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Relationship Between GDP, Inflation and Real Interest Rate with Exchange Rate Fluctuation of African Countries

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Abstract

This paper tries to explore the relationship between, gross domestic product, inflation and real interest rate with the exchange rate. 10 African countries with 15 years of data from 1996 to 2010 were used for this study. Three independent variables i.e. inflation, interest rate and Gross Domestic Product were used in order to investigate their relationship which causes exchange rate fluctuations. Three hypotheses served as a basis to analyze the results. Based on the analysis, it is found that that the GDP has significant relationship with the exchange rate where interest and inflation has non-significant relationship with the exchange rates of African countries.

Keywords: Exchange Rate, Inflation, Real Interest Rate, and Gross Domestic Product

Introduction

Background

Countries around the world do not have enough resources to fulfill all its need that's why they have to involve in international business. Ricardo, D. (1817) in comparative advantage theory suggests that a country should specialize in producing those products in which it has competitive advantage and should import the products that will need higher resource utilization and energies.

Trading in this way will benefit all the countries around the world. Imperfection of market condition also provides the incentive to be involved in international businesses because immobility of factors of production provides conditions to enter in the international trade. One additional reason for involving in international trade is explained by product life cycle theory, which is presented by Vernon, R. (1966). This theory states that firms having higher information about domestic market initially introduce goods and services in domestic market and meet international trade by exporting it. The import and export of goods or services does not take place in same currency. So, trading countries need to determine the currency exchange rate which is widely accepted all over the world. According to Madura, J. (2006), Rugman, M.A., Collinson, S & Hodgetts, R.M. (2006), Hall E.R. (2006) and Lieberman (2004), the exchange rate is *“the amount of one unit of currency that is traded for one unit of another currency.”*

The purpose of currency exchange rate is to determine the value of goods or services imported or exported. Conversion of one currency into their home currency demonstrates the revenues and profits in the own currency of traded countries. Values of these currencies always fluctuate due to the demand and supply of currencies.

Why Exchange Rates Fluctuate?

According to Madura, J. (2006) and Rugman, M.A., Collinson, S. & Hodgetts, R.M. (2006) fluctuations in the exchange rates are due to change in demand and supply of currencies. Fluctuation in exchange rate could be found with the help of different economic factors that affects the demand and supply. When fluctuation occurs, the new exchange rate is determined where demand and supply meets together at an equilibrium level. On the other hand, Broda, C. (2004) and Meese, R. (1990) after examining several studies conclude that the economist is not able recognize that why exchange rate fluctuates. Ray, H. (2008) argued that there is a positive relationship between macroeconomic variables and exchange rate. The relationship is positive when time factor is involved. According to Madura, J. (2006) common factors that effect on demand and supply of currency are inflation rates, national income growth rate, relative interest rate, exchange rate expectations, government intervention, terms of trade, political stability and public debt etc.

Objectives and Significance of the Study

The objective of this paper is to determine the relationship between the economic factors mentioned by Madura, J. (2006) and the exchange rate fluctuations in African countries. Normally, developing countries have higher imports than exports. So exchange rate can either increase or their payments for the purchase of goods or services from developed countries. Moreover, these African countries have lower value of their currencies against US dollar or Euro. The significance of studying exchange rate fluctuation is to investigate the extent of relationship between economic variables which effect on exchange rate. Studying exchange rate fluctuation for African countries helps in identifying the economic factors that have relationship on the exchange rate fluctuation.

Literature Review

Bodnár, K. (2007) argues that the developing and emerging economies are not more efficient due to which they are exposed by the exchange rate fluctuation which has often a negative impact. According to Rugman, M.A., Collinson, S. & Hodgetts, R.M. (2006) the supply and demand for a currency comes from both trade flows (exports and imports) and capital flows (investments and

borrowing). So, the balance of payments implications for exchange rates must include both sides of the story, the “real” flows, and the financial flows. According to Madura, J. (2006), the government in freely floating exchange rate does not find the values of transaction currency, but it is finding through markets’ interaction. This market interaction finds exchange rate value through demand and supply. When there is a fixed or peg exchange rate system, than the trade shocks has negative impact on the real GDP. However, McPherson & Rakovski (2000) concluded that there is no relationship of gross domestic product (GDP) and interest rate with exchange rate. They used vector auto regression model (VAR) for analyzing a data of Kenya, which is based on 26 years from 1970 to 1996 by creating a direct and indirect relationship with gross domestic product and interest rate. According to Simpson *et al.* (2005), the exchange rate will appreciate if the variation in inflation rate of both countries is in same direction when the inflation of country at domestic level remains low as compared to the other country. According to Rebitzky (2010), exchange rate reactions to macroeconomic news hardly vary over time. Hsing (2007) explains the relationship between inflation rate and exchange rate and found that there is adverse association among them.

According to Dornbusch (1976), the effect of monetary policy on interest rates and exchange rates is significantly affected by the behaviors of real output. Fausta *et al.* (2007) based on concerned economic variables, divides the information into two types: strong information and weak information. Strong information about economic variables leads to appreciation in the exchange when there is same trend of movement in interest rate and exchange rate. Inci and Lu (2004) developed a model that explains the effect of interest rate on the exchange rates and concluded that there are also some other factors or dynamics other than the interest rate, which have an impact on the exchange rate fluctuations. According to Kim & Roubini (2000), whenever there is a positive change in interest rate, the exchange rate appreciates and whenever there is a negative change in interest rate, there is a decrease in exchange rate at the domestic level. Kanas, A. (2005) found that exchange rate is affected by legged interest rate. The model that Kanas used shows the changes that are due to using both fixed exchange rate and floating exchange rate. Cavaglia, S.M.F.G. & Wolff, C.C.P. (1996) have combined the exchange rate and interest rate to find out that how much they have an impact on exchange rate to fluctuate through change in risk, interest rate news. They found that the interest rate news has not a significant effect on the exchange rate movement however, revision of these variables on daily basis is important to change the demand and supply of the currency in order to fluctuate. Dominguez (2006) supported it by arguing that the relationship between interest rate and exchange rate depends upon the economic policy of country.

Hypothesis

H1: There is a relationship between Gross domestic product and exchange rate of African countries.

H2: There is a relationship between real interest rate and exchange rate of African countries.

H3: There is a relationship between Inflation and exchange rate of African countries.

Methodology of Research

According to Medura, J. (2006) common factors that effect on demand and supply of currency are inflation rates, national income growth rate, relative interest rate, exchange rate expectations, government intervention, terms of trade, political stability and public debt etc. We have delimited

our study by choosing gross domestic product, inflation and real interest rate. We assumed that these variables have an impact on the exchange rate to fluctuate in African countries (figure 1).



Figure 1. Impact on the exchange rate to fluctuate in African countries

We selected 10 African countries with 15 years of data from 1996 to 2010. Data was collected from World Bank website. These countries include Cameroon, Cape Verde, Comoros, Burundi, Ethiopia, Algeria, Gambia, Kenya, Egypt and Angola. We systematically selected developing countries of Africa with the similar features. Due to their similarity in features, the data could easily be analyzed and the results could be obtained in a realistic way. Furthermore, each country was analyzed independently so that results of one country could not be intervened on other country's results.

Equation Model

According to Madura, J. (2006), change in exchange rate is caused by the change in GDP, Inflation, interest rates, income level, government control and future expectations of exchange rate etc. So this can be interpreted as follows;

$$\Delta ER = C + f(\Delta(\Delta D, \Delta I, \Delta R, \Delta i, \Delta GC, \Delta EXP)) + \varepsilon \tau \quad (1)$$

Where:

ΔER = change in exchange rate; ΔGDP = change in the differential of African countries' GDP;

ΔI = change in the differential of African countries' inflation.

ΔR = change in the differential of African countries' real interest rate.

Δi = change in the differential of African countries' income level

ΔGC = change in the differential of African countries' government control.

ΔEXP = future expectations of exchange rate; $\varepsilon \tau$ = Error term.

So, we selected only three components from the above equation because the data of these three items was easily accessible.

$$\Delta \varepsilon \tau = f(\Delta DP, \Delta I, \Delta R, \varepsilon \tau) \quad (2)$$

Eviews is used to analyze the data in which AR (1) autocorrelation is eliminated from regression model. AR(1) process is the equations is:

$$U_t = P U_{t-1} + \varepsilon \tau \quad (3)$$

So we put in eviws to eliminate the autocorrelation to observe the relationship of independent variables with the dependent variables.

Data Analysis and Interpretations

Egypt

During regression analysis of Egypt, results shows that p-value of the GDP is 0.0432 which is less than 5%. So, it has a significant relationship on the exchange rate fluctuation. Whereas, the p-value of the real interest rate is 0.2852 and inflation has 0.8714 which shows no relationship between these variables on exchange rate. The result shows that gross domestic product has relationship with the exchange rate, which is H1, and it is accepted in this case where real interest rate (H2) and inflation (H3) shows no relationship which means rejection of both hypotheses.

Dependent Variable: ER
Method: Least Squares
Date: 08/02/12 Time: 12:12
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 103 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	789.9193	165934.3	0.004760	0.9963
GDP	-0.001638	0.000697	-2.351932	0.0432
I	0.004231	0.025408	0.166507	0.8714
R	-0.033262	0.029276	-1.136139	0.2852
AR(1)	0.999576	0.091224	10.95743	0.0000
R-squared	0.929183	Mean dependent var	4.850733	
Adjusted R-squared	0.897708	S.D. dependent var	1.097933	
S.E. of regression	0.351153	Akaike info criterion	1.017262	
Sum squared resid	1.109774	Schwarz criterion	1.245496	
Log likelihood	-2.120831	Hannan-Quinn criter.	0.996134	
F-statistic	29.52189	Durbin-Watson stat	2.017179	
Prob(F-statistic)	0.000035			
Inverted AR Roots	1.00			

Kenya

During regression analysis of Kenya, result shows the p value of the GDP is 0.0005 which shows significant relationship with the exchange rate fluctuations. Whereas the p value of the real interest rate is 0.9385 and Inflation is 0.7120 shows non-relationship with the exchange rate. So, we accept hypothesis H1 while H2 and H3 are both rejected.

Dependent Variable: ER
Method: Least Squares
Date: 08/02/12 Time: 12:21
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 98 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4403.277	267726.5	0.016447	0.9872
GDP	-0.088515	0.016905	-5.235914	0.0005
I	0.041367	0.108578	0.380992	0.7120
R	0.008322	0.104921	0.079317	0.9385
AR(1)	0.999117	0.055445	18.01996	0.0000
R-squared	0.919927	Mean dependent var	72.76822	
Adjusted R-squared	0.884339	S.D. dependent var	6.807458	
S.E. of regression	2.315146	Akaike info criterion	4.789276	
Sum squared resid	48.23913	Schwarz criterion	5.017511	
Log likelihood	-28.52493	Hannan-Quinn criter.	4.768149	
F-statistic	25.84936	Durbin-Watson stat	1.164212	
Prob(F-statistic)	0.000060			
Inverted AR Roots	1.00			

Cameron

Analysis of Cameron shows that the p-value of the GDP is 0.0003 which reflect the significant relationship on the exchange rate which cause to fluctuation. Whereas the p-value of the real interest rate is 0.4623 and Inflation of 0.4941 shows statistically non-significant. The result shows that gross domestic product has impact on the exchange rate, which is H1 that is accepted. While real interest rate H2 and inflation H3 shows no relationship which are rejected.

Dependent Variable: ER
 Method: Least Squares
 Date: 08/02/12 Time: 12:30
 Sample (adjusted): 1997 2010
 Included observations: 14 after adjustments
 Convergence achieved after 8 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1027.379	113.5496	9.047843	0.0000
GDP	-0.449341	0.078622	-5.715201	0.0003
I	2.924104	4.102765	0.712715	0.4941
R	-3.307728	4.308389	-0.767741	0.4623
AR(1)	0.611463	0.162157	3.770800	0.0044
R-squared	0.930061	Mean dependent var	570.4073	
Adjusted R-squared	0.898977	S.D. dependent var	91.87988	
S.E. of regression	29.20315	Akaike info criterion	9.858883	
Sum squared resid	7675.413	Schwarz criterion	10.08712	
Log likelihood	-64.01218	Hannan-Quinn criter.	9.837756	
F-statistic	29.92103	Durbin-Watson stat	1.609788	
Prob(F-statistic)	0.000033			
Inverted AR Roots	.61			

Algeria

Statistical data shows that there was abnormal rise in the real interest rate from 2009 which we excluded from our analysis to show consistency of data. Regression analysis of Algeria shows that all the results are in-significant. It means that data shown regarding GDP, interest and inflation do not have any relationship on the volatility of exchange rate. So, hypothesis H1, H2 could be accepted but H3 is rejected in the case of Algeria.

Dependent Variable: ER
 Method: Least Squares
 Date: 08/02/12 Time: 14:27
 Sample (adjusted): 1997 2008
 Included observations: 12 after adjustments
 Convergence achieved after 20 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	109.7786	39.21524	2.799387	0.0265
GDP	-0.007829	0.003657	-2.140786	0.0696
I	-0.037159	0.326833	-0.113696	0.9127
R	-0.192575	0.097360	-1.977978	0.0884
AR(1)	0.867567	0.156050	5.559527	0.0009
R-squared	0.893550	Mean dependent var	70.36922	
Adjusted R-squared	0.832722	S.D. dependent var	7.185853	
S.E. of regression	2.938987	Akaike info criterion	5.288344	
Sum squared resid	60.46350	Schwarz criterion	5.490388	
Log likelihood	-26.73006	Hannan-Quinn criter.	5.213539	
F-statistic	14.68971	Durbin-Watson stat	1.320460	
Prob(F-statistic)	0.001624			
Inverted AR Roots	.87			

Ethiopia

Like Algeria, regression analysis of Ethiopia shows similar results. It means that data shown regarding GDP, interest and inflation do not have any impact on the volatility of exchange rate. Statistical data shows that real interest rate was continuously showed decreasing trend at a sharp decline while inflation showed a continuous increasing since 2003. Furthermore, we deducted inflation of year 2008 because it has a big value which could effect on our results. Deducting 2008 inflation cause improvement of results but still it was non-significant. So, hypothesis H1, H2, and H3 are rejected in the case of Ethiopia.

Dependent Variable: ER
 Method: Least Squares
 Date: 08/02/12 Time: 14:22
 Sample (adjusted): 1997 2010
 Included observations: 12 after adjustments
 Convergence achieved after 13 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.863859	2.381219	2.462545	0.0433
GDP	0.021967	0.011866	1.851357	0.1066
I	-0.071717	0.081024	-0.885134	0.4055
R	-0.047557	0.096964	-0.490459	0.6388
AR(1)	0.343698	0.318791	1.078128	0.3167
R-squared	0.794038	Mean dependent var	8.748822	
Adjusted R-squared	0.676345	S.D. dependent var	1.907223	
S.E. of regression	1.085031	Akaike info criterion	3.295432	
Sum squared resid	8.241051	Schwarz criterion	3.497476	
Log likelihood	-14.77259	Hannan-Quinn criter.	3.220628	
F-statistic	6.746711	Durbin-Watson stat	0.703107	
Prob(F-statistic)	0.014985			
Inverted AR Roots	.34			

Angola

Date of Angola shows a very inconsistent data. There were huge variations in the data. From 1996 to 2000, inflation was very high while GDP was very low. As a result, we excluded 1996 to 2000 to get sustainable results. Now, after the analysis, it is observed that all the results are insignificant. So, the entire hypotheses H1, H2, H3 are rejected in this case.

Dependent Variable: ER
 Method: Least Squares
 Date: 08/03/12 Time: 10:56
 Sample (adjusted): 2002 2010
 Included observations: 9 after adjustments
 Convergence achieved after 12 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	141.1879	63.11003	2.237170	0.0889
GDP	-0.010371	0.009805	-1.057755	0.3498
I	0.187030	0.255668	0.731534	0.5050
R	-0.097300	0.238922	-0.407248	0.7047
AR(1)	0.740254	0.117188	6.316819	0.0032
R-squared	0.812553	Mean dependent var	76.90872	
Adjusted R-squared	0.625107	S.D. dependent var	13.76035	
S.E. of regression	8.425258	Akaike info criterion	7.400526	
Sum squared resid	283.9399	Schwarz criterion	7.510095	
Log likelihood	-28.30237	Hannan-Quinn criter.	7.164076	
F-statistic	4.334855	Durbin-Watson stat	1.777826	
Prob(F-statistic)	0.092236			
Inverted AR Roots	.74			

Comoros

Regression of Comoros shows relatively consistent results as compared to other African countries. If we observe, there is a suave data with small volatility. Result shows strong relationship of GDP with the exchange rate whereas real interest rate has also significant relationship with the exchange rate while relationship of inflation with the exchange rate is non-significant. As a result, we accept H1 and H2 but reject H3 hypothesis.

Burundi

Analysis shows for Burundi that GDP has a significant relationship whereas relationship of inflation and real interest rates are non-significant. The reason is that data of GDP is consistent with exchange rate while inflation and real interest rates is asymmetric with high volatility. So, in the case of Burundi, we accept only H1 but H2 and H3 hypothesis are rejected.

Gambia

Like Comoros, regression analysis of Gambia shows relatively consistent results as compared to other African countries. We observe that there is a smooth data with low variations. Result shows that relationship of GDP and inflation is significant with the Exchange rate. Whereas real interest rate has non-significant relationship As a result, we accept H1 and H3 but reject H2 hypothesis.

Dependent Variable: ER
Method: Least Squares
Date: 08/03/12 Time: 11:10
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 29 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1852.571	3049.340	0.607532	0.5585
GDP	-0.860178	0.092661	-9.283037	0.0000
I	-0.249334	1.946055	-0.128123	0.9009
R	-3.531541	1.565988	-2.255151	0.0506
AR(1)	0.982434	0.055200	17.79764	0.0000
R-squared	0.975876	Mean dependent var		427.8049
Adjusted R-squared	0.965154	S.D. dependent var		68.90980
S.E. of regression	12.86345	Akaike info criterion		8.219111
Sum squared resid	1489.216	Schwarz criterion		8.447345
Log likelihood	-52.53377	Hannan-Quinn criter.		8.197983
F-statistic	91.01747	Durbin-Watson stat		2.074789
Prob(F-statistic)	0.000000			
Inverted AR Roots	.98			

Dependent Variable: ER
Method: Least Squares
Date: 08/03/12 Time: 13:26
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 115 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	55524.61	1902081.	0.029192	0.9773
GDP	-3.700219	1.319132	-2.805041	0.0205
I	0.247279	1.800698	0.137324	0.8938
R	-2.681460	2.578209	-1.040048	0.3255
AR(1)	0.998465	0.053790	18.56221	0.0000
R-squared	0.985702	Mean dependent var		919.1231
Adjusted R-squared	0.979347	S.D. dependent var		291.7862
S.E. of regression	41.93259	Akaike info criterion		10.58246
Sum squared resid	15825.08	Schwarz criterion		10.81069
Log likelihood	-69.07720	Hannan-Quinn criter.		10.56133
F-statistic	155.1155	Durbin-Watson stat		0.655779
Prob(F-statistic)	0.000000			
Inverted AR Roots	1.00			

Dependent Variable: ER
Method: Least Squares
Date: 08/03/12 Time: 13:35
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 10 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-16.16088	95.35344	-0.169484	0.8692
GDP	-0.047819	0.011834	-4.040952	0.0029
I	0.309697	0.121244	2.554321	0.0310
R	0.063394	0.067788	0.935185	0.3741
AR(1)	1.033766	0.063966	16.16110	0.0000
R-squared	0.967426	Mean dependent var		21.16660
Adjusted R-squared	0.952949	S.D. dependent var		7.538069
S.E. of regression	1.635101	Akaike info criterion		4.093739
Sum squared resid	24.06199	Schwarz criterion		4.321973
Log likelihood	-23.65617	Hannan-Quinn criter.		4.072611
F-statistic	66.82401	Durbin-Watson stat		1.570511
Prob(F-statistic)	0.000001			
Inverted AR Roots	1.03			

Cape Verde

Analysis of Cape Verde shows that there is a significant relationship of GDP with the exchange rate whereas the values of the real interest rate and Inflation show statistically non-significant relationship. The result shows that gross domestic product has impact on the exchange rate, which is H1 that is accepted. While real interest rate H2 and inflation H3 shows no impact which are rejected.

Dependent Variable: ER
Method: Least Squares
Date: 08/03/12 Time: 13:44
Sample (adjusted): 1997 2010
Included observations: 14 after adjustments
Convergence achieved after 113 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5864.982	317292.0	0.018484	0.9857
GDP	-0.045246	0.010274	-4.403746	0.0017
I	0.152419	0.438365	0.347698	0.7361
R	0.041711	0.389699	0.107033	0.9171
AR(1)	0.998803	0.066930	14.92304	0.0000
R-squared	0.911028	Mean dependent var		95.46305
Adjusted R-squared	0.871484	S.D. dependent var		15.43107
S.E. of regression	5.531900	Akaike info criterion		6.531393
Sum squared resid	275.4172	Schwarz criterion		6.759627
Log likelihood	-40.71975	Hannan-Quinn criter.		6.510265
F-statistic	23.03872	Durbin-Watson stat		0.661205
Prob(F-statistic)	0.000095			
Inverted AR Roots	1.00			

A summary and cumulative result could be seen at the end of paper in appendix 1.

Conclusions

Importance of exchange rate increases as financial liberalization increases. This study is carried out to find the relationship between GDP, inflation, and interest rate on exchange rate. In order to examine the relationship, three hypotheses were used to analyze. It is found that GDP is only variable which shows a significant relationship with exchange rate while other two variables i.e. inflation and real interest has shown non-significant relationship. Furthermore, interest rate of Comoros and inflation of Gambia has the only countries which have significant effect on exchange rate. Lastly, the data of Ethiopia and Angola is not statistically sustainable for analysis because there were huge variations in the data of both countries.

Recommendations

The future work can be done by spilling the data quarterly, increased number of years with adding other factors which cause exchange rate volatility.

References

- Bodnár, K. (2007). "Survey Evidence on the Exchange Rate Exposure of Hungarian SMEs". Emerging Markets: Lessons for Southeastern Europe. Magyar Nemzeti Bank.
- Broda, C. (2002). Terms of trade and exchange rate regimes in developing countries (Staff Reports No. 148). Federal Reserve Bank of New York.
- Cavaglia, S. M. F. G., & Wolff, C. C. P. (1996). A note on the determinants of unexpected exchange rate movements. *Journal of Banking & Finance* 20, 179–188.
- Dornbusch, R. (1976). Expectations and Exchange Rate Dynamics. *Journal of Political Economy* 84, pp. 1161–1176.
- Hall, E. R. (2006). Comparative Advantage and the Gains from Trade. 2nd Ed Hall .E.R., *The Microeconomics of Online Retailing*. 2nd Ed.
- Hoffmann, M. (2007). Fixed versus Flexible Exchange Rates: Evidence from Developing Countries. *Economica* 74, pp. 425–449.
- Honohan, P., & Lane, P. R. (2003). Divergent inflation rates in EMU. *Economic Policy* 18, pp. 357–394.

- Hsing, Y. (2007). Exchange rate fluctuations in Croatia: test of uncovered interest rate parity and the open economy model. *Applied Economics Letters* 14, pp. 785–788.
- Inci, A. C., & Lu, B. (2004). Exchange rates and interest rates: can term structure models explain currency movements? *Journal of Economic Dynamics and Control* 28, pp. 1595–1624.
- Kanas, A. (2005). Real or monetary? The US/UK real exchange rate, 1921-2002. *Journal of International Financial Markets, Institutions and Money* 15, pp. 21–38.
- Kim, S., & Roubini, N. (2000). Exchange rate anomalies in the industrial countries: A solution with a structural VAR approach. *Journal of Monetary Economics* 45, pp. 561–586.
- Madura, J. (2006). Exchange rate Determination; *International Financial Management*. 10th ed. South-Western.
- McPherson, M. F., & Rakovski, T. (1998). Exchange Rates and Economic Growth in Kenya: An Econometric Analysis (Paper No. 651). Harvard - Institute for International Development.
- Meese, R. (1990). Currency Fluctuations in the Post-Bretton Woods Era. *The Journal of Economic Perspectives* 4, pp. 117–134.
- Mussa, M. (1984). The theory of exchange rate determination, in: J.F.O. Bilson and R.C. Manston, eds., *Exchange rate theory and practice* (University of Chicago Press, Chicago).
- Obstfeld, M., Rogoff, K. (2000). New directions for stochastic open economy models. *Journal of International Economics* 50, pp. 117–153.
- Péridy, N. (2003). Exchange rate volatility, sectoral trade, and the aggregation bias. *Review of World Economics*. 139, pp. 389–418.
- Ray, H. (2008), *Dynamic Interactions of Exchange Rates, Stock Prices and Macroeconomic Variables in India*, The Icfai University Press, India.
- Rebitzky, R. R. (2010). The Influence of Fundamentals on Exchange rates: Findings from Analysis of News Effects. *Journal of Economic Surveys* 24, pp. 680–704.
- Ricardo, D. (1817). *Principles of Political Economy and Taxation*.
- Vernon, R. (1966). *International Investment and International Trade in the Product Cycle*. Quarterly Journal of Economics. Cambridge. p. 191.
- Rugman, M. A., Collinson, S., & Hodgetts, R. M. (2006). Determination of the exchange rate *International Businesses*. 6th ed. Prentice Hall.

Appendix 1

Countries	Effect on exchange rate		
	GDP	Interest rate	Inflation
Egypt	significant	Non-significant	Non-significant
Kenya	significant	Non-significant	Non-significant
Cameron	significant	Non-significant	Non-significant
Algeria	Less significant	Non-significant	Less significant
Ethiopia	Non-significant	Non-significant	Non-significant
Angola	Non-significant	Non-significant	Non-significant
Comoros	significant	significant	Non-significant
Burundi	significant	Non-significant	Non-significant
Gambia	significant	Non-significant	significant
Cape Verde	significant	Non-significant	Non-significant