Changes in the Monthly Effects from the Romanian Foreign Exchange Market

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Abstract: This paper investigates the systematic patterns displayed by the Romanian Foreign Exchange Market in some months of the year. In our analysis we employ monthly values of the Romanian national currency rates against the United States dollar and the euro. We find that since the Foreign Exchange Market settlement in Romania until present significant changes occurred in the monthly effects. We associate these changes to the new tend in the Romanian foreign trade and to the new monetary strategy of the central bank.

Keywords: Seasonality, Romanian Foreign Exchange Market, Foreign Trade, Monetary Policy

JEL Classification: G02, G14, G19

1. Introduction

The financial markets seasonality is among the subjects largely approached in the specialized literature. Especially for the stock markets there were studied different forms of seasonality: quarterly, monthly, weekly, daily a.s.o. (for example Wachtel 1942, Officer 1975, Rozeff and Kiney 1976, Gultken and Gultken 1983, Agrawal and Tandor 1994, Schwert 2001). From the financial decisions perspective it is important not only the seasonality of price levels but also the seasonality of prices volatility (Tang 1998).

In many aspects the exchange rates behavior is similar to the prices of other financial assets, their evolutions reflecting the market expectations (Frenkel 1981). However, there are some circumstances that differentiate the exchange rates seasonality. Along with expectations other factors, such as the central bank interventions or the external transactions could influence decisively the prices of the foreign currency.

The Romanian foreign exchange market evolution in the last two decades could be split in two stages:

- a transition stage, between 1991 and 1998;
- a consolidation stage, between 1999 and 2009.

During the first stage, in the context of transition to the market economy, the Romanian foreign exchange market experienced some substantial transformation. After the communist regime collapse in December 1989 the Romanian authorities implemented transition reforms, which included the foreign exchange market liberalization. However, this process was quite slow and many restrictions, especially the ones for the foreign capitals, lasted for a long time.

In most of the 1990s in Romania there was a serious macroeconomic instability with a severe decline of the industrial production, significant deficits of the trade balance and a high inflation. Financing the trade balance deficits was very difficult in the absence of the foreign investment and since borrowing in foreign currencies was not easy. In these circumstances, after the significant decrease of the foreign reserve, the national currency (ROL) devaluation was unavoidable (Figure 1). However, in order not to aggravate the monetary instability, the National Bank of Romania (NBR) tried to obtain d a slow and controlled depreciation. In these years the trust in the national currency was quite low, so in many transactions the dollar and other foreign currencies were pre-

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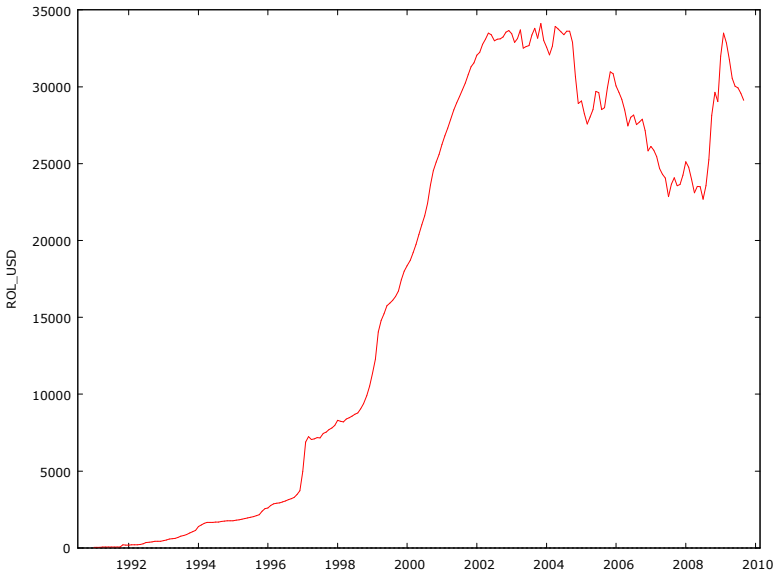
ferred. Such currencies were bought on the black market at higher prices than the official exchange rates.

Figure 1. Evolution of ROL/USD exchange rate from January 1991 to September 2009



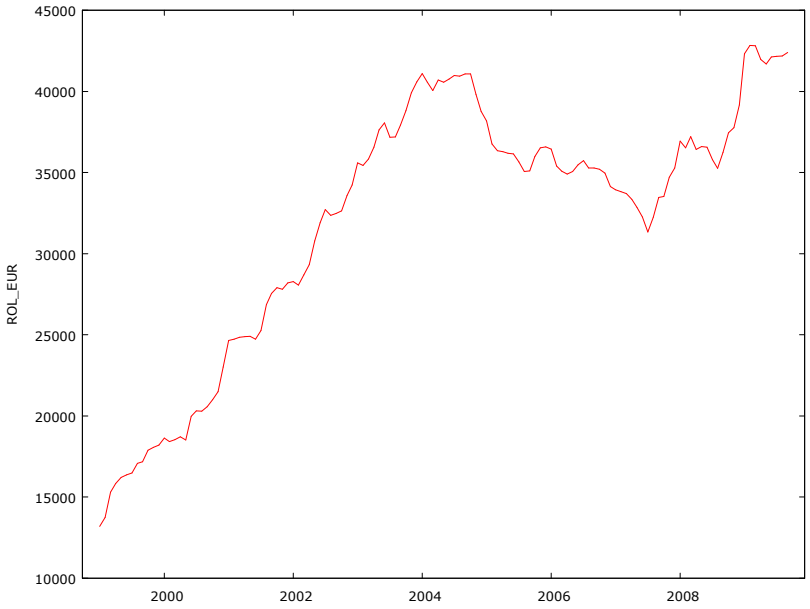
The intervention in the exchange rates evolution was subordinated to the price control applied by the Government. Most of the prices with major impact on population were related to the exchanges rates, so the authorities tried to avoid abrupt depreciations. However, especially in some winter months, when the imports of oil and gas substantially led to the foreign reserves decrease, NBR had to allow significant devaluation. These events led to some expectations about significant depreciations during the cold seasons. The high inflation contributed, by deteriorating of national currency purchasing power, to the devaluation from this period of time.

The consolidation stage of the Romanian foreign exchange market coincided with the recovery of the national economy. The new European currency, euro, replaced, step by step, the US dollar in many transactions and NBR added the evolution of ROL / EUR exchange rate to its main targets. In the first years some restrictions for the foreign capitals were eliminated and the other could be easily avoided. In these circumstances, the speculative operations with foreign capitals began to play a major role. The privatization process was accelerated and most of the prices were liberalized. Since the inflationary pressure was attenuated, NBR allowed a substantial devaluation in the first years. In 2005 NBR officially adopted the inflation targeting regime for its monetary policy and it liberalized the foreign capital inflows. It was announced the intention of a lower intervention of NBR on the foreign exchange market, a measure with potential significant impact on the volatility of the exchange rates. In the next years the foreign direct investment, the remittances of the Romanian workers from abroad and the real interest rates high level contributed to the appreciation of the national currency. However, between 2008 and 2009, in the financial crisis context, the national currency depreciated again (Figure 2).

In this article we investigate the monthly effects exhibited by the foreign exchange market during the two stages. We also try to identify the presence of the exchange rates volatility monthly seasonality before and after the adoption of the inflation targeting regime and the liberalization of

the foreign capital inflows. For that purpose we use classical regression techniques with dummy variables for each month.

Figure 2. Evolution of ROL/EUR exchange rate from January 1999 to September 2009



The rest of the paper is organized as follows. In the second part we describe the data and the methodology used in our analysis. In the third part we present the empirical results and in the fourth part we conclude.

2. Data and Methodology

We employ average monthly values of ROL / USD and ROL / EUR provided by NBR. For the ROL / USD exchange rate we used data from January 1991 to September 2009. For the ROL / EUR exchange rate the data are from January 1999.

For both series of time we calculated the monthly returns as it follows:

$$R_t = 100 * [\ln (S_t) - \ln (S_{t-1})] \quad (1)$$

where S_t *and* S_{t-1} are average exchange rates in the months t and t-1, respectively.

We use two variables to express the returns of the two time series:

- *RUSD* as the returns for ROL / USD monthly exchange rates;
- *REUR* as the returns for ROL / EUR monthly exchange rates.

We estimate the volatilities of the two exchange rates by monthly coefficients of variation:

- *CVUSD* – monthly coefficient of variation for ROL / USD exchange rates from January 1998 to September 2009;
- *CVEUR* - monthly coefficient of variation for ROL / EUR exchange rates from January 1999 to September 2009.

We also define for every month of a year a dummy variable which takes the value of one in the respective month and value of zero otherwise.

In order to capture the changes in the seasonality of the returns induced by the economic recovery and the foreign capital inflows we split the sample of ROL/USD monthly values in two periods of time: one from January 1991 to December 1997 and the other from January 1998 to September 2009. Also, we analyze the seasonality of the exchange rates volatilities for two periods of time: before and after liberalization of foreign capital inflows.

The stationarity of the time series will be investigated by the Augmented Dickey – Fuller tests. In case of a variable is proved to be not stationary in level we will use in the further analysis its first differences.

We estimate the seasonalities of the time series by performing regressions in which the dummy variables are included. We use two types of models: a simple one and an autoregressive one.

The simple model has the equation:

$$R_t = \sum_{i=1}^{12} a_i * d_{it} + u_t \qquad (2)$$

where d_{it} is a monthly dummy variable taking the value one for the month I and zero otherwise. An a_i coefficient could be interpreted as the average returns in the month i.

The autoregressive model has the form:

$$R_t = \sum_{i=1}^{12} b_i * d_{it} + c * R_{t-1} + u_t \qquad (3)$$

We determine the coefficients of the two equations by the OLS technique.

3. Empirical Results

3.1. Stationarity of the variables

In the Table 1 there are presented the results of ADF Tests for RUSD and REUR. It indicates that both variables are stationary in level.

Table 1. Augmented Dickey-Fuller Test for RUSD and REUR

Variable	Deterministic terms	Lagged differences	Test statistics	Asymptotic p-value
RUSD	No constant and no trend	13	-2.76197	0.005584
	Constant and no trend	13	-2.83042	0.05402
REUR	No constant and no trend	6	-2.9024	0.003605
	Constant and no trend	6	-3.22484	0.01862

Note: The number of the lagged differences was chosen based on Akaike Information Criteria.

The results of ADF tests for CVUSD and CVEUR are presented in the Table 2. According to them both variables are not stationary in levels but stationary in their first differences.

Table 2. Augmented Dickey-Fuller Test for CVUSD and CVEUR in levels and in their first differences

Variable	Deterministic terms	Lagged differences	Test statistics	Asymptotic p-value
CVUSD	Constant and no trend	13	-1.11572	0.7119
	Constant and trend	13	-1.85226	0.6791
d_CVUSD	No constant and no trend	12	-5.60457	0.00001
	Constant and no trend	12	-5.57005	0.00001
CVEUR	Constant and no trend	19	-1.54392	0.5114
	Constant and trend	19	-1.84073	0.6849
d_CVEUR	No constant and no trend	18	-2.67083	0.007342
	Constant and no trend	18	-2.67273	0.0788

Note: The number of the lagged differences was chosen based on the Akaike Information Criteria.

3.2. Monthly effects for the simple model

In the Table 3 there are presented the monthly effects of the ROL / USD exchange rates for the simple model from January 1991 to December 1997. It indicates significant effects in seven months of the year.

Table 3. Monthly effects for ROL/USD from January 1991 to December 1997 in a simple model

$$RUSD_t = \sum_{i=1}^{12} a_i * d_{it} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	10.4569	4.98841	2.0962	0.03963**
dfeb	7.98733	4.70278	1.6984	0.09381*
dmar	4.98565	1.79982	2.7701	0.00715***
dapr	8.36844	7.628	1.0971	0.27632
dmay	2.69409	1.73302	1.5546	0.12450
djun	4.77079	2.35424	2.0265	0.04647**
djul	6.71823	4.26268	1.5761	0.11946
daug	2.78312	1.21943	2.2823	0.02547**
dsep	3.1629	1.2339	2.5633	0.01249**
doct	3.87256	1.76445	2.1948	0.03145**
dnov	20.9283	18.0418	1.1600	0.24994
ddec	2.23515	2.18932	1.0209	0.31075

Mean dependent var	6.533585	S.D. dependent var	15.21644
Sum squared resid	16906.26	S.E. of regression	15.43102
R-squared	0.109554	Adjusted R-squared	-0.028402
F(11, 71)	3.678957	P-value(F)	0.000369
Log-likelihood	-338.4108	Akaike criterion	700.8215
Schwarz criterion	729.8476	Hannan-Quinn	712.4826
rho	-0.018846	Durbin-Watson	2.032077

The monthly effects of ROL / USD exchange rates for the simple model from January 1998 to September 2009 are presented in the Table 4 from which monthly effects in January, June and September result.

Table 4. Monthly effects for ROL/USD from January 1998 to September 2009 in a simple model

$$RUSD_t = \sum_{i=1}^{12} a_i * d_{it} + u_t$$

Variable	**Coefficient**	**Std. Error**	**t-ratio**	**p-value**
djan	2.18401	1.15592	1.8894	0.06110*
dfeb	0.515866	0.930067	0.5547	0.58010
dmar	0.922604	1.33115	0.6931	0.48951
dapr	0.66254	0.900559	0.7357	0.46326
dmay	0.0663186	0.794724	0.0834	0.93363
djun	0.989395	0.558894	1.7703	0.07906*
djul	-0.307903	0.657667	-0.4682	0.64046
daug	0.871036	0.713578	1.2207	0.22446
dsep	1.71822	0.696274	2.4677	0.01492**
doct	1.94194	1.20064	1.6174	0.10825
dnov	1.5259	1.15677	1.3191	0.18949
ddec	-0.169547	1.14274	-0.1484	0.88229

Mean dependent var	0.896873	S.D. dependent var	3.103229
Sum squared resid	1255.164	S.E. of regression	3.131448
R-squared	0.062313	Adjusted R-squared	-0.018270
F(11, 128)	1.684748	P-value(F)	0.083831
Log-likelihood	-352.1879	Akaike criterion	728.3758
Schwarz criterion	763.6755	Hannan-Quinn	742.7206
rho	0.588832	Durbin-Watson	0.822593

The monthly effects for the ROL / EUR exchange rates from January 1999 to September 2009 are presented in the Table 5 from which significant monthly effects for September and October result.

Table 5. Monthly effects for ROL/EUR from January 1999 to September 2009 in a simple model

$$REUR_t = \sum_{i=1}^{12} a_i * d_{i_t} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	2.43866	1.07312	2.2725	0.02490
dfeb	-0.547504	0.658745	-0.8311	0.40761
dmar	1.19852	1.05675	1.1342	0.25907
dapr	0.403064	0.565048	0.7133	0.47708
dmay	0.649171	0.604497	1.0739	0.28509
djun	1.21239	0.794743	1.5255	0.12985
djul	-0.0293818	0.59449	-0.0494	0.96067
daug	0.624084	0.778824	0.8013	0.42459
dsep	1.29251	0.401408	3.2199	0.00166***
doct	1.58612	0.491951	3.2241	0.00164***
dnov	1.05854	0.666747	1.5876	0.11509
ddec	1.31103	0.907528	1.4446	0.15126

Mean dependent var	0.912304	S.D. dependent var	2.331058
Sum squared resid	619.2492	S.E. of regression	2.310488
R-squared	0.102663	Adjusted R-squared	0.017571
F(11, 116)	3.095475	P-value(F)	0.001110
Log-likelihood	-282.5187	Akaike criterion	589.0374
Schwarz criterion	623.2618	Hannan-Quinn	602.9429
rho	0.499233	Durbin-Watson	0.964994

3.3. Monthly effects for the autoregressive model

In the Table 6 there are presented the monthly effects of ROL / USD exchange rates obtained in an autoregressive model from January 1991 to December 1997. Significant monthly effects for six months of the year result.

Table 6. Monthly effects for ROL/USD from January 1991 to December 1997 in an autoregressive model

$$RUSD_t = \sum_{i=1}^{12} b_i * d_{i_t} + c * RUSD_{t-1} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	10.5	5.03075	2.0872	0.04057**
dfeb	9.80749	5.57727	1.7585	0.08310*
dmar	5.13618	2.4354	2.1090	0.03858**
dapr	8.4624	7.71053	1.0975	0.27623
dmay	2.8518	2.43568	1.1708	0.24569
djun	4.82156	2.43999	1.9761	0.05215*
djul	6.80814	4.37335	1.5567	0.12411
daug	2.90973	1.85554	1.5681	0.12143
dsep	3.21535	1.37137	2.3446	0.02193**
doct	3.93217	1.89206	2.0782	0.04141**
dnov	21.0013	18.1944	1.1543	0.25237
ddec	2.62957	1.95894	1.3423	0.18389
RUSD_1	-0.018846	0.200671	-0.0939	0.92545

Mean dependent var	6.634619	S.D. dependent var	15.28205
Sum squared resid	16789.61	S.E. of regression	15.59897
R-squared	0.112450	Adjusted R-squared	-0.041906
F(12, 69)	3.598469	P-value(F)	0.000345
Log-likelihood	-334.5466	Akaike criterion	695.0932
Schwarz criterion	726.3806	Hannan-Quinn	707.6546
rho	-0.001991	Durbin-Watson	2.003836

The monthly effects of ROL / USD exchange rates derived from an autoregressive model from January 1998 to September 2009 are presented in the Table 7, indicating significant monthly effects in January, June and September.

Table 7. Monthly effects for ROL/USD from January 1998 to September 2009 in an autoregressive model

$$RUSD_t = \sum_{i=1}^{12} b_i * d_{it} + c * RUSD_{t-1} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	2.28393	1.1173	2.0441	0.04302**
dfeb	-0.655514	0.62206	-1.0538	0.29400
dmar	0.618603	0.999993	0.6186	0.53729
dapr	0.118846	0.656184	0.1811	0.85657
dmay	-0.324118	0.693645	-0.4673	0.64112
djun	0.950313	0.497551	1.9100	0.05841*
djul	-0.890956	0.550654	-1.6180	0.10816
daug	1.05248	0.894413	1.1767	0.24152
dsep	1.20491	0.513756	2.3453	0.02057**
doct	0.752258	0.930629	0.8083	0.42042
dnov	0.381507	0.969847	0.3934	0.69471

ddec	-1.06876	0.851091	-1.2558	0.21153
RUSD_1	0.589303	0.0997313	5.9089	0.00001***

Mean dependent var	0.908767	S.D. dependent var	3.111248
Sum squared resid	821.6483	S.E. of regression	2.553628
R-squared	0.384911	Adjusted R-squared	0.326331
F(12, 126)	6.327789	P-value(F)	1.12e-08
Log-likelihood	-320.7227	Akaike criterion	667.4455
Schwarz criterion	705.5936	Hannan-Quinn	682.9479
rho	0.034527	Durbin-Watson	1.925820

In the Table 8 there are presented the monthly effects of ROL / EUR exchange rate from January 1999 to September 2009 obtained from an autoregressive model, indicating significant monthly effects in five months of the year.

Table 8. Monthly effects for ROL/EUR from January 1999 to September 2009 in an autoregressive model

$$REUR_t = \sum_{i=1}^{12} b_i * d_{it} + c * REUR_{t-1} + u_t$$

Variable	**Coefficient**	**Std. Error**	**t-ratio**	**p-value**
djan	1.78408	0.731899	2.4376	0.01633**
dfeb	-2.24076	0.443378	-5.0538	0.00001***
dmar	1.47188	0.875622	1.6810	0.09551*
dapr	-0.195339	0.528239	-0.3698	0.71222
dmay	0.447927	0.484974	0.9236	0.35764
djun	0.888268	0.82032	1.0828	0.28117
djul	-0.634712	0.529254	-1.1993	0.23291
daug	0.638754	0.78363	0.8151	0.41670
dsep	0.980909	0.415042	2.3634	0.01980**
doct	0.900345	0.539799	1.6679	0.09808*
dnov	0.266616	0.690838	0.3859	0.70027
ddec	0.782514	0.755417	1.0359	0.30245
REUR_1	0.499286	0.100323	4.9768	0.00001***

Mean dependent var	0.886344	S.D. dependent var	2.321640
Sum squared resid	440.1699	S.E. of regression	1.964978
R-squared	0.351873	Adjusted R-squared	0.283649
F(12, 114)	5.619611	P-value(F)	1.68e-07
Log-likelihood	-259.1340	Akaike criterion	544.2680
Schwarz criterion	581.2425	Hannan-Quinn	559.2903
rho	-0.062543	Durbin-Watson	2.009944

3.4. Monthly effects in the exchange rates volatility

In the Table 9 there are presented the monthly effects if the first differences of CVUSD, obtained in an autoregressive model from January 1998 to December 2004. The F test indicates the model has a poor adequacy, ignoring that we may identify a significant June effect.

Table 9. Monthly effects for ROL/USD volatility from January 1998 to December 2004 in an autoregressive model

$$d\_CVUSD_t = \sum_{i=1}^{12} \alpha_i * d_{i_t} + \beta * d\_CVUSD_{t-1} + u_t$$

Variable	**Coefficient**	**Std. Error**	**t-ratio**	**p-value**
djan	-0.149994	0.218675	-0.6859	0.49506
dfeb	0.106202	0.0908348	1.1692	0.24636
dmar	0.793027	0.57892	1.3698	0.17518
dapr	-0.59916	0.492206	-1.2173	0.22764
dmay	-0.305797	0.310497	-0.9849	0.32813
djun	-0.304035	0.156067	-1.9481	0.05547*
djul	-0.0821137	0.191549	-0.4287	0.66949
daug	0.224472	0.145234	1.5456	0.12678
dsep	-0.0191179	0.142585	-0.1341	0.89373
doct	0.0674666	0.184382	0.3659	0.71555
dnov	0.376559	0.329408	1.1431	0.25693
ddec	-0.0397356	0.282373	-0.1407	0.88850
d_CVUSD_{t-1}	-0.468677	0.317654	-1.4754	0.14465

Mean dependent var	-0.000506	S.D. dependent var	0.842076
Sum squared resid	35.26282	S.E. of regression	0.714881
R-squared	0.386055	Adjusted R-squared	0.279282
F(13, 69)	1.512937	P-value(F)	0.134956
Log-likelihood	-81.75346	Akaike criterion	189.5069
Schwarz criterion	220.7943	Hannan-Quinn	202.0683
rho	-0.125205	Durbin-Watson	2.232658

The monthly effects of d_CVUSD derived from an autoregressive model from January 2005 to September 2009 are presented in the Table 10, indicating a significant May effect.

Table 10. Monthly effects for ROL/USD volatility from January 2004 to September 2009 in an autoregressive model

$$d\_CVUSD_t = \sum_{i=1}^{12} \alpha_i * d_{it} + \beta * d\_CVUSD_{t-1} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	0.05159	0.383964	0.1344	0.89373
dfeb	-0.463897	0.67236	-0.6900	0.49385
dmar	0.162811	0.196511	0.8285	0.41186
dapr	0.0144892	0.458628	0.0316	0.97494
dmay	-0.519684	0.172434	-3.0138	0.00427***
djun	0.00491891	0.35362	0.0139	0.98896
djul	-0.200716	0.158579	-1.2657	0.21228
daug	0.466686	0.521224	0.8954	0.37546
dsep	0.126091	0.225849	0.5583	0.57947
doct	-0.272655	0.461987	-0.5902	0.55809
dnov	0.326619	0.482784	0.6765	0.50224
ddec	0.159904	0.364137	0.4391	0.66272
d_CVUSD_{t-1}	-0.52803	0.126308	-4.1805	0.00014***

Mean dependent var	0.000151	S.D. dependent var	0.877525
Sum squared resid	25.77338	S.E. of regression	0.765349
R-squared	0.402325	Adjusted R-squared	0.239323
F(13, 44)	3.239090	P-value(F)	0.001742
Log-likelihood	-58.25879	Akaike criterion	142.5176
Schwarz criterion	169.0772	Hannan-Quinn	152.8396
rho	-0.192724	Durbin's h	-4.417340

In the Table 11 there are presented the monthly effects of the d_CVEUR in an autoregressive model from January 1999 to December 2004, indicating a lack of monthly seasonality.

Table 11. Monthly effects for ROL/EUR volatility from January 1999 to December 2004 in an autoregressive model

$$CVEUR_t = \sum_{i=1}^{12} \alpha_i * d_{it} + \beta * CVEUR_{t-1} + u_t$$

Variable	Coefficient	Std. Error	t-ratio	p-value
djan	-0.042574	0.382163	-0.1114	0.91169
dfeb	-0.264436	0.243017	-1.0881	0.28111
dmar	0.738598	0.836401	0.8831	0.38091
dapr	-0.429418	0.565968	-0.7587	0.45114
dmay	-0.144954	0.459065	-0.3158	0.75334
djun	-0.0933063	0.178064	-0.5240	0.60231
djul	0.202301	0.382872	0.5284	0.59929
daug	-0.201588	0.226216	-0.8911	0.37660
dsep	0.0517125	0.270542	0.1911	0.84909
doct	-0.239831	0.186164	-1.2883	0.20286

dnov	-0.00152802	0.323706	-0.0047	0.99625
ddec	0.450125	0.3021	1.4900	0.14174
d_CVEUR$_{t-1}$	-0.470678	0.314984	-1.4943	0.14061

Mean dependent var	0.002922	S.D. dependent var	0.993445
Sum squared resid	44.08408	S.E. of regression	0.879434
R-squared	0.352647	Adjusted R-squared	0.216363
F(13, 57)	1.205778	P-value(F)	0.299282
Log-likelihood	-83.14182	Akaike criterion	192.2836
Schwarz criterion	221.5141	Hannan-Quinn	203.8943
rho	-0.184427	Durbin-Watson	2.056205

The monthly effects results for d_CVEUR obtained from an autoregressive model in the period January 2005 – September 2009 are presented in Table 12. They indicate a significant March effect but the model wasn't validated by F test.

Table 12. Monthly effects for ROL/EUR volatility from January 2005 to September 2009 in an autoregressive model

$$CVEUR_t = \sum_{i=1}^{12} \alpha_i * d_{i_t} + \beta * CVEUR_{t-1} + u_t$$

Variable	**Coefficient**	**Std. Error**	**t-ratio**	**p-value**
djan	0.118404	0.179887	0.6582	0.51383
dfeb	-0.228863	0.398898	-0.5737	0.56907
dmar	-0.508421	0.23073	-2.2035	0.03284**
dapr	0.035796	0.338221	0.1058	0.91619
dmay	-0.116115	0.217752	-0.5332	0.59655
djun	0.0685377	0.286699	0.2391	0.81217
djul	-0.050834	0.260621	-0.1950	0.84625
daug	0.163609	0.329078	0.4972	0.62154
dsep	0.226031	0.207657	1.0885	0.28231
doct	0.0958658	0.592274	0.1619	0.87216
dnov	0.245661	0.630942	0.3894	0.69889
ddec	-0.347009	0.299709	-1.1578	0.25318
d_CVEUR$_{t-1}$	-0.460536	0.160002	-2.8783	0.00615***

Mean dependent var	-0.015417	S.D. dependent var	0.688209
Sum squared resid	18.10583	S.E. of regression	0.641480
R-squared	0.317711	Adjusted R-squared	0.131632
F(13, 44)	1.522416	P-value(F)	0.147504
Log-likelihood	-48.19520	Akaike criterion	122.3904
Schwarz criterion	148.9501	Hannan-Quinn	132.7124
rho	-0.166113	Durbin-Watson	2.329403

4. Conclusions

In this paper we approached the monthly seasonality exhibited in the last decades by the Romanian foreign exchange market. We began with the investigation of the monthly effects on the exchange rates returns in the transition and the consolidation stages. For the transition stages we found, by simple and autoregressive models, seasonal effect of the ROL/USD exchange rates returns for seven months: January, February, March, June, August, September and October. There are different explanations for these seasonal effects. Quite often, during the winter months January and February, NBR had to allow, because of the increased imports of oil and gas, sharp devaluation of the national currency. In general, in the cold season the justified increase of the prices with major impact for the population was avoided. This measure was postponed for the beginning of spring and it could be considered as responsible for the March effect. In June and August there were also operated quite often increases of some administrated prices. Because July and August are holiday months for the Parliament and for many members of the Government, many important economic and political decisions were postponed for the next months, generating significant changes in the exchange rates returns in September and October.

In the consolidation stage we found some changes in the seasonality of the foreign exchange market. There are significant differences between ROL/USD and ROL/EUR and between the simple and the autoregressive model. In this period of time the US dollar was replaced by euro as the main instrument for savings and transactions. For all the models we obtained a significant September effect explained by the July and August holidays of the decision factors. For some models we found monthly effect in January, February and March, which could be connected with the circumstances of the cold season.

We did not identify many changes in the exchange rates monthly volatilities after the foreign capital inflows liberalization and the inflation targeting adoption, except a May effect for the ROL / EUR exchange rate. This situation could be explained by the facts that massive foreign capital yet occurred before the liberalization and NBR still has significant interventions on the foreign exchange market.

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