verses specific country data); different study periods ranging from a few years to tens of years; and different proxies for both stock market development and economic growth. For instance, while Okechukwu [29] in his study focusing on the role of stock market in sub-Saharan African economies selected eleven countries, Aboudou [2] and Herve and Shen [16] looked at the West African Financial Markets under the West African Monetary Union which has eight member states. On their part, Mohtadi and Agarwal [23] focused on 21 emerging stock markets over a 21-year period. A few researchers in Africa and elsewhere have carried out studies on single countries. Ujunwa and Salami [35] and Abu [26] focused on Nigeria; Ake and Ognaligui [7] on Cameroon; Haque and Fatima [15] on Bangladesh; Shahbaz, Ahmed, and Ali [24] on Pakistan; and Odhiambo [27] on South Africa.

2.2. Empirical Methodologies

Different empirical methodologies have been used in the several approaches used to determine the contribution of stock markets to economic growth. Odhiambo [27] uses ARDL-Bounds testing procedure in his analysis of South Africa to avoid the limitations in the other approaches that have been used before. He argues that 'residual-based cointergration' techniques and the 'maximum likelihood test' are not appropriate for small sample sizes as indicated by Nerayan and Smyth and Odhiambo [27]. Based on different studies, ordinary least squares can be used to investigate the relationship between stock markets and economic growth just as can the error-correction method. In stock market – economic growth studies, stock market capitalization, stock market traded value and stock market turnover have been used as proxies for stock market development while real GDP per capita has been used as a proxy for economic growth in many stock market verses economic growth studies.

2.3. Stock Exchanges and Economic Growth

According to Nurudeen [26], stock market development is important in predicting the future performance of an economy, and not just following economic growth. This seems to suggest the dual-relationship between stock markets and economic growth. On a study on the Indian economy, Deb and Mukherjee [12] established that there was a strong causal flow from the stock market development to economic growth and that a bi-directional causal relation existed between real market capitalisation and economic growth. Also, Odhiambo [28] established a bi-directional causal relationship between stock market development and economic growth in his study on South Africa. His study concluded that, "...whilst both financial development and economic growth Granger cause each other, the development of the financial sector in South Africa is largely driven by the stock market activities" (p.77). On a similar note, Nurudeen [26] in his study focusing on Nigeria reported that stock market development Granger-causes economic growth. He also indicates that while in the long-run there was a feedback relationship between stock market development and economic growth, in the short-run the causality is only in the direction of economic growth from the stock market development.

At the same time, Ujunwa and Salami [35] established that whereas stock market size and turnover ratios were positive in explaining the economic growth of Nigeria, the stock market liquidity coefficient was negative in explaining long-run growth. Interestingly, Minier [22] indicates that while a developed stock market has a positive influence on economic growth, the reverse is true for an underdeveloped stock market. On their part, Adam and Sanni who similarly studied Nigeria reported a one-way causality between GDP growth and market capitalization but a two-way causality between GDP growth and market turnover. Interestingly, the findings of Osinubi and Amaghionyeodiwe did not support that stock markets promotes economic growth of Nigeria. Similarly, while Hossain and Kamal [19] established that stock market development strongly influences the economic growth in Bangladesh, they at the same time established that there was no causality from economic growth to stock market development. Similarly, Ake and Ognaligui [7] in their study on Douala Stock Exchange of Cameroon established that the stock exchange did not affect Cameroonian economic growth. However, they reported a positive relationship between the development of the stock

exchange and the economic growth on whose basis they recommended that the Cameroonian government should devise financial policies to encourage companies to list on the stock market and use IPO to generate capital away from the traditional approach of bank loans. This they argued will help create a financial stock market culture.

Looking at the literature discussed so far concerning correlation between stock markets and economic growth, it is clear that the results vary depending on several factors as supported by the following studies. Antonios [4] established that there was a bilateral causal relationship between stock market development and economic growth which implied that economic growth in Ireland had a positive effect of stock market development; Xiaohui and Peter [39] established a one-way causality from economic growth to stock market prices in the long-run and from stock market prices to economic growth in the short-run in Greater China in the short-run; Vazakidis and Adamopoulos [37] carried out Granger causality tests on data from Italy and established that there was a unidirectional causality between stock market development and economic growth with the direction from economic growth to stock market development. Adamopoulos [4] established similar results when he studied the situation of Germany for the period 1965 – 2007 that there was a unidirectional causality between stock market development and economic growth with the direction from economic growth to stock market development.

Similarly, Rahman and Salahuddin [30] on their study on Pakistan established a positive relationship between efficient stock markets and economic growth in both the short- and long-run while Agrawalla and Tuteja [6] established a stable long-run equilibrium relationship between stock market developments and economic growth in India.

Unlike the favourable findings by the other scholars, Haque and Fatima [15] in their study on the influences of stock market on real economy which focused on Bangladesh established that the stock market did not have any effect on the real economic activity.

3. Methodology

This study was historical in nature covering a period of twenty five years, twelve on either side of the USE inception year of 1998. It was purely quantitative as it involved analysing seconday econometric data.

3.1. Data Collection Methods

A statistical data collection guide was used for collecting time serial data for a 25-year period (1986 to 2010) of the economic growth of Uganda, and 13-year period (1998 to 2010) for stock market performance data. The sources of these data included UBOS, BOU, USE, MoFPED, International Monetary Fund (IMF), and World Bank databases. They also included official websites and published annual and official reports of UBOS, BOU, USE, MoFPED, CMA and the listed companies were used.

This study only focused on the real per capita GDP, as the proxy to economic growth being the most relevant according to Dhamija [13]; while stock market capitalization ratio, total value of shares traded ratio and stock market turnover ratio served as proxies to the USE development. The choice of the proxies was in line with studies by Mohtadi and Agarwal [23], and Odhiambo [27], since they also studied stock markets and their roles in economic growth. As for GDP, Svoboda [33] indicates that it is "the most comprehensive measurement of economic performance and thereby economic growth" (p. 75).

3.2. Data Analysis and Presentation

3.2.1. Mathematical Models Used in Analysis

The analysis for economic growth was carried out using real GDP while proxies for stock market performance were turnover, value of shares traded, and market capitalization. Past and recent studies such as studies by by Mohtadi and Agarwal [23], and Odhiambo [27] were also reviewed.

Arising from different proxy indicators for both economic growth and stock market performance, several analytical models have been derived. These models have also depended on the type of study-whether cross-country or intracountry. With different justifications, different researchers have opted for different models to study the relationship between stock market development and economic growth. For instance, Okechukwu [29] focused on 11 sub-Saharan African economies; Aboudou [2] and Herve and Shen [16] on 8 West African Financial Markets; and Mohtadi and Agarwal [23] focused on 21 emerging stock markets. Examples of single country (country specific) studies were conducted by: Ujunwa and Salami [35] and Abu [26] focusing on Nigeria; Ake and Ognaligui [7] on Cameroon; Haque and Fatima [15] on Bangladesh; and Odhiambo [27] on South Africa.

Since this study aimed at establishing the role played by the USE towards the economic growth of Uganda, the Ordinary Least Square (OLS) regression, was used. This approach was in line with that adopted by Odhiambo [27] who similarly undertook a country-specific study while researching on South Africa.

3.2.2. Analysis of Secondary Data

To analyze the 25-year period data, an econometric analysis using Autoregressive distributed lag (ARDL) bounds testing procedure, Granger Non-causality test, stationarity tests, cointegration test, and analysis of causality test based on error-correction model were applied to investigate long-run causal linkages and short-run dynamics between stock market development and economic growth of Uganda. The time series analysis was carried out using SHAZAM computer software package. Both regression and time-series analyses were computed. While regression analysis was to establish the contribution of the stock market to economic growth, the time series analysis was to establish the trend of events throughout the study period.

To analyse the link between the USE and the economic growth of Uganda, and in line with studies by Mohtadi and Agarwal [23], and Odhiambo [27], the proxies indicated above were used. The equations 1 to 5 show how these proxies are computed in which: stock is denoted by STK; gross domestic product by GDP; real GDP by y; and total population by N. Similarly, market

capitalization is denoted by SCAP; total value of shares traded by STKT; total value traded by STOV; and the stock market capitalization by SCAP

$$\text{Stock market development} = \frac{\text{STK}}{\text{GDP}} \tag{1}$$

$$\text{Real GDP per capita}\left(\text{y / N}\right) = \frac{\text{Real GDP }\left(\text{y}\right)}{\text{Total population }\left(\text{N}\right)} = \frac{y}{N} \tag{2}$$

$$\text{Stock market capitalization ratio} = \frac{\text{Market capitalisation}}{\text{GDP}} = \frac{\text{SCAP}}{\text{GDP}} \tag{3}$$

$$\text{Stock market traded value ratio} = \frac{\text{Total value of shares traded}}{\text{GDP}} = \frac{\text{STKT}}{\text{GDP}} \tag{4}$$

$$\text{Stock market turnover ratio} = \frac{\text{Total value traded}}{\text{Stock market capitalisation}} = \frac{\text{STOV}}{\text{SCAP}} \tag{5}$$

ARDL bounds-testing techniques, which according to Odhiambo [27] was used to examine the long-run cointergration relationship between each of the three USE proxies to GDP per capita, the economic growth proxy. The advantages of this technique are that: it can be used even if the underlying regressors are integrated of the order one [I(1)], order zero [I(0)], or fractionally integrated; it is suitable even for small sample sizes unlike other cointegration techniques; and it provides unbiased estimates of the long-run model and valid t-statistics even when some of the regressors are endogenous [27]. This study used the analysis approach adopted by Odhiambo [27] where he used an ARDL-Bounds Approach in his study, 'the stock market development and economic growth development in South Africa'. The key tests included ARDL bounds testing procedure, Granger non-causality test, stationarity tests, cointegration test, and analysis of causality test based on error-correction model. The three models are as illustrated below.

(a) Cointegration – ARDL bounds testing procedure

1. Stock market capitalization and economic growth

$$\Delta Iny_t = a_0 + \sum_{i=1}^{n} a_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} a_{2i}\Delta InSCAP_{t-i} + a_3 Iny_{t-1} + a_4 InSCAP_{t-1} + \mu_t \tag{6}$$

$$\Delta InSCAP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\Delta InSCAP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta Iny_{t-i} + \beta_3 Iny_{t-1} + \beta_4 InSCAP_{t-1} + \mu_t \tag{7}$$

2. Stock market traded value and economic growth

$$\Delta Iny_t = \phi_0 + \sum_{i=1}^{n} \phi_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} \phi_{2i}\Delta InSTKT_{t-i} + \phi_3 Iny_{t-1} + \phi_4 InSTKT_{t-1} + \mu_t \tag{8}$$

$$\Delta InSTKT_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\Delta InSTKT_{t-i} + \sum_{i=0}^{n} \delta_{2i}\Delta Iny_{t-i} + \delta_3 Iny_{t-1} + \delta_4 InSTKT_{t-1} + \mu_t \tag{9}$$

3. Stock market turnover and economic growth

$$\Delta Iny_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\Delta InSTOV_{t-i} + \alpha_3 Iny_{t-1} + \alpha_4 InSTOV_{t-1} + \mu_t \tag{10}$$

$$\Delta InSTOV_t = \lambda_0 + \sum_{i=1}^{n} \lambda_{1i}\Delta InSTOV_{t-i} + \sum_{i=0}^{n} \lambda_{2i}\Delta Iny_{t-i} + \lambda_3 Iny_{t-1} + \lambda_4 InSTOV_{t-1} + \mu_t \tag{11}$$

In the equations above,

Iny = log of per capita real GDP
InSCAP = log of stock market capitalization
In STKT = log of stock market traded
InSTOV = log of stock market turnover
μ_t = white noise error term
Δ = first difference operator

(b) Granger non-causality test

The Granger non-causality test was used to test for the causal relationship between stock market development and economic growth of Uganda. In this test, "if past values of a variable *y* significantly contribute to forecast the future value of another variable *x* then *y* is said to Granger cause *x*. Conversely, if past values of *x* statistically improve the prediction of *y*, then it can be concluded that *x* Granger causes *y*" ([1], p.19). In this study, the test was based on the following three regression models.

1. Stock market capitalization and economic growth

$$\Delta Iny_t = a_0 + \sum_{i=1}^{n} a_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} a_{2i}\Delta InSCAP_{t-i} + ECM_{t-1} + \mu_t \tag{12}$$

$$\Delta InSCAP_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i}\Delta InSCAP_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta Iny_{t-i} + ECM_{t-1} + \mu_t \tag{13}$$

2. Stock market traded value and economic growth

$$\Delta Iny_t = \phi_0 + \sum_{i=1}^{n} \phi_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} \phi_{2i}\Delta InSTKT_{t-i} + ECM_{t-1} + \mu_t \tag{14}$$

$$\Delta InSTKT_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i}\Delta InSTKT_{t-i} + \sum_{i=0}^{n} \delta_{2i}\Delta Iny_{t-i} + ECM_{t-1} + \mu_t \tag{15}$$

3. Stock market turnover and economic growth

$$\Delta Iny_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i}\Delta Iny_{t-i} + \sum_{i=0}^{n} \alpha_{2i}\Delta InSTOV_{t-i} + ECM_{t-1} + \mu_t \tag{16}$$

$$\Delta InSTOV_t = \lambda_0 + \sum_{i=1}^{n} \lambda_{1i}\Delta InSTOV_{t-i} + \sum_{i=0}^{n} \lambda_{2i}\Delta Iny_{t-i} + ECM_{t-1} + \mu_t \tag{17}$$

In the equations above,

Iny = log of per capita real GDP
InSCAP = log of stock market capitalization
In STKT = log of stock market traded

InSTOV = log of stock market turnover
μ_t = white noise error term
Δ = first difference operator
ECM_{t-1} = the lagged error correction term

(c) Stationarity tests

Before running the causality test stock market capitalization, stock market traded value, stock market turnover, and economic growth were tested for stationarity. The Dickey-Fuller generalized least square (DF-GLS) and Phillips-Perron (PP) test were carried out. According to the article entitled 'DF-GLS vs. Augmented Dickey – Fuller', "DF-GLS is used to test for a unit root in a time series. It is an augmented Dickey-Fuller test except that the time series is transformed via a generalized lead squares (GLS) regression before performing the test". "It is a two-step process, in which the series is estimated by generalized least squares in the first step before a normal Dickey-Fuller test is used to test for a unit root in the second step" (Dicky-Fuller Test, n.d). On the other hand, the Phillips-Perron test is a unit root test used to test null hypothesis that a times series is integrated of order 1 and it takes a non-parametric correction to the t-test statistic.

(d) Cointegration test

This test involved the long-run relationship between [SCAP, y]; [STKT, y] and [STOV, y] was examined using the ARDL bounds testing procedure. According to Lin [21], two series are said to be cointegrated when linear combination of two I(O) process become an I(φ) process. Lin further states that cointegration is relevant because it implies existence of long-run equilibrium; it implies common stochastic trend; it can aid in the separation between short- and long-term relationships among variables; and it can be used to improve long-run forecast accuracy.

(e) Analysis of causality test based on error-correction model

Nurudeen [26] in his study focusing on Nigeria used the error correction approach to investigate whether stock market development raises economic growth. In this case an error correction model (ECM) is used. This is a good time series model because it is able to describe both short-run dynamics and long-run equilibrium simultaneously; An ECM uses an error correction term as defined in the equation below.

$$\xi_t = y_t - \beta x_t$$

Where: ξ_t = the error from a regression of y_t on x_t
β = a cointegrating coefficient

The ECM is given as: $\Delta y_t = \alpha\xi_{t-1} + \gamma\Delta x_t + u_t$

This equation indicates that Δy_t can be explained by the lagged $\alpha\xi_{t-1}$ and Δx_t. While β is called the long-run parameter α and γ are called the short-run parameters. Since all the variables in the ECM are stationary, the ECM has no spurious regression problem. In this study, there was need to establish the relationship between the USE and the economic growth of Uganda in both the short- and long-run horizons

4. Results and Discussions

4.1. Economic Growth of Uganda from 1986 to 2010

Using the growth rate of the GDP constant price (also called real GDP or inflation-corrected GDP), Figure 2 was generated. The figure shows that, in general terms, Uganda's economy grew gradually from 1986 to 2010. However, considering the economic growth in real terms, the trend was not as smooth (Figure 3) as much as the overall trend was upwards.

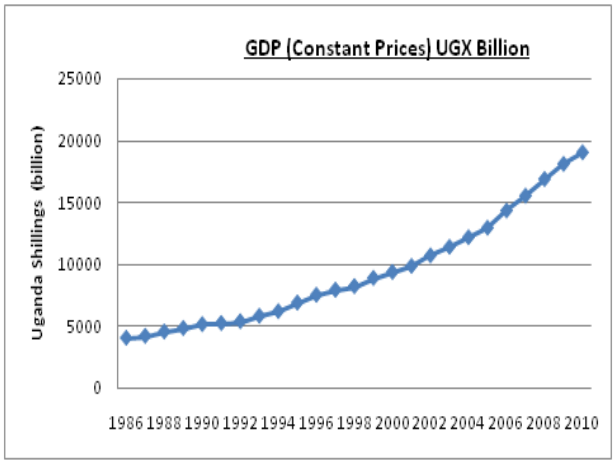

Figure 2. GDP (constant prices, national currency) UGX billion: Adopted from IMF (2011) World Economic Outlook

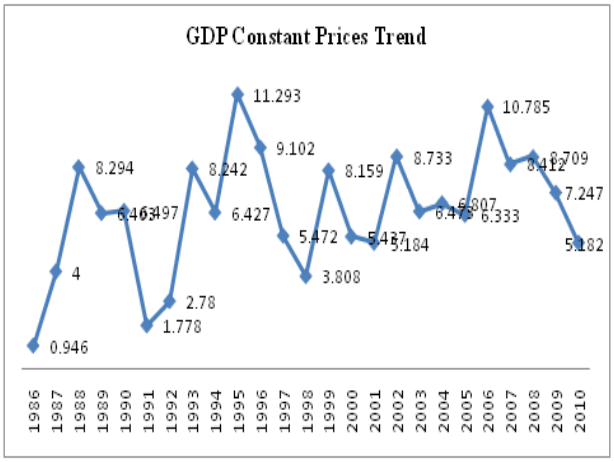

Figure 3. GDP constant prices growth rate between 1986 and 2010: Adopted from IMF (2011) World Economic Outlook

Focusing on the study period (1986 – 2010), Uganda registered the lowest growth rate in 1986 of about 0.95% and the highest (11.29%) in 1995. As per the GDP Constant prices, there was a general upward trend from 1986 to 2010, albeit the many and deep troughs. Also, after 1998 the troughs were shallower while the peaks were shorter compared to the period before. Whether this trend had anything to do with the establishment of USE in 1998 is not conclusive at this point. Save for 1998 when the growth was 3.8% and 2006 when it was 10.8%, the GDP fluctuated between 5 – 10% since the inception of the USE up to 2010.

4.2. Correlation Analyses

Correlation analyses, regression analysis, stationarity tests, cointegration test and causality test were carried out to find out if USE had a role in the upward trend of economic growth of Uganda established earlier. Using Real GDP per capita as a proxy of economic growth and the stock market performance proxies being market

capilisation, turnover and shares traded, the results obtained were as displayed in Figure 4 and Table 1:

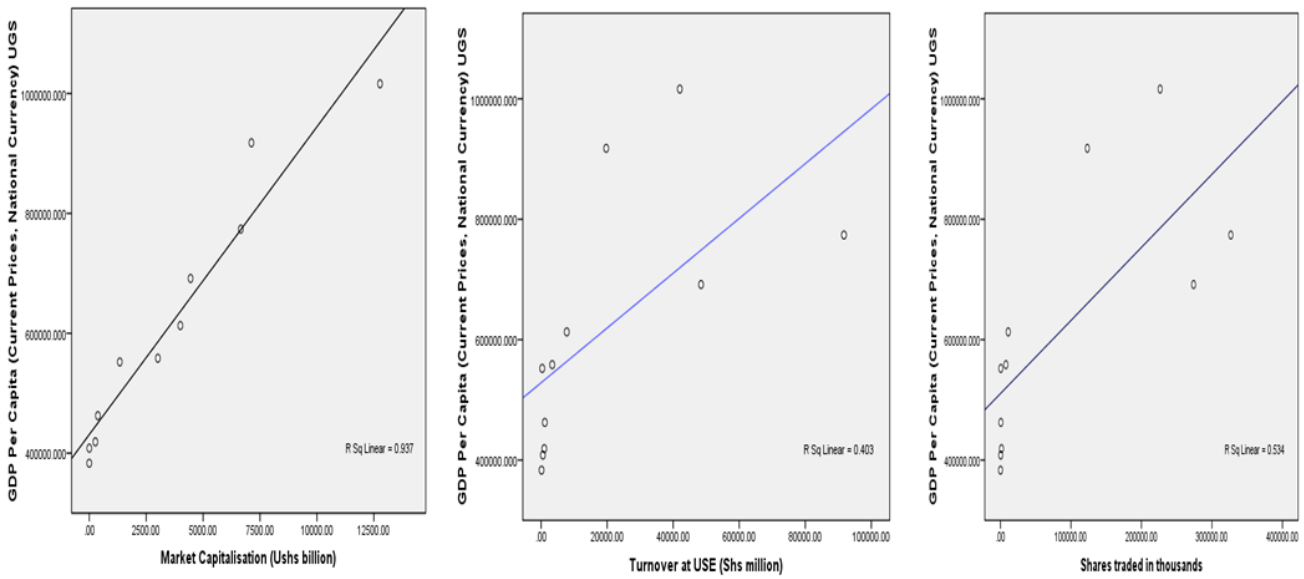

Figure 4. Correlation - Real GDP per capita and stock market variables

From the Figure, it is evident that the GDP is more closely correlated to market capitalisation than it is with the turnover and the shares traded. As per Table 1, the GDP Vs market capitalisation results were: Pearson's r = .973, Sig. (2-tail) = .000; those of GDP Vs turnover: Pearson's r = .634, Sig. (2-tail) = .036; and of GDP Vs shares traded were: Pearson's r = .730, Sig. (2-tail) = .011.

Table 1. Correlation tests – Economic Growth and Stock Market

		GDP (Current Prices, National Currency) UGS Billion	Market Capitalisation (Ushs billion)
GDP (Current Prices, National Currency) UGS Billion	Pearson Correlation	1	.973**
	Sig. (2-tailed)		.000
	N	11	11
Market Capitalisation (Ushs billion)	Pearson Correlation	.973**	1
	Sig. (2-tailed)	.000	
	N	11	11

		GDP (Current Prices, National Currency) UGS Billion	Turnover at USE (Shs million)
GDP (Current Prices, National Currency) UGS Billion	Pearson Correlation	1	.634*
	Sig. (2-tailed)		.036
	N	11	11
Turnover at USE (Shs million)	Pearson Correlation	.634*	1
	Sig. (2-tailed)	.036	
	N	11	11

		GDP (Current Prices, National Currency) UGS Billion	Shares traded in thousands
GDP (Current Prices, National Currency) UGS Billion	Pearson Correlation	1	.730*
	Sig. (2-tailed)		.011
	N	11	11
Shares traded in thousands	Pearson Correlation	.730*	1
	Sig. (2-tailed)	.011	
	N	11	11

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

According to these results, the Pearson's r values for all correlations were above 0.5 implying that the variables were strongly correlated. Similarly, the Sig. (2-tailed) values indicate that the correlations were statistically significant since they were all less than 0.05. This implied that an increase in any of the three stock market variables will significantly correlate with an increase in the GDP.

4.3. Multiple Regression Analyses

A multiple regression analysis pitting the GDP per capita as the dependent variable and the independent variables being market capitalization, value of shares traded, and market turnover, was also carried out. This

was to further determine the relative contribution of the the stock market variables towards economic growth as measured by the change in real GDP per capita. The results are presented below under several tables namely the model summary, analysis of variance (ANOVA), regression coefficients, and residuals statistics. A histogram and a P-P Regression plot have also been presented.

Table 2. Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.859[a]	.738	.701	2510.661462

a. Predictors: (Constant), Shares traded in thousands, Market Capitalisation (Ushs billion), Turnover at USE (Shs million)
b. Dependent Variable: GDP (Constant Prices, National Currency) UGS Billion

According to the regression model summary, Table 2, the R and R^2 values were 0.859 and 0.738 respectively. While the former statistic suggests a high degree of correlation, the latter indicates the level of dependence of GDP to the independent variables. In this case it is at 73.8% which is considered to be very large. Looking at the "Regression" row and the "Sig." column in Table 3, the regression model is said to predict the GDP variable significantly well.

Table 3. Analysis of Variance (ANOVA)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.729E8	3	1.243E8	19.719	.000[a]
	Residual	1.324E8	21	6303420.979		
	Total	5.053E8	24			

a. Predictors: (Constant), Shares traded in thousands, Market Capitalisation (Ushs billion), Turnover at USE (Shs million)
b. Dependent Variable: GDP (Constant Prices, National Currency) UGS Billion

Table 4.Regression Coefficients Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	7401.030	566.313		13.069	.000
	Market Capitalisation (Ushs billion)	1.122	.277	.775	4.046	.001
	Turnover at USE (Shs million)	.036	.100	.167	.358	.724
	Shares traded in thousands	-.003	.026	-.054	-.102	.920

a. Dependent Variable: GDP (Constant Prices, National Currency) UGS Billion

Since the significance level is less that 0.05, it indicates that, in general, the model applied is significantly suitable for predicting the dependent variable, the GDP. As per the "Sig." column, it is only market capitalisation among the independent variables that is significant at the 0.01 level. Using the column B, in Table 4, the following regression requisition was derived:

$$GDP = 7401 + 1.122(Market\ Capitalisation) + 0.036\ (Turnover) - 0.003(Shares\ Traded)$$

This equation is of the form: $Yi = B_1 + B_2X_{2i} + B_3X_{3i} + B_4X_{4i} + \mu i$

Where, Y = is the dependent variable

B_1 to B_4 = the numeric components in the equation

X_2 to X_4 = are explanatory variables

μ = is the stochastic disturbance term

Table 5 gives the Residuals Statistics results. The Std. Residual is given by the difference between the Residual and the Std. Predictive Value. That is,

Std.Residual statistic

$$= Dependent\ variable(Residual) - Std.\ Predicted\ value$$

$$e = y - \hat{y}$$

Where: e = Residual statistic

y = *Dependent variable (Residual)*

$\hat{y}$ = *Std. Predicted value*

Table 5. Residuals Statistics

Residuals Statistics[a]					
	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	7.40103E3	2.26355E4	9.40268E3	3941.698335	25
Residual	-3.561519E3	3.541921E3	.000000	2348.508752	25
Std. Predicted Value	-.508	3.357	.000	1.000	25
Std. Residual	-1.419	1.411	.000	.935	25

a. Dependent Variable: GDP (Constant Prices, National Currency) UGX Billion

As expected, the mean of the Std. Residual is zero considering that the Minimum Residual Statistic value is -1.419 while the Maximum value is -1.411

The histogram (Figure 5) of the standardized residual values gives a fair distribution on both sides around the mean of zero. This suggests that the residuals are normally distributed. On the other hand, the Normal P-P Plot of Regression Standardized Residual values (Figure 6) suggests that there is very little deviation of the expected values from the observed values since all values are either very close or on top of the reference line. This also suggests that the distribution can be considered to be normal.

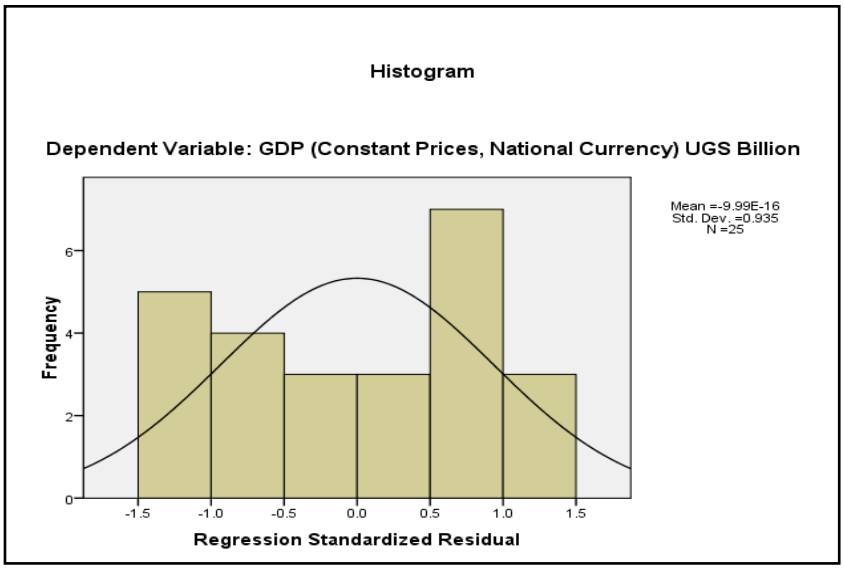

Figure 5. Correlation – Histogram

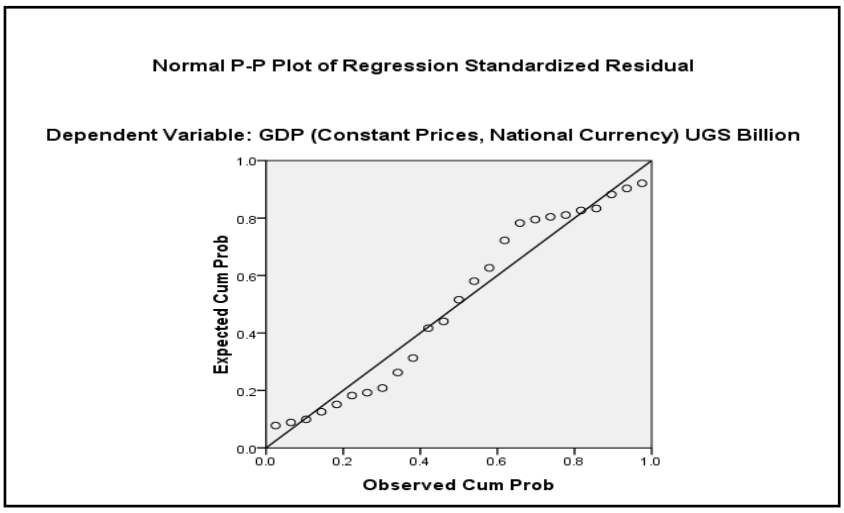

Figure 6. Correlation – Regression standardized residual

This residual plot helps to validate the regression model. This is because randomness and unpredictability are crucial elements of any regression model [14] to make it valid. This is because for a valid regression model:

$$\text{Response} = (\text{Constant} + \text{Predictors}) + \text{Error}$$

Or Response = Deterministic + Stochastic

Frost [14] explains that, while the deterministic portion is explained by the predictor variables of the model, the stochastic error, which means random and unpredictable, is the difference between the expected value and the observed value. The residual plot helps assess whether the observed error (residuals) is consistent with the stochastic error. In summary, it was established that there was a high degree of correlation between the study variables, and that the level of dependence of GDP to the independent variables was very high at over 70%. The results also indicated that the regression model predicted the GDP variable significantly well. Also, since the significance level was less that 0.05, it indicated that, in general, the model applied was significantly suitable for predicting the dependent variable, that is, the GDP. It was also established that it was only market capitalisation among the independent variables that was significant at the 0.01 level. Arising from the results, it was possible to generate an equation of the form $Yi = B_1 + B_2X_{2i} + B_3X_{3i} + B_4X_{4i} + \mu i$ where Y was the GDP; B_1 to B_4 were numeric components in the equation; X_2 was market capitalisation; X_S the turnover; and X_4 the shares traded.

Also, the Normal P-P Plot of Regression Standardized Residual values suggested that there was very little deviation of the expected values from the observed values since all of them were either very close or on top of the reference line further suggesting that the distribution can be considered to be normal. The residual plot helped to validate the regression model since according to Frost [14] randomness and unpredictability are crucial elements of any regression model to make it valid.

The findings of this study were that there was a high degree of correlation and a dependence of GDP to the independent variables as much as the GDP was established to have been more closely correlated to market capitalisation than it was with the turnover and the shares traded. All the same, all correlations were strong and statistically significant which implied that an increase in any of the three stock market variables will significantly correlate with an increase in the GDP.

The different conclusions by different authors as established by the literature review analysis of stationarity, cointegration, and causality tests meant that the debate as

to the relationships between economic growth and stock markets is not yet over. This study actually failed to yield results that could have supported one of the sides of the argument. As such, it is not conclusive as to whether stock markets Granger cause economic growth or is it the other way round and whether there is only a unidirectional relationship between the two variables or is it dual. The findings by the different researchers may have generated different results partly because of the different study backgrounds and study foci. It could also be because of the level of development of the economies and the stock market studied.

4.4. Stationarity Tests

Before running the causality test, the study variables needed to be tested for stationarity. According to Odhiambo [27], this can best be done using Phillips-Perron test and Dickey-Fuller generalised least square (DF-GLS) which are the most recent unit root tests.

4.5. Cointegration Test

The Bounds F-Tests for Cointegration were carried out to investigate the long-run relationship between the dependent variable (GDP) and each of the independent variable (stock market capitalisation, traded stock market, and stock market turnover). Apparently, the results were inconclusive and this was blamed on the limited and inconsistent data.

4.6. Causality Test

This was based on the Error-Correction Model [27]. This test was meant to establish whether the causality established by the correlation results above was from the stock market (the USE) to the economic growth of Uganda or whether it was the other way round. Again, the results were inconclusive just as it was the case with the cointegration test. The short-run and long-run relationship could, therefore, also not be established.

Arising from the results of the above three sub-sections, it is indicated that the stationarity, cointegration, and causality test results were inconclusive and therefore it was not possible to investigate the long-run relationship between the dependent variable (GDP) and each of the independent variable (stock market capitalisation, traded stock market, and stock market turnover).

4.7. Summary of the Findings

The findings of this study indicate that the economy has generally grown throughout the study period except for a few downward fluctuations. The findings may also be confirming the thinking of Arestis, Demetriades and Luintel [8] that as much as stock markets contribute towards economic growth, this contribution has been exagerrated by cross-country growth regression studies. On the other hand, the findings may be in support of the declaration by Singh as quoted by Yartey & Adjasi [40] that critics of stock markets "argue that stock markets may not perform efficiently in developing countries and that it may not be feasible for all African markets to promote stock markets given the huge costs and the poor financial structures" (p. 3). Also, they may be in support of the postulation by Cole, Moshirian, and Wu [11] and Agarwal [5] that a positive correlation between stock markets and economic growth may not have been conclusively established as the rule of thumb.

5. Conclusions and Recommendations

5.1. Conclusions

- Uganda's economy improved from 1986 to 2010 in general terms but after 1998 the degree of fluctuations reduced leading to shallower troughs and shorter peaks. This could not be solely be attributed to the establishment of the USE. Also, financial services under which stock markets belong serve as just one of the complementary sectors and not a key player in the economic growth. As such, as much as Uganda had shown some improvement in its economy from 1998 as established by this study, this could not be pegged to the establishment of the USE.
- The GDP per capita, just as the overall GDP, improved over the years. The improvement on GDP was established to have been as a result of several sectors, although the stock markt may have had an input. The failure to establish the causality relationship between USE and economic growth meant that it was not easy to establish whether the stock market Granger-causes the economic growth or vice versa.
- It is to be noted Baier et al. [9] indicated that as much as countries tend to grow faster after establishing stock exchanges, it is not the accumulation of capital that is important but the efficiency of allocation of the resources. Also, according to Ntim [25], the size of the stock market compared to its corresponding economy matters. In this case, he quotes WFEs (2012) which states that the capitalization of Uganda is just between 31 – 63% of Uganda's GDP compared to developed markets, say, UK (145.6%) and the US (122.8%); and emerging markets such as Malaysia (183.7%), India (172.5%) and Brazil (110.8).
- The performance growth of USE has fluctuated over the years. In general, though, as indicted by shares traded, the stock market turnover, and the ALSI, the performance has been on the rise over the years.

5.2. Recommendations

1. The government of Uganda through its relevant institutions such as the BoU and CMA should support and the USE to be able to attract more investors, local and abroad, so as to become more vibrant. This, according to Baier, Dywer and Tamura [9], and Wolassa [38] will ensure that USE will be well-functioning stock market that then can play a critical role in sustaining the economic growth of the country; and that it will better attract inflows of foreign capital
2. The USE should take advantage of both EASEA and ASEA to grow its operations and market base so as to become more vibrant.

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