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MACROECONOMIC ENVIRONMENT AND NPLS – EVIDENCE FROM SERBIA AND THE CZECH REPUBLIC [a]

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Abstract

The so-called twin nature of the ongoing global crisis emphasizes the importance of the link between a set of key macro variables and the quality of loan portfolios of commercial banks. The aim of this paper is to explore the differences in prevailing macroeconomic determinants of the banks' NPLs (non-performing loans) in in many respects similar economies of Serbia and the Czech Republic. Due to the fact that all relevant time series turn out to be unit root processes, the methodology deployed is cointegrated VAR. Cointegration analysis has been performed through the VECM for each of the four specifications, modelling the NPL ratios for corporate and household sectors in both countries. Results reveal that only a few crucial particularities of the Serbian and the Czech financial environment, economic structure, as well as growth orientation, made all the difference in terms of NPL ratios' dynamics for households and corporate sectors in the two countries, in spite of the equally impressive financial resilience of the banking industry in both economies.

Key words: non-performing loans, macroeconomic environment, cointegration, Serbia, the Czech Republic.

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МАКРОЕКОНОМСКО ОКРУЖЕЊЕ И ПРОБЛЕМАТИЧНИ КРЕДИТИ-ПРИМЕР СРБИЈЕ И РЕПУБЛИКЕ ЧЕШКЕ

Апстракт

Такозвана близаначка природа текуће глобалне кризе апострофира везу између сета кључних макроваријабли и квалитета банкарских портфолија зајмова. Циљ овог рада је да испита разлике у преовлађујућим макроекономским детерминантама проблематичних кредита у, по којечему сличних, привреда Србије и Чешке. Како су све релевантне временске серије, показало се, процеси с јединичним кореном, примењена методологија је коинтегрисани VAR. Коинтеграциона анализа посредством VECM искоришћена је за све 4 спецификације, моделирајући NPL рација за секторе домаћинстава и предузећа у обе земље. Резултати указују на то да свега пар круцијалних специфичности српског, тј. чешког финансијског амбијента, привредне структуре и стратегије раста, проузрокују позамашну разлику у NPL динамици сектора домаћинстава и предузећа у посматраним земљама, упркос једнако импресивној отпорности банкарске индустрије у обе земље.

Кључне речи: проблематични зајмови, макроекономски амбијент, коинтеграција, Србија, Чешка

INTRODUCTION

After the collapse of Lehman Brothers Inc. back in 2008 and the outburst of US subprime crisis, the quantification of financial sector vulnerabilities became the most pressing question. Since a collapse of commercial banks can lead to widespread financial instability, one of the adequate and prudential measures would be to examine the likely effect of macroeconomic environment and particular macro variables on the credit risk emanation in the financial sector (BCBS, 2011). The so-called twin nature of the ongoing global crisis in fact emphasizes the importance of the link between a set of key macro variables and the quality of loan portfolios of commercial banks.

We chose to investigate two emerging market countries, Serbia and the Czech Republic, in an econometric estimation of non-performing loans (NPLs) made by national bank industries, with the aim of identifying their chief macroeconomic determinants in each case. Unlike Serbia, after spearheading the process of post-communist transition in Central and Eastern Europe (CEE), the Czech Republic became a member of the European Union in 2004 and a role-model of successful economic transformation. However, the two countries arguably share much more similarities than meets the eye upon glancing their mutual Slavic origin and communist past. Namely, both countries have a competitive, reasonably well-trained work force, a similar population size, and common main trading partners. In addition, their central banks follow a monetary strategy of flexible inflation targeting and managed float, their banking systems were privatized to and predominantly owned by foreign bank groups, they hold an attractive geo-economic position in their respective regions, they have automobile industry as an important part of their respective economies, and they were both hit by imported recession from the Eurozone (albeit through alternative channels).

Moreover, Serbian as well as Czech banking system exhibited above-average robustness against the destructive waves of the global financial crisis. The Czech financial system proved reasonably resilient in that, during the last three years, banks further strengthened their capitalization levels, with total capitalization increasing to 15.9 percent by as early as June 2011. Hence, the Czech banking sector was one of the very few in the CEE, which, so far, has not required public or supranational support (IMF, 2012). Although Serbia became a candidate for European Union membership only in 2012, ever since July 1, 2010, the National Bank of Serbia (Serbian central bank) has been making concerted efforts in fostering the stability of the national financial and banking system. As part of the Financial Sector Assessment Programme (FSAP), stress tests were conducted to assess the resilience of the Serbian banking sector to a set of extreme but plausible developments. Even though political and armed conflicts delayed the transition process of Serbia, fast and robust growth took place in recent pre-crisis history. The so-called "Vienna Agreement" with foreign banks pressed the pedal on the crisis-driven capital outflows from the Serbian banking sector and therefore softened the inevitable financial landing that followed. Still, protracted recession and political clouds gathering over the common currency, Eurozone's economy and its national banking sectors reinforced tremendous pressures on economy, businesses, and entrepreneurs in Serbia, thereby threatening the sustainability of bank sources of finance, as well as their outstanding claims. Nevertheless, the Serbian banking sector's unusually high capital adequacy ratio, reserve requirements, and alike reservations remain superior to their E(M)U banking counterparts, notwithstanding that fragility of certain macroeconomic relationships could still prove to be a clear, if not already present, danger for the health of the banking system (Malovic and Paunovic, 2012). On June 28, 2013 the European Council endorsed conclusions and recommendations of the Council of Ministers to open accession negotiations with Serbia and announced that they would commence by January 2014 at the latest, which should put an additional ease on the much needed financial stability imperative in Serbia.

And yet, Serbia and the Czech Republic exhibited stark differences in their macro performance, which prompted us to investigate whether just a handful of the more pronounced differences, namely, stable koruna, low interest rates, and full-fledged export-led growth strategy among the Czechs, coupled with FX-clause protected loans, sky-rocketing interest rates, sub-par trade balance, and higher unemployment in Serbia, could have accounted for somewhat diverging NPL dynamics of both sectors in the two economies.

The rest of the paper is organized as follows: section 2 provides an overview of relevant empirical literature, section 3 describes data and methodology, section 4 presents empirical results for NPL ratios of household (HH) and corporate sectors (CS) of Serbia and the Czech Republic, while section 5 offers some concluding remarks.

LITERATURE OVERVIEW

So far, many empirical studies have employed macro-credit models of one sort or the other in an attempt to test the sensitivity of NPL ratio to a selected set of macroeconomic explanatory variables.

Boss (2002) used the macroeconomic credit model to analyze the stress test implication for bank default probability in Austria and found that industrial production, inflation rate, stock index, nominal short-term interest rates, and oil prices are decisive factors of default probability. Pain (2003), using panel regression analysis, concluded that real GDP growth, real interest rate, and lagged aggregate lending growth can influence loan loss provisions in UK banks.

Peura and Jokivuolle (2003) measured the capital adequacy by simulating the difference between a bank's actual capital and the minimum capital requirements and they determined whether the estimated bank's capital buffer is sufficient to sustain it through the business cycle.

Pesola (2001, 2007) confirmed that macroeconomic shocks generate bank loan losses jointly with financial fragility. His findings suggest that high CS and HH indebtedness, combined with negative macroeconomic shocks, contributed to the banking crisis in Sweden, Norway, and Finland.

Surina Salas and Salas-Fumas (2002) used panel data in comparison determinants of problem loans of Spanish commercial and savings bank. They took into account different macroeconomic variables which might explain credit risk, such as GDP growth rates, net interest margin, and capital ratio. They found that NPLs are determined by loan portfolio decomposition and families' indebtedness.

In a similar fashion, Kalirai and Scheicher (2002) modeled the impact of key macroeconomic variables, namely the indicators of general economic activity, price stability, HH and CS situation, financial market, and external events on aggregated loan loss provisions (LLP) using a linear regression model and a sensitivity analysis for macro stress-testing. Short-term interest rates, GDP growth rates, the stock index, and industrial production were found to influence LLP.

Baboucek & Jancar (2005) employed the vector autoregression model (VAR) using the NPLs and the macroeconomic factors for the Czech Republic. Through macroprudential analysis they used an unrestricted

VAR model to empirically investigate transmission involving a set of macroeconomic variables earmarked to characterize Czech economy.

Boss et al. (2006) estimated the relationship between the macroeconomic variables and the credit risk for the corporate default rate in the Austrian banking sector. Virolainen (2004) and Virolainen, Jokivuolle and Vähämaa (2008) developed a macroeconomic credit risk model that estimates the probability of default in Finnish industries. The idea is to model the relationship between default rates and macroeconomic factors and to simulate the evolution of default rates over time by generating macroeconomic shocks to the system. Simons and Rolwes (2008) estimated relations between macroeconomic variables and Dutch firms' default. They studied GDP growth, interest rate, exchange rate, stock market return and volatility, and oil price. Their results showed a negative relation between GDP growth and default rate.

Drehmann, Sorensen and Stringa (2010) estimated the integrated impact of the credit and interest rate risks on the banks' portfolios, assessing the banks' economic value, the future earnings and the capital adequacy. Bofondi and Ropele (2011) analysed which macroeconomic variables affected Italian households and firms. Their research covers bank loan quality in Italy during the period from 1990 Q1 to 2010 Q2.

All of these studies confirmed that macroeconomic variables could affect the quality of a bank's portfolio and increase credit risk measured by LLP[1] and NPL.

DATA AND METHODOLOGY

For the purpose of calculation default rates we use the Wilson model (1997a, b), (one of the few credit risk models that explicitly links macroeconomic factors and corporate sector default rates), as in Virolainen (2004). First, the average default rate for sector *s* is modeled by the logistic functional form as

$$d_{s,t} = 1/(1+e^{y s,t}), \tag{1}$$

where $d_{s,t}$ is the default rate in industry *s* at time *t*, and $y_{s,t}$ is the sector-specific macroeconomic index, whose parameters must be estimated.

Following Boss (2002) we adopt the formulation that a higher value for $y_{s,t}$ implies a better state of the economy with a lower default rate $d_{s,t}$ and vice versa. The logistic functional form is given by:

$$L(d_{s,t})\ ln\ [(d_{j,t}/(1 - d_{s,t})] = y_{s,t}\,. \tag{2}$$

[1] "Loan-loss provisioning is a non-cash expense for banks to account for future losses on loan defaults." (Financial Dictionary, 2012).

The logit transformed default rate (sector-specific macroeconomic index) is assumed to be determined by a number of exogenous macroeconomic factors:

$$y_{s,t} = ß_{s,0} + ß_{s,1}\, x_{1,t} + ß_{s,2}\, x_{2,t} + \ldots + \beta_{s,n}\, x_{n,t} + \varepsilon_{s,t}\ , \qquad (3)$$

where $\beta_s = (\beta_{s,1}, \beta_{s,2}, \ldots, \beta_{s,n})$ is a set of regression coefficients to be estimated for the s^{th} sector, $x_{n,t}$ $(x_{1,t}, x_{2,t} \ldots x_{n,t})$ is the set of explanatory macroeconomic factors, and random error assumed to be independent and identically normally distributed.

However, since time series data are known to often be nonstationary and indeed cointegrated, we chose to apply the well-known Johansen's trace test, whose popularity stems from the fact it allows for more than one cointegration relationship as opposed to ADF unit root methodology, to check for cointegration presence. Cointegration is a constellation in which each component $y_{s,t}$, $s = 1,\ldots,n$, of a vector time series process y_t is a unit root process, possibly with drift, but certain linear combinations of the $y_{s,t}$'s are stationary. Granger representation theorem further shows that under certain assumptions one could represent a cointegrated process y_t as vector error correction model (VECM), in which changes in each VAR-encompassing variable are regressed on a constant, $(p – 1)$ lags of variable's own changes, $(p – 1)$ lags of changes in each of the remaining variables, and r cointegrated elements (Hamilton, 1994, pp. 580-582).

We used NPL ratio of either HH or CS as the dependent variable and a measure of credit risk, respectively, and total loans outstanding. An array of macroeconomic variables (i.e., output measures, interest rates, inflation, exchange rate etc.) was deployed as by and large explanatory variables. The macroeconomic data for the Czech Republic have been taken from the time series archives (ARAD) of the Czech National Bank (2013). For the Republic of Serbia we used data from reports of the National Bank of Serbia. Quarterly data series for various variables we took into consideration time-span from 2002 Q1 to 2012 Q3.

Table 1. Non-performing loans for household and corporate sector

Year	Household sector, NPLs in %		Corporate sector, NPLs in %	
	Czech Republic	Serbia	Czech Republic	Serbia
2008	3	7.1	4.2	12.4
2009	4.1	8.7	7.9	18.2
2010	5.2	8.8	9.0	21.8
2011	5.0	9.1	8.2	24.6
2012 (end of Q3)	5.2	10.1	7.4	23.7

Source: ARAD and NBS

Although both sectors' credit repayment performance in both countries has clearly deteriorated with the onset of the global crisis, the total share of NPLs in Serbia for HH and especially CS has been constantly increasing since 2008. In 2012 Q3 percentage of NPLs for the HH sector in Serbia was almost double as compared with HH NPL ratio in the Czech Republic. NPL ratio of CS in Serbia was three times larger than its counterpart in the Czech Republic.

Bearing in mind that VAR models indeed enable endogenization of potential independent variables (instead of *a priori* arbitrarily pronouncing them exogenous or predetermined), we tried many different specifications by letting the empirical inputs "speak for themselves", in the words of Christopher Sims. Variables that proved highly significant in our sample in explaining the dynamics of NPLs in the Czech Republic turned out to be only a three-month PRIBOR and unemployment rate for HH together with the real exchange rate for the CS. Other considered specifications and related results containing different combinations of those and of long term interest rates (for real estate purchases), final consumption expenditures, exchange rate CZK_USD, ratio of debt to disposable income, debt to GDP ratio, real wage, and CPI as a proxy for inflation and Czech GDP, which did not yield satisfactory or statistically robust returns, are available upon request. In Serbia, NPLs turned out to be primarily explained by real wage, unemployment and savings rates for HH, whereas for CS the best specification pinpointed CPI and nominal exchange rate dynamics. Once again, alternative specifications and inferior fits considering bank lending to CS, Serbian GDP, industrial production, exchange rate RSD_CHF (due to great deal of real estate credits denominated in CHF), etc., are also available upon request.

EMPIRICAL RESULTS AND DICUSSION

Empirical results for NPL modeling for the two selected groups in the two countries are presented as follows. Since all variables are unit-root processes, their correlation is analyzed within the CVAR framework (Juselius, 2006). The application of the Johansen trace test (Johansen, 1995) shows that cointegration exists. Cointegration analysis is presented and estimated by the VECM, as discussed for each specification. All the results presented in the paper are generated by the WinRats 6.2 package. The section is therefore divided into four subsections: the first one presents the cointegration in system modeling for HH in the Czech Republic, the second one presents the same analysis of NPLs for CS in the Czech Republic, and the third and the fourth subsections deal with Serbian HH and CS, respectively.

Cointegration framework for NPL modeling – HH sector, the Czech Republic

We used a three-variable vector autoregressive model (VAR) with the linear trend (*t*) included as a part of the cointegration space. The variables considered in the chosen specification are: NPLs for households (*nplh*), interest rate (*i*), and unemployment rate (*un*). We used log values covering the 2004 Q1-2012 Q3 period.

The main features of the CVAR model for HH in the Czech Republic are summarized as follows: a) the number of lags is 5, b) the system variable is non-performing loans for households, c) the deterministic component included in the cointegration space is restricted trend, and d) the weakly exogenous variables are unemployment rate and interest rate.

The presence of one cointegrated vector is detected by the Johansen trace test, as presented in Table 2.

Only the cointegrating vector is estimated as follows:

$$nplh = 1.499i + 1.288un + 0.027t\ . \tag{4}$$

Table 2. Testing for cointegration

Hypothesis	Eigenvalue	Trace*	$C_{95\%}\,(p-r)$
H_0: $r = 0$ and $p - r = 1$	0.0623	23.632	18.155

Note: * denotes small sample correction of trace test and the corresponding *p*-value. The number of cointegrated vectors is denoted by *r*, while *p* stands for the dimension of VAR system. $C_{95\%}\,(p-r)$ denotes critical values taken from Dennis (2006).

Model performs statistically well as confirmed by several multivariate and univariate tests that are presented in Tables 3 and 4.

Table 3. Univariate test statistics

Equation for	Mean	Standard deviation	Skewness	Kurtosis	Maximum	Minimum
$\Delta nplh$	0.000	0.018	0.137	3.257	0.041	-0.044

	ARCH(5)	Normality	R-squared
$\Delta nplh$	9.376 (0.095)	1.837 (0.15)	0.906

Note: *p*-values are in parentheses

Table 4. Multivariate test statistics

Test for	Value	*p*-value
Autocorrelation of order 7	7.848	0.020
Normality	1.837	0.399
ARCH (1)	1.766	0.184

Note: Autocorrelation is tested by the multivariate version of the Box-Ljung test. Normality is assessed by multivariate version of the Doornik-Hansen test (Juselius, 2006).

Results imply that in the long run 1% rise in interest rate is associated with the 1.5% rise in NPLs and *vice-versa*, while 1% change in unemployment rate implies 1.3% change in NPLs in the same direction, as well. Thus, a long-run upward trend of NPLs is caused by an upward trend in interest rate and unemployment rate. According to the estimate of the adjustment coefficient in the equation for the first difference of NPLs (-0.8), the dynamics of NPLs is adjusted each month by approximately four-fifths towards the long-run relation with interest rate and unemployment rate. The presence of linear trend in the cointegration vector captures the effects of those variables that are not explicitly modelled by our system.

Cointegration framework for NPL modeling – CS, the Czech Republic

We used a bi-variable VAR model for estimating NPLs for CS (*nplc*), the period covered being: Q1 2002-Q3 2012. The system variable is NPLs for CS, whereas the weakly exogenous variable is real exchange rate (*rex*). Log values are modeled. Two dummy variables are: *D1*= {-1, for Q2 2003, Q2 2007 and Q2 2008; 0 otherwise} and *D2*={1 for 2009 (all quarters), otherwise 0}. The deterministic component is restricted trend and VAR is of order 1.

The presence of one cointegrated vector is detected by the Johansen trace test, as presented in Table 5.

Table 5. Testing for cointegration

Hypothesis	Eigenvalue	Trace*	$C_{95\%}(p-r)$	p-value*
H_0: $r = 0$ and $p - r = 1$	0.548	33.127	15.331	0.000

Note: * denotes small sample correction of trace test and the corresponding p-value. The number of cointegrated vectors is denoted by r, while p stands for the dimension of VAR system. $C_{95\%}(p-r)$ denotes critical values taken from Dennis (2006).

Only the cointegrating vector is estimated as follows:

$$nplc = -1.353rex - 0.193t \quad (5)$$

In order to demonstrate that a model performs well, a detailed residual analysis has been performed. The main univariate and multivariate statistics are presented in Table 6 and Table 7:

Table 6. Univariate test statistics

Equation for	Mean	Standard deviation	Skewness	Kurtosis	Maximum	Minimum
$\Delta nplc$	0.000	0.046	-0.203	3.138	0.105	-0.122
	ARCH(5)		Normality		R-squared	
$\Delta nplc$	0.002 (0.964)		1.193 (0.551)		0.781	

Note: p-values are in parentheses.

Table 7. Multivariate test statistics

Test for	Value	*p*-value
Autocorrelation of order 10	5.973	0.743
Normality	1.193	0.551
ARCH (1)	-0.614	.NA

Note: Autocorrelation is tested by the multivariate version of the Box-Ljung test. Normality is assessed by the multivariate version of the Doornik-Hansen test (Juselius, 2006).

An increase in real exchange rate for 1% causes approximately 1.4% decrease in NPLs in the corporate sector. The dynamics of NPLs is adjusting very slowly each quarter, only 2.5% each quarter towards a long-run equilibrium with real exchange rate.

Cointegration framework for NPL modeling – HH sector, Serbia

Model summary for CVAR is the following:

a) The system variables are NPLs for HH (*nplh*) and real wages (*rw*), log values;
b) The weakly exogenous variables are unemployment rate (*un*) and savings rate (*sr*), log values;
c) One impulse dummy variable is included – D1={1 for Q4 2006, 0 otherwise};
d) Restricted trend is included as a part of cointegration space;
e) The number of lags is 5.

Johansen trace test shows that cointegration exists, as presented in Table 8:

Table 8. Testing for cointegration

Hypothesis	Eigenvalue	Trace*	$C_{95\%}(p\text{-}r)$	*p*-value*
H_0: $r = 0$ and $p - r = 2$	0.741	42.096	35.956	0.010
H_0: $r = 1$ and $p - r = 2$	0.317	12.786	18.155	0.244

Note: * denotes small sample correction of trace test and the corresponding *p*-value. The number of cointegrated vectors is denoted by *r*, while *p* stands for the dimension of VAR system. $C_{95\%}(p - r)$ denotes critical values taken from Dennis (2006).

The following cointegrated vector is estimated:

$$nplh = -1.219rw + 0.544un - 0.225sr + 0.009t \,. \tag{6}$$

In the long run 1% change in real wages causes 1.2% change of opposite direction of NPLs for HH sector. It is intuitive that with the increase in real wages, paying credits is easier and the number of defaults reduces.

Unemployment rate and savings rate are weakly exogenous variables. Percentage increase in unemployment rate causes a decrease of 0.5% in NPLs, and 1% increase in HH savings causes a decrease of 0.2% in NPLs.

Univariate and multivariate test statistics are also reported in the following tables.

Table 9. Univariate test statistics

Equation for	Mean	Standard deviation	Skewness	Kurtosis	Maximum	Minimum
$\Delta nplh$	-0.000	0.061	0.443	3.391	0.157	-0.116
Δrw	0.000	0.022	0.700	3.684	0.066	-0.041
	ARCH(5)		Normality		R-squared	
$\Delta nplh$	4.885 (0.430)		2.265 (0.322)		0.583	
Δrw	3.306 (0.653)		3.535 (0.171)		0.920	

Note: *p*-values are in parentheses.

Table 10. Multivariate test statistics

Test for	Value	*p*-value
Autocorrelation of order 8	35.940	0.001
Normality	7.174	0.127
ARCH (9)	3.059	0.962

Note: Autocorrelation is tested by the multivariate version of the Box-Ljung test. Normality is assessed by the multivariate version of the Doornik-Hansen test (Juselius, 2006).

Cointegration framework for NPL modeling – CS, Serbia

Model summary for CVAR is the following:

a) Sample: Q1 2003: Q3 2012
b) The system variable is NPLs for CS (*nplc*), log values;
c) The weakly exogenous variables are consumer price index as a measure of inflation (*cpi*) and nominal exchange rate (*ex*), log values;
d) Two dummies are included: *D1*={-1 for Q3 2009 and Q3 2010, 0 otherwise}; *D2*={1 for Q1 2009, Q2 2009, Q3 2009, Q2 2010 and Q2 2011, 0 otherwise}
e) There is no deterministic component included in the cointegration space;
f) VAR is of order 3.

Johansen trace test shows that cointegration exists, as presented in Table 11:

Table 11. Testing for cointegration

Hypothesis	Eigenvalue	Trace*	$C_{95\%}(p-r)$	*p*-value*
H_0: $r = 0$ and $p - r = 1$	0.276	11.241	11.425	0.053

Note: * denotes small sample correction of trace test and the corresponding p-value. The number of cointegrated vectors is denoted by *r*, while *p* stands for the dimension of VAR system. $C_{95\%}$(p-r) denotes critical values taken from Dennis (2006).

The following cointegrated vector is estimated:

$$nplc = -1.992cpi + 1.704ex\ . \quad (7)$$

Univariate and multivariate test statistics are also reported in the following tables.

Table 12. Univariate test statistics

Equation for	Mean	Standard deviation	Skewness	Kurtosis	Maximum	Minimum
$\Delta nplc$	0.000	0.041	0.006	2.115	0.083	-0.078

	ARCH(3)	Normality	R-squared
$\Delta nplc$	0.627 (0.890)	0.852 (0.653)	0.778

Note: *p*-values are in parentheses.

Table 13. Multivariate test statistics

Test for	Value	*p*-value
Autocorrelation of order 9	11.934	0.063
Normality	0.852	0.653
ARCH (1)	0.025	0.875

Note: Autocorrelation is tested by the multivariate version of the Box-Ljung test. Normality is assessed by the multivariate version of the Doornik-Hansen test (Juselius, 2006).

Rise of exchange rate (nominal depreciation) causes an increase of NPLs in the long run by 1.7%, and a change of 1% in inflation rate causes 1.9% change of opposite direction in NPLs for the CS (low and predictable inflation is a usual companion of economic growth, which in turn expectedly lowers NPL ratio). Dynamics of NPLs is adjusted each quarter by approximately 11% towards the long-run relation with CPI and nominal exchange rate.

CONCLUDING REMARKS

In this paper, we deployed cointegrated VAR methodology on NPL ratios in corporate and household sectors of Serbia and the Czech Republic in order to empirically pinpoint their chief macroeconomic determinants. These two countries, in addition to many economic similarities, have had banking systems that proved very resilient to the challenges of the global crisis.

Since Czech economy happens to be extremely export-oriented, its corporate sector NPL ratio has shown high sensitivity to real exchange rate movements. Serbian corporate sector’s NPL ratio, however, appears to have been mainly driven by nominal exchange rate trajectory (coupled with inflation dynamics). Interestingly, Czech households, despite comparatively rather low interest rates, have precisely revealed the interest rate dynamics, followed by unemployment rate, as the main determinants of their repayment capacity. Even more surprisingly, perhaps, Serbian households’ NPL ratio has not been determined by interest rate dynamics, but by combination or real wage, unemployment rate, and savings rate, all with theoretically intuitive coefficient signs.

Thus, just a few stylized particularities of Serbia and the Czech Republic do feature strongly in the empirical modelling of the NPL trajectory and they did confirm the importance of macroeconomic environment for credit risk vulnerabilities of banking systems at hand.

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МАКРОЕКОНОМСКО ОКРУЖЕЊЕ И ПРОБЛЕМАТИЧНИ КРЕДИТИ - ПРИМЕР СРБИЈЕ И РЕПУБЛИКЕ ЧЕШКЕ

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Сажетак

У овом раду смо применили VAR методологију са коинтеграцијом на учешће NPL у корпоративном сектору и сектору домаћинстава у Србији и Републици Чешкој како би емпиријски моделирали њихове кључне макроекономске детерминанте. Ове две земље, поред бројних сличности, имају банкарске системе доказано отпорне на глобалну финансијску кризу. Чешке банке послују у здравој економији и ослањају се на солидне штедне депозите који су у највећој мери деноминовани у домаћој валути, што им је омогућило да се рекапитализују брзо и да избегну тражење помоћи од међународних или државних фондова. С друге стране, банкарски систем Србије има просечни рацио капиталне адекватности који је један од највећих у Европи. Међутим, наши емпиријски резултати откривају да очигледно тек неколико спечифичности српског у односу на чешки финансијски систем (сужено банкарство и екстремно високе каматне стопе у Србији, док је у Чешкој супротно), економска структура (висока доларизација и зависност од званичне помоћи и дознака у Србији, што није карактеристично за Чешку), као и оријентација раста (зрео извозно оријентисани раст у Чешкој наспрам још увек херметичне србијанске производње) допринеле су целокупној разлици у NPL динамици за HH и CS у посматране две земље, упркос подједнако импресивном финансијском имунитету банкарске индустрије у обе земље.

С обзиром на то да је чешка привреда изразито извозно оријентисана, NPL за сектор предузећа показује високу осетљивост на промене у реалном девизном курсу, јер реална депрецијација побољшава међународну ценовну конкурентност и стога смањује могућност појаве отплатних доцњи извозника или банкротства. Међутим, динамика NPL за српски корпоративни сектор је највише узрокована кретањем номиналног девизног курса са позитивним знаком оцењеног коефицијента, али и динамиком инфлације са негативним знаком оцењеног коефицијента. Другачије речено, висока неликвидност српских фирми чини да је експанзивна монетарна политика добродошла јер помаже да регулишу своје финансијске обавезе, премда релативно аутаркична производња с недовољно извоза, прекомерним увозом са FX клаузулама, обично уграђеним у уговоре о зајму, чине да су српски корпоративни дужници преосетљиви на номиналну депрецијацију када су њихови приходи претежно у динарима и то са знатним заостатком услед већ хроничне неликвидности.

Оно што је занимљиво је да чешка домаћинства, упркос компаративно ниским каматним стопама, откривају динамику каматне стопе, праћену стопом незапослености, као главну детерминанту капацитета отплате.[2] Оно што можда још више

[2]Ова спецификација је тим више загонетна када се има у виду да чешка домаћинства која позајмљују од банака нису најугроженија, јер се популација

изненађује је то да учешће NPL за српска домаћинства уопште није детерминисано каматном стопом[3], већ комбинацијом реалних зарада, стопом незапослености и стопом штедње, све променљиве са теоретски интуитивним знаком коефицијента. Очигледно, раст незапослености у 2012. је узроковао раст учешћа NPL јер је пуно људи осталих без посла изгубило и отплатну способност. Незапосленост у трећем кварталу 2012. износила је 23,5% у Србији и 8,4% у Чешкој у истом периоду по званичној статистици. Трансмисиони механизам девизног курса је учинио реалне плате доминантним у односу на номиналне у Србији, док је значај стопе штедње достигао огроман значај према М. Фридмановом концепту сталног дохотка у поређењу са текућим дохотком (драстично смањеним тежином кризе) у Србији.

Најзад, очито свега неколико стилизованих специфичности Србије и Чешке значајно утичу на кретање NPL коефицијента и посредно потврђују значај привредног амбијента за осетљивост посматраних банкарских сектора на еманацију кредитног ризика.

очајних дужника (сатераних у „ћошак“) у Чешкој окренула небанкарским зеленашима који позајмљују средства уз хипотеке и сл. залоге.

[3] Опет, овај налаз открива чињеницу да су готовински кредити и сл. краткорочне позајмице код српских банака резервисани за домаћинства која су толико неликвидна да су им неповољне каматне стопе најмања брига.