ANALYSIS OF THE ROMANIAN CURRENT ACCOUNT SUSTAINABILITY

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This paper explores the sustainability of the Romanian current account. For this purpose we test the stationarity and cointegration of the monthly credit and debit transactions of the current account. It results these time series have unit roots for levels values, but they are stationary for their first differences. We find that the debit and the credit transactions are not cointegrated so the current account deficit could not be considered as sustainable.

Keywords: Romanian Current Account, Sustainability, Cointegration

JEL Classification: F40, C22, C32

Introduction

This paper approaches the perspectives of the Romanian current account sustainability. In the recent years Romania experienced significant deficits of the current account and their perpetuation could become a serious constraint for the macroeconomic policies.
In the last decades the problem of external disequilibrium was largely approached in the specialized literature. A clear distinction between sustainable and unsustainable foreign trade disequilibrium was made by Mann (2002). A sustainable disequilibrium occurs when the exports and the imports converge on a long-run. In that case significant changes in the macroeconomic policy are not necessary. An unsustainable disequilibrium occurs when exports and imports don't converge on a long-run. In the absence of an active implication of the government this situation could lead to significant increases of the interest rates in order to attract foreign capitals.
For the analysis of the current account sustainability we used several methods. The most reliable seemed to be the cointegration techniques which allow analyzing if exports and imports are moving together on a long-run. A simple model proposed by Husted (1992) could be used in studying the cointegration between exports and imports. Arize (2002) provided a similar framework based on the equation:

$$M_t = a + b X_t + e_t \qquad (1)$$

where: M_t refers to the imports of goods and services;
X_t refers to the exports of goods and services;
e_t is a stationary process.
A current account is considered as sustainable if M_t and X_t are cointegrated and the slope coefficient b is statistically equal to 1.
The cointegration techniques were applied in the current account sustainability analyze for several countries. Bahmani - Oskooee (1994) proved that Australian exports and imports will converge in the long-run. Hollauer and Mendonça (2006) tested the cointegration of Brazilian exports and imports using monthly data and we found the balance of accounts was sustainable. Verma and Perera (2008) found that Sri Lanka current account deficits are unsustainable. Erbaykal and Karaca (2008) examined the foreign deficit of Turkey and concluded that, although exports and imports are cointegrated, the slope coefficient of their regression is not statistically equal to 1.

The analysis of the Romanian current account sustainability has some particularities. First, the importance of the current account components other than exports and imports has to be taken into consideration. Second, it has to be adapted to the significant changes that occurred in the last decades. In this paper we analyze the cointegration between the credit transactions of the current account instead of the exports and the debit transactions of the current account instead of the imports. We apply tests of stationarity that allow taking into account the structural breaks.
The remaining part of this paper is set out as follows. The second part approaches the data and methodology we used. The results of the analyses are presented in the third part and the fourth part concludes.

Data and Methodology
In this analysis we employ monthly data of credit and debit transactions of the Romanian current account provided by the National Bank of Romania. Our sample covers the period from January 2005 to February 2009. Because of the significant seasonality of these values we apply ARIMA (Autoregressive Integrated Moving Average) technique to obtain seasonally adjusted values. We use four variables:

-X for natural logarithms of seasonally adjusted values of credit transactions from the current account;
-M for natural logarithms of seasonally adjusted values of debit transactions from the current account;
-d_X for first differences of X;
-d_M for first differences of M.

We use two unit root tests for analyzing the stationarity of the four time series: the classic Augmented Dickey Fuller (ADF) and a test proposed by Saikkonen and Lutkepohl (2002) and Lanne et al (2002) which allows taking into account the structural breaks. For selecting the numbers of lagged differences we apply four criteria: Akaike Info Criterion (AIC), Final Prediction Error (FPE), Hannan-Quinn Criterion (HQC) and Schwarz Criterion (SC).
After we drew conclusions about the stationarity of the four variables we study the cointegration between credit and debit transactions. We start with the classical Engle-Granger method (1987) which consists in performing a regression between the two variables and testing the stationarity of the resulted residuals. We continue with much powerful lambda-max and trace cointegration tests proposed by Johansen (1995) and then with the nonparametric test developed by Breitung (2002).

Empirical Results
We begin to test the stationarity for levels values of the debit and credit transactions taking into consideration, as Figure 1 suggests, intercept and time trend as deterministic terms. The results of the ADF test are presented in the Table 1. It suggests that we cannot reject, for both time series, the null hypothesis of a unit root.

Table 1 - Augmented Dickey Fuller Unit Root Test for levels values of the two variables (with intercept and time trend as deterministic terms)

Variable	Lagged differences	Test statistics
X	AIC, FPE, HQC, SC: 4	-0.7034
M	AIC, FPE: 4	1.2819
	HQC, SC: 1	0.8484

We also apply the unit root tests with structural breaks with two kind of shift function for the structural breaks: with impulse dummy and with shift dummy. The results confirm that debit and credit transactions are not stationary (see Table 2).

Table 2 - Unit root tests with structural breaks for levels values of the two variables (with intercept and time trend as deterministic terms)

Variable	Shift Function	Break Date	Lagged differences	Test statistics
X	Impulse dummy	2007 M8	AIC, FPE, HQC, SC: 1	-1.3678
	Shift dummy	2007 M8	AIC, FPE, HQC, SC: 1	-1.2776
M	Impulse dummy	2007 M5	AIC, FPE: 4	-1.6431
		2007 M5	HQC: 1	-1.1041
		2007 M5	SC: 0	-1.3690
	Shift dummy	2007 M11	AIC, FPE, HQC: 1	-1.3072
		2007 M10	SC: 0	-1.4052

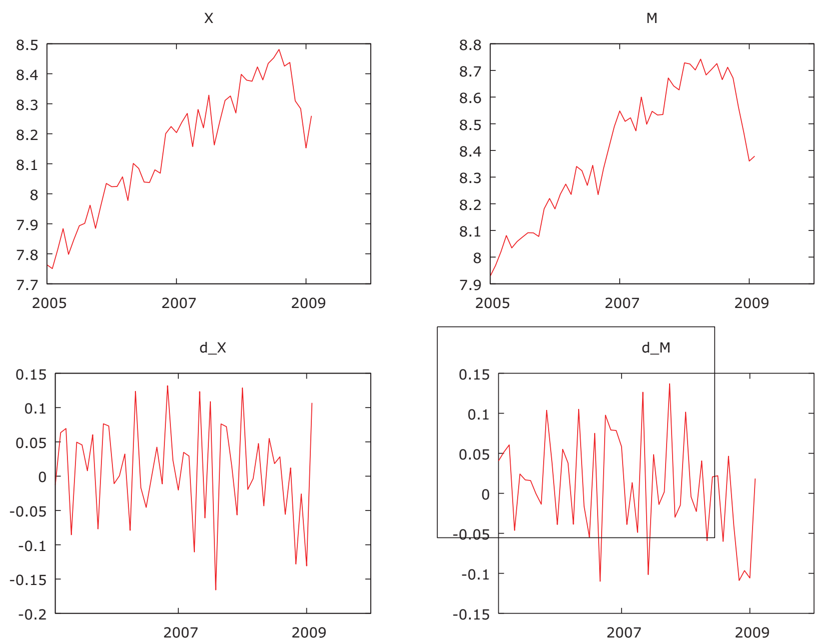

Figure 1 - Evolution of the debit and credit transactions for level values and for their first differences

We test the stationarity of the first differences of the debit and credit transactions using only intercept as deterministic term (see Figure 1).

The results of the ADF tests indicate that we can reject the null hypothesis of a unit root for the two variables (Table 3).

Table 3 - Augmented Dickey Fuller Unit Root Test for the first differences values of the two variables (with intercept as deterministic term)

Variable	Lagged differences	Test statistics
d_ X	AIC, FPE, HQC, SC: 0	-10.7925***
d_ M	AIC, FPE: 2	-2.5786*
	HQC, SC: 0	-8.0202***

* Indicates that results are significant at 10% level;
*** Indicates that results are significant at 1% level of significance.

We continue the analysis of the stationarity performing the unit root tests with structural breaks for the first differences of the debit and credit transactions. It resulted that both time series are stationary (Table 4).

Table 4 - Unit root tests with structural breaks for the first differences values of the two variables (with intercept as deterministic term)

Variable	Shift Function	Break Date	Lagged differences	Test statistics
d_ X	Impulse dummy	2007 M8	AIC, FPE, HQC, SC: 0	-9.2245***
	Shift dummy	2007 M8	AIC, FPE, HQC, SC: 0	-2.7008*
d_ M	Impulse dummy	2007 M10	AIC, FPE, HQC: 1	-4.5583***
		2007 M5	SC: 0	-6.9244***
	Shift dummy	2007 M6	AIC, FPE, HQC, SC: 0	-2.8939*

* Indicates that results are significant at 10% level;
*** Indicates that results are significant at 1% level of significance.

We apply the Engle-Granger cointegration technique starting with a regression with M as dependent variable. A slope coefficient of 1.155 resulted (Table 5).

Table 5 - Cointegration regression (Dependent variable: M)

Variable	Coefficient	Std. Error	t-statistic	p-value
const	-1.01697	0.314551	-3.2331	0.00222***
X	1.15522	0.0385731	29.9488	<0.00001***
R^2	0.949203			
Durbin-Watson statistic	1.3789			

*** Indicates that results are significant at 1% level of significance.

We analyze the stationarity of the residuals with ADF tests. The graphical representation cannot indicate a single form of the deterministic terms so we use two variants: with only intercept and with intercept and time trend (see Figure 2). The results indicate that the residuals are not stationary, so we find no evidence of the cointegration relation between the two series.

Table 6 - Augmented Dickey Fuller Unit Root Test for the residuals of cointegration regression

Deterministic terms	Lagged differences	Test statistics
Intercept	AIC, FPE, HQC, SC:1	-1.9684
Intercept and time trend	AIC, FPE, HQC:3	-0.6495
	SC:1	-1.9206

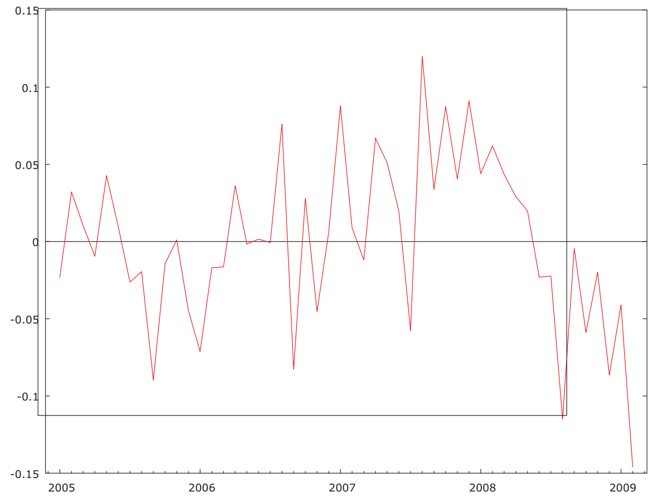

Figure 2 - Residuals of the cointegration regression

We continue the cointegration analysis with the two lags Johansen tests with no restriction on intercept. In Table 7 there are presented the results of lambda-max test that suggest a cointegration rank of 0.

Table 7 - Johansen lambda-max test for cointegration between the two variables (with no restriction on intercept)

r	Test statistic	Critical values		
		20%	10%	5%
0	11.5	10.1	12.1	14.0
1	2.4	1.7	2.8	4.0

The results of trace test, presented in Table 8, indicate also a cointegration rank of zero. In these circumstances we reject the hypothesis of cointegration between debit and credit transactions.

Table 8 - Johansen trace test for cointegration between the two variables (with no restriction on intercept)

r	Test statistic	Critical values		
		20%	10%	5%
1	2.4	1.7	2.8	4.0
0	13.9	11.2	13.3	15.2

We apply the non parametric Breitung test for the case with no drift. The results indicate a cointegration rank of zero, so we reject the hypothesis of cointegration between the two variables.

Table 9 - Breitung test for cointegration between the two variables (case with no drift)

H0	H1	Test statistic	Critical value	
			10%	5%
r = 0	r > 0	143.75	261.00	329.90
r = 1	r > 1	11.37	67.89	95.60

Conclusions

In this paper we analyzed the Romanian current account sustainability. We investigated the stationarity of debit and credit transactions and we found that the two time series had unit roots for level values, but are stationary for the first differences. We proved, using several techniques, that debit and credit transactions were not cointegrated so the Romanian current account deficit was unsustainable.

The research over the Romanian current account could be extended by using other foreign trade variables with nominal and real values. It could be also continued by studying the global crisis implication in the external equilibrium.

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