Does the Banking Sector Affect Sovereign Risk?

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Definitions

- Sovereign risk: ability and willingness of the government to pay back its debt.
- Major rating agencies, S&P, Moody's, and Fitch assign credit ratings, watches, and outlooks to the sovereigns, and receive fees for their service.
- The rating committee considers the confidential information provided by the sovereign in addition to the publicly available macroeconomic variables.

Sovereign Risk Modeling

1 - Modern Finance Theory

Contingent Claims Approach. Option pricing theory and sovereign balance sheet is used.

2 - Secondary Market Approach

Shifts focus from macroeconomics to microeconomics. Sovereign bond and CDS spreads are used.

3 - Quantitative Approach

Focus on macroeconomic modeling, mapping of credit ratings or credit scores.

Motivations

- The impact of banking system variables, such as concentration and liquidity ratios, on sovereign credit ratings (in addition to macroeconomic variables)
- The effect of financial structure and legal system variables
- Econometrics: a simpler and robust framework

Literature Review

1 - Cantor and Packer, 1996
Cross Sectional, OLS, 49 Countries
Per Capita Income, GDP Growth, Inflation, Fiscal Balance External Balance, External Debt, Economic Development, Default History

2 - Borio and Packer, 2004
Panel, OLS, 1996-2003 period, 52 countries
Per Capita GDP, Growth, Inflation, Debt to Exports, Corruption, Original Sin

3 – Afonso, Gomes, and Rother, 2007
Panel, REOP, 1995-2005, 78 Countries
Per Capita GDP, Growth, Government Debt, Government Effectiveness, Inflation, External Reserves, Default History, EU Dummy

Data

- Panel, 1996 - 2004 Period
- 34 Countries (24 AE + 10 EM)
- S&P, Moody's, and Fitch Ratings
- Sources: IMF, WB, ECB, TI, IADB

Advanced Economies

country	year	total
Australia	1996 - 2004	9
Canada	1996 - 2004	9
Israel	1996 - 2004	9
Japan	1996 - 2004	9
NewZealand	1996 - 2004	9
Norway	1996 - 2004	9
Singapore	1996 - 2004	9
Sweden	1996 - 2004	9
Switzerland	1996 - 2004	9
UK	1996 - 2004	9
Finland	1996 - 2004	8
Italy	1996 - 2003	8
France	1996 - 2004	8
Ireland	1996 - 2004	8
Netherlands	1996 - 2004	8
Denmark	1996 - 2002	7
Germany	1996 - 2002	7
Greece	1996 - 2003	7
Spain	1996 - 2002	7
Belgium	1996 - 2001	5
Portugal	1996 - 1999	4
Cyprus	2003 - 2004	2
Austria	1999	1
Luxembourg	1997	1

Emerging Markets

country	year	total
Chile	1996 - 2004	9
Colombia	1996 - 2004	9
Philippines	1996 - 2004	9
SouthAfrica	1996 - 2004	9
CostaRica	1997 - 2003	8
Malaysia	1996 - 2003	8
Bolivia	1998 - 2004	7
Morocco	1998 - 2004	6
Paraguay	1998 - 2004	5
TrinidadTobago	2001 - 2003	3

Data

Distribution of observations across years and rating categories

S&P Ratings	Numerical Transformation	Year									Total by rating
		1996	1997	1998	1999	2000	2001	2002	2003	2004	
AAA	18	8	9	6	9	8	9	11	9	11	80
AA+	17	5	5	5	9	8	7	4	2	1	46
AA	16	5	5	5	2	1	2	1	1		22
AA-	15	1	1					1	1	1	5
A+	14	1							1		2
A	13		1				1	1	1	2	6
A-	12	2	2	2	3	3	2	2	3	1	20
BBB+	11							1			1
BBB	10				1	1	1		2	1	6
BBB-	9	2	2	2		1	2	2			11
BB+	8	1	2	2	3	1	1	1			11
BB	7		1	2	2	3	2	3	4	4	21
BB-	6	1		2	1						4
B+	5					1	1	1			3
B	4				1						1
B-	3							1	1	2	4
SD	1								1		1
Total by year		26	28	26	31	27	28	29	26	23	244

Econometric Modeling

$$R_{it}^{*} = X_{it}B1 + f_{it}B2 + a_{t}B3 + u_{it}$$

Where, $u_{it} = e_i + v_{it}$,

R_{it}: The sovereign credit rating assigned by a major agency

X_{it}: The observed independent variables

f_{it}: Financial system indicators

a_t: Aggregate time effects, dummies for each year

e_i: The individual error

v_{it}: The idiosyncratic disturbances

Results

	Baseline Model	Improved Model	Final Model
Variable Definition	**Coefficient**	**Coefficient**	**Coefficient**
1 Gross National Income PC - PPP	3.990 ***	4.422 ***	4.962 ***
2 Inflation (% change in CPI)	-0.192 ***	-0.166 ***	-0.103 ***
3 Central Government Debt (% of GDP)	-0.022 ***	-0.021 ***	-0.020 ***
4 Real Effective Exchange Rate	0.033 ***	0.049 ***	0.042 ***
5 Current Account Balance (% of GDP)	0.080 ***	0.047 **	0.044 **
6 Corruption Index		0.390 ***	0.354 ***
7 Trade in Services (% of GDP)		0.037 ***	0.042 ***
8 **Concentration in Banking System**		-5.326 ***	-4.850 ***
9 **Bank Liquid Reserves to Bank Assets**			-0.119 ***
Number of Observations	244	244	244
Pseudo R^2	0.477	0.547	0.586

*, **, *** Significant at .1, .05, and .01 levels respectively

(year dummies 1996 to 2003 are not shown)

Contributions

- Showed that the banking system variables, such as concentration and liquidity ratios, are strongly related to sovereign credit ratings.
- None to our knowledge has examined the effect of the banking system on sovereign risk.
- Validated the importance of legal system variables, suggested the Corruption Index as the best proxy.
- Showed that the financial structure does not matter. Improved the econometrics with a simple and robust methodology.

Further Research

Contingent Claims Approach to Sovereign Risk Modeling

Gray, Merton, Bodie

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