Full Length Research Paper

Effects of selected socio-economic factors and elections spending on aggregate savings (total deposits) in Ghana

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Savings as a tool for domestic capital accumulation in developing countries has come under serious consideration in economic and financial development. However, savings in Ghana is characterized by very low tendencies, irregular trend and unenthusiastic attitudes of citizens towards it at the micro and macro levels. This study examined the effect of economic factors, election spending and health financing scheme on aggregate savings in Ghana. Time series spanning from 1997 to 2012 was used. The Dickey-Fuller Generalised Least Squares (DF-GLS), Johansen Cointegration technique and Vector Error Correction method were used for data analysis. The study revealed that the financial (interest rate spread and Treasury bill), and real sectors (GDP growth and international investment) and health financing scheme had significant effect in influencing aggregate savings in the long run. In addition to past savings, 91-day Treasury bill, age dependency and health financing scheme were short-run determinants of aggregate savings in Ghana although these dynamics were not immediate. As such, policies to influence aggregate savings should consider not only the financial instruments but also deal with the socio-demographic and the real sector dynamics of the economy as a whole in the intermediate to long-run basis.

Key words: Aggregate savings, socio-economic, election spending, cointegration, error correction, Ghana a.

INTRODUCTION

Developing nations have been experiencing low savings for the past decade. Whereas sub-Sahara Africa and Latin America experienced drastic reduction in savings, the savings of East Asia and other developed nations soured over the same period (Nwachukwu and Odigie, 2009; Joshua, 2012). Savings is a sacrifice of current
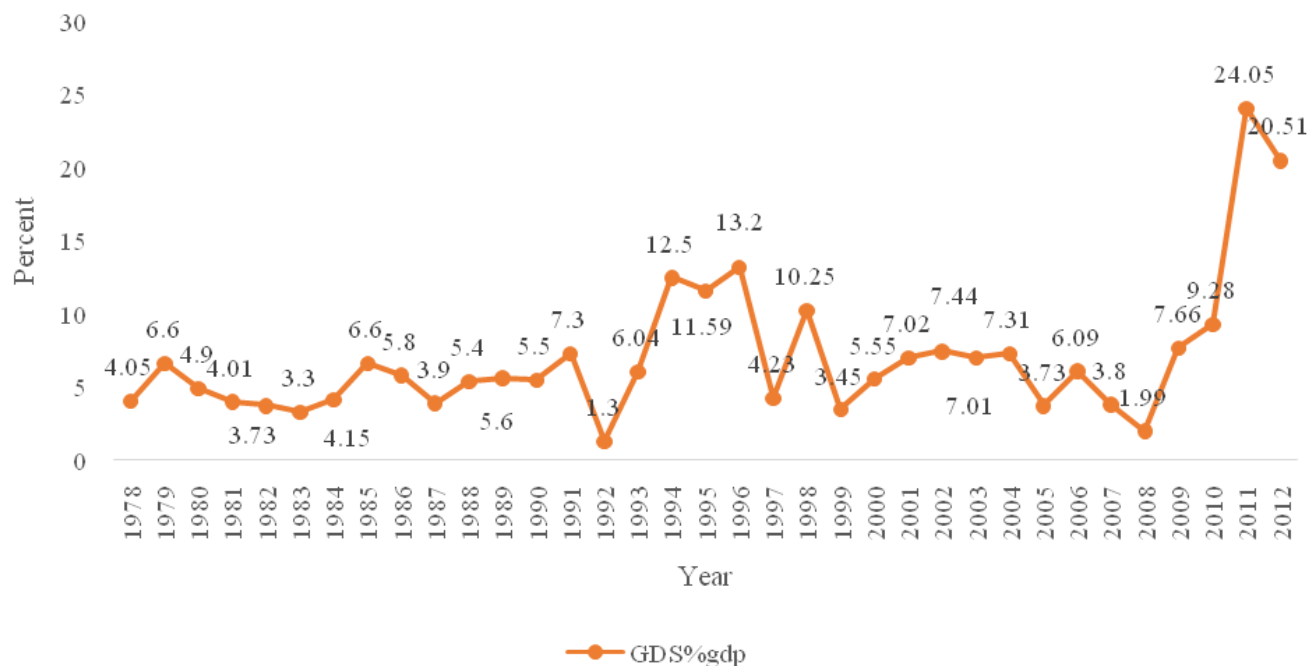
Figure 1. Trend of aggregate savings in Ghana (1978 to 2012).

consumption and it provides for the accumulation of capital which, in turn, produces additional output that can potentially be used for consumption in the future. The issue of savings as a means of domestic capital accumulation in developing countries (Turner and Manturuk, 2012) has come under serious consideration in economics, finance and the development literature since the postulations of the classical economists, through the Harrod-Domar (1956) and the Solow's theories of savings and economic growth. Savings have also gained prominence in recent times mainly because of the threat of expropriation, repudiation and other hostile acts against foreign suppliers of capital and dwindling donor assistance. It again allows for growth in income, increases in consumption and smoothening of consumption in the presence of various uncertainties.

National savings in Ghana is the aggregate of savings from the public sector and private sector actors. Thus savings in Ghana are from two main sources; public sector and the private sector. Government agencies are the public sector actors who collect tariffs and taxes for redistribution of resources and developmental interventions in the economy. The private sector on the other hand consists of domestic household and private businesses, such as banks and other nonbanking financial institutions (NBFIs), in the country. However, savings in Ghana is characterized by very low tendencies and unenthusiastic attitudes of citizens towards it at the micro level and also with undulating trends at the macro level. It is apparent that very few people own bank accounts in Ghana. At the micro level, the Ghana Statistical Service (2008), reported

that one-third of all households own savings accounts with 40% of these account owners being urban households and only 22% are owned by the rural inhabitants in Ghana.

The best savings period Ghana recorded was from 1960 to 1965 and since then the trend of savings in Ghana has been erratic (Joshua, 2012; World Development Indicator, 2013; Charles 2013). Figure 1 shows that gross domestic savings as a percentage of GDP witnessed a down turn from 1979 until it hit the worse rate of about 1.3% in 1992. This drastic drop was attributed to the continual political instabilities and to some extent the famine that engulfed these periods. The growth in gross domestic savings in 1993 onwards started increasing gradually and steadily until it reached 13.2% in 1996. This growth in savings rate over this period was due to the economic recovery programs pursued in the 1980s and the stability associated with ushering into democratic dispensation in 1992. The rate however fell drastically to 3.45% by 1999. Between 2000 and 2004, it rose to 7.31%, and persistently fluctuated downwardly from 2005 to 2009, which was largely attributed to the global financial crises. From 2009 onwards, savings rate has been on the increase until it reached about 24%, and this was attributed to increased income and government reserves and the influx of foreign investment due to the discovery and extraction of oil from 2010 onwards.

It is apparent from the discussions that the rise and fall in the trend of savings in Ghana has been attributed to economic (USAID, 2009; Charles 2013; Tandoh-Offin et

al., 2013) and political instability (Kpessa, 2010). Also, financial issues which have been speculated to be responsible for this intermittent savings trend include low savings and deposit rates, poor attitudes of bankers towards small savers, numerous documentation require-ments and a sharp disparity between interest paid on savings and interest rates on loans – the interest paid on savings are not quite significant, while annual interest rates on loans range from 27.5% to about 38% (Bank of Ghana, 2010; Joshua, 2012; Charles, 2013).

The bench mark interest rate in Ghana was last recorded at 16% and historically, from 2002 until 2013, Ghana's interest rate averaged 16.56%. This reached an all-time high of about 28% in 2003 and a low record of about 13% in 2006.

Also spread between lending and borrowing rates in Ghana is very wide and this has been speculated to have the inclination of daunting people from opening savings accounts. Presently, interest rates on loans are as high as about 30% or more while the interests on savings accounts are very low with banks offering interest rates as low as 8.9% in 2011 on a savings accounts on deposits of more than GHS 3000 (Joshua, 2012; Ghana Commercial Bank, 2013).

There is also a controversy in literature regarding the direction of the effect of interest rate on national savings. Whereas studies by Levine et al. (2001), Bekaert and Campbell (2003) and Bonfiglioli and Mendicino (2004) show that interest rate has a positive relationship with savings, others such as Nabar (2011) showed that interest rate has a negative relationship with savings particularly in China. Also at the demographic front, the relationship between children and savings is yet to be concluded in both theoretical and empirical strands either at the macro or micro level (Charles, 2013).

Also substantial portions of investment portfolios (over 70%) are invested in the money market which has a short maturity period making capital market investment, which is a vehicle for savings, comparatively low (Tandoh-Offin et al., 2013).

The investment in money market has also been cited as having an effect on the poor term of savings and investment because of the fact that most of the investments are into short term securities. However, none of these studies in Ghana brought together these economic and political factors in an econometric framework. National savings cannot be comprehensibly evaluated by limiting the focus to only economic issues or political situation as indicated earlier. This current study departs from the previous studies in Ghana because it examines some key economic (finance), demographic and political factors together and also captures the effects of interest rate spread and health financing scheme. The specific objectives of the study are to estimate and discuss the effects of interest rate spread and election spending on aggregate savings in Ghana and to assess the effects of other economic factors and health financing policy on aggregate savings in Ghana.

LITERATURE REVIEW

Theory of savings

The concept of savings and savings behavior has been examined by several scholarly works overtime. The neo-classical view saw savings as primarily determined by interest rate with other factors including income playing peripheral role in explaining the quantum of saving income (Harrod, 1951; Heilbroner, 1992). The Keynesian theory linked savings to income levels on grounds that this was more pragmatic in explaining savings behavior. Keynes argued few people were very sensitive to interest rate dynamics in planning savings and that individuals first sought decent level of consumption and afterwards spend on savings. This was perceived to be possible only if people had sufficient income to meet consumption expenditure and as such savings was considered a residual income that change with changes in the level of income (Harrod, 1951; Dillard, 1983; Heilbroner, 1992; Keynes, 2008). Thus, the difference between the neo-classical and Keynesian views of savings is one of varying emphasis on interest rates and income.

Generally, three main theories have been postulated by economists in the explanation of why people save. These theories are: the relative income hypothesis which assumes that individuals are more concerned with their relative level of consumption over absolute levels (Dusenberry, 1949); the life-cycle hypothesis (Modigliani and Ando, 1957; Modigliani, 1986) and the permanent income hypothesis (Friedman, 1957) which posit that individuals balance their life-time earnings stream with consumption for utility maximization. A review of various studies revealed that the life-cycle theory is the most widely used theory mainly because most studies concentrate on household savings and others aggregate household and businesses into private savings (Sturm, 1983). Three fundamental motives of household savings have been propounded and these are the retirement saving, the precautionary saving and the bequest saving.

The retirement saving involves accumulation of assets to cater for retirement consumption when current earnings cease. Sturm (1983) argued that this motive provides the basis of the life-cycle theory. The precautionary motive argues that households save to take care of future circumstances or emergencies whereas the bequest motive entails savings to leave for succeeding generations.

Growth, financial market and savings

Economic growth has been cited as explaining savings by a number of studies. Increases in growth have been associated with greater changes in savings. Nwachukwu (2012) found a positive and significant relationship

between private savings and income both in the short run and long run in Nigeria. Also the author found real interest rate to have only long-run effect on private savings while the development of the financial sector does not have significant effect on private savings. Loayza et al. (2000) also found that increase in income growth rate has a proportionate, though partial transitory, effect on the private saving rate. They also found an inverse relationship between private credit flows to income and long-run private savings rate. However, Ahmed and Mahmood (2013) found contrary relationship between national income per capita and aggregate savings. They employed an Autoregressive Distributed Lag Model (ARDL) bound testing approach for co-integration and Error Correction analysis using data covering 1974 to 2010 to examine macroeconomic determinants of national savings. The authors found that per capita income, inflation and exchange rate, though significant, had negative relationship with national savings. Money supply and the international economy were found to have positive relationship with aggregate savings in Pakistan.

In Nigeria, Essien and Onwioduokit (1998) using the Error-Correction Methodology assessed the effects of financial development on savings and showed that there is no long-run equilibrium relationship between financial depth and domestic savings. Bandiera et al. (2000) analyzed the effect of financial liberalization on savings over eight countries and observed varying effects of financial openness on savings rate. They found positive effect in Ghana and Turkey; negative effect in Mexico and Korea and insignificant effect in the other four countries. Delafrooz and Paim (2011) analyzed the relationship of savings behavior and financial literacy, financial stress and financial management practice in Malaysia using Cronbach's alpha and found that financial literacy and management practices were significant in predicting saving behavior whereas financial stress was found not to be significant.

Despite the studies done that relate the financial sector and national growth to savings, the direction and significance of the effects cannot be said to be definite because regarding the direction, as majority found positive effects, others found negative effects. In respect of the financial sector and savings, the review also shows contrasting findings because some found significant effect of financial variables and financial development on savings whiles others failed to find any significant relationship.

Age dependency and savings

Age distribution of the population has been identified as demographic determinants of savings. Attanasio and Weber (1997) found that households who had the wife working save less than those without their wives working partly because of the reduction in earnings uncertainty

that comes with multiple income sources. But Jappelli and Pagano (1997) refuted this finding and showed that multiple household income sources do not necessarily reduce savings. Ike and Umuedafe (2013) applied a semi-log model to investigate factors influencing savings and capital formation in Nigeria. Their cross-sectional data analysis revealed that income, year of experience in saving program, age and distance to financial institution affect savings. Other studies have also found the existence of relationship between children and savings. For instance, Leff (1969) found across 74 countries in 1964 that the savings rates are negatively related to the proportion of children under age 15 and people over age 64.

Also, Schultz (2005) indicated that there is an inverse relationship between monetary savings and number of children to be expected because children act as a mechanism for resource transfer over the life of parents to a period of low productivity in the old age. Gedela (2012) employed multiple regression and logistic regression models to examine the determinants of savings behavior in India. He found that demographic factors such as age, sex, dependency ratio, income and health spending affected savings. Generally, the effect of dependency ratio and savings is not clear cut because studies, depending on the techniques and location, have reported different findings (Cannari, 1994; Apergis and Christou, 2012).

MATERIALS AND METHODS

Model specification

Following the argument of Strum (1983), national savings is considered as an identity which is equal to the weighted (the weights being the share in national disposable income of the respective sectors) average of the savings ratio in the private household, business and general government subsectors of the economy multiplied by disposable income. This study used the Modified Life Cycle model Nwachukwu (2012) as the analytical framework to examine the effects of selected financial, economic and election factors on aggregate savings. National/aggregate saving is a combination of private and public savings which can be expressed in the form of total deposits (both current and time) with financial and nonfinancial institutions or actors in an economy. Total savings (TS) or deposits (D) in an open economy can be represented in the equation below as;

$$TS = Spvt + Sgovt \qquad \text{3.1a}$$

$$= (Gdp + Iiv + Dr - Lr - Tb - C) + (Gdp + t - Ir - G) \qquad \text{3.1b}$$

For the purpose of this study which examines the relationship between savings on one hand and financial factors and elections spending on the other hand, total savings can be considered as being dependent on financial variables and election spending whiles controlling for the effect of national income, economic dependency and health spending policy. This is shown in the saving function presented in an augmented life cycle model in the OLS form as follows;

$$lSav_t = \beta_0 + \beta_1 lirs_t + \beta_2 lGdp_t + \beta_3 lTb_t + \beta_4 lAdr_t + \beta_5 lliv_t + \beta_6 TElec_{0,1;t} + \beta_7 THId_{0,1;t} + e_t$$

3.2

where *Spvt* is the private savings; *Sgvt* is the public saving; *Gdp* is the natural logarithm of gross domestic income growth rate; *lirs* is the natural logarithm of interest rate spread (defined as the difference between lending rate and deposit rate); *lTb* is the natural logarithm of the 91-Day T-Bill rate; *lAdr* is the natural logarithm of age dependency rate; *lliv* is the natural logarithm of international investment; *TElec* is a dummy interacting election spending and time; *THId* is a dummy interacting health spending policy (where 1 is period the health insurance is under implementation and 0 is period of cash and carry) and time and *t* denotes tax.

The estimation of equation [3.2] with OLS cannot be taken as given since time series is shrouded with stability issues and hence need to be subjected to the process of time series econometrics.

Method of data analysis and estimation techniques

Time series analysis was used in this study because the data set used was obtained over time and is in a temporal order. Therefore, tests for the presence or absence of unit root (stationarity or otherwise) and cointegration (long-term or equilibrium relationship between the series) become imperative.

Unit root test

A time series Y_t is stationary if it's mean, variance and covariance are constant over time, or if covariance between two values from the series depends only on the length of time separating the two values, and not on the actual times at which the variables are observed (Hill et al., 2008; Kuwornu, 2011). The risk of spurious regression in which apparently significant regression results from unrelated observations are found when non-stationary series are used in a regression analysis is the underlying reason why it is important to establish whether a series is stationary or non-stationary before launching a regression analysis (Davidson and Mackinnon, 1999; Greene, 2002). The conditions of stationarity theoretically are illustrated with the Dickey-Fuller (DF) model below as;

$$Y_t = \rho Y_{t-1} + V_t$$

3.3

Where Y_t is the series of concern, Y_{t-1} is the lag of the series and V_t is an independent random errors assumed to have a zero mean and constant variance σ_v^2. From equation [3.3], unit root can be tested for by the null hypothesis that $\rho = 1$ against the alternative hypothesis that $\rho < 1$. This is done by taking the difference of both sides of equation [3.3]. This yields;

$$\Delta Y_t = (\rho - 1)Y_{t-1} + \mu_t$$

3.4a

$$= \delta Y_{t-1} + \mu_t$$

3.4b

where $\delta = \rho - 1$ and $\Delta Y_t = Y_t - Y_{t-1}$

Therefore, the null hypothesis of $(H_0: \delta = 0)$ is tested against the alternative hypothesis of $(H_1: \delta < 0)$ and if the null

hypothesis is rejected, then the series does not have a unit root and the vice versa.

However, using the DF test as specified earlier is also shroud with the tendency to have the problem of serial correlation, and thus this study used the Augmented Dickey-Fuller (ADF) test (to deal with the likelihood of serial correlation) and the Phillips-Perron (PP) test (which is superior to the ADF because of its relaxation of the ADF assumption of the homoscedasticity of the error term (see Phillips, 1987)) in investigating the stationarity status of the series. Also the modified test statistic (DF-GLS) was also used because of its higher power than the conventional tests in distinguishing between a unit autoregressive (AR) root and a root that is large but less than one (Stock and Watson, 2007). The DF-GLS test statistic was specified to test $\hat{\delta}_c = 0$ in the regression;

$$\Delta Y_t^d = \delta_0 Y_{t-1}^d - \delta_1 \Delta Y_{t-1}^d - \cdots - \delta_p \Delta Y_{t-p}^d - \varepsilon_t$$

3.5

Where ε_t is the error term, t is time trend, $Y_t^d = Y_t - (\delta_0 + \delta_i t)$ obtained by estimating an OLS and using the estimators $(\delta_0 \text{ to } \delta_p)$ to compute a detrend as the first step and the lagged difference terms added was determined empirically. These lagged terms were included enough to ensure that the residuals are not auto correlated. The second step involved the use of the Dicky-Fuller test for a unit root autoregressive root in Y_t^d by regressing ΔY_t^d in equation 3.5 (Elliot et al., 1996; Stock and Watson, 2007).

If the null hypothesis is not rejected, then there is the presence of unit root in equation [3.5], and if the series becomes stationary after first differencing, then the series is said to be integrated of order one [I(1)]. Thus taking the first difference of equation [3.5] produces a stationary process as;

$$\Delta Y_t^d = Y_t^d - Y_{t-1}^d = v_t$$

3.6

This implies that the series, $\Delta Y_t^d = Y_t^d - Y_{t-1}^d = v_t$, is stationary since v_t, which is an independent (0, σ_v^2) random variable, is stationary.

Cointegration tests

Cointegration test was performed to establish whether there is a long-run or equilibrium relationship among the variables. This is important for determining the stationarity of the residuals of a regression model. Despite the use of the Engel and Granger (1987) ADF residual test of Cointegration and other test (such as the ARDL bound test) in the literature, this study made use of the Johansen procedure since it overcomes the assumption of single cointegrating vector (Johansen and Juselius, 1990), and is also appropriately applied when the sample size is appreciably large. Given the VAR with a vector of variables y as follows:

$$y_t = \eta + A_1 y_{t-1} + A_2 y_{t-2} + \cdots + A_p y_{t-p} + \mu_t$$

3.7a

Where y_t is M x 1 vector of variables, η is M x 1 vectors of

parameters, A_1-A_p are M x M matrices of parameters and μ_t is M x 1 vector of disturbances where μ_t is NIID $\backsim(0, \sigma^2)$. Using the differenced operator $\Delta = 1 - L$, the VAR (p) model is transformed into a Vector Error Correction model (VECM) as;

$$\Delta y_t = \eta - \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} - \Pi y_{t-1} - \mu_t$$

3.7b

Where $\Gamma_i = -\sum_{j=i-1}^{j=p} A_j$; $\Pi = \sum_{j=1}^{j=p} A_j - I_k$ and is a matrix $[-(I - A_1 - \cdots - A_g)]$ which can be represented as;

$$\Pi = \alpha\beta'$$

3.7c

where α and β are both n*xr* matrices with matrix β denoting the cointegrating matrix and matrix α representing the adjustment matrix (or feedback matrix). All rows in Π are expected to be zeros if there is no cointegration or nonstationary combination. However, if there are stationary combinations of variables, then some parameters in the Π will be non-zeros and the rank of Π matrix shows the number of independent rows in the Π and as such represents the number of cointegrating vectors. From the forgoing, the identified cointegration relationship can be represented as;

$$Y_t = \alpha_0 - \alpha_1 X_t - \mu_t$$

3.7d

where Y_t and X_t are the vectors of series.

These series are cointegrated if they are integrated of order one and the error term is also integrated at levels [that is, $I(1, 0)$]. The α_1 shows the long-run equilibrium relationship between the variables whereas μ_t indicates the divergence from this long-run equilibrium. The cointegration relationship was tested by applying the trace test and the maximum eigenvalue test statistics. These are likelihood ratio tests where the trace statistic test the null hypothesis of r *cointegrating* vectors against the alternative that it is greater than r, and the maximum eigenvalue test the null of existence of r *cointegrating* relationships against an alternative of r + *1* cointegrating relationships. Sjo (2008) indicated that once the rank Π is established and imposed on the model, then the model will consist of stationary variables or expressions, and estimated parameters follows standard distributions.

Vector error correction (VEC) model

The VEC model is a multivariate dynamic model, which establishes the causal relationship between pairs of time series variables (Hill et al., 2008). The VEC model does not only examine how much the regressand variable will change resulting from a change in an explanatory variable, but it also measures the speed of the change (the error correction part). It is relevant when say two nonstationary time series, Y_t and X_t, are both integrated of order one [I(1)]; $Y_t \backsim$ I(1) and $X_t \backsim$ I(1), and which have shown to be cointegrated. The VEC is preferred over the VAR model because the former incorporates the cointegrating relationship between I(1) variables,

which is important for retaining and using of valuable information about the cointegrating relationship. It also makes the best use of the properties of time series data than the latter (Hill et al., 2008). The VEC model is given as;

$$\Delta Y_t = \gamma_1 + \gamma_2 \Delta X_t - \theta(Y_{t-1} - \eta_0 - \eta_1 X_{t-1}) + u_t$$

3.8

where u_t is the error term assumed to be NID$\backsim(0, \sigma^2)$, γ_1 and γ_2 are parameter estimates representing the short-run effect of X on Y, η measures the long-run equilibrium relationship between the X's and Y shown as:

$$Y_t = \eta_0 + \eta_1 X_t + \mu_t$$

3.9

where $Y_{t-1} - \eta_0 - \eta_1 X_{t-1} + \mu_t$ represents the long-run equilibrium divergence errors and θ measures the extent of error correction adjustment in Y and it is expected to have a negative sign to ensure the adjustment to long-run equilibrium is in the expected direction (Hallam and Zanoli, 1993; Nkegbe and Abdul Mumin, 2014). The empirical specification of the error correction model used is given as:

$$\Delta lSav_t = \beta_0 + \sum_{i=1}^{n-1} \beta_{1i}\Delta lSav_{t-i} + \sum_{i=1}^{n-1} \beta_{2i}\Delta lirs_{t-i} + \sum_{i=1}^{n-1} \beta_{3i}\Delta lGdp_{t-i} + \sum_{i=1}^{n-1} \beta_{4i}\Delta lTb_{t-i}$$
$$+ \sum_{i=1}^{n-1} \beta_{5i}\Delta lAdr_{t-i} + \sum_{i=1}^{n-1} \beta_{6i}\Delta lIiv_{t-i} + \sum_{i=1}^{n-1} \beta_{7i}\Delta TElec_{t-i}$$
$$+ \sum_{i=1}^{n-1} \beta_{8i}\Delta THId_{t-i} + \theta EC_{t-i} + \varepsilon_t$$

with

$$\theta EC_{t-i} = \beta(\gamma_1 lSav_{t-i} - \gamma_2 lirs_{t-1} - \gamma_3 lGdp_{t-1} - \gamma_4 lTb_{t-1} - \gamma_5 lAdr_{t-1}$$
$$- \gamma_6 lIiv_{t-1} - \gamma_7 TElec_{t-1} - \gamma_8 THId_{t-1})$$

3.10

where the $\beta's$ are parameter estimates explaining the short-run dynamics of the explanatory variables on the explained. θEC_{t-i} is the error correction term, ε_t is the error term and the γ's are the long-run equilibrium effects of the regressors on the regressand. Finally, Equation 3.10 was estimated as a single equation with stata. The ECM was employed because it estimates both the short-run and long-run effects at once, allowing for consistent estimates (Sjo, 2008; Nkegbe and Abdul Mumin, 2014) and reduction of biasedness compared to the Engel and Granger two stage estimation.

Sources and type of data

Monthly data spanning from 1997 to 2012 (192 sample data) was used in this study. The timeframe was determined by the availability of data for all the variables. The data used were obtained from the Bank of Ghana and the World Development indicators by the World Bank. Series on savings defined as total deposits (*Sav*), lending rate (*Lr*), deposit interest rate (*Dr*), 91-day Treasury bill (*Tb*) and international investment (*Iiv*) were sourced from the Bank of Ghana whereas, series on gross domestic product growth (*Gdp*) and the

Table 1. Description of selected variables by election.

Variable	Election		Nonelection		Mean difference and t-test significance
	Mean	Std. Dev.	Mean	Std. Dev.	
Sav	43,544.32	61,430.19	21,292.68	39,169.43	22,251.64***
Lr	19.26	5.09	23.63	10.77	-4.38**
Dr	15.36	7.84	17.43	9.94	-2.07*
Gdp	0.53	0.16	0.51	0.25	0.03
Iiv	0.39	0.36	0.21	0.31	0.17***
Tb	23.03	10.31	24.29	12.88	-1.27

Note "***, ** and *" denote significance at 1, 5 and 10% respectively.

Table 2. Lag order selection criteria.

Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-421.23	-	-	-	1.6e-07	7.037	7.111	7.220
1	566.62	1975.7	64	0.000	4.2e-14*	-8.109*	-7.436*	-6.454*
2	621.75	110.25	64	0.000	4.9e-14	-7.963	-6.693	-4.837
3	648.94	54.372	64	0.799	9.2e-14	-7.359	-5.492	-2.763
4	705.15	112.44*	64	0.000	1.1e-13	-7.232	-4.768	-1.164

Note: * means the criterion for the lag order selection and LL means log-likelihood.

age dependency ratio (*Adr*) were obtained from the World Development Indicator pool. All these series were transformed into natural logarithms before they were used enabling them to be interpreted in percentages. Election period spending (*Elec*) was captured as a dummy exogenous factor where election years were captured as 1 (where the spending of government is expected to be high) and nonelection years were captured as zero. *THId* is a dummy interacting health financing scheme (where 1 is period the health insurance is under implementation and 0 is period of cash and carry) and time.

Table 1 presents some basic descriptive statistics of selected variables by election. The mean difference of savings between election and nonelection years is 22,251.64 million cedis and this is significant at 1%. This suggests that savings in Ghana has been significantly higher in election years than nonelection years, and this can be attributed to the spending of government and other political parties which goes to enhance individual holding of cash balances and subsequently boost private savings. Other factors, namely international investment, lending rate and deposit rate, exhibited significant difference in their mean values between election and nonelection periods.

RESULTS AND DISCUSSION

Lag order selection

Table 2 depicts the results of the estimates for the lag order selection. The finite prediction error, Akaike information criterion (AIC), Hannan-Quinn information criterion (HQIC) and the Schwarz/Bayesian information criterion (SBIC) selected a lag order of one. However, the sequentially modified likelihood ratio (LR) test statistic settled on lag order of four (4). This study settled and

used a lag order of four (4) because this length envelops the order one selected by the other four criteria and was also appropriate in effectively dealing with the problem of serial correlation.

Trend regression

Table 3 reveals that all the variables have significant time trend and constants and as such, the equations of the unit root tests in Table 4 were specified to include constant and trend terms. The rate of savings showed a monthly increase of 0.0187% over the study period. Other factors that witnessed monthly increases over these months were the interest rate spread (0.0018%), GDP growth (0.0028%) and international investment (0.1134%). The rest of the factors showed significant decline over these months with the Treasury bill rate falling by 0.0072% monthly and the age dependency ratio recording the least (0.0007%) rate of decline over these periods.

Unit root and cointegration tests

The unit root estimates show that all the variables, except GDP growth rate (which was significant using the ADF), were not significant at levels using the ADF, PP and Dfgls tests (Table 4). Using the Dfgls, which is more efficient, all the series (savings, interest rate spread, gdp growth rate, 91-day Treasury bill, age dependency ratio,

Table 3. Trend regression[1]

Variable	Time			Constant			Diagnostics	
	Coefficient	Std error	Prob	Coefficient	Std error	Prob	R^2	F-stat
lSav	0.0187***	15.53	0.000	7.266***	53.98	0.000	0.559	241.12
lirs	0.0018***	7.36	0.000	0.168***	6.06	0.000	0.222	54.22
lGdp	0.0028***	12.93	0.000	0.024***	10.00	0.000	0.468	167.07
lTb	-0.0072***	-15.77	0.000	3.735***	73.69	0.000	0.567	248.61
ladr	-0.0007**	-2.87	0.005	-2.69***	-101.3	0.000	0.042	8.24
liv	0.1134***	6.51	0.000	-19.86***	-9.89	0.000	0.194	42.41

Note: *** and ** indicate significant at 1% and 5% levels. [1]$\Delta Y_t = \alpha + \Delta T_t + \varepsilon_t$ Where Y_t is the series of the variables under consideration in this study, T_t is the time trend and ε_t is the error term.

Table 4. Unit root test.

Variable	Level				First Difference			
	ADF	PP	DFGLS	LAG	ADF	PP	DFGLS	LAG
lSav	-2.262	-2.897	-1.676	3	-5.737***	-11.206***	-9.984***	2
lirs	-2.889	-1.896	-2.407	1	-2.944	- 7.806***	-9.175***	1
lGdp	-4.936***	-5.365***	-2.886	1	-6.402***	-12.185***	-9.332***	1
lTb	-2.550	-1.960	-1.852	1	-3.714**	- 8.079***	-6.131***	1
ladr	-2.999	-1.979	-1.832	11	-3.591***	- 8.680***	-5.778***	11
liv	-2.950	-1.453	-1.838	12	-2.577	- 3.916**	-4.176***	11
T*Elec	-2.463	-2.421	-2.607	1	-4.778***	-11.018***	-9.334***	1
T*Hid	-0.061	-0.012	-1.444	1	-6.020***	-13.716***	-9.360***	1

Note: ***, ** and * indicate significant at 1%, 5% and 10% levels.

international investment, interaction of election dummy and time, and the interaction of health insurance dummy and time) had unit root (nonstationary) at their levels. Also, deposit rate and international investments remained nonstationary with the ADF test even after first difference. However, using the Dfgls test made all the series stationary at first difference and thus after first differencing with this and the PP test, the null hypothesis of the presence of unit root is rejected in favor of the alternative of no unit root for all the variables.

Table 5 represents the results of the Johansen Cointegration test. Both the trace and the maximum eigenvalue tests statistics indicate there is one (1) Cointegrating relationship among these variables. This study added the information criteria tests in investigating cointegration and whereas the Schwarz/Bayesian information criteria settled on no cointegration relationship, the result of the Hannan-Quinn information criterion appeared consistent with the trace and maximum eigenvalue statistics. This means that the series have long-run equilibrium relationship.

Long-run relationships

Table 6 depicts the long-run effects of the various factors

on savings. The coefficient of the error-correction term is negative and statistically significant (Table 7). Thus, the expected relationship has been observed suggesting that this term acts to correct deviations from long-run equilibrium. This implies that when the average savings rate is too high, it will fall back towards the average values of the other variables. The coefficient suggests that 0.2% of previous period's disequilibrium in the system is corrected in the next period. Interest rate spread has a negative and statistically significant, at 10%, effect on savings in the long run. A percentage increase in the spread of interest rate reduces savings rate by 12.996% in the long run. Thus when the lending rate falls or the deposit rate increases this has long-run effects on saving in Ghana.

This interest rate spread was cited by IEA (2010) as an exhibition of less developed, inefficient and less competitive financial systems in Ghana. GDP growth rate also has a long-run effect on savings in Ghana. This was found to be positively related to and has a statistically significant effect (at 1%) on national savings in the long run. This implies that a percentage increase in aggregate income brings about 17.891% increase in savings in the long-run suggesting that the Keynesian and Permanent Income hypothesis of income and savings hold for Ghana because at the aggregate level savings is a direct

Table 5. Cointegration test.

Hypothesized No. of CE(s)	Test statistics		Critical value (5%)		Information criteria	
	Trace	Max	Trace	Max	SBIC	HQIC
None	161.7087*1	57.1598*1	156.00	51.42	-3.2401*	-5.2881
At most 1	104.5489*5	36.1447*5	124.24	45.28	-3.1263	-5.3279*
At most 2	68.4042	26.3960	94.15	39.37	-2.9565	-5.2912
At most 3	42.0081	17.8533	68.52	33.46	-2.7905	-5.2379
At most 4	24.1549	12.5220	47.21	27.07	-2.6348	-5.1743
At most 5	11.6328	7.3605	29.68	20.97	-2.5064	-5.1177
At most 6	4.2723	3.0701	15.41	14.07	-2.4063	-5.0687

Note: An order of 4 lags was used.

Table 6. Long-run relationships.

Variable	Coefficient	z-value	P-value
lrs	-12.996*	-1.67	0.094
lGdp	17.891**	2.51	0.012
lTb	-9.156**	-1.89	0.059
lAdr	-80.385***	-7.62	0.000
lIiv	-41.487***	-4.20	0.000
T*Elec	-0.035	-0.12	0.904
T*Hid	0.249*	1.95	0.061

Diagnostics: R^2=0.195; X^2=39.404 (prob. of chi=0.0406) and Lagrange-multiplier test at lags (2) statistics are: Chi-square = 41.4799 and Prob of chi-square value = 0.7686.

function of income growth (Dillard, 1983; Keynes, 2008). This finding also confirms the long-run findings of Nwachukwu (2012) that there exist both short-run and long run relationships between growth in income and savings in Nigeria and run at variance with the findings of Ahmed and Mahmood (2013) in Pakistan.

Treasury bills have a negative and statistically significant relationship with total deposits in the long run. The coefficient implies that a percentage increase in the 91-day Treasury bill rate decreases aggregate savings by 9.16% in the long-run. Treasury bill is seen as an alternative to savings in demand and time deposits in Ghana and accounts for about 70% or more of total investment portfolio in Ghana. The poor savings behavior and amounts have been attributed to investments in these money market securities (Tandoh-Offin et al., 2013) because of their advantages of not being highly susceptible to inflation eroding its value overtime, less risk of default and short maturity period. International investment also explains total deposits in Ghana and is significant at 1% alpha level. The coefficient and the negative sign suggest that an increase in international investment by one percentage point decreases savings by 41.49% in the long run. This could be partly attributed to the repatriation of dividend and net profits by foreign

investors in Ghana to their home countries. Ghana has over the years pursued liberalization and investment promotion policies including the Free Zone incentives (under the Free Zone Act (1995)) to investors that remove any condition or restriction on dividend or net profit repatriation. This repatriation and other acts of this sort have the tendency to limit the rate of saving profits and dividends in the form of deposits with domestic financial institutions.

Age dependency rate also significantly affects savings in the long run. It has a negative relationship with savings rate implying that a percentage increase in the dependency rate (that is, the ratio of children and aged to the active economic group) contributes to 80.39% decline in savings in the long run. Population dynamics in Ghana play crucial role in explaining savings in the long run. Finally, heath insurance scheme dummy (representing heath financing policy regimes) was significant and positively affects savings in Ghana. The coefficient suggests that average savings rate is 0.249% higher under the current health insurance scheme than the cash and carry scheme. Thus savings has been enhanced over the period of implementing the health insurance policy (that is, 2003 to date) relative to the cash and carry policy which was in implementation until the end of 2002.

Short-run dynamics

The VEC estimates of the short-run dynamics in Table 6, represents financial variables and election spending models. The third lag of savings has a negative and significant effect on current savings. Basically it takes a period of 3 months for a change in savings to have an effect on itself in the short run. The coefficient shows that a percentage increase in savings in a particular month will lead to 0.63% decrease in savings after three months. Although the effects of the first and second lags were positive, they were found not significant. The money market in Ghana affects the rate of deposits with financial institutions. The result in Table 7 shows that the lags of

Table 7. VEC Model results (Short run dynamics).

Model	Savings	Interest rate spread	91 day T-Bill	T*Election
EC_{t-1}	-0.002(-0.70)***	-0.000(-2.05)**	1.09e-06(0.01)	0.022(0.30)
$\Delta lSav_{t-1}$	0.044(0.48)	0.020(0.97)	0.007(0.41)	-0.331(-0.05)
$\Delta lSav_{t-2}$	0.020(0.23)	0.027(1.31)	0.035(2.09)**	3.860(0.57)
$\Delta lSav_{t-3}$	-0.634(-4.54)***	-0.010(-0.50)	0.007(0.41)	-20.007(-2.89)***
Δlrs_{t-1}	-0.191(-0.49)	-0.052(-0.59)	0.060(0.84)	-7.556(-0.26)
Δlrs_{t-2}	0.009(0.02)	-0.015(-0.17)	0.056(0.78)	59.535(2.07)**
Δlrs_{t-3}	-0.267(-0.07)	-0.077(-0.88)	0.089(1.24)	-46.696(-1.62)
$\Delta lGdp_{t-1}$	0.151(0.40)	-0.122(-1.42)	-0.062(-0.89)	5.840(0.21)
$\Delta lGdp_{t-2}$	-0.062(-0.16)	-0.010(-0.12)	0.004(0.06)	-8.339(-0.29)
$\Delta lGdp_{t-3}$	-0.141(-0.37)	-0.069(-0.81)	-0.100(-1.42)	9.616(0.34)
ΔlTb_{t-1}	-0.621(-1.51)	0.107(1.15)	0.437(5.69)***	5.707(0.19)
ΔlTb_{t-2}	1.002(2.22)**	-0.056(-0.55)	0.024(0.29)	7.423(0.22)
ΔlTb_{t-3}	-0.830(-1.97)**	-0.151(-1.57)	0.128(1.63)	7.743(0.25)
$\Delta lAdr_{-1}$	-0.143(-0.64)	-0.035(-0.69)	-0.011(-0.27)	3.664(0.22)
$\Delta lAdr_{-2}$	-0.198(-0.89)	-0.026(-0.51)	0.049(1.19)	2.007(0.12)
$\Delta l lAdr_{t-3}$	-0.409(-1.88)*	-0.034(-0.69)	-0.038(-0.94)	-12.277(-0.76)
$\Delta lliv_{t-1}$	-0.059(-0.31)	-0.003(-0.08)	-0.045(-1.27)	5.429(0.38)
$\Delta lliv_{t-2}$	-0.025(-0.13)	0.042(0.96)	0.006(0.18)	14.022(0.98)
$\Delta lliv_{t-3}$	-0.099(-0.64)	0.034(0.98)	0.019(0.67)	-2.026(-0.17)
$T*\Delta Elec_{t-1}$	-0.000(-0.29)	-0.000(-0.52)	0.000(0.24)	-0.012(-0.16)
$T*\Delta Elec_{t-2}$	-0.000(-0.44)	-0.000(-0.07)	0.000(0.06)	0.031(0.38)
$T*\Delta Elec_{t-3}$	-0.000(-0.16)	-0.000(-0.14)	0.000(2.00)*	-0.011(-0.14)
$T*\Delta Hld_{t-1}$	-0.002(-0.47)	-0.002(1.50)	0.002(2.37)**	0.123(0.32)
$T*\Delta Hld_{t-2}$	0.001(0.10)	-0.002(1.50)	-0.001(-0.99)	-0.293(-0.75)
$T*\Delta Hld_{t-3}$	0.011(2.01)*	0.001(0.21)	-0.001(-0.77)	0.789(2.02)**
C	0.022(0.93)	-0.003(0.58)	-0.003(-0.83)	0.803(0.45)

Note: ***, ** and * denote significant at 1, 5 and 10% level.

the 91-Day Treasury bills rate have a significant effect on savings in the short run. An increase in the rate of treasury bills will, in the short run, increase the rate of savings by 1.002%, after two months, and decrease it by 0.83% after three months. This implies although the effect of changes in Treasury bill rates take at least two months to manifest, the expected relationship between savings (demand and time) and rates of the money markets instruments takes at least three months to be apparent.

Changes in the age dependency ratio affect the rate of savings in Ghana. Table 7 reveals that age dependency ratio has a negative and statistically significant effect on the rate of savings in the short run. The coefficient suggests that an increase in the age dependency ratio in the short run reduces the rate of aggregate savings by 0.409% after three months. This implies that age dependency is a critical factor in explaining savings behavior of people in Ghana because most people spend on their children needs (seen as an investment towards future security) and cater for the aged and all these put burden on the disposable income and their ability to save.

Hence aggregate savings is hampered when the age dependency ratio increases. Health financing scheme policy positively affects aggregate savings in the short run. This is statistically significant at 10% and the coefficient means that aggregate savings during period under health insurance is 0.011% higher than the means aggregate savings under cash and carry.

The other variables such as the interest rate spread, GDP growth rate, international investment and election year spending did not significantly affect savings in the short run. Particularly, the insignificant short-run effect of the interest rate spread on savings could be attributed to time limitation for such changes in interest rate to work through changes in demand and supply of money and other securities to affect savings. With respect to GDP growth rate, this observation could be explained by the transmission mechanism where the short-run period is too short to allow for the interplay of the intermediary factors of the transmission to enable the effect of growth in GDP to manifest in influencing saving.

Examining the effects of savings on the financial market factors used showed that only the 91 day Treasury

bill rate respond to savings in the short-run and this took a two-month period for an increase in saving rate to contribute up to 0.035% increase in the Treasury bill rate. Table 7 also shows that the rate of aggregate savings is about 20% lower in election years compared to nonelection years in the short run. Basically, this can be explained by the unproductive spending by government and political parties in Ghana which dissipates savings in the short run

Conclusions

The financial factors that determined savings in Ghana were the interest rate spread and the 91-day Treasury bills. Whereas interest rate spread affects savings only in the long run, the Treasury bill rate has both short-run and long-run implications in explaining savings. Also, age dependency ratio and health financing scheme have both short-run and long-run effects on national savings while GDP growth and international investment had only long-run effects on savings in Ghana. However election period spending was not significant in explaining national savings in Ghana.

The capital market in Ghana (lagged savings and interest rate spread) exerts significant influence on savings (total deposits) in the short and long run. So when the rates of savings, interest and Treasury bill are altered would take time for individuals to respond. As such policies aimed at influencing savings through deposits amounts and interest rates should be those that would persist overtime to allow for the grace period, before the manifestation of the effects, to elapse. Also, the Treasury bill market in Ghana acts as a sturdy alternative to savings because the money market accounts for substantial amounts of investment and the manipulation of the rate of the 91-day Treasury bill influences savings in both the short and long terms. It is recommended that government and actors in the financial market of Ghana should not always see the use of the money market instruments as the best policy option in the pursuit of monetary policies or financing budget deficits, as it has mostly been, but need to ensure a balance between the use of the money market instruments as against the use of savings and other capital market instruments in order to promote savings for capital mobilization and investment.

Population dynamics has an implication on the rate of savings in Ghana because higher age dependency caused total deposits to fall in the short run and in the long run. This shows that if the ratio of dependants is allowed to increase relative to the active economic segment, then national savings in the end will go down because resources will be diverted into taking care of the dependent group. Thus social programs such as the Livelihood Empowerment Against Poverty (LEAP) and planning of families should be encouraged to reduce the burden on disposable income to be able to increase savings and investment. It is apparent that health spending explains savings behavior of people in Ghana in the sense that the higher the out of pocket spending on health, associated with the cash and carry, the lower the inclination to save in the short and long run. Health policy is one of the key issues government can consider influencing to manipulate savings which is required for investments. Thus the health insurance policy and its current stance should be improved and strengthen to provide both quality services and to enroll more members not only to fulfil the health needs of the country but also as a way of promoting savings in the long run in Ghana.

The real sector plays a significant role in enhancing savings and is reflected in the effect of GDP growth rate, in the long-run, on savings in Ghana. The effect of GDP growth on savings is a delayed one because of the transmission GDP works through (aggregate demand, investment and then savings) to get to savings. This underscores the interrelationship between savings and investment/GDP and as such, growth policies and strategies (which Ghana currently needs) should be a priority to enhance savings and investment (as proposed by Harrod-Domar, 1956) to ensure economic stability. International investment though was expected to have a positive effect, turns out to be a cause of falling deposits in Ghana partly because of the effect of investment promotion policies in liberalizing repatriation of income. Governments and stakeholders need to review this full liberalization or effectively monitor the activities of international investors.

Conflict of interests

The authors have not declared any conflict of interests.

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