

Supplementary material for *The main determinants of banking crises in OECD countries* – construction of the Regulation and Supervision indices

Banking regulatory frameworks are exploited very often in the financial literature. Their complexity leads to a separation in topics and each paper considers only a few as relevant for the analysis. Usually the main selected topics are capital adequacy requirements, deposit insurance, restrictions on banks activities and bank supervision.

In our paper, we consider all topics mentioned above and many others, covering the majority of the measurable answers of the Bank Regulation and Supervision Survey (BRSS) promoted by the World Bank. As an example, consider the 2007 BRSS. This survey has 268 questions grouped on 12 topics:

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|--|---|
| 1. Entry into banking | 7. Liquidity and diversification requirements |
| 2. Ownership | 8. Depositors' (savings) protection schemes |
| 3. Capital | 9. Provision requirements |
| 4. Activities | 10. Accounting/information disclosure requirements |
| 5. External auditing requirements | 11. Discipline/problem institutions/exit requirements |
| 6. Internal management/organizational requirements | 12. Supervision |

We selected 45 questions for the construction of the regulation index and 17 for the supervision index.¹ The selected questions for the regulation index are the following:

Four questions about *entry into banking*:

- 1.4.** Is it legally required that applicants submit information on the source of funds to be used as capital?

¹ BRSS (2001): 31 questions for the regulation index and 12 questions for the supervision index. BRSS (2003): 39 questions for the regulation index and 13 questions for the supervision index.

1.5. Are the sources of funds to be used as capital verified by the regulatory/supervisory authorities?

1.7. Can initial disbursement of capital be done with borrowed funds?

1.8. Which of the following are legally required to be submitted before issuance of the banking license?

- Draft bylaws?
- Intended organization chart?
- Financial projections for first three years?
- Financial information on main potential shareholders?
- Background/experience of future directors?
- Background/experience of future managers?
- Sources of funds to be disbursed in the capitalization of new bank?
- Market differentiation intended for the new bank?

One question about *ownership*:

2.1. Is there a maximum percentage of bank capital that can be owned by a single owner?

Eleven questions about *capital*:

3.1. What is the minimum capital to asset ratio requirement?

3.1.1. Is this ratio risk weighted in line with the 1988 Basle guidelines?

3.2. Does the minimum ratio vary as a function of an individual bank's credit risk?

3.3. Does the minimum ratio vary as a function of market risk?

3.3.1. Does the minimum ratio vary as a function of operational risk?

3.3.2. Is there a simple leverage ratio that is required?

3.4. What is the actual risk-adjusted capital ratio in banks as of yearend 2005, using the 1988 Basle Accord definitions?

3.4.1. What is the actual ratio between shareholders' equity (Tier 1 regulatory capital) and total risk-weighted assets of banks as of yearend 2005?

3.5. Is subordinated debt allowable as part of regulatory capital?

3.6. Is subordinated debt required as part of regulatory capital?

3.10. Are accounting practices for banks in accordance with International Accounting Standards (IAS)?

Four questions about the topic *activities* (considered together as only one practice):

4.1. What are the conditions under which banks can engage in securities activities?

4.2. What are the conditions under which banks can engage in insurance activities?

4.3. What are the conditions under which banks can engage in real estate activities?

4.4. Can banks own voting shares in nonfinancial firms?

Five questions about *external auditing requirements*:

5.1. Is an external audit a compulsory obligation for banks?

5.1.1. Are auditing practices for banks in accordance with international auditing standards?

5.1.2. Is it required by the regulators that bank audits be publicly disclosed?

5.2. Are specific requirements for the extent or nature of the audit spelled out?

5.3. Are auditors licensed or certified?

Four questions about *liquidity and diversification requirements*:

7.1. Are there explicit, verifiable, and quantifiable guidelines regarding asset diversification? (for example, are banks required to have some minimum diversification of loans among sectors, or are their sectoral concentration limits)?

7.1.1. Are banks limited in their lending to single or related borrowers?

7.3. Are banks required to hold either liquidity reserves or any deposits at the Central Bank?

7.6. Are banks required to hold reserves in foreign denominated currencies or other foreign denominated instruments?

Six questions about *depositor (savings) protection schemes*:

8.1. Is there an explicit deposit insurance protection system? If no, you may skip to question 8.2. If yes:

8.1.8. Does the deposit insurance scheme also cover foreign currency deposits?

8.1.9. Are interbank deposits covered?

8.3. As part of failure resolution, how many banks closed or merged in the last 5 years?

8.8. Are nonresidents treated less favorably than residents with respect to deposit insurance scheme coverage (either in terms of coverage for which they are entitled or the actual protection provided)?

8.10. Is participation in the deposit insurance system compulsory for all banks?

Three questions about *provisioning requirements*:

9.1. Is there a formal definition of a "nonperforming loan"?

9.4. What is the ratio of nonperforming loans to total assets as of year-end 2005?

9.5. If a customer has multiple loans and one loan is classified as non-performing, are the other loans automatically classified as non-performing?

Five questions about *accounting/information disclosure requirements*:

10.3. Are financial institutions required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries (including affiliates of common holding companies)?

10.4.1. Are off-balance sheet items disclosed to the public?

10.5. Must banks disclose their risk management procedures to the public?

10.6. Are bank directors legally liable if information disclosed is erroneous or misleading?

10.7.1. How many of the top ten banks (in terms of total domestic assets) are rated by international credit rating agencies (e.g., Moody's, Standard and Poor)?

Two questions about the topic *discipline/problem institution/exit*:

11.1. Are there any mechanisms of cease and desist type orders, whose infraction leads to the automatic imposition of civil and penal sanctions on the banks directors and managers?

11.8. Does the Banking Law establish predetermined levels of solvency (capital or net worth) deterioration which forces automatic actions (like intervention)?

On the other hand, the selected questions for the supervision index include:

Eight questions about supervision:

12.1. What body/agency supervises banks? - 12.1.2. A Single Bank Supervisory Agency/
Superintendency

12.2.2. Does the head of the supervisory agency (and other directors) have a fixed term?

12.3. Is your country planning on adopting Basel II

12.3.1. If yes, which variant are you planning on adopting:

- The Standardized Approach
- The Foundation IRB Approach
- The Advanced IRB Approach

12.7. How frequently are onsite inspections conducted in large and medium size banks?

12.9. If an infraction of any prudential regulation is found in the course of supervision, must it be reported?

12.10. Can individual supervisory staff be held personally liable for damages to a bank caused by their actions or omissions committed in the good faith exercise of their duties?

12.10.1. Can the supervisory agency be held liable for damages to a bank caused by its actions?

Six questions about *external auditing requirements*

5.4. Do supervisors get a copy of the auditor's report?

5.5. Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank?

5.6. Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse?

5.6.1. Are external auditors legally required to report to the supervisory agency any other information discovered in an audit that could jeopardize the health of a bank?

5.7. Can supervisors take legal action against external auditors for negligence?

5.8. Has legal action been taken against an auditor in the last 5 years?

One question about *internal management/organizational requirements*

6.1. Can the supervisory authority force a bank to change its internal organizational structure?

One question about *accounting/information disclosure requirements*

10.4. Are off-balance sheet items disclosed to supervisors?

One question about *discipline/problem institutions/exit*

11.2. Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses?

In constructing the indices we added 1 point whenever an expected answer was observed for the main questions and 0,5 points for each expected answer observed for sub-questions.

For each question we defined an expected answer, based on previous research and on our expectations about what should be a strong regulation and strong supervision (see Table A1 and Table A2). Therefore, when the expected answer (sub-answer) is observed for these questions it means that one regulatory or supervisory practice (sub-practice) is verified. For the 2007 BRSS the total of expected points is 36,5 for the regulation index and 15 for the supervision index². The indexes are then presented as a proportion of the total, so they range between 0 and 1.

Table A3 and Table A4 present the observed points for each country and their regulation and supervision indexes, obtained for the years 2001, 2003 and 2007, according to our calculations.

² BRSS (2001): 26,5 points for the regulation index and 11,5 for the supervision index. BRSS (2003): 33,0 points for the regulation index and 12,0 for the supervision index.

Table A1 – Expected answers defined by the authors: *regulation index*

Topic/question	Expected answer	Points
<i>1. Entry into Banking</i>		
1.4	yes	1
1.5	yes	1
1.7	no	1
1.8.1	yes to all questions	1
1.8.2		
1.8.3		
1.8.4		
1.8.5		
1.8.6		
1.8.7		
1.8.8		
<i>2. Ownership</i>		
2.1	yes	1
<i>3. Capital</i>		
3.1	$\geq 8\%$	1
3.1.1	yes	0,5
3.2	yes	1
3.3	yes	1
3.3.1	yes	0,5
3.3.2	yes	0,5
3.4	\geq average (0,125)	1
3.4.1	\geq average (0,100)	0,5
3.5	yes	1
3.6	yes	1
3.10	yes	1
<i>4. Activities</i>		
4.1	"restricted" to all questions	1
4.2		
4.3		
4.4		
<i>5. External Auditing requirements</i>		
5.1	yes	1
5.1.1	yes	0,5
5.1.2	yes	0,5
5.2	yes	1
5.3	yes	1
<i>7. Liquidity & Diversification Requirements</i>		
7.1	yes	1
7.1.1	yes	0,5
7.3	yes	1
7.6	yes	1

Table A1 – Expected answers defined by the authors: *regulation index* (cont.)

Topic/question	Expected answer	Points
<i>8. Depositor (Savings) Protection Schemes</i>		
8.1	yes	1
8.1.6.1		
8.1.8	no	0,5
8.1.9	no	0,5
8.2		
8.3	0	1
8.8	no	1
8.10	yes	1
<i>9. Provisioning Requirements</i>		
9.1	yes	1
9.4	<= average (0,018)	1
9.5	no	1
<i>10. Accounting/Information Disclosure Requirements</i>		
10.3	yes	1
10.4.1	yes	0,5
10.5	yes	1
10.6	yes	1
10.7.1	>= average (7,464)	0,5
<i>11. Discipline/ Problem Institutions/ Exit</i>		
11.1	yes	1
11.8	yes	1
	Total	36,5

Table A2 – Expected answers defined by the authors: *supervision index*

Topic/question	Expected answer	Points
<i>5. External Auditing requirements</i>		
5.4	yes	1
5.5	yes	1
5.6	yes	1
5.6.1	yes	0,5
5.7	yes	1
5.8	no	1
<i>6. Internal Management/ Organizational Requirements</i>		
6.1	yes	1
<i>10. Accounting/Information Disclosure Requirements</i>		
10.4	yes	1
<i>11. Discipline/ Problem Institutions/ Exit</i>		
11.2	yes	1
<i>12. Supervision</i>		
12.1.2	no	0,5
12.2.2	no	0,5
12.3	yes	1
12.3.1	yes to all answers	1
12.7	"annually"	1
12.9	yes	1
12.10	yes	1
12.10.1	yes	0,5
Total		15

Table A3 – Regulation index

<i>Country</i>	BRSS2001		BRSS2003		BRSS2007	
	26,5 points = 100%		33,0 points = 100%		36,5 points = 100%	
	<i>Points</i>	<i>Regulation Index</i>	<i>Points</i>	<i>Regulation Index</i>	<i>Points</i>	<i>Regulation Index</i>
Australia	21,0	0,793	17,5	0,531	19,5	0,534
Austria	19,5	0,736	23,5	0,712	19,5	0,534
Belgium	17,0	0,642	20,0	0,607	22,5	0,616
Canada	15,0	0,566	23,0	0,697	21,5	0,589
Chile	12,0	0,453	19,0	0,577	23,0	0,630
Czech Republic	14,5	0,547	22,5	0,682	21,5	0,589
Denmark	16,0	0,604	16,0	0,485	22,5	0,616
Estonia	19,0	0,717	22,5	0,683	22,5	0,616
Finland	16,0	0,604	18,5	0,562	20,5	0,562
France	14,0	0,529	16,2	0,492	22,0	0,603
Germany	10,0	0,377	15,5	0,470	17,5	0,479
Greece	14,0	0,528	17,5	0,531	19,5	0,534
Hungary	16,5	0,623	21,0	0,638	23,5	0,644
Iceland	17,0	0,642	20,5	0,622	24,5	0,671
Ireland	16,0	0,604	21,5	0,652	20,0	0,548
Israel	13,0	0,491	14,0	0,425	15,0	0,411
Italy	12,0	0,453	16,0	0,485	19,5	0,534
Japan	14,0	0,529	21,5	0,652	21,0	0,575
Luxembourg	18,0	0,679	23,5	0,713	25,5	0,699
Mexico	18,5	0,698	25,0	0,759	23,0	0,630
Netherlands	12,0	0,453	18,0	0,546	21,0	0,575
Norway	n/a	n/a	23,0	0,697	21,5	0,589
Poland	14,0	0,529	18,6	0,562	22,5	0,616
Portugal	15,0	0,566	20,5	0,622	22,5	0,616
Slovak Republic	13,0	0,491	23,5	0,713	21,5	0,589
Slovenia	18,5	0,698	24,5	0,743	24,5	0,671
Korea, Rep.	17,0	0,642	23,0	0,697	24,0	0,658
Spain	17,0	0,642	22,5	0,683	23,5	0,644
Sweden	15,0	0,566	17,5	0,531	17,5	0,479
Switzerland	16,0	0,604	20,5	0,622	24,5	0,671
Turkey	14,0	0,528	23,5	0,713	n/a	n/a
United Kingdom	18,0	0,679	20,5	0,622	20,5	0,562
United States	17,0	0,642	16,0	0,486	18,0	0,493

Note: For Norway (BRSS2001) and for Turkey (BRSS2007) we assume the BRSS2003 values, due to the lack of information on those years.

Table A4 – Supervision index

<i>Country</i>	BRSS2001		BRSS2003		BRSS2007	
	11,5 points = 100%		12,0 points = 100%		15,0 points = 100%	
	<i>Points</i>	<i>Supervision Index</i>	<i>Points</i>	<i>Supervision Index</i>	<i>Points</i>	<i>Supervision Index</i>
Australia	6,5	0,565	7,5	0,625	12,0	0,800
Austria	11,0	0,957	11,0	0,917	9,5	0,633
Belgium	10,0	0,870	10,5	0,875	13,5	0,900
Canada	6,0	0,522	9,5	0,792	10,5	0,700
Chile	9,0	0,783	11,0	0,917	12,5	0,833
Czech Republic	8,5	0,739	6,5	0,542	11,0	0,733
Denmark	9,0	0,783	11,5	0,958	10,5	0,700
Estonia	10,0	0,870	10,5	0,875	10,3	0,687
Finland	9,0	0,783	9,5	0,792	11,5	0,767
France	8,0	0,696	9,5	0,792	10,0	0,667
Germany	8,5	0,739	8,5	0,708	11,5	0,767
Greece	7,0	0,609	10,0	0,833	11,0	0,733
Hungary	8,5	0,739	9,0	0,750	12,5	0,833
Iceland	10,0	0,870	10,5	0,875	14,0	0,933
Ireland	7,0	0,609	9,5	0,792	12,0	0,800
Israel	5,0	0,435	9,0	0,750	9,5	0,633
Italy	5,0	0,435	9,0	0,750	10,0	0,667
Japan	6,0	0,522	8,5	0,708	9,0	0,600
Luxembourg	9,0	0,783	8,0	0,667	13,5	0,900
Mexico	8,0	0,696	11,0	0,917	13,0	0,867
Netherlands	6,0	0,522	9,5	0,792	10,5	0,700
Norway	n/a	n/a	9,0	0,750	13,5	0,900
Poland	6,5	0,565	8,0	0,667	10,5	0,700
Portugal	8,0	0,696	9,5	0,792	13,0	0,867
Slovak Republic	8,0	0,696	9,5	0,792	11,5	0,767
Slovenia	10,0	0,870	10,5	0,875	13,0	0,867
Korea, Rep.	4,5	0,391	8,0	0,667	9,5	0,633
Spain	7,0	0,609	8,5	0,708	11,0	0,733
Sweden	6,0	0,522	6,0	0,500	9,0	0,600
Switzerland	8,0	0,696	9,5	0,792	12,5	0,833
Turkey	9,5	0,826	10,5	0,875	n/a	n/a
United Kingdom	6,0	0,522	6,5	0,542	10,5	0,700
United States	9,0	0,783	9,5	0,792	8,0	0,533

Note: For Norway (BRSS2001) and for Turkey (BRSS2007) we assume the BRSS2003 values, due to the lack of information on those years.