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The Influence of Petroleum Products, Transport and Communication on Kenya's Balance of Payments

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Abstract:
A major challenge to the Kenyan economy is the persistence disequilibrium in the balance of payments. This study examined the relationship between transport and communication output, import value of petroleum products, FDI, domestic credit and their influence on balance of payments in Kenya over the period 1980-2012. By using co integration and error correction multivariate framework, it was found that output from transport infrastructure, communication investment, value of petroleum products, domestic credit and FDI were co integrated. The results showed that all the variables were significant but domestic credit and value of petroleum products were negatively related to net balance of payments, while FDI and Transport &Communication output were positively related.

This implies that to correct the disequilibrium in balance of payments in Kenya, equal attention to transport and communication and the utilization of the oil reserves in the country is key instead of solely relying on monetary tools to attain stability in the country's balance of payments adjustment.

Keywords: *Petroleum products, Transport &Communications, Balance of Payments, Co integration, Kenya*

1. Introduction

Agricultural products are central to Kenya's export industry with horticultural and tea being the most important. Other export items include textiles, coffee, tobacco, iron and steel products, petroleum products, cement among others. Kenya imports mostly machinery and transportation equipment, petroleum products, motor vehicles, iron and steel, resins and plastics. This is what comprises the external trade and it plays a vital role in the Kenya's economic development. As such the value of total exports grew from Ksh 512.6 Billion in 2011 to Ksh 517.8 billion in 2012 and the value of imports grew by 5.7 per cent from Ksh 1,300.7 billion in 2011 to Ksh 1,374.6 billion in 2012. This forced the trade balance worsen further by 8.7 per cent in 2012 compared to 46.7 per cent in 2011.That aside, the current account deteriorated to a deficit of Ksh 359.5 billion in 2012 from a deficit of 340.2 billion in 2011 but the Capital and Financial accounts recorded a higher surplus of Ksh 438.0 billion in 2012 compared to a surplus of Ksh 332.6 billion recorded in 2011. As a result the overall balance of payments which records all these transactions improved from a surplus of Ksh 21.8 billion in 2011 to another surplus of Ksh 123.2 billion in 2012.

All these economic transactions that take place among countries are reflected in the balance of payments account of the country. This account combines the current account which captures country's imports, exports and services transacted with the rest of the world and the capital and financial accounts that comprise various debt, aid and equity flows. For each account the balance between inflows and outflows is measured and it is virtually the value of the inflows during the period which is considered. The components of the current account comprise goods and services, incomes from investments, labour and transfer payments of residents. The main components of the capital account are the direct investments account, the portfolio investments account and the banks, corporate, government and central bank lending accounts, Reserve assets and assets bought by the central bank among others.

Kenya of recent has put special emphasis on development of the infrastructural sector including energy, roads and railway as priority for sustaining high growth and ensuring that the growth is inclusive and to improve the balance of payments of the country. These heavy investments on infrastructures however put pressure on the balance of payments position of the country on the other hand. As a result we wanted to investigate if Kenya in her new venture to development through infrastructure led strategy especially on-broad roads, double gauge rail and ports can influence the balance of payments.

Investment in transport infrastructure is capable and sure way of increasing the productivity of any country directly by reducing the transportation costs, journey and waiting times and vital for ease of movement within a country. Even the movement of goods across countries is depended and takes into account the quality of roads, rail network and ports, and the same to business centers and tourist attractions.

On the other hand connectivity whether by Internet or mobile phones is increasingly bringing market information, financial services, and health services to remote areas, and is helping to change people's lives in unprecedented ways. New information and

communications technologies (ICT), and particularly high-speed internet, are changing the way companies do business, transforming public service delivery and democratizing innovation. As such information and communication is impacting economic growth in developing countries Kenya included in a big way.

Similarly the Energy sector has traditionally played an important role in the Kenyan economy as it is an indispensable input in economic growth and development. At the same time it is one of the external shocks Kenya needs to eliminate by exploiting her recently discovered resources to avoid heavy dependence on imported energy, food and technology which has put the country historically run a current account deficit. Kenya depends on foreign oil imports for domestic use and for re- export. Oil is transformed into a number of products, the most important of which are liquid petroleum gas (LPG), kerosene, diesel, fuel oil, and residues. Thus in Kenya there is surge in demand for petrol and diesel as a result of the rapid expansion of Kenya's vehicle fleet especially in urban centers which unfortunately have infrastructure deficits and consumers' preference for smaller, fuel efficient vehicles which clog the Kenyan roads and as the most preferred and dominant mode of travel. Thus, it poses a challenge to the country's balance of payments as Oil shocks affect the terms of trade.

On that note Transport and Communication sectors, recorded a growth of 4.0 per cent in 2012 compared to 4.7 per cent in 2011 .Transport sub-sector grew by 3.1 per cent in 2012, compared to 4.9 per cent in 2011. Communication sub-sector, expanded by 5.3 per cent in 2012 compared to a 4.3 per cent growth in 2011. The railway sub-sector recorded an increase of 22.4 per cent in earnings from freight in the period under review. This was attributed to increased tariff levied on transported cargo and restructuring of the operations of the Rift Valley Railways (RVR) .Total Port through output the rose by 9.9 per cent from 19,953 thousand tonnes recorded in 2011 to 21,920 thousand tonnes in 2012.Total pipeline through output of white petroleum products rose by 14.2 percent to 4,855.6 thousand cubic metres in 2012.The mobile subscriber base increased from 25.3 million in 2011 to 29.7 million in 2012. Mobile money transfer subscriptions increased from 17.4 million in 2011 to 19.5 million in 2012.The total internet subscriptions rose by 37.1 per cent to 8.5 million in 2012 from 6.2 million in 2011.

The performance of these services sector is vital for growth of the economy and reduction in balance of payments disequilibrium in general in Kenya. That means low infrastructure investment threatens Kenya's long-term position as the largest East African economy and long run disequilibrium in the balance of payments, as the deterioration in the balance of payments has effects on economic growth, although some countries are successful at absorbing shocks (Funke et al., 2008). At the same time inadequate access to these services hurt people, especially consumers, undermines the productivity of firms and farms as well as their ability to engage in trade.

2. Literature Review

Through the years different adjustment mechanisms to balance of payments disequilibria were developed, namely the monetary approach, the elasticity's approach, and the absorption approach (Du Plessis *et al.* 1998).

Monetary approach insists on money market disequilibrium as a factor provoking balance of payments disequilibrium if there is stock imbalance between the demand for and supply of money. The MA regards the balance of payments as a monetary phenomenon and can only be corrected by monetary measures. In other words it expresses the relationship between a country's balance of payments and its money supply (Chacholiades, 1990). It shows the extent to which changes in domestic credit are offset by changes in international reserves, and the coefficient assumes a negative sign for MABP in the reserve flow equation (Dhliwayo, 1996).

The elasticity approach, associated with Robinson (1937), places emphasis on the effects of exchange rate changes on the trade account balance, and ignores all other variables like income, and applied the Marshall-Lerner condition. The condition states that the sum of the elasticities of demand for imports and exports must be greater than unity in absolute terms for a devaluation to improve the balance of payments (Du Plessis et al., 1998). That is to say if $e_x+e_m > 1$.The elasticities approach provides an analysis of how devaluations of exchange rate and price level will affect the balance of trade depending on the elasticities of supply and demand for foreign exchange and foreign goods. It leads to the "J-curve effect", which refers to the pattern of the balance of trade following devaluation.

Conversely, the absorption approach to the balance of trade emphasizes how domestic spending on domestic goods changes relative to domestic output. It runs through the income effect of devaluation as against the price effect to the elasticity approach. The absorption approach presented by Alexander (1952), sought to look at the balance of trade from the national income identity. It showed how devaluation might change the relationship between expenditures / absorption and income. The contention is that devaluation of a currency would lead to an increase in inflationary prices, which would in turn provoke an increase in prices. This implies that, if total absorption (expenditure) exceeds income (production), then imports will exceed exports, resulting in a balance of payments deficit and the opposite could be in surplus. Therefore, a balance of payments deficit can only be corrected if the level of absorption changes relative to the level of income (Du Plessis et al., 1998).

There are also several studies which show that, improvements in infrastructure can have a significant positive impact on trade, growth, and development and as such improved infrastructure increases the ability to move goods, services, and ideas within countries and to ensure flow of goods and services from one country to another. It decreases transportation costs, and reduces inventory and logistical costs, thereby expanding markets. On the other hand Information technologies have made possible improvements in the transport logistics process and its fruitful reorganization. Therefore we viewed infrastructure as a direct injection to the economy and typically as a factor of production just like the other traditional factors like capital and labor.

The association between a country's balance of payment and its money supply is expressed by the monetary approach (MA), (Chacholiades 1990). If money supply is greater than money demand then it creates deficits and if opposite condition lies then it generates surplus (Howard & Mamingi 2002). A similar conclusion was also reached by Leon (1988) who justified MA in the case of

Jamaica. Leon explored the implication of reserve-flow and sterilization equations in Jamaica. The likes of, Lachman (1975) and Dhliwayo (1996) found evidence of the MA while others including Watson (1990) did not found any support in favour of the MA.
Salvatore (1998) and Fleermuys (2005) showed that the monetary approach to the balance of payments is a "*monetary phenomenon*". They further argued that the monetary approach focuses on how the demand and supply of money affect the balance of payments and the exchange rate. On the other hand the role of public infrastructure in the process of economic growth has received a wide attention since the contributions of Aschauer (1989) and the theoretical model of Barro (1990). The conventional wisdom is that pubic investment in infrastructure, in particular transport, and plays a crucial role in facilitating economic growth and international competitiveness. Ashipala & Haimbodi, (2003) in their study implied that the better the infrastructure the more successful the economic development polices. Good transport linkages reduce transport costs, road congestion and promote industrial development throughout the country. World Bank (1994) indicated that Poor infrastructure facilities, especially in transport, communications and information technologies, are regarded as one of the major impediments for investment and growth in many African countries.
Conversely, Easterly and Rebelo (1993), Calderón and Servén (2004), Queiroz and Gautam (1992) found a positive effect of investment in transport and communication on economic growth. Aschauer (2000) found that the stock of public infrastructure capital is a significant determinant of aggregate total factor of productivity and that investments in public sector not only improve quality of life but also increase economic growth and returns for private investments. Zou et al. (2008) analyzed data from China and found that higher economic growth level comes to a greater extent from better transport infrastructure and that public investment on road construction in poor areas is crucial to growth and poverty alleviation.
Sturm et al. (1999) also found strong evidence of a positive impact of investments in transport infrastructures, such as roads, canals and railways, on the output level of the Dutch economy in the second half of the nineteenth century. Mamatzakis (2002) found a positive effect of public infrastructure (ports, railways, roads, electricity and communications) on output and private capital productivity of the Greek industrial sector. They also established the causal relationship to be from public infrastructure to productivity.
Pradhan (2010) explored the nexus between transport infrastructure (road and rail), energy consumption and economic growth in India over the period 1970-2007. They also found evidence of unidirectional causality from transport infrastructure to economic growth. Calderón and Servén (2004) demonstrated that Latin America's lackluster infrastructure investment performance is a significant determinant of the region's trade and growth underperformance relative to East Asia in the 1980s and 1990s. Ndukwe (2005), said that the developed world had been able to transform not only their domestic economic growth but also increase their competitiveness in the world market, partly due to economic development policies predicated on telecommunications as an essential component of the economic infrastructure
Telecommunications infrastructure has been identified as having both direct and indirect impact on the growth of an economy (Udjo et al., 2000). Ariyo and Jerome (2005), argued that telephone penetration has a positive impact on gross domestic product (GDP) because it provides a stimulant to economic growth and that as economies become more highly developed, they need more communications .Okafor (2007) submitted that telecommunications infrastructure becomes a crucial ingredient in the process of economic development in both the developing and the developed countries.
Net oil-importing countries normally experience deterioration in their balance of payments (Malik 2007), putting downward pressure on exchange rates. As a result, imports become more expensive and exports less valuable, leading to a drop in real national income. Oil price increase leads to a transfer of income from importing to exporting countries (Hamilton 2003; Federer 1996). It changes the balance of trade between countries and exchange rates.
In the nutshell, an open infrastructural sector is an important determinant of economic growth and improving living standards. Mattoo et al. (2001) indicated that openness in telecommunications and finance, influences long-run growth performance. Countries with fully open telecommunications and financial services sectors grow up to 1.5 percentage points faster than other countries. As such the accessibility, quality and cost of transport and distribution of the services determine how efficiently goods move from producers to final consumers. Free movement of people facilitates trade in services, thereby increasing business transactions.
Export competitiveness in Kenya is centered on the costs of international transport, Services and especially shipping costs. World Bank (2002a) found that a doubling of shipping costs is associated with slower growth of more than half a percentage point. Potential access to foreign markets, of which transport costs are a determinant, explains up to 70 per cent of variations in country GDP. Therefore high transport costs also restrain the growth of trade in services (World Bank, 2002a). They argued that an inefficient internal transport system contributed to the concentration of China's export industries in its coastal region.
Limao and Venables (2001) found relatively high elasticities of trade volumes in response to reductions in transport costs. Even tourism sector also depends on the costs of international travel, and therefore small changes in transport costs can lead to large changes in travel volumes. Limao and Venables (2001) showed that infrastructure is a significant and qualitatively important determinant of transport costs and bilateral trade flows.
Conversely, Kenya's transport systems are well below international standards. They lack container freight, port procedures were perceived to be cumbersome and time-consuming, due to the many certification requirements and duplication of documents, lack of coordination between the different governments' agencies involved in the various modes of transport, poorly trained staff. But when transport costs are reduced, resources are saved (DeardorV, 2001). Thus Port performance is directly related to the policy environment, and handling costs in port are in many cases just as important as costs associated with physical distance (Clark et al., 2001).In contrast, Holtz-Eakin (1994), Holtz-Eakin and Schwartz (1995) and Garcia-Mila et al. (1996) suggested that there is little evidence of an effect from infrastructure to income growth in a panel of U.S. State level data, particularly when fixed effects are included.

Thus energy, infrastructure and transport and communication sectors have a direct link with the economic development of a country. The magnitude by which Kenya is hurt as a result of price shock depends on the share of cost of oil in national income and the degree of dependence on imported oil. This paper analyzed the impact of rising import value of petroleum products along with the changing infrastructure investments output on the balance of payments.

3. Model Specification

Our empirical methodology was based on Monetary Approach to Balance of Payment, which regards the balance of payments as a ―monetary phenomenon, which expresses the relationship between a country's balance of payments and its money supply (Chacholiades, 1990).Therefore our explanatory variables included in the model were, total domestic credit; Transport and communication output, FDI and import value of Petroleum product. The macroeconomic model to be estimated for Kenya was specified as:

Balance of payments= f (DOC, FDI, TAC, PEP)

We therefore generated a general estimating equation with the expected signs of the coefficients as:

$BOP= \alpha -\beta_1 DOC + \beta_2 FDI +\beta_3 TAC - \beta_4 PEP +\mu$

Where

BOP =Balance of payments (overall balance)

DOC= domestic credit

FDI= foreign direct investment

TAC= transport and communication output

PEP= import value of petroleum products

μ = Stochastic error term

3.1. Data Issues

This study used Secondary data. The data on Transport &Communication were obtained from the Kenyan economic surveys of various years and statistical abstracts and for balance of payments and FDI; we collected from World Bank development indicator. The annual time-series data on the variables covered the period 1980-2012 and we employed ordinary least squares in the estimation of the coefficients of the parameters and also used to establish the relationships between the dependent variable and the independent variables.

3.2. Data Analysis

Economic theory suggests that economic time series vectors should move jointly and should be characterized by means of a long-run equilibrium relationship. As such when estimating regression models using time series data it is necessary to know whether the variables are stationary or not in order to avoid spurious regression problems. Therefore we performed this analysis by using the unit root and stationarity tests and results are shown in Table 1. This was done to avoid the problem of the spurious regression and the failure to account for the appropriate dynamic specifications. We followed most existing empirical studies by using the standard Augmented Dickey-Fuller (ADF), Phillip-Perron and Elliott et al. (1996)

Variables	ADF test statistics	Critical values At 1%	At 5%	At 10%	t-statistics	Probability
BALANCE OF PAYMENTS	-8.193683	-3.670170	-2.963972	-2.621007	-8.19368	0.00000
Petroleum products(PEP)	-4.602112	-2.679735	-1.958088	-1.607830	-2.26992	0.00000
Domestic credit(DOC)	-3.134700	-2.650145	-1.953381	-1.609798	-2.77996	0.00029
Transport(TAC) communication	-6.376168	-4.284580	-3.562882	-3.215267	2.666068	0.00001
FDI	-6.772389	-3.679322	-2.961161	-2.622989	2.32958	0.00000
U at levels	-4.810299	-3.737853	-2.991878	-2.635542	-.42828	0.00008

Table 1

We realized that the variables were co integrated of at least order one (i.e. they were stationary after first difference). Then we ran the OLS test which is usually followed procedure for testing hypotheses concerning the relationship between non-stationary variables on data which had initially been differenced.

Thereafter we proceeded to run the johansen's a test for co integration that allows for more than one co integrating relationship, unlike the Engle–Granger method. The results showed 4 co integrating (Trace test) eqn(s) at the 0.05 level while Max-eigenvalue test

indicated 4 co integrating eqn(s) at the 0.05 level as shown in the appendix Table 3.All variables except Balance of payments and PEP lagged to 1(one) period cannot influence balance of payments in the short period.

Series: BALANCE OF PAYMENTS FDI DOC PEP TAC				
Lags interval (in first differences): 1 to 1				
Unrestricted Co integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.973303	188.5945	69.81889	0.0000
At most 1 *	0.765737	90.76827	47.85613	0.0000
At most 2 *	0.697492	51.58291	29.79707	0.0000
At most 3 *	0.376410	19.30046	15.49471	0.0127
At most 4 *	0.215391	6.549381	3.841466	0.0105

Table 2

Trace test indicates 4 co integrating eqn(s) at the 0.05 level				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.973303	97.82626	33.87687	0.0000
At most 1 *	0.765737	39.18536	27.58434	0.0011
At most 2 *	0.697492	32.28245	21.13162	0.0009
At most 3	0.376410	12.75108	14.26460	0.0855
At most 4 *	0.215391	6.549381	3.841466	0.0105
Max-eigenvalue test indicates 4 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				

Table 3

We also thought that it could be interesting as well to formulate a model that combines both long-run and short-run behaviour of the variables. This approach is based on the estimation of error correction models (ECM) that relate the change in one variable to the deviations from the long-run equilibrium in the previous period. Therefore we examined the short run causality (ECM)) and found the value of coefficient of ECM as -0.112665. This implied that error correction process converges to equilibrium with the speed of 11.27% from current to next time period. Thus we had to transform the VAR into a VECM and thereafter the long run form of VECM as:

$y_t = A_1 y_{t-1} + \ldots + A\, y_{t-p} + CD_t + u_t$

Transitory form of VECM:

$\Delta y_t = \Gamma_1 \Delta y_{t-1} + \ldots + \Pi_{K-1} \Delta y_{t-p+1} + \Delta y_{t-1} + CD_t + \varepsilon_t$,

$\Gamma_I = -(Ai +_1 + \ldots + A_P)$, for $i = 1 \ldots P - 1$,

$\Pi = -(I - A_1 - \cdot \cdot \cdot - A_P)$.

Long-run form of VECM:

$\Delta yt = \Gamma_1 \Delta y_{t-1} + \ldots + \Gamma_{p-1} \Delta y_{t-p+1} + \Delta y_{t-p} + CD_t + \varepsilon_t$,

$\Gamma i = -(I - A_1 - \ldots - Ai)$, for $I = 1 \ldots P - 1$,

$\Pi = -(I - A_1 - \cdot \cdot \cdot - A_P)$

For co-integration an appropriate lag length is required to be determined. So the next step was to process as to determine the optimal lag length. In order to find out the optimal lag order of the model we carried out a lag order selection criteria procedure. They included the Akaike Information Criterion (AIC), LR, FPE, SC and HQ, which suggested the same lag length of 3 as shown by Table 4.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1188.834	NA	2.07e+35	95.50673	95.75051	95.57435
1	-1082.357	161.8448	3.20e+32	88.98859	90.45124	89.39426
2	-1004.577	87.11354	6.18e+30	84.76619	87.44772	85.50993
3	-947.2377	41.28460*	1.10e+30*	82.17901*	86.07942*	83.26082*
* indicates lag order selected by the criterion						

Table 4

4. Results

The result presented in table 5 shows that the five variables, Balance of payments, Domestic credit, Transport &Communication, FDI and Petroleum Products have statistically significant coefficients. In addition, their signs are as predicted by theory and in our model, signifying that in the Kenyan case DOC, FDI, TAC and PEP significantly affect Balance of Payments. The model is adequately specified and the residuals do not violate the classical assumptions of normality, serial dependence and Heteroskedasticity.

Dependent Variable: BALANCE OF PAYMENTS				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.017854	0.007664	2.329578	0.0279
DOC	-0.077343	0.028144	-2.748147	0.0107
PEP	-0.009348	0.003789	-2.467568	0.0205
TAC	0.004535	0.001669	2.717744	0.0115
C	140.1663	97.02242	1.444680	0.1605
R-squared	0.508861			
Adjusted R-squared	0.433301			
F-statistic	6.734531	Durbin-Watson stat		2.574183
Prob(F-statistic)	0.000737			

Table 5

This equation shows the coefficients from the co integration regression. The results show that the variables having greatest impact on balance of payments are domestic credit, FDI and import value of petroleum products.

Balance of payments=1554.27+0.261546(FDI)-0.807943(DOC)-0.021(PEP) +0.003316(TAC)
(11.7314) (-7.54645) (-2.90596) (1.87814)

The reason for low adjusted R-square value is that there are other variables which have significant impact on BALANCE OF PAYMENTS, which we overlooked in the study. But the F statistic is significant and R^2 is less than Dw. The Dw also is more than two and greater than R.^{2} This study showed that growth of TAC positively affects balance of payments. The coefficient for this variable is 0.003316 implying that 1% increase in the growth rate of the transport and communication sector causes 0.33% improvement in the balance of payments. A similar result was obtained by Easterly and Rebelo (1993), Calderón and Servén (2004), Queiroz and Gautam (1992), Zou et al (2008), Pradhan (2010), Mamatzakis (2002).

On the other hand, the study found a negative or an inverse relationship between domestic credit and the Balance of payments. A 1% decrease in domestic credit causes an 80.8% decrease in the balance of payments deficit. The result suggests that excessive creation of credit generate the situation where reserves might be lost .The excessive domestic credit expansion will lead to reserve out flows. The negative result implies that the government budget deficit will increase and eventually lead to excessive expansion in domestic credit and as a result, a loss of foreign exchange reserves. The finding is consistent with the theory as well as empirical works of Umer *et al.* (2010) and Fleermuys (2005) who found an inverse relationship between domestic credit and reserves in their respective studies.

Conversely, the estimated coefficient for PEP was negative and significant, implying that import values of petroleum product is inversely related to balance of payments. The study shows that 1% change in PEP deepens the balance of payments deficit by as much as 2.1%. It concurs with the study done by Malik (2007), who found that Net oil-importing countries normally experience deterioration in their balance of payments.

The co-efficient of FDI is statistically significant with a positive sign and suggests that a 1 percent increase in the inflow of FDI reduces the deficit by 26%.It suggests that the inflows are geared solely towards foreign exchange earning movement. Even Hossain (2007) showed that the initial impact of an inflow of FDI on BALANCE OF PAYMENTS is positive but the medium term effect could become either positive or negative as the investors increase their imports of intermediate goods and services, and begin to repatriate profit. Lehman (2002) found that structural change in external accounts of a country takes place due to FDI inflows. Thus this study showed that balance of payments is not solely impacted by monetary factors especially in the case of Kenya. As a result, issues of imbalances in BALANCE OF PAYMENTS cannot be resolved only through monetary policies.

5. Conclusion

Both series were non -stationary indicating that there would be short-run and long-run relationships among the variables. Therefore we examined both the existence of a short-run relationship in the VAR model and consecutively the existence of a long-run relationship by performing a Co-integration test and found out that the variables had a long run associationship. Then we estimated a vector error correction model (VECM) and checked the signs and realized that they were statistically significant as well as their coefficient(s).Based on the estimated equation, the coefficients of the rest of the variables had expected signs. The empirical results confirmed that money has played a significant role in the determination of deficits in the balance of payments in Kenya. For that reason, a tight rein on domestic credit creation is a necessary condition for maintaining stability in the balance of payments over time.

Conversely, the findings show that the balance of payments disequilibrium in Kenya is not solely due to the influence of monetary variables but also by FDI, PEP and TAC. Diagnostic tests were carried out to test the residuals for serial correlation and the results

showed that the residuals were free from serial correlation; heteroscedasticity and were normally distributed as show by the Wald test, Breusch-Godfrey serial correlation LM test and Heteroskedasticity test Breusch –pagan Godfrey in Appendix Figure 1 and Table 4 & 5.

Thus we set out to examine the influence of imports of petroleum products, role of transport and communication on the balance of payments in Kenya using annual data set that covered 1980-2012. The reason is that Kenya of recent has embarked on massive investment on the infrastructure and has discovered oil. It was found that FDI, PEP, TAC and DOC commonly drifted together making linear relationships between these variables over long period of time thus translating into equilibrium relationships of economic variables. All the four variables were found to have a significant impact on net foreign assets. Although the findings generally fulfill predictions and expectations of literature, the result reveals that disequilibrium in the balance of payment does not entirely comply with the influence of monetary variables. However though it follows a monetary approach contrary to early finding of Osoro (2013) in the study which concluded that balance of payments is both a monetary and real phenomenon.

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APPENDIX

Dependent Variable: BALANCE OF PAYMENTS				
Method: Least Squares				
Sample: 1980 2012				
Included observations: 31				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	0.017854	0.007664	2.329578	0.0279
DOC	-0.077343	0.028144	-2.748147	0.0107
PEP	-0.009348	0.003789	-2.467568	0.0205
TAC	0.004535	0.001669	2.717744	0.0115
C	140.1663	97.02242	1.444680	0.1605
R-squared	0.508861	Mean dependent var		113.4839
Adjusted R-squared	0.433301	S.D. dependent var		395.7652
S.E. of regression	297.9298	Akaike info criterion		14.37828
Sum squared resid	2307817.	Schwarz criterion		14.60957
Log likelihood	-217.8634	Hannan-Quinn criter.		14.45368
F-statistic	6.734531	Durbin-Watson stat		2.574183
Prob(F-statistic)	0.000737			

Table 1

Dependent Variable: D(BALANCE OF PAYMENTS)				
Method: Least Squares				
Sample (adjusted): 1984 2012				
Included observations: 23 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	36.21503	123.8388	0.292437	0.7735
D(FDI)	0.015340	0.006991	2.194218	0.0424
D(DOC)	-0.196050	0.047017	-4.169813	0.0006
D(PEP)	-0.027677	0.006654	-4.159216	0.0007
D(TAC)	0.011934	0.005400	2.209973	0.0411
U(-1)	-0.643557	0.457330	-1.407206	0.1774
R-squared	0.694521	Mean dependent var		34.60000
Adjusted R-squared	0.604675	S.D. dependent var		657.5873
S.E. of regression	413.4574	Akaike info criterion		15.10644
Sum squared resid	2906100.	Schwarz criterion		15.40266
Log likelihood	-167.7241	Hannan-Quinn criter.		15.18094
F-statistic	7.730070	Durbin-Watson stat		2.693356
Prob(F-statistic)	0.000594			

Table 2

Dependent Variable: D(BALANCE OF PAYMENTS)				
Method: Least Squares				
Sample (adjusted): 1983 2012				
Included observations: 26 after adjustments				
D(BALANCE OF PAYMENTS) = C(1)*(BALANCE OF PAYMENTS(-1) + 0.260967108442*FDI(-1) - 0.806136004466				
*MONEY(-1) - 0.0218418938413*PEP(-1) + 0.00327088541849				
*TAC(-1) + 3200.07434576) + C(2)*D(BALANCE OF PAYMENTS(-1)) + C(3)*D(FDI(-1)) +				
C(4)*D(DOC(-1)) + C(5)*D(PEP(-1)) + C(6)*D(TAC(-1)) + C(7)				
*D(BALANCE OF PAYMENTS(-2)) + C(8)*D(FDI(-2)) + C(9)*D(DOC(-2)) + C(10)*D(PEP(-2))				
+ C(11)*D(TAC-2)) + C(12)				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.112665	0.126779	-0.888673	0.3892
C(2)	-0.611287	0.281001	-2.175386	0.0472
C(3)	-0.001275	0.028582	-0.044623	0.9650
C(4)	-0.130595	0.131526	-0.992926	0.3376
C(5)	-0.003959	0.012873	-0.307536	0.7630
C(6)	0.001081	0.004400	0.245619	0.8095
C(7)	-0.469506	0.232763	-2.017102	0.0633
C(8)	0.012888	0.038113	0.338161	0.7403
C(9)	-0.124173	0.162968	-0.761948	0.4587
C(10)	-0.014657	0.004965	-2.952180	0.0105
C(11)	0.001490	0.002620	0.568569	0.5787
C(12)	200.6496	225.3943	0.890216	0.3884
R-squared	0.904454	Mean dependent var		49.20385
Adjusted R-squared	0.829383	S.D. dependent var		624.8663
S.E. of regression	258.1064	Akaike info criterion		14.24866
Sum squared resid	932665.1	Schwarz criterion		14.82932
Log likelihood	-173.2326	Hannan-Quinn criter.		14.41587
F-statistic	12.04787	Durbin-Watson stat		1.996588
Prob(F-statistic)	0.000025			

Table 3

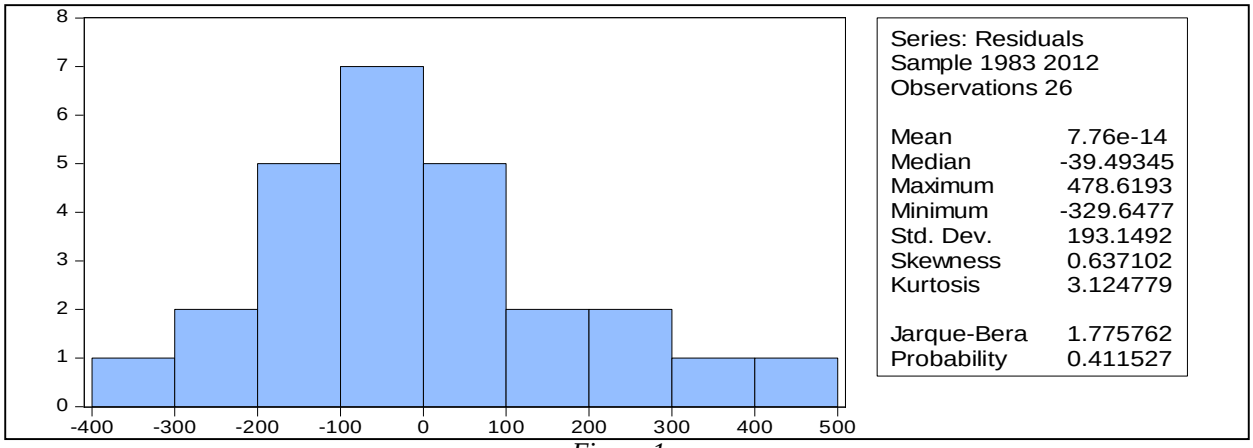

Figure 1

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.309784	Prob. F(2,12)	0.7393
Obs*R-squared	1.276492	Prob. Chi-Square(2)	0.5282

Table 4

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.478795	Prob. F(15,10)	0.9042
Obs*R-squared	10.86781	Prob. Chi-Square(15)	0.7619
Scaled explained SS	3.347613	Prob. Chi-Square(15)	0.9992

Table 5