The Fiscal Policy and the Stability of the nominal Sector: The Romanian Case (revisited version)

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18. November 2008

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Keywords: impact, inflation, fiscal policy, econometric analyze, fiscal deficit, budgetary sold

Abstract: *the fiscal policies in the contemporaneous economic systems heavy influence both the real and nominal sectors. These effects could be located at the primary distribution of the social resources as will as at level their redistribution one.*
The aims of this paper are: (1) to review the literature of the main conceptual frameworks which link the fiscal policy and the dynamic of real sector, especially on the inflation side (2) to advance an empirical analyze of these link for the Romanian case and (3) to draw some conclusion about desirable framework of the fiscal policy for the current period in the perspective of Romanian access to European Union.

1. INTRODUCTION

Specialized international economic literature identifies two types of theoretical approaches regarding the link between inflation and fiscal policy: on one side an approach promoted by Sargent and Wallace (1981) known as „The Theory of inflationary fiscal deficit", on the other side an approach formulated by Leeper (1991), Woodford (1995, 1997, 1998) and Sims (1994) known as „The Theory of fiscal determination of the level of prices".
The theory of the inflationary fiscal deficit tries to explain, on long term, to what extent do significant and persistent deficits determine the in the increase of price indexes and which are the precise ways to counteract their negative effect.
The theory of fiscal determination of the level of prices takes in to the effects induced over the inflation by the adjustments of fiscal policy and evaluates the measure in which these can be quantized using empirical investigations. Moreover, it is considered that the de facto level of price should correspond with the one for which the real value of public debt equalizes the present value of future budget excess, ensuring in this way an inter-temporal budget balance.

2. THEORETICAL FUNDAMENTS

Knowing the monetary nature of the inflation, economic literatures study the relations between fiscal and monetary policy, as well as the results on their impact over inflation. We remark, as a matter of fact the interaction between the powers of two characteristic

authorities: on one side the Govern as a principle promoter of fiscal policy and on the other side the Central Bank, as a forum of conceiving and applying monetary policy.
In such circumstances the Govern can force the Central Bank to accept direct financing of the budget deficit or to maintain the refinancing installment at a low level, so that the cost for public credit remains low. Thus, according to Barro and Gordon (1983), a high level of independence of the Central Bank can induce a high level of price indexes when the bank tries to maintain fiscal sustainability in the economy with cost levels as small as possible.
Cotarelli et al. (1998) sums up the fact that there is a big impact of fiscal deficit over the inflation, especially in countries in which money markets aren't highly developed; suggesting limited access of governs on those markets and their propensity to ask for help from the Central Bank.

Of course, the „fiscal-monetary" game is not a unique explanation for the effects induced by the fiscal policy on the inflation dynamic. More generally, it could be argued against the thesis of fiscal policy neutrality if there are fulfilled at least two cumulative conditions: (1) inflation is not a „pure" monetary process but rather a „structural-monetary" one as an expression of simultaneous disequilibrium in the real and nominal sectors of the economy; (2) the fiscal policy is able to influence the structural determinants of the inflationary processes.
We consider that such argument could be especially taking into account in the case of an emergent economy as the Romanian one which is in a phase of deep structural, functional and institutional transformations. Thus our analytical objective is to provide some evidences for the thesis of fiscal policy non-neutrality in such a case.

The next section describes the empirical analysis framework and the results derived from its appliance for the Romanian involved variables in the last 10 years of transition (monthly data provided by National Bank of Romania public disclosure in its publications). A brief discussion of the results is done in Section 4 and some conclusions are formulated and some further research directions are suggested in Section 5. The main output of the proposed analysis consists in finding some supportive empirical evidences for a relevant impact of fiscal policy over the inflation dynamic in a short time span.

3. METHOD AND RESULTS

In order to test the links between the inflation and some budgetary macro-variables (public revenues and public expenditures) a *Vector Error Correction* (**VEC**) could be involved. The **VEC** methodology presents several advantages. In particular, it allows building a model of the connections between some co-integrated variables, being extremely useful in the study of the economic fluctuations.
A **VEC** model is a particular restricted *Vector Error* (**VAR**) model designed for use with non-stationary series that are known to be co-integrated. The **VEC** has co-integration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics. The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments.

To take the simplest possible example, consider a two variable system with one co-integrating equation and no lagged difference terms. The co-integrating equation is:

$$y_{2,t} = \beta y_{1,t} \quad (1)$$

The corresponding **VEC** model is:

$$\begin{aligned} \Delta y_{1,t} &= \alpha_1 \left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{1,t} \\ \Delta y_{2,t} &= \alpha_2 \left(y_{2,t-1} - \beta y_{1,t-1}\right) + \varepsilon_{2,t} \end{aligned} \qquad (2)$$

In this simple model, the only right-hand side variable is the error correction term. In long run equilibrium, this term is zero. However, if y_1 and y_2 deviate from the long run equilibrium, the error correction term will be nonzero and each variable adjusts to partially restore the equilibrium relation. The coefficient α_i measures the speed of adjustment of the i-th endogenous variable towards the equilibrium.

The vector of the endogenous variables has the following representation:

$$Y_t = [IP_t \; VP_t \; \mathrm{CHP}_t] \qquad (3)$$

where: *IP* - variations in the level of inflation, *VP* - variations in the level of public revenues, *CHP* - variations in the level of public expenditures and *t* represent the current period t.
Variations that can be expressed as:

$$x_t = ln\left(\frac{X_t}{X_{t-1}}\right) * 100 \qquad (4)$$

For presenting how such a model can be applied in approaching the inter-linkages between inflation, public revenues and their allocation, in an instable economic system, as in Romania, we propose an analysis made for September 1998 - December 2007 period, which was shaped by important changes in the fiscal policy. The seasonal effects are drawn from the original data by the usage of an *X12-ARIMA* procedure in order to preserve a more stable interaction between the involved variables.
Despite some differences between them, the group unit root tests suggest that there could be identified some common unit root processes which are driving the involved variables but not individual unit roots:

Group unit root test: Summary
Sample: 1998M01 2007M12
Exogenous variables: Individual effects, individual linear trends
User specified lags at: 6
Andrews bandwidth selection using Quadratic Spectral kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	22.6873	1.0000	3	336
Breitung t-stat	-5.35734	0.0000	3	333
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-5.81936	0.0000	3	336
ADF - Fisher Chi-square	44.0105	0.0000	3	336
PP - Fisher Chi-square	168.018	0.0000	3	336

Null: No unit root (assumes common unit root process)				
Hadri Z-stat	1.43287	0.0759	3	336

*** Probabilities for Fisher tests are computed using an asympotic Chi -square distribution. All other tests assume asymptotic normality.*

The estimation of the general model parameters described by the relation (3) leads to following results:

Vector Error Correction Estimates
Sample (adjusted): 1998M09 2007M12
Included observations: 112 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegration Restrictions:
B(1,1)=1
B(1,2)=0
B(2,1)=0
B(2,2)=1
A(2,1)=0
A(3,1)=0
A(1,2)=0
Restrictions identify all cointegrating vectors
LR test for binding restrictions (rank = 2):

Chi-square(3)	***0.902901***
Probability	***0.824728***

Cointegrating Eq:	**CointEq1**	**CointEq2**
IP_SA(-1)	1.000000	0.000000
VP_SA(-1)	0.000000	1.000000
CHP_SA(-1)	-0.162919	-1.001500
	(0.20626)	(0.06640)
	[-0.78989]	[-15.0818]
@TREND(98M01)	-0.019409	0.008666
C	1.335811	0.105342

Error Correction:	**D(IP_SA)**	**D(VP_SA)**	**D(CHP_SA)**
CointEq1	-3.170459	0.000000	0.000000
	(0.55242)	(0.00000)	(0.00000)
	[-5.73921]	[NA]	[NA]
CointEq2	0.000000	-2.902789	0.931589
	(0.00000)	(0.92919)	(0.80961)
	[NA]	[-3.12401]	[1.15067]
D(IP_SA(-1))	1.639269	-0.083658	0.058595
	(0.51537)	(0.30429)	(0.26733)

	[3.18077]	[-0.27493]	[0.21919]
D(IP_SA(-2))	1.128469	-0.058543	0.145588
	(0.45046)	(0.26597)	(0.23366)
	[2.50517]	[-0.22012]	[0.62309]
D(IP_SA(-3))	0.833613	-0.052351	0.146438
	(0.37165)	(0.21944)	(0.19278)
	[2.24299]	[-0.23857]	[0.75961]
D(IP_SA(-4))	0.478365	-0.016845	0.123813
	(0.28736)	(0.16967)	(0.14906)
	[1.66470]	[-0.09928]	[0.83065]
D(IP_SA(-5))	0.203813	0.032529	0.087290
	(0.19488)	(0.11507)	(0.10109)
	[1.04582]	[0.28270]	[0.86350]
D(IP_SA(-6))	0.061771	0.040960	0.030700
	(0.10685)	(0.06309)	(0.05542)
	[0.57810]	[0.64924]	[0.55390]
D(VP_SA(-1))	-1.113610	1.124648	-0.841193
	(1.47290)	(0.86965)	(0.76401)
	[-0.75606]	[1.29321]	[-1.10103]
D(VP_SA(-2))	-0.582886	0.658657	-0.674071
	(1.28427)	(0.75828)	(0.66616)
	[-0.45387]	[0.86862]	[-1.01187]
D(VP_SA(-3))	-0.229841	0.492489	-0.543579
	(1.06288)	(0.62756)	(0.55132)
	[-0.21624]	[0.78477]	[-0.98595]
D(VP_SA(-4))	-0.252484	0.314011	-0.467767
	(0.82870)	(0.48929)	(0.42985)
	[-0.30468]	[0.64177]	[-1.08820]
D(VP_SA(-5))	-0.487516	0.145086	-0.365241
	(0.54985)	(0.32465)	(0.28521)
	[-0.88664]	[0.44690]	[-1.28059]
D(VP_SA(-6))	-0.386456	0.048236	-0.183017
	(0.26095)	(0.15408)	(0.13536)
	[-1.48094]	[0.31307]	[-1.35208]
D(CHP_SA(-1))	0.279244	-2.151895	-0.194715
	(1.51205)	(0.89277)	(0.78432)
	[0.18468]	[-2.41036]	[-0.24826]
D(CHP_SA(-2))	-0.146577	-1.580109	-0.208820
	(1.34450)	(0.79384)	(0.69741)
	[-0.10902]	[-1.99046]	[-0.29942]

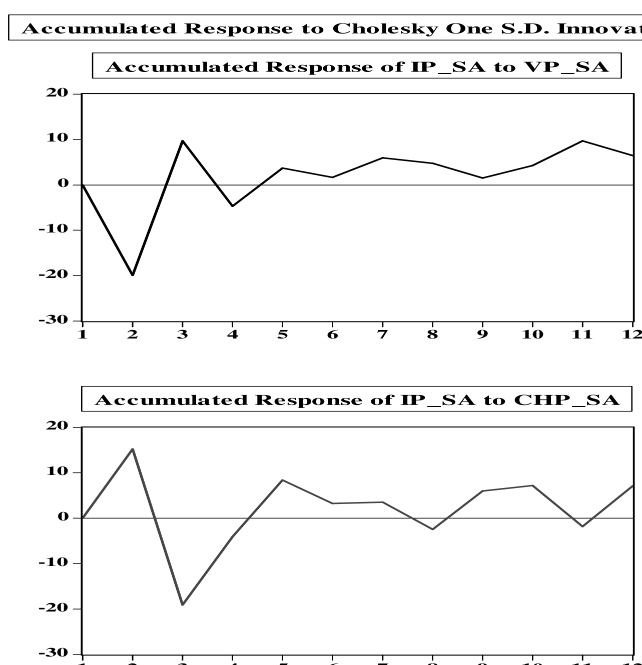
D(CHP_SA(-3))	-0.657006	-1.210711	-0.086818
	(1.13423)	(0.66969)	(0.58834)
	[-0.57925]	[-1.80787]	[-0.14757]
D(CHP_SA(-4))	-0.221427	-0.828428	0.049259
	(0.90895)	(0.53668)	(0.47148)
	[-0.24361]	[-1.54363]	[0.10448]
D(CHP_SA(-5))	0.174207	-0.457075	0.201463
	(0.62568)	(0.36942)	(0.32454)
	[0.27843]	[-1.23727]	[0.62076]
D(CHP_SA(-6))	0.222489	-0.137721	0.157973
	(0.32374)	(0.19115)	(0.16793)
	[0.68724]	[-0.72049]	[0.94071]
C	-3.650670	1.044573	0.518463
	(12.1463)	(7.17161)	(6.30040)
	[-0.30056]	[0.14565]	[0.08229]
@TREND(98M01)	0.047173	-0.002722	-0.018235
	(0.17038)	(0.10060)	(0.08838)
	[0.27687]	[-0.02706]	[-0.20633]
R-squared	0.754896	0.703883	0.559828
Adj. R-squared	0.697705	0.634789	0.457121
Sum sq. resids	300690.8	104825.0	80903.60
S.E. equation	57.80146	34.12803	29.98214
F-statistic	13.19958	10.18734	5.450729
Log likelihood	-601.0601	-542.0478	-527.5419
Akaike AIC	11.12607	10.07228	9.813249
Schwarz SC	11.66006	10.60627	10.34724
Mean dependent	0.082002	-0.089756	-0.356119
S.D. dependent	105.1292	56.47282	40.69219
Determinant resid covariance (dof adj.)		1.42E+09	
Determinant resid covariance		7.37E+08	
Log likelihood		-1620.619	
Akaike information criterion		30.22533	
Schwarz criterion		31.97294	

In order to check the appropriateness of the estimated VAR and the VEC specification stability the inverse roots of the characteristic AR polynomial could be analyzed. Such an analysis confirms that the estimated VEC could be considered as „stable" since there is only 1 unit root as is imposed by the VEC specification and therefore in terms of involved parameters the stability of the model could be considered as „good enough":

Roots of Characteristic Polynomial	
Endogenous variables: IP_SA VP_SA CHP_SA	
Exogenous variables:	
Lag specification: 1 6	

Root	Modulus
1.000000	1.000000
-0.672570 + 0.585462i	0.891693
-0.672570 - 0.585462i	0.891693
-0.061351 - 0.827350i	0.829621
-0.061351 + 0.827350i	0.829621
0.504295 + 0.635366i	0.811174
0.504295 - 0.635366i	0.811174
0.605901 + 0.512404i	0.793519
0.605901 - 0.512404i	0.793519
-0.785518 - 0.034684i	0.786283
-0.785518 + 0.034684i	0.786283
-0.409832 - 0.663633i	0.779981
-0.409832 + 0.663633i	0.779981
0.299876 + 0.671995i	0.735869
0.299876 - 0.671995i	0.735869
-0.003405 + 0.677926i	0.677934
-0.003405 - 0.677926i	0.677934
-0.523045 - 0.423832i	0.673209
-0.523045 + 0.423832i	0.673209
-0.545879	0.545879
0.200147	0.200147
VEC specification imposes 1 unit root(s).	

Based on these results we could consider that this model satisfactory describes the connection between implicated variables. Its use allow us to make an approximation of the impulse function form, which estimates the inflation evolution caused by a shock in the revenues level or in the public expenditures level:



4. DISCUSSIONS

As the impulse functions from chart suggests, an initially exogenous shock in the dynamic of public revenues exercises initially a reduction in the inflation rate, followed in a 2-3 month by an „up" adjustment. After this period, the translated effects reach a lower „peak" in two quarters and are slowly absorbed after that. Similarly, an expansion of the public expenditures contributes to the inflationary tensions in a quarter. Such effect is slowly absorbed in 2-3 quarters.

It is important to remark that the ensemble of these effects is "short-termed", reaching maximal levels in first two post-impact quarters. In other words, changes in the configuration of public decision mentioned determinants are fast and instable rebounded upon the dynamic of revenues and expenditures flows, determining frequent inter-correlated adjustment and exerting a "fast" reaction on the prices formation mechanisms.

This framework could also be applied for the study of variances decomposition:

Period	S.E.	IP_SA	VP_SA	CHP_SA
1	57.80146	100.0000	0.000000	0.000000
2	69.63696	87.05258	8.159565	4.787856
3	83.49744	61.56517	18.23186	20.20297
4	86.73714	58.64309	19.65323	21.70369
5	*88.04111*	*56.92935*	*19.99214*	*23.07852*
6	*88.40181*	*56.88364*	*19.88359*	*23.23277*
7	88.72249	56.95634	19.97716	23.06651
8	88.94663	56.69354	19.89588	23.41058
9	89.43421	56.14229	19.81185	24.04587
10	89.76193	56.34907	19.76064	23.89029
11	90.38239	55.57844	19.85897	24.56259
12	90.90093	54.98110	19.76256	25.25635

Cholesky Ordering: IP_SA VP_SA CHP_SA

It could be noticed that the public revenues and expenditures contributes almost in the same proportion to the inflation rate volatility and the increases in these variables' volatility are fast transmitted on inflationary behavior with induced effects being saturated in two quarters.

5. CONCLUSIONS

The analysis presented in this paper had in mind to envisage the way of manifestation of the correlation between public resources, their allocation and the prices evolution.

Results obtained suggest the existence of some "fast" adjustment processes inducted by the intrinsic characteristics of the fiscal policy, by the specific behaviour of the public authorities, particularities that are active in adoption and application of the public decision and also by the imperfect correlation between the fiscal and monetary policies. In other words, the impact of the fiscal policy on the costs levels, the modalities chosen by the public authorities to finance the public deficit as well as the inflationary expectations induced to the economic subjects could "counter-balance" the effects of a restrictive monetary policy.

The main analytical development directions are:

- Widening of conceptual framework taken into consideration explicitly determinant factors of correlation between public revenues and public expenditures;
- Adoption of some alternative methodologies for empirical testing of these determinants way of manifestation;
- Taking into consideration the case of other emerging economic systems.

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