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THE IMPACT OF EXTERNAL DEBT ON EXCHANGE RATE VARIATION IN ROMANIA

ABSTRACT. Through this paper we aim to identify the existence or non-existence of a link between Romania's external debt components on medium and long term and the evolution of RON/EUR exchange rate. If a correlation will be identified, the paper aims to guantify numerical that correlation for selecting several determinants of the exchange rate. The paper check if external debt components may allow econometric modeling of exchange rate RON/EUR by using regression.

JEL Classification: H63, F31 ***Keywords***: exchange rate, direct external debt, private external debt.

Introduction

In recent years a significant number of researches have focused on the relationship between exchange rates and different causal factors. The studies have used different data sets and empirical strategies. The exchange rate is one of the most important macroeconomic variables in the emerging and transition countries. It affects inflation, exports, imports and economic activity. Exchange rates have long been thought to have an important impact on the export and import of goods and services, and, thus, exchange rates are expected to influence the price of those products that are traded.

There is a vast literature on the factors that determine the evolution of exchange rates. Recent research has found a positive relationship between exchange rates and economic growth. Different rationales for this association have been offered, but they all imply that the mechanisms involved should be more prevalent in developing countries. It was shown that the currency undervaluation tends to decrease with the level of GDP per capita. The effect of undervaluation is larger and more robust for developing countries than for developed ones (Rapetti, Skott, Razmi, 2011). Exchange rate movements are difficult to predict but there appear to be discernible patterns in how currencies jointly appreciate or depreciate against other currency. Scotti C. and Benediktsdóttir S. (2009) analyzed the changes in dependence measures over time, and investigated whether these measures are affected by the business cycle or interest rate differentials. The results show that dependencies are indeed time-varying.

A multi-scale relationship was examined between the interest rate, exchange rate and stock price using a wavelet transform. The maximum overlap discrete wavelet transform was applied to the interest rate, exchange rate and stock price in US over the period 1990-2008. Results show that the relationship between interest rate and exchange rate is not significantly different from zero. In general it seems that the interest rate and exchange rate series are generally quite independent (Hamrita, Trif, 2011). Most studies that try to explain the

fluctuations of stock prices and exchange rates are interested in finding a high-frequency, statistical relationship between the two variables. It was asserted the link between stock prices and exchange rates as positive when stock prices are the lead variable and likely negative when exchange rates are the lead variable. A depreciation of the currency may depress the stock market. The stock market will react with a less than one percent decline to a one percent depreciation of the exchange rate (Dimitrova, 2005). This also implies that an appreciating exchange rate boosts the stock market. Literature present the correlation between the price of foreign currency and nominal interest rates as negative. This is is not necessarily an indication of movements in the real rate of interest. Such a correlation could be consistent with a monetarist model in which the real rate is constant. Examination of the money demand equation seems to suggest that as interest rates go up, prices, and hence exchange rates, should rise (Engel, 1986).

The role of exchange rate changes in eliminating international trade imbalances suggests that we should expect countries with current trade surpluses to have an appreciating currency, whereas countries with trade deficits should have depreciating currencies. Such exchange rate changes would lead to changes in international relative prices that would work to eliminate the trade imbalance. Regarding the effects of exchange rate volatility on trade, the considerable array of theoretical and empirical literature remains ambiguous. Taglioni (2002) argued that it is customarily presumed that the adverse effect of exchange rate volatility (on trade flows), if it exists, is certainly not large. Ozturk (2006) shared this conclusion too. It is revealed that a rather wide range of empirical evidence, some in favour and some against the hypothesis of a negative relationship between exchange rate volatility and trade. On the issue of the level of exchange rates, theoretical and empirical studies over the years show that the relationship between the level of a currency and trade is so multi-faceted and complex that it is hard to take a firm line in any particular direction (Auboin, Ruta, 2011).

There are several working papers that deal with the relationship between inflation and exchange rates. Eduard S. (2006) found that: (1) countries that have adopted an inflation targeting regime have experienced a decline in the pas-through from exchange rate changes to inflation; (2) the adoption of inflation targeting monetary policy procedures have not resulted in an increase in (nominal or real) exchange rate volatility and (3), there is some evidence that inflation targeting countries with a history of high an unstable inflation tend to take into account explicitly developments in the nominal exchange rate when conducting monetary policy. Siok K.S., Cheau P. O., Mohd. T.I. (2012) conducted an empirical investigation on the relationship between exchange rate and inflation targeting regime in the three developed and three emerging Asian economies that have adopted inflation targeting regime. The results present a significant correlation between exchange rate movements and inflation and output movements. Inflation targeting has significant impacts on the movements of inflation, output and exchange rate. Inflation targeting leads to higher volatility in exchange rate movement in majority economies.

The link between government spending and the real exchange rate has been the subject of a growing but inconclusive literature in international macroeconomics. Chatterjee S., Mursagulov A. (2012) examined the mechanism through which public infrastructure spending affects the dynamics of the real exchange rate. Using a two-sector dependent open economy model with intersectoral adjustment costs, they has shown that government spending generates a non-monotonic U-shaped adjustment path for the real exchange rate with sharp intertemporal tradeoffs. The effect of government spending on the real exchange rate depends critically on (i) the composition of public spending, (ii) the underlying financing policy, (iii) the intensity of private capital in production, and (iv) the relative productivity of public infrastructure (Chatterjee, Mursagulov, 2012).

The influence of the following key GDP, inflation rate, money supply, interest rate and balance of payments on exchange rate of the Romanian leu was examined against the most important currencies (EUR, USD) during 2000-2010 period. The main findings were that there is an inverse relationship between exchange rate EUR/RON, Gross Domestic Product, respectively money supply and a direct. The correlation between exchange rate and balance of payment was not validated because the test statistic was not significant (Nucu, 2011).

The objectives of our research are to identify the existence of a determination relationship between a component of Romania's external debt and exchange rate variation, to determine the intensity of this connection, to select variables showing the most intense connection, to parameterize a linear regression model valid for exchange rate forecasting (Bratu, 2012). Research methodology aimed the analyze of the correlation between variables (existence, purpose, intensity), to determine the model and linear regression estimators and to test the validity of the model. Multifactorial model is frequently used in modeling of economic phenomena, it implies in our research that the exchange rate is a result of external debt of Romania. Using this model is based on the assumption that among the factors determining the exchange rate variation are determining factor among the components of external debt.

1. Romania external debt in figures

At the end of 2013, Romania registered an external debt of € 76,951.3 million, it decresed by 2.3% from previous year, but more than 3 times higher than in 2005 (National Bank of Romania, 2014). It can be seen that the government and the population of Romania was heavily in debt since 2008 so that in 2012 the external debt reached the highest level of € 78,759.6 million. These developments are due in part to the upward evolution of public debt since 2009. At the end of 2013, direct external debt represented 43% of Romania's total external debt, up with 2 percent from previuos year. During analyzed period, external direct public debt rose sharply starting in 2009, by 95%, from € 17,669.7 million in 2009 to € 33,061.3 million in 2013.

Table 1. External debt of Romania 2005–2013 (current prices)*

Year	External debt on medium and long term – Direct public debt and IMF loans		External debt on medium and long term – Publicly guaranteed debt		External debt on medium and long term – Private debt (publicly non-guaranteed)		External debt on medium and long term – Deposits of non-residents		Total	Exchange rate
	Mil. €	%	Mil. €	%	Mil. €	%	Mil. €	%		
2013	33.061,3	43,0	1.218,2	1,6	36.219,1	47,1	6.452,7	8,4	76.951,3	4,4633
2012	32.409,5	41,1	1.423,6	1,8	37.181,5	47,2	7.745,0	9,8	78.759,6	4,4895
2011	29.846,3	39,3	1.465,8	1,9	36.126,8	47,4	8.489,9	10,6	75.928,8	4,3267
2010	25.240,3	34,6	1.708,2	2,3	37.733,2	51,8	8.227,7	11,3	72.909,4	4,2925
2009	17.669,7	26,9	1.517,2	2,3	39.186,7	59,7	7.242,5	11,0	65.616,1	4,2248
2008	9.028,2	17,4	1.721,0	3,3	35.545,2	68,7	5.467,3	10,6	51.761,7	3,9153
2007	8.180,7	21,1	2.019,5	5,2	25.292,3	65,3	3.218,7	8,3	38.711,2	3,5289
2006	6.930,6	24,2	3.755,6	13,1	16.970,3	59,3	965,7	3,4	28.622,2	3,4141
2005	6.894,9	28,0	4.366,5	17,7	12.431,0	50,4	949,1	3,9	24.641,5	3,6589

Source: National Bank of Romania (*NBR does not provide data expressed in constant prices for external debt).

Regarding the evolution of publicly guanranteed debt it is noticed a steady decrease in the value and its share in total external debt from 3.3% in 2008 to 1.6% in 2013 indicating a preventive policy of the state. Private debt accounts for 47.1% of the total external debt in 2013 amounting to € 36,219.1 million decreasing by 2.6% from previous year. Remarkable is its decrease as share in total debt from 68.7% in 2008 to 47.1% in 2013, while its value increased from € 35,545.2 million in 2008 to € 36,219 million in 2013. Deposits of non-residents had a negative trend from both perspectives, both as value and percentage. Thus, their value fell by 24%, from € million 8,489.9 in 2011 to € 6452.7 million in 2013 from 10.6% in total external debt in 2011 to 8.4% in 2013.

Figure 1. The evolution of external debt and exchange rate in Romania (01.2005–08.2013)
Source: Processing of author on data series provided by National Bank of Romania.

Regarding the evolution of the exchange rate in the same period, it is noted an annual depreciation of the leu against the euro, from 3.6589 RON / EUR in 2005 to 4.4633 RON / EUR in 2013. This impairment is influenced by increasing external indebtedness?

2. Research methods and results

Variables statistical analyzed are:
a) Exogenous variables (x) include components of external debt of Romania on medium and long term, namely: direct public debt and loans from the IMF, publicly guaranteed debt, private debt (publicly non-guaranteed), debt from medium and long-term deposits of non-residents. We used monthly data series provided by National Bank of Romania, the values are expressed in million euros.

Gross external debt, at any given time, is the outstanding amount of those actual current, and not contingent, liabilities that require payment(s) of principal and/or interest by the debtor at some point(s) in the future and that are owed to nonresidents by residents of an economy (IMF, 2003). The public sector includes the general government, monetary authorities, and those entities in the banking and other sectors that are public corporations (IMF, 2003). Publicly guaranteed private sector external debt is defined as the external debt liabilities of the private sector, the servicing of which is contractually guaranteed by a public entity resident in the same economy as the debtor. The private sector can include resident

entities in the banks and other sectors. External debt of the private sector that is not contractually guaranteed by the public sector resident in the same economy is classified as nonguaranteed private sector external debt.
b) Dependent variable (y) is represented by the spot exchange rate leu / euro. We used data series provided by National Bank of Romania comprising average monthly values of the RON / EUR.
c) The random variable summarizes all other factors except the external debt, which influences the evolution of the exchange rate, but they are not specified in the econometric model.

The data series used in the current analysis are time series covering January 2005 – August 2013 period, we got 104 observations for each variable. Softwares that where used for data processing and statistical analysis are SPSS 18.0 and Eviews 4.1. The 5 series were tested for normal distribution, it also was checked the stationarity, cyclical and seasonal series and autocorrelation in time. After processing the data series to acquire content we moved to quantify the correlation coefficients of series.

Graphical analysis shows no apparent seasonality and cyclicality for any of the five variables, but it can be observed a linear trend which leads to the construction of a linear regression. In the first stage of our analysis we proceeded to test the hypothesis of normal distribution of data series by graphics method as histogram, P-P plots and Q-Q plots. It was found the predominance of asymmetric time series.

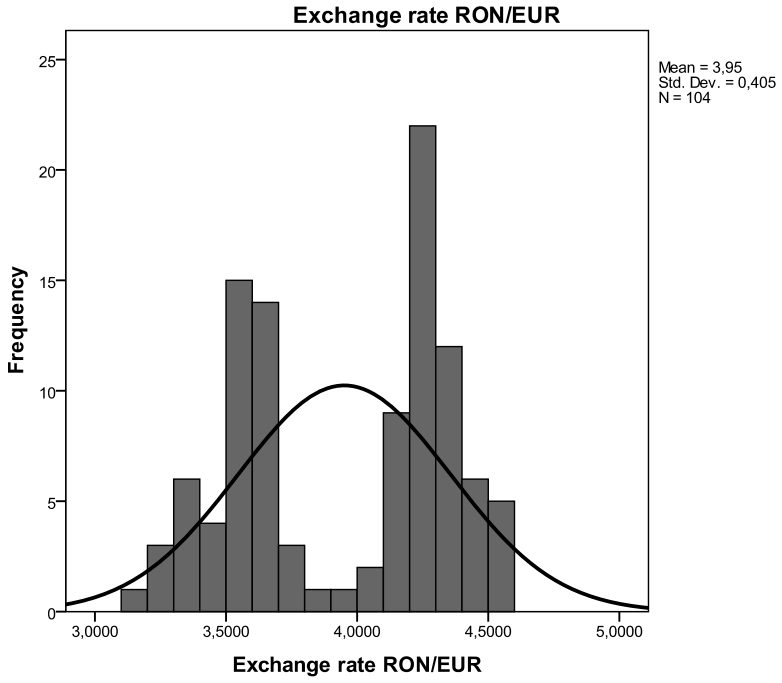

Figure 2. Exchange rate histogram – unprocessed data series
Sourse: Processing of author using SPSS.

To ensure the findings, we continued the tests by determining coefficients of skewness and kurtosis. The five analyzed variables are divided into two categories: variables external public direct debt and publicly guaranteed debt present a right asymmetry and variables external private debt and non-resident deposits have a left asymmetry. It should be noted that there is a slightly asymmetrical series for the dependent variable, the coefficient of symmetry has a value closed to zero (-0.224). Analysis of kurtosis leads to ratios smaller than 3 for all

analyzed variables indicating the existence of platykurtic series. The variables height is smaller than the height of normal distributed series.

Table 2. Results of testing normal distribution hypotesis

Variable	External debt on medium and long term – Direct public debt and IMF loans	External debt on medium and long term – Publicly guaranteed debt	External debt on medium and long term – Private debt (publicly non-guaranteed)	External debt on medium and long term – Deposits of non-residents	Exchange rate RON/ EUR
Skewness (S)	0.397	0.646	-0.654	-0.401	-0.220
Kurtosis (K)	1.4700	1.646	1.746	1.487	1.543
Jarques-Bera	12.876 (p=0.0016)	15.181 (p=0.0005)	14.237 (p=0.0008)	12.704 (p=0.0017)	10.034 (p=0.0066)

Source: Author calculation in SPSS.

Jarques-Bera test takes into account a combination of asymmetry and kurtosis (JB = (N / 6) * (S ^ 2 + (1/4 * (K -3) ^ 2) and test the null hypothesis that the data have a normal distribution. If the probability associated with the test is higher than p = 0.01, the null hypothesis is accepted. By comparing the JB value with χ^2 value from spreadsheet we can see that all variables have a JB value greater than $\chi^2_{(0.01,2)} = 9.21$ which leads to reject the null hypothesis and to accept the alternative hypothesis (H_1: the series does not have a normal distribution). For all variables were recorded JB probabilities lower than the level of security 0.10, which reinforces the acceptance of alternative hypothesis, ie. data sets do not have a normal distribution.

Testing the hypothesis of normality ended with the same results by Skewness – Kurosis Test. Graphically through five P-P plots and Q-Q plots for raw series and for series processed by diferences of 1st order we get the same results too.

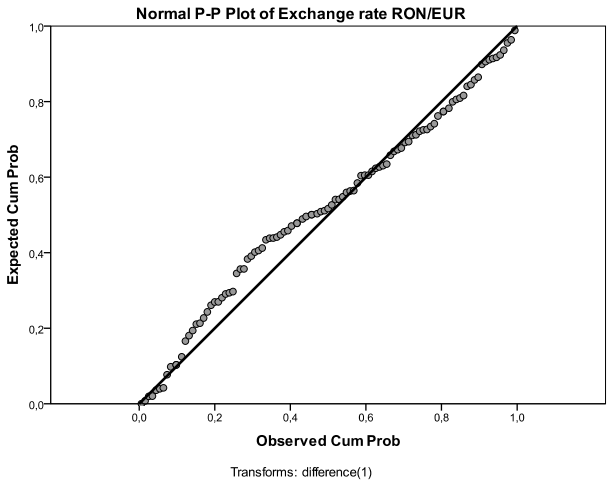

Figure 3. P-P plot Exchange Rate
Source: Author processing in SPSS.

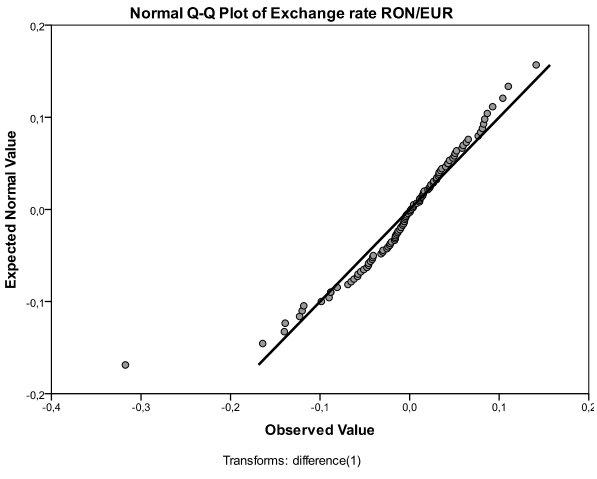

Figure 4. Q-Q plot Exchange Rate
Source: Author processing in SPSS.

For analysing the autocorrelation of the data series have been applied the autocorrelation function (ACF) and partial auto-correlation function (PACF) and Box-Ljung test in SPSS. Autocorrelation function null hypothesis is H_0: no autocorrelation data series.

By its application, the autocorrelation coefficients have failed the safety test and recorded values of p > 0.01, which leads to rejection of the null hypothesis and confirmation of autocorrelation. The results of PACF function reconfirmed the same results, variables in raw series are autocorrelated in time. Graphical representation of partial autocorrelation coefficients indicated processing the date by differences of 1st order.

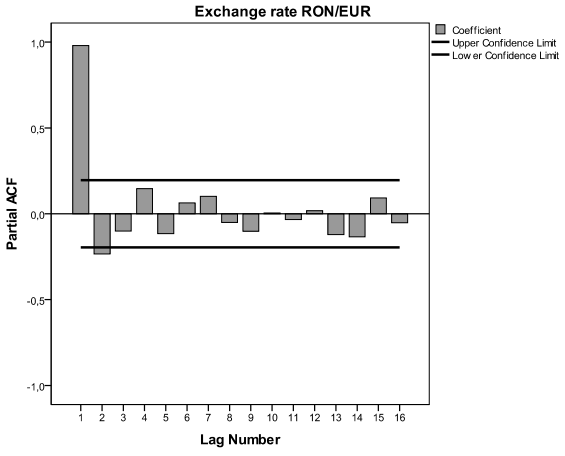

Figure 5. PACF – raw data series
Source: Author processing in SPSS.

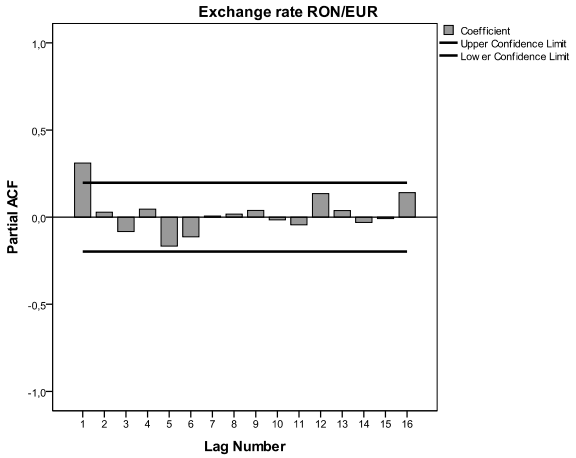

Figure 6. PACF – differences of 1st order
Source: Author processing in SPSS.

Ljung-Box test starts at H_0: the data series are independent, ie autocorrelation coefficients are 0. For a probability p = 0.01, the critical value for rejecting the null hypothesis is Q> $\chi 2$ (0.99,16) = 5.81. For all five analyzed variables, raw series obtained a Q value higher than 5.81 which means accepting the alternative hypothesis that the data is not randomly distributed, but autocorrelated. After resumption of ACF and Ljung-Box test for series with differences of 1st order (16 lags) autocorrelation problem was partially removed, it was kept for last lags. The test procedure was checked for differences of 2nd order series and autocorrelation problem persisted.

Testing the hypothesis of stationarity of data series (Unit Root Test) was done in EViews using Augumented Dickey – Fuller test (ADF) by checking the shape of the regression with constant. The null hypothesis in the Augumented Dickey – Fuller test comes from the fact that the series has a unit root problem and they are non-stationary (H_1: series has a unit root and it is stationary). For t* > ADF $_{critic,\alpha}$ the null hypothesis is accepted (the series are non-stationary), for t * < ADF $_{critic,\alpha}$ the null hypothesis is rejected (the series are stationary). For p = 0.010 ADF $_{critic,\alpha}$ was -3.49. Applying the ADF test on unadjusted series of the five variables resulted has result to the following values: ADF for direct public debt = 0.539, ADF for publicly guaranteed debt = -1.040, ADF for private debt = -2.101 ADF for debt from deposits made by non-residences = -1.661, ADF for exchange rate = -0.915. ADF values exceed the critical values for acceptance and confirmation of the null hypothesis for non-stationary series for regression with a constant. We continued the test on series of differences of 1st order and we have obtained the following values: ADF for direct public debt = -10.490, ADF for publicly guaranteed debt = -6.019, ADF for private debt = -1.511, ADF for debt from deposits made by non-residences = -5.055, ADF for exchange rate = -7.468. Except private debt variable, all the other variables recorded lower levels than ADF critical. This confirms the existence of stationary series obtained by differences of 1st order. For the variable private debt we made differences of 2nd order. In conclusion, for eliminating autocorrelation we transformed the series by differences of 1st and 2nd order.

Exchange rate correlation analysis in Romania with external debt components revealed the existence of a strong link between variables. In this regard were determined Pearson coefficients. We have obtained high values of correlation coefficients for all four components of external debt, but have highlighted the following issues: public external debt has the greatest direct impact on varation of exchange rate, the positive correlation between the two indicators indicate that an increase in direct indebtedness of the government and local authorities on foreign financial markets is followed by a depreciation of the domestic currency against the euro.

Table 3. Correlation coeficients of external debt and exhange rate in Romania (raw data series)

Correlation coeficients	External debt on medium and long term – Direct public debt and IMF loans	External debt on medium and long term – Publicly guaranteed debt	External debt on medium and long term – Private debt (publicly non-guaranteed)	External debt on medium and long term - Deposits of non-residents
Pearson	0.877	-0.841	0.836	0.858

Source: Author processing in SPSS.

As it can be seen in the table, publicly guaranteed external debt shows a correlation coefficient above 0.5, indicating a significant impact of this variable in the evolution of the exchange rate. It stands in contrast the negative sign of correlation coefficient for this variable which means that increasing state guarantees for granted foreign loans lead to currency appreciation against the euro. External debt of citizens and companies registered positive correlation coefficients, but slightly lower compared to the other components of external debt in relation to the exchange rate. Positive sign of the correlation coefficients for the variables private debt and debt resulting from deposits made by non-residents indicate an appreciation of the national currency against the euro amid diminishing population indebtedness to foreign creditors. A decreased level of external debt lead to a lower demand for currency needed to cover maturities and interest rates followed by lower prices of foreign currency, that mean an appreciation of national currency.

In order to achieve long-term relationship between the analyzed variables, they must be cointegrated. Actually it was decided to apply a cointegration test to determine whether there is or not a cointegration equation for a group of non-stationary series. To identify the number of cointegrating relations it were used differences of 2nd order for all variables and two tests in EViews, such as LH (likelihood ratio), namely the Trace test and Maximum Eigenvalue test. It starts from the null hypothesis H_0: there is at most 'r' cointegrating relations and for $t_{calculated} > t_{critic}$ null hypothesis is rejected. Testing is repeated sequentially for r = 0, 1, 2 ... n, until the last r for which the null hypothesis is accepted. By applying the Trace test for the exchange rate abd and the components of external debt, null hypothesis was rejected because we obtained a t-Trace = 61.34 higher than t_{critic} = 54.46, the value of p = 0.01, which indicates the existence of two cointegrating relations. At a 5% probability, Trace test indicated the existence of three cointegrating relationships. Application of Maximum Eigenvalue test (p = 0.01, $E_{calculated}$ = 38.92 > E_{critic} = 38.77) led to the rejection of the null hypothesis and confirmation of cointegration equations at p = 0.01.

Sample(adjusted): 2005:06 2013:08				
Included observations: 99 after adjusting endpoints				
Trend assumption: Linear deterministic trend				
Series: CS DELDPD DELDPG DELDP DELDN				
Lags interval (in first differences): 1 to 4				
Unrestricted Cointegration Rank Test				
Hypothesized		Trace	5 Percent	1 Percent
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None **	0.325066	100.2674	68.52	76.07
At most 1 **	0.236293	61.34658	47.21	54.46
At most 2 *	0.222830	34.65900	29.68	35.65
At most 3	0.091338	9.701442	15.41	20.04
At most 4	0.002210	0.218994	3.76	6.65
*(**) denotes rejection of the hypothesis at the 5%(1%) level				
Trace test indicates 3 cointegrating equation(s) at the 5% level				
Trace test indicates 2 cointegrating equation(s) at the 1% level				

Granger causality test was performed in Eviews for the 4 cases of combinations of two variables (ie eight possibilities Granger causality test: CS ↔ DPD, CS ↔ DPG, CS ↔ DP, CS ↔ DN). Since the null hypothesis assumes that there is no Granger causality between the exchange rate and the four independent variables and vice versa, the null hypothesis is accepted in all cases indicating the absence of series with bidirectional Granger causality type the two lag-sites.

Pairwise Granger Causality Tests			
Date: 10/29/13 Time: 15:19			
Sample: 2005:01 2013:08			
Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Probability
DELDPD does not Granger Cause CS	102	1.98306	0.14319
CS does not Granger Cause DELDPD		10.5397	7.2E-05
DELDPG does not Granger Cause CS	102	4.30937	0.01611
CS does not Granger Cause DELDPG		0.72412	0.48735
DELDP does not Granger Cause CS	102	5.21703	0.00705
CS does not Granger Cause DELDP		6.71269	0.00186
DELDN does not Granger Cause CS	102	5.78400	0.00424
CS does not Granger Cause DELDN		0.79578	0.45415

Before building the linear regression we rechecked the correlation between variables on data series processed by differences of 1st order. The new values of Pearson, Kendall and Spearman correlation coefficients tend to value 0 indicating an absence of a correlation between the components of external debt and exchange rate changes.

Table 4. Correlation coeficients of external debt and exhange rate in Romania (differences of 1st order data series)

Correlation coeficients	External debt on medium and long term – Direct public debt and IMF loans	External debt on medium and long term – Publicly guaranteed debt	External debt on medium and long term – Private debt (publicly non-guaranteed)	External debt on medium and long term – Deposits of non-residents
Kendall	-0.001	-0.053	0.104	-0.160
Spearman	0.007	-0.080	0.139	-0.237
Pearson	-0.083	-0.057	0.074	-0.259

Source: Author processing in SPSS.

This result is not surprising given the non-stationary nature of unadjusted data and their autocorrelation in time. However, it was constructed by the enter method into SPSS, a multi factorial linear regression model that includes the four variable sets obtained by differences of 1st order to reinforce the lack of statistical significance of the result obtained previously. Regression has the following general form: $CS_t = \beta_0 + \beta_1 * DPD_t + \beta_2 * DPG_t + \beta_3 * DP_t + \beta_4 * DN_t + u_t$ (t = 1,2, .. n the number of observations in the sample, β0 constant u_t the error term of the equation). Before testing the model assumptions we stopped out regression coefficients by t-Student test and Fisher-Snedecor test. Multicollinearity between variables was tested in SPSS by using Collinearity Statistics (VIF). For raw variables the VIFs values exceed 10 and that means a high multicollinearity between them, but multicollinearity does not exist for differences of 1st order when VIFs values are 1.0 - 1.3 (below critical value 3).

Coefficients[a] $t_{calculat} < t_{critic,100} = 2,364$

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-,009	,007		-1,252	,214
	DIFF(DEL_DPDFMI,1)	-4,258E-6	,000	-,050	-,490	,625
	DIFF(DEL_DPG,1)	-3,335E-6	,000	-,013	-,110	,913
	DIFF(DEL_DN,1)	6,744E-6	,000	,087	,775	,440
	DIFF(DEL_DDN,1)	-6,065E-5	,000	-,258	-2,594	,011

a. Dependent Variable: DIFF(EURM,1)

According to t-Student test the model is not valid. The results obtained for each variable indicate a $t_{calculated} < t_{critic,100} = 2.364$ and $p > 0.01$ which means accepting the null hypothesis according to which the regression coefficients are statistically insignificant, statistically they can be considered with zero value.

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.
1. Regression	,034	4	,008	2,074	,090[a]
Residual	,396	98	,004		
Total	,429	102			

a. Predictors: (Constant), DIFF (DEL_DDN,1), DIFF (DEL_DPG,1), DIFF (DEL_DPDFMI,1), DIFF (DEL_DN,1).
b. Dependent Variable: DIFF (EURM,1).

Model Summary[b]

Model	R	R Square	Adjuster R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	,279[a]	,078	,040	,0635541	,078	2,074	4	98	,090	1,462

a. Predictors: (Constant), DIFF (DEL_DDN,1), DIFF (DEL_DPG,1), DIFF (DEL_DPDFMI,1), DIFF (DEL_DN,1).
b. Dependent Variable: DIFF (EURM,1).

Fisher-Snedecor F-test shows how well the independent variables explain the evolution of exchange rate. This determines whether all coefficients have the zero statistically value in the same time. The null hypothesis considers all of the coefficients of the regression with value zero, that means the absence of a regression relationship, while the alternative hypothesis consider that at least a statistical coefficient is not zero, it is significant and there is regression relationship. The value obtained for F was 2.074 ($p = 0.090 > 0.01$) lower than F_{critic} value (0.01,4,98) = 3.65 (four independent variables, 103 - (4 +1) degrees of freedom), which leads to acceptance of the null hypothesis, alternative hypothesis is therefore rejected, so there is no nonzero coefficient and it is disproved the existence of a linear regression.

Conclusion

The created econometric model is incorrectly specified and cannot be considered because it has not statistical significance. Therefore evolution RON / EUR exchange rate cannot be predicted considering the evolution of public and private external debt. A common view in the literature is that exchange rate movements are difficult to predict. Although researchers have shown theories for explaining systematic patterns of exchange rate behavior, the usefulness of these theories for predicting future exchange rates is limited by the proclivity for the unexpected to happen. The real world is characterized by unpredictable activities. Research will continue through the identification and testing of other factors that influence the exchange rate, such as the money supply or other indicators of public finance.

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