Modelling loans and deposits during electoral years in Romania

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Abstract

This paper analyzes the effect of electoral years on loans and deposits for population in Romania. Using monthly data regarding the total loans and deposits, we identify the significance of the electoral timing on population´s behavior regarding financial decisions. We estimate that there are small changes in population´s affinity for increase in the indebtedness or for savings.

We use dummy variables for electoral periods, and when these are econometrically significant there is an evidence of the influence of the electoral timings in population´s financial decisions.

Keywords: *electoral years, loans, deposits, econometric model, ARDL model*

JEL Classification: *C32, C52, G10*

Introduction

There are studies that suggest there are different approaches of the banking system across Europe and the rest of the world when electoral years are coming. These studies stress that in well-established democracies such as the in the US or UK, governments have usually only a regulatory role in the banking sector, while in many other countries governments directly control financial resources through ownership of one or more banks in addition to their regulatory functions. In the states where the government highly controls the banking system, there are suspicions of corruption and state-owned banks can be misused by the ruling party, who may direct money to projects which will benefit those who support the government rather than those who serve the greater public interest.

In most democracies, the banking system is independent and usually the government cannot direct money through banks in order to increase the chances of re-election. Nevertheless, we analyze how the banking system and the population react in electoral years.

There are studies analyzing the situation across the world for state owned banks, like Sapienza[1] (2004) – in Italy - provides evidence that state-owned banks charge lower interest rates than do private sector banks, Khwaja and Mian[2] (2005) – Pakistan - provide evidence that low-quality borrowers with political connections can borrow from state-owned banks, Baum et al.[3] (2008) find that politically affiliated banks in Ukraine have significantly lower interest rate margins, Chinese state-owned banks are less profitable, less efficient and have worse asset quality than other types of banks (Lin and Zhang[4] (2009), Berger et al.[5] (2009)).

In Romania, because of the independence of National Bank of Romania, there are not clear evidences of this type of behavior. We focus on pure electorate preferences, meaning the level of confidence in the stability of the economic situation.

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[1] Sapienza, P., 2004. The effects of government ownership on bank lending. Journal of Financial, Economics 72 (2), 357–384.

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Let variable *dvl_total* be the total deposits in lei and *crl_total* total credits in lei. We assume that in presidential electoral years like 2004, 2009 and 2014 there is a change in these values.

We define 3 dummy variables for these electoral years (dummy04, dummy09 and dummy12), where the values are 1 in electoral years (on monthly level) and 0 otherwise.

As data sources, we use the values from National Bank of Romania, http://www.bnro.ro/Raport-statistic-606.aspx. The modelling was completed using E-Views, version 9.0.

For deposits, the assumption is tested using the following econometric model:

Table 1. Total deposits in lei – author's calculations

Dependent Variable: DVL_TOTAL/IPC
Method: Least Squares
Date: 06/22/15 Time: 19:20
Sample (adjusted): 2002M10 2014M12
Included observations: 147 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	760.4141	312.7101	2.431690	0.0163
DVL_TOTAL(-1)/IPC(-1)	0.984609	0.012514	78.68318	0.0000
RD	-29.58915	15.63153	-1.892915	0.0604
DUMMY09	-658.8270	259.7429	-2.536458	0.0123
DUMMY12	-445.6710	242.9918	-1.834099	0.0687
DUMMY14	-29.49539	254.0484	-0.116101	0.9077

R-squared	0.989246	Mean dependent var	15871.55
Adjusted R-squared	0.988864	S.D. dependent var	7274.270
S.E. of regression	767.6285	Akaike info criterion	16.16445
Sum squared resid	83084754	Schwarz criterion	16.28651
Log likelihood	-1182.087	Hannan-Quinn criter.	16.21404
F-statistic	2593.962	Durbin-Watson stat	1.935352
Prob(F-statistic)	0.000000		

Where IPC represents the Consumer Price Index and RD is the referential interest rate.

The estimators for electoral years 2009 and 2004 are econometrically significant, while the one for 2014 is not.

Moving to credits, the obtained results are:

Table 2. Total credits in lei – author's calculations

Dependent Variable: CRL_TOTAL/IPC
Method: Least Squares
Date: 06/22/15 Time: 19:12
Sample (adjusted): 2002M10 2014M12
Included observations: 147 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	948.1708	264.3648	3.586600	0.0005
CRL_TOTAL(-1)/IPC(-1)	0.987082	0.005216	189.2375	0.0000
RD	-21.27032	12.53150	-1.697349	0.0918
DUMMY09	-483.0364	196.8037	-2.454407	0.0153
DUMMY12	-357.2469	177.5202	-2.012429	0.0461
DUMMY14	-132.4890	185.3929	-0.714639	0.4760

R-squared	0.998464	Mean dependent var	32703.52

Adjusted R-squared	0.998410	S.D. dependent var	14040.17
S.E. of regression	559.9157	Akaike info criterion	15.53341
Sum squared resid	44204281	Schwarz criterion	15.65547
Log likelihood	-1135.706	Hannan-Quinn criter.	15.58300
F-statistic	18332.20	Durbin-Watson stat	0.729741
Prob(F-statistic)	0.000000		

The estimators for electoral years 2009 and 2004 are econometrically significant, while the one for 2014 is not. Also, the model does not pass the autocorrelation test (DW test value is low).

We can conclude that both for deposits and credits, electoral years 2004 and 2009 showed an influence, meaning that there was a decrease in total deposits in these 2 years. For year 2014, the results were not econometrically supported.

We used also another set of dummy variables, where we select only 2 months prior the electoral moment and 2 after.

For deposits, the results are:

Table 3. Total deposits in lei – author's calculations

Dependent Variable: DVL_TOTAL/IPC
Method: Least Squares
Date: 06/22/15 Time: 19:06
Sample (adjusted): 2002M10 2014M12
Included observations: 147 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	872.2507	291.5686	2.991580	0.0033
DVL_TOTAL(-1)/IPC(-1)	0.972677	0.011622	83.69328	0.0000
RD	-32.04046	14.41367	-2.222921	0.0278
DUMMY09M	-273.6475	361.5812	-0.756808	0.4504
DUMMY12M	-277.0588	357.6630	-0.774637	0.4399
DUMMY14M	712.6067	366.0472	1.946762	0.0536

R-squared	0.988951	Mean dependent var	15871.55
Adjusted R-squared	0.988559	S.D. dependent var	7274.270
S.E. of regression	778.0748	Akaike info criterion	16.19148
Sum squared resid	85361445	Schwarz criterion	16.31354
Log likelihood	-1184.074	Hannan-Quinn criter.	16.24108
F-statistic	2524.026	Durbin-Watson stat	1.911667
Prob(F-statistic)	0.000000		

We can observe that only for electoral year 2014 the estimator is econometrically significant.

For total credits, the obtained results are:

Table 4. Total credits in lei – author's calculations

Dependent Variable: CRL_TOTAL/IPC
Method: Least Squares
Date: 06/22/15 Time: 19:22
Sample (adjusted): 2002M10 2014M12
Included observations: 147 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1134.273	242.1076	4.684996	0.0000
CRL_TOTAL(-1)/IPC(-1)	0.981672	0.004757	206.3747	0.0000
RD	-28.56219	11.39351	-2.506882	0.0133

DUMMY09M	-207.5735	269.3308	-0.770701	0.4422
DUMMY12M	-283.7317	264.1095	-1.074296	0.2845
DUMMY14M	-194.9298	269.9848	-0.722003	0.4715

R-squared	0.998387	Mean dependent var	32703.52
Adjusted R-squared	0.998330	S.D. dependent var	14040.17
S.E. of regression	573.7795	Akaike info criterion	15.58233
Sum squared resid	46420431	Schwarz criterion	15.70439
Log likelihood	-1139.301	Hannan-Quinn criter.	15.63192
F-statistic	17455.66	Durbin-Watson stat	0.675040
Prob(F-statistic)	0.000000		

Here none of the estimators for our periods of interest are econometrically significant.

The second analysis, based on dummy variable created to capture the precise months near the electoral event, cannot be econometrically sustained (only for deposits, in electoral year 2014).

As we mention in a previous article[6], analyzing the evolution of credits and deposits suggests a model with autoregressive and lag-distributed factors (an ARDL model). If the series are I(0) – stationary, we can use basic OLS for estimation. If we know the order of integration for the series, and it is the same for all, but they are not cointegrated, we estimate each series independently. If the series are integrated of the same order and are cointegrated, the theory suggest that we estimate, according to Dave Giles[7] "(i) An OLS regression model using the levels of the data. This will provide the long-run equilibrating relationship between the variables. (ii) An error-correction model (ECM), estimated by OLS. This model will represent the short-run dynamics of the relationship between the variables."

For credits, using Eviews software, we obtaine the following results:

Table 5. Total credits in lei – ARDL model - author's calculations

Dependent Variable: CRL_TOTAL/IPC
Method: ARDL
Date: 06/01/15 Time: 23:49
Sample (adjusted): 2003M04 2014M12
Included observations: 141 after adjustments
Maximum dependent lags: 12 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (12 lags, automatic): RD
Fixed regressors: C @TREND
Number of models evalulated: 156
Selected Model: ARDL(2, 7)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
CRL_TOTAL(-1)/IPC(-1)	1.461233	0.076212	19.17316	0.0000
CRL_TOTAL(-2)/IPC(-2)	-0.470285	0.075415	-6.235946	0.0000
RD	-4.739891	40.90288	-0.115882	0.9079
RD(-1)	80.46257	63.79553	1.261257	0.2095
RD(-2)	-194.5636	64.93482	-2.996290	0.0033
RD(-3)	141.0182	65.98484	2.137130	0.0345
RD(-4)	-56.46841	65.48296	-0.862338	0.3901
RD(-5)	-56.88114	65.67987	-0.866036	0.3881
RD(-6)	123.2913	64.77300	1.903436	0.0592
RD(-7)	-101.5646	40.55301	-2.504490	0.0135
C	1766.352	322.8551	5.471035	0.0000
@TREND	-8.803979	2.156076	-4.083335	0.0001

[6] Jula N.M., 2015, Software solutions for ARDL models, CKS 2015, 1001-1006
[7] Giles D., 2013, ARDL Models, http://davegiles.blogspot.com.es/2013/03/ardl-models-part-i.html

R-squared	0.999198	Mean dependent var	33817.94
Adjusted R-squared	0.999130	S.D. dependent var	13225.93
S.E. of regression	390.1402	Akaike info criterion	14.85215
Sum squared resid	19635010	Schwarz criterion	15.10311
Log likelihood	-1035.077	Hannan-Quinn criter.	14.95414
F-statistic	14614.98	Durbin-Watson stat	2.016080
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

This translates in a model like:

$$CRL\_TOTAL/IPC_t = \beta_0 + \beta_1\, CRL\_TOTAL(-1)/IPC(-1) + \beta_2\, CRL\_TOTAL(-2)/IPC(-2) + \alpha_0 RD_t + \alpha_1 RD_{t-1} + \alpha_2 RD_{t-2} + ... + \alpha_7 RD_{t-7} + \varepsilon_t$$

For deposits, we obtain an ARDL(7,0) model:

Table 6. Total deposits in lei – ARDL model - author's calculations

Dependent Variable: DVL_TOTAL/IPC
Method: ARDL
Date: 06/22/15 Time: 19:50
Sample (adjusted): 2003M04 2014M12
Included observations: 141 after adjustments
Maximum dependent lags: 12 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (12 lags, automatic): RD
Fixed regressors: C @TREND
Number of models evalulated: 156
Selected Model: ARDL(7, 0)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DVL_TOTAL(-1)/IPC(-1)	1.008354	0.085511	11.79208	0.0000
DVL_TOTAL(-2)/IPC(-2)	-0.041918	0.120099	-0.349027	0.7276
DVL_TOTAL(-3)/IPC(-3)	0.104406	0.119382	0.874557	0.3834
DVL_TOTAL(-4)/IPC(-4)	-0.096606	0.118184	-0.817418	0.4152
DVL_TOTAL(-5)/IPC(-5)	0.005022	0.117421	0.042766	0.9660
DVL_TOTAL(-6)/IPC(-6)	0.411911	0.117306	3.511413	0.0006
DVL_TOTAL(-7)/IPC(-7)	-0.416436	0.082093	-5.072705	0.0000
RD	-50.09462	21.26648	-2.355566	0.0200
C	1120.154	410.7344	2.727199	0.0073
@TREND	-2.396577	3.497914	-0.685145	0.4945

R-squared	0.989945	Mean dependent var	16397.15
Adjusted R-squared	0.989254	S.D. dependent var	6954.140
S.E. of regression	720.8813	Akaike info criterion	16.06711
Sum squared resid	68076759	Schwarz criterion	16.27624
Log likelihood	-1122.731	Hannan-Quinn criter.	16.15209
F-statistic	1433.032	Durbin-Watson stat	1.842568
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

A problem when using complex models to overcome the econometric tests is that it is difficult to keep a reasonable economic interpretation for the created variables. As Mayumi and Gianpietro stated in *Dimensions and logarithmic function in economics: A short critical analysis* (2010), the analysts should "know the importance of "dimensional homogeneity" in daily life which is an arithmetic principle: 4 m^2 plus 4m^3does not

make any sense; one dollar plus one dollar makes perfect sense, but one dollar times one dollar does not make any sense at all. So, economists concerned with the biophysical and monetary aspects of ecological and economic interactions must understand the importance of "dimensional homogeneity".

Conclusions

There are articles that suggest in some countries where the central bank is not independent or the state has enough banks under its control, in electoral years can be observed an increase in credits, especially for political supports. In Romania, the results indicate that in 2004 and 2009 the credits and the loans decreased. Less credits may be interpreted as an insecure period for both the creditors and debtors. Less number of deposits suggests that the population may have opted for other saving options.

For further development of this analysis, we should compare also the results for credits and loans in foreign currency. Even if the National Central Bank encouraged population to avoid credits in foreign currency, there is a lot of demand for these types of credit lines.

Also, for deposits and loans we suggest using ARDL models, as these time series variables are most suitable for these models and using OLS can raise a succession of hypothesis testing issues.

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