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Full Length Research Paper

The effect of remittances on gross domestic savings in Uganda (1999-2011)

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This paper investigates the effect of remittances on gross domestic savings in Uganda using maximum likelihood framework. The results show that remittances have a significant negative effect on gross domestic savings. This contradicts the studies that show positive relationship between remittances and gross domestic savings but in agreement that remittances are mainly devoted to daily consumption needs and that foreign capital inflows have a negative and significant impact on domestic savings. The study also showed that other factors such as real effective exchange rate, per capita gross domestic product, and inflation rate and deposit interest rate affect remittances positively. It is therefore recommended, that government should establish agencies in countries to where most Ugandans migrate in order to capture their savings and help them channel those savings into productive projects in Uganda.

Key words: Remittances, gross domestic savings, maximum likelihood, migration, developing countries.

INTRODUCTION

Background to the study

Remittances have become an important source of income for many developing countries. The increase in the volume of these financial inflows in developing countries and their impact on these economies has long been a concern for the economists. These inflows have been proven to be a stable source of capital for poor countries. The impact of these financial flows on the growth of the recipient countries varies from country to country and their effect on different macroeconomic variables varies. In 2010, worldwide remittance flows were estimated to have exceeded $440 billion. From that amount, developing countries received $325 billion, which represents an increase of 6% from the 2009 level. This amount exceeded the volume of official aid flows and constitutes more than 10% of gross domestic product in many developing countries. The true size, including unrecorded flows through formal and informal channels, is believed to be significantly larger. Recorded remittances in 2009 were nearly three times the amount of official aid and almost as large as foreign direct investment (FDI) flows to developing countries.

In the period of 2000-2010, Uganda experienced a significant growth in remittances from US$299 in 2003 to US$773 (World Bank, 2011). This increase is mainly attributed to the growing number of Ugandans working abroad, loosening of the foreign exchange regulatory regime, and the adoption of new remittance technologies that helped to reduce on the transfer costs and increase in competition in the market. In 2010, Uganda received a total of US$768 million registering a slight decrease of 1.3% from US$778 million received in 2009. This is possibly because of the fragile labor markets, global

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financial crisis, and the increased scrutiny of migrants without proper documentation in destination countries. However in shillings terms, total personal transfers in 2010 were estimated at UGX 1,673 billion. This was an increase of 6% when compared to the estimate of UGX 1,580 billion of 2009. The 7% depreciation of the domestic currency during 2010 from the 2009 average more than offset the shilling increase in personal transfers. Remittance recipient households were estimated at 468,413 for cash and 175,463 for personal transfers in kind (BOU, 2010). Furthermore, the same report revealed that remittances were mainly used for consumption (65%); this mainly included household expenses, education, investment and health. The main investment expenditure types include acquisition of property (such as land and buildings), start-up business, and farming and savings contributed 12.1% and 52.7% of the recipient households received these transfers formally.

As shown in Figure 1, the trends in remittance inflows in Uganda show a steady growth between the period 1996 to 1999 and in the year 2000 to 2002, there is a steep growth which then goes down in 2003. After 2003, there is a recovery which registers again another steep growth up to 2007. This may be attributed to increase in the numbers of Ugandans moving and settling abroad and also the favorable government policies through liberalization of foreign exchange regime in 1997. The setback in 2007 may have been as a result of the global financial crisis.

Remittance channels, regulatory and policy environment in Uganda

Government has undertaken a number of measures aimed at improving the recording, management and integrity of workers' remittances, while at the same time trying to maximize the benefits in terms of their contribution to economic development. Key among these is the review of the law on foreign exchange, the Foreign Exchange Act (FEA) 2004 and its implementing regulations were gazetted and implemented in 2006 and is operational. The Act repealed the Exchange Control Act of 1996 and legally provides for licensing of the money remittance businesses thus enhancing competition. Furthermore, this law strengthened the capacity of Bank of Uganda to monitor and regulate the transactions in the context of a fully liberalized capital account in addition to allowing further development of financial markets and products.

LITERATURE REVIEW

Remittances can also be referred to as transfers of funds by workers (remitters) who are living and working in developed (host) countries to their families in home (migrant sending) countries (Karagoz, 2009). There are debates about the effect of remittances on development, with Leon-Ledesma and Piracha (2001) supporting remittances for increased savings yet others such as Rempel and Lobdell (1978) noting that remittances are mainly devoted to daily consumption needs.

Effect of remittances on savings in developing countries

In the 1970s until the late 1980s, the economic literature had not found a positive relationship between remittances and development, arguing that remittances are mainly used for subsistence consumption (food, clothing…), non-productive investments, repayment of debts, and that these kinds of expenditures tend to have little positive impact on local economy's development.

Avila and Schlarb (2008) analyzed an empirical link between remittances and financial sector development on a micro level. The study revealed that receiving monetary remittances had a positive and significant effect on the probability of having a bank account. Therefore, this contradicted Rempel and Lobdell (1978) and Lipton (1980) argument that remittances were mainly devoted to daily consumption needs.

Tests conducted by Leon-Ledesma and Piracha (2001) on 11 countries of Central and Eastern Europe and Drinkwater et al. (2003) on 20 developing countries show that remittances contribute significantly in increasing the level of savings in their home countries.

According to Adelman and Taylor (1990), inward remittances are believed to have a positive impact on savings and investment. Household surveys in Pakistan indicated that in the late 1980s and early 1990s, the marginal propensity to save was higher (0.711) for income from international remittances than from domestic urban rural remittances (0.49) or rental income (0.085) (Adams, 1998).

The theoretical literature predicts that on the domestic front, remittances increase household income of migrant families, improve living standards enhance savings and generally contribute to national economic growth (Azad, 2005). According to Grabel (1996), there is unambiguous evidence that once basic needs are met, remittances are used for savings, debt repayment, consumer durables, land and housing purchases, small enterprise development and agriculture, and investments in education and healthcare.

Obwona and Ddumba (1995) revealed that in Uganda, the household sector is the main source of domestic savings and one of the factors that influence the saving behavior of households is the ability to save which depends on disposable income and the household expenditure. Since remittances increase a household's

disposable income, this clearly indicates that there is a positive relationship between remittances and domestic savings. This is in agreement with a study conducted by Athukorala and Sen (2003) who also found that savings rate is increased with the rate of growth of disposable income.

BOU (2010) revealed that 41% of the households that were interviewed in the survey indicated that the recipient households were better off compared to non-recipient households. Within these households, 63% attributed the better conditions to improvements in the standard of living due to remittances. In addition, the results revealed that for all categories of expenditures, recipient households registered higher mean expenditures. The difference between the recipient and non-recipient households' expenditure was found to be statistically significant. This indicates that the important role of remittances is smoothing household consumption. However this does not obviate the fact that remittances may at the same time also boost household savings. In particular, remittances may free up resources for greater savings from other sources of household income (Kapur, 2003).

In the empirical work analyzing aggregate savings, foreign savings indicators are commonly used as explanatory variables. The access to foreign borrowing in international markets is expected to supplement domestic savings and fill the gap between domestic investment and national savings. The capital inflows are therefore expected to increase household savings.

The literature on savings provides a long list of factors affecting the savings rates. Studies have found an ambiguous effect of increase in real interest rate on savings because of a positive substitution effect towards future consumption and a negative income effect due to increased returns on saved wealth. Fry (1978) found a small but positive interest rate elasticity of savings while Giovannini (1985) found savings to be insignificantly related to real interest rates. The empirical evidence on the effects of real interest rates on savings has therefore proven to be inconclusive (Schmidt-Hebbel et al., 1999).

According to Karagoz (2009), remittances have a potential of serving as a development tool and positively impact on economies of recipient countries. At macro – economic level, development effects of remittances can be decomposed into their impact on savings, investments, growth, consumption, and poverty and income distribution. At household level, they reduce inequalities in incomes and opportunities, help in acquiring houses, promote entrepreneurial activities, and meet educational and health costs. However, remittances, like foreign aid, may only be more effective in a good policy environment. For instance, a good investment climate with well-developed financial systems and sound institutions is likely to imply that a higher share of remittances is invested in physical and human capital (Giuliano and Ruiz-Arranz, 2005).

Effects of other macroeconomic variables on domestic savings

Effect of real effective exchange rate

Despite their potential positive impacts on small economies, other scholars have argued that remittances may not necessarily contribute to economic development. Large inflows of these private transfers are said to lead to unnecessary appreciation of the local currency which translates into expensive domestically produced goods and thus reducing the competitiveness of exports, a condition referred to as Dutch disease problem (Ratha, 2003; Serven and Solimano, 1993). Still remittances are reportedly spent mostly on consumption, housing, and land, and are likely not to be used for productive investment that would contribute to long-run growth (Giuliano and Ruiz-Arranz, 2005). Nevertheless, Ratha (2003) suggests that remittance inflows that raise the consumption levels of rural households might have substantial multiplier effects because they are more likely to be spent on domestically produced goods.

Levy-Yeyat and Sturzenegger (2007) also claim that a more depreciated real exchange rate results in higher saving, but through a different channel: a more depreciated exchange rate is associated with lower real wages, inducing firms to invest more and to increase their saving to finance the additional investment, thereby raising overall saving.

Effect of deposit interest rate

Because real money balances are directly influenced by real deposit interest rates, the capacity of countries to mobilize savings to finance investment depends on its level of development. High deposit interest rates encourage savings. According to the life-cycle theory, the net effect of the real interest rate on savings is unclear. The net effect of the real interest rate on savings can be decomposed into two effects. The substitution effect which implies that a higher interest rate increases the current price of consumption relative to the future price, and thus affecting savings positively. The other effect, which is called the income effect, indicates that if the household is a net lender, an increase in the interest rate will increase lifetime income, and so increase consumption and reduce saving. Therefore, it is expected that the interest rate will have a positive impact on saving ratio only when the substitution effect dominates the income effect. In developing countries where financial markets are still not well developed, substitution effect is expected to be much greater than income effect, and

thus the real interest rate is likely to have a net positive impact on domestic savings (Özcan et al., 2003). However, the complexity and distortions in both the real and the financial sides of the economy tend to reduce the benefits of an increase in interest rates, and thus the positive impact on domestic savings may not be achieved.

Effect of inflation

Higher inflation reflects higher savings and income. On the other hand inflation leads to uncertainty and may therefore lead to lower rate of saving (Hondroyiannis, 2004). According to Thirlwall (1974), the rate of inflation is linked to the level of savings. This might be expected for at least two reasons: first is that the real value of assets denoted in fixed terms, such as bonds, falls in times of inflation; second, rapid changes in prices lend uncertainty to the economic environment, including increased uncertainty to the real value of many assets. The loss in wealth associated with inflation will cause individuals to save more and consume less. Increased uncertainty increases savings for precautionary purposes.

Thirwall (1974) further argued that inflation can stimulate savings through two mechanisms, through the income redistribution towards profits and through the effect of inflation of money holdings. Thirwall supported the hypothesis that savings increase with inflation. The explanations that were offered for this observation are that people attempt to increase their real balances in periods of inflation. This phenomenon has been observed in Sierra Leone where high inflation and expanding informal markets for goods and currencies were experienced.

The empirical research of Corbo and Schmidt-Hebbel (1991), Masson et al. (1998) and Haque et al. (1999) showed a negative or zero coefficients of consumer price index. Meanwhile, Athukorala and Sen (2003), Loayza et al. (2000) and Özcan et al. (2003) found that inflation and saving were positively related with each other. Athukorala and Tsai (2003) proved that inflation and saving were uncorrelated.

Effect of per capita GDP

Economic growth is associated with the increase in the expenditures and savings. Such an increase is a result of increase in living standard of the peoples which is the outcome of the increase in income level. A positive association between national savings and current income levels is observed both in time series and cross section data (micro and aggregate) as savings (as a proportion of GDP) rises with the level of income per capita. The evidence has found a type of inverted “U” relation between savings and the level of income per capita (Masson et al., 1998). It has therefore become an accepted stylized fact that savings rates rise at the initial stages of development (although not at very low per capita income levels) and declines as the countries reach higher per capita income and more mature development levels (Ogaki et al., 1995). In low-income countries that are closer to subsistence levels, we may expect that most income are consumed with little left for savings. Higher income levels make it possible to save more; however, the size of the effect declines as income raises, in line with a decline in investment and growth opportunities, the aging of the population, and lower fertility rates are features that tend to be observed in countries that approach higher per capita income levels.

Carrol and Weil (1994) reported that higher saving rates are due to the increase in income per capita. Loayza et al. (2000) confirm that savings are positively related to income per capita, by using cointegration approach in India. Özcan et al. (2003) found that in Turkey that income level were positively affected on savings.

Modigliani (1986) found that developing countries needed higher savings rate to growing up faster. Collins (1989) also found that income and savings were positively related. According to subsistence-consumption theories, it stimulate that those countries tend to achieve higher savings rate when they increase their level of per capita income. Studies such as Edwards (1996), Loayza et al. (1998), and Dayal-Ghulati and Thimann (1997) proved this theory empirically.

From the above literature, the effects of remittances on gross domestic savings are inconclusive. Whether remittances affect gross domestic savings positively or negatively is still an issue and moreover, the study has been conducted in Uganda in this aspect. Given this fact, from the reviewed studies where Uganda is used as a case study, none has investigated the effect of remittances in the light of gross domestic savings. Therefore this study sought it fit to establish the effect that remittances have on Uganda’s gross domestic savings.

METHODOLOGY

The model that is used in this study was modified from that used by Baldé (2010). The model predicts that Gross domestic savings is determined by Per capita GDP, Deposit rate, Inflation, Remittances and Real effective exchange rate. The general specification of the model is as follows:

$$GDS = f\left(PGDP, DIR, INFLR, REMIT, REER\right) \quad (1)$$

$$GDS_t = \beta_0 + \beta_1 PGDP_t + \beta_2 DIR_t + \beta_3 INFLAT_t + \beta_4 REMIT_t + REER_t + \varepsilon_t \quad (2)$$

where, $\varepsilon_t \sim$ i.i.d$(0,\delta^2)$ = error term; GDS = Gross Domestic savings; PGDP = Gross Domestic Savings; PGDP = Per Capita GDP; DIR = Deposit Interest Rate; INF = Inflation; REMIT = Remittances; REER = Real Effective Exchange Rate and $\acute{\varepsilon}_t$ is the error term.

Natural logarithms were taken for all variables in equation 2 leading to a version of the econometric model as shown thus:

Equation 3 was thus used to estimate the effect of remittances on domestic savings.

$$LGDS_t = \beta_0 + \beta_1 LPGDP_t + \beta_2 LDIR_t + \beta_3 LINFLAT_t + \beta_4 LREMIT_t + LREER_t + \varepsilon_t \quad (3)$$

Estimation and testing procedures

The first step involves pre-testing each variable to determine its order of integration since by definition cointegration necessitates that variables are integrated of the same order. For this purpose, the Augmented Dickey Fuller (ADF) unit root test (Dickey and Fuller, 1979) was conducted for each of the series in the study to test for stationarity of the series. This tests the size of the coefficient ε_t in the following equation:

$$\Delta y_t = \alpha + \gamma Y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta Y_{t-1} + \varepsilon_t$$

where t denotes time trend and acceptance of the null hypothesis that $|\varepsilon|$=0 confirms the presence of non-stationary process.

Assuming the results in step one indicate that at least one series is integrated of the same order as the dependent variable, step two involves formulation and estimation of the theoretical long run equilibrium relationship. The concept of cointegration implies that if there is a long run relationship between two or more non-stationary variables, deviations from long run relationship are stationary. To test for cointegration among these six series, a multivariate cointegration technique developed in Johansen (1988) and applied in Johansen and Juselius (1990) is used. This system approach sets up a non-stationary time series as vector autoregressive process of order ***k*** in a re-parameterized form as given in equation 4:

$$X_t = \alpha + \prod_1 X_{t-1} + \ldots\ldots + \prod_k X_{t-k} + \varepsilon_t \quad (4)$$

where X_t is an ***(nx1)*** vector of endogeneous variables that are integrated of order one, commonly denoted as I(I), and ε_t is an nx1 vector of innovations. This Vector Auto Regression can be re-written as given in equation 5:

$$\Delta X_t = \prod X_{t-1} + \sum_{i=1}^{k-1} \Gamma_1 \Delta X_{t-1} + \Phi d_t + \varepsilon_t \quad (5)$$

where each of the (nxn) matrices Γ_i and Π comprise coefficients to be estimated; $i = 1,\ldots\ldots k-1$ is the number of lags included in the system; d_t is a vector of deterministic terms (constants, linear trends, 'spike' and intervention dummies); Δ is a difference operator; ε_t is a well-behaved vector of structural innovations, with zero mean, ie $E(\varepsilon_t) = 0$, a time invariant positive definite covariance matrix Σ and are serially uncorrelated, that is, $E(\varepsilon_t \varepsilon_{t-k}^{'}) = 0$ for $k \neq 0$. The vector $\prod$ is a matrix of long-run coefficients, defined as a multiple of two (nxr) vectors, α and $\beta^{'}$. If the coefficient matrix $\prod$ is a matrix with reduced rank $r < n$, then there exist ***(n x r)*** matrices α and β, each with rank r, such that; $\prod = \alpha\beta^{'}$ and $\beta^{'} y_t$ is stationary. R is the number of cointegrating relationships, the elements of α are the adjustment parameters in the vector error correction model and each column of β is a cointegrating vector.

Johansen (1988) and Johansen and Juselius (1990) propose two statistics, the trace statistic and maximum eigen value statistic. The trace test (λ_{trace}) and maximum eigen value $(\lambda_{\max})$ are shown in equations (6) and (7), respectively:

$$\lambda_{trace} = -T \sum_{i=r+1}^{n} \ln\left(1 - \hat{\lambda}_i\right) \quad (6)$$

$$\lambda_{\max} = -T \ln\left(1 - \hat{\lambda}_{r+1}\right) \quad (7)$$

where T is the sample size and $\hat{\lambda}_{r+1}$**,……,** $\hat{\lambda}_n$ are the smallest characteristic roots. If the statistic is bigger than

Table 1. Descriptive statistics for variables in levels.

Variable	LDIR	LGDS	LINFLR	LPGDP	LREER	LREMIT
Mean	0.919893	6.82269	1.60498	5.813538	4.678847	4.49537
Median	0.858662	6.720799	1.609438	5.793562	4.689787	4.632299
Maximum	1.623341	7.797977	2.607124	6.246611	4.886658	5.646718
Minimum	0.039221	5.938196	-0.051293	5.439383	4.465448	2.529721
Std.dev	0.30505	0.682949	0.588626	0.296962	0.112703	0.744983
Skewness	0.252284	0.178687	-0.499376	0.201727	-0.329987	-0.574
Kurtosis	3.280854	1.515256	3.236668	1.457527	2.227692	3.05992
Jarque-Bera	0.708618	4.955883	2.23872	5.401748	2.193053	2.808177
Probability	0.701658	0.083916	0.326489	0.067147	0.334029	0.245591
Observations	51	51	51	51	51	51

Table 2. Results of unit root test.

Macro variable	ADF in levels		ADF in difference	
	ADF_c	Order of Integration	ADF_c	Order of Integration
LDIR	-2.5961	I(I)	-9.206	I(0)
LGDS	-2.7265	I(I)	-6.4641	I(0)
LINFLR	-4.7098	I(I)	-6.4747	I(0)
LPGDP	-2.1754	I(I)	-5.5016	I(0)
LREER	-2.4997	I(I)	-5.8562	I(0)
LREMIT	-2.4997	I(I)	-9.8874	I(0)

Notes:
(i) L is logarithm and ADF is Augmented Dickey Fuller Test.
(ii) Asterisk *, **, and *** indicate significance at 1%, 5% and 10% levels respectively.
(iii) MacKinnon (1980) critical values are used for rejection of hypothesis of a unit root.
(iv) ADF values for ADF statistics (in levels) are 4.1498, 3.5005 and 3.1793 at 1%, 5% and 10% respectively.
(v) Critical values for ADF statistics (in first difference) are -3.5713, -2.9228 and 2.5990 at 1%, 5% and 10% respectively.

the critical value, the null hypothesis of at most ***r*** cointegrating vectors is rejected.

Data and measurement

Quarterly time series data on the Ugandan macroeconomic variables for the period of 1999:I - 2011:IV were used in this study. All variables were transformed to natural logarithms before estimation. The data were taken from Uganda Bureau of Statistics (UBOS), Bank of Uganda and the International Finance Statistics published by the International Monetary Fund. Since quarterly data on gross domestic savings, GDP and population were not readily available on quarterly basis, the existing annual data were transformed into quarterly data using Eviews quadratic match average.

EMPIRICAL RESULTS

Univariate test results

Descriptive statistics of the data were taken on the transformed variables and the results of the tests are summarized in Table 1. Looking at the Jarque –Bera statistics, Skewness and kurtosis, all the variables satisfy the normality test in levels.

Test for unit root

If the time series are non-stationary, the regression results obtained in a traditional way are spurious. Thus unit root tests are conducted on the logarithmic form of REER, DIR, GDS, INFLR, REMIT and PGDP.
The results from Table 2 show that most of the variables failed to reject the null hypothesis of non- stationary which implies that they were non-stationary at all levels. Therefore, it was necessary to differentiate all the variables. The null hypothesis is accepted when the series are first differenced, this implies that the series are integrated of order one [that is, I(1)].

Cointegration test

After determining the order of integration, we endeavor to

Table 3. Unrestricted cointegration rank test with trace statistic.

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.637027	110.5905	95.75366	0.0032
At most 1	0.416047	62.95942	69.81889	0.1559
At most 2	0.341433	37.67647	47.85613	0.3163
At most 3	0.229780	18.04509	29.79707	0.5627
At most 4	0.089514	5.774382	15.49471	0.7220
At most 5	0.028664	1.366896	3.841466	0.2423

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level, *denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values.

Table 4. Unrestricted cointegration rank test with Max-Eigen statistic.

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.637027	47.63107	40.07757	0.0059
At most 1	0.416047	25.28295	33.87687	0.3661
At most 2	0.341433	19.63138	27.58434	0.3672
At most 3	0.229780	12.27071	21.13162	0.5212
At most 4	0.089514	4.407486	14.26460	0.8140
At most 5	0.028664	1.366896	3.841466	0.2423

Max-Eigen value test indicates 1 cointegrating eqn(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values.

establish whether the non-stationary variables are cointegrated. This was because, as pointed out by Engle and Granger (1987), variables are said to be cointegrated if their individual time series are non-stationary but their linear combinations can be stationary because equilibrium forces tend to keep such series together in the long run. The error-correction terms exist to account for short-term deviations from the long-run equilibrium relationship implied by the cointegration.

From Tables 3 and 4, the cointegration relationship among inflation rate, real effective exchange rate, deposit rate, remittances and per capita GDP is investigated using Johansen (1988) test statistic. The test results indicate that there is at least one cointegrating vector among LINFLR, REER, DIR, REMIT and PGDP. We can reject the null of no cointegrating vector in favor of one cointegrating vector under the trace statistic and Maximum Eigen value at 5% level of significance. We also cannot reject the null of at most one cointegrating vector against the alternative of 2 cointegrating vectors for both trace and max-Eigen tests. Consequently, we can conclude that there is only one cointegrating relationship among LREER, LDIR, LPGDP, LINFLR and LREMIT. This implies that there is an established long run relationship among all the variables.

Lag length determination

Getting the lag length for cointegration analysis, the considered criteria are: the Akaike Information criteria and Swartz Bayesian criteria (SBC). SBC has suggested a maximum lag length of 1 as optimal while AIC suggests an optimal lag of 3. We shall take the lag length suggested by SBC because it is more accurate than AIC.
From Table 5, taking the Swartz Information Criteria the maximum lag length is 1. As shown in Table 6, with a lag of one, the LM test could not reject the null hypothesis of no serial correlation in the residuals since the probabilityof the LM-stat is 0.0817.
As shown in Table 7, from the long run statistics, holding the influence of other factors constant, the coefficient of inflation (INFLR) was expected to take either a positive or negative sign. In this case, the study revealed that INFLR had a positive effect on domestic savings. The magnitude of the coefficient was 4.389. This is to say that a one percent increase in inflation rate tend to increase domestic savings by 4.4%. This is consistent with Deaton (1977) who observed that holding cash outside banks in countries with high inflation increased in order for people to take advantage of informal busines opportunities. Similarly, the coefficient of per capita GDP (log of per capita GDP Per Capita) of 4.3779 had the expected positive sign. This means that a one percent increase in per capita GDP result in 4.4% increase in domestic savings.

The coefficient of REER (Log of real exchange rate) is 9.6707 and was expected to take either positive or negative sign. In this case, the study revealed that REER

Table 5. Lag length determination.

Lag	Log L	LR	FPE	AIC	SC	HQ
0	13.90839	NA	2.83e-08	-0.351484	-0.110596	-0.261683
1	242.8364	386.6340	5.44e-12	-8.926062	-7.239844*	-8.297457
2	294.0581	72.84862	3.01e-12	-9.602582	-6.471034	-8.435172
3	345.6255	59.58896*	1.91e-12*	-10.29446*	-5.717587	-8.588251*

* indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, and HQ: Hannan-Quinn information criterion.

Table 6. VAR residual serial correlation LM Test.

Lags	LM-Stat	Prob
1	48.36374	0.0817
2	46.51439	0.1127

Probs from chi-square with 36 df.

Table 7. Estimation of the long run model.

Cointegrating Eqn:	CointEq1	Standard errors	t-statistics
C	-46.1945		
LDIR(-1)	2.6412	1.3348	-1.9788
LINFLR(-1)	4.3891	0.8345	5.2594
LPGDP(-1)	4.3779	1.6158	2.7095
LREER(-1)	9.6707	3.656	2.6452
LREMIT(-1)	-5.0672	0.6984	-7.2553

had a positive effect on domestic savings and was statistically significant at 5% level of significance. This is to say that a 1% depreciation of the real exchange rate in a shilling tend to increase in domestic savings by 9.7% which shows positive relationship between real exchange rate and domestic savings.

The coefficient of deposit interest rate had the expected positive sign. The model revealed that a one percent increase in deposit interest rate results into a 2.6% increase in domestic savings though not statistically significant. This is not surprising in developing countries like Uganda where people bank in order to secure safe custody for their financial assets rather than seeking to earn interest. This positive relationship between savings and real deposit interest rate is consistent with the previous studies conducted by Athoukarala (1998), Shrestha et al. (2007), Ddumba and Obwona (1995) and Deaton (1989). While coefficient of REM IT (Remittances) is -5.0672. This reflects negative impact of workers' remittances on domestic savings though not significant. This did not bear the expected positive sign. A one percent increase in remittances results into a 5.1% decrease in domestic savings. This is consistent with the findings of Obwona and Dumba (1995) who revealed that foreign capital inflows have a negative and significant impact on domestic savings and Rampell and Lobdell (1978) who noted that remittances are mainly devoted to daily consumption needs. The findings also concur with the findings of BOU (2010) in ward remittance survey which showed that 69.8% was used for consumption and the remaining percentage is shared between savings and investment. Thus the observed t-statistic for REMIT, INFLR, REER and PGDP were all significant at 5% level except for DIR which is significant at 10% level of significance.

The short run model reveals that the Adjusted R-squared value of about 0.22 means that about 22% of the variation in domestic savings is explained by per capita GDP, REMIT, DIR, Real Effective Exchange Rate and Per capita GDP.

Table 8. The Vector Error Correction Model (VECM).

Variable	Coefficient	t-statistic	Standard errors
Coint Eq1	-0.0034		
DLGDS_1	0.4192	1.7375	0.2413
DLGDS_2	-0.1474	-0.6187	0.2383
DLDIR_1	0.3378	2.7011	0.1251
DLDIR_2	-0.1229	-0.6744	0.1823
DLINFLR_1	0.0037	0.0571	0.0652
DLINFLR_2	0.0209	0.3302	0.0636
DLPGDP_1	0.0738	0.0572	1.2896
DLPGDP_2	1.5309	1.066	1.4361
DLREER_1	-0.2950	-0.8013	0.3682
DLREER_2	0.2570	0.6723	0.3823
DLREMIT_1	0.0081	0.2180	0.0370
DLREMIT_2	0.0104	0.2996	0.0346
C	-0.0009	-0.0442	0.0206

Table 9. Tests for serial correlation.

Lags	LM-Stat	Prob
1	37.61551	0.3951
2	50.01427	0.0603
3	34.14109	0.5572
4	39.15852	0.3300
5	36.98327	0.4233
6	34.10934	0.5588
7	28.84147	0.7959
8	39.09226	0.3326
9	48.11723	0.0853
10	26.70789	0.8700
11	37.02804	0.4213
12	40.59757	0.2748

Probs from chi-square with 36 df.

After establishing that all variables in the model are I(1) and cointegrated, a VECM with one cointegration and one lag in each equation is estimated. The VECM allows the long run behavior of the endogenous variables to converge to their long run equilibrium relationship while allowing a wide range of short run dynamics. The coefficient of the error correction term is -0.003 and it carries the correct sign and is statistically insignificant at 1% with speed of convergence to equilibrium of 4% (Table 8). It confirms stability of the system with a low speed of adjustment. The coefficient of error correction terms for all variables have a negative sign however DIR, INFLR and REMIT are significant at 5% level. This depicts convergence in the system and convergence towards equilibrium in case of any disturbance in the system. However, restoration to equilibrium path will take longer time because the values of ECT are quite small (0.04, 0.08 and 0.15 respectively). The significant coefficients of the error correction terms of each time series depict that they cause one another.

Diagnostic tests

From Table 9, the probabilities at all lags are significant; this indicates that there is no serial correlation in the residuals. As per the results of Table 10, the Jarque-Bera statistic is 7.5508 and the p-value is 0.8192. We fail to reject the null hypothesis that the residuals are normally distributed. The kurtosis = 2.290, p = 0.8911 shows a normal distribution. This result is evident that the model was robust and reliable in explaining the relationship between Gross Domestic Savings and remittances. From Table 11, the Heteroskedacity test for stability of residuals yields a chi-square of 532.98 with a probability of value 0.6469. This shows that the results are satisfactory in terms of explaining the coefficient stability of the model.

Conclusion

The study revealed that remittances have a significant but negative effect on domestic savings. Other variables including deposit interest rate, real effective exchange rate, inflation and per capita GDP had a positive contribution to domestic savings in Uganda. In other words, the findings of the study are consistent with the argument of Rempel and Lobdell (1978) and Lipton (1980) that remittances are mainly devoted to daily consumption needs and Obwona and Dumba (1995) who also found that foreign capital inflows have a negative and significant impact on domestic savings. In a nutshell, the large flow of remittances to Uganda can be attributed to the altruism motive which mainly determines the flow of remittances in LDCs but a large percentage of remittances is used for consumption, with less amounts going to investment, education and health. This therefore calls for improved methods of recording all the information regarding inward remittances as it remains questionable as to why remittances do not have positive effect on domestic savings.

remittances depends on the motives that push the sender; these can be either an altruistic motive or savings and investment motives. This implies that Uganda government should establish agencies in countries to where most Ugandans migrate in order to capture their savings and help them channel those savings into productive projects in Uganda. Policy makers should therefore design strategies that will help Ugandans

Table 10. Jarque-Bera test for normality.

Component	Skewness	Prob	Kurtosis	Prob	Jarque-Bera	Prob
1	-0.3131	0.3912	3.3166	0.6647	0.923157	0.6303
2	-0.511	0.1617	3.3632	0.6190	2.205738	0.3319
3	-0.0764	0.8342	2.6061	0.5896	0.334786	0.8459
4	0.4362	0.2323	3.0993	0.8918	1.445303	0.4855
5	0.0032	0.993	3.2324	0.7502	0.101421	0.9506
6	-0.3823	0.2951	2.1223	0.2294	2.540441	0.2808
Joint		0.5109		0.8911	7.550846	0.8192

Table 11. Heteroskedacity test.

Chi-sq	Df	Prob.
532.9831	546	0.6469

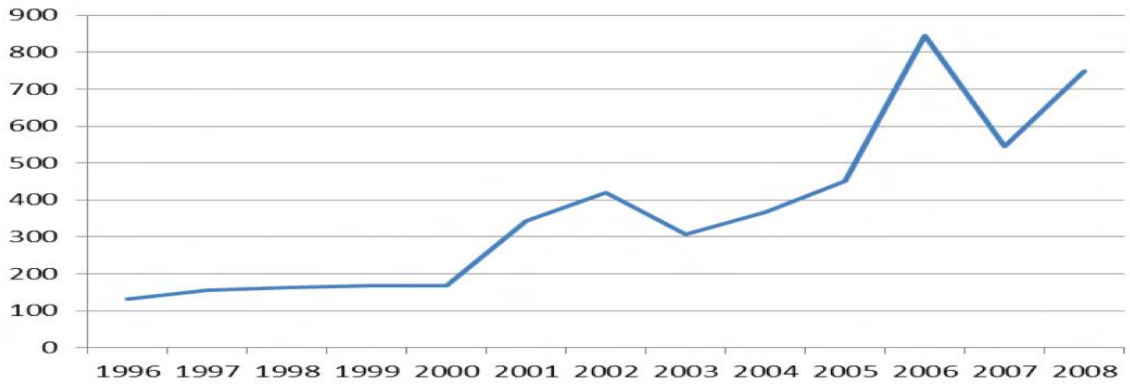

Figure 1. The trend of remittances received (US $ millions) for the period of 1996-2008.
Source: Bank of Uganda.

channel their remittances into priority developmental areas of the economy.

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