DETERMINANTS OF BALANCE OF PAYMENTS IN KENYA

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Abstract

This study investigates the long-run determinants of balance of payment dynamics in Kenya between 1963 and 2012, using co integration and error correction mechanism. The study uses annual time series data for Kenya.

The paper examines how the determinants of balance of payments lead to adjustments in removing disequilibrium in the balance of payments position. Results show that variables, which exhibited non-stationarity, were insignificant in determining the balance of payments in the long run. However, the results of the variables identified ,confirmed that balance of payments co integrated, suggesting that balance of payments fluctuations could be caused by the level of trade balance, exchange rate movement and foreign direct investment inflow. The investigation further reveals that FDI and Exchange rates are the main determinants of balance of payments. The positive effect of FDI leads to the development of new products and services which eventually causes an improvement in the balance of payments via expansion of exports. Thus, the findings of this study show that balance of payments is both a monetary and real phenomenon.

Keywords: Balance of payments, co integration, trade balance, FDI, Kenya

Introduction

Balance of payments is a macro variable and a statistical statement that systematically summarizes for a specific period, the economic transaction of an economy with the rest of the world. It records transactions that give rise to sets of accounts that indicates all the flows of value between residents of one country and the residents of other countries of the world that they enter into economic dealings. In other words, it reflects changes in the claims and liabilities of an economy with other countries of the world. Therefore it summarizes countries international transactions and it acts as a link to all the separated parts of international economics and it indicates

whether the overall pattern of the country's balance of payments has achieved a sustainable equilibrium .

This account helps us understand how people of Kenya trade the shilling for that of another country as well as the flow of human capital across as indicated by net private non-official capital flows and flows of official reserves. In other words, balance of payments records trade in financial assets and all those international transactions, which involve the exchange of money for something else and even including employees' compensation.   Thus it gives a complete picture of the macroeconomic linkage among economies that Kenya engages in international trade and the changes in the country's indebtedness to foreigners and the corresponding receipts.

The transactions resulting therefrom are recorded in a statement of accounts, systematically following the double entry system which gives the division between the inflows and outflows of foreign exchange, which arise from the exchange of goods and services and financial transactions between Kenya and the rest of the world. The double entry system eventually gives an overall net balance of zero because each transaction requires offsetting credit and debit entries.   Subsequently, therefore, these transactions indicate a direct bearing on the movements of funds between Kenya's private sector, government and, the rest of the world. In point of fact, the transactions recorded and described in the balance of payments account are in respect of four items, namely: visible, invisible, capital transfers and financial transfers. In all these transactions, money practically changes hands and the effect overflows across borders of the country. Therefore, the transactions on these items and their consequences signify a country as a creditor or debtor. Unfortunately, Kenya has remained a net importer of food and a net exporter of agricultural raw materials since independence. This has brought about a high export-import gap, which is as a result of inelasticity of demand for Kenya's primary products from foreign markets, attraction to foreign goods than locally produced and processed goods. This has aggravated the pressure on the current account throwing it into deficits in most of the years under review.

The balance of payments accounting is important to Kenya because at one glance it can show the health of the economy. At the same time BOP data can be used by, foreign creditors, as a warning or indicator for deep-seated economic crises (Hylleberg 1989).A crisis in the balance of payments distorts the workings of the entire economy because it creates disequilibrium between the supply and demand for money.   This disequilibrium is a reflection of disequilibrium in the money market (IMF, 2000) and it produces an adverse effect on the aggregate expenditure for goods and services because of the excess supply of money. IMF (2000) argues that, the

balance of payments problems are due to the disequilibrium in the physical flows, namely exports and imports of goods and services. Thus, it could be analyzed based on partial elasticities of the exports and imports and the role of exchange rate in the adjustments of balance of payments via devaluation.

That notwithstanding, over the last four decades, there has been growing trend in the fluctuations of the Kenyan balance of payments. Literature on balance of payments in Kenya is few and far between particularly at the theoretical level. It is worth noting that none of these studies empirically modeled the long run determinants of balance of payments fluctuation or even attempted to discuss the problems and policies of balance of payments of Kenya and how to deal with them. In response to this situation this study attempts to construct an econometric model for balance of payments of Kenya using the official time-series data for the period 1963-2012.

Balance of payments position of Kenya

Despite rapid economic growth experienced between 1963 and 1970,the current account balance of payments remained in deficit except in 1963,1964,1965,1977,1993,2003,2009 and 2010   when it recorded US$ 10.1m, US$50.6m, US$0.5m,US$25.9m, US$124.5m, US$ 132.4m, US$ 9908.3m and US$11404.95m respectively in that order .For Kenya to address and arrive at high growth rates, issues of trade deficits and growing indebtedness should be well analyzed because the automatic forces equating payments and foreign receipts are weak and imperfect. The adjustments in balance of payments in Kenya appears to be complicated because the receipts and expenditures are mostly financial and seldom in real assets.

The balance of payments data for Kenya does not reveal large amounts of international transactions that warrant a BOP crisis in the country. Nevertheless, it can only suggest a serious mismanagement of macroeconomic policies as well as challenges of governance of international resources. One could also assume that development policies that the Kenyan government has followed since independence paid little attention to the vital contribution of foreign trade, private sector and foreign investment. The possible   neglect of the contribution of these sectors to economic development is reflected in the regular balance of payments deficits .Most importantly is the failure to embrace export-oriented solutions to agriculture and to oil imports that for long have put the balance of payments of the country in disequilibrium through imports.

Kenya is a country richly endowed with good climate, natural and human resources, political stability, a liberalized external trade, market based economy and is investment friendly, and has a good reason to be newly industrializing developing economy .Besides Kenya 's non aligned status during the cold war era enabled it to attract a substantial level of foreign

investment and a significant amount of development aid from diverse sources, notably China, UK, USA, World bank, European development fund, IMF among others. This notwithstanding, Kenya has had a substantial trade deficits from1963 due to fluctuations in her main primary exports commodities. Kenya's economy is vulnerable to world price fluctuations, poor infrastructure, and overdependence on a few agricultural exports goods, extreme disparities of weather, economic mismanagement and corruption.

The structural composition of Kenya's GDP also remained substantially the same as one of the colonial economy. Over the period 1963-1970, the Kenyan economy did not face any serious macroeconomic challenges. The economy swiftly grew at around 8% annually, inflation remained below 2%, and the balance of payments of the country recorded surpluses of US$12.6m,   US$11.2m,US$25.2m,   US$ 11.3m,and   US$5.1m   in 1966,1967,1968,1969 and 1970 in that order. Nevertheless the balance of payments managed dismal deficits in the first three years of independence recording US$-16.0m, US$ -15.8m and US$-16.5m in years 1963, 1964 and 1965 respectively. The surplus in balance of payments in 1967 was occasioned by the devaluation of the pound by 14.3% which was pegged to Kenyan currency.

The impressive performance enjoyed by the economy immediately after independence in1963 was not sustained due to external and internal shocks, notably in the years 1973, 1974, 1979, 1990, 2010 and 2011 when the country experienced the worst oil crises. Similarly, in 1979, 1994 and 1992 severe droughts, and violence after the 2007 elections disrupted the production of food crops. This was followed by drought and world economic recession in 2008. As a result the current account deficits increased, exchange rates depreciated and terms of trade deteriorated. This affected the cost of production, and food imports thereby leading to a drop in GDP.

Over the period 1970-1990, Kenya experienced a decline in economic performance due to poor implementation of imports substitution policy and also due to rising oil prices which made the Kenyan manufacturing sector uncompetitive. In addition there was lack of exports incentives, tight import control, government intervention on private sector and effects of vagaries of weather. The economy was also confronted by the effects of the collapse of the fixed exchange rate policy in 1971, the oil crisis of 1973, inflation, a reduction in capital flows and devaluation of the exchange rate due to the devaluation of the dollar.

The Balance of payments recorded a small deficit of US$-10.7m in 1971 and US$ -8.0m in 1972 before it bounced to record a surplus in 1973 of US$69m due to a reduction in domestic credit. In 1974, the balance of payments suffered the effects of higher oil prices, the recession in the Western countries and the depreciation of the shilling against major

currencies by 5.7 % forcing the balance of payments into a deficit of US$-88.0m (Republic of Kenya 1975). Similarly, in 1975 there was an improvement in the balance of payments deficit of US$-43m due to the rise in coffee prices, the depreciation of the shilling and recovery from the recession in industrial countries. The effects of the depreciation of the shilling continued to be felt in 1976. The country realized a higher value of coffee exports, slower rate of wage increase and subsidy of exports of manufactured goods, and an increase in tourism earnings.

   The closure of the Kenyan-Tanzania border also to a great extent affected trade, and the balance of payments registered a deficit ofUS$-83.9m and US$ -269.1m in1976 and 1977 in that order. The balance of payments bounced into surplus in 1979 of US$ 71.6m from a deficit of US$-220.2m in 1978 because of a reduction in imports and increased net capital flows, as inflation declined to 8% from 12% in 1978 ,and coffee and tea prices also improved. However, the drop of the prices for the same crops and an increase in imports led to a deficit in 1980 of US$-371.4m andUS$-305.9m in 1981.

   Over the period 1980-1990, the balance of payments continued to deteriorate because of the second oil shock, in disregard of the efforts put by the government to liberalize imports, devalue the shilling exchange rate and raise the interest rate in 1980-1981. In 1982, there was decline in flows of capital ,decline in net transfer receipts, rise in debt servicing, fall in long term capital receipts for both government and private account, increase in net outflow of international investment income ,but the imports were still restricted ,besides this was followed by another devaluation of the shilling. Even then in the same year there was a rise in tourism earning due to attractive exchange rate and rising domestic and external imbalances. As a result the balance of payments recorded surpluses of US$159.9m, US$97.6m, US$61.5m and US $52.1m in 1982, 1983, 1984 and 1985 respectively. In 1987, 1988 and 1989, the balance of payments recorded surpluses of US$25.3m, US$43.6m and US$122.0m respectively up from a deficit of US$ -137m in 1986.

   This occurred because of the mini coffee boom of 1986, the introduction of other government debt instruments of one, two, and five years of maturities, and the introduction of cash ratio of 6% for commercial banks, the fall in world market prices of coffee, tea; arise in the price of crude oil, a decline in net earning on services, decline in the inflow of grants and net foreign reserves in 1987, increased outflow of international investment income and an increase in net earning from tourism.

   Subsequently, in 1988 Kenya recorded increased earnings from exports and services, there was weak world oil prices and greater inflow of foreign grants and loans and tourism earnings increased by 21% (Republic of Kenya

1989), an increase in the average prices for coffee and tea, rise in foreign debt service payments and expansion of imports due to import liberalization policy. There were also large inflows of unrequited transfers, official capital inflows especially to parastatals like Kenya airways, earnings from tourism and there was also a substantial amount of concessional loans from the World Bank, Japan, African Development Bank and other multilateral agencies in 1989.

   Over the period 1990-2000, the economy recorded mixed reactions and this period is regarded as one of economic deterioration which forced the country to adopt comprehensive economic reforms ranging from a more flexible exchange rate system to a more liberalized and decontrolled trade and interest rate regime. The government also introduced an open market operations policy to supplement the adjustment of liquidity in the economy. The years 1990-1993 can be viewed as the worst as far as the economic and political mismanagement is concerned. It is a period over which the economy recorded its worst performance since Independence. The GDP stagnated ,agriculture declined to an annual growth rate of 3.9% , inflation hit the 100% mark, budget deficit increased to 10% of GDP, and the bilateral and multilateral donors slapped aid suspension in 1991.

   The country held the first Democratic Multiparty election in 1992 and this was accompanied by heavy spending by political competitors. Because of political reasons the government relaxed the money supply regulations. This led to mismanagement of the economy until 1996 when order was restored through an amendment to the central bank act to allow independence and autonomy in the management of monetary policy. As a result, in 1993, 1996, 1997 and 1998, the balance of payments registered surpluses of US$441.0m, US$387.0m, US$15.5m and US$82.6m in that order.

    In 1994, the country realized an increase in exports of coffee, pyrethrum, horticultural products and an increase in grants to agricultural sector which increased by 8%. Much as there was an increased government inflow of US$317.3m, the country recorded a decline in the balance of payments due to substantial growth of imports because of the liberalized trade and exchange system. On the other hand, deficits were recorded of US$ -92.5m, US$-43.9m, US$ -256.9m, US$-141.6m and US$-34.0m in the years 1990,1991,1992,1995 and 1999 correspondingly. Consequently, to arrest the situation the government from 1993-1996, embarked on serious economic reforms and liberalization. This was intended to eliminate price controls and import licensing, remove foreign exchange controls, start privatizing loss making parastatals ,freeze employment and adopt a conservative fiscal and monetary policies. Based on these reforms the real GDP grew to an average of 4%. Similarly, 1997-2000, stood out as a period of stagnation and slow growth because of weather changes, elections of 1997and because the IMF

suspended lending due to the government's non-commitment on governance reforms. Nevertheless, the balance of payments deficit reduced to a low of US$-7.2m.

From 2001-2012, Kenya enjoyed enormous development, achieved huge democratic space, and high economic growth similar to that experienced in the 60s. The country recorded a surplus in the balance of payments of US$ 10m in 2001 due to impressive performance of the external merchandise trade account and current transfers. Even the net income earning services and net services dropped, international commodity prices were subdued and decreased. On the other hand there was an improvement in the net long-term capital flows, and demand for imports increased because of the increase in economic activities at home. In 2002, the balance of payments surplus reduced to US$-16.4m due to a decrease in private grants, sharp reduction in imports due to lower demand for the goods because of weaker domestic activities, contraction of net current transfers, delay in remittances from abroad pending a stable political transition and travel dropped (Republic of Kenya 2003).

This occurred against the backdrop of the huge net capital and financial flows, increase in net foreign assets of the banking system, increase in tourism earning and grants inflows. This made the balance of payments in 2003 to swing into an enormous surplus ofUS$425.2m. However, there was a sharp shift in 2004 when the balance of payments reverted into a US$-13.1m deficit. This happened due to the decline in trade in goods ,services, income and unilateral transfers, high value of imports, the slow down in net direct investment, net portfolio which was as a result of increase in foreign holding of debt and equity securities by residents. Similarly, in 2005 the balance of payments continued to record a surprising surplus of US$117.0m even when the import bill had gone high. However, this can be attributed to the growth in the capital flows, decrease in short term outflows of other investments, increase in net long term and other investment, decrease in net capital flight, increase in tourism earnings and transportation. The same trend continued to 2006 when balance of payments doubled to register a surplus of US$581.3m, even though this was partially depressed by a marked increase in the value of imports.

Subsequently in 2007, the "black year "in the Kenyan history the balance of payments recorded an exorbitant surplus US$811.3m in spite of the chaos experienced after general election result dispute. However, this is attributed to increased net capital inflows and private transfers, increase in tourism earning, long-term capital investments, foreign direct investments flows due to injections from partners and the privatization of parastatals. This withstanding, the balance of payments recorded a deficit of US$-495.3 in 2008. This was ascribed to world economic slow down, decrease in foreign

direct investment, net official reserves short term capital inflows, weakening of the shilling to Dollar, increased foreign loan repayment and capital repatriation.

In the period 2009-2010, the overall balance of payments surplus decreased from US$1117.97m to US$141.60m respectively. The decline was associated with a decrease in net capital inflows, widened current account deficit and, depreciation of the shilling against the dollar. On the other hand, the years 2008-2011 was regarded as the most challenging and turning point in the Kenyan political-economic history. The challenges ranged from heavy expenditures in carrying out referendum (2010), passing of the new constitution and the attendant implementation challenges, weather changes and the after effects of global economic recession (2008). The balance of payments faced therefore the challenges of world economic slowdown, and decreased foreign direct investment inflows. Net official reserves declined due to growth in import bill and there was unmatched growth in exports of goods and services and net capital inflows. The only boost to the economy came from increased foreign loan repayment and capital repatriation at the stock market especially from the foreigners who participated in the "Safaricom"IPO.

Analytical framework

In this study we start by specifying the long-run relationship between the following variables: exchange rates, FDI and balance of trade. If the variables are found to be co integrated, then we apply the unit root test and the residual test to determine whether there is co integration amongst the variables. If this residual is stationary, then we include the error correction variable in the equation. Thus, we employ the Augmented Dickey-Fuller (ADF) test for stationarity of 48 observations. We also adopt a general framework developed by Kallon (1994), because little is known about the macro economic variables that influence the balance of payments in Kenya. The results from the regression equation are then evaluated using the *t*-ratios (McKinnon critical values) at a 5% level of significance in order to capture the long run relationship between the variables while checking for spurious results. Nevertheless variables like interest rates, domestic credit, budget deficit, and terms of trade were found to be non stationary but insignificant in explaining the long run behavior of balance of payments in Kenya.   The trade balance, exchange rates and foreign direct investment however proved highly significant. Thus we derived the model using the three variables as follows:

$$BOP = \beta_0 + \beta_{1\,FDI\,t} + \beta_{2EXCHANGEt} + \beta_{3BOTt} + \mu_t.$$

Where BOP = balance of payments, BOT = Balance of trade, FDI=direct foreign investment, μt = stochastic error term.

Annual data from 1963-2012 was then used to estimate this equation. All the time series data used were collected from the international financial statistics and IMF statistics year books (balance of payments year books) and some from the CBS publications.

We then tested for the order of integration of the variables in the model, followed by a co integration test.   This was preceded by stationarity procedures for detecting unit roots in the three variables using the Augmented Dickey-Fuller (ADF) and the Phillip and Perron (PP) tests. We the proceeded to use vector auto regression (VAR) because it allows time series to be modeled simultaneously and corrects for autocorrelation and endogeneity using vector error correction model (VECM). This method also prevents bias in OLS estimates of co integration relations when Engle-Granger two step procedures are used (johansen 1988, 1995).

Thus the vector of p-variables, $Z_t = (Z_{1-t.} \ldots Z_{m-t})$ is generated by the k-order vector autoregressive process.

$Z_t = \mu + A_1 Z_{t-1} + \ldots. A_m Z_{t-m} + \mu + \varepsilon_t$

Where Z_t is a p·1 vector of 1(1) variable, the "A's are estimable parameters,ε_t are iid N $p(0, \Sigma)$ and μ is a vector of constants. In order to distinguish between stationarity by linear combinations and by differencing, this process may be written in error correction form as:

$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \ldots + \Gamma_{k-1} \Delta Z_{t-k+1} + \Pi Z_{t-k} + \mu + \varepsilon_t$

Z_t is vector of variable.

Co integration Test and VECM Results

We applied Johansen co integration test using two statistics, trace statistics and maximum eigenvalues. The lag length of the variables was set at 3 based on Akaike information criterion, final prediction error and log likelihood ratio.   The variables were found to be stationary after first difference as indicated in Table 1.The diagnostic statistics were performed on the unrestricted VAR and the VECM and results indicated that residuals were multivariate normal, and that there was no serial correlation. Table 3 indicates that there were three co integrating vectors, according to trace statistic and maximum eigenvalues. Since the three variables co integrated we proceeded to run the VECM of our estimated long run normalized balance of payments equation expressed as follows with t- values in parentheses.

BOP=397.3707-0.110285(BOT)-7.592315(FDI)-2.484402(EXCHANGE)
                        (0.13076)   (5.25779)   (3.33615)

The model was found not to be spurious because the residuals had a unit root as per the ADF test shown and computed in Table 2 and was significant. The R squared value was less than DW statistics, and the residual was not serially correlated. The test statistics also indicated that Trace statistics and

Max-Eigen indicated three co integrating equations. We therefore proceeded
to run the VECM as shown in Table 4 and appendix 5.

Table. 1 ADF test

Variable	Test critical values:	critical value at 1%	critical value at 5%	critical value at 10%	probability values
BOP	-8.841003	-4.156734	-3.504330	-3.181826	0.0000
BOT	-7.313438	-4.170583	-3.510740	-3.185512	0.0000
EXCHANGE	-7.311645	-3.574446	-2.923780	-2.599925	0.0000
FDI	-5.552820	-4.156734	-3.504330	-3.181826	0.0002
D(U)	-10.63905	-3.5682	-2.9215	-2.5983	0.0000

Table 2: stationary test at fist difference

Variable	ADF value	t-statistics	Remarks
B.O.P	-8.8410	-3.5043	Stationary
B.O.T	-7.3135	-3.5107	Stationary
FDI	-5.5528	-3.5043	Stationary
EXCHANGE RATE	-7.3116	-2.9238	Stationary

Table 3: Co integration test results

Eigen value	Trace statistics	5% critical value	Hypothesized no. of co integration equations	Probability**
0.534737	86.64193	47.85613	None *	0.0026
0.407416	49.91465	29.79707	At most 1*	0.0130
0.398675	24.79808	15.49471	At most 2*	0.0009
0.007975	0.384314	3.841466	At most 3*	0.5353

Table 4.

variables	Coefficient	t-statistics	Probability
C_1	-0.6836	-3.5942	0.0011
C_2	-0.1563	-0.6734	0.5055
C_3	-0.2643	-1.0718	0.2918
C_4	-0.0425	-0.2321	0.8179
C_5	0.0770	0.6296	0.5334
C_6	0.3890	2.2940	0.0285
C_7	0.3316	1.9130	0.0647
C_8	-4.2101	-0.5316	0.5986
C_9	-7.7682	-0.9695	0.3396
C_{10}	4.7488	0.5990	0.5531
C_{11}	-0.6120	-1.2513	0.2199
C_{12}	0.6164	0.9719	0.3384
C_{13}	-0.02490	-0.0405	0.9679

R2   0.8610
DW   2.226

H_O: $C_1+C_2+C_3+\ldots\ldots\ldots+C_{14} = 0$ (Coefficient not jointly significant)

H_A: $C_1+C_2+C_3+\ldots\ldots\ldots+C_{14} \neq 0$ (Coefficient are jointly significant)

Table 5: Error Correcting Model

Variable	Coefficient	t-statistics	Probability
C	10.426	0.3307	0.7424
D(BOT)	0.0623	3.2851	0.0020
D(FDI)	1.68180	7.537	0.0000
D(EXCHANGE	-1.7400	-0.2855	0.7766
U(-1)	-1.44700	-11.8456	0.000

U (-1) is the error correcting term that adjusts/corrects the long run and short run reaction of the model by a factor of 1.447.

Empirical results and analyses

The result obtained from the regression shows that there is negative but significant impact of Foreign Direct Investment (FDI) on Balance of payments with a coefficient of -7.592315. This coefficient is statistically significant as revealed by its corresponding standard error and t-values of 5.25779. Hence, FDI is elastic to balance of payments. This negativity in the coefficient of Foreign Direct Investment is in conformity to the prior sign that a negative impact of Foreign Direct Investment on Balance of payments worsens the country's balance of payments deficit.

The coefficient of exchange rate is negative contrary to the theoretical expectations. It indicates that a depreciation of the exchange rate causes worsening of the balance of payments. However it is found to be highly statistically significant. This supports the empirical analysis that the impact of the nominal exchange rate and the price differentials between domestic and foreign prices does not seem to play a strong role in terms of the movements in the balance of payments although the coefficient implies that exchange rate movements do have a negligible impact on balance of payments. This result is understandable since the direct impact of the exchange rate is felt on both the current and capital accounts and that is why the competitiveness of a country is determined through the real effective exchange rate.   Thus an appreciation of the real effective exchange rate is associated with loss in competitiveness. Therefore the exchange rates seem not to be playing a direct role in the determination of balance of payments in Kenya. We attribute this to other institutional and economic factors .That is, a fall in the real effective Exchange rate has the effect of reducing the trade deficit, though by a small amount.

On the other hand the impact of trade balance on the balance of payments is negative and statistically insignificant. This is possibly due to exchange rates which play a role in determining the short-and-long-run behavior of the

Kenya trade balance. Moreover, devaluation improves the trade balance, which is consistent with the ML conditions.

Conclusion and Policy Lessons

Results from our empirical analysis provide support for the unit root alternative hypothesis hence these variables are non-stationary, and indeed, they are of random walk. Given the non-stationarity of these series, and the co integration equation estimated, the results confirm that balance of payment co integrates with exchange rates, balance of trade, and direct foreign investment. As a result our study concurs with recent studies such as Lehman (2002) and Brada and Tomsik (2003) who show that FDI contributes positively to the balance of payments and that the contribution can be very large.

Thus, in order to reduce balance of payment fluctuations, the Kenyan government has to work on both fiscal and monetary policies and structural adjustment in order to encourage and attract private investment flows, target inflation and increase trade. However direct investment and exchange rate are too closely related to be considered separately but movements in exchange rates do not appear to be a major factor in driving balance of payments. Kenya is therefore likely to benefit through more FDI inflows if it creates an investment climate that can attract more FDI flows to the country and implement the vision 2030 strategy effectively to attract and tap benefits from FDI. That notwithstanding, FDI can have a negative impact on the balance of payments, and even contribute to the persistent deficits due to its larger propensity to import production inputs from abroad. Therefore to minimize its negative effects, Kenya should emphasize on first-class infrastructure, education and skills; focus on investment promotion; public-private partnerships, lowering bureaucratic hurdles; and restoring stability and security in the country. FDI may also mitigate or worsen the constraints imposed by balance of payments especially through outflows in terms of profit repatriation.

References:

Alexander, S.S.   Effects of devaluation on a trade balance. *IMF Staff Papers*, 2(2):26, 1952.

Economic survey: Kenya national bureau of statistics, 1975, 1989 and 2003.

Chacholiades, M.   International economics. New York: McGraw-Hill Publishers, 1990

Du Plessis, SPJ, BW Smit & CL McCarthy. *International economics* (Second edition).Johannesburg: Heinemann, 1998.

Engel, FR & CWJ Granger.   Co-integration and error correction representations, estimation, and testing. *Econometrica*, 53:251–276, 1987.

Frenkel, J.A.   A theory of money, trade and the balance of payments in a model of accumulation. *The journal of international economics*, 2:158–187, 1971.

Frenkel, J & H. Johnson. The monetary approach to the balance of payments: Essential concepts and historical origins. London: 1976.

Granger, CWJ. Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37(3):424–438, 1969.

Johnson, HG. The monetary approach to balance of payments theory. *Journal of financial and quantitative analysis*, 7:1555–1572, 1972.

Kallon, K.M. An Econometric Analysis of Inflation in Sierra Leone. *Journal of African Economies*, 3(2):1999, 230, 1994.

Mundell, RA. *International economics*. London: Macmillan. 1968.

Mundell, RA. *Monetary theory: Inflation, interest and growth in the world economy*. Pacific Palisades: Goodyear 1971.

Robinson, J.   The foreign exchanges. (ed.).   *Essays in the theory of employment*. London: Macmillan1937.

Engel, R. F. and C. W. J. Granger .Co integration and Error-correction: Representation, Estimation and Testing, *Econometrics* 55, Pp. 251 –76. 1987.

Engel, R. F. and C.W.J. Granger .Long run Economics Relations: Readings in co integration, *Oxford University Press London.* 1991.

Hylleberg. S. and G.F.Mizan.   Co integration and Error Correction Mechanism, The Economic Journal, 99, Pg.113-125. 1989.

IMF. Training in the use of Balance of payments Statistics – staff notes, Thirteenth meeting of the IMF committee on Balance of payments Statistics, Washington, D.C. October 23 – 17, 2000.

Machlup, F. Three Concepts of Balance of payments and the so-called Dollar shortage*, Economic Journal Vol. LX March*, Pp.46 – 68. , 1960.

Thrill wall, A.P. *Trade, Balance of payments and Exchange Rate Policy in Developing Countries*, Edward Edger Publishing, UK, 2004.

APPENDIX
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0.534737	86.64193	47.85613	None *	0.0026
0.407416	49.91465	29.79707	At most 1*	0.0130
0.398675	24.79808	15.49471	At most 2*	0.0009
0.007975	0.384314	3.841466	At most 3*	0.5353

Maximum Eigen test indicates 3 co integration equations at the 0.05 level

*denotes rejection of the hypothesis at the 0.05 level

**MacKinnon –Haug-Michelis (1999) p-values

Table 4: Vector Error Correction Model (Short run reaction)

The equation is given by:

$D(BOP) = C(1)*(BOP(-1) + 0.371476417997*BOT(-1) + 1.32671571352 *EXCHANGE(-1) + 1.30459854998*FDI(-1) + 244.25258958) + C(2) *D(BOP(-1)) + C(3)*D(BOP(-2)) + C(4)*D(BOP(-3)) + C(5)*D(BOT(-1)) + C(6)*D(BOT(-2)) + C(7)*D(BOT(-3)) + C(8)*D(EXCHANGE(-1)) + C(9) *D(EXCHANGE(-2)) + C(10)*D(EXCHANGE(-3)) + C(11)*D(FDI(-1)) + C(12)*D(FDI(-2)) + C(13)*D(FDI(-3)) + C(14)$

Coefficient	Value	t-statistics	Probability
C_1	-0.6836	-3.5942	0.0011
C_2	-0.1563	-0.6734	0.5055
C_3	-0.2643	-1.0718	0.2918
C_4	-0.0425	-0.2321	0.8179
C_5	0.0770	0.6296	0.5334
C_6	0.3890	2.2940	0.0285
C_7	0.3316	1.9130	0.0647
C_8	-4.2101	-0.5316	0.5986
C_9	-7.7682	-0.9695	0.3396
C_{10}	4.7488	0.5990	0.5531
C_{11}	-0.6120	-1.2513	0.2199
C_{12}	0.6164	0.9719	0.3384
C_{13}	-0.02490	-0.0405	0.9679
C_{14}	136.96	2.4521	0.0198
R^2 0.8610			
Dw Test 2.226			

H_O: $C_1 + C_2 + C_3 + \ldots\ldots\ldots + C_{14} = $ 0 (Coefficient not jointly significant)

H_A: $C_1 + C_2 + C_3 + \ldots\ldots\ldots + C_{14} \neq $ 0 (Coefficient are jointly significant)

Table 5: ERROR CORRECTING MODEL

Variable	Coefficient	t-statistics	Probability
C	10.426	0.3307	0.7424
D(BOT)	0.0623	3.2851	0.0020
D(FDI)	1.68180	7.537	0.0000
D(EXCHANGE	-1.7400	-0.2855	0.7766
U(-1)	-1.44700	-11.8456	0.000

U (-1) is the error correcting term that adjusts/corrects the long run and short run reaction of the model by a factor of 1.447.

Appendix 1: stationarity test -B.OP

Null Hypothesis: BOP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.841003	0.0000
Test critical values:	1% level	-4.156734	
	5% level	-3.504330	
	10% level	-3.181826	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BOP)
Method: Least Squares
Date: 09/21/12   Time: 15:51
Sample (adjusted): 1964 2012
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOP(-1)	-1.335404	0.151047	-8.841003	0.0000
C	-212.9562	86.58972	-2.459370	0.0177
@TREND(1963)	11.85165	3.125756	3.791611	0.0004

R-squared	0.631327	Mean dependent var	21.65306
Adjusted R-squared	0.615297	S.D. dependent var	468.0595
S.E. of regression	290.3111	Akaike info criterion	14.23905
Sum squared resid	3876904.	Schwarz criterion	14.35488
Log likelihood	-345.8568	Hannan-Quinn criter.	14.28300
F-statistic	39.38586	Durbin-Watson stat	1.788610
Prob(F-statistic)	0.000000		

Appendix 2: stationarity test in B.O.T

Null Hypothesis: BOT has a unit root			
Exogenous: Constant, Linear Trend			
Lag Length: 3 (Automatic - based on SIC, maxlag=3)			

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.313438	0.0000
Test critical values:	1% level	-4.170583	
	5% level	-3.510740	
	10% level	-3.185512	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(BOT)
Method: Least Squares
Date: 09/21/12   Time: 16:21
Sample (adjusted): 1967 2012
Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BOT(-1)	-1.435828	0.196327	-7.313438	0.0000
D(BOT(-1))	1.759251	0.365769	4.809733	0.0000
D(BOT(-2))	1.384017	0.456496	3.031828	0.0043
D(BOT(-3))	2.834484	0.521576	5.434459	0.0000
C	358.3768	354.5403	1.010821	0.3182
@TREND(1963)	-45.76230	16.30292	-2.807000	0.0077

R-squared	0.687012	Mean dependent var	118.5261
Adjusted R-squared	0.647889	S.D. dependent var	1622.807
S.E. of regression	962.9565	Akaike info criterion	16.69900
Sum squared resid	37091412	Schwarz criterion	16.93752
Log likelihood	-378.0770	Hannan-Quinn criter.	16.78835
F-statistic	17.56011	Durbin-Watson stat	1.943927
Prob(F-statistic)	0.000000		

Appendix 3: Unit root test in FDI

Null Hypothesis: FDI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.552820	0.0002
Test critical values:	1% level	-4.156734	
	5% level	-3.504330	
	10% level	-3.181826	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(FDI)

Method: Least Squares

Date: 09/21/12   Time: 16:24

Sample (adjusted): 1964 2012

Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-0.831615	0.149764	-5.552820	0.0000
C	-14.44341	33.04895	-0.437031	0.6641
@TREND(1963)	2.906979	1.226505	2.370131	0.0220

R-squared	0.402982	Mean dependent var	6.436735
Adjusted R-squared	0.377024	S.D. dependent var	144.1924
S.E. of regression	113.8093	Akaike info criterion	12.36620
Sum squared resid	595817.8	Schwarz criterion	12.48202
Log likelihood	-299.9718	Hannan-Quinn criter.	12.41014
F-statistic	15.52478	Durbin-Watson stat	1.970738
Prob(F-statistic)	0.000007		

Appendx 4: stationarity test in Exchange rate

Null Hypothesis: D(EXCHANGE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.311645	0.0000
Test critical values: 1% level	-3.574446	
5% level	-2.923780	
10% level	-2.599925	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXCHANGE,2)
Method: Least Squares
Date: 09/21/12   Time: 16:56
Sample (adjusted): 1965 2012
Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXCHANGE(-1))	-1.115728	0.152596	-7.311645	0.0000
C	1.826747	0.853018	2.141510	0.0376

R-squared	0.537503	Mean dependent var	-0.189167
Adjusted R-squared	0.527449	S.D. dependent var	8.135687
S.E. of regression	5.592662	Akaike info criterion	6.321562
Sum squared resid	1438.782	Schwarz criterion	6.399528
Log likelihood	-149.7175	Hannan-Quinn criter.	6.351025
F-statistic	53.46016	Durbin-Watson stat	1.954406
Prob(F-statistic)	0.000000		

Appendix 5

ADF Test Statistic	-10.63905	1% Critical Value*	-3.5682
		5% Critical Value	-2.9215
		10% Critical Value	-2.5983

*MacKinnon critical values for rejection of hypothesis of a unit root.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(U)
Method: Least Squares
Date: 11/05/12   Time: 15:40
Sample(adjusted): 1964 2012
Included observations: 49 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
U(-1)	-1.415565	0.133054	-10.63905	0.0000

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C	-0.052670	33.08046	-0.001592	0.9987

R-squared	0.706597	Mean dependent var	-3.861933
Adjusted R-squared	0.700355	S.D. dependent var	423.0000
S.E. of regression	231.5497	Akaike info criterion	13.76743
Sum squared resid	2519917.	Schwarz criterion	13.84464
Log likelihood	-335.3019	F-statistic	113.1893
Durbin-Watson stat	2.099777	Prob(F-statistic)	0.000000

Appendix 6: co integration tests

Date: 09/21/12   Time: 15:06
Sample (adjusted): 1965 2012
Included observations: 48 after adjustments
Trend assumption: Linear deterministic trend
Series: BOP BOT EXCHANGE FDI
Lags interval (in first differences): 1 to 1
Unrestricted Co integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.534737	86.64193	47.85613	0.0000
At most 1 *	0.407416	49.91465	29.79707	0.0001
At most 2 *	0.398675	24.79808	15.49471	0.0015
At most 3	0.007975	0.384314	3.841466	0.5353

Trace test indicates 3 co integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Co integration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.534737	36.72729	27.58434	0.0026
At most 1 *	0.407416	25.11657	21.13162	0.0130
At most 2 *	0.398675	24.41377	14.26460	0.0009
At most 3	0.007975	0.384314	3.841466	0.5353

Max-eigenvalue test indicates 3 co integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Co integrating Coefficients (normalized by b'*S11*b=I):

BOP	BOT	EXCHANGE	FDI
0.002053	-0.000212	-0.005005	-0.015101
0.004726	-0.000877	-0.024074	-0.006522
0.008511	0.000878	-0.012623	0.007263
0.001024	0.000485	0.045310	0.001991

Unrestricted Adjustment Coefficients (alpha):

D(BOP)	1.805360	28.01120	-142.4133	11.10942
D(BOT)	-436.5894	573.0227	-286.4100	46.50844

D(EXCHANGE)	0.060842	-0.053246	-1.374963	-0.404537
D(FDI)	69.80784	35.35316	-12.97285	3.831808

| 1 Co integrating Equation(s): | | Log likelihood | -1152.557 | |

Normalized co integrating coefficients (standard error in parentheses)

BOP	BOT	EXCHANGE	FDI
1.000000	-0.103304	-2.437772	-7.354696
	(0.09154)	(3.48720)	(1.26812)

Adjustment coefficients (standard error in parentheses)

D(BOP)	0.003707	
	(0.08278)	
D(BOT)	-0.896399	
	(0.38133)	
D(EXCHANGE)	0.000125	
	(0.00159)	
D(FDI)	0.143328	
	(0.03099)	

| 2 Co integrating Equation(s): | | Log likelihood | -1139.998 | |

Normalized co integrating coefficients (standard error in parentheses)

BOP	BOT	EXCHANGE	FDI
1.000000	0.000000	0.898113	-14.85776
		(6.56073)	(2.18174)
0.000000	1.000000	32.29185	-72.63070
		(38.7032)	(12.8705)

Adjustment coefficients (standard error in parentheses)

D(BOP)	0.136085	-0.024948
	(0.20655)	(0.03617)
D(BOT)	1.811657	-0.409920
	(0.84159)	(0.14737)
D(EXCHANGE)	-0.000127	3.38E-05
	(0.00400)	(0.00070)
D(FDI)	0.310404	-0.045810
	(0.07253)	(0.01270)

| 3 Co integrating Equation(s): | | Log likelihood | -1127.791 | |

Normalized co integrating coefficients (standard error in parentheses)

BOP	BOT	EXCHANGE	FDI
1.000000	0.000000	0.000000	-11.20976
			(1.57691)
0.000000	1.000000	0.000000	58.53391
			(7.09508)
0.000000	0.000000	1.000000	-4.061849
			(0.59129)

Adjustment coefficients (standard error in parentheses)

D(BOP)	-1.076033	-0.150001	1.114328
	(0.33358)	(0.04221)	(0.92670)
D(BOT)	-0.626054	-0.661417	-7.994564
	(1.56444)	(0.19797)	(4.34609)
D(EXCHANGE)	-0.011829	-0.001174	0.018334

	(0.00742)	(0.00094)	(0.02062)
D(FDI)	0.199989	-0.057201	-1.036750
	(0.13862)	(0.01754)	(0.38510)

Appendix 7: VECM

Dependent Variable: D(BOP)
Method: Least Squares
Date: 09/21/12   Time: 15:33
Sample (adjusted): 1967 2012
Included observations: 46 after adjustments
D(BOP) = C(1)*(BOP(-1) + 0.371476417997*BOT(-1) + 1.32671571352
    *EXCHANGE(-1) + 1.30459854998*FDI(-1) + 244.25258958) + C(2)
    *D(BOP(-1)) + C(3)*D(BOP(-2)) + C(4)*D(BOP(-3)) + C(5)*D(BOT(-1)) +
    C(6)*D(BOT(-2)) + C(7)*D(BOT(-3)) + C(8)*D(EXCHANGE(-1)) + C(9)
    *D(EXCHANGE(-2)) + C(10)*D(EXCHANGE(-3)) + C(11)*D(FDI(-1)) +
    C(12)*D(FDI(-2)) + C(13)*D(FDI(-3)) + C(14)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.683558	0.190183	-3.594212	0.0011
C(2)	-0.156291	0.232094	-0.673397	0.5055
C(3)	-0.264300	0.246605	-1.071755	0.2918
C(4)	-0.042538	0.183212	-0.232180	0.8179
C(5)	0.076965	0.122250	0.629569	0.5334
C(6)	0.388934	0.169545	2.293984	0.0285
C(7)	0.331608	0.173346	1.912984	0.0647
C(8)	-4.210108	7.919027	-0.531645	0.5986
C(9)	-7.768153	8.012865	-0.969460	0.3396
C(10)	4.748830	7.928519	0.598955	0.5534
C(11)	-0.611952	0.489017	-1.251391	0.2199
C(12)	0.616331	0.634153	0.971896	0.3384
C(13)	-0.024898	0.614456	-0.040520	0.9679
C(14)	136.9626	55.85440	2.452136	0.0198

R-squared	0.861021	Mean dependent var	22.44348
Adjusted R-squared	0.804561	S.D. dependent var	483.3858
S.E. of regression	213.6976	Akaike info criterion	13.81279
Sum squared resid	1461334.	Schwarz criterion	14.36933
Log likelihood	-303.6942	Hannan-Quinn criter.	14.02128
F-statistic	15.25005	Durbin-Watson stat	2.226157
Prob(F-statistic)	0.000000		

APPENDIX 8: ECM

Dependent Variable: D(BOP)
Method: Least Squares
Date: 09/21/12   Time: 15:19
Sample (adjusted): 1964 2012
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.42612	31.52623	0.330712	0.7424
D(BOT)	0.064229	0.019551	3.285139	0.0020
D(FDI)	1.681795	0.223143	7.536836	0.0000
D(EXCHANGE)	-1.739504	6.093207	-0.285483	0.7766
U(-1)	-1.469955	0.124093	-11.84561	0.0000

R-squared	0.821015	Mean dependent var	21.65306
Adjusted R-squared	0.804744	S.D. dependent var	468.0595
S.E. of regression	206.8252	Akaike info criterion	13.59808
Sum squared resid	1882173.	Schwarz criterion	13.79112
Log likelihood	-328.1529	Hannan-Quinn criter.	13.67132
F-statistic	50.45774	Durbin-Watson stat	1.665918
Prob(F-statistic)	0.000000		

APPENDIX 9
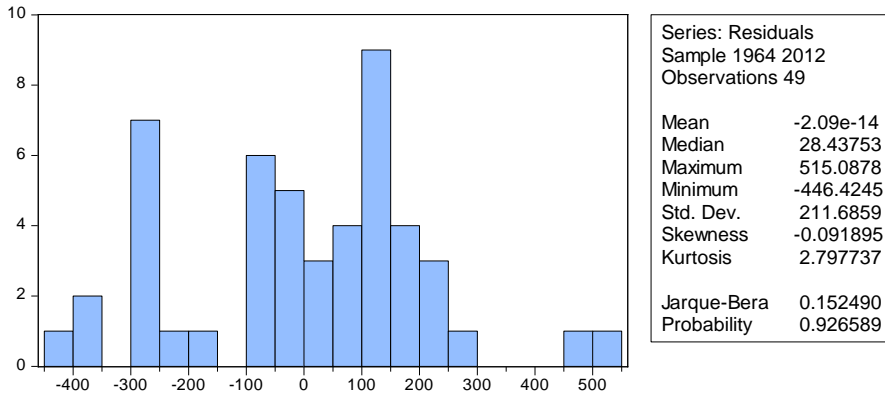
Dependent Variable: BOP
Method: Least Squares
Date: 11/08/12   Time: 12:25
Sample (adjusted): 1964 2012
Included observations: 49 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-160.8299	49.98790	-3.217376	0.0024
BOT	0.062527	0.020126	3.106810	0.0033
BOP(-1)	-0.529758	0.120105	-4.410810	0.0001
EXCHANGE	5.714908	1.231103	4.642103	0.0000
FDI	1.585600	0.293204	5.407841	0.0000

R-squared	0.583762	Mean dependent var	67.84286
Adjusted R-squared	0.545922	S.D. dependent var	328.1113
S.E. of regression	221.0988	Akaike info criterion	13.73155
Sum squared resid	2150925.	Schwarz criterion	13.92459
Log likelihood	-331.4229	Hannan-Quinn criter.	13.80479
F-statistic	15.42719	Durbin-Watson stat	1.512879
Prob(F-statistic)	0.000000		

APPENDIX 10

	Series: Residuals
	Sample 1964 2012
	Observations 49
Mean	-2.09e-14
Median	28.43753
Maximum	515.0878
Minimum	-446.4245
Std. Dev.	211.6859
Skewness	-0.091895
Kurtosis	2.797737
Jarque-Bera	0.152490
Probability	0.926589

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.408756	Prob. F(2,41)	0.1025
Obs*R-squared	5.046991	Prob. Chi-Square(2)	0.0802

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/08/12   Time: 12:41
Sample: 1965 2012
Included observations: 48
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.77076	48.14931	0.369076	0.7140
D(BOT)	0.009679	0.029644	0.326513	0.7457
D(EXCHANGE)	-9.752555	9.873002	-0.987800	0.3290
D(FDI)	-0.039488	0.348352	-0.113357	0.9103
U(-1)	-0.235642	0.390200	-0.603902	0.5492
RESID(-1)	-0.024046	0.246129	-0.097698	0.9226
RESID(-2)	0.420860	0.219260	1.919455	0.0619

R-squared	0.105146	Mean dependent var	1.72E-14
Adjusted R-squared	-0.025809	S.D. dependent var	302.5717
S.E. of regression	306.4513	Akaike info criterion	14.42203
Sum squared resid	3850409.	Schwarz criterion	14.69492
Log likelihood	-339.1288	Hannan-Quinn criter.	14.52516
F-statistic	0.802919	Durbin-Watson stat	1.940636
Prob(F-statistic)	0.573429		