THE EXTERNAL PAYMENTS' BALANCE AND THE ROMANIAN ECONOMIC GROWTH BETWEEN 1996 AND 2006

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The economic development involves, for a short time, a deficit of external payments balance (EPB). Studying the evolution of the EPB sold provides useful information regarding the economic development' degree (rate). An invariable deficit which has acceptable limits and correlated with an investment policy in production sectors could cause a long economic growth. Studying the relationship between the growth rate of GDP and the growth deficit of EPB for the 1996-2006 periods confirms this hypothesis.

1. Introduction

External payments balance illustrates the summation of a country's economic transactions fluxing in its reports with the foreign countries, completed in a certain time period, usually a year. At the end of a year, EPB can be found in one of the following situations:

a) Balance – the surpluses and the deficits compensate each other;

b) Surplus – the surpluses exceed the deficits;

c) Deficit – the deficits exceed the surpluses.

The EPB is with surplus or in balance when the exports and debits' value is bigger or equal with the value of imports and/or credits. This specific situation characterizes the big oil exporters or developed countries that, in times of economic progress add a big surplus value to the raw material as a result of a high technological degree of the production process. An EPB with surplus or in balance can facilitate the economic growth of a country. The EPB's surplus it is usually oriented through the development of the national activity sectors.

The EPB is with deficit when the exports and debits' value is lower than the value of imports and/or credits. This specific situation characterizes the least developed, in course of development and in transition countries that don't contrive to produce competitive goods for the international economic market. An EPB with deficit causes foreign borrowings, witch can be least favorable for the economic development process.

The paper's objective is to analyze the relationship between the economic growth and the EPB's balance account in Romania, for the 1996-2006 period.

The working method is the time series' econometric modeling. An econometric model will be created to explain the evolution of the Romanian EPB's balance account, for the 1996-2006 period. Also, a model will be created to explain the dependence of the EPB's balance account dynamics on the economic growth.

Statistical data

The EPB's balance account data for the 1996-2006 period include the current account and the capital account, expressed in mill. ECU for the 1996-1998 period, and mill. EURO for the 1999-2006 period. Although for this period both ECU and EURO were subjected to erosion, caused by inflation, its influence was relatively small, so the actualization wasn't all that necessary. Data subjected to analyze is EPB's balance account and the Romanian GDP, for the 1996-2006 time period. For the modeling of the relationship between the economic growth and the EPB's balance account was used the GDP's growth rate and the EPB's deficit growth rate.

2. The analyze of Romanian EPB's evolution, for the 1996-2006 period

By analyzing Figure 1 it can be observed that the EPB's deficit has an amplifying tendency, emphasized especially in the 2003-2006 period. The evolution of the Romanian EPB's balance account is related to the shape of a hyperbole or a geom. Parabola arch, which leads us to try the trend modeling by a inverse, quadratic or cubic function.

The analysis of the possibilities leads to a cubic trend for the Romanian EPB's balance account, as suggested in Figure 1. The disadvantage of this model is that it doesn't allow the underlying of major evolution changes in the future, it only allows the extension of a descending trend.

Figure 1. The Romanian EPB's balance account dynamics, in the 1996-2006 period
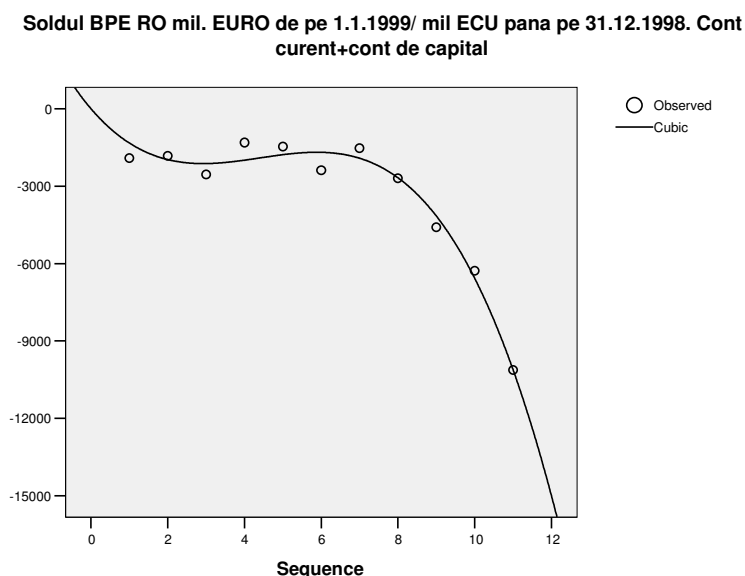
3. Modeling the Romanian EPB's dynamics with a cubic trend model

As shown in Figure 1, the evolution of the Romanian EPB's balance account can be estimated with a cubic model.

Estimation and validation of the model's parameters

The estimated cubic model is given by the following relation:

$$Y_t = a + b_1 X_t + b_2 X_t^2 + b_3 X_t^3,$$

where a, b_1, b_2, b_3 are the parameters estimates of the regression model. Using the ordinary least squares method and the SPSS software, the following results has been obtained:

Table 1. Correlation coefficients

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
Case Sequence	-1740,672	226,097	-2,800	-7,699	,000
Case Sequence ** 2	445,573	61,326	6,369	7,266	,000
Case Sequence ** 3	-33,718	3,965	-4,668	-8,504	,000

The estimated model, without the constant, is: $Y_t = -1740,527 t + 445,573 t^2 - 33,718 t^3$. As shown in the table above, models' parameters are significant.

Correlation coefficients and model validation

The cubic model with no constant explains 98.6% (Adjusted R Square) of the variation of Romanian EPB's balance account for the 1996-2006 period. The ANOVA test, presented in Table 2, shows that the correlation coefficient is statistically significant, and so is the estimated regression model.

Table 2. Regression model's validation

ANOVA[a]

	Sum of Squares	df	Mean Square	F	Sig.
Regression	193600975,722	3	64533658,57	255,546	,000
Residual	2020257,278	8	252532,160		
Total	195621233,000	11			

a. The equation was estimated without the constant term.

Analyzing modeling errors

Table 3 shows the result of error distribution normality testing, as obtained in the trend modeling of the Romanian EPB's balance account's evolution by a cubic model. The results show that the model errors' distribution doesn't differ significantly from the normal distribution (sig. = 0,982).

Table 3. Model errors' distribution normality testing

One-Sample Kolmogorov-Smirnov Test

		Error for BPE_EUR MOD CUBIC ct=0
N		11
Normal Parameters [a,b]	Mean	-31,1862099
	Std. Deviation	448,28103921
Most Extreme Differences	Absolute	,174
	Positive	,174
	Negative	-,149
Kolmogorov-Smirnov Z		,578
Asymp. Sig. (2-tailed)		,892

a. Test distribution is Normal.

b. Calculated from data.

In Table 4 are presented the results of the errors' independence testing, using Runs test. The test results show that the errors' independence hypothesis is accomplished. The results presented in Table 5 illustrate that the model errors also discharge the homoskedasticity hypothesis (Spearman ranks' correlation coefficient between the errors and the time variable was calculated and validated).

Table 4. Model errors' autocorrelation testing

Runs Test

	Error for BPE_EUR from CURVEFIT, MOD_ 4 CUBIC NOC
Test Value [a]	-15,70271
Cases < Test Value	5
Cases >= Test Value	6
Total Cases	11
Number of Runs	8
Z	,671
Asymp. Sig. (2-tailed)	,502

a. Median

Table 5. Model errors' homoskedasticity testing

Correlations

			Ani	mod_er_ mod_cub
Spearman's rho	Ani	Correlation Coefficient	1,000	-,436
		Sig. (2-tailed)	.	,180
		N	11	11
	mod_er_mod_cub	Correlation Coefficient	-,436	1,000
		Sig. (2-tailed)	,180	.
		N	11	11

Te obtained results allow us to conclude that the estimated model fulfills all the hypothesis of a classical regression model. Therefore, the model estimated with a cubic function explains statistically significant the variation of the Romanian EPB's balance account for the 1996-2006 period. Based on this model, prediction for the future periods can be made.

4. Modeling the relationship between the economic growth – EPB's balance account

The relationship between the economic growth and the EPB's balance account is presented in Figure 2. The model that explains the relationship between the two variables is a quadratic model and it has the parameter's estimates presented in Table 6.

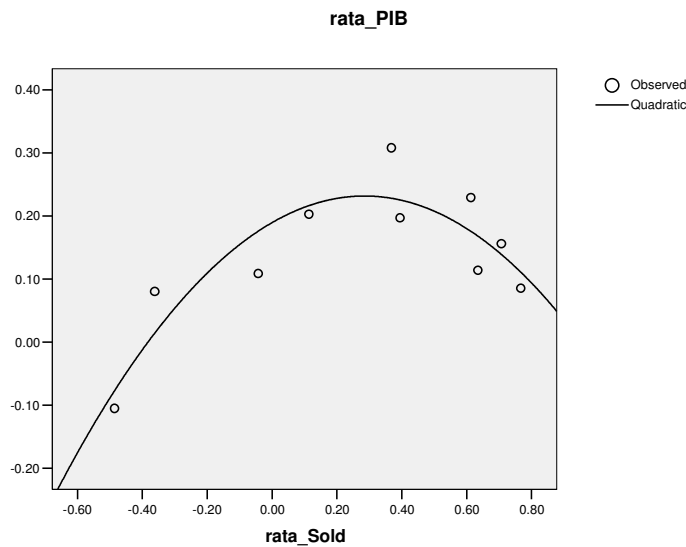*Figure 2. Economic growth rate and EPB's balance account growth rate for the 1996-2006 period*

Table 6. Regression coefficients

Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
rata_Sold	.296	.059	1.191	5.030	.002
rata_Sold ** 2	-.520	.130	-.945	-3.994	.005
(Constant)	.189	.031		6.073	.001

The estimated model, as presented in the table above, is:

$Rata\_PIB = 0,189 + 0,296 Rata\_Sold - 0,52 Rata\_Sold^2$.

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The tests made for the model errors shows that the model fulfills all the hypothesis from the econometric modeling (Tables 7-9).

Table 7. Errors' normality testing

One-Sample Kolmogorov-Smirnov Test

		Error for rata_PIB with rata_Sold from CURVEFIT, MOD_7 QUADRATIC
N		10
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	.05137099
Most Extreme Differences	Absolute	.205
	Positive	.205
	Negative	-.151
Kolmogorov-Smirnov Z		.647
Asymp. Sig. (2-tailed)		.797

a. Test distribution is Normal.

b. Calculated from data.

Table 8. Errors' independency testing

Runs Test

	Error for rata_PIB with rata_Sold from CURVEFIT, MOD_7 QUADRATIC
Test Value[a]	-.01955
Cases < Test Value	5
Cases >= Test Value	5
Total Cases	10
Number of Runs	6
Z	.000
Asymp. Sig. (2-tailed)	1.000

a. Median

Table 9. Errors' homoskedasticity testing

Correlations

		t	abs_erori
t	Pearson Correlation	1	.180
	Sig. (2-tailed)		.619
	N	11	10
abs_erori	Pearson Correlation	.180	1
	Sig. (2-tailed)	.619	
	N	10	10

The obtained model shows that an EPB's balance account rate's growth leads to economic growth up to a certain level, after which an economic regress is recorded. For Romania, the ongoing growth of the EPB's deficit draws a fall into the economic growth, which can create, on long term, the appearance of major macroeconomic dysfunctions.

5. Conclusions

The estimated model for the EPB's balance account's dynamics can be used for predictions, with the reserve that, at a certain point, it is possible to appear political changes in Romania regarding the international economic transactions, which can cause ruptures in the EPB's balance account's evolution. These changes in the EPB's balance account's evolution can't be predicted, it can only be investigated later, applying some specific tests.

The relationship between GDP's growth rate (mill. EUR) and the EPB's deficit growth rate depend on the each economy's specificity, but, in general terms, we can talk about the economic growth of a country

based on the growth of the EPB's deficit. This is the case for Romania. What makes the model specific for each economy is the way that the country comprehends to indebted it self.

1. If based on the growth of the country's indebt degree occur a growth of the weight of the productive sectors in the country's economy, these can generate a surplus value on economic level that will lead to economic growth. This strategy is a positive one and can be pointed up through ascending models: linear, exponential or growth models.

2. If based on the growth of the country's indebt degree occur a growth of the population's consumption, it will draw a national economy collapse in the near future. This strategy can be pointed up through quadratic models with a point of maximum, followed by a fall of the independent variable values. Unfortunately this is the Romania's case, and from the analysis it is showed very clearly that the debts created by the Romanian government was directed to consumption and not to investment in the productive sectors.

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