

Are sovereign credit ratings overrated?

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¹The opinions expressed in this paper are those of the authors and do not necessarily represent the official views of the Croatian National Bank.

Introduction and motivation

- During the last years news media and policymakers have routinely suggested that credit rating announcements strongly affect the borrowing cost of European countries
- What can explain this reasoning?
 - ① Credit rating agencies may **reveal to financial markets important information** about the creditworthiness of the country as a debt issuer, beside the information already contained in publicly available macroeconomic fundamentals (in this paper we examine whether this is supported by the data)
 - ② Governments may use rating agencies to **justify the implementation of structural reforms and spending cuts** due to the fact that reforms are in general hard to sell. They can therefore present the rating agencies as the *Bogeyman* who forces such policies

Introduction and motivation

- In this paper we examine the relevance of changes in sovereign credit rating for the borrowing cost of Croatia and other EU countries
- We try to isolate the **informational contribution of credit ratings** on sovereign bond spreads after controlling for the information already contained in macroeconomic and fiscal fundamentals
- What is the difference between the **information set** on which the credit rating agencies base their decisions and that of market participants? Are there any **informational asymmetries** between governments as debt issuers and investors?
 - if the two information sets are to a large extent equal \Rightarrow no impact of rating changes on bond yields (no asymmetric information)
 - if the two information sets differ significantly \Rightarrow rating changes will surprise investors and affect bond yields (asymmetric information)

Four steps of the analysis:

- 1 The **direct impact** of sovereign credit rating changes on CDS spreads is analysed by using high frequency data
- 2 What are the determinants of sovereign credit ratings (what is the **relevant information set** used by rating agencies when deciding on sovereign credit ratings)?
- 3 What is the **informational contribution of credit ratings** to the CDS market in addition to the information already contained in the economic fundamentals?
- 4 Estimating **market implied ratings** for EU countries

1. Are credit rating announcements affecting financial markets?

$$\Delta CDS_{i,t} = \alpha_0 + \eta_{i,t} + \sum_{j=0}^2 \beta_j D_{i,t-j} + \alpha_1 \Delta \log(STOCK_{i,t}) + \alpha_2 \Delta PC_t + \alpha_3 \Delta VX_t + \epsilon_{i,t}$$

- Daily data
- $\Delta CDS_{i,t}$ - change of CDS spreads (5 year maturity)
- $D_{i,t-j}$ - dummy variable identifying announcements of rating changes (rating upgrades or downgrades according to the *big three* rating agencies - *Moody's*, *Standard & Poor's* and *Fitch*)
- $\Delta \log(STOCK_{i,t})$ - Stock market index growth rate
- ΔPC_t - change of the common factor of EU CDS spreads
- ΔVX_t - global risk aversion (*Euro Stoxx 50 Volatility Index*).

1. Are credit rating announcements affecting financial markets?

	CDS	
	Rating downgrade	Rating upgrade
Intercept	-0.05 ()	-0.01 ()
Risk aversion	0.05 (*)	0.05 (*)
CDS common factor	18.73 (***)	18.75 (***)
Stock prices	-18.43 (***)	-18.73 (***)
Rating	6.11 (**)	-1.01 ()
Rating(-1)	4.74 (**)	0.15 ()
Rating(-2)	0.92 ()	-2.16 ()
Adjusted R ²	0.31	0.31
S.E. of regression	9.64	9.65
F-statistic	825.2 (***)	820.6 (***)

Note: Dependent variables are daily changes in CDS spreads. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% level, based on the White robust standard error estimator.

1. Are credit rating announcements affecting financial markets?

	CDS		
	Junk entry	Junk ratings	Investment ratings
Intercept	-0.01 ()	-0.40 (**)	0.02 ()
Risk aversion	0.04 (*)	-0.02 ()	0.06 (*)
CDS common factor	19.00 (***)	33.57 (***)	17.51 (***)
Stock Prices	-24.24 (***)	-93.17 (***)	-17.20 (***)
Rating	0.38 ()	1.55 ()	3.51 ()
Rating(-1)	28.60 (**)	16.62 (**)	4.61 (**)
Rating(-2)	3.18 ()	8.33 (**)	-0.42 ()
Adjusted R ²	0.33	0.34	0.34
S.E. of regression	6.61	11.23	5.88
F-Statistic	907.2 (***)	255.8 (***)	847.2 (***)

Note: Dependent variables are daily changes in CDS spreads. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% level, based on the White robust standard error estimator.

2. Determinants of sovereign credit ratings

$$R_{i,t} = c + \eta_{i,t} + \beta_1' X_{i,t} + \beta_2' D_{80} X_{i,t} + \varepsilon_{i,t}$$

- $R_{i,t}$ - credit rating (4 models are estimated: one for each of the 3 agencies and the average rating)
- $X_{i,t}$ - macro and fiscal fundamentals (smoothed values):
 - Real GDP growth rate (annual rate of change)
 - Public debt (general government debt-to-GDP ratio)
 - Budget balance (overall budget balance of the general government, expressed as a ratio to GDP)
 - Interest payments (general government interest payments, expressed as a ratio to GDP)
 - Inflation rate (annual rate of change in the HICP)
 - Unemployment rate
 - Economic freedom index

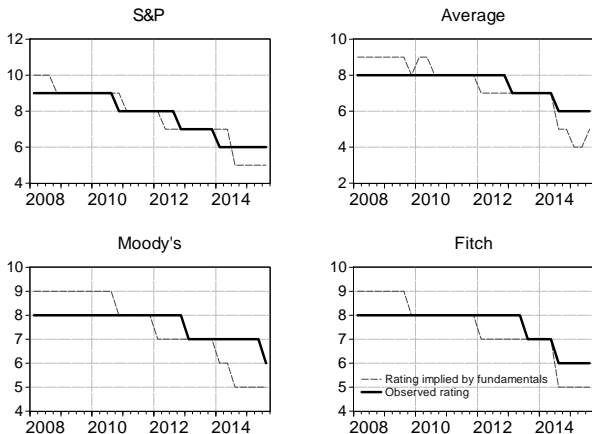
2. Determinants of sovereign credit ratings

Precision of the estimated credit rating models

	Baseline Model				Nonlinear Model			
	SP	Moody's	Fitch	Average	SP	Moody's	Fitch	Average
Correct prediction	0.49	0.48	0.53	0.48	0.55	0.59	0.60	0.60
Within 1 notch	0.86	0.85	0.89	0.88	0.89	0.89	0.91	0.91
Within 2 notches	0.97	0.95	0.97	0.97	0.97	0.96	0.98	0.97

2. Determinants of sovereign credit ratings

Figure: Rating implied by fundamentals and observed rating for Croatia



3. Decomposition of CDS spreads

- What is the **informational contribution of credit ratings** to the CDS market in addition to the information already contained in the economic fundamentals

$$CDS_{i,t} = \alpha_0 + \eta_{i,t} + \alpha_1 \hat{R}_{i,t} + \alpha_2 \hat{\epsilon}_{i,t} + \alpha_3 VX_{i,t} + \epsilon_{i,t}$$

- Decomposition of CDS spreads to the following contributions:
 - Rating implied by fundamentals (fit of the previous equation, $\hat{R}_{i,t} = \hat{c} + \hat{\eta}_{i,t} + \hat{\beta}'_1 X_{i,t} + \hat{\beta}'_2 D_{80} X_{i,t}$)
 - Discretionary actions of rating agencies - overestimation indicator (residual from the previous equation, $\hat{\epsilon}_{i,t}$)
 - Global risk aversion - market sentiment ($VX_{i,t}$)

3. Decomposition of CDS spreads

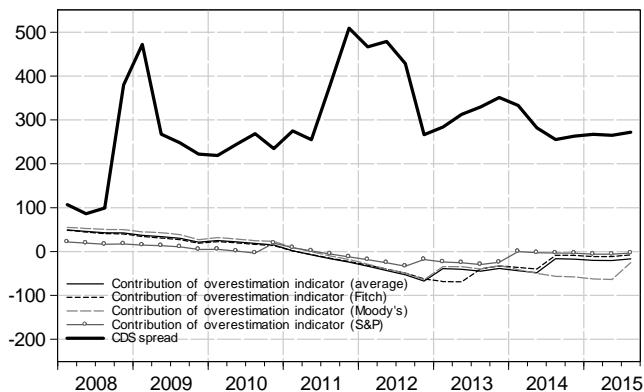
CDS spread equation

	S&P	Moody's	Fitch	Average
Intercept	757.79 (**)	494.19 (**)	789.79 (***)	665.23 (**)
Fundamentals	-52.73 (***)	-36.09 (***)	-52.38 (***)	-46.20 (***)
Overestimation indicator	-27.01 (***)	-34.90 (***)	-33.28 (***)	-34.69 (***)
Risk aversion	7.02 (***)	7.14 (***)	6.87 (***)	7.01 (***)
Adjusted R ²	0.58	0.57	0.59	0.59
S.E. of regression	99.45	100.87	98.24	99.07

Note: Dependent variables are quarterly averages of CDS spreads. The symbols ***, ** and * denote statistical significance at the 1%, 5% and 10% level, based on two-step bootstrap standard errors.

3. Decomposition of CDS spreads

Figure: Contribution of rating overestimation indicators to the level of Croatian CDS spreads



3. Decomposition of CDS spreads

CDS spreads variance decomposition

	S&P	Moody's	Fitch	Average
Fundamentals	0.36	0.27	0.36	0.33
Overestimation indicator	0.04	0.07	0.05	0.06
Risk aversion	0.60	0.66	0.59	0.61

Note: The values are representing contributions of the respective variable to the R^2 statistics by using the methodology in Lindeman et al (1980).

4. Market implied rating

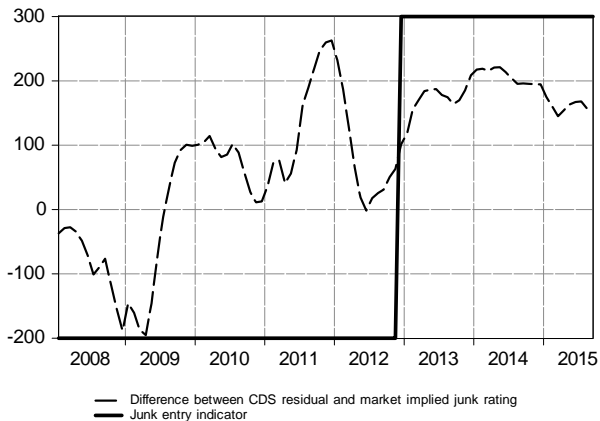
- Markets can informally assign ratings to individual countries - **market implied ratings**
- Market implied ratings are not always equal to the actual credit rating assigned by rating agencies
- Our objective is to minimise the penalty function shown below in order to find the optimal threshold between rating categories:

$$P(g) = \frac{1}{m} \sum_{i=1}^m \max(S_{i,R_1} - g, 0) + \frac{1}{n} \sum_{j=1}^n \max(g - S_{j,R_2}, 0)$$

- Are markets anticipating downgrades into the junk category before the actual downgrades?

4. Market implied rating

Figure: Market implied rating for Croatia



Conclusion

- The autonomous impact of credit rating announcements on the borrowing cost of EU countries is of limited economic importance
- It seems that rating agencies do not provide financial markets with significant information in addition to those already contained in macroeconomic fundamentals
- Given the sentiment in financial markets, the government's borrowing cost can only be reduced by improving macroeconomic and fiscal fundamentals, where any increase in the credit rating may then follow only as a consequence of these improvements