The Sustainability and Macroeconomic Effects of the Public Sector Wage Bill in Kenya

Selly Chemeli Yagan
Macroeconomics Division
Kenya Institute for Public Policy
Research and Analysis

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Bishops Garden Towers, Bishops Road
PO Box 56445-00200 Nairobi, Kenya
tel: +254 20 2719933/4; fax: +254 20 2719951
email: admin@kippra.or.ke
website: http://www.kippra.org

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Abstract

The size of the public sector wage bill has been a central issue of concern to the government recently. Management of the public wage bill is important for overall budget sustainability more so because it the wage bill constitutes about 30 per cent of total government expenditure and has increased from Ksh 215 billion in 2008 to Ksh 389.5 billion in 2013, representing an 81.2 per cent change. In 2013, the wage bill as a per cent of GDP was 10.3 per cent, which is higher than the ratio for most East African countries and the internationally desirable level of 7.0 per cent.

The objective of this study was to determine whether the public sector wage bill is sustainable. Data used in the study is time series from 1982 to 2012 from the Kenya National Bureau of Statistics and 2012/13 data from the National Treasury. The Johansen cointegration test is used to assess the wage bill sustainability, while scenario analysis using the KIPPRA-Treasury Macroeconomic Model (KTMM) is used to assess the macroeconomic effects of public sector wage bill.

The results of the Johansen co-integration tests (both the trace test and the maximum eigenvalue test) at 5 per cent level of significance show that the variables were not co-integrated. The results using KTMM showed that an increase in government remuneration has effects on volume of consumptions, imports, GDP at market rate, current account, domestic debt and financial deficit.

The finding from the cointegration suggests that Kenya's public sector wage bill has no long run relationship and, based on this finding, the study concluded that Kenya's public sector wage bill is in violation of its inter-temporal budget constraint and, therefore, unsustainable. Simulations using KTMM showed that the effects of increased government remuneration by 25 per cent in 2012/13 would affect macroeconomic indicators responsible for macroeconomic stability. The fiscal deficit would widen, current account balance would worsen, and increase public debt.

The study recommends that the government reduces the public sector wage bill by developing a public sector wage policy, optimally utilize the existing human resources in public service, undertake job evaluation for all cadres of public sector employees, and fast track legislation on allocation of revenue to various expenditures.

Abbreviations and Acronyms

ADF	Augmented Dickey Fuller
BPS	Budget Policy Statement
CSRP	Civil Service Reform Programme
FY	Financial Year
GDP	Gross Domestic Product
GoK	Government of Kenya
IBC	Inter-temporal Budget Constraint
IMF	International Monetary Fund
KNBS	Kenya National Bureau of Statistics
KTMM	KIPPRA-Treasury Macroeconomic Model
MTP	Medium Term Plan
OECD	Organization for Economic Cooperation and Development
PP	Phillips and Perron
PVC	Present Value Constraint
WEO	World Economic Outlook

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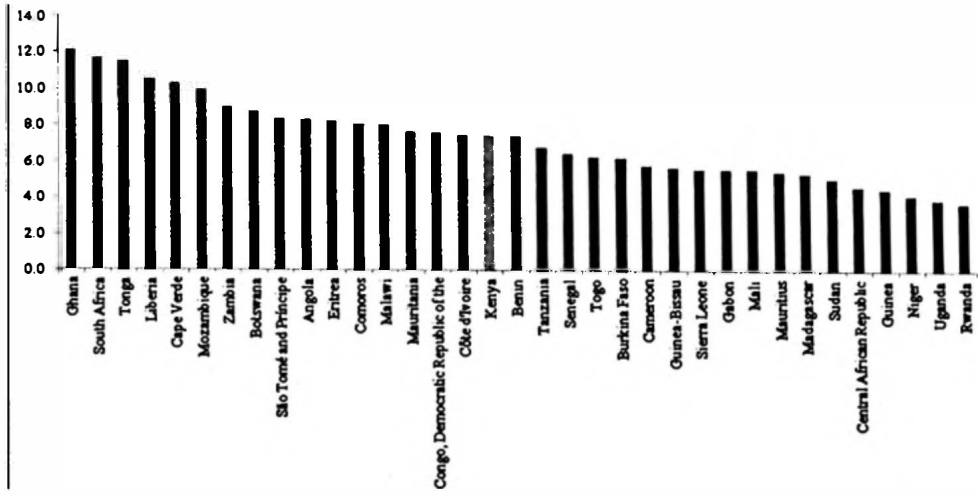
1. Introduction

1.1 Background

The size of the public sector wage bill has been a central issue of concern to the government recently, and public wage bill management is highly important for overall fiscal sustainability. A high wage bill is a worldwide concern, and global comparison is a challenge since each country has different benefits that may or may not be included in salaries and wages. In OECD countries, the average wage bill as a percentage of GDP ranges from 6.4 per cent in Japan to 17.4 per cent in Denmark (Cahuc and Carcillo, 2012), while in Euro countries, the government wage bill accounts for almost a quarter of total public spending (Holm-Hadulla *et al.*, 2010).

While there are significant differences across countries, on average the wage bill accounts for 30.4 per cent of total public expenditure, equal to about 6.5 per cent of GDP across 41 African countries in 2010 (Clements *et al.*, 2010). According to the World Economic Outlook report (IMF, 2012), African countries' wage bills as a percentage of GDP was estimated to range from 3.8 per cent (Rwanda) to 12.0 per cent (Ghana). According to the report, the Kenyan 2012 wage bill rate was 7.8 per cent for central government wages, the highest in East Africa followed by Tanzania, Uganda and Rwanda. Figure 1.1 compares Kenya's public sector wage bill to other African countries.

Figure 1.1: Central government wage bill as a % of GDP in African countries



Source: IMF (2012)

Kenya is facing challenges over the size of its public sector wage bill, which has been the subject of debate. The public sector comprises of general government and public corporations (legal entities that are owned or controlled by the government and produce most of their goods and services for sale in the market at economically significant prices) (Cahuc and Carcillo, 2012). In Kenya, the public sector wage bill refers to personal emoluments paid to the civil service, teachers' service, disciplined services, judiciary service, state law office, parliamentary service, state corporations, armed forces, public universities, constitutional commissions, and independent offices. It constitutes about 30 per cent of the total government expenditure and it has increased from Ksh 215 billion in year 2008 to Ksh 389.5 billion in 2013, representing an 81.2 per cent change (Government of Kenya, 2014). In 2013, the wage bill as a per cent of GDP was 10.8 per cent, which is higher than the ratio for most East African countries and the internationally desirable level of 7 per cent. Table 1.1 shows the total public sector wage payments and total wage bill as a percentage of GDP trends.

The 81.2 per cent change in wage bill from Ksh 215 million in 2008 to Ksh 389.5 million in 2013 is explained by an increase in the size of wage employment in the public sector; annual salary increment and promotion; salary increment awarded to teachers, the police service, and doctors; and establishment of constitutional offices and the county governments (KNBS, 2013).

A huge wage bill causes fiscal burden in countries with a large government spending (Campo *et al.*, 1997). It causes fiscal imbalances that threaten

Table 1.1: Total public sector wage payments (Ksh Million)

Year	2008	2009	2010	2011	2012	2013
Central government	50,741.6	57,891.3	64,220.7	73,171.9	88,728.8	102, 729.5
Teachers Service Commission	77,191.6	79,699.6	87,844.9	101,859.7	115,276.7	143,456.5
Parastatal bodies	46,949.1	51,575.4	52,522.3	55.975.6	63,971.4	75,466.9
Majority control by the public sector[1]	29,860.4	32,802.7	33,405.0	35,601.4	40,686.8	47,998.1
County government[2]	10,270.9	10,857.0	11,354.9	11,630.4	12,484.5	19,849.9
Total wage bill	215,013.6	232,826	249,347.8	278,238.6	321,148.0	389,500.9
Total wage bill as % of GDP	10.2	10.41	10.13	9.93	9.95	10.3

Source: KNBS (Various), Economic Survey

[1] Refers to institutions where the Government has over 50% shareholding, but does not fully own them.
[2] Data up to 2012 refer to Local Authorities.

macroeconomic stability, which is one of the foundations of development. Increased wages widen the deficit requiring increased borrowing to finance deficits, raising interest rates and lowering investments and growth. It may also lead to reallocation of resources meant for development expenditure, thus impacting on economic growth. Therefore, managing the wage bill at sustainable levels is crucial to freeing national resources for purposes of development, improving service delivery, and overall economic growth. Fiscal sustainability comprise of government solvency, sustained economic growth, stable revenues and inter-generational fairness (Schick, 2005). Elsewhere, it is seen as the avoidance of excessive increases in government liabilities that can impose burdens on future generations, while ensuring that the government is able to deliver the necessary public services (European Union, 2012). A sustainable fiscal situation satisfies two conditions: (i) a country's ability to satisfy its current period budget constraint without resorting to default or excessive debt monetization; and (ii) a country does not keep accumulating debt while knowing that a major future adjustment will be needed in order to service its debt (Alvarado, Izquierdo and Panizza, 2004). This study defines public sector wage bill sustainability as the government's ability to pay public sector wages without adversely affecting the ability to meet other recurrent expenditures (e.g. operations and maintenance) and development expenditure from its revenue.

A public sector wage bill that is unsustainable affects macroeconomic stability of the economy. On the demand side, an increase in the wage share can lead to an increase in aggregate demand. This is because high wages lead to high consumption expenditure, stimulating high demand, consequently resulting to high prices (inflation). Conversely, a profit-led demand regime means that an increase in the wage share leads to a decline in aggregate demand. Demand may be profit-led if investment is highly sensitive to a reduction in profit margins. High profitability (at a given rate of capacity utilization) may motivate firms to expand their production capacity and increase investment (Stockhammer, 2011). High wages also increase demand, which leads to increase in demand for imports, thus worsening the balance of payments and affecting exchange rates. This is also expected to push the interest rate high and slow down investments.

On the supply side, high public sector wages motivate employees and will help attract and retain employees in the public sector. High wages in government may attract private sector employees, thus resulting to crowding out private sector, which affects economic growth (Theodoropoulos, 2012). To contain wage bill spending, the government may freeze employment, hence increase unemployment levels.

The government has put in place various initiatives to contain the public sector wage bill. The Kenya Vision 2030 prioritizes stable macroeconomic environment and a wage bill target of 6 per cent of GDP by 2030 (Government of Kenya, 2007). The first Medium Term Plan (2008-2012) targeted to reduce the wage bill to 7.5 per cent of GDP by 2008/2009. However, this was not achieved (Government of Kenya, 2008). The second Medium Term Plan (2013-2017) emphasizes managing wage bill on the principal of moderation to ensure fiscal sustainability (Government of Kenya, 2013).

The Constitution of Kenya 2010 advocates for a wage setting mechanism that links remuneration to fiscal sustainability. Article 230(1) provides for establishment of the Salaries and Remuneration Commission, whose powers and functions as provided under Article 230(4) are to set and regularly review the remuneration and benefits of all state officers and to advice the national and county governments on the remuneration and benefits of all other public officers. In performing its functions, the Commission takes into consideration the need to ensure that the public compensation bill is fiscally sustainable (Government of Kenya, 2010). The Public Finance Management Act 2012 Article 15 requires a provision of 30 per cent of the total national budget for development expenditure. This implies that the recurrent expenditure (which includes wage bill) shall not exceed 70 per cent of the budget (Government of Kenya, 2012). In addition, it requires that the expenditure on wages and benefits shall not exceed a percentage of national government revenue as prescribed by the regulations.

1.2 Research Problem

The rising public sector wage bill is a major concern in Kenya today (Budget Policy Statement-BPS, 2013), accounting for about 51 per cent of the ordinary revenue collected. According to Medium Term Plan 2013-2017, the revenue collected is about 24 per cent of GDP, meaning that out of the total ordinary government revenue, only 13 per cent of GDP is left to finance other government expenditure, development expenditure, and recurrent expenditure (operation and maintenance expense). The public sector wage bill as a percentage of GDP has increased from 10.2 per cent in 2008 to 10.3 per cent in 2013, rates that are high compared to the internationally accepted standard of 7 per cent (Clement *et al.*, 2010) and the Kenya Vision target of 6 per cent. The establishment of county governments and the expansion of the legislative arm of government are among the causes of the rising wage bill (KIPPRA, 2013b).

The implications of the huge wage bill to the economy include: high prices of goods (inflation), increase in cost of production, loss of competitiveness, and

decline in foreign investments. Inflation occurs because of wage-price spiral effects (rising wages increase disposable income, thus raising the demand for goods and causing prices to rise). Rising wages also increase the production costs for producers, who may pass the increased costs to consumers by raising their products prices. This leads to loss of competitiveness of goods because a high wage economy can suffer compared to low wage economies. Foreign investors avoid high wage economies because the cost of doing business is high. Employment will also fall as demand for labour contracts increase, impacting negatively on economic growth and employment. This may affect the government's ability to deliver on its goal of creating one million jobs per year (Jubilee manifesto). Funding of important development projects is also affected as resources are reallocated to pay wages and salaries that slow the country's economic growth.

Despite various initiatives by government, the public sector wage bill has continued to rise prompting this study to determine the sustainability of the public wage bill and the effects of the rising public sector wage bill on selected macroeconomic variables.

1.3 Study Objective

The overall objective of this study is to determine whether the public sector wage bill is sustainable. Specifically, the study seeks to:

(a) Assess the sustainability of public sector wage bill; and

(b) Examine the effects of the rise of public sector wage bill on selected macroeconomic indicators; that is, economic growth (GDP), current account, financial deficit, domestic debt, and exchange rate.

1.4 Justification of the Study

The main objective of expenditure policy at macro level is to support macroeconomic stability and facilitate economic growth. The issue of whether the current public sector wage bill is sustainable or not is important since it will determine the need for future policy actions. Sustainability analysis helps to determine whether a current policy can be maintained in the long run, with the ongoing ability to generate financial resources.

Huge wage bill is a threat to sustainable government expenditure and is a hindrance to appropriate distribution of available resources between recurrent and capital expenditure. Focus on wages is justified by a large share of government spending on wage bill at 30 per cent, and any changes in employment and

compensation have long lasting effects on spending trends, therefore affecting fiscal sustainability. The Kenya Vision 2030, Public Finance Management Act 2012, the Constitution of Kenya 2010, and the government manifesto emphasize the importance of rationalization of public expenditure and containing the wage bill.

This study will contribute in availing the necessary information to policy makers to enable them make sound policy formulation based on empirical evidence. In addition, the study will stimulate further discussions and debate on the effects of the rising wage bill on the country's long-term economic prospects. This study will also be useful to the National Treasury, Salaries and Remuneration Commission, and County Public Service Boards as they come up with policies to address the wage bill.

2. Overview of the Public Sector

2.1 Public Sector Employment

The size of the public sector employment has grown from 76,000 at independence to 688,500 by 2013. Central government employment increased from 88,600 at independence to 273,700 by 1990, representing an annual growth rate of 4.4 per cent, significantly faster than population growth of 3.57 per cent per year during the period (Mule *et al.*, 2004). One factor that has contributed to the rapid growth in public sector wages has been the growth in the number of public sector workers. Between 2008 and 2013, the size of public sector employees increased by nearly 15.4 per cent. Significant increases have been witnessed in the central government and in the Teachers Service Commission, which reflect the government's policy to improve access and quality of basic services such as security, education and healthcare. County governments saw a rapid increase between 2012 and 2013 as the devolved county governments started their operations. Table 2.1 shows trends in public sector employment, GDP at market price, ordinary revenue and total public sector wage bill.

2.2 Public Sector Wage Earnings and Ratios

Kenya has experienced an upward trend in public sector earnings from Ksh 215 billion in 2008 to Ksh 389.5 billion in 2013. This could be attributed to increase in employment size in the public sector and annual increments awarded to public servants and establishment of county government and constitutional offices. Average wage earnings per public sector employee have increased by approximately 48.7 per cent between financial years 2008 and 2013. This growth is nearly fourfold the growth witnessed in average wages in the private sector. Currently, public sector employees, on average, earn more than their counterparts in the private sector (KIPPRA, 2013a). This could explain why the public sector has become an employer of choice for certain cadres. As shown in Table 2.2, with the exception of the parastatal bodies and companies which a majority are controlled by the government, average wage earnings per employee have risen by over 50 per cent since 2008.

To evaluate the wage bill of government employees, a range of indicators are used. Public sector wages as a share of GDP, public sector wages as a share of total spending, public sector wages as a share of domestic revenue and public sector wages compared to spending on non-wage outlays are the suggested indicators. The public sector wage bill as a share of GDP has been on an upward trend from 10.2 per cent in 2008 to 10.3 per cent in 2013, higher than the internationally-desired level of 7 per cent.

Table 2.1: Public sector employments, GDP, wage bill and ordinary revenue

	2008	2009	2010	2011	2012	2013*
Total public sector employees	596.6	612	619.8	643.3	662.1	688.5
GDP at market price (Ksh millions)	2,107,589	2,366,984	2,553,733	3,048,867	3,403,534	3,797,988
Growth in GDP	274,078	259,395	186,749	495,134	354,667	394,454
Percentage change in GDP (Nominal)	14.95	12.31	7.89	19.39	11.63	11.59
GDP growth rate	1.5	2.7	5.8	4.4	4.6	4.7
Total ordinary revenue (as of 30th June)	441,530	488,934	542,945	651,410	725,522	830,320
Growth in ordinary revenue	69,541	47,404	54,011	108,465	74,112	104,798
Growth in ordinary revenue (%)	18.7	10.7	11.0	20.0	11.4	14.4
Total public sector wage bill	215,014	232,826	249,348	278,239	321,148	389,501
Growth in total public sector wage bill	11,884	17,812	16,522	28,891	42,909	68,353
Growth in total public sector wage bill (%)	5.9	8.3	7.1	11.6	15.4	21.3
Wage bill as a % of total ordinary revenue	48.7	47.6	45.9	42.7	44.3	46.9
Wage bill as a % of GDP	10.2	9.8	9.8	9.1	9.4	10.3

Mean estimated figures

Source: KNBS (Various), Economic Survey

2.3 Public Sector Wage Bill Reforms and Policies

Since independence, the government has been addressing the issue of high wage bill through various development plans and policy documents. Employment in the civil service grew at 9 per cent and 7 per cent in the 1980s and 1990s, respectively, well above the growth rate of the economy. During the late 1970s, the public sector wage bill had grown to an unsustainable level as fiscal deficit widened (Omolo, 2010). This led to establishment of the Civil Service Reform Programme (CSRP) in 1993, which facilitated the implementation of reforms in the civil service with an objective of improving its efficiency and productivity. The CSRP was designed for implementation in three phases. Phase I focused on cost containment, Phase II on performance improvement through rationalization of structures and functions to be undertaken by government, while Phase III was on refinement, consolidation and sustenance of reform gains (Government of Kenya,

Table 2.1 Average wage earnings per employee Ksh per annum

Year	2008	2009	2010	2011	2012	2013	% change 2013/2008
Central government	257,833.5	288,590.6	302,927.7	332,750.9	398,601.8	442,462	53.32
Teachers Service Commission	325,977.9	324,814.2	361,457.1	393,736.7	430,779.8	516,593	59.04
Parastatal bodies	569,553.3	611,130.7	619,686.5	650,670.8	705,717.6	815,809.5	33.5
Majority control by the public sector	752,900.5	807,862.2	819,172.3	860,130.9	932,898.0	1,078,430	33.5
County government	251,234.0	264,800.6	289,691.9	311,998.2	331,343.1	477,448.6	80.3
Average wage earning per public sector employee	360,414.1	380,454.3	402,328.5	432,521.6	485,016.0	565,755.2	48.71
Average wage earning per private sector employee	369,439.1	384,429.3	391,769.1	404,521.3	420,570.1	467,689.7	21.7

Source: KNBS Economic Survey (Various)

2005). Phase II (CSRP) 1999–2004 was mainly on rationalization of ministerial functions and structures and staff rationalization and management of the wage bill. In 1999, a comprehensive assessment of ministerial functions was undertaken by the government, where all Ministries/Departments specified their missions and defined their core functions with the objective of avoiding overlapping and duplicating functions. Despite staff rationalization initiatives in 1993, the size of the civil service only reduced from 272,000 employees in 1993 to 191,700 employees in 2004, with no much commensurate decrease in the wage bill.

The government made commitment in the Economic Recovery Strategy for Wealth and Employment Creation 2003-2007 to reduce the wage bill. To implement the government's commitment of reducing the wage bill and down-sizing the public service, the government approved the implementation of a targeted voluntary early retirement scheme in which excess staff in all cadres and non-core functional areas opted to retire. The scheme was implemented over a period of three years from July 2004 to June 2007.

With the development of the Kenya Vision 2030 in 2008, whose macroeconomic framework emphasizes on prudent fiscal policies and public expenditure management, it became apparent that the public service wage bill should be managed on the principle of moderation. The Medium Term Plan 2008-2012 emphasized on sound macroeconomic framework, prudent fiscal policies

and public expenditure management to reduce the wage bill to 7.5 per cent by 2008/9 fiscal year, while the Medium Term Plan 2013-2017 emphasized on sound macroeconomic policies to ensure fiscal and debt sustainability. Table 2.2 shows strategies previously used in addressing the wage bill.

2.4 Wage Determination

The Government of Kenya has been using three main approaches to address issues of wage bill and other labour-related issues in the public sector: First, administrative

Table 2.2: Past and current policies (1964-2013)

Policy document	Period	Strategies
1. Development plan	1964 - 1970	Wage policy designed to eliminate exploitation and discrimination, but also related to productivity
2. Sessional Paper No. 10 of 1965 on African Socialism and its Application to Planning in Kenya	1965	Wages and income policy that recognizes need for differential incentive as well as an equitable distribution of income
3. Development plan	1994 - 1996	Restructuring civil service and reducing it by 16,000 each year to be lean and efficient to reduce wage bill Total non-replacement of staff who leave the service Improvement of salaries for professional and technical staff to be competitive with the rest of the economy
4. Development plan	1997 - 2001	Wage restraint, resources channelled to non-wage operating and maintenance expenditure in order to stimulate growth
5. Economic Recovery Strategy for Wealth and Employment Creation	2003 - 2007	The government commitment to accelerate public service reforms to create a leaner, efficient, motivated and more productive public service that concentrates public finance and human resources on the delivery of core government services Reducing wage-related expenditures to 8.5% of GDP by end of fiscal year 2005/2006
6. Kenya Vision 2030	2008 - 2030	Reducing wage bill to 6% by 2030
7. First MTP	2008 - 2012	Prudent macroeconomic policies and reduce wage bill to 7.5% by 2008/09
8. Sessional Paper of 2012 on Kenya Vision 2030	2012	Rationalization of expenditure
9. Second MTP	2013 - 2017	Managing wage bill on principle of moderation to ensure fiscal prudence and sustainability Recommend development of wage policy

-Source: Authors own compilation

reviews approach in which the government relied on ad hoc commissions and committees to determine the terms and conditions of service for public servants; Second, collective bargaining where pay levels and benefits for unionized workers in the public service are determined through an industrial process, and; Finally, the institutional processes approach where the ministry responsible for finance can issue wage guidelines to guide employers and employee representatives in negotiating the terms and conditions of service at the work place, in accordance with statutory minimum wages gazetted by the Minister for Labour (Government of Kenya, 2006).

The inherent weaknesses of the above approaches have manifested in form of wage disparities, both horizontal and vertical. Horizontal wage disparities refer to different pay for same employees having same qualifications across different sub-sectors of the public service, whereas vertical wage disparity is where the wage compression ratio between the highest and the lowest paid public sector employee is too large. Currently, the wage compression ratio for public sector employees stands at 98:1 (KIPPRA, 2013a) compared to the recommended ratio of 20:1.

3. Literature Review

3.1 Theoretical Literature

The two conceptual approaches used to test sustainability are based on the accounting and present value constraint (PVC) approaches (Kustepeli and Onel, 2005). The accounting approach assesses the mutual consistency among a number of macro policy targets. The approach focuses on a particular debt ratio, typically debt to real GDP. In this approach, a primary deficit (or surplus) is defined as sustainable if it does not generate an ever-increasing debt/GDP ratio given a specified real GDP growth target and constant real interest rate (Cuddington, 1997). Thus, in the case where seigniorage[1] revenue and foreign borrowing are ignored, the 'sustainable' primary surplus to GDP ratio is determined by setting the change in the debt/GDP ratio equals to zero. The accounting approach assumes that changes in the primary surplus will have no effect on either real interest rates or GDP growth. The weakness of the accounting approach is that it attempts to determine the "financeable" fiscal deficit by making assumptions that liabilities can continue to grow at the growth rate of the economy's GDP, as this implies that the debt/GDP ratios remain constant (Cuddington, 1997).

The present value constraint approach is based on the "no ponzi game" condition,[1] implying that the presented discounted value of expected future surpluses is equal to the outstanding debt stock at any instance for sustainability of the debt/GDP ratio (Kustepeli and Onel, 2005). The PVC approach initiated by Hamilton and Flavin (1986) has shown that governments are subject to an inter-temporal budget constraint (IBC),[2] which implies an implicit promise to creditors that the government will run surpluses in future so as to offset its prevailing deficit. Compliance with the IBC implies that the government is balancing its budget inter-temporarily by setting the current market value of its debt equal to the discounted sum of expected future surpluses, while not resorting to Ponzi scheme financing.

According to Blanchard (1990), a sustainable fiscal policy is one that ensures that the ratio of debt to GDP converges back towards its initial level. Buiter

[1] The no-Ponzi game condition (also called transversality condition) means that the government does not service its debt (principal and interest) by issuing new debt on a regular basis (Escolano, 2010).

[2] Inter-temporal budget constraint is "the requirement that the total spending of an individual, firm or government must be within the funds available to it over some long period."

(1985) also defined fiscal policy as being sustainable if it maintains the ratio of government net worth to GDP at the present level. The major problem with defining sustainable policy as one under which the debt-to-GDP ratio converges back towards the initial level is the apparent arbitrariness of such a definition. The definition is arbitrary in at least two ways: first, there is no theoretical reason why the debt ratio should be required to return to its initial level and not to any other stable level, be it lower or higher. Second, one can easily conceive a policy under which the debt ratio initially rises to levels that are likely to be perceived as excessive by market participants, and it is only later when the debt comes down and returns to "safe" levels.

3.2 Empirical Literature

The vast literature on budget deficits shows that the ability of a government to have sustainable fiscal deficits is important in terms of its effect on macroeconomic stability of the economy. Different tests of sustainability are proposed in the literature. These pay special attention to integration orders of deficit and debt processes, and to the underlying stochastic structures and the existence of cointegration relationships between revenues and expenditures. Hamilton and Flavin (1986) indicate that the condition for fiscal sustainability is the stationarity of the debt, that is equals to zero or that the discounted debt process follows an I(0) process without drift (Wilcox, 1989). Later, work developed by Hakkio and Rush (1991), Smith and Zin (1991), Trehan and Walsh (1988, 1991) provided for alternative conditions for fiscal sustainability: that total public revenue and expenditure are first-order integrated, sustainability requires both series to be cointegrated. Quintos (1995) extended this literature by introducing "strong" and "weak" conditions for fiscal sustainability. On one hand, a "strong" condition corresponds to those previously mentioned: stationary of the debt process or, alternatively, cointegration between revenue and expenditure. However, these only refer to sufficient conditions for sustainability. On the other hand, a "weak" condition requires the growth rate of debt to be lower than the growth rate of the economy. Strong sustainability is understood as a situation in which no future problems in the deficit's behaviour are expected to arise in the absence of significant changes in the processes, followed by both public expenditures and revenues. However, weak sustainability implies that governments may have future problems in marketing their debt, involving a substantial risk of a rise in interest rates that may have perverse effects on economic growth and the public budget, necessitating fiscal reforms. According to Castro and Cos (2002), following Quintos´ approach on the sustainability of the Spanish public budget performance, the tests on cointegration between public revenues and expenditures

showed a sustainable but weak deficit. Bajo-Rubio *et al.* (2006) focused on testing the sustainability of the US budget deficit using the multiple endogenous break model over the period 1947:1 to 2005:3. The data used was federal government revenues and expenditures. The study found weak sustainability of the deficit over the full sample, but when the sample was split into three breaks (estimated at 1955:3, 1982:1 and 1996:3), the US budget deficit was strongly sustainable only in the third regime (1982:1 – 1996:2), and weakly sustainable in the first and second regimes (1947:1–1955:2 and 1955:3–1981:4). Kustepeli and Onel (2005) tested fiscal deficit sustainability with structural break for Turkey during the period 1970-2003, using the inter-temporal budget approach. The empirical analysis with and without structural breaks showed a weakly sustainable fiscal deficit.

Fan and Arghyrou (2012), using dynamic ordinary least squares (DOLS) cointegration method without accounting for structural breaks, found that UK fiscal policy sustainability over the period 1955-2006 was sustainable. Taking structural breaks into consideration, sequential cointegration stability test was undertaken to determine whether fiscal policy was sustainable in certain periods and non-sustainable in others. Sustainability was evident with three structural breaks. Richter and Parapas (2008) investigate the sustainability of fiscal policy in Greece for the periods 1833-2009 and 1960-2009. Several approaches such as Johansen approach, Dynamic Ordinary Least Squares, Engle-Granger approach, Bohn test, and Trehan-Walsh approach were used to test fiscal sustainability. The results of the tests indicated sustainable fiscal policy in both tested periods. Similarly, Olekalns and Cashin (2000) examined the sustainability of India's fiscal policy by investigating if India had breached its intertemporal budget constraint. Time series evidence for the period covering 1951-52 to 1997-98 on central government tax revenues and expenditures were examined for cointegration using procedures that are robust in the presence of structural change. There was no evidence of cointegration, a result that implies a violation of intertemporal solvency and that current fiscal policies were unlikely to be sustainable in the long-run.

Lundgren (2010) assessed wage policy and fiscal sustainability in Benin for the period 2007-2009. The wage bill grew at an average rate of 14.7 per cent during the period. Using scenarios to examine the effects on debt and fiscal sustainability of different wage costs, it was found that the growing wage bill would cause a significant deterioration in fiscal sustainability over the medium term based on scenarios done and without corrective measures. Surging wage costs will also significantly undermine debt sustainability in the long term. Rotich (2013, unpublished) assessed Kenya's fiscal sustainability effect of the proposed wage review for the public sector in February 2013. Using forecasting framework on projected country's debt ratios from 2013 to 2033, the assumption is that the economy grows at 6 per cent on average per annum and inflation rate moderating

at 5 per cent over the same period. It was found that new wage proposals would increase the wage bill by 2.4 per cent points of GDP (from the current 12.2% to 14.6%) and because there is no room for offsetting increase in revenue, it would lead to deficit financing. In the projected period, debt ratios (debt to GDP and debt to debt service to-revenue) will worsen and rise beyond the sustainability thresholds, resulting to the conclusion that the proposed remuneration was fiscally not sustainable.

The link between fiscal policy and investment is essential in explaining the effects of wage growth on economic growth. Expansionary fiscal policy stimulates growth, while contractionary fiscal policy slows it. Increased public spending would have a negative impact on the company's profits because increases in public wages would make private sector employees push for higher wages, which cut into private sector profits, leading to reduced private investment and overall growth. Reduced public spending would increase private investment, therefore increasing growth (KIPPRA, 2013a). According to the Parliamentary Budget Office (PBO) report, a better measure of the sustainability of wage bill is its proportion as a share of revenue. The PBO carried out simulations using Parliamentary Budget Office Model (PBOM) to review the impact of increased public sector wage bill to the economy. It was found that increased public sector wage bill would result to consumption-driven economy rather than investment, hence unsustainable. Also, growth trajectory would stagnate, and current account would worsen as imports increase and exports remain the same (PBO, 2013).

4. Methodology

To assess the sustainability of the public sector wage bill, the study used a similar method as used in testing fiscal policy sustainability. The Johansen co-integration test method assesses the public sector wage bill sustainability, while the scenario analysis using the KIPPRA-Treasury Macroeconomic Model examines the effects of high wage bill on some macroeconomic variables.

4.1 Johansen Co-integration Test

Co-integration is the existence of a long run equilibrium relationship among time series variables. It is a property of two or more variables moving together through time, and despite following their own individual trends, will not drift too far apart since they are, in some sense, linked together.

The method tests the co-integration between government expenditure and government revenue. Hakkio and Rush (1991) argue that for fiscal policy to be sustainable, public revenue and expenditure should be co-integrated with $\beta=1$ in the co-integration regression equation for fiscal sustainability:

$$R_t = \alpha + \beta G_t + \varepsilon_t$$

where R_t and G_t, respectively, denote the logs of real government revenue and government expenditure, including interest on outstanding debt, and ε_t is a random error term. The necessary conditions for the existence of co-integration is such that government revenue and expenditure are integrated of order one. This study runs co-integration tests between government revenue and public sector earnings from 1982 to 2012, and the necessary condition of the two variables integrated of the same order are satisfied. Augmented Dickey Fuller (ADF) test and the Phillips-Perron (PP) test are done to determine unit.

4.2 Simulations (Scenario Analysis) using the KIPPRA-Treasury Macroeconomic Model

The KIPPRA-Treasury Macroeconomic Model (KTMM) is a macroeconomic tool of the Kenyan economy. It provides medium term projections of major macroeconomic variables in a consistent framework (Were and Karingi, 2002). The KTMM contains four agents (domestic production, households, government, and the rest of the world) and three markets (labour, product, and financial market). The model has the ability to simulate the effect of policy options, which is crucial in assessing the implications of a proposed policy or policies before being implemented. In this study, a simulation is carried out to determine the

effect of the change in government spending wage bill. This is a partial simulation that considers the effect of a change in the variant variable on the other variables. Analysis would take into account all possible effects of change on wage bill spending on the selected macroeconomic variables as reflected by the model. Simulation analysis involves making a run (called a variant or a simulation) using a model and comparing the results with those of another run with the same model, called a baseline or base run. In simulation, one compares the model's outcomes on the assumption that a particular event happens (e.g change in wages and salaries) with the baseline. The difference represents the model's response to this particular event, driven by the model's coefficients.

4.3 Data Source

The study used time series data obtained from the Kenya National Bureau of Statistics various Economic Surveys and World Economic Outlook database (IMF, 2013). The variables considered are total government revenue from World Economic Outlook database (2013) and total public sector earnings from KNBS (various Economic Surveys) for the period 1982 to 2012 (Appendix 2). Data on public sector wage bill used to carry out simulations using KTMM were obtained from Budget Policy Statement 2013.

4.4 Diagnostic Tests

Various diagnostic tests were done to ensure that the time series properties of the data were not violated. The unit root tests used the ADF test (Dickey and Fuller, 1981) and the PP test (Phillips and Perron, 1988).

4.5 Data Analysis

The analysis of data was done using both Johansen cointegration test and KIPPRA-Treasury Macroeconomic Model for simulations.

5. Empirical Results and Discussion

5.1 Unit Root Tests

The unit root tests showed that the two variables were non-stationary at levels and stationary at first difference at 5 per cent level of significance as shown by Table 5.1. None of the tests at level rejects the null hypothesis of existence of unit root, hence non-stationarity.

Establishing the order of integration of the variables is necessary, if cointegration test is to be done. The ADF and PP tests are done again after first differencing of variables. The variables become stationary, meaning that variables are integrated of order one I(1).

Table 5.1: Unit root at levels and at first difference

	At level			First difference		
Variable	ADF	PP	Conclusion	ADF	PP	Conclusion
Log revenue	-0.70679	-0.493397	Non stationary	-3.986359**	-2.975308**	Stationary
logwages	-0.592027	-1.08039	Non stationary	-4.151502**	-4.22227**	Stationary

*The null hypothesis of unit root using ADF and PP is rejected at the following levels of significance: ***, **, * represent 1%, 5% and 10%, respectively.*

5.2 Cointegration Test

Having established that all variables have unit root and integrated of the same order, test for cointegration using Johansen co-integration test (Johansen and Juselius, 1990) was done (Table 5.2).

The results of the Johansen co-integration tests (both trace and the Maximum Eigenvalue tests) at 5 per cent level of significance show that the variables were not cointegrated. This study concludes that there is no long-run or short term relationship between government revenue and public sector wages. This, therefore, concludes that the inter-temporal condition is violated and the continuation of current policy stance would not be sustained by government revenue, hence may lead to large fiscal deficit.

Table 5.2: Unrestricted cointegration rank test (Trace)

Hypothesized No. of CE(S)	Eigen value	Trace statistics	0.005 Critical value	Prob.**
None	0.2689	10.6866	15.4947	0.2315
At most 1	0.0536	1.6003	3.8416	0.2059

Trace test indicates no cointegration at the 0.05 level

5.3 Wage Analysis using KTMM

The government remuneration variable in the model is increased by 25 per cent and the effects on the selected macroeconomic variables are shown by Table 5.3. Appendix 3 shows the possible impacts of the increase in the public sector wage bill in the model.

Volume consumption households

The volume of consumption at household increases by an additional 3.4 per cent in 2013, since by increasing workers' take-home pay, families gain both financial security and an increased ability to purchase goods and services.

Import volume of goods and services by business

The volume of import increases by an additional 1.9 per cent in 2013 because of increase in disposable income, which stimulates increase in demand.

GDP at market rate

In 2013, GDP growth increased by 1.9 per cent, and from 2014 onwards the growth slowed down to 0.4 per cent in 2014 followed by a stagnation at 0.2 per cent in 2015, 0.2 per cent in 2016, and 0.3 per cent in 2017. The slow growth in GDP is associated with a decline in investment due to resources being diverted from

Table 5.3: KTMM Simulation results on the selected macroeconomic variables

Simulations results					
Variable	2013	2014	2015	2016	2017
GDP (market prices; 2001; % volume change)	1.87	0.39	0.20	0.23	0.26
Volume consumption households	3.4	0.8	0.2	0.2	0.2
Wage employment <B> (% change)	0.58	0.51	0.58	0.15	0.07
Export volume of goods and services by <B>	0.0	-0.5	0.1	0.2	0.2
Import volume of goods and services by <B>	1.9	0.4	0.1	0.2	0.2
Current account balance (% GDP m.p.)	-0.50	-0.72	-0.74	-0.76	-0.79
Public expenditure (% GDP m.p.)	0.97	0.96	1.00	1.03	1.04
Government domestic debt (% GDP m.p.)	0.67	1.69	2.65	3.55	4.38
Financial deficit (-) central Government (GFS basis)**(Ksh Million)	-56682.57	-51481.82	-52738.06	-55538.88	-57484.35

Source: KIPPRA-Treasury Macroeconomic Model

development expenditure to recurrent expenditure to pay the huge wage bill.

Current account balance

Increase in salaries and wages results to extra earnings, which boost consumption because of an increase in disposable wage income. Due to an increase in consumption, demand for imports goes up, leading to deterioration in foreign exchange reserves, hence widening the current account deficit by 0.5 per cent in 2013, which worsens by 0.7 per cent, 0.8 per cent and 0.8 per cent in 2014, 2015, 2016 and 2017, respectively.

Public expenditure (% GDP market price)

A 25 per cent increase in public sector wage bill resulted to an increase in public expenditure by an additional 1 per cent in 2013, and throughout the medium term period.

Domestic debt

Domestic debt increased by 0.7 per cent in 2013, then by an additional 1.7 per cent in 2014, 2.6 per cent in 2015, 3.5 per cent in 2016, and by 4.4 per cent in 2017. Due to inadequate resources to finance its expenditures, the government may borrow from domestic market, thus increasing domestic debt.

Financial deficit (-) central government (GFS basis)

The deficit widened over the medium term on the base that the model assumes the increased expenditure would be financed from the domestic market.

In summary, the current public sector wage bill will affect macroeconomic stability of the economy if is not appropriately addressed.

6. Conclusion and Policy Recommendations

6.1 Conclusion

This study assessed the sustainability of Kenya's public sector wage bill using the inter-temporal budget constraint approach, which dictates that if real revenue and real expenditure are integrated of order one, then co-integration is a necessary and sufficient condition for the economy to satisfy its inter-temporal budget constraint. In addition, the study carried out simulation analysis using KTMM on government remuneration and assessed the effects on selected macroeconomic variables.

Using the co-integration method, the analysis consisted of two stages where the unit root tests for the time series was conducted using the Dickey Fuller and Phillip Perron methodology, then the co-integration test followed using the Johansen co-integration test. The unit root tests on both revenue and public sector wages confirm that the time series data were integrated of the same order for the two tests applied. The results of the co-integration suggest that Kenya's public sector wage bill has no long run relationship, and based on these findings, the study concludes that Kenya's public sector wage bill is a violation of its inter-temporal budget constraint, and is therefore unsustainable.

Simulations using KTMM showed that the effects of increased government remuneration by 25 per cent in 2012/13 would affect macroeconomic indicators responsible for macroeconomic stability. Fiscal deficit would widen, current account balance would worsen, and and therefore lead to increase in public debt. These have important policy implications. First, an unsustainable wage bill results to large fiscal deficit, implying that the government cannot finance the bill from domestic revenue. Therefore, it means that the government will be forced to borrow from either domestically or externally to finance the deficit, thus pushing public debt high beyond the debt threshold level, and resulting to overburdening of the future generation. Second, a huge wage bill will crowd out other recurrent expenditure operations and maintenance of public assets that are very critical in service delivery.

6.2 Policy Recommendations

(i) Development of public sector wage policy

The government should develop a wage policy as a matter of urgency to guide the wage bill issues both at national and county government levels. The policy should clearly set out what constitutes basic pay, what variables should be factored in determining a pay, and the frequency of salary reviews. The policy should also be

clear on what allowances should be included in the pay package.

(ii) Optimal utilization of human resources in public service

To get the most out of the existing establishment in the public service, both the national and the county governments need to utilize their human resources optimally. This can be achieved by undertaking the following:

(a) Job evaluation for all public sector employees

There is need for the government to put in place mechanisms that will ensure that pay and benefits are linked to performance. The government should undertake job evaluation for all cadres of public sector employees to establish the optimal staffing size and appropriate remuneration for the position. This will promote the principle of equal pay for equal work done, hence ensuring equity and fairness in pay determination.

(b) Avoid duplication of roles

The government should identify core functions and non-core functions, then contract-out, out-source and/or privatize non-core functions to reduce the size of the public sector. The size of the public service should be measured and evaluated based on outputs.

(iii) Reduce wastage

The government should come up with mechanisms of reducing wastage in the public sector, which occurs through existence of fictitious workers in the government payroll system, undeserved allowances and duplication of roles and functions. These can be addressed through strengthening of payroll systems to facilitate more effective expenditure control and elimination of fictitious workers. Public sector allowances should be restricted to only the essential and deserving cases. Tightening eligibility and reducing the number and size of allowances cannot only achieve fiscal savings, but also increase the transparency of remuneration.

(iv) Fast-track legislation on allocation of revenue to various expenditures

The government should fast-track the development of legislation to guide the process of allocating the national revenue to the various categories of the recurrent expenditure, including the wages and benefits as proposed under the Public Finance Management Act (2012). This will ensure that recurrent expenditures are within the ceilings, thus guarding against exceeding the allocated ceilings.

6.3 Limitations of the Study and Areas for Further Research

The study did not address the breakdown of the public sector wage bill into allowances and basic salary. There is need to study wage bill as basic salary and allowances differently to provide more information on what contributes to increased wage bill, and provide a more reliable basis upon which the recommendations are to be implemented.

The study also faced challenges of data inconsistencies. Data from the National Treasury is different from that of the Kenya National Bureau of Statistics. There is need to have harmonized data to ensure accuracy in report analysis.

References

Alvarado, C. D., Izquierdo, A. and Panizza, U. (2004), "Fiscal Sustainability in Emerging Market Countries with an Application to Ecuador," Inter-American Development Bank Research Department Working Paper No. 511.

Bajo-Rubio, O., Díaz-Roldán, C. and Esteve, V. (2006), Testing the Sustainability of the US Budget Deficit with a Multiple Endogenous Break Model, Departamento de Economia Aplicada II, Universidad de Valencia, Avda dels Tarongers, s/n, 46022 Valencia, Spain.

Blanchard, O. J. (1990), "Suggestions for a New set of Fiscal Indicators," OECD Working Paper No. 79 (April), Paris.

Buiter, W.H. (1985), "Guide to Public Sector Debt and Deficits: Economic Policy," *European Forum,* Vol. 1 (November).

Cahuc, P. and Carcillo, S. (2012), "Can Public Sector Wage Bills be Reduced?" National Bureau of Economic Research NBER Working Paper Series 17881.

Campo, S.S., Tommaso G. and Mukherjee, A. (1997), Government Employment and Pay in Global Perspective: A Selective Synthesis of International Facts, Policies and Experience.

Castro, F. and Cos, P. (2002), On the Sustainability of the Spanish Public Budget Performance. Instituto de Estudios Fiscales.

Clements, B., Gupta, S., Karpowicz, I. and Tareq, S. (2010), Evaluating Government Employment and Compensation. Washington DC: Fiscal Affairs Department, International Monetary Fund.

Cuddington T. J. (1997), Analysing the Sustainability of Fiscal Deficits in Developing Countries, Economics Department, Georgetown University Washington, DC, USA.

Dickey, D. A. and Fuller, W. A. (1981), "Distribution of the Estimators for Autoregressive Time Series with a Unit Root," *Econometrica.*

Escolano, J. (2010), A Practical Guide to Public Debt Dynamics, Fiscal Sustainability and Cyclical Adjustment of Budgetary Aggregates. Washington DC: Fiscal Affairs Department, International Monetary Fund.

European Union (2012), Fiscal Sustainability Report 2012, Economic and Financial Affairs, European Union.

Fan, J. and Arghyrou, G. M. (2012), "UK Fiscal Policy Sustainability, 1955–2006," *Journal The Manchester School*, Vol. 19 No. 3.

Government of Kenya (1964), National Development Plan, 1964-1970, Nairobi: Government Printer.

Government of Kenya (1965), Sessional Paper No. 10 of 1965: African Socialism and its Application to Planning in Kenya, Nairobi: Government Printer.

Government of Kenya (1966), National Development Plan, 1966-1970, Nairobi: Government Printer.

Government of Kenya of Kenya (1969), National Development Plan 1970-1974, Nairobi: Government Printer.

Government of Kenya (1973), Sessional Paper No. 10 of 1973: Employment, Nairobi: Government Printer.

Government of Kenya (2005), Donor/GoK Consultative Meeting, Public Service Reform and Development Secretariat, Office of the President, siteresources.worldbank.org/INTKENYA.

Government of Kenya (2006), Kenya Gazette: Labour Institution Act on Regulation of Wages, Nairobi: Government Printer.

Government of Kenya (2007), Kenya Vision 2030, Ministry of Planning and National Development and Vision 2030, National Economic and Social Council (NESC) and Office of the President.

Government of Kenya (2008), First Medium Term Plan, 2008–2012: Kenya Vision 2030, Office of the Prime Minister, Ministry of Planning and National Development and Vision 2030.

Government of Kenya (2010), Constitution of Kenya, Nairobi: Government Printer.

Government of Kenya (2012), The Public Finance Management Act 2012, Nairobi: Government Printer.

Government of Kenya (2013), Second Medium Term Plan, 2013-2017: Kenya Vision 2030, The Presidency, Ministry of Devolution and Planning.

Hakkio, C. S. and Rush, M. (1991), "Is the Budget Deficit Too Large," *Economic Inquiry*, Vol. 29.

Hamilton, J. D. and Flavin, M.A. (1986), "On the Limitations of Government Borrowing: A Framework for Empirical Testing," *American Economic Review*, Vol. 76 (September).

Holm-Hadullah, F., Kamath, K., Lamo, A., Perez, J.J. and Schuknecht, L. (2010), "Public Wages in the Euro Area: Towards Securing Stability and Competiveness," Occasional Paper Series No. 112/June 2010, European Central Bank.

International Monetary Fund (2012), World Economic Outlook Database, available at www.imf.org/external/pubs/ft/weo/2012.

International Monetary Fund (2013), World Economic Outlook Database, available at www.imf.org/external/pubs/ft/weo/2013.

Johansen, S. and Juselius, K. (1990), "Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money," *Oxford Bulletin of Economics and Statistics*, Vol. 52.

Kenya National Bureau of Statistics - KNBS (2013), Economic Survey, Nairobi: Government Printer.

KIPPRA (2013a), A Comparative Study on Public-Private Sector Wage Differentials in Kenya. Policy Paper No. 5, Nairobi: Kenya Institute for Public Policy Research and Analysis.

KIPPRA (2013b), Kenya Economic Report 2013. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Kustepeli, Y. and Onel, G. (2005), Fiscal Deficit Sustainability with a Structural Break: An Application to Turkey, Eastern Mediterranean University, Review of Social, Economic and Business Studies.

Lundgren, C. (2010), Wage Policy and Fiscal Sustainability in Benin. Washington DC: International Monetary Fund.

Mule, H., Ryan, T.C.I., Ndii (2004), Public Sector Wage Policy Study: A Review of Recent Developments on Wage Structure and Policies with Particular Reference to the Public Sector in Kenya, Nairobi: Ministry of Finance.

Olekalns, N. and Cashin, P. (2000), An Examination of the Sustainability of Indian Fiscal Policy, University of Melbourne, Research Department, International Monetary Fund.

Omolo, J. (2010), "The Dynamics and Trends of Employment in Kenya," IEA Research Paper Series No. 1/2010, Nairobi: Institute of Economic Affairs.

Parliamentary Budget Office (2013), "The Public sector Wage bill and its Implications on Economic Performance in Kenya". Policy Working Paper No. 1.

Phillips, P.C.B. and Perron, P. (1988), "Testing for Unit Root Series Regression," *Biometrika* 75, Great Britain.

Quintos, C. E. (1995), "Sustainability of the Deficit Process with Structural Shifts", *Journal of Business & Economic Statistics*, Vol.13.

Richter, C. and Parapas, D. (2008), An Empirical Investigation of Sustainability of Fiscal Policy in Greece During the Last Centuries, UEL Royal Docks Business School, University of East London.

Rotich, H. (2013, ppt), Fiscal Sustainability Effects of Proposed Wage Review, Retrieved 11 August 2013 from src.co.ke/reports, www.src.co.ke. Unpublished.

Schick, A. (2005), "Sustainable Budget Policy: Concepts and Approaches," OECD *Journal on Budgeting*, Vol. 5/1.

Smith, G. and Zin, S. E. (1991), "Persistent Deficits and the Market Value of Government Debt", *Journal of Applied Econometrics*, Vol.6.

Stockhammer, E. (2011), "Wage-Led Growth: An Introduction: Towards a Sustainable Recovery: The Case for Wage-Led Policies," *International Journal of Labour Research*, Geneva: International Labour Office.

Theodoropoulos, S. (2012), "Seeking a Sustainable Size and Structure for the Greek Public Sector's Activities According to the Fiscal Pact For Euro," *SPOUDAI Journal*, Vol. 62.

Trehan, B. and Walsh, C.E. (1988), "Common Trends, The Government's Budget Constraint, and Revenue Smoothing," *Journal of Economic Dynamics and Control*, Vol. 12 (June-September).

Trehan, B. and Walsh, C.E. (1991), "Testing Intertemporal Budget Constraints: Theory and Applications to U.S. Federal Budget and Current Account Deficits," *Journal of Money, Credit and Banking*, Vol. 23.

Were, M. and Karingi, S. (2002), *Better Understanding of the Kenyan Economy: Simulations from the KIPPRA-Treasury Macro Model*. KIPPRA DP No. 16. Nairobi: Kenya Institute for Public Policy Research and Analysis.

Wilcox, D. (1989), "The Sustainability of Government Deficits: Implications of the Present Value Borrowing Constraint," *Journal of Money, Credit & Banking*, No. 21.

Appendix

Appendix 1: Summary literature review

Author/Year	Where	Data Type Period	Method	Findings
Olekalns and Cashin (2000)	India	Time series 1951/52-1997/98	Co-integration of central government tax revenues and expenditures	No evidence of co-integration, implying violation of intertemporal solvency
Castro and Cos (2002)	Spain	Time series	Co-integration between public revenues and expenditures	Deficit sustainable but weak
Bajo-Rubio *et al.* (2006)	US	Time series 1947-2005	Co-integration of federal government revenues and expenditures	Weak sustainability of the deficit over full sample
Kustepeli and Onel (2005)	Turkey	1970-2003	Inter-temporal budget approach	Weakly sustainable fiscal deficit
Richter and Parapas (2008)	Greece	Time series 1833-2009 & 1960-2009	Used several approaches Johansen, Dynamic Ordinary Least Squares, Engle-Granger approach, Bohn test and Trehan-Walsh approach	Sustainable fiscal policy in both tested periods
Fan and Arghyrou (2012)	UK	Time series	Using dynamic ordinary least squares (DOLS) co-integration method	Sustainable fiscal policy
Lundgren (2010)	Benin	2007-2009	Scenario analysis using different wage cost	Worsening of fiscal sustainability over medium term
Rotich (unpublished 2013)	Kenya	Time series 2013-2030	Projections of PV of Debt-to-GDP Ratio, PV of Debt-to-Revenue Ratio, Debt Service-to-Revenue Ratio and comparing the ratios with thresholds	The public sector wage bill was not fiscally sustainable

Appendix 2: Revenue and public sector wages in Ksh billions

Year	Revenue	Public Sector Wages
1982	18.233	9.286
1983	19.533	10.270
1984	21.699	11.223
1985	25.050	12.916
1986	28.855	15.074
1987	34.404	16.288
1988	40.693	19.258
1989	46.665	22.036
1990	53.832	24.242
1991	43.437	27.062
1992	47.246	29.508
1993	65.664	32.008
1994	107.595	38.010
1995	146.024	45.170
1996	159.031	55.240
1997	177.847	66.088
1998	201.983	81.014
1999	201.455	130.741
2000	200.537	136.409
2001	210.492	147.971
2002	215.142	167.670
2003	248.287	166.886
2004	287.794	166.287
2005	318.014	178.032
2006	359.923	191.694
2007	423.330	203.130
2008	482.870	215.014
2009	538.194	232.826
2010	627.547	249.348
2011	724.905	278.239
2012	807.363	301.891

Source: IMF (2013), World Economic Outlook, and KNBS (Various), Economic Surveys

Appendix 3: KTMM simulation results

% Change	25% Increase in Wages in Government Sector				
International	2013	2014	2015	2016	2017
income of trading partners	0.0	0.0	0.0	0.0	0.0
world trade price (in Ksh)	0.1	0.1	0.1	0.1	0.1
long-term interest rate USA	0.0	0.0	0.0	0.0	0.0
short-term interest rate USA	0.0	0.0	0.0	0.0	0.0
wages and prices (%)					
real wage rate (CPI-urban based)	0.0	0.1	0.1	0.0	0.0
wage rate businesses	0.0	0.1	0.1	0.1	0.1
consumer price <H> (change) -SNA based	0.0	0.0	0.0	0.0	0.0
CPI inflation (overall)	0.03	0.00	0.01	0.02	0.02
export price (change)	0.0	0.0	0.1	0.1	0.1
import price (change)	0.1	0.1	0.1	0.1	0.1
investment price <B> (change)	0.1	0.0	0.0	0.0	0.0
price of output <B>	0.6	0.0	0.0	0.0	0.0
labour costs per production unit	-1.1	0.1	0.5	0.0	-0.1
GDP mp deflator	1.8	0.0	-0.1	-0.1	-0.1
volumes (%)					
volume consumption households (incl. discrepancy)	3.4	0.8	0.2	0.2	0.2
volume consumption government	-0.2	0.1	0.0	0.0	0.0
total investments (incl. change in inventories)	0.7	0.3	0.4	0.4	0.5
investments Businesses	0.0	0.4	0.6	0.6	0.7
investments government	2.7	-0.1	-0.1	-0.1	-0.1
export volume of goods and services by <B>	0.0	-0.5	0.1	0.2	0.2
import volume of goods and services by <B>	1.9	0.4	0.1	0.2	0.2
gross value added businesses	1.7	0.4	0.2	0.2	0.2
gross domestic product (SNA 93 Chained Indices)	2	0	0	0	0
gdp (market prices; 2001; % volume change)	1.9	0.4	0.2	0.2	0.3
wage employment <B> (% change)	0.6	0.5	0.6	0.1	0.1
labour productivity	1.1	-0.1	-0.4	0.1	0.2

purchasing power of average earner	0.0	0.1	0.0	0.0	0.1
rates (%)					
current account balance (% gdpm.p.)	-0.5	-0.7	-0.7	-0.8	-0.8
imports cover by official exchange reserves	-0.2	-0.5	-0.8	-1.0	-1.3
financial deficit - SNA basis (% gdpm.p.)	-1.2	-1.0	-1.0	-1.0	-1.0
financial deficit - GFS basis (% gdpm.p.)	-1.3	-1.1	-1.0	-1.0	-1.0
public expenditure (% gdpm.p.)	1.0	1.0	1.0	1.0	1.0
taxes and social security contribution (% gdpm.p.)	-0.2	-0.1	0.0	0.0	-0.1
informal+tradional sector rate	0.0	0.0	0.0	0.0	0.0
labour income share	-0.6	-0.5	-0.4	-0.4	-0.4
government domestic debt (% gdpm.p.)	0.7	1.7	2.6	3.5	4.4
long-term interest rate	0.0	0.0	0.0	0.0	0.0
short-term interest rate (Treasury Bills 91 days)	0.003	0.003	0.004	0.006	0.008
labour years (millions)					
total wage employment	0.0	0.0	0.0	0.0	0.0
informal sector	0.1	0.1	0.2	0.2	0.2
traditional sector	0.0	0.0	0.0	0.0	0.0
Mln. Kshs					
financial deficit (-) total Government (SNA Basis)	-61434.3	-58719.6	-92151.9	-79420.3	-93988.6
financial deficit (-) central Government (GFS Basis)**	-56682.6	-51481.8	-52738.1	-55538.9	-57484.3
index					
Kshilling per dollar	0.1	0.2	0.3	0.3	0.4
Note: <B> = businesses, GFS = government finance statistics, Ksh = Kenya shillings, MP = market price					