

An Assessment of Kenya's Public Debt Dynamics and Sustainability¹

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Abstract

Increased borrowing requirements to finance investment in public infrastructure coupled with the stagnant foreign support to the budget has seen Kenya's public domestic debt rise to new levels in absolute terms over the last decade. The economy has also witnessed a series of shocks ranging from the global financial crisis and high oil prices to the post election crisis in early 2008. These developments raise the question on whether the country's public debt remains sustainable. Using annual data on a fiscal year basis for the period 1983 to 2013, this paper examines the sustainability of Kenya's public debt using both the co-integration and stochastic debt sustainability approaches. It also analyses the trade-offs of holding external or domestic public debt in Kenya.

The results show that the public debt is sustainable. In addition, depreciations in the exchange rate did not have significant effects on the average interest rates on external debt during the study period. However, the implementation of policies to support faster economic growth, restructuring public debt towards external borrowing which is cheaper than domestic debt, continued deepening of the capital markets to lengthen further the maturity profile of domestic debt, and rationalisation of recurrent expenditure would be necessary in the medium-term to ensure that the public debt remains on a sustainable path. These policies can be supported by measures to improve the trade deficit in order to reduce the vulnerability of the exchange rate to external shocks, rationalization of government expenditure to increase the relative share of development expenditure and enhancing the absorption of development funds, and promoting domestic revenue mobilization efforts.

Keywords: public debt, sustainability, primary deficit, vector auto regression.

JEL Classification: G18, E63, E58

1. Introduction

Kenya's Medium Term Debt Management Strategy (MTDS) was formulated so that public debt is sustainable (Republic of Kenya, 2014). This will ensure that the country is able to service its debt in the short, medium and long-run without renegotiating or defaulting, and without having to undertake policy adjustments that are implausibly large from an economic and political standpoint (*IMF*, 2004). A sustainable debt provides confidence that the government will be able to borrow and pay potential creditors. Unsustainable debt levels, on the other hand, present risks to government expenditures on development and social programmes since a large proportion of tax revenue would be diverted to debt service. Elbadawi *et al.* (1997) found that while debt inflows enhanced economic growth, debt overhang had a negative impact on economic growth. They found that liquidity constraints caused by rising external debt servicing payments reduced exports and thus were an impediment to economic growth. However, different countries, or even the same country at different stages of economic development, can sustain different levels of debt depending on its growth profile and the credibility and quality of the relevant institutions that are charged with developing or implementing policy. Although there are debt sustainability benchmarks, these guidelines do not apply mechanically as they may depend on the political and economic constraints which limit a country's capacity to adjust.

The MTDS, a prudent fiscal policy and a stable macroeconomic environment contributed to the reversal in the trend of a rising public debt in Kenya by June 2013. Public debt stood at 52 percent of GDP in June 2013 down from 64 percent in June 2003 (Republic of Kenya, 2013). The structure of public debt was also favorable as a large proportion of external debt was on concessional terms. Domestic debt increased three-fold between 2005 and 2013 mainly to provide finance for infrastructure developments which included projects in the roads and energy sectors. This shift towards domestic sources can be partly attributed to unpredictable external financing. Domestic debt accounted for 56 percent of total public debt in June 2013 compared with 45 percent in June 2006. The share of domestic debt held by banks stood at 46 percent in June 2013 compared with 41 percent in 2006, reflecting continued dominance by institutional investors such as pension schemes and insurance companies (particularly life insurance).

The rising proportion of domestic debt, which attracts higher interest rates relative to external debt, in total public debt coupled with persistent shocks on the economy which affect tax

revenue, indicate an increasing risk to debt sustainability. Interest payments on total public debt increased from 10 percent of total tax revenue in 2005/06 to 12 percent in the fiscal year 2012/13. In addition, economic growth decelerated following a series of shocks attributed to a slowdown of the global economy following the global financial crisis, volatile oil prices and the post election crisis in early 2008. These developments, coupled with the increasing need to finance flagship projects under the *Vision 2013* development plan (Republic of Kenya, 2007), raise the question on whether the country's public debt remains sustainable.

Debt sustainability studies on Kenya and other developing economies have been undertaken by Elbadawi *et al.* (1999) and IMF (2003), among others. This paper contributes to the existing literature by employing a broad set of indicators and approaches to establish the dynamics and sustainability of Kenya's public debt. Using annual data, on a fiscal year basis, for the period 1983 to 2013, this paper analyses first, Kenya's public debt dynamics using a vector auto-regression framework, and then its sustainability based on a co-integration approach. The main conclusion in this paper is that the public debt is sustainable. However, implementation of policies to support faster economic growth, restructuring public debt towards external concessional borrowing which is cheaper than domestic debt, continued deepening of the capital markets, and recurrent expenditure rationalisation would be necessary in the medium-term to ensure that public debt remains on a sustainable path. These policies should be matched with measures to improve the trade deficit in order to reduce the vulnerability to external shocks, rationalization of government expenditure to increase the relative share of development expenditure and enhance the absorption of development funds, and promoting domestic revenue mobilization efforts.

The rest of the paper is divided into five sections. Section 2 provides the literature review on debt sustainability analysis; Section 3 reviews the public debt developments in the study period; Section 4 provides the methodology adopted in the study and describes the data used in the analyses; Section 5 reports the empirical results; and Section 6 concludes the paper and provides policy recommendations.

2. Review of Literature on Public Debt Sustainability

Various approaches to public debt sustainability have been proposed in the literature (Foncerrada, 2005; IMF, 2004; Reddy, 2006; and Gupta, 1992). The concept of sustainability of debt has evolved from the definition based on meeting a group of indicators and thresholds, to a more general approach where it is conceived as a process (Foncerrada, 2005). The process comprises a series of actions and functions aimed at sustaining first, the debt flows and then the borrowing and consequential debt service. It identifies the minimum aspects that are critical to the debt sustainability process as: existence of a legal framework and institutional structure for debt management, a framework for coordination among the key players in the debt and communication of debt management activities, market development structure, and a staffing with requisite skills and necessary analytical tools.

However, sustainability of public debt should also be assessed by the ability of a government to meet thresholds set on a group of indicators (IMF, 2003). These indicators ensure that countries remain solvent such that they are able to meet their debt obligations on time without constraining their growth objectives. The ratio of the budget deficit to GDP is one such measure since it is a proxy for fiscal sustainability. In more recent times the accumulated debt liabilities and the cost of servicing them has been expressed as a ratio of GDP, of sustainable revenues⁴, and of government expenditures.

Other benchmarks for domestic debt sustainability proposed by the IMF include the ratio of domestic debt to GDP which should be below the 15-20 percent range, and a “cautionary flag” if the rate of growth of that ratio exceeds a 5-7 percent range. It has also been observed that sustainable revenues are in general, a better denominator than GDP but numeric values of the critical levels of the ratios are not agreed. Another key indicator of public debt sustainability is the ratio of the rate of interest and rate of growth of the economy (Reddy, 2006). This approach considers that the interest rate at which the government borrows cannot be greater than the rate of growth of the economy. An unsustainable debt would occur since the ratio of debt to GDP will rise. The composition of public debt in terms of domestic and foreign sources is also an important determinant of debt sustainability. A larger proportion of domestic debt ensures that debt service expenditure remains in the domestic economy rather than being paid out of the

⁴ Excludes one-off revenues and proceeds from sale of assets through privatisation.

country. In addition, exchange rate risk is minimized. However, excessive borrowing from the domestic market can crowd-out private sector borrowing since interest rates could be pushed up.

Debt sustainability analysis should also include an assessment of the institutional development and monitoring (IMF, 2004). One of the main measures of the quality of a country's policy environment is the World Bank's Country Policy and Institutional Assessment (CPIA) Index. The CPIA rates countries against a set of criteria grouped in four clusters: economic management; structural policies; policies for social inclusion and equity; and public sector management and institutions. The rating influences the parameters and international perception of a country's sovereign debt risk. Other rating agencies such as Standard and Poor's, Moody and Fitch, use a broader set of indicators to influence potential investors in debt instruments.

3. Public Debt Developments in Kenya

The composition of public debt shifted towards domestic debt between June 2005 and 2013 (Annex 1 Chart 2). However, the country had a diversified financing source for its budget deficit (Annex 1 Chart 3). As indicated in Annex 1 Chart 4, domestic debt rose at a faster rate from 2008 for reasons already alluded to above. In a three gap sense (budget deficit, net current account, domestic savings/investment gap) it is clear that fiscal savings are inadequate to cover the needs of public sector investment and hence private savings have been diverted to fill the gap while foreign savings have periodically assisted.

Institutional investors such as pension funds and insurance companies continue to play a significant role in the investor base acquiring domestic debt instruments (Annex 1 Chart 5). Consequently, the costs of borrowing and rollover risks declined between 1999 and 2013 (Table 1). Commercial banks have been a dominant group of investors in government securities over the years. Hence, the risk of crowding-out other potential borrowers from commercial bank funds, particularly since private sector companies rely on them for finance, has persisted.

In December 2005, roughly 75 percent of securitised domestic debt had a tenor of 4 years or less (Annex 1 Chart 6a). Implementation of the MTDS resulted in a decline in this proportion to roughly 45 percent – the maturity profile has lengthened significantly despite the increase in debt over the same period (Annex 1 Charts 4 and 6b) rising from 2.5 years to around 6.25 years. The decline in average maturity from over 7 years observed in Annex 1 Chart 6b in early 2011 was largely attributed to increased uptake of the 364-day Treasury bills by investors. The 364-day

Treasury bill was introduced and sold on a bi-monthly basis from August 2009, on a monthly basis from 13th December 2010, and on a weekly basis from February 2013. As a result, the average maturity of domestic debt was generally stagnant as the short-term instrument was popular due to higher returns (Annex 1 Chart 6b). Speculation induced instability of the exchange rate in 2004, 2007 and 2011 was associated with the declines in the maturity of domestic debt.

The increase in the external debt occurred at a much slower rate compared with domestic debt largely reflecting shortfalls in tax revenue collections sparking domestic borrowing, and unpredictable release of funds committed by development partners (Annex 1 Chart 2). By June 2013, 60.7 percent of external debt was owed to multilateral creditors, 30.5 percent to bilateral creditors, and the remaining 8.8 percent in commercial loans (Republic of Kenya, 2013). The currency structure of the external debt was also diverse as 33.0 percent was in Euros, 32.3 percent in US Dollars, 15.1 percent in Japanese Yen, 5.7 percent in Chinese Yuan, 5.5 percent in Sterling Pounds, and 8.4 percent in other currencies. The diverse currency structure mitigates against exchange rate risk. The default risk on external debt was also low as 75 percent of the debt stock had a maturity of over 10 years, a grant element of 68.6 percent, grace period of 8 years, average maturity of 33.7 years, and average interest rate of 1.2 percent per annum.

4. Methodology

4.1 Assessing Debt Sustainability and Dynamics

This study follows the approach of Reddy (2006), IMF (2004), and Favero and Giavazzi (2007) to analyze debt dynamics in Kenya. For an open economy with access to external financing, the government's budget constraint at time t in nominal terms can be expressed as:

$$D_t^d + E_t D_t^f = (1 + i_t^d) D_{t-1}^d + (1 + i_t^f) E_t D_{t-1}^f - (PB_t + \Delta M_t) \quad \dots (1)$$

Where D_t^d is the domestic debt at time t , D_t^f is the foreign debt at time t , E_t is the nominal exchange rate (local currency/USD) for end of period t , i_t^d , is the nominal interest rate on domestic debt in period t , i_t^f is the nominal interest rate on foreign debt in period t , PB_t is the primary balance in time t , and ΔM is money finance from the Central Bank through the overdraft. Over the period of analysis, ΔM constituted a negligible proportion to GDP and is

therefore excluded in subsequent analysis. The primary balance is the difference between government ordinary revenue and non-interest government expenditure.

Equation (1) can be re-written as:

$$D_t = (1 + i_t^d)(1 - \alpha_{t-1})D_{t-1} + (1 + i_t^f)\alpha_{t-1}(1 + \varepsilon_t)D_{t-1} - PB_t \quad \dots (2)$$

Where $D_t = (D_t^d + E_t D_t^f)$ is the total public debt expressed in local currency in time t , $\alpha_{t-1} = (E_{t-1} D_{t-1}^f) / (D_{t-1})$ is the share of foreign debt in total public debt in time $t-1$, and $\varepsilon_t = (E_t - E_{t-1}) / E_t$ is the rate of nominal exchange rate depreciation in time t .

Dividing equation (2) by nominal GDP at time t yields, where $P_t Y_t = (1 + g_t) Y_{t-1} (1 + \pi_t) P_{t-1}$:

$$d_t = \frac{[1 + i_t^w + \alpha_{t-1} \varepsilon_t (1 + i_t^f)]}{(1 + g_t)(1 + \pi_t)} d_{t-1} - pb_t \quad \dots (3)$$

Where d_t is total debt to GDP ratio at time t , $i_t^w = (1 - \alpha_{t-1})i_t^d + \alpha_{t-1}i_t^f$ is the weighted average of total domestic and foreign nominal interest rates in period t , π_t is the GDP deflator inflation rate, g_t is the real GDP growth rate in period t , d_{t-1} is total debt to GDP ratio at time $t-1$, and pb_t is the primary balance to GDP ratio at time t .

Equation (3) can be expressed as:

$$d_t = \phi_t d_{t-1} - pb_t \quad \dots (4)$$

Where $\phi_t = \frac{[1 + i_t^w + \alpha_{t-1} \varepsilon_t (1 + i_t^f)]}{(1 + g_t)(1 + \pi_t)}$

Subtracting d_{t-1} on both sides in equation (4) yields:

$$\Delta d_t = (\phi_t - 1)d_{t-1} - pb_t \quad \dots (5)$$

The economy remains solvent while the debt ratio stabilizes if $\lim_{t \rightarrow \infty} E(d_t) = 0$.

This paper presents three approaches to test for debt sustainability. The first approach evaluates it from equation 5, next we evaluate threats arising from the primary budget balance, pb , and finally, through a discussion approach, we explore what we have termed the Gambler Syndrome

in Annex 1 Chart 1. In the Gambler Syndrome approach, short-term debt service causes the budget to be non-sustainable knocking-on to debt default threats.

First, we consider public debt to be sustainable if, over time, $\phi_t < 1$. It is unsustainable if $\phi_t > 1$ since the stock of debt will increase infinitely. We next consider the condition $pb_t \geq 0$ which ensures that the debt burden eases in the long-run through accumulation of budget surpluses. Since public debt sustainability is inter-temporal, a temporary budget deficit is sustainable if it is matched by an appropriate future surplus. Therefore, incorporating structural breaks, public debt is considered sustainable if both public expenditure and revenue are cointegrated. Unit root and co-integration⁵ tests incorporating structural breaks are conducted in line with Dickey and Fuller (1979), Gregory and Hansen (1996), and Johansen (1995).

In order to establish the linkages between public debt and macroeconomic indicators in the debt equation (3), we model debt dynamics using a vector autoregression (VAR) (Favero and Giavazzi, 2007). The VAR is based on the total debt to GDP ratio, weighted average of total domestic and foreign nominal interest rates, inflation rate, real GDP growth rate, the primary balance to GDP ratio, and the rate of nominal exchange rate depreciation. We estimate a recursive⁶ VAR and analyse the impulse responses of functions.

4.2 Choice between Domestic and External Debt

This study also analyses the policy options in choosing between contracting external and domestic debt in the medium-term. In this regard, the choice of an optimal debt structure involves making trade-offs between the cost and risk of alternative forms of financing as well as external factors (UNCTAD, 2008). Although a positive relationship has been shown by Abbas and Christensen (2007) to exist between domestic public debt and economic growth, a long maturity profile, macroeconomic stability, a deep bond market, a sound legal framework for debt management, and a broad investor base comprising mainly institutional and foreign investors are

⁵ In the Johansen (1995) approach, the number of co-integrating equations is determined based on the maximal eigenvalue or trace statistics. Gregory and Hansen (1996) argue that a shift in the cointegration vector due a structural break in the data can result in the rejection of cointegration.

⁶ The optimal lag order of the VAR model can be established using various statistical tests including likelihood ratio test, the Akaike information criterion and the Schwartz Bayesian criterion. However, Favero and Giavazzi (2007) showed that it is sufficient to have at most two lags of the debt to GDP ratio in the VAR. Stability or stationarity of the VAR ensures that standard errors for impulse response functions are valid and deductions on the impulse response functions would not be spurious.

key to reducing the risks associated with domestic borrowing. However, UNCTAD (2002) showed that an increasing reliance on domestically issued debt had negative implications on the interest cost and, ultimately, financial stability in Africa. However, bond markets in Africa were still shallow during the period covered by that study and hence that threat could well be mitigated in several countries with active stock markets.

Similarly, the study by Beaugrand *et al.* (2002) on Central and West African countries showed that concessional external debt is preferable to domestic debt at market rates even if there is a high probability of a large depreciation in the exchange rate. Apart from creating a benchmark for local private corporations to issue bonds in the global markets, issuance of bonds in the international market was found to be cheaper than similar bonds issued in the domestic market for emerging economies (UNCTAD, 2008).

4.3 Non-conventional aspects of debt sustainability analysis

There are also non-conventional aspects of debt sustainability analysis where debt is considered sustainable for as long as creditors are prepared to buy and hold public debt instruments. That is to say they have confidence in a government's commitment to honour its debt obligations and the rewards offered compensate for any risk incurred in acquiring, holding or disposing of such instruments. The proportion of debt maturing at the current time, and the proportion of that maturing debt that is rolled over, are relevant indicators of confidence in debt instruments. The average maturity of outstanding debt also contributes to confidence in government debt instruments. The longer the average maturity of the outstanding debt the more likely the holders will roll it over when it matures. But where that average is short they may only be induced to reinvest by offering higher returns (Annex 1 Chart 1). On the one hand there is the credibility necessary to persuade investors that default is unlikely so they will purchase and retain debt while on the other hand there is the aspect of pain which can be examined from the standpoint of a likelihood of increasing tax rates to raise the required revenue to service debt. The alternative to raising tax rates would be to implement measures to reduce revenue leakages or cut down on recurrent, or in some cases, development expenditure. Some of these measures could affect the economic growth outcomes of a country.

Credibility in government debt instruments hinges on expectations and therefore it is necessary to understand expectation formulation. Deteriorating expectations with respect to the rate of exchange will shift financing to hot money from real investment. Adverse expectations regarding inflation will undermine the incentive to save. Expectations with respect to interest rates will change portfolio structures as can be seen in an examination of commercial bank asset portfolios shifting between bills and bonds. A stable yield curve is critical therefore for a government to be able to market long-term debt instruments.

5. The Data and Empirical Results

5.1 The Data

Annual data for the period 1983 to 2013 is used in the analysis since the nominal GDP data (at market prices) and audited government budget data are only available on an annual basis. The data were obtained from the annual Economic Surveys published by the Kenya National Bureau of Statistics (KNBS). Government budget data is also available on a financial year basis – from July to June. Consequently, all the data variables are considered on financial year basis. Financial year GDP data for year t is computed from the annual data as $(GDP_t + GDP_{t-1})/2$. The study uses the GDP deflator inflation rates which are computed as the rate of change in the estimated financial year deflators.

Exchange rates (Ksh/USD) are averages for the month of June in the financial year. The GDP deflator, GDP, government revenue and expenditure data were obtained from the Annual Economic Surveys published by the KNBS. Primary deficit data was computed from the budget data published in the Economic Surveys. Exchange rates data was obtained from the Monthly Economic Reviews published by the CBK. Public debt comprises of gross domestic and external debt. External debt comprises of public and publicly guaranteed debt. Public debt data was obtained from the Annual Debt Management Reports published by the National Treasury.

Following the approach of Favero and Giavazzi (2007), the weighted average interest rates on public debt were computed by dividing the total foreign and domestic interest payments on public debt in year t by the public debt in time $t-1$. This computation is also supported by the fact that a large proportion of public external and domestic debt had a maturity of over one year. The

individual implicit interest rates on domestic and foreign debt were computed by dividing the respective interest payments by the previous year debt stocks.

5.2 Empirical Results

5.2.1 Public Debt Sustainability and Dynamics

An analysis of the trends in the variables in the debt equation shows that the debt to GDP ratio has generally decreased since 1999, but has risen since 2008 (Table 1). The performance of the economy remained resilient considering the extent of the shocks experienced in the period. However, the share of foreign debt in total debt declined substantially largely reflecting unpredictability of and a low absorption rate for foreign financing. There were also several occasions where foreign aid flows were disrupted. This happened in January 1992, July 1997, and June 2004. Consequently, the deficit in the primary balance widened as the country relied more on domestic borrowing which is comparably expensive. However, this also contributed to the development of the bond market in Kenya in order to meet the increased domestic borrowing requirements.

A comparison of the implicit interest rates on foreign and domestic debts shows that foreign borrowing, since it is largely concessional and conditional on implementing stipulated policies, attracted much lower rates. However, the diversification of the investor base and increase in the maturity of domestic debt contributed to a general decline in the implicit interest rate on domestic debt from 16.3 percent in the fiscal year 1998/99 to 9.6 percent in 2012/2013. However, the implicit interest rate on domestic debt increased by about 2 percent between 2011 and 2012, reflecting the notable rise in interest rates in 2011. This trend reversed in 2013.

The significant exchange rate depreciations in 1999, 2008 and 2011 did not have a noticeable effect on the implicit interest rates on foreign debt. Similarly, the GDP deflator inflation rate movements have been driven mainly by supply factors and the impact has been largely felt on the average rates on domestic debt.

Table 1: Trends in Main Debt Variables for the Fiscal Year to June (%)

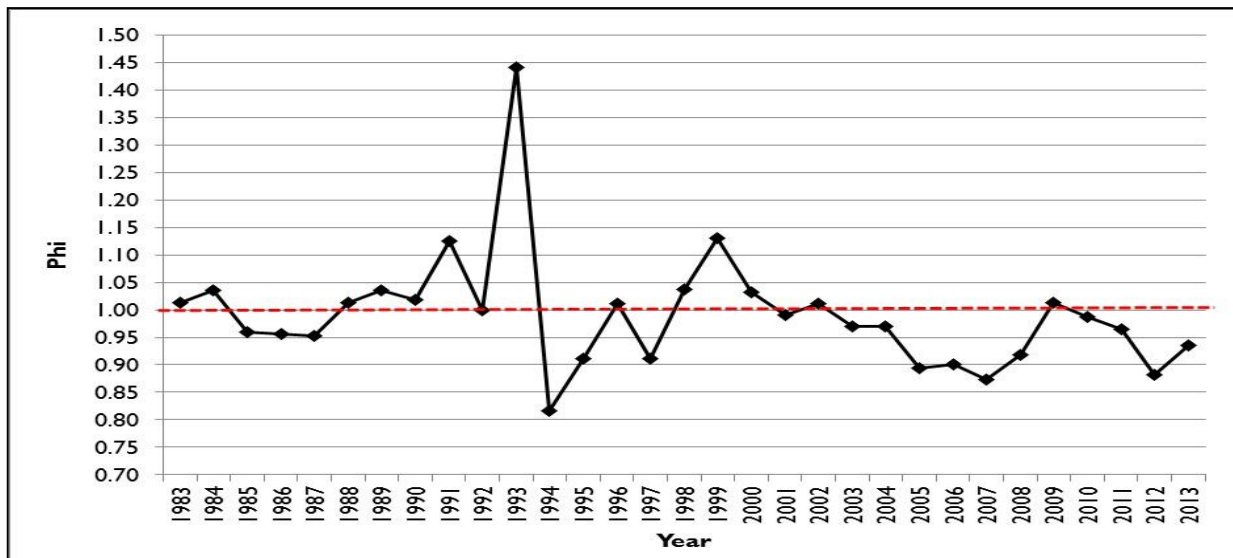
Year to end June	Debt/GDP ratio	Foreign debt/Total debt	Real GDP growth	Weighted implicit rate on debt	Ksh/USD depreciation rate	Implicit rate on domestic debt	Implicit rate on foreign debt	Primary balance/GDP ratio	GDP Deflator Inflation rate
1999	66.59	70.16	2.78	7.10	22.58	16.25	2.43	4.01	5.32
2000	64.41	65.75	1.43	4.95	6.91	12.28	1.83	3.99	4.91
2001	61.21	65.04	2.20	4.06	1.32	9.98	0.97	1.20	3.65
2002	59.72	61.55	2.43	4.93	-0.25	10.81	1.76	1.00	1.11
2003	64.27	58.45	1.74	5.81	-5.86	10.94	2.61	-0.55	3.42
2004	62.29	59.14	3.73	3.98	7.21	7.58	1.43	-0.60	7.61
2005	55.76	57.93	5.52	3.57	-4.16	7.25	1.03	1.08	7.09
2006	51.94	54.65	6.12	4.19	-3.05	8.55	1.03	-0.94	7.09
2007	46.40	49.53	6.67	4.94	-9.90	9.57	1.10	-0.25	6.84
2008	43.39	49.63	4.17	6.22	-2.81	10.59	1.76	-3.96	9.56
2009	46.19	49.94	2.14	5.91	19.26	10.23	1.53	-3.37	11.75
2010	48.88	45.38	4.29	5.39	6.17	9.57	1.20	-3.88	5.34
2011	52.05	47.73	5.09	5.68	9.70	9.15	1.51	-3.96	8.64
2012	49.85	46.59	4.49	6.51	-6.27	11.14	1.44	-3.13	12.22
2013	52.06	43.95	4.62	5.78	2.11	9.56	1.44	-4.25	9.10

Source: Computed based on data from Kenya National Bureau of Statistics, the National Treasury and CBK.

Using the first approach in which public debt is considered sustainable if $\phi_t < 1$, it is deduced that public debt was generally sustainable since 2001 except for the interlude in 2008/09 which was the aftermath of the post election crisis (Chart 1). The economic growth rate dropped substantially while supply related inflation pressures picked up during the period. However, the situation reversed and the debt was sustainable thereafter. However, domestic debt increased at a much faster rate in 2013 (by 22.3 percent); hence the rise in ϕ_t , although it was still 6.5 percent below the critical value of 1. Overall, public debt sustainability has remained vulnerable to shocks on economic growth. The most notable period followed the impact of the fiscal indiscipline in the early to mid 1990's when economic fundamentals collapsed as inflation and interest rates spiraled to over 50 percent. Real GDP growth plummeted to 0.5 percent in 1997 which contributed to the deterioration in the plot of ϕ_t .

Correlation tests for the key variables in the debt equation are shown in annex 6. A strong positive and statistically significant correlation is observed between debt/GDP ratio and primary balance/GDP ratio and implicit interest rate on domestic debt. The positive but statistically insignificant relationship between the debt/GDP ratio and implicit interest rate on foreign debt indicates that the interest cost on public debt was mainly driven by domestic debt. However, a negative but statistically significant correlation is observed between real GDP growth and debt/GDP ratio suggesting, as expected, that a strong positive growth of the economy would ensure debt sustainability. The correlation statistic between depreciation in the exchange rate and the implicit interest rates on foreign debt was not statistically significant at 5 percent. This reflects the fact that a large proportion of the external debt was on concessional terms.

Chart 1: Measuring Public Debt Sustainability using ϕ_t in the Debt Equation



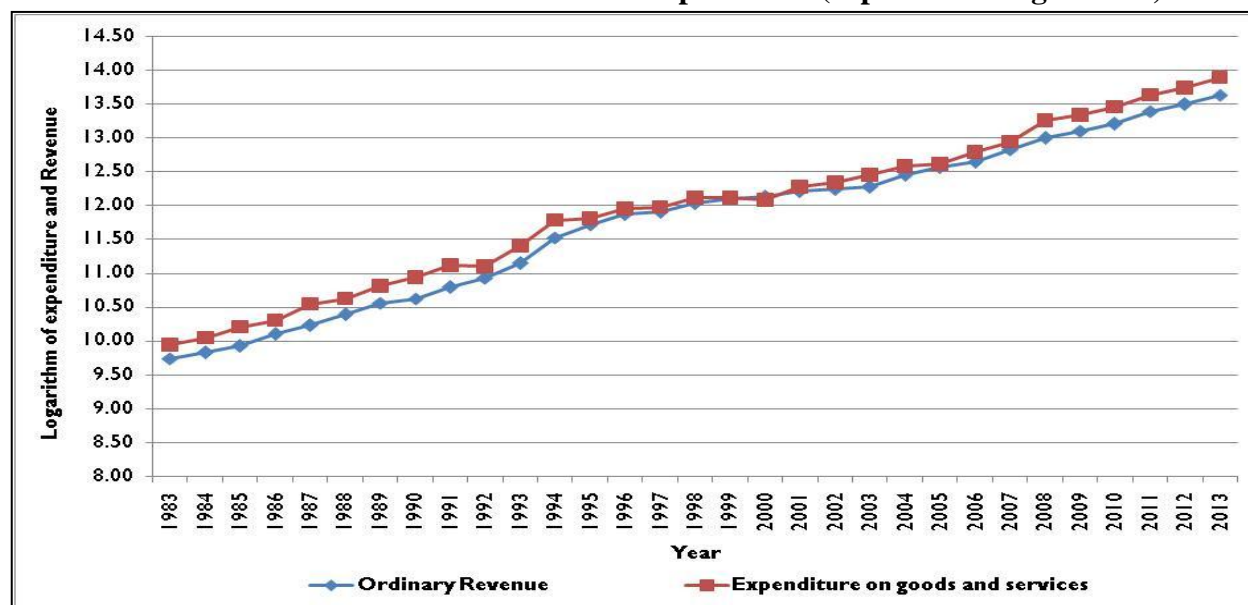
Source: Author computations based on data from KNBS, the National Treasury and CBK.

In the second approach debt is sustainable if public expenditure and revenue both change at the same rate, and are therefore cointegrated. We first establish whether there are structural breaks in the revenue and expenditure data (expressed in logarithms) before testing whether the two series are cointegrated. Presence of a structural break in the data in 1994 was found to be statistically significant at 5 percent level based on the Wald test. This is also depicted in the plot of the data in Chart 2. The main cause of the structural break was the significant rise in government interest expenditure following the expansionary fiscal policy in 1993/94. The CBK undertook to mop-up the excess liquidity in order to rein in inflation and dampen the significant depreciation in the exchange rate during the period. Consequently, the 91-day Treasury bill rate rose from 17.9 percent in June 1992 to 84.9 percent in June 1993.

Other similar episodes depicted in Annex 1 Chart 7 relate to the decline in confidence following the adoption of a queue voting system in 1988 which was further undermined by an aid freeze by development partners. The IMF Enhanced Structural Adjustment Facility for Kenya was suspended in July 1997 and expired in April 1999 before any disbursements were made. This resulted in increased domestic borrowing to bridge the financing gap with the 91-day Treasury bill rates rising from 18.3 percent to 23.6 percent in August 1997.

Unit root tests in annex 3 indicate that the two series are integrated of order one. The results in Table 2 under both the maximum eigenvalue and trace tests show cointegration between expenditure and revenue in the period since 1983. The cointegrating vector is about (1,-1). Based on these results, it was deduced that the budget deficits were sustainable in the long-run.

Chart 2: Trends in Government Revenue and Expenditure (expressed in logarithms)



Source: Computation based on data from the National Treasury

Table 2: Johansen Cointegration Test

No. of CE(s)	Trace				Max-Eigen			
	Eigenvalue	Statistic	Critical Value	Prob.	Eigenvalue	Statistic	Critical Value	Prob.
None *	0.4328	16.5432	15.4947	0.0347	0.4328	16.4466	14.2646	0.0222
At most 1	0.0033	0.0965	3.8415	0.7560	0.0033	0.0965	3.8415	0.7560
Normalized cointegrating coefficients with standard errors in brackets								
Log expenditure		Log revenue						
1.0000		-1.0803 (0.0207)						

*denotes rejection of the null hypothesis at 0.05 percent level. Cointegration test assumes linear deterministic trend and a dummy for the structural break identified in 1994. Standard error is in brackets.

The linkages between public debt and the other variables in the debt equation were analyzed using the VAR for total debt to GDP ratio, weighted average of total domestic and foreign nominal interest rates, inflation rate, real GDP growth rate, the primary balance to GDP ratio, and the rate of nominal exchange rate depreciation. Annex 2 depicts the data used in the VAR estimations. The Augmented Dickey-Fuller (ADF) tests indicated that all variables except depreciation in the exchange rate and real GDP growth have unit roots in levels but are stationary in their first differences at 5 percent significance level (Annex 3). Depreciation in the exchange rate and real GDP variables were found to be stationary in levels and first differences.

The optimal lag order of the VAR model was established using various statistical tests (Annex 4). The appropriate lag length using the likelihood ratio test and Schwarz information criterion is one lag while the Akaike Information Criterion shows two lags. A lag reduction to one lag was accepted at 5 percent significance level. Using one lag in the VAR model, there was no statistically significant evidence of autocorrelation, heteroscedasticity or non-normality in the residuals from the models. The VAR model was found to be stable (or stationary) as all roots of the auto-regression characteristic polynomial were within the acceptance region (Annex 5).

The estimated impulse response functions in Chart 3 show that real GDP growth has a negative effect on public debt with a maximum effect after two years. In particular, the results show that a 1 percent increase in economic growth reduces the debt/GDP ratio by a peak of 2.5 percent within three years. The results also show that depreciation in the exchange rate reduced the debt/GDP ratio over the same time horizon. Although this is contrary to expectations, the result implies that the impact of depreciation improves economic growth through exports in a much more pronounced way than it increases external debt. In addition, given the concessional nature of the country's external debt, depreciations did not have significant effects on the average interest rates on the debt during the study period. This was also confirmed by correlation tests in Annex 6. As expected, increases in the primary balance and inflation increase the debt/GDP ratio. However, the impact is not statistically significant at 5 percent level.

It is also established in the impulse response function in Chart 4 that an increase in the debt/GDP ratio has feedback effects to real GDP growth and the primary balance. An increase in the debt has a positive and statistically significant effect on the economy over a three year horizon. This is particularly so if the government invests the borrowed fund in growth enhancing projects such as infrastructure development.

Chart 3: Impulse Response functions of the Debt/GDP ratio to Shocks in the Macroeconomic Indicators in the Debt Equation

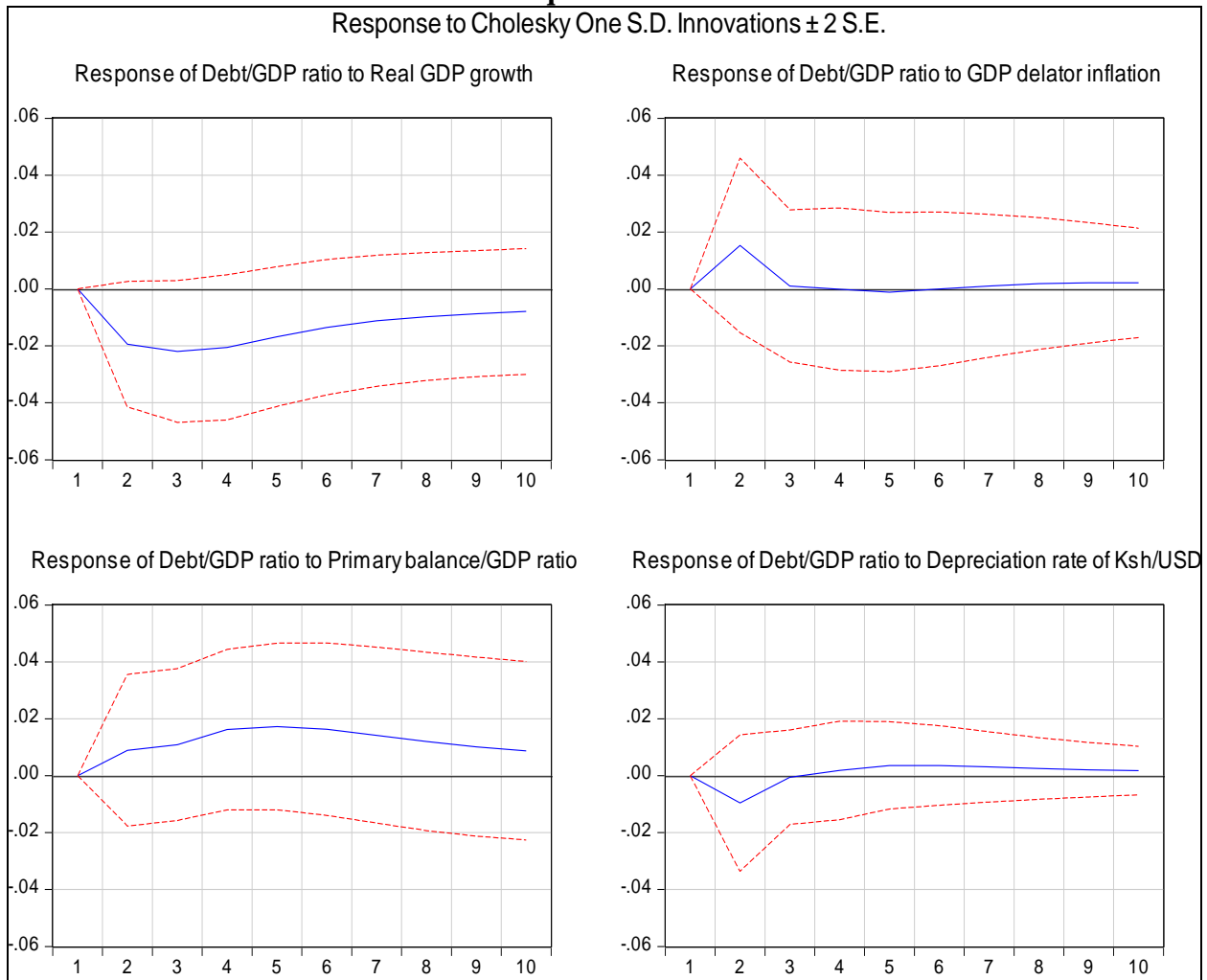
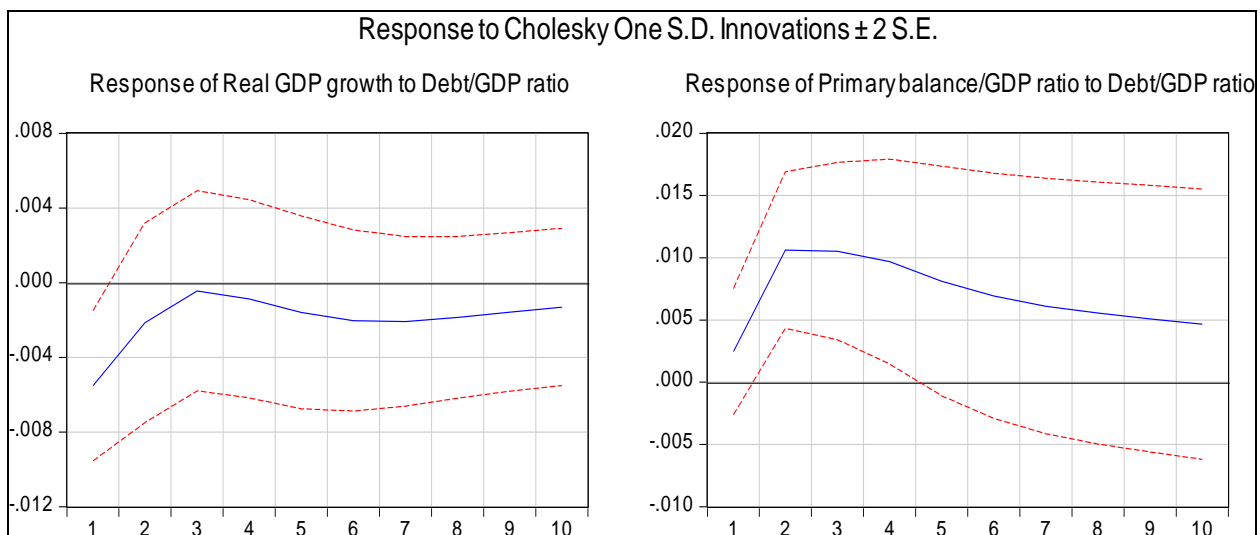


Chart 4: Impulse Response functions of the Growth and Primary Balance to Shocks in the Debt/GDP ratio



5.2.2 Cost and Risk Implications of External and Domestic Debts

This section analyses the cost implications of domestic and external debt on the government annual budget. Kenya has made significant progress in implementing debt management measures to minimise the risks associated with domestic borrowing. These include extending the average maturity of domestic debt to over 6 years (Annex 1 Charts 6a and b), a diverse investor base with increased participation by non-bank institutions (Annex 1 Chart 5), minimal use of Central Bank financing of the budget deficit (Annex 1 Chart 3), and a deepening bond market. However, increased domestic borrowing relative to external sources resulted in a rapid increase in the debt between 2008 and 2013 (Annex 1 Chart 2 and 4). Consequently, domestic interest payments accounted for 88.4 percent of total interest payments in 2013 up from 85.8 percent in 2006 (Table 3). In addition, the proportion of tax revenue going towards meeting the interest cost on domestic debt rose from 7.8 percent in 2005 to 10.5 percent in 2013. However, given the comparably lower interest rates on external debt, interest payments to service that debt as a percentage of tax revenue averaged only 1.4 percent between 2006 and 2013. Notably, the proportion of domestic interest payments to tax revenue eased in 2013 reflecting a decline in interest rates on government securities in the period.

The rising proportion of interest rate payments in total government recurrent expenditure contributed to the crowding-out of development expenditure in 2013. The proportion of interest payments in total recurrent expenditure stood at 9.9 percent in 2013 while that of development expenditure to recurrent expenditure was 31.9 percent. The growth in the budget deficit as shown in Annex 1 Chart 3 could lead to a non-sustainable debt service in the short-run moreso because most of the financing was through domestic borrowing. In addition, the increase in recurrent expenditure could crowd-out development expenditure and jeopardize growth and the consequential sustainability of the long-term debt. The crowding-out of development expenditure can also be attributed to under-performance of tax revenue due to periodic shocks on the economy as the government has resorted to borrow mainly from the domestic market.

A rising stock of foreign exchange reserves between 2005 and 2013 supported exchange rate stability and contributed to minimal pass-through effects of depreciations in the exchange rate to the interest cost on external debt (Table 3). Inadequate foreign exchange reserves would call for an increase in foreign currency debt or could lead to an erosion of market confidence on the

sustainability of the debt, (Baksay *et al.* 2012). This can affect the budget deficit directly through interest costs and indirectly through the Central Bank balance sheet. However, the significant widening of the current account deficit to GDP ratio between 2009 and 2011 contributed to the instability in the exchange rate witnessed in 2011, (CBK, 2012). This was largely attributed to increased demand for foreign exchange to finance imports of machinery and capital goods towards roads and energy sector infrastructure development. Although the current account deficit to GDP ratio eased slightly in 2012 and 2013, it remains a threat to exchange rate stability.

Table 3: Public Debt Implications on the Budget (%)

Year to end June	Development/ Recurrent Expenditure	Total Interest/Recurrent Expenditure	Domestic Interest/ Total Interest	Domestic Interest/ Recurrent Expenditure	Total Interest/ Tax Revenue	Domestic Interest/ Tax Revenue	Foreign Interest/ Tax Revenue	Current account deficit/ GDP (Year to December)	Usable Foreign exchange reserves in months of imports (End June)
2005	19.01	10.68	82.93	8.86	9.36	7.77	1.60	-1.35	3.28
2006	25.29	11.09	85.80	9.52	10.17	8.72	1.44	-2.27	3.95
2007	24.00	11.65	87.83	10.23	10.48	9.21	1.28	-3.79	3.75
2008	30.02	11.38	85.96	9.79	11.29	9.71	1.58	-6.31	3.90
2009	35.22	11.12	87.15	9.69	10.34	9.01	1.33	-5.22	3.61
2010	44.72	11.62	88.92	10.33	10.65	9.47	1.18	-7.30	3.89
2011	34.29	9.64	87.94	8.45	10.95	9.64	1.31	-11.16	3.95
2012	34.71	12.61	89.45	11.28	13.68	12.24	1.44	-10.57	4.27
2013	31.90	9.88	88.37	8.73	11.82	10.45	1.37	-10.86	4.22

Source: Computations based on data from KNBS, National Treasury and CBK

The Gambler Syndrome shown in Annex 1 Chart 1 can be supported using monthly data on domestic borrowing through Treasury bills for the fiscal years 2010/11, 2011/12 and 2012/13 which had increasing budget deficits (Annex 1 Chart 3). During these fiscal years, a total of sixteen new borrowings could not cover redemptions while seven of these under-borrowings were followed by significant interest rate rises.

6. Conclusions and Policy Recommendations

This paper has used annual data to analyse Kenya's public debt dynamics using a vector autoregression framework and its sustainability based on the co-integration approach. It has also looked at the possible options for the choice between external and domestic debt accumulation. The main conclusion in this paper is that the public debt is sustainable provided that interest charges do not create a short-run crisis. However, the rising domestic debt levels which attract higher interest rates also augment vulnerability of the economy to external and domestic shocks and hence pose a risk to the debt sustainability. The results show that accumulation of public

debt in the study period had a positive impact on the economy. However, it is also shown that a 1 percent increase in economic growth reduces the debt/GDP ratio by up to 2.5 percent within three years. In addition, given the concessional nature of the country's external debt stock during the period, depreciation in the exchange rate did not have a significant effect on the average interest rates on the debt during the study period.

Based on these findings, continued deepening of the capital markets to lengthen further the maturity profile of domestic debt and diversification of the investor base, continued implementation of policies to support macroeconomic stability and faster economic growth, restructuring public debt towards external borrowing which is comparably cheaper than domestic debt, and rationalisation of recurrent expenditures to contain the widening deficit in the primary balance would be necessary in the medium-term to ensure that public debt remains on a sustainable path.

However, the share of concessional external borrowing is expected to decline in the medium-term due to budget constraints in advanced economies emanating from persistence of the impact of recent financial crises coupled with the emerging perception that Kenya is moving to attain a frontier economy status. As an emerging frontier economy, Kenya may miss out on grants and other concessional borrowing. This development underscores the need for Kenya to address its trade deficit as the cost of external borrowing is expected to increase over time. Given the country's external vulnerability attributed to a high current account deficit, restructuring public debt towards external borrowing should be matched with implementation of policies to promote the export sector. Specifically, these policies should support the key sectors in the economy by improving the business environment and reducing the cost of doing business. In addition, given the significance of oil products in the country's import bill, policies that promote exports as well as focusing on harnessing the country's renewable energy potential will reduce vulnerability to external shocks.

A notable advantage of restructuring public debt towards external borrowing through issuance of sovereign bonds is that it will help to benchmark Kenya's credit and facilitate access to international capital markets by corporate entities in the country thereby stepping up investment activities. A reduction in the government's domestic borrowing would also ensure that commercial banks are encouraged to enhance lending to key sectors of the economy including

the Small and Medium Enterprises thereby stimulating capital investment, employment creation, and growth.

Rationalization of the composition of government expenditure to increase the relative share of development vis-à-vis recurrent expenditure will be necessary to stimulate the growth enhancing investments such as infrastructure which will eventually lead to reduction of the debt/GDP ratio. This includes implementing measures to enhance the absorption of development funds. The debt/GDP ratio would also remain stable or decline if the government promotes domestic revenue mobilization efforts including by addressing any leakages.

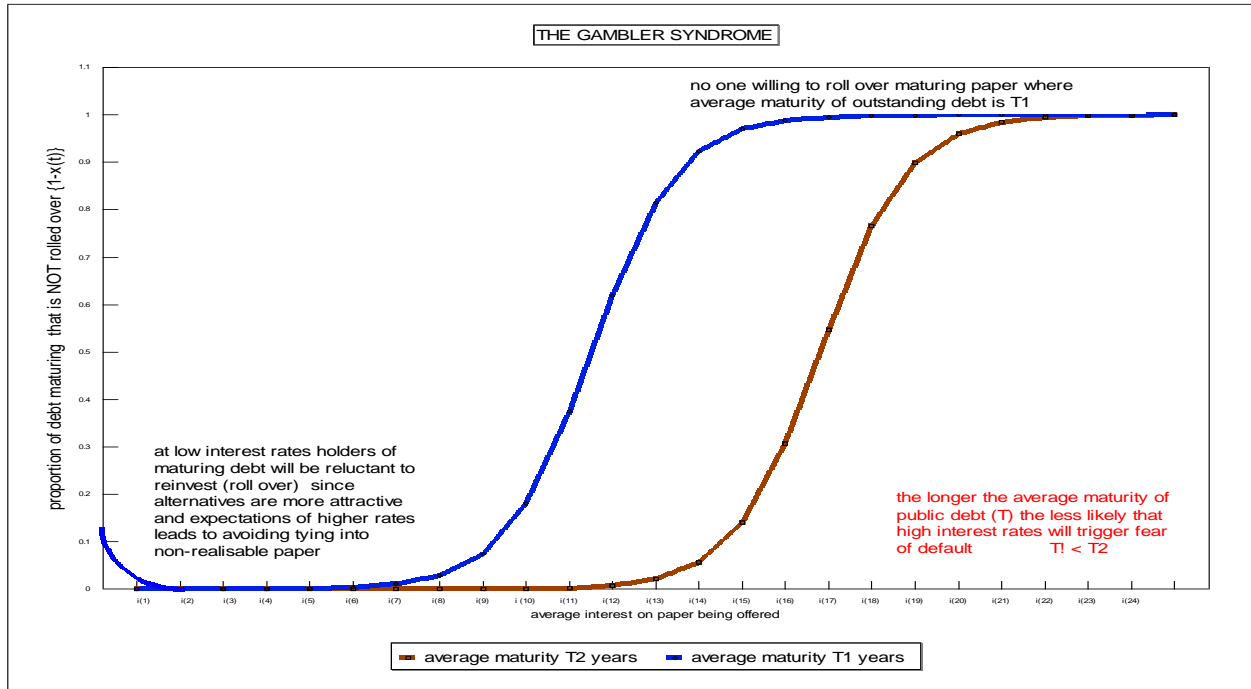
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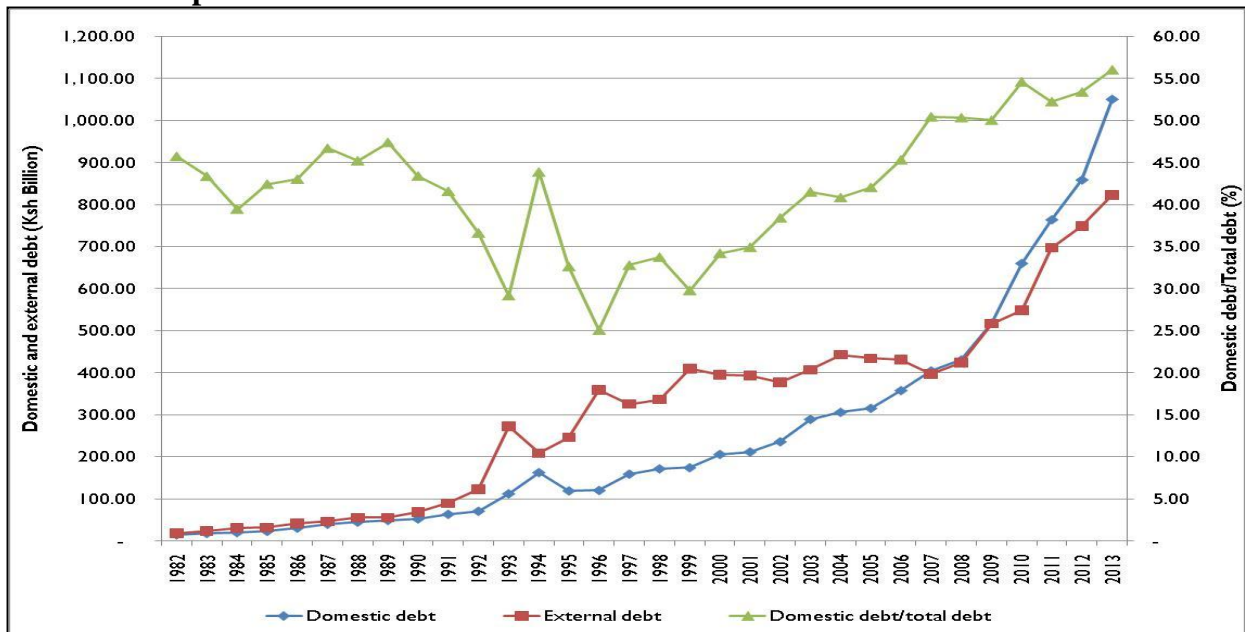
Annex 1: Charts

Chart 1: Gamblers Syndrome



Source: Author's illustration

Chart 2: Composition of Public Debt



Source: Treasury

Chart 3: Sources of Financing of the Government Budget Deficit (Ksh Billion)

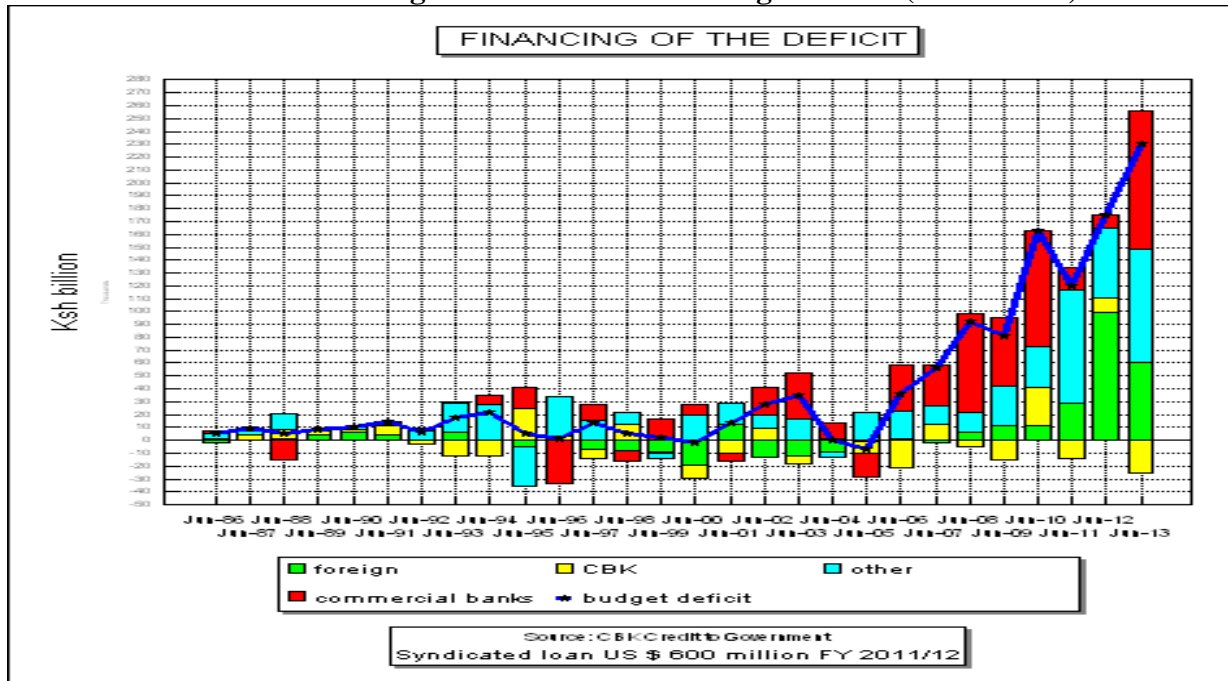
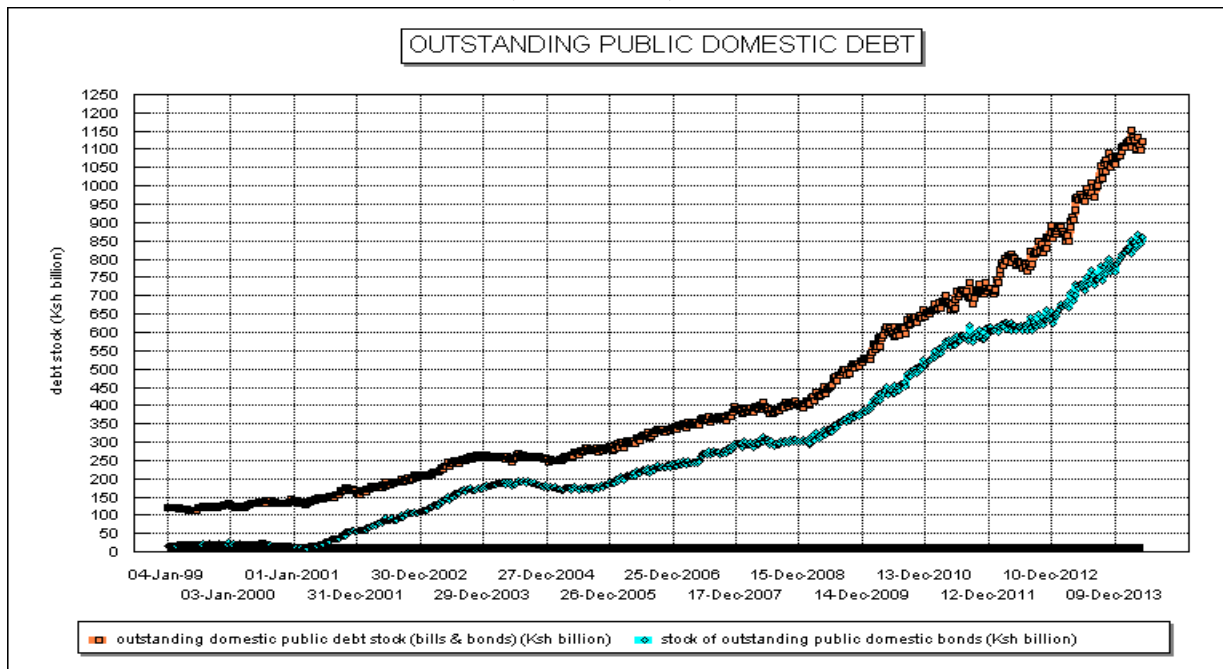
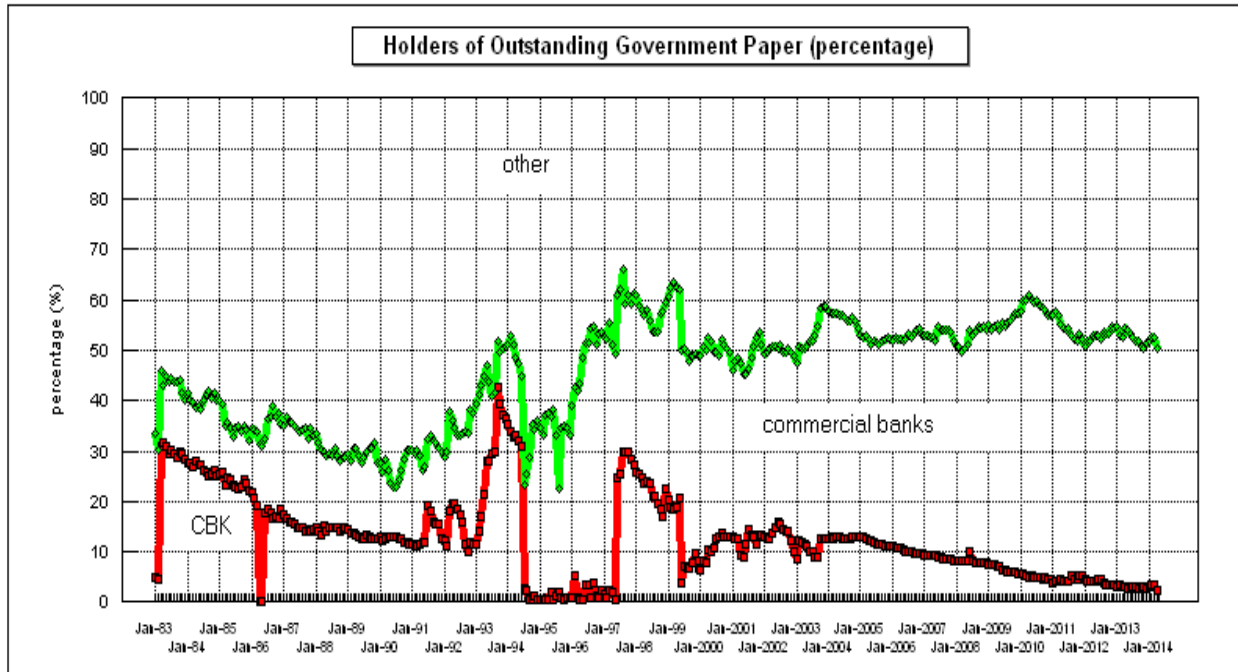


Chart 4: Evolution of Domestic Debt (Ksh Billion)



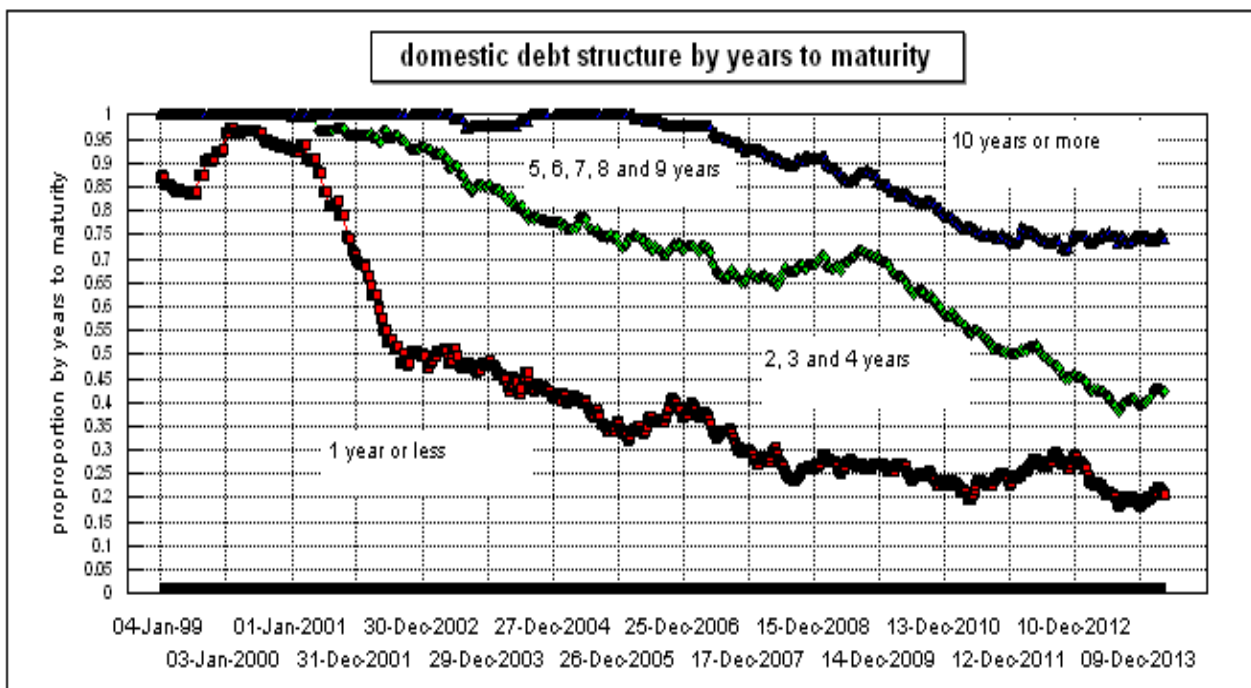
Source: CBK

Chart 5: Holders of Domestic Debt (Proportion %)



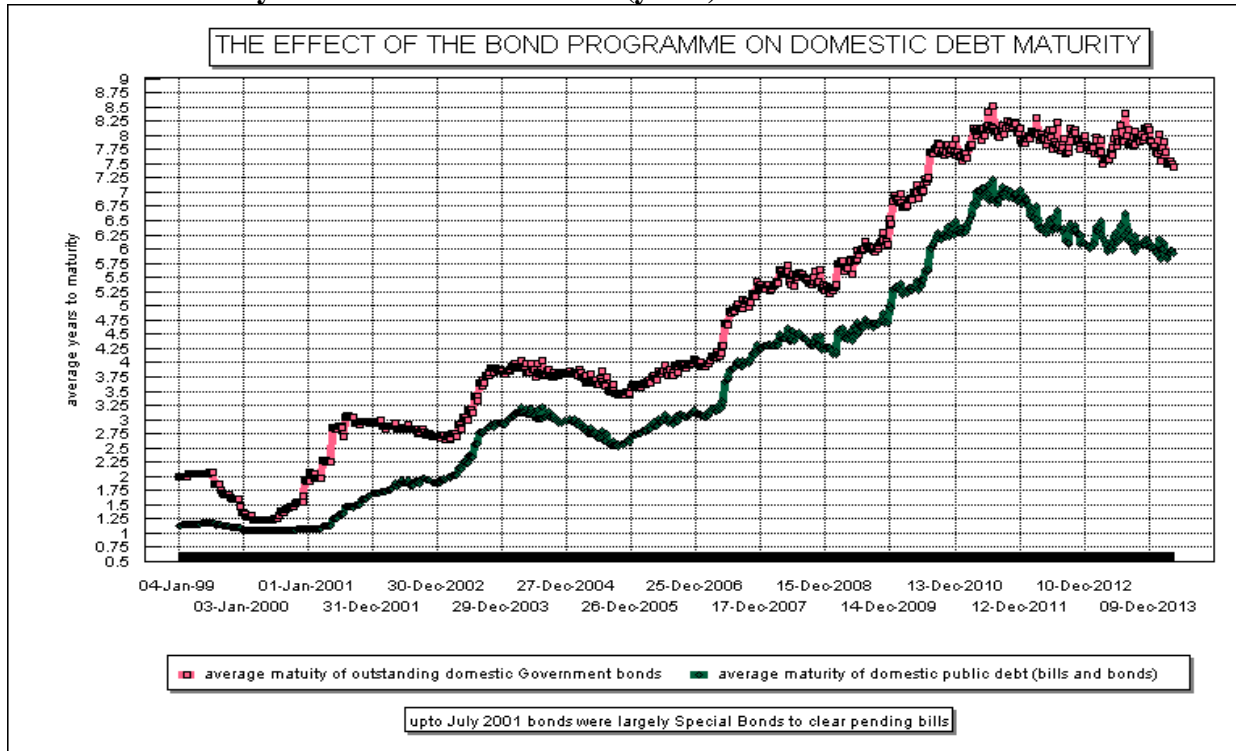
Source: CBK

Chart 6a: Maturity Profile of Domestic Debt (proportions)



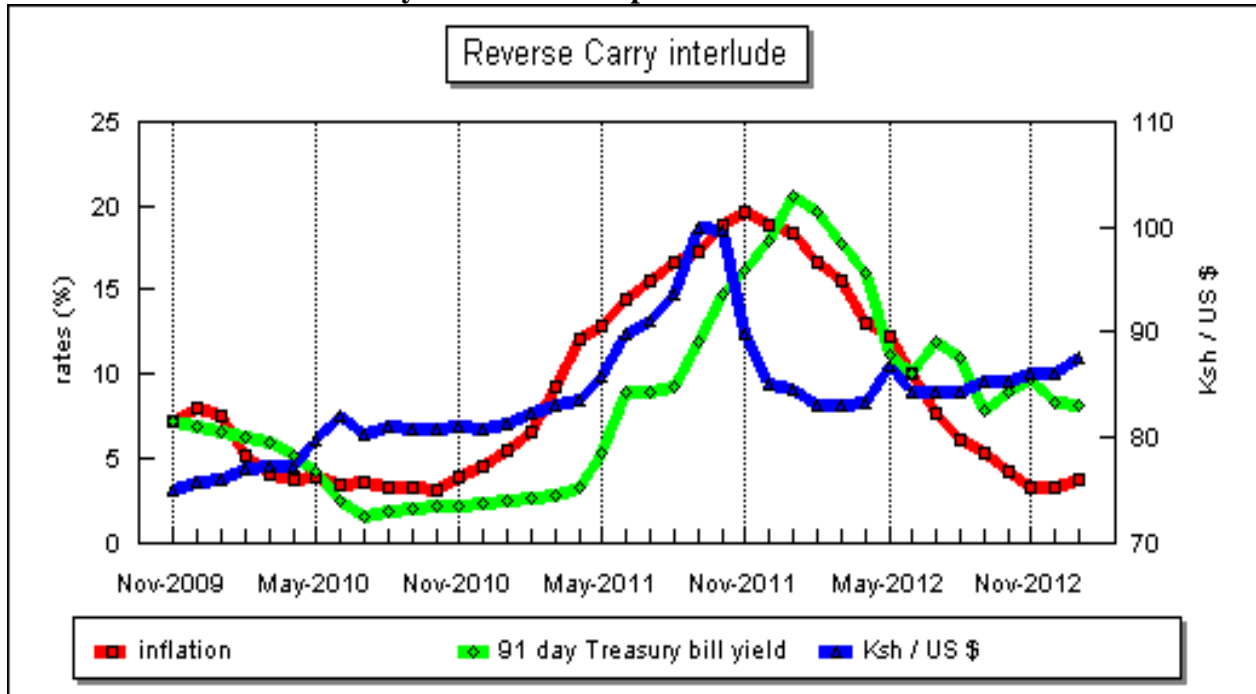
Source: CBK

Chart 6b: Maturity Profile of Domestic Debt (years)



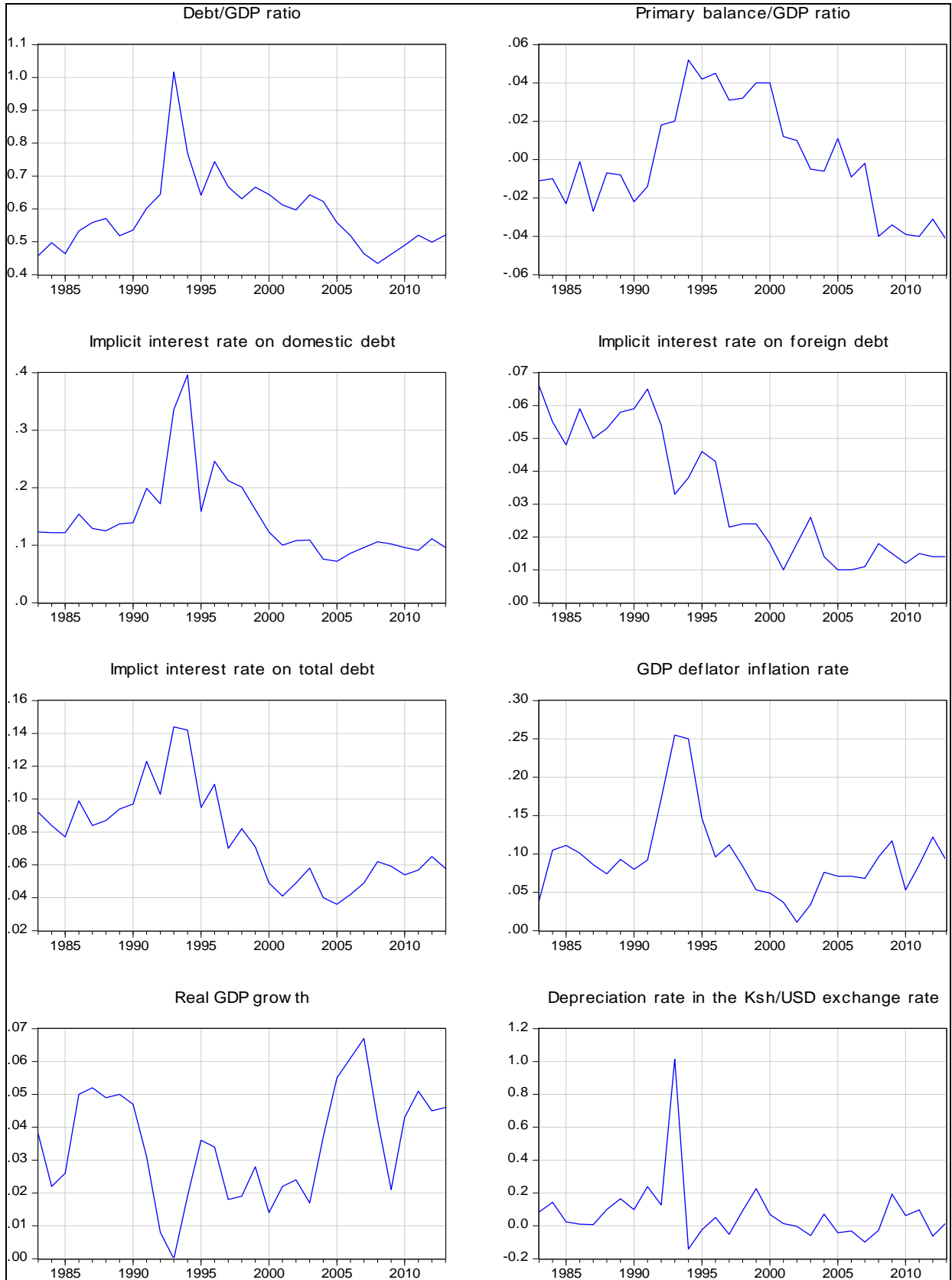
Source: CBK

Chart 7: Periods of Instability – Fiscal Indiscipline in 1992



Source: CBK

Annex 2: Data Used in VAR Model Estimations (absolute ratios) – 1983 to 2013



Annex 3: Unit Root Tests for Variables

Variable	Variables in Levels		Variables in First Differences	
	ADF Statistic	P-Value	ADF Statistic	P-Value
Log expenditure	-2.0137	0.5705	-5.9616	0.0000
Log ordinary revenue	-1.91113	0.6229	-3.6027	0.0120
Debt/GDP ratio	-2.4933	0.1270	-6.5653	0.0000
Real GDP growth	-3.3043	0.0240	-3.2489	0.0023
Ksh/USD depreciation	-5.5295	0.0001	-9.9724	0.0000
Weighted implicit rate on debt	-1.6868	0.4275	-7.5193	0.0000
Implicit rate on domestic debt	-2.3717	0.1578	-7.1651	0.0000
Implicit rate on foreign debt	-1.4182	0.8330	-6.5231	0.0000
GDP Deflator inflation	-2.7983	0.0709	-5.1250	0.0000
Primary balance/GDP ratio	-1.5394	0.7927	-7.3785	0.0000

Annex 4: Lag Length Selection Criteria for the VAR Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	337.3191	NA	7.28e-18	-22.43580	-21.87002	-22.25860
1	413.5823	110.4502*	4.94e-19	-25.21257	-22.94946*	-24.50379*
2	457.2115	45.13366	4.52e-19*	-25.73872*	-21.77828	-24.49836

* indicates lag order selected by the criterion

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

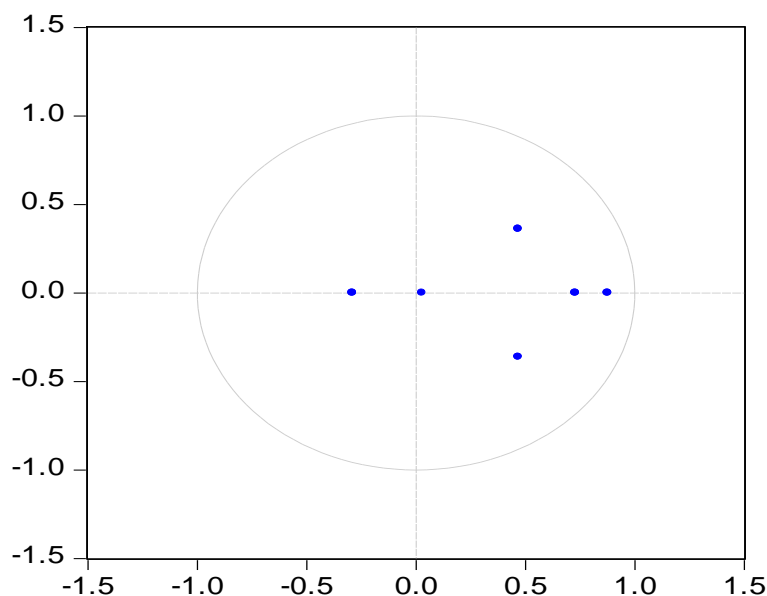
FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Annex 5: VAR Stability Test for debt equation variables Inverse Roots of AR Characteristic Polynomial



Annex 6: Correlation Tests for Variables in Debt equation

	Debt/GDP	Primary balance/GDP	Implicit interest rate on domestic debt	Implicit interest rate on foreign debt
Primary balance/GDP	0.6908			
	0.0000			
Implicit interest rate on domestic debt	0.7728	0.6033		
	0.0000	0.0003		
Implicit interest rate on foreign debt	0.0382	0.0698	0.3204	
	0.8383	0.7092	0.0789	
Implicit interest rate on total debt	0.5362	0.3226	0.8402	0.7301
	0.0019	0.0767	0.0000	0.0000
GDP Deflator inflation	0.5533	0.2613	0.7640	0.2226
	0.0012	0.1556	0.0000	0.2288
Real GDP growth	-0.6124	-0.4740	-0.5172	-0.0709
	0.0003	0.0071	0.0029	0.7047
Exchange rate depreciation	0.5770	0.0586	0.3862	0.1785
	0.0007	0.7542	0.0319	0.3366

The first row is the correlation statistic while the second is the p-value of the statistic