

# **FISCAL REACTION OF INTEREST PAYMENTS IN SERBIA-A TIME SERIES EXPLORATION**

**Vladimir Andric  
Milojko Arsic  
Aleksandra Nojkovic**

# **OBJECTIVES**

- 1. QUANTIFY THE RESPONSE OF PRIMARY FISCAL BALANCE TO INTEREST PAYMENTS IN SERBIA BETWEEN 2004Q3-2014Q3;**
- 2. ASSESS THE POTENTIAL OF BUSINESS CYCLE IN RESTORING FISCAL PRUDENCE;**
- 3. DETECT A REGIME CHANGE IN THE PRIMARY FISCAL BALANCE RESPONSE TO INTEREST PAYMENTS AND BORROWING COSTS BEFORE, DURING AND IN THE AFTERMATH OF THE GLOBAL FINANCIAL CRISIS WITHOUT FISCAL CONSOLIDATION FROM THE END OF 2014.**

# RESULTS

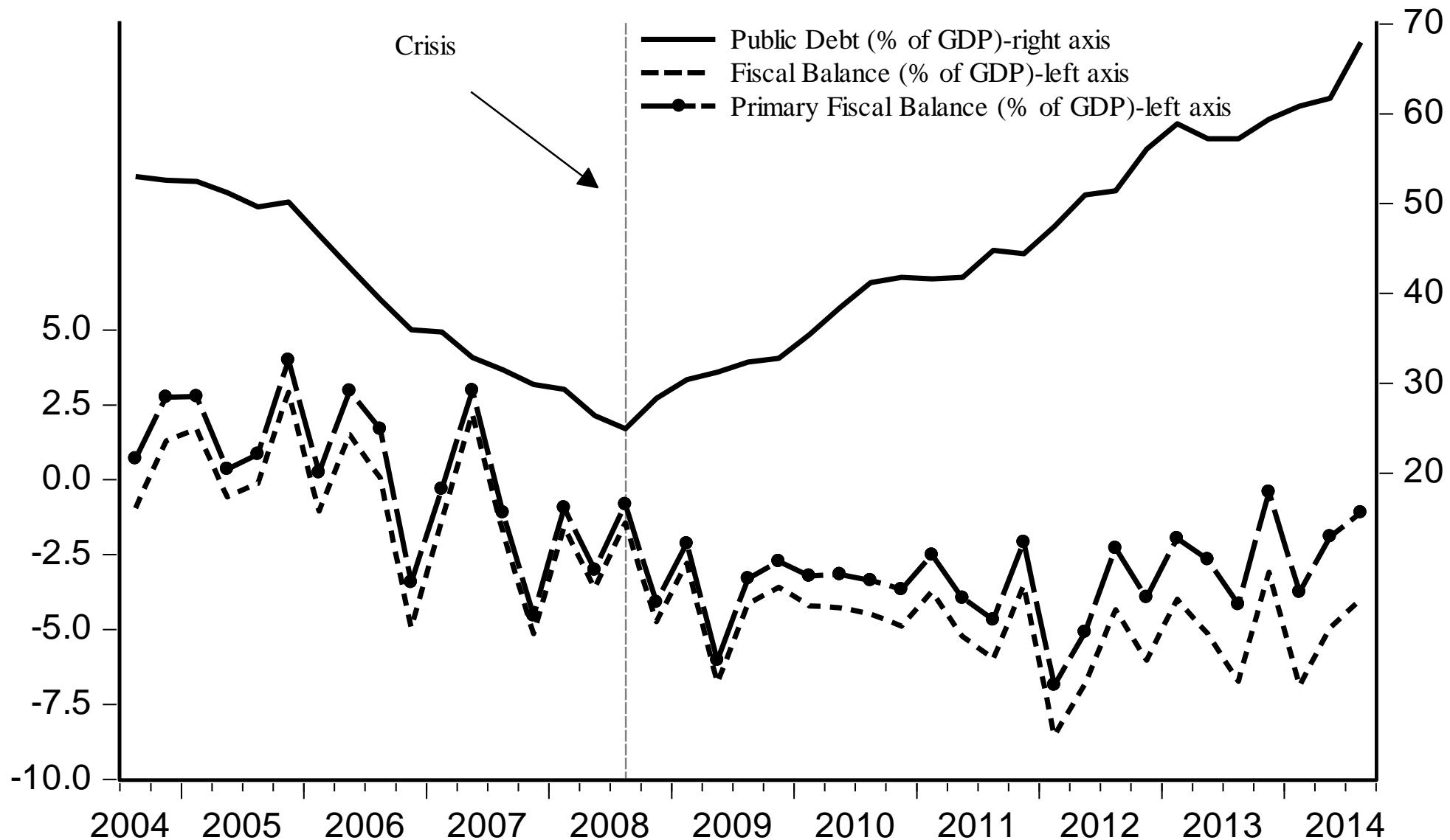
- 1. THE RESPONSE OF PRIMARY FISCAL BALANCE TO INTEREST PAYMENTS RANGES BETWEEN 0.5-1.07 PERCENTAGE POINTS BETWEEN 2004Q3-2014Q3;**
- 2. A-CYCLICALITY OF PRIMARY FISCAL BALANCE WITH RESPECT TO BUSINESS CYCLE FLUCTUATIONS;**
- 3. POLICY MAKERS RESPONDED TO RISING INTEREST PAYMENTS AND BORROWING COSTS BY INCREASING PRIMARY FISCAL DEFICIT IN THE AFTERMATH OF THE GLOBAL FINANCIAL CRISIS.**

# CONTRIBUTIONS

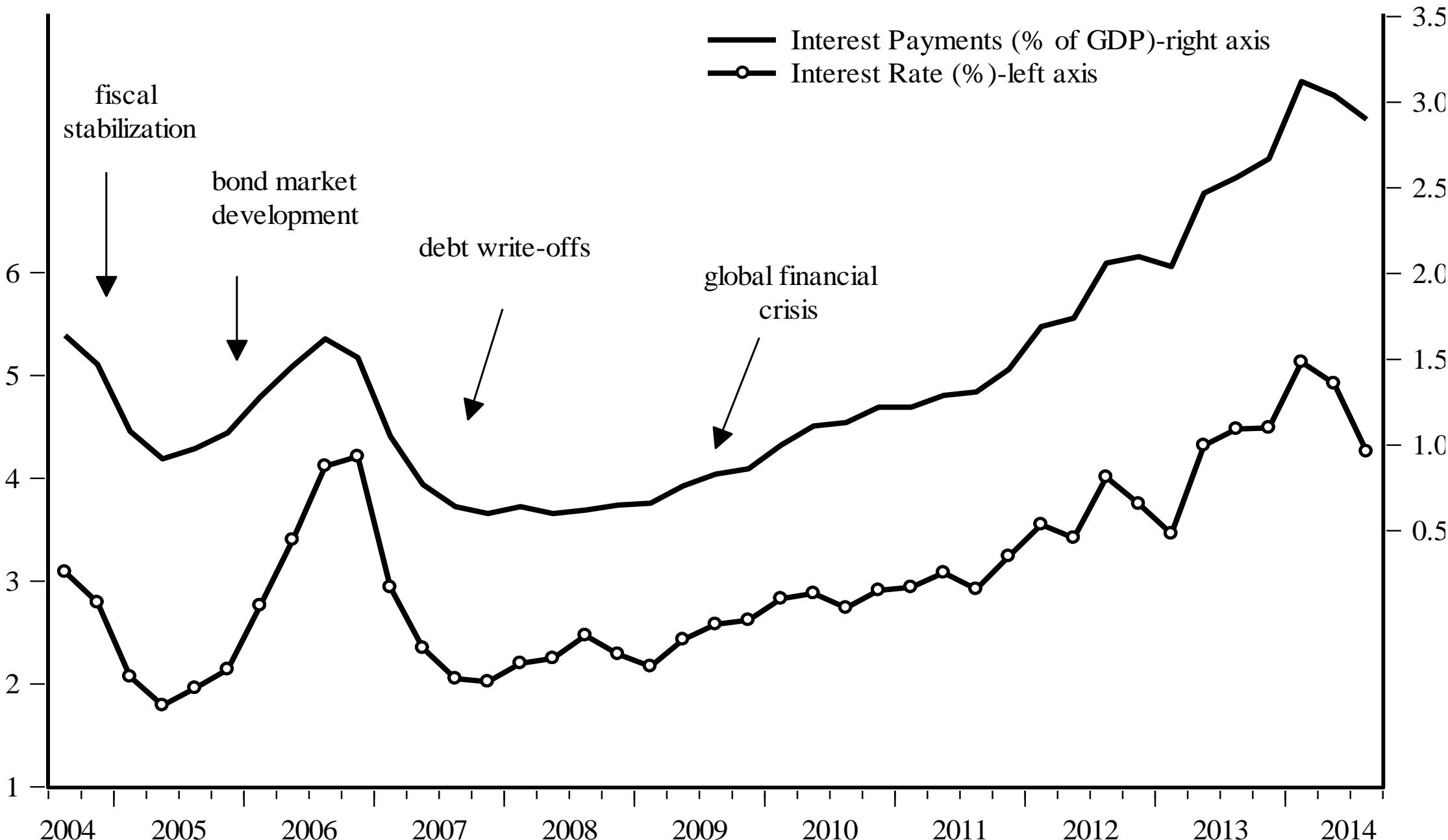
- 1. THE INVESTIGATION OF FISCAL REACTION FUNCTION NOT ONLY WITH RESPECT TO PUBLIC DEBT, BUT ALSO WITH RESPECT TO *INTEREST PAYMENTS AND BORROWING COSTS*;**
- 2. THE INVESTIGATION OF THE STABILITY OF THE FISCAL RESPONSE BETWEEN 2004Q3-2014Q3;**
- 3. MYOPIC BEHAVIOUR OF THE SERBIAN GOVERNMENT FROM THE ONSET OF THE GLOBAL FINANCIAL CRISIS.**

# **STYLIZED FACTS**

**FIGURE 1: FISCAL BALANCE, PRIMARY FISCAL BALANCE AND PUBLIC DEBT IN SERBIA, 2004Q3-2014Q3**



**FIGURE 2: INTEREST PAYMENTS (% OF GDP) AND IMPLIED EFFECTIVE INTEREST RATE (%) ON SERBIAN PUBLIC DEBT, 2004Q3-2014Q3**



# METHODOLOGY

1. THEORETICAL BACKGROUND: Barro (1979), Debrun & Kinda (2013);
2. FISCAL REACTION FUNCTIONS (FRFs): Bohn (1998, 2005), Uctum et al. (2006), Mendoza & Ostry (2008), Ghosh et al. (2011), Plödt & Reicher (2014), Lamé et al. (2014), Uctum et al. (2006);
3. AUGMENTED FRFs: Staehr (2008), Debrun & Kinda (2013), Baldi & Staehr (2013), Mauro et al. (2013);
4. OLS & OLS WITH BREAKS: Bai (1997), Bai & Perron (1998, 2003).

## AUGMENTED FRF WITH INTEREST PAYMENTS, 2004Q4-2014Q3

$$S_t = \mu + \alpha_0 Crisis + \alpha_1 GGAP_t + \alpha_2 YGAP_t + \alpha_3 B_{t-1} + \alpha_4 Interest_{t-1} + \epsilon_t.$$

*Crisis* –dummy (1 if t>2008Q3);

*GGAP<sub>t</sub>* –transitory government spending (% of GDP);

*YGAP<sub>t</sub>* –output gap (log levels of real GDP, HP filter with  $\lambda = 1600$ );

*B<sub>t-1</sub>* –lagged public debt (% of GDP);

*Interest<sub>t-1</sub>* –lagged interest payments (% of GDP).

$\alpha_4$  –focus is on the response of *Interest<sub>t-1</sub>*

SOURCES: Ministry of Finance, National Bank, Statistical Office.

# AUGMENTED FRF-DEBT DYNAMICS RELATION

$\alpha_4$  –the response of primary fiscal balance to *Interest* <sub>$t-1$</sub> ;

1.  $\alpha_4 < 1 \rightarrow$  *self – generating debt – to – GDP ratio*;

2.  $\alpha_4 = 1 \rightarrow$  *stabilized debt – to – GDP ratio*;

3.  $\alpha_4 > 1 \rightarrow$  *mean – reverting debt – to – GDP ratio*.

TABLE 1: AUGMENTED FRF WITH INTEREST PAYMENTS, 2004Q3-2014Q3

<i>Regressors</i>	<i>Coefficients</i>	<i>Standard Errors</i>	<i>t – stat.</i>
$\mu$	-1.23**	0.82 (0.57)	-1.50 [-2.16]
<i>Crisis</i>	<b>-3.82***</b>	0.27 (0.26)	-14.12 [-14.43]
<i>GGAP</i> <sub>t</sub>	-0.93***	0.07 (0.07)	-12.90 [-13.40]
<i>YGAP</i> <sub>t</sub>	<b>8.36*</b>	7.02 (4.87)	1.19 [1.72]
<i>B</i> <sub>t-1</sub>	0.02	0.03 (0.02)	0.75 [1.29]
<i>Interest</i> <sub>t-1</sub>	<b>0.50***</b>	0.39 (0.17)	1.29 [2.89]
<i>R</i> <sup>2</sup>	0.93	<i>S.E.</i>	0.72
<i>F – stat.</i>	95.95	<i>DW</i>	1.94

ROBUSTNESS: CYCLE, AC, TB, INFLATION, DYNAMICS, TREND POLYNOMIALS;

*Interest*<sub>t-1</sub> ∈ [0.5 – 1.07].

## AUGMENTED FRF WITH INTEREST PAYMENTS SHIFTS, 2004Q4-2014Q3

$$S_t = \mu + \alpha_0 GGAP_t + \alpha_1 YGAP_t + \alpha_2 B_{t-1} + \alpha_3 Interest_{t-1(2004Q4-2008Q4)} \\ + \alpha_4 Interest_{t-1(2009Q1-2012Q1)} + \alpha_5 Interest_{t-1(2012Q2-2014Q3)} + \epsilon_t.$$

**BREAKS:** 2008Q4, 2012Q1 (Bai & Perron, 1998, 2003);

**95% CONFIDENCE INTERVALS:** [2008Q2 – 2009Q2], [2011Q2 – 2012Q4] (Bai, 1997).

**$GGAP_t$  –transitory government spending (% of GDP);**

**$YGAP_t$  –output gap (log levels of real GDP, HP filter with  $\lambda = 1600$ );**

**$B_{t-1}$  –lagged public debt (% of GDP);**

**$Interest_{t-1}$  –lagged interest payments (% of GDP).**

**SOURCES:** Ministry of Finance, National Bank, Statistical Office.

TABLE 2: AUGMENTED FRF WITH INTEREST PAYMENTS SHIFTS, 2004Q3-2014Q3

<i>Regressors</i>	<i>Coefficients</i>	<i>Standard Errors</i>	<i>t – stat.</i>
$\mu$	-4.12***	0.91 (0.77)	-4.50 [-5.34]
$GGAP_t$	-0.93***	0.07 (0.07)	-13.45 [-13.55]
$YGAP_t$	14.73*	7.45 (7.49)	1.98 [1.97]
$B_{t-1}$	0.05**	0.03 (0.02)	2.12 [2.38]
<i>Interest</i> <sub><math>t-1(2004Q4-2008Q4)</math></sub>	<b>1.69***</b>	0.51 (0.44)	3.34 [3.88]
<i>Interest</i> <sub><math>t-1(2009Q1-2012Q1)</math></sub>	<b>-1.77***</b>	0.52 (0.42)	-3.43 [-4.19]
<i>Interest</i> <sub><math>t-1(2012Q2-2014Q3)</math></sub>	<b>-0.65*</b>	0.35 (0.36)	-1.84 [-1.83]
$R^2$	0.93	<i>S.E.</i>	0.70
<i>F – stat.</i>	86.35	<i>DW</i>	1.77

TABLE 3: SENSITIVITY ANALYSES FOR THE PRIMARY FISCAL BALANCE RESPONSE TO INTEREST PAYMENTS

<i>Periods/FRFs</i>	<i>Linear Trend</i>	<i>Breaking Trend</i>	<i>Sample Split</i>	<i>Crisis Break</i>	<i>Simultaneous Breaks</i>	
					<i>08Q4</i>	<i>08Q4, 12Q1</i>
04Q4 – 08Q4	<b>1.64***</b>	<b>0.89**</b>	<b>0.98**</b>	<b>2.43***</b>	<b>1.0***</b>	<b>1.01***</b>
09Q1 – 14Q3	-	-	-	-0.49	<b>1.0***</b>	-
09Q1 – 12Q1	<b>-1.50**</b>	2.44	-2.44	-	-	-0.26
12Q2 – 14Q3	-0.41	0.98	-0.51	-	-	0.53

## AUGMENTED FRF WITH SHIFTS IN IMPLIED EFFECTIVE INTEREST RATE, 2004Q4-2014Q3

$$S_t = \mu + \alpha_0 GGAP_t + \alpha_1 YGAP_t + \alpha_2 B_{t-1} + \alpha_3 R_{t-1}(2004Q4-2008Q4) + \alpha_4 R_{t-1}(2009Q1-2012Q1) + \alpha_5 R_{t-1}(2012Q2-2014Q3) + \epsilon_t.$$

**BREAKS:** 2008Q4, 2012Q1 (Bai & Perron, 1998, 2003);

**95% CONFIDENCE INTERVALS:** [2008Q3 – 2009Q1], [2010Q4 – 2013Q2] (Bai, 1997).

**$GGAP_t$**  –transitory government spending (% of GDP);

**$YGAP_t$**  –output gap (log levels of real GDP, HP filter with  $\lambda = 1600$ );

**$B_{t-1}$**  –lagged public debt (% of GDP);

**$R_{t-1}$**  –lagged implied effective interest rate (%).

**SOURCES:** Ministry of Finance, National Bank, Statistical Office.

TABLE 4: AUGMENTED FRF WITH SHIFTS IN IMPLIED EFFECTIVE INTEREST RATE, 2004Q3-2014Q3

<i>Regressors</i>	<i>Coefficients</i>	<i>Standard Errors</i>	<i>t – stat.</i>
$\mu$	-3.87***	1.02 (0.80)	-3.80 [-4.80]
$GGAP_t$	-0.96***	0.07 (0.07)	-14.24 [-14.19]
$YGAP_t$	9.94	7.31 (7.43)	1.36 [1.34]
$B_{t-1}$	0.06***	0.02 (0.02)	2.97 [3.32]
$R_{t-1}(2004Q4-2008Q4)$	<b>0.46***</b>	0.21 (0.15)	2.24 [3.05]
$R_{t-1}(2009Q1-2012Q1)$	<b>-0.93***</b>	0.21 (0.15)	-4.30 [-6.05]
$R_{t-1}(2012Q2-2014Q3)$	<b>-0.58***</b>	0.17 (0.15)	-3.46 [-3.85]
$R^2$	0.94	<i>S.E.</i>	0.67
<i>F – stat.</i>	93.20	<i>DW</i>	2.11

**TABLE 5: SENSITIVITY ANALYSES FOR THE PRIMARY FISCAL BALANCE RESPONSE TO THE IMPLIED EFFECTIVE INTEREST RATE**

<i>FRFs</i> <i>/Periods</i>	<i>Linear</i>	<i>Breaking</i>	<i>Sample</i>	<i>Crisis</i>	<i>Simultaneous</i> <i>Breaks</i>	
	<i>Trend</i>	<i>Trend</i>	<i>Split</i>	<i>Break</i>	<b>08Q4</b>	<b>08Q4, 12Q1</b>
04Q4 – 08Q4	<b>0.48***</b>	<b>0.36**</b>	<b>0.37**</b>	<b>0.64***</b>	<b>0.47***</b>	<b>0.37**</b>
09Q1 – 14Q3	-	-	-	<b>-0.6***</b>	0.30	-
09Q1 – 12Q1	<b>-0.64**</b>	0.83	-0.96	-	-	-0.39
12Q2 – 14Q3	-0.25	0.46	-0.29	-	-	0.13

# **LIMITATIONS**

- 1. ALTERNATIVE FISCAL STANCE MEASURES;**
- 2. THE USE OF PRIVATIZATION RECEIPTS IN DEFICIT FINANCING;**
- 3. ONGOING FISCAL CONSOLIDATION FROM THE END OF 2014.**

# **POLICY IMPLICATIONS**

- 1. SELF-GENERATING PUBLIC DEBT:  $Interest_{t-1} \in [0.5 - 1.07]$  BETWEEN 2004Q3-2014Q3;**
- 2. THE VARIABILITY OF FISCAL RESPONSE TO INTEREST PAYMENTS AND BORROWING COSTS BEFORE, DURING AND AFTER THE GREAT RECESSION;**
- 3. AUTOMATIC ADJUSTMENTS INCAPABLE OF RESTORING FISCAL SOLVENCY IN SERBIA BETWEEN 2004Q3-2014Q3;**
- 4. AD-HOC AUSTERITY MEASURES ADOPTED AFTER THE PUBLIC DEBT FISCAL RULE BREACH (45% OF GDP) IN 2012Q1 FAILED TO STABILIZE FISCAL POLICY STANCE IN SERBIA.**

**THANK YOU FOR YOUR  
ATTENTION!**

**QUESTIONS?**

**COMMENTS?**