3 ANALYSIS OF FOREIGN IMBALANCES AND EXCHANGE RATE POLICY IN THE ROMANIAN ECONOMY*

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Abstract

Considering the previous year's results, the paper re-addresses the issue of inflationary shocks dynamics and the dynamics of the foreign imbalance - induced shocks. The ideea of a correlation between the foreign imbalances and the output gap was first introduced by Acad. Emilian Dobrescu (2004) and provides an answer to certain behaviors specific to the Romanian transition economy. The paper presents an econometric analysis of the foreign imbalances and exchange rate policies, on the basis of certain short-term error-correcting econometric models (mothly data series) that reveal the correlations between the output gap and the foreign and exchange rate imbalances, the adjustment speed to the long-term balance, as well as the reaction towards the stability condition. At this stage, the previous year's results are used[1].

Key words: foreign imbalances, output gap, exchange rate policy;
JEL Classification: C32, F31, F32.

Introduction

Dobrescu (2004) showed that it is necessary to consider both the domestic and foreign imbalances: those due to inflation and to the current account deficit. The author considered that if one took into account only the data regarding inflation,

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[1] *"Dinamica şocurilor inflaţioniste. Estimări pe date lunare pentru economia României", authors: Cornelia Scutaru, Cristian Stănică, Paper worked out with the financial support of the Romanian Academy, within the Grant Project No. 181/2005: "Politici si previziuni macroeconomice bazate pe PIB potential".*

unemployment rate and wages, there would have been no assurance that the potential GDP level thus obtained would have corresponded to a stable foreign trade balance. The two indicators (inflation and foreign trade balance) interact through: the exchange rate, wages, import prices, other production costs – which all are factors of competitiveness.

Consequently, the model built by Dobrescu (2004) proposed to condition the potential output by both the stable inflation rate and the stability of the current account balance. Since the determining impact on the current account balance is that of the foreign trade balance, the model considers the weighthing of the foreign trade balance in the GDP. The model may be written as follows:

$$dlog(P)=\beta*[log(Y)-log(Y_p)]$$

$$n_x=c(1)+c(2)*[(log(Y)-log(Y_p)]$$

where P is the prices, Y is the real output, Y_p is the potential output in real terms, and n_x is the share in GDP of the foreign trade balance. The β coefficient is positive, the constant term c(1) is the relative level of the foreign trade balance at which the economy tends to stabilize in a certain period of time. The stable state of the system corresponds to the following identity: $Y = Y_p$, $P = P(-1)$, $n_x = c(1)$, $dlog(p)= 0$.

The method was used in the specific case of Romania, one of the main conclusions being that the output gap values are consistent with the pressures from the demand side determined by the income policy.

We shall start by analyzing the foreign market imbalances. The model is built on monthly data series, where the monthly GDP was determined by the Chow and Lin method (Cristian Stănică, 2004). It is a model adapted after the Dobrescu model, with error-correction term, which includes one long-term equation and one short-term dynamics equation, both built on monthly data series in real terms, deseasonalized (using the mobile average method).

1. The foreign imbalances

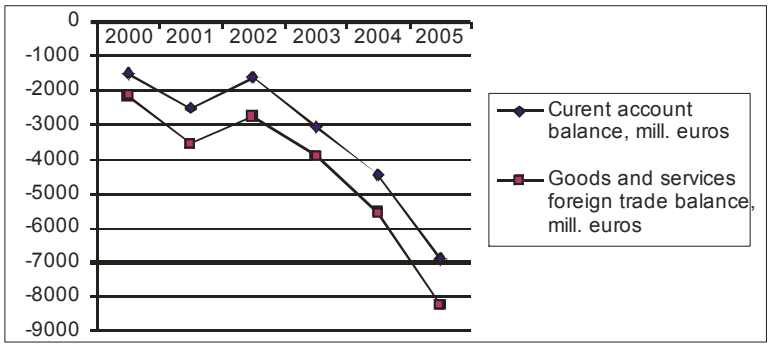
1.1. The current account and foreign trade balances

The foreign imbalances are reflected by the current account balance, which is strongly influenced by the foreign trade balance dynamics. Graph 1, built on annual data, shows on the one hand a strong correlation between the two balances (the foreign trade deficit outrunning the current account one), and on the another hand an upward trend of both deficits, at least since 2002: for the current account from –1623 mill. euros in 2002 to –6891 in 2005, and for the foreign trade with goods and services from –2747 mill. euros in 2002 to –8240 mill. euros in 2005[1].

[1] *Provisional data, Monthly NBR Bulletin, No. 1/2006.*

Graph 1

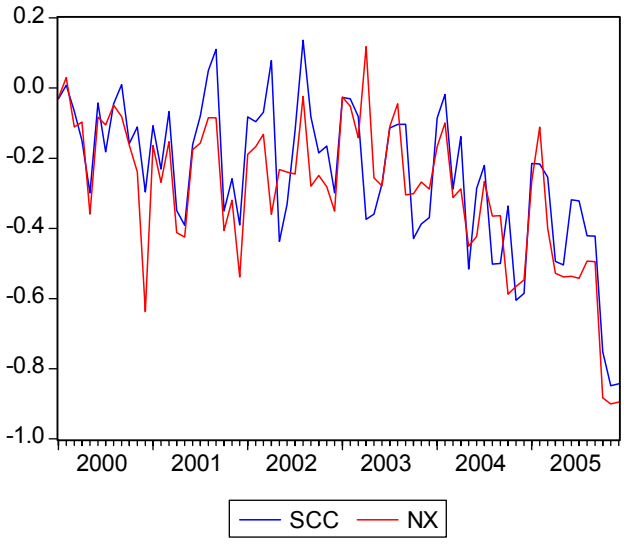
Current account balance and foreign trade balance dynamics (annual data)



As regards the monthly evolutions[1], the same correlation is maintained, as one may notice, although not at the same level as in the case of the annual data, which cumulate the monthly balances. We shall perform first an econometric analysis of the phenomenon.

Graph 2

Current account balance and foreign trade balance dynamics (monthly data)



[1] *The data are current estimations from the monthly NBR bulletins, adjusted with the annual total.*

The two variables are strongly interconnected, as it shows the correlation matrix below:

	SCC	NX
SCC	1.000000	0.817282
NX	0.817282	1.000000

where: SSC = CCC-CCD
NX = XGSD-MGSD
CCC = current account, credit, bill. USD
CCD = current account, debit, bill. USD
XGSD = export of goods and services, bill. USD
MGSD = import of goods and services, bill. USD

Another indicator with the same significance is the ratio of the two components:

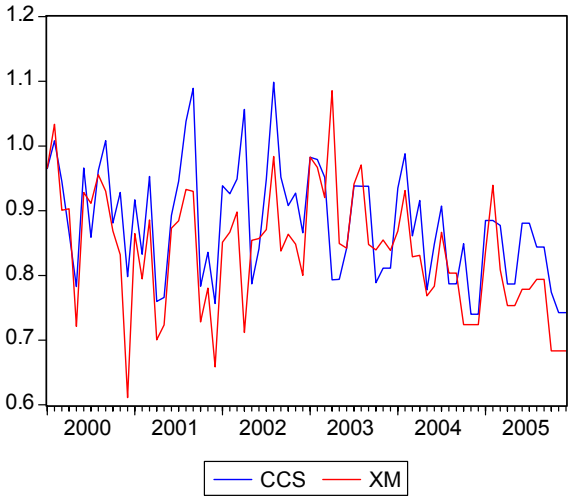
CCS=CCC/CCD

XM=XGSD/MGSD

Obviously, a current account deficit (SCC<0) corresponds to a CCS ratio below unit, and a current account surplus (SCC>0) corresponds to a CCS ratio above unit. Similarly, XM, the degree of import coverage by export is below unit when there is a trade balance deficit (NX<0) and above unit when there is a trade balance surplus (NX>0).

Graph 3

Evolution of the ratio of the current account credit to the current account debit and of the degree of coverage of import by export



The correlation matrix of the two variables also shows a strong link between them:

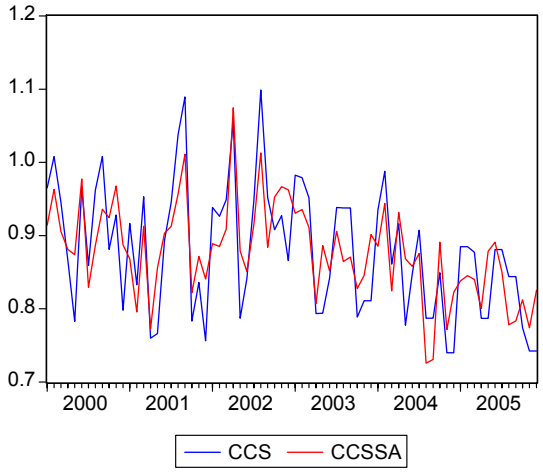
	CCS	XM
CCS	1.000000	0.666166
XM	0.666166	1.000000

In the model we shall use as variables the ratio of the current account credit to the current account debit and the degree of coverage of imports by exports, because the interpretations of the coefficients may be expressed as elasticities.

The deseasonalized series are presented in the graphs below:

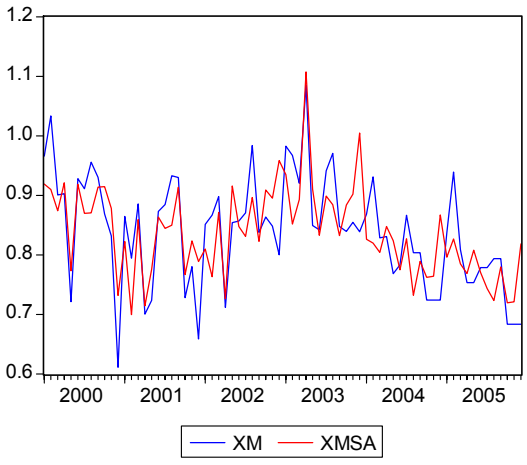
Graph 4

Ratio of the current account credit to the current account debit, gross and deseasonalized series



Graph 5

Degree of coverage of import by export, gross and deseasonalized series



The correlations between the two series may be expressed through a long-term cointegration equation, as follows[1]:

LOG(CCSSA)=-0.06148207424+0.3922288964*LOG(XMSA)

with a moderate - 0.39 long-term elesticity of the current account (ratio of credit to debit) as against the degree of coverage of import by export.

The short-term dynamics equation is:

Equation 1

DLOG(CCSSA)= 0.006457-0.857589*(LOG(CCSSA(-1))-(-0.06148207424+
(0.93) (-8.21)

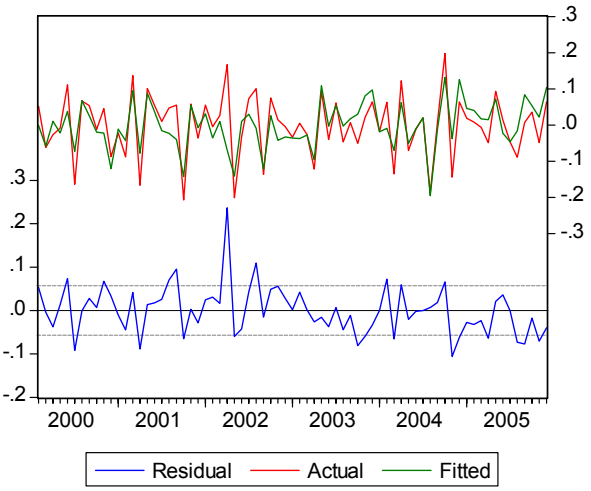
0.3922288964*LOG(XMSA(-1))))+ 0.320380*DLOG(XMSA) -0.159722*DUM8904
(4.60) (-4.67)

R^2=0.57

DW=1.92

Graph 6

Residuals of the short-term equation 1



The speed of adjustment to the long-term balance is fast, namely –0.85, and the short-term elasticity of the current account (ratio of credit to debit) as against the degree of coverage of import by export is slightly lower than the long-term one, namely 0.32.

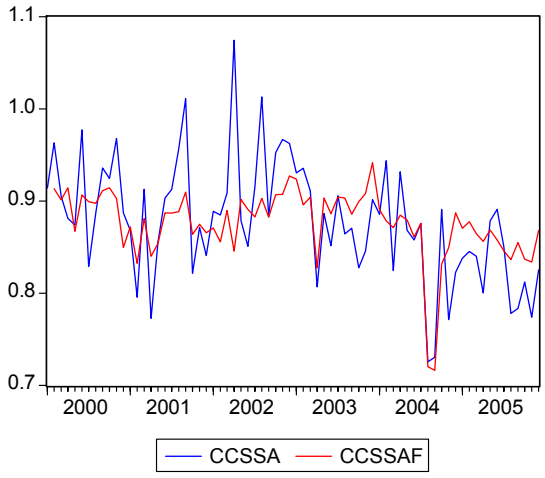
[1] *We mention that it is important for building up a long-term equation to fulfill the cointegration test (which testifies the the existence of a stationary linear combination among non-stationary variables). It is important for the terms of the equation to respect the signs imposed by the economic theory. Since the variables of the equation are not stationary (but only a linear combination of them is), the residuals will not have a normal distribution, so that the t-statistic test has no meaning in such a case.*

An important conclusion of this analysis refers to the influence of the foreign trade policies upon the current account. Any short-term measure regarding the foreign trade reflects upon the current account in the long run, under the circumstances of a fast speed of adjustment to the long-term equillibrium.

For forecasting, the equation performs well, in the sense that reveals a satisfactory adjustment degree considering the high degree of seasonality of the deseasonalized series itself.

Graph 7

Adjustment to the real data of the forecast of the current account credit to debit ratio obtained with the help of the short-term equation



1.2. The correlation between the output gap and the degree of coverage of import by export. Monthly data

We shall use the potential GDP computed in the previous year[1] on the basis of a SVAR model of Blanchard-Quah type, where the basic variables are the real GDP, inflation and unemployment rate. This time we shall use as determinants for the output gap the ratio of the achieved GDP in real terms and the potential GDP. An output gap above unit reveals an achieved GDP higher than the potential one, which involves the presence of certain inflationary pressures in the economy. An output gap less than unit indicates an achieved GDP below the level of the potential GDP, signalling a period of disinflation.

[1] "Dinamica şocurilor inflaţioniste. Estimări pe date lunare pentru economia României", authors: Cornelia Scutaru, Cristian Stănică, Paper worked out with the financial support of the Romanian Academy, within the Grant Project No. 181/2005**:** **"**Politici si previziuni macroeconomice bazate pe PIB potential".

In order to emphasize the influence of the foreign imbalances, we have built a model with error-correction term between the level of the foreign trade balance (expressed by the degree of the coverage of import by export) and that of the output gap determined as above. The equations were built on real data series, logarithmated and deseasonalized.

The long-term cointegration equation shows a near 0.3 elasticity of the degree of coverage of import by export as against the output gap:

LOG(XMSA)=-0.1707521549+0.2992942836*LOG(OG22SA)

The short-term equation in differences is:

Equation 2

DLOG(XMSA)=0.008807-0.872828*(LOG(XMSA(-1))-(-0.170752+0.299294*LOG(OG22SA(-1))))

(0.76) (-7.59)

-0.433128*DLOG(OG22SA(-3))+0.301086*DUM403

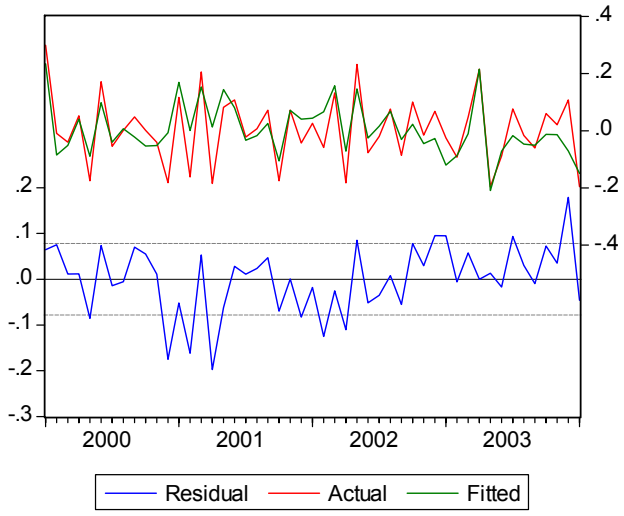
(-1.97) (3.78)

R^2=0.59

DW=1.88

Graph 8

Residuals of the short-term equation 2



We have imposed the long-term stability condition, namely the assumption that the term c(2) of the long-term equation is equal to zero, and we have obtained then short-

term dynamics equation that should have ensured the long-term stability of the foreign trade balance (in our case the degree of coverage of import by export):

The short-term dynamics equation that meets the long-term stability condition is:

Equation 3

DLOG(XMSA)=0.009248-0.921767*(LOG(XMSA(-1))-(-0.170752))

(0.84) (-7.69)

-0.379797*DLOG(OG22SA(-3))+0.267823*DUM403

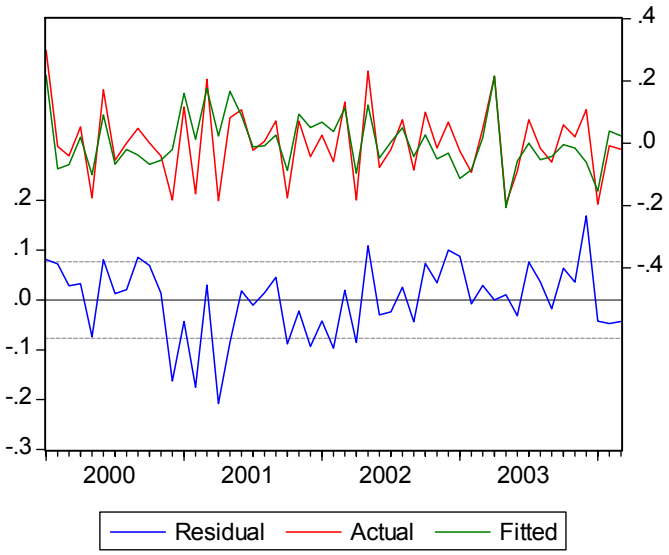
(-1.77) (3.43)

R^2=0.59

DW=1.73

Graph 9

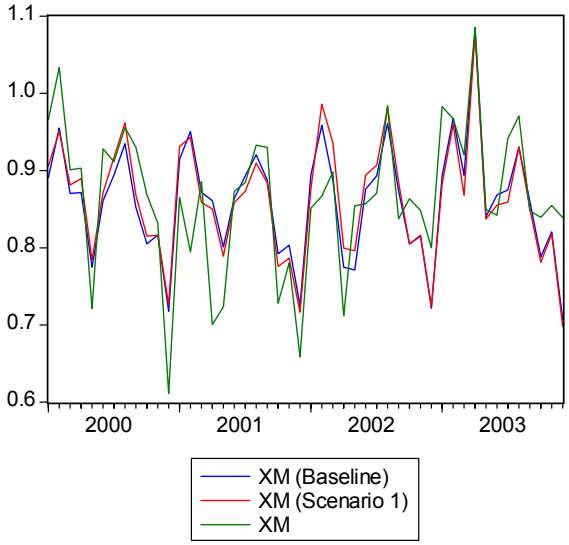
Residuals of the short-term equation that ensures the long-term stability of the degree of coverage of import by export



On the basis of these two equations (equation 2 and equation 3) we have built two models with error-correcting terms. The dynamic solving of the two models reveals different solutions, but quite close to the real data (Graph 10). The conclusion was that although the foreign imbalances have significantly influenced the output gap dynamics, imposing a long-term satbility condition is not impossible under the current circumstances of the Romanian economy.

Graph 10

Dynamic solutions of the models built on the basis of the two short-term equations: equation 2 (Baseline) and equation 3 (Scenario 1)



The graph shows the dynamic solving of the two models with error correction term for the interval January 2000–December 2003. The solution refers to the level of the degree of coverage of import by export, used as a proxy for the foreign trade balance, in the case of observing the current long-term trend (Baseline) also when the long-term stability condition is imposed (Scenario 1), formulated in the Dobrescu model regarding the double-conditioned potential GDP.

1.3. The correlation between the output gap and the ratio of the current account credit to the current account debit. Monthly data

We have used the same procedure for the ratio of the current account credit to debit, considered as a variable that characterized the current account balance. Due to the existing correlation between the current account balance and the foreign trade balance, one may expect similar results.

The long-term cointegration equation shows a 0.24 long-term elasticity of the ratio of the current account credit to the debit as against the output gap:

LOG(CCSSA)=-0.1079023347+0.2362651644*LOG(OG22SA)

The short-term dynamics equation is:

Equation 4

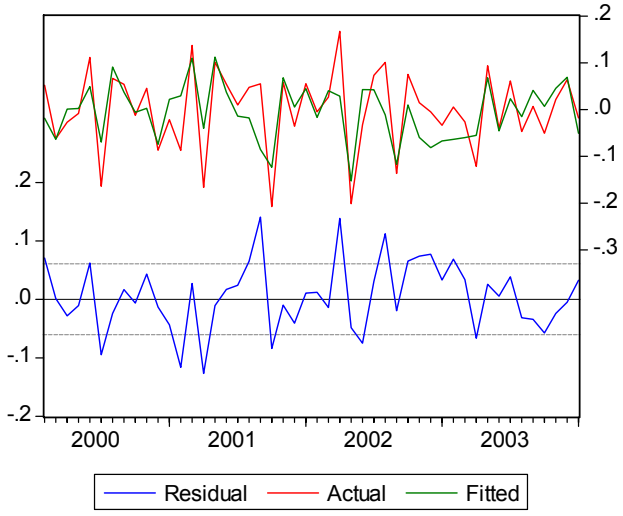
DLOG(CCSSA)=-0.914982*(LOG(CCSSA(-1))-(-0.1079023347+

(-6.34)

0.2362651644*LOG(OG22SA(-1))))-0.220794*DLOG(OG22SA(-1))
(-1.28)
+1.007690*DLOG(RSD_97SA(-1))
(1.65)
R^2=0.51
DW=1.90

Graph 11

Residuals of short-term equation 4



Similarly to the above-mentioned model (see equation 3), we have imposed the long-term stability condition, namely assuming that the term c(2) of the long-term equation was equal to zero, and we have obtained the short-term dynamics equation that should have ensured the long-term stability of the current account balance (in our case, the ratio of the current account credit to debit):

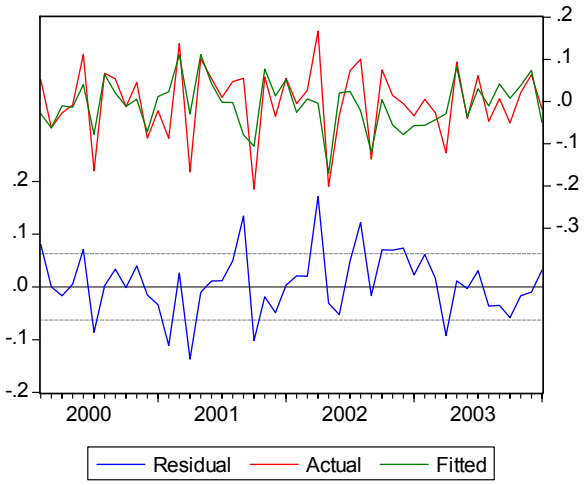
The short-term dynamics equation with long-term stability condition is:

Equation 5

DLOG(CCSSA)=-0.839000*(LOG(CCSSA(-1))-(-0.1079023347))
(-5.87)
-0.121871*DLOG(OG22SA(-1))+1.172293*DLOG(RSD_97SA(-1))
(-0.68) (1.87)
R^2=0.47
DW=1.91

Graph 12

Residuals of short-term equation 5 that satisfies the long-term stability condition



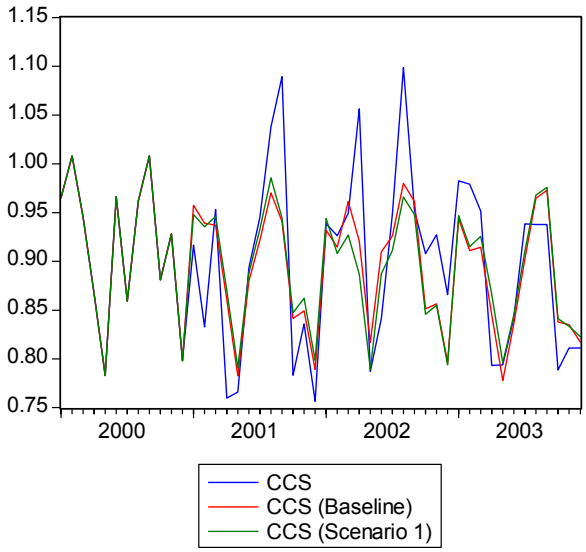
Unlike the case of the foreign trade, the short-term equation has provided better results when we have also used other variables for specification: it seems that the USD exchange rate has had a significant influence upon the current account. Such a dependence comes to confirm the hypothesis regarding the influence of the exchange rate policies upon the correlation between the current account balance and the output gap. If the short-term elasticity of the output gap as against the ratio of the current account credit to debit is –0.12, the elasticity as against the exchange rate is 1.17, which indicates an acceleration of the increase in the current account deficit as against the increase in the exchange rate.

On the basis of these two equations (equation 4 and equation 5) we have built two models with error-correction terms. The dynamic solving of these models reveals different solutions, but quite close to the real data (Graph 13). The resulting conclusion is that although the current account imbalance significantly influences the output gap dynamics, imposing a long-term stability consition is not impossible under the current circumstances of the Romanian economy.

The graph presents the dynamic solving of the two models with error-correction term for the interval January 2001 – December 2003. The solution refers to the level of the ratio of the current account credit to debit, used as a proxy for the current account balance, in the case of observing the current long-term trend (Baseline) also under the circumstances of imposing the long-term stability condition (Scenario 1), formulated in the Dobrescu model regarding the double-conditioned output gap. The two solutions are close enough to each other to draw the conclusion that imposing such a stability condition is feasible for the Romanian economy in this stage of its evolution.

Graph 13

Dynamic solutions of the models built on the basis of the two short-term equations: equation 4 (Baseline) and equation 5 (Scenario 1)



1.4. The exchange rate and the exchange rate policy

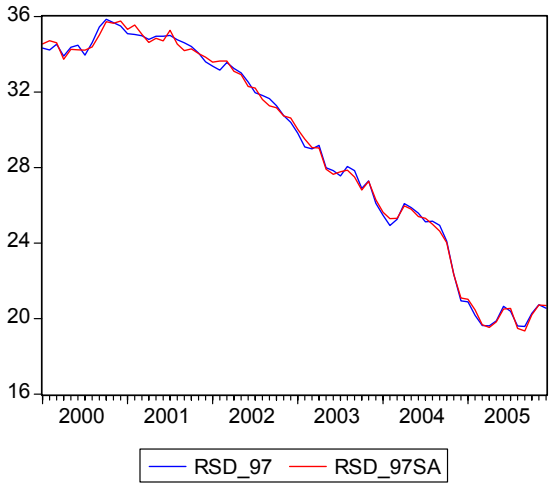
The influence of the exchange rate upon the correlation between the current account and the output gap as revealed by the equations 4 and 5 has determined us to build a model with error-correction mechanism in order to estimate how important such an influence is.

The exchange rate evolution is involved in that of the foreign imbalances through the influence it has upon the export and import: the exchange rate appreciation has a positive influence upon export and a negative one upon import. In real terms, since March 1999 a quasi-permanent depreciation of the exchange rate occurred (Graph 14). The exchange rate dynamics has two determinants: a) the forex foreign market evolutions: b) the central bank interventions, aimed at levelling down the extreme fluctuations of the forex market.

For the empirical analysis we had in view, we have built a model with error-correction mechanism that expressed the dependency of the output gap estimated last year through the Blanchard-Quah method upon the main variables expressing the domestic imbalances (inflation and unemployment rate) and the foreign ones (the ratio of current account credit to debit and the exchange rate in real terms).

Graph 14

Exchange rate dynamics, 1997 real terms, gross and deseasonalized series



The long-term cointegration equation indicates the following long-term output gap elasticities: 0.099 as against the ratio of the current account credit to debit, -0.47 as against the real exchange rate, and 0.51 as against the unemployment rate.

LOG(OG22SA)=0.5174332259+0.0992774692*LOG(CCSSA)-

0.4758870744*LOG(RSD_97SA)+0.5149550143*LOG(RSOMSA)-
0.09032017862*DUM303

The short term dynamics equation indicates quite a fast speed of adjustment to balance (-0.7) and the following short-term elasticities: 0.1 as against the ratio of the current account credit to debit, 0.6 as against the unemployment rate, and 0.96 as against inflation. One may notice that the elasticity as against the ratio of the current account credit to debit is almost identical in the long run and short run, and the elasticity as against the unemployment rate increases in the short run as compared to that in the long run. However, the essential differences are those concerning the elasticity as against the exchange rate, which shows influence only in the long run, which strengthens the influence exerted by inflation - whose elasticity is 0.96 in the short run.

Equation 6

DLOG(OG22SA)=0.007675-0.698431*(LOG(OG22SA(-1))-
(0.5174332259+0.0992774692

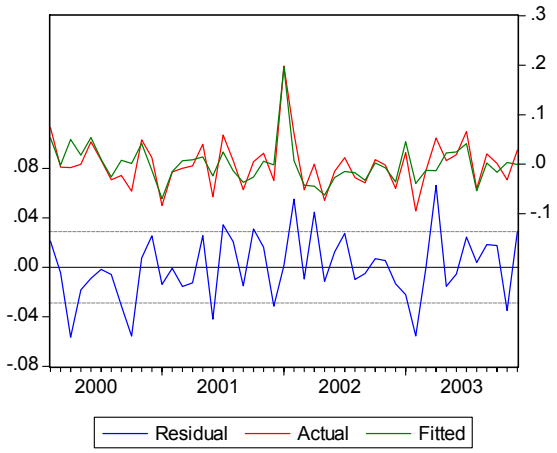
(1.77) (-4.78)

*LOG(CCSSA(-1))-0.4758870744*LOG(RSD_97SA(-
1))+0.5149550143*LOG(RSOMSA(-1))

-0.09032017862*DUM303(-1)))+0.100696*DLOG(CCSSA)+0.640493*DLOG(RSOMSA)
(2.02) (7.95)
-0.070351*DUM303+0.963457*DLOG(IPCSA)
(-2.23) (2.22)
R^2=0.70
DW=2.09

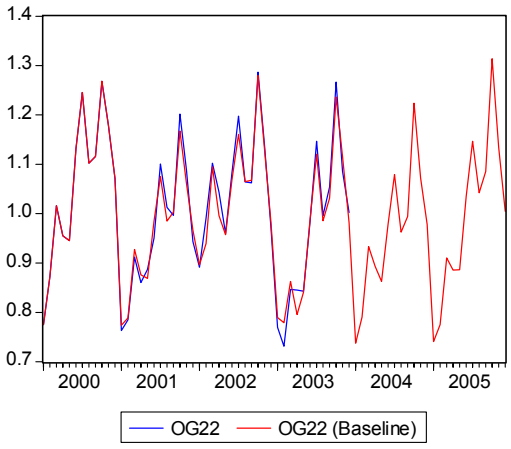
Graph 15

Residuals of equation 6



Graph 16

Dynamic solution of the model built on the basis of equation 6



The adjustment of the dynamic solution built on the basis of equation 6 to the data computed for the output gap (over the interval January 2001–December 2003) provides the basis for the estimation of a feasible forecast for the output gap. It is the case of an *ex post* forecast, which indicates a behavioral pattern similar to the previous intervals, with peaks exceeding unit in the second half of the respective year.

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