Determinants of Domestic Saving in Guinea

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Abstract

Some economic literatures provide fundamental framework on the factors affecting domestic saving of countries. In Guinea a few studies have been conducted on determinants of domestic saving. To this effect, our paper provides empirical evidence on the determinants of domestic saving in Guinea for the periods 1984-2014. We used time series econometric model after testing robustness of the data. Augmented Dickey Fuller test was used to test unit root of the data. In addition, Johansen's Co-integration technique was conducted to validate co-integration among variables. The findings of the study have revealed that foreign capital inflow has robust positive effect on domestic saving both in the short run and long run, which implies that foreign saving tend to complement domestic saving in Guinea. Per capita income has significant positive effect on domestic saving both in the long run and short run supporting permanent income hypothesis. In addition, inflation and FDI affect domestic saving positively in the long run. Growth rate of per capita income impacts domestic saving negatively in the long run contradicting the fundamental implication of life-cycle hypothesis. Financial depth and government consumption expenditure have worsening effect on domestic saving in the short run.

Keywords: Domestic saving; Guinea; Time Series Model

JEL Classification: E21

1. Introduction

Economic development of sub-Saharan Africa is still remained unsatisfactory and world's poorest continent (Basu, Calamitsis and Ghura, 2000). The reason could be both internal and external factors and partly sharp decline of average national saving rate of countries (Kumo, 2011). It is also argued that low domestic saving rate in sub-African countries results in low or negative economic growth (Sache et al., 2004). The gross saving per GDP average growth rate of Sub-Saharan Africa had declined from 3.33 percent in 1980-1995 to a low level of 0.4 percent in the periods of 1996-2014 (WDI, 2014). This low domestic saving could be the result of an unfavorable income distribution, the lack of adequate rewards for saving and financial repression of capital markets in less developed countries (Alvarez-Cuadrado and Vilalta, 2012). In turn low domestic saving has led the countries to serious economic problems (Shaw, 1973). Furthermore, economic literatures reveal that promoting the level of investment is among the important determinants of growth in different countries (Solow, 1956). Positive and sustainable macroeconomic performance, therefore, depends on investment expansion and it's financing. As we can understand from different economic literatures saving is primarily used to finance investments. In the other words, countries with higher saving rate can grow faster than countries with lower saving rate (World Bank, 1993). So, increase in saving results in increase in investment. The important question that must be raised here is that whether increase in investment is financed domestically or foreign capital. Raising resources through domestic saving compared to foreign saving to finance domestic investment is more important because it can reduce country's vulnerability to unexpected shift in international capital flows (Schmidt-Hebbel and Serven, 1997) and dependency on foreign saving. Saving is not only important for capital formation but also for consumption smoothing in the future in the face of volatile and unpredictable income.

Gross domestic saving in Guinea has felt below the level of investment since 2011 registering the lowest growth rate in 2012. Average growth rate of gross fixed capital formation was 16.8 percent in the periods of 1985-2014 but the growth rate of gross domestic saving per GDP was 11.9 in the same period of time. This shows domestic savings in Guinea fall short of financing domestic investment since 2010. It declined at fastest rate as we can observe from Figure 1.

Decline in domestic saving may lead the country to rely on foreign capital inflow as a means to finance domestic saving-investment gap and domestic borrowing. In addition, reliance on foreign saving may not be sustainable because of decline in foreign capital inflow as the result of donor fatigue and increased competition from different countries for financial resources (Schmidt-Hebbel and Serven, 1997). There is also further concern that depending on foreign saving may increase external indebtedness and socio-political dependence and also unpredictable external forces for the country's development. Because of that, an understanding of the fundamental determinants of saving in Guinea represents critical importance in order to formulate policies to rise the domestic saving in line with the needs of economic growth. Therefore, the major aim of this paper is to analyze the determinants of domestic saving in Guinea. In addition, this article gives clear policy measure for making decision in stimulating domestic saving in Guinea.

The rest part of this paper is organized into four parts; part two is about domestic saving, investment and economic growth in Guinea, part three provides theoretical and empirical literatures, Part four covers

research methodology and data. Part five presents results and discussions and part six is about the conclusions and recommendation.

2. Domestic Saving, Investment and Economic Growth in Guinea
Recently there is high saving-investment gap in Guinea. As it is observed from Figure 1 gross fixed capital formation declined to 16.81 percent of GDP in 2014 from the maximum of 22.9 percent in 1990. In addition, from the trend, it is understood that domestic investment in Guinea has declined since 1990. Gross domestic saving was also declined from 1991 to 2012. The figure 1 depicts that it registered the lowest point in 2012 achieving negative 16.82 percent per GDP. Furthermore, the gap between domestic saving and domestic investment has been widening though both have shown declining trend. For example, in 2007 the gap between domestic investment and domestic saving was 7.27 percent per GDP because gross fixed capital formation was 13.87 percent per GDP and domestic saving was only 6.6 percent per GDP.

FIG. 1: Fixed capital formation in Guinea
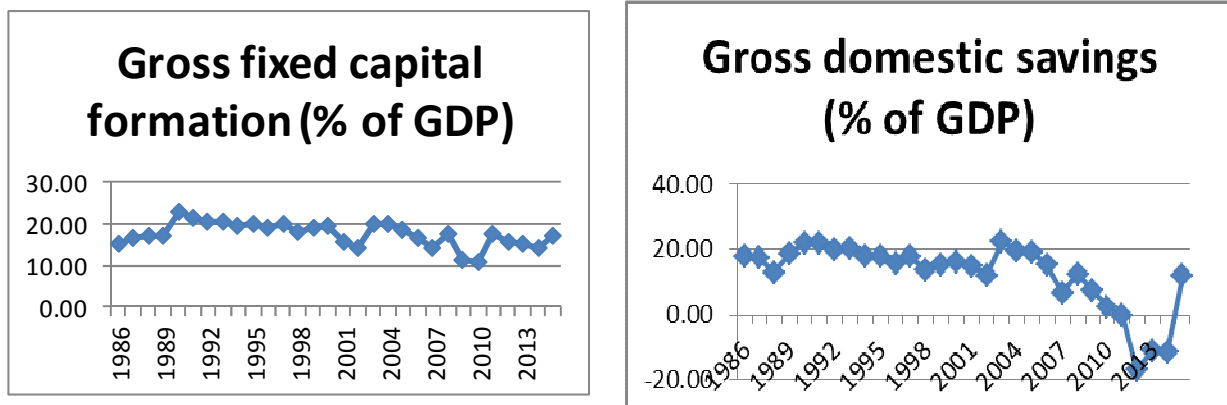
Source: Computed by Authors, based on data from World Development Indicator

Domestic investment-saving gap was expected to be financed by foreign saving, domestic borrowing or using other mechanisms that would result in deficit. Current account balance of Guinea for last three decades was negative in Guinea. The lowest point or the highest current account deficit was registered in 2011. It was negative 22.9 percent per GDP (Figure 2). This high current account deficit reflects a low level of domestic savings relative to domestic investment or domestic saving was unable to finance domestic investment. For capital poor developing country, such as Guinea which has more investment opportunities than they can undertake because of low levels of domestic savings, a current account deficit is more common (Şahin and Mucuk, 2014). Current account deficit may have positive or negative impact on domestic economy. Its impact on economy of the country depends on the amount of deficit per GDP and the way to finance the deficit. For example, if a country is borrowing from abroad to finance spending, this may have negative effect on the economy in the long run. However, if it is financed through attracting long term foreign direct investment, this may have positive effect on the economy of the country.

FIG. 2: Current account deficit in Guinea
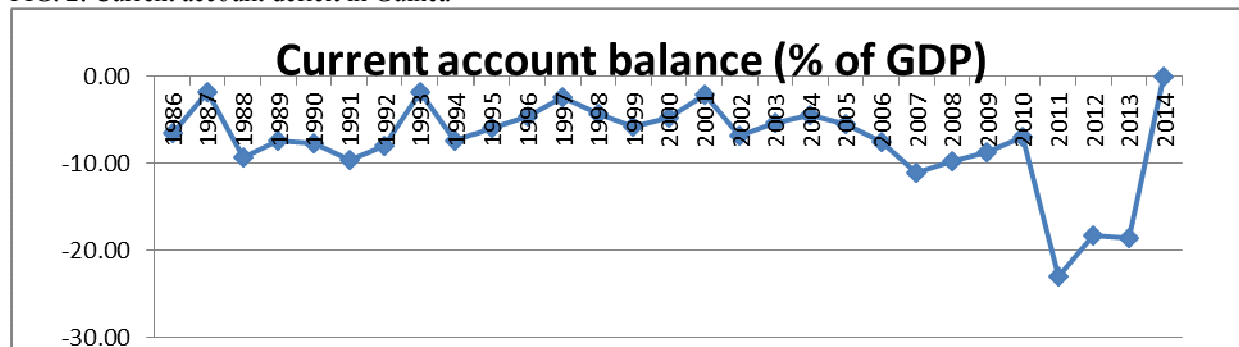
Source: Computed by Authors, based on data from World Development Indicator

Guinea has registered the lowest GDP per capita growth rate in last three decades. The average economic growth of GDP per capita was 0.25 percent. The maximum growth was registered in 2002 attaining annual growth rate of 3.3 percent. However, the minimum growth rate was recorded in 2009 having negative 3 percent. Though the government is promoting private investment, Guinea's economic performance has had no noteworthy success. In addition, from the trend in figure 3, there is fluctuation in GDP per capita growth since 1995.

FIG. 3: Real GDP per capita growth

GDP per capita growth (annual %)
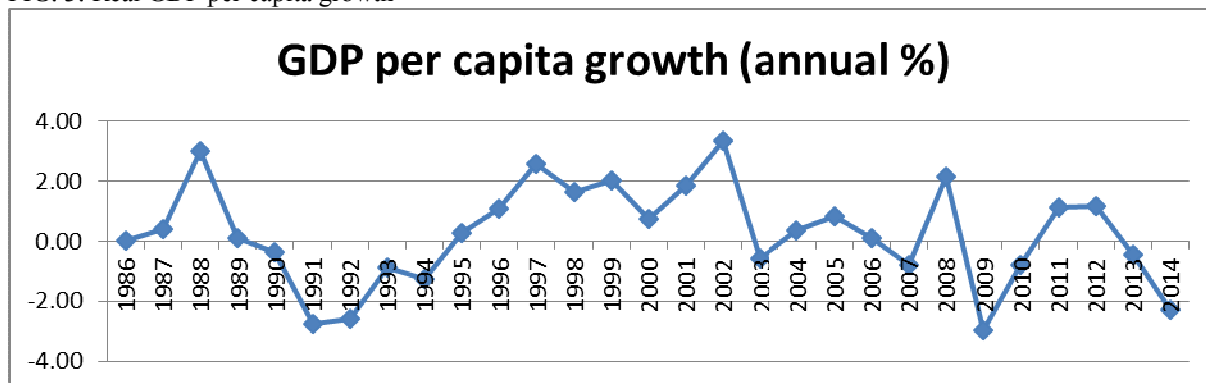
Source : Computed by authors from World Development Indicator

3. Theoretical and Empirical Literature
3.1. Theoretical literature
A number of theoretical literatures provide fundamental framework on the determinants of domestic saving and its significance for economic development. For example, the standard Keynesian model provides simple saving-income relationship. Total consumption has included in macroeconomic models after the works of Keynes (1936). As it is indicated in the model, household's current consumption expenditure is a positive function of real current disposable income. As the income increases, the increment is partly consumed and partly saved. Therefore, saving is supposed to depend entirely on current income. That is the saving-income ratio is expected to be an increasing function of income. The national saving ratio rises as per-capita income rises within a country or between countries.

So there is very strong correlation between income and saving. Therefore, in Keynes model income seemed to be the main determinant of saving. In addition, it is generally believed that this model can be used to explain the saving behaviour of the relatively poor countries. The reasoning follows that people with low incomes may not be able to afford the sufficient level of saving when they are young and productive to support their consumption in old age, or at least not as much as people with higher incomes.

However, this Keynes saving-income relationship is opposed by the life-cycle hypothesis model. The fundamental implication of life cycle hypothesis is that the saving to income ratio is unrelated to per-capita income. However, it depends on the long term growth rate of income (Modigliani and Brumberg, 1954, Ando & Modigliani, 1963). That is saving is positive function of growth rate of income (Modigliani, 1986). The hypothesis starts from the classic Fisher's view that economic agents choose to maximize utility derived from their life time resources by allocating them optimally between current and future consumption. It means it identifies life resources, instead of current income, as the budget constraint. This postulate, when combined with the stable preferences for the allocation of resources over a finite life are independent of the size of life income, and a stable path of resources by age will give rise to a stable age pattern of the saving-to-income and wealth-to-income ratio. The life cycle hypothesis says that income varies systematically over the phases of the consumer's life cycle and saving allows the consumer to achieve smooth consumption (Modigliani and Brumberg, 1954, Ando & Modigliani, 1963). For this matter we have included both the growth rate and the level of per capita income as explanatory variables in the domestic savings function in the study.

Furthermore, the permanent income hypothesis of Friedman (1957) explained household consumption behavior. Under this approach, households' consumption decisions are viewed as inter-temporal optimization problems. It shows how households decide to allocate their current disposable income between consumption and saving and thus determine their future consumption level. According to this hypothesis household consumption and saving decisions are based not only on the level of current disposable income, but also on their expectations of lifetime income and wealth. This presupposes that households assess the present value of assets available for consumption in the future and distribute it evenly into permanent income so that they can afford constant consumption levels.

3.2.   Empirical Literature
Some empirical economic literatures suggest that the mobilization of savings is important to promote economic growth. Saving can be mobilized domestically by increasing domestic saving or relying on foreign capital inflow (foreign saving). Domestic saving is one of the fundamental prerequisites for economic growth. Some literatures such as Solow (1956), Harrod (1939) and Domar (1946) revealed that economic growth is associated with policies aimed at transforming and restructuring the real economic sectors including sufficient domestic

resources, savings and investment of countries. In turn domestic saving of countries can be determined by different factors. Based on some empirical literatures we have found policy and non-policy determinants of saving. Income, per capita GDP growth and uncertainty are among non-policy determinants of saving. For example, real per capita income can positively affects domestic saving (Loayza, Schmidt-Hebbel and Servén, 2000). However, the ability of economic agents to save rises sharply only after income exceeds subsistence consumption level because if consumers have no income which exceed subsistence consumption they cannot save. As a result, they do not save either to smooth future consumption or to invest. The influence of income typically is greater in developing countries than in industrial countries.

It is also known that public deficits reduce national savings and investment, and contribute to current account deficits. One common explanation for this phenomenon is that deficits tend to raise real interest rates which lead, in the short run, to a negative effect on balance sheets inducing individuals to consume less, invest less and save more. However, in the long run, this effect on saving will be reverted by a fall in output (Gale and Orszag, 2004). Most economists agree that public deficits reduce, in the long run, domestic capital stocks, and increase foreign debt, thus increasing the burden for future generations. However, other scholars believe that public deficits do not matter at all since they will be offset by the same amount of private saving in the long run (Huntley, 2014).

The relationship between domestic saving and foreign resource inflow has been examined in several empirical studies. Some literatures attempt to find the relationship between foreign saving and national saving. However, there is no consensus whether foreign saving has positive or negative effect on domestic saving. Chete (1999) showed that external debt accumulation because of financing capital formation and investment has a negative impact on saving. Thus, a high external debt ratio will lead economic agents to anticipate future tax liabilities for its servicing. This will invariably prompt the transfer of capital to foreign countries, thereby reducing domestic saving. Arawomo, Badejo & Oshota (2015) examined the impact of foreign aid and domestic savings on economic growth in the West Africa monetary zone countries including Guinea. In their control variables they have included trade openness, financial liberalization and foreign direct investment. Their results found that economic growth obviously deteriorates with foreign aid and hence does not complement the role of saving on economic growth of these countries. Savings on the other hand was found to be positively significant in increasing economic growth in the sub-region. In addition, Angmortey and Tandoh-Offin (2014) found positive and significant effect of foreign capital inflow on real domestic savings in Ghana in the long run. Therefore, foreign direct investment and foreign aid do not displace domestic savings in the case of Ghana both in the short-run and the long-run.

Furthermore, domestic saving can also depend on growth rate of per capita income. For example, the simple permanent-income theory predicts that higher growth may reduce current saving whereas the life-cycle model growth says it has an ambiguous effect on saving, depending on which cohorts benefit the most from income growth, how steep their earning profiles are, and the extent to which borrowing constraints apply. Reverse causation from saving to growth also is possible, taking place through capital formation (Deaton, 1992). A number of empirical studies are conducted to test the effect of income growth on domestic saving. The results studies by Modigliani and Brumberg (1954), Ando and Modigliani (1963) and Modigliani (1986) concluded that saving is positively determined by growth rate of income. However, study by Loayza et al. (2000) obtained negative relationship between saving and growth rate of income for developing countries. Real per capita income can also positively or negatively affect domestic saving. Given the links between income inequality and saving, income concentration is expected to have a positive effect on household saving, but a negative effect on corporate and public saving, resulting in an ambiguous effect on aggregate saving. Therefore, both income growth rate and current per capita income can have either positive or negative effect on domestic saving.

Another relevant determinant of domestic saving is financial depth captured by the ratio of broad money (M2) to GDP (Ozcan, Gunay and Ertact, 2003). Financial depth or financial market development shows the range and availability of financial assets, accessibility to banking facilities, and extent of credit opportunity. The range and availability of different financial assets that suit savers interest, expansion of bank branches and improvement in the accessibility to banking facilities help motivate individuals to save. Increase in financial depth can have positive effect on domestic saving (Touny, 2008).

In most saving studies inflation is incorporated to capture the impact of macroeconomic uncertainty on saving behaviors. Ndirangu & Muturi (2015) and Kudaisi (2013) found that inflation has robust positive effect on gross domestic saving in Kenya and West African countries, respectively. These literatures reason out that inflation has positive effect on saving because higher uncertainty would rise saving since risk averse consumers set resources aside as a precaution against possible adverse changes in income and other factors (Modigliani and Cao, 2004). Another effect of inflation is that since it increases nominal interest rate, in turn, it will lead to higher household income and saving. But, if interest rate is not adjustable to inflation rate changes, a rise in inflation rate will reduce real interest rate which causes a disincentive to save in financial assets (Loayza et al., 2000). Using both theoretical and empirical literatures we have identified different explanatory variables that can

determine domestic saving Guinea.

4. Methodology and Data
4.1. Source of data
This study covers the period from 1984 to 2014 based the data availability. The data are taken from World Development Indicators (2015), Ministry of Finance and Economic Development of Guinea (2015).

4.2. Method of Data Analysis
In relation to objective of the study, this paper tried to give basic understanding on the impact of human capital on economic growth in Ethiopia using time series econometric analysis. In relation to objective of the study, we tried to give basic understanding on determinants of domestic saving in Guinea. To achieve this objective time series econometric analysis is used. Time series properties like stationarity and co-integration tests are conducted. Augumented Dickey Fuller test is implemented to test the existence of unit root in the variables. In order to see the long run relationship between/among variables Johnson co-integration test is used. Furthermore, some addional long run diagnostic tests are conducted to test overall fitness of the model, heteroscedasticity problems and multicolliarity of explanatory variables.

4.3. Model specification
Based on theoretical and empirical literatures, we have defined our econometrics model as per the following function and equation.

GDS = f [Growth, INF, HHCON, GCON, FDI, AID, CA, M2, DEBT, percapin]

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$$GDS = \beta_0 + \beta_1 Growth + \beta_2 INF + \beta_3 HHCON + \beta_4 GCON + \beta_5 FDI +$$

$$\beta_6 AID + \beta_7 DEBT + \beta_8 CA + \beta_{10} M2 + \beta_{11} percap + \varepsilon$$

(1)

Where, GDS is gross domestic saving per GDP, dependent variable,
Growth represents growth rate of real per capita GDP,
INF is rate of inflation (GDP Deflator Growth Rate) to proxy macroeconomic instability,
HHCON represent Household Consumption per GDP,
GCON is Government Consumption per GDP,
FDI is inflow of foreign direct investment per GDP,
AID is aid per GDP,
DEBT is debt per GDP,
CA represents current account deficit proxy to total foreign capital inflow,
M2 is M2 per GDP proxy to degree financial depth,
Percapin is per capita income and ε is residual.
The Equation is estimated using annual data for periods 1984-2014. The estimation period is determined largely by the availability of adequate data on all variables.

Table 1: Variables description

Variable	Obs.	Mean	Std. Dev.	Minimum	Maximum
GDS	30	12.331	10.402	-16.82	22.39
FDI	30	2.448	4.106	0	18.87
Growth	30	0.249	1.697	-2.96	3.34
GCON	30	9.022	2.034	6.76	15.03
HHCON	29	3.049	7.081	-19.36	13.88
INF	29	13.055	10.305	0.43	37.58
AID	30	48.064	14.137	22.83	86.9
CA	30	-8.046	5.315	-22.92	-1.73
DEBT	30	324.671	112.814	61.35	470.56
M2	30	15.637	12.281	0.83	38.26
Percapita	30	288.257	13.827	264.258	308.28

Source: Computed by Authors from World Development Indicator

5. Results and Discussion
5.1. Stationarity test
In modeling time series variables one needs to put great attention over the variables under the study because the regression result might be spurious. That is it will have high R^2 values and significant t- statistics but in reality they may not have any relationship. Such result could occur of course when variables under regression are non-

stationary. So, in order to test stationarity we used augmented Dickey Fuller test. This test is superior to Dicky Fuller test because error terms are assumed to be uncorrelated. In addition, in Augmented Dicky Fuller test additional lags are incorporated in the regression to obtain an error term that has no autocorrelation (Verbeek 2004). As we can observe from the Table 2 seven variables are not stationary at level. Hence, to transform the nonstationary to stationary, first differencing is employed. After first differencing they found to be stationary. However, three variables such as household consumption, growth and foreign direct investment are stationary at level. Therefore, these variables are integrated at order one (I(1)).

Table 2: Augmented Dickey Fuller test

Variable	Test Static Z(t)	1% Critical Value	5% critical Value	Order	Status
GDS	-0.045	-3.702	-2.99	I(0)	Nonstationary
DGDS	-3.14**	-3.736	-2.99	I(1)	Stationary
HHCON	-3.368**	-3.736	-2.994	I(0)	Stationary
INF	-2.728	-3.736	-2.994	I(0)	Nonstationary
DINF	-5.76***	-3.743	-2.997	I(1)	Stationary
Growth	-3.39**	-3.736	-2.994	I(0)	Stationary
Percapin	-1.038	-3.736	-2.994	I(0)	Nonstationary
DPERCAP	-3.504**	-3.736	-2.994	I(1)	Stationary
M2/GDP	-0.325	-3.73	-2.992	I(0)	Nonstationary
DM2	-7.184***	-3.736	-2.994	I(1)	Stationary
DEBT	-0.201	-3.73	-2.992	I(0)	Nonstationary
DDEBT	-5.973***	-3.736	-2.994	I(1)	Stationary
AID	-2.98	-3.73	-2.992	I(0)	Nonstationary
DAID	-7.084***	-3.736	-2.994	I(1)	Stationary
GCON	-2.131	-3.73	-2.992	I(0)	Nonstationary
DGCON	-5.001***	-3.736	-2.994	I(1)	Stationary
CA	-1.806	-3.73	-2.99	I(0)	Nonstationary
DCA	-7.934***	-3.736	-2.994	I(1)	Stationary
FDI	-4.349***	-3.73	-2.992	I(0)	Stationary
ECM(-1)	-5.192***	-3.743	-2.997	I(0)	Stationary

Source: computed by authors *** *Stationary at 1%level of significance   ** Stationary at 5% level of significance*

5.2. Co-integration

If variables are stationary at their difference, we can estimate the model by using their difference. However, the difference gives only short run dynamics. Therefore, in order to have both short run and long run relationship, we have to apply co-integration test. Therefore, we tested for a co-integration among variables using Johnson co-integration test. According to the result in the Table 3 below the gross domestic saving is co-integrated with its determinant variables. The trace statistics value is higher than the critical values at 5% level of significance for at least 7 equations. Therefore, this test reveals rejection of the null hypothesis of no co-integration. There are seven co-integration relationships among the variables that show long run relationship between the variables.

Table 3: Johnson co-integration test

Maximum rank	Log likelihood	eigenvalue	Trace statistic	5% critical value
Rank<=0	-890.532	.	563.9045	277.71
Rank<=1	-781.220	0.9997	345.2802	233.13
Rank<=2	-733.776	0.97023	250.3933	192.89
Rank<=3	-702.235	0.90333	187.31	156
Rank<=4	-678.909	0.82233	140.6588	124.24
Rank<=5	-659.540	0.76182	101.9214	94.15
Rank<=6	-644.509	0.67156	71.8594	68.52
Rank<=7	-631.041	0.63125	44.9229*	47.21
Rank<=8	-620.658	0.53658	24.1567	29.68
Rank<=9	-612.648	0.4475	8.1376	15.41
Rank<=10	-608.872	0.24404	0.584	3.76
Rank<=11	-608.58	0.0214		

Source: Computed by authors   *co-integration relationship

5.3. Long-run diagnostic tests

Ramsey RESET test is used to test variables omission or over all model fit. The test result reveals rejection of null hypothesis. Therefore, the model we conducted in our study has no variables omission problem. We have also tested the existence of heteroscedasticity using Breusch-Pagan test. The results in the Table 4 below show that there is no heteroscedasticity problem. Furthermore, we have conducted Breusch-Godfrey LM test to check serial correlation. The result indicates acceptance of null hypothesis that says there is no serial correlation. Finally variance inflation factor is used to test multicollinearity among independent variables. The test results in Table 5 shows there is no multicollinearity problem among explanatory variables used in the estimation.

Table 4: Long run diagnostic tests

Test	Hypothesis	F/Chi2	p-value
Ramsey RESET test: Functional form of Model	Ho: Model has no omitted variables / H1: Model has omitted variables	F(3,14)= 0.45	0.7218
Breusch-Pagan test: heteroscedasticity	Ho: Constant variance / H1: Not constant variance	Chi2(1)= 0.12	0.7345
Breusch-Godfrey LM test: Autocorrelation	Ho: No serial correlation / H1: Serial correlation	Chi2= 0.010	0.9185

Source: Computed by authors

Table 5: Variance inflation factor to test multicollinearity among independent variables

Variable VIF	VIF	1/VIF
DEBT	6.8	0.147164
M2/GDP	4.74	0.211155
CA	4.35	0.230074
GCON	3.63	0.275584
Percapin	3.17	0.315221
HHCON	3.11	0.321536
FDI	2.15	0.465453
AID	2.04	0.490323
Growth	1.90	0.526186
INF	1.87	0.533375
Mean VIF	3.38	

Source: Computed by authors

5.4. Long run output

Table 6: Output of the long run model

Dependent variable: Gross Domestic Saving per GDP (GDS)

Independent Variables	Coefficients	Std. Err.	t	P>t
HHCON	-0.028	0.175	-0.16	0.873
INF	0.176*	0.094	1.88	0.077
AID	-0.020	0.071	-0.28	0.785
FDI	0.441*	0.248	1.78	0.093
Growth	-1.267**	0.572	-2.22	0.041
Percapin	0.038**	0.016	2.38	0.029
CA	0.727**	0.272	2.68	0.016
M2/GDP	-0.399***	0.126	-3.17	0.006
DEBT	0.098	0.090	1.08	0.294
GCON	-0.203	0.665	-0.31	0.764
constant	-16.373	31.661	-0.52	0.612

F(10,   17) = 20.68   Prob > F   = 0.000
R-squared   = 0.924   Adj R-squared = 0.879
Durbin-Watson d-statistic(11,   28) = 1.857

Source: Regression Results, *** *significant at 1%level of significance * significant at10% level of significance*

5.5. Short run model

The coefficient of error correction term or the speed of the adjustment (lagECM) is negative as is expected to be

negative, significant. It has an absolute value smaller than one indicating the gradual convergence of the system toward long run equilibrium values. Based on the result, the magnitude of the error correction coefficient is -0.732 implying that within one year it adjusts about 73% of the disequilibria. In other words, deviation from the long run equilibrium adjusted fairly quickly 73% of the disequilibrium in each period.

Table 7: Output of the short run model

Dependent variable: Change in Gross Domestic Saving (DGDS)

Variables	Coefficients	Std. Err.	t-value	p>t
DDEBT	-0.04334	0.388357	-0.11	0.913
DCA	1.037788**	0.484316	2.14	0.049
DM2	-0.30803	0.390669	-0.79	0.443
DCAPITA	0.091398***	0.029395	3.11	0.007
DAID	-0.05335	0.083731	-0.64	0.534
DGCON	-2.77224**	1.235308	-2.24	0.04
DINF	0.31275	0.165270	1.89	0.078
HHCON	-0.06198	0.219205	-0.28	0.781
FDI	-0.45698	0.424706	-1.08	0.299
Growth	0.327605	0.826220	0.4	0.697
ECM(-1)	-0.7320**	0.302479	-2.42	0.029
_cons	-1.27392	1.872673	-0.68	0.507
$R^2= 0.63$		Adj $R^2=0.55$		
F-value(9, 21)=4.95 , p=0.001		Durbin-Watson d-statistic (12, 27) = 1.87		

Source: Regression results, *** significant at 1%level of significance * significant at10% level of significance

5.6. Discussion of results

In this section results of both error correction and long run models are briefly discussed. As we can observe from Table 6, inflation rate has significant positive effect on domestic saving in Guinea in the long run. It is significant at 10% level of significance. It shows 1% increase in inflation rate results in 0.176% increase in domestic saving in the long run. It suggests that increased macroeconomic uncertainty encourages people to save a larger proportion of their income.   However, inflation does not determine domestic saving in the short run in Guinea. This result gives the evidence to precautionary motives for saving when there is macroeconomic instability. This is particularly true for people in developing countries such as Guinea whose income predictions are more uncertain than their counterparts in developed countries (Kudaisi, 2013). In addition, increase in inflation rate may increase savings through its effect on the distribution of income in the long run. This is because it may support individual with higher income where their marginal propensity to save is higher than the low income people. This result is consistent with the results of Ozcan et al. (2003) and Ndirangu and Muturi (2015) who found positive effect of inflation on domestic saving. In addition, our result can be backed by the results of Kudaisi (2013) that found inflation has significant positive effect on domestic saving in West African countries including Guinea.

Current account deficit proxied to foreign capital inflow has robust positive effect on domestic saving rate both in the short run and long run which shows foreign capital inflow is complement to domestic saving in Guinea. In addition, its magnitude is more higher compared to other significant determinants of domestic saving in Guinea. Unit increase in foreign capital inflow per GDP increases domestic saving by 0.727 and 1.04 in long run and short run, respectively (Table 6 and Table 7). So, foreign capital inflow in terms of aggregate of loans, foreign direct investment, grant and portfolio has no adverse effect on the level of domestic saving in Guinea. That mean, foreign capital inflow does not relax domestic saving effort in Guinea. It may encourage public saving by financing public expenditures. In addition, it does not encourage an increase in consumption in Guinea and therefore, foreign capital inflow does not obstruct domestic saving in Guinea. Hence, this robust positive relationship between foreign capital inflow and domestic saving rate both in the long run and short run indicate that foreign capital inflow is complement to domestic saving in Guinea. This result is very important because the role of foreign capital inflow in the development process was generally regarded as supplementing domestic investment. That is, more attention was given to the role of capital inflow in supplementing domestic investment. However, less focus was given on the relationship between capital inflow and domestic saving. We also tried to see the individual effect of foreign direct investment and official aid. Foreign direct investment is found to be positively contributing to domestic saving in the long run. However, its effect is insignificant in error correction model. This result is consistent with the study of Angmortey and Tandoh-Offin (2014) in Ghana. They determined positive and significant effect of foreign capital inflow on domestic saving.

We have also investigated the role of per capita income on domestic saving in both short run and long

run. According to long run model per capita income can stimulate domestic saving in Guinea. It shows 1% change in per capita income changes domestic saving by 0.038% in same direction at 5% level of significance (Table 6). In addition, per capita income has positive statistically significant effect on domestic saving. 1% increase per capita income of the society results in 0.091% increase in domestic saving in the short run. It is significant at 1% level of significance (Table 7). Therefore, these results reveal that income is one of the crucial determinants of domestic saving in Guinea. This result supports Keynesian model that demonstrates strong correlation between income and saving. Keynes saving model, therefore, works in Guinea as income is appeared to be the main determinant of saving. In addition, since Guinea is one of relatively poor countries, saving behavior can be better explained by Keynes saving model.

Growth rate GDP per capita has statistically significant negative effect on domestic saving in the co-integration model. 1% increase per capita GDP growth decreases domestic saving by 1.267%. It has insignificant effect on domestic saving in error correction model. Our result does not support Modigliani (1963) life-cycle hypothesis of savings behavior of economic agents over time that beliefs income growth has ambiguous effect on domestic saving. Our result contradicts the fundamental implication of life-cycle hypothesis that the saving to income ratio is unrelated to per-capita income, but depends on the long term growth rate of income. Our result is inconsistent with Modigliani and Brumberg (1954), Ando and Modigliani (1963) and Modigliani (1986) that determine saving is positive function of growth rate of income. However, our result supports the simple permanent-income theory that predicts higher growth (that is, higher future income) reduces current saving. Our results are also consistent with the results obtained from studies by Loayza et al. (2000) for developing countries.

Furthermore, the ratio of M2/GDP is used as a proxy for financial depth in the economy as well as a degree of financial development. It has statistically significant negative effect on domestic saving in the long run. Unit increase in M2/GDP result with 0.399 units decrease in domestic saving. This shows that financial system development in Guinea has deteriorating effect on domestic saving in Guinea. This study cannot explicitly determine the reason why financial deepening has negative effect on domestic saving. However, from literature we loosely reason out that it may be because of lack of strength of governance such as control of corruption, rule of law and government effectiveness. In addition, unenthusiastic financial institutions and lack of the infrastructure to screen and monitor financial market may be considered as a cause for the negative effect of financial depth on domestic saving (Ghura et al., 2009). This result is opposite to the results of Kudaisi (2013) that found financial depth has insignificant positive effect on domestic saving in West African countries including Guinea.

Finally, government consumption per GDP has strong negative effect on domestic saving in the short run. However, its effect is insignificant in the long run co-integration model. This might be because when governments' consumption spending increases, crowding out will occur. That means government spending reduces available funds and increases the cost of capital, leading many businesses to abandon expansion of their business and income and will negatively affect domestic saving.

6.   Conclusions and Recommendations

In this study we have examined the determinants of domestic saving in Guinea using time series econometrics model for the periods of 1984 to 2014. We have employed a number of econometric empirical inferences for robustness check. Unit root, co-integration and the long run diagnostic tests were conducted to test time series data. Augmented Dickey Fuller test and Johnson co-integration tests were conducted to test unit root of the data and long run relationship among variables, respectively. Furthermore, Ramsey RESET, Breusch-Pagan and Breusch-Godfrey LM tests were used to check long run diagnosis such as overall model fitness, hetroscedaciticty and autocorrelation.

The results of this study shows that current account deficit (proxy for foreign capital inflow) and per capita income have robust positive effect on domestic saving in both in long run and error correction model in Guinea. Positive impact of foreign saving on domestic saving indicates that foreign capital inflow is complementary to domestic saving in Guinea. We also disaggregated capital inflow to different components to determine the individual effect of them. From the components, foreign direct investment is found to be positively contributing to domestic saving in the long run. However, its effect is insignificant in error correction model. The effect of aid inflow per GDP has insignificant effect on saving in both long run and short run.

In addition, inflation has positive statistically significant effect on domestic saving in the long run giving evidence on precautionary motives for saving when there is macroeconomic instability. This is particularly true for people in developing countries such as Guinea whose income predictions are more uncertain.

Growth rate of per capita income has statistically significant negative effect on domestic saving in the long run. It contradicts life-cycle hypothesis that the saving to income ratio depends on the long term growth rate of income. Government consumption expenditure and broad money (proxy to financial depth) have deteriorating effect on domestic saving in error correction model in Guinea. Finally, based on the results of short run dynamic model, the magnitude of the error correction coefficient is -0. 73 implying that within one year it adjusts about

73% of the disequilibria.

Based on these findings, therefore, government should improve macroeconomic environment that will encourage foreign direct investment. Furthermore, greater efforts should be made by stakeholders to improve income of the society that will increase the saving level of households. There should be also prudent use of foreign saving to finance domestic saving investment gap because it will raise the probability of indebtedness of the country in the future though it has complementary effect on domestic saving. In addition, further research should be conducted considering demographic determinants of domestic saving.

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