

## ROMANIAN COUNTY RATING MEASUREMENT. A COMPARATIVE ANALYSIS

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### **Abstract:**

*In the second wave of financial crisis, namely the sovereign debt crisis, the country's most affected by this phenomenon are Greece, Italy, Spain, Portugal, Ireland and last year Cyprus joined. Future more the crisis in Greece in 2015 requires local authorities to evaluate constantly their rating in order to prevent bankruptcy. In this paper we conducted a comparative analysis using Altman method and the Stickney method and correlate the scores with ratings agencies Standard & Poor's and Moody's.*

**Key words:** public debt, rating, standing, liquidity, performance

**JEL classification:** H72

### **1. LITERATURE REVIEW**

The international financial crisis has prompted more than ever rating agencies such as Moody's, Standard & Poor's, Fitch IBCA and Thomson Bank Watch to prepare quarterly reports on the rating of banks, large corporations, municipalities and countries to highlight risk posed to investors. For this process a number of agencies search financial and non-financial information relating to issuers of securities standing in the financial market. Financial information taken from the financial statements, forecasts, investment programs and international news will be the basis of determining the assessed rating after selection and adjustment.

Some authors test the hypothesis that major credit rating agencies (CRAs) have been inconsistent in assessing the implications of monetary union membership for sovereign risks. [1]

Using ordered logit and probit plus random effects ordered probit approaches, in their study other authors established the determinants of sovereign debt ratings. [2]

Other authors' empirical findings indicate that tradeoffs occur between highway project-related debt and other state debt in those states with formal restrictions on total general obligation and revenue backed debt (umbrella debt limits). [3]

In a recent paper authors investigate the impact of state-level tax and expenditure limits (TEs) on state government revenues and aid to local governments. Using an instrumental variable approach to control for endogeneity, the authors find that the general fund TEs (i.e., revenue and expenditure limits) have led to substantial increases in tax and non-tax revenues. [4]

American authors studied the impact of state tax and expenditure limitations (TEs) on bond credit ratings used an incomplete panel in US states in which the authors find limited differences in the fiscal and economic variables that influence the ratings of the two agencies respectively Standard&Poor's and Moody's. [5]

Politicians often propose force strategies in fighting the underground economy in order to increase budget revenues: some advocate for trust-based strategies, some advocate for power-based strategies and others for an appropriate mixture of trust and power [6-10].

Romanian authors explain that the public debt includes all amounts borrowed by government, the administrative units and other public entities, individuals or legal entities from domestic and abroad and of outstanding at a time. [11]

Same authors said that the obligations represent commitments arising from borrowing, i.e. repayment of principal, payment of interest, fees, special benefits granted to creditors. [12]

On the other hand the international financial crisis has prompted more than ever rating agencies such as Moody's, Standard & Poor's, Fitch IBCA and Thomson Bank Watch prepare quarterly reports on the rating of banks, large corporations, municipalities and countries to highlight risk posed to investors.

In our opinion the financial information taken from the financial statements, forecasts, and investment programs will be the basis of determining the rating, which is a measure of the financial standing health of the companies and local public administration.

## 2. METHOD AND RESULTS

Rating agencies analyze the information needed to assess risks associated with an issue of securities based on the trend registered by the entities in the past five years.

During the time, in evaluation rating process, the rating agencies took into account the three principles:

- certainty ability to pay, at maturity, the interest and to repayment the amounts borrowed;
- nature and the insurance / bond provisioning;
- management decisions to prevent the bankruptcy, such as the reorganization and the financial restructuring, which not could affect the rights of creditors.

### 2.1. The importance of rating agencies in the financial markets

In Romania each bank has own rating system, to establish the financial standing of the companies and local administration. These ratings are based both on the financial ratios and non-financial information and show the risk associated with losses in the event of defaulting on payment of a debtor and the recovery of these losses.

Most rating systems contain between six and ten different ranks that are sufficient to achieve a classification according to risk classes.

Until now, the market is dominated by three major rating agencies: Standard & Poor's Ratings Group, Moody's Investors Service and Fitch - IBCA and the focus is on assessing credit risk associated with debt in the form of securities / bonds issued by companies, municipalities, banks or countries which are traded on the international market.

Rating agencies products use uppercase and lowercase letters (A, B and C). Thus the "Standard & Poor's" agency notes the rating by uppercase and „Moody's Investor Service" used a combinations of uppercase, lowercase letters and digits.

The rating system applied to individual borrowers varies from agency to agency; some prefer to analyze financial criteria while others are more focused on quality criteria in the risk process evaluation.

Thus the financial criteria involve performance ratios, liquidity and solvency, debts ratios, turnover growth while the nonfinancial information is: industry development, competitive advantage, quality management and shareholders in compliance with required standards.

From our point of view the raking based on financial criteria can be applied as well in the banking industry, financial industry and in local government administration.

In our paper we use the financial analysis ratios in order to assess the financial policy of the county government in Romania in the last period and thus, facilitate the future decisions in local administration.

Therefore we used The Altman Model and the Stickney Model to measure the rating and the probability of bankruptcy of the public administration, and to correlate these ratings with agencies Standard&Poors and Moody's products.

## 2.2. The Ratings of local government county in Romania

The financial analysis used in local administration is a tool to assess the financial policy of the county government and to facilitate the future public decisions based on the financial statements of county local government.

On the other hand financial analysis takes into account the public activity of county government, the quality of the public management, the administration personnel, motivation and the public performance.

Results of the analysis undertaken by the county government may be intended either for internal users and especially its staff management or external users, bankers or other investors.

In our opinion, the financial analysis should be focused on the main factors used in credit risk evaluation and in the ranking process.

Analysis of the local government rating is based on a number of indicators used in the financial analysis, which takes into account the financial strengths of local government: to issue county bonds, to access bank loans in public debt limits.

Three types of evaluation of the financial issues, namely univariate analysis, multivariate analysis and logit analysis are addressed in financial theory.

Univariate model proposed by William Beaver achieved a moderate level of accuracy of prediction. [13]

The most commonly used model was proposed by Edward Altman, Professor of Finance at the Stern School of Business at New York University.

More recently model used in rating analysis is the Stickney model [14], whose application is based on four stages:

- In the first stage is calculated seven financial ratios according with the data table:

**Table 1. The Stickney Model**

Financial ratios	Coefficients
Constant	+ 0,23883
Stocks/Turnover	- 0,108
Receivables/Stocks	- 1,583
(Cash + Short term investment)/Total Assets	- 10,78
Current Assets/Current liabilities	+ 3,074
Operating profit/(Total Assets – Total current debts)	+ 0,486
Long term liabilities/(Total Assets – Total current debts)	- 4,35
Turnover/(Working capital + Fixed Assets)	+ 0,11
$y =$	Constant + $\sum$ (Coefficient * Financial ratio)
Probability of bankruptcy =	$1/(1 + e^y)$

Source: C.P. Stickney, *Financial Reporting and Statement Analysis, 3rd Edition*. The Dryden Press, Ft. Worth: TX, 1996

- In the second stage each ratio is multiplied by a coefficient that can take positive or negative values.
- In the third stage partial products are added together.
- Finally default probability is calculated as the inverse function  $(1+e^y)$ .

**Table 2. Stickney Method in Romanian county**

Local County	2008	2009	2010	2011	2012	2 013	2 014
<i>Inventories</i>	15 421 958	17 703 281	18 082 813	26 256 823	20 420 341	24 587 674	26 525 693
<i>Operation Revenues</i>	460 954 145	518 687 969	568 671 023	470 112 116	550 016 922	567 240 270	345 061 474
R1	0,03	0,03	0,03	0,06	0,04	0,04	0,08
Variable	0,1080	0,1080	0,1080	0,1080	0,1080	0,1080	0,1080
Score	0,0032	0,0032	0,0032	0,0065	0,0043	0,0043	0,0086
<i>Current receivables</i>	1 710 438	2 226 427	615 330	22 277 939	9 270 815	8 527 899	158 647 528
<i>Inventories</i>	15 421 958	17 703 281	18 082 813	26 256 823	20 420 341	24 587 674	26 525 693
R2	0,11	0,13	0,03	0,85	0,45	0,35	5,98
Variable	1,583	1,583	1,583	1,583	1,583	1,583	1,5830
Score	0,1741	0,2058	0,0475	1,3456	0,7124	0,5541	9,4663
<i>Treasury</i>	36 491 365	23 388 444	21 372 323	28 927 026	25 455 397	14 153 634	20 449 591
<i>Total assets</i>	386 157 137	405 153 738	453 663 954	674 642 650	512 912 426	1 099 403 972	1 305 922 640
R3	0,09	0,06	0,05	0,04	0,05	0,01	0,02
Variable	10,7800	10,7800	10,7800	10,7800	10,7800	10,7800	10,7800
Score	0,9702	0,6468	0,5390	0,4312	0,5390	0,1078	0,2156
<i>Current assets</i>	53 638 903	43 360 651	40 088 695	77 476 759	55 164 409	47 339 577	205 699 277
<i>Current liabilities</i>	8 279 113	10 869 224	10 825 928	27 692 629	20 078 086	18 675 545	183 608 152
R4	6,48	3,99	3,70	2,80	2,75	2,53	1,12
Variable	3,0740	3,0740	3,0740	3,0740	3,0740	3,0740	3,0740
Score	19,9195	12,2653	11,3738	8,6072	8,4535	7,7772	3,4429
<i>Operational Result</i>	36 161 684	- 23 221 560	20 522 473	38 759 446	25 241 611	- 50 671 006	45 277 476
<i>Total assets- Current liabilities</i>	377 878 024	394 284 514	442 838 026	646 950 021	492 834 340	1 080 728 427	1 122 314 488
R5	0,10	-0,06	0,05	0,06	0,05	-0,05	0,04
Variable	0,4860	0,4860	0,4860	0,4860	0,4860	0,4860	0,4860
Score	0,0486	-0,0292	0,0243	0,0292	0,0243	-0,0243	0,0194
<i>Public debt</i>	463 554	15 689 668	48 733 834	77 986 376	76 816 604	106 621 950	86 051 714
<i>Total assets- Current liabilities</i>	377 878 024	394 284 514	442 838 026	646 950 021	492 834 340	1 080 728 427	1 122 314 488
R6	0,00	0,04	0,11	0,12	0,16	0,10	0,08
Variable	4,3500	4,3500	4,3500	4,3500	4,3500	4,3500	4,3500
Score	0,0000	0,1740	0,4785	0,5220	0,6960	0,4350	0,3480
<i>Operation Revenues</i>	460 954 145	518 687 969	568 671 023	470 112 116	550 016 922	567 240 270	345 061 474
<i>Working capital + Fixed assets</i>	377 878 024	394 284 514	442 838 026	646 950 021	492 834 340	1 080 728 427	1 122 314 488
R7	1,22	1,32	1,28	0,73	1,12	0,52	0,31
Variable	0,1100	0,1100	0,1100	0,1100	0,1100	0,1100	0,1100
Score	0,1342	0,1452	0,1408	0,0803	0,1232	0,0572	0,0341
Y = 0.23883 – R1* 0.108 – R2*1.583- R3*10.78 + R4*3.074 + R5* 0.4860 – R6* 4.35 + R7* 0.11	x	x	x	x	x	x	x
<b>TOTAL</b>	19,1936	11,5903	10,7095	6,6502	6,8881	6,9477	-6,3033

SCORE							
Bankruptcy probability	0	0,00013	0,00025	0,00575	0,00479	0,00457	0,99249
S&P's Rating	A-	A-	A-	A-	A-	A-	BB
Moody's Rating	A3	A3	A3	A3	A3	A3	Ba2

Source: own calculations

As we observe starting with 2008 until 2013 the local authorities had a strong rating A-. In 2014 the rating of these authorities' decreases at rating BB as consequences of public debt increased to finance the local projects investments.

A way of correlating with Stickney score with the rating agencies Standard & Poor's and Moody's is shown in the following table:

**Table 3. The correlation between Stickney Ratings and the Agencies Ratings**

Risk grade	Bankruptcy probability	Local county government rating	
		Moody's	Standard&Poor's
1	0,0-0,15	A3	A-
2	0,15-0,3	Baa1/Baa2	BBB+/BBB
3	0,3-0,6	Baa2/Baa3	BBB/BBB-
4	0,6-1,2	Ba1/Ba2	BB+/BB/BB-
5	1,2-2,5	Ba3	B+/B
6	2,5-5	B1	B-
7	5-10	B2/B3	CCC
8	Over 10	CaaCa/C	CC/C

Source: Adaptation E. Cade, Managing Banking Risks Woodhead Publishing, 1997, p. 115

Bond ratings are issued by bond rating agencies, the most prominent of which are **Moody's** and **Standard&Poor's**. The ratings attest to the creditworthiness of a firm: The probability that adverse conditions will result in financial difficulties is taken into consideration assessing the likelihood of the firm defaulting on its interest or principal payments. Bond indentures and the degree of protection afforded in the event of bankruptcy are among other important considerations in the rating process. [15]

The relation between bond rating and Z-score adjusted for an intercept of 3.25 is the follow:

$$Z = 6.56X_1 + 3.26 X_2 + 6.72X_3 + 1.05X_4 + 3.25$$

X<sub>1</sub>=Working capital/Total Assets -reflects liquidity

X<sub>2</sub>= Retained earnings/Total assets-reflects age of firm and cumulative profitability

X<sub>3</sub>=Earnings before interest and taxes/Total Assets-reflects profitability

X<sub>4</sub>= Shareholder's equity/Total Liabilities-reflects financial structure

**Table 4. the Altman Corporate Bonds Rating**

US Bond Rating	Average Z-score (with intercept)
AAA	8.15
AA+	7.60
AA	7.30
AA-	7.00
A+	6.85
A	6.65
A-	6.40
BBB+	6.25

BBB	5.85
BBB-	5.65
BB+	5.25
BB	4.95
BB-	4.75
B+	4.50
B	4.15
B-	3.75
CCC+	3.20
CCC	2.50
CCC-	1.75
D(Default)	0

Source: J.M.Hartzell, Matthew Peck and E.I.Altman, Emerging Market Corporate Bonds, A scoring System, Salomon Brothers, May 15, 1995, p.9

**Table 5. The Altman Ratings in Romanian County**

County		2008	2009	2010	2011	2012	2 013	2 014
<i>Working capital</i>		45 359 790	32 491 427	29 262 767	49 784 130	35 086 323	28 664 032	22 091 125
<i>Total assets</i>		386 157 137	405 153 738	453 663 954	674 642 650	512 912 426	1 099 403 972	1 305 922 640
<b>Liquidity</b>		0,12	0,08	0,06	0,07	0,07	0,03	0,02
Variable X1	6,560	0,79	0,53	0,39	0,46	0,46	0,20	0,13
Retained earnings		59 067 258	86 333 595	45 791 521	78 008 085	96 026 347	118 271 961	64 701 276
<i>Total assets</i>		386 157 137	405 153 738	453 663 954	674 642 650	512 912 426	1 099 403 972	1 305 922 640
<i>Age of county</i>		0,15	0,21	0,10	0,12	0,19	0,11	0,05
Variable X2	3,260	0,49	0,69	0,33	0,39	0,62	0,36	0,16
<i>EBIT</i>		28 074 217	- 25 892 558	12 961 870	34 532 732	12 780 016	- 51 987 022	42 418 187
<i>Total assets</i>		386 157 137	405 153 738	453 663 954	674 642 650	512 912 426	1 099 403 972	1 305 922 640
<b>Profitability</b>		0,07	-0,06	0,03	0,05	0,02	-0,05	0,03
Variable X3	6,720	0,47	-0,40	0,20	0,34	0,13	-0,34	0,20
<i>Equity</i>		377 414 470	378 594 846	394 104 192	568 963 645	416 017 736	974 106 477	1 036 262 774
<i>Public Debt</i>		445 224 395	491 487 333	499 455 475	752 650 735	608 938 773	1 217 675 933	1 370 623 916
<b>Financial structure</b>		0,85	0,77	0,79	0,76	0,68	0,80	0,76
Variable X4	1,050	0,89	0,81	0,83	0,80	0,71	0,84	0,80
Constant	3,350	3,35	3,35	3,35	3,35	3,35	3,35	3,35
"Z" Score		5,99	4,97	5,10	5,33	5,28	4,41	4,64
Rating		BBB	BB	BB	BB+	BB+	B	B+

Source: Own calculus

As we observe the Altman ratings are more restrictive comparing with Stickney ratings. Thus 2008 – 2012 the ratings are constant at BB level, while 2013 and 2014 the ratings decreased to B level.

Based on both models we can establish the following relations with Standard&Poor's and Moody's ratings.

**Table 6. The local government ratings**

US Bond Standard&Poor's Rating	Altman Z-score	Stickney Bankruptcy Probability	Risk Grade	Moody's Ratings	Standard&Poor's Ratings
AAA	8.15	-	-	-	-
AA+	7.60	-	-	-	-
AA	7.30	-	-	-	-
AA-	7.00	-	-	-	-
A+	6.85	-	-	-	-
A	6.65	-	-	-	-
A-	6.40	0,0-0,15	1	A3	A-
BBB+	6.25	0,15-0,3	2	Baa1	BBB+
BBB	5.85	0,15-0,3	2	Baa2	BBB
BBB-	5.65	0,3-0,6	3	Baa3	BBB-
BB+	5.25	0,6-1,2	4	Ba1	BB+
BB	4.95	0,6-1,2	4	Ba2	BB
BB-	4.75	0,6-1,2	4	Ba2	BB-
B+	4.50	1,2-2,5	5	Ba3	B+
B	4.15	1,2-2,5	5	Ba3	B
B-	3.75	2,5-5	6	B1	B-
CCC+	3.20	5-10	7	B2	CCC+
CCC	2.50	5-10	7	B3	CCC
CCC-	1.75	5-10	7	B3	CCC-
D(Default)	0	Over 10	8	CaaCa/C	CC/C

Source: Own presentation

Based on the above results and take into consideration the date correlated in the table above we get the following results:

**Table 7. The comparison between Stickney and Altman Models**

Ratings	2008	2009	2010	2011	2012	2013	2014
Stickney Y Score	19,1936	11,5903	10,7095	6,6502	6,8881	6,9477	-6,3033
Bankruptcy Probability	0	0,00013	0,00025	0,00575	0,00479	0,00457	0,99249
Standard&Poor's Rating	A-	A-	A-	A-	A-	A-	BB
Moody's Rating	A3	A3	A3	A3	A3	A3	Ba2
Altman Z Score	5,99	4,97	5,10	5,33	5,28	4,41	4,64
Standard&Poor's Rating	BBB	BB	BB	BB+	BB+	B	B+

Source: Own calculus

As we saw the ratings both Altman and Stickney models are very close, which means the Altman model or Stickney model may be used in determining the rating of local governments.

### 3. CONCLUSIONS

- The rating is an important method in predicting the financial stability of local governments;
- Local governments must periodically evaluate their ratings to increase investors' confidence in their ability to repay loans and interests and the public debts;
- Rating models must reflect the risk of bankruptcy among local governments, based on local financial autonomy;
- Both Altman and Stickney models are important tools for the local authorities in measuring the financial health of its standing.

- We consider that based on this model it is possible to build other important rating models for particular cases in Romanian local administration for measuring its financial health.

## REFERENCES

- [1] F. M.Körner, H.M. Trautwein, Rating sovereign debt in a monetary union – original sin by transnational governance, , The Journal of Risk Finance, Vol. 16 Issue 3 pp. 253 – 283, <http://dx.doi.org/10.1108/JRF-11-2014-0171>
- [2] A.Alfonso, P.Gomes, P.Rother, Ordered response models for sovereign debt ratings, Applied Economics Letters, 2009, vol.16, 769-773, doi:10.1080/13504850701221931
- [3] D. V. Denison, M. M. Hackbart, M. J. Moody, Intrastate Competition for Debt Resources, Public Finance Review, Volume 37 Number 3, May 2009 269-288, doi: 10.1177/1091142108323486
- [4] S. N. Kioko, C. R. Martell, Impact of State-Level Tax and Expenditure Limits (TEs) on Government Revenues and Aid to Local Governments, Public Finance Review, (2012), 40(6) 736-766, DOI: 10.1177/1091142112438460
- [5] J. I. Stallmann, S. Deller, L. Amiel, C.Maher, Tax and Expenditure Limitations and State Credit Ratings, Public Finance Review, (2012),40(5) 643-669, DOI: 10.1177/1091142112446844
- [6] Bătrâncea, L., Nichita, A., “Which is the Best Government? Colligating Tax Compliance and Citizens’ Insights regarding Authorities/ Actions”, *Transylvanian Review of Administrative Sciences*, No. 44 E, 2015, pp. 5-22
- [7] Kogler, C., Batrancea, L., Nichita, A., Pantya, J., Belianin, A., Kirchler, E., “Trust and Power as Determinants of Tax Compliance: Testing the Assumptions of the Slippery Slope Framework in Austria, Hungary, Romania and Russia”, *Journal of Economic Psychology*, Vol. 34, 2013, pp. 169-180
- [8] Bătrâncea, L., Nichita, A., Bătrâncea, I., “Tax Non-compliance Behavior in the Light of Tax Law Complexity and the Relationship between Authorities and Taxpayers”, *Scientific Annals of the “Alexandru Ioan Cuza” University of Iasi. Economic Series*, Vol. 59, No. 1, 2012, pp. 97-106.
- [9] Bătrâncea, L. Nichita, A., Bătrâncea, I., “Understanding the Determinants of Tax Compliance Behavior as a Prerequisite for Increasing Public Levies”, *The USV Annals of Economic and Public Administration*, Vol. 12, No. 1, 2012, pp. 201-210
- [10] Batrancea, L., Nichita, R.A., Batrancea, I., Pop, R., “Multifacets of Tax Evasion in Theory, Surveys, Case Studies, and Economic Experiments”, *Advances in Finance and Accounting*, Proceedings of the 1<sup>st</sup> WSEAS International Conference on Finance, Accounting and Auditing (FAA’12), 2012, pp. 378-383
- [11] Văcărel, I., Bistriceanu, G., Bercea, F., Moşneanu, G. A., Bodnar, M., & Georgescu, F. (2004) *Finante publice*. Bucuresti: Editura Didactica si Pedagogică
- [12] Moşteanu, T., Vuţă, M., Câmpeanu, E.-M., Gyorgy, A., & Cataramă, D.-F. (2008) *Buget și trezorerie publică*. Bucureşti: Editura Universitară
- [13] J. Shepard, The Dilemma of Matched Pairs and Diversified Firms in Bankruptcy Prediction Model. *The Mid-Atlantic Journal of Business*, no.30, March , (1994), p. 9
- [14] C.P. Stickney, *Financial Reporting and Statement Analysis, 3rd Edition*. The Dryden Press, Ft.Worth: TX, 1996
- [15] Gerald I.White, Ashwinpaul C. Sondhi, Dov Fried, *Financial Statements*, John Wiley & Sons, Inc, 1998, pp.1001-1010
- [16] E. Cade, *Managing Banking Risks*, Woodhead Publishing, 1997,p. 115.
- [17] J.M.Hartzell, Matthew Peck and E.I.Altman, *Emerging Market Corporate Bonds, A scoring System*, Salomon Brothers, May 15, 1995, p.9