The government interventions, what then? – the effect of government policy responses on risk-taking behavior of banks

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Agenda

Motivation

Methodology

Results

Conclusions

Motivation

- The government interventions exceeded **30 trilllion USD** in the United States.

- According to Bloomberg (2009) the European Union governments:

    - approved **311.4 billion euros** for capital injections,
    - **2.92 trillion euros** for bank liability guarantees,
    - **33 billion euros** for relief of impaired assets and
    - **505.6 billion euros** for liquidity and bank funding

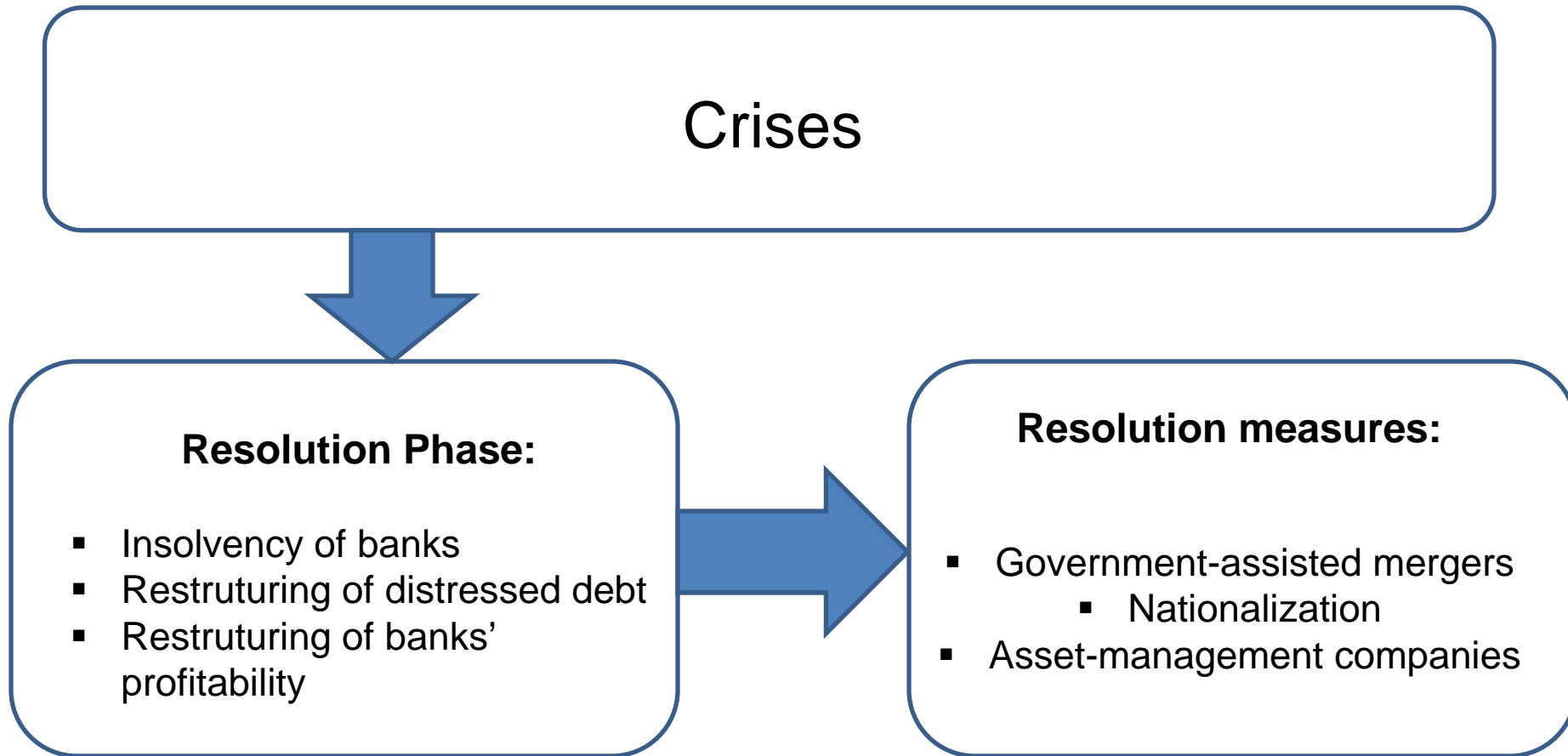# Forms of Interventions in the Systemic Banking Crises

Crises

Containment Phase of the Crisis:

- Lost of confidence in the market
  - Uncertainty
  - Bank runs
  - Lack of liquidity

Resolution measures

- Deposit Gurantees
- Blanket Guarantees
- Emergency Liquidity Provisions

Forms of Interventions in the Systemic Banking Crises

Crises

Resolution Phase:

- Insolvency of banks
- Restruturing of distressed debt
- Restruturing of banks' profitability

Resolution measures:

- Government-assisted mergers
  - Nationalization
- Asset-management companies

Banks all over the world received help

Date(s) of Intervention	Country	Institution
Intervened institutions - banks		
9/29/2008	United States	Wachovia
9/29/2008	Belgium/Netherlands/ Luxembourg	Fortis
10/3/2008	Belgium/Netherlands	Fortis
10/13/2008	United Kingdom	Royal Bank of Scotland, HBOS, LloydsTSB
10/16/2008	Switzerland	UBS
10/19/2008	Netherlands	ING Group
10/28/2008	United States	JPMorgan Chase & Co.
10/28/2008	United States	Bank of America
11/24/2008	United States	Citigroup
1/8/2009	Germany	Commerzbank
1/19/2009	United Kingdom	Royal Bank of Scotland

Date(s) of Intervention	Country	Institution
Intervened institutions - investment banks		
3/14/2008	United States	Bear Stearns
9/15/2008	United States	Lehman Brothers
9/15/2008	United States	Merrill Lynch
10/28/2008	United States	Goldman Sachs
10/28/2008	United States	Morgan Stanley
Intervened institutions - insurance companies		
9/16/2008	United States	AIG

Existing literature on banking interventions (I)

- **Many studies concentrate on:**
  - ➢ cost of the crises (Sheng, 1996; Honohon and Klingebiel, 2001; Laeven and Valencia, 2010)
  - ➢ effectiveness in restoring banking stability (Honohan and Klingebiel, 2004; Kane and Klingebiel, 2004; Laeven and Levine, 2009)
- **Less studies look at the future impact of government inverventions:**
  - ➢ Moral hazard risk (less empirically evindences; Berger et al., 2010; Gropp et al., 2010)
  - ➢ Political economy
    - ✓ state-ownership of banks is related to the high risk-taking and poor efficiency (Shleifer and Vishny, 1994; Berger et al. 2005; Iannota et al., 2007)
    - ✓ risky projects, especially before the elections (Rogoff and Sibert, 1988)
    - ✓ weaker insitutional infrastructure (Beck, et al., 2006)
    - ✓ no incentives due to short-sight (Kane, 1986, 1989)

Existing literature on banking interventions (II)

- The literature on the effects of various banking intervention measures is less obvious

- We do know know how the various intervention measures correlate with each other. The existing literature concentrates on examining individual measures

- There is limited evidence on how the effectiveness of various banking intervetions depends on the country-specific characteristics

Research questions

- Do the government interventions significanlty contribute to the increased moral hazard behavior of banking insitutions in the future?

- Which government interventions contribute to such behaviour at most?

- Can any country characteristics, as improved insitutional infrastructure, better creditors/shareholder protection, monitoring rules, discourage banks from such risk?

Sample

- Novel bank-level database on distressed insitutions and measures undertaken to rescue them in 23 developing and developed countries during systemic crises

- Database covers the period 1991-2003

- 27 out of 40 systemic banking crises presented in Laeven and Valencia (2008)

- In total 170 banking insitutions rescued by any means, however we effectively use 110 insitutions for our study

- Z-score a measure of risk. As a robustness check we alternatively use other variables: non-performing loans, loan loss provsions to total loans, components of z-score measures.

Independent variables

- Net loans to assets
- Cost to income
- Size (logasset)

Bank's characteristics

- Concentration measure
- Gdp growth
- Inflation (log)

Country's characteristics

- Dummy if the country is developed =1
- Dummy if there was also a currency crisis = 1

Dummies

Summary Statistics – Potential effects of government interventions

	Intervened banks					Non-intervened banks					
Guarantee	**Mean**	**Std.dev**	**Min.**	**Max.**	**N**	**Mean**	**Std.dev.**	**Min.**	**Max.**	**N**	**t-test**
z-score	4.635	6.117	-5.310	23.900	45	12.131	11.769	-0.100	90.750	149	4.103***
net loans to asset	45.576	22.817	3.770	89.340	45	50.203	16.916	0.130	84.630	147	0.143
cost to income	89.547	76.298	42.500	457.940	42	69.291	62.328	3.580	735.640	149	-1.767*
logasset	8.834	2.302	3.030	14.010	45	7.027	2.147	0.520	13.980	149	-4.864***
standard deviation	8.765	12.163	0.200	44.040	43	2.712	4.121	0.100	36.290	149	-5.160***
ROA	-0.447	4.056	-20.660	2.460	43	1.724	4.025	-23.150	31.580	149	3.111***
liquid asset to cust. and st. funding	26.071	19.205	1.690	75.560	35	41.167	25.666	0.520	146.650	127	1.978**
loan loss res. to loans	7.780	24.036	-112.690	86.090	41	6.109	6.010	0.500	43.920	142	-0.755
non-performing loans	13.083	16.752	0.820	95.620	34	9.515	28.167	0.030	266.150	93	-0.694

Summary Statistics – Potential effects of government interventions

	Intervened banks					Non-intervened banks					
National	**Mean**	**Std. dev.**	**Mean**	**Max.**	**N**	**Mean**	**St.d.dev.**	**Mit.**	**Max.**	**N**	**t-test**
z-score	5.556	7.757	0.120	35.420	37	11.532	11.561	-5.310	90.750	157	2.986***
net loans to asset	39.723	20.621	3.770	82.180	37	51.361	17.296	0.130	89.340	155	3.539***
cost to income	87.603	79.073	3.580	457.940	35	70.636	62.541	13.520	735.640	156	-1.378
logasset	8.216	1.586	4.150	11.230	37	7.265	2.416	0.520	14.010	157	-2.279**
standard deviation	9.469	11.663	0.420	44.040	36	2.821	5.013	0.100	40.670	156	-5.326***
ROA	1.730	6.308	-12.130	31.580	36	1.125	3.448	-23.150	16.300	156	-0.794
liquid asset to cust. and st. fun.	34.255	23.168	0.630	97.070	31	38.769	25.598	0.520	146.650	131	0.898
loan loss res. to loans	4.701	21.621	-112.690	24.310	34	6.890	9.275	0.500	86.090	149	0.924
non-perf. to loans	18.590	50.893	0.820	266.150	26	8.380	12.514	0.030	95.620	101	-1.831*

Summary Statistics – Potential effects of government interventions

AMC	Intervened banks					Non-intervened banks					t-test
	Mean	**Std.dev.**	**Min.**	**Max.**	**N**	**Mean**	**Std.dev.**	**Min.**	**Max.**	**N**	**t-test**
z-score	6.811	8.080	-5.310	37.360	50	11.635	11.833	-0.100	90.750	144	2.673***
net loans to asset	43.395	21.325	0.250	86.010	50	51.133	17.036	0.130	89.340	142	2.580**
cost to income	76.673	65.807	3.580	457.940	48	72.763	66.236	13.520	735.640	143	-0.355
logasset	8.620	2.150	4.270	14.010	50	7.039	2.227	0.520	13.980	144	-4.365***
standard deviation	6.841	10.512	0.260	44.040	49	3.117	5.399	0.100	36.290	143	-3.191***
ROA	1.221	6.059	-20.660	31.580	49	1.244	3.233	-23.150	16.300	143	0.034
liquid asset to cust and st. funding	31.463	22.535	0.520	97.070	43	40.233	25.717	1.690	146.650	119	1.978**
loan loss res. loans	6.884	22.804	-112.690	86.090	45	6.353	6.279	0.500	43.920	138	-0.248
non-perf. to loans	17.266	45.507	0.620	266.150	36	7.782	9.290	0.030	57.330	91	-1.901*

Summary Statistics – Potential effects of government interventions

Liquidity	Intervened banks					Non-intervened banks					t-test
	Mean	**Std.dev.**	**Min.**	**Max.**	**N**	**Mean**	**Std.dev.**	**Min.**	**Max.**	**N**	**t-test**
z-score	9.103	9.793	-5.310	37.360	44	10.770	11.548	-0.480	90.750	150	0.870
net loans to asset	48.610	21.946	3.770	89.340	44	49.269	17.437	0.130	84.630	148	0.836
cost to income	73.697	67.873	3.580	457.940	43	73.760	65.652	13.520	735.640	148	0.006
logasset	7.866	2.004	3.030	10.820	44	7.323	2.382	0.520	14.010	150	-1.374
standard deviation	4.991	8.487	0.200	40.670	44	3.793	6.803	0.100	44.040	148	-0.966
ROA	1.650	6.478	-20.660	31.580	44	1.116	3.121	-23.150	16.300	148	-0.753
liquid asset to cust. and s.t fun.	29.238	20.395	0.630	97.070	40	40.747	25.966	0.520	146.650	122	2.555**
loan loss res. to loans	5.895	22.695	-112.690	86.090	43	6.664	6.911	0.500	43.920	140	0.353
non-performing loans	17.754	48.341	0.620	266.150	32	8.017	9.143	0.030	57.330	95	-1.880*

Summary Statistics – Potential effects of government interventions

Merger	Intervened banks					Non-intervened banks					t-test
	Min.	**Std.dev.**	**Min.**	**Max.**	**N**	**Min.**	**Std.dev.**	**Min.**	**Max.**	**N**	**t-test**
Zscore	11.106	8.610	0.490	37.360	42	10.195	11.799	-5.310	90.750	152	-0.467
net loans to asset	47.642	17.878	0.250	69.040	42	49.532	18.717	0.130	89.340	150	0.584
cost to income	61.100	19.279	34.850	136.320	42	77.310	73.669	3.580	735.640	149	1.410
logasset	8.999	2.423	4.150	14.010	42	7.018	2.088	0.520	13.980	152	-5.251***
standard deviation	2.517	5.928	0.200	36.290	41	4.488	7.492	0.100	44.040	151	1.557
ROA	1.555	2.757	-3.170	16.300	41	1.152	4.425	-23.150	31.580	151	-0.553
liquid asset to cust. and st. funding	28.823	19.424	0.520	72.800	32	40.141	25.941	0.630	146.650	130	2.312**
loan loss res. to loans	7.122	8.332	0.710	43.920	38	6.316	13.360	-112.690	86.090	145	-0.354
non-perf. to loans	19.162	52.941	0.710	266.150	24	8.445	12.473	0.030	95.620	103	-1.865*

Regression Analyses – Panel and Cross-Section

Government intervention and risk-taking of banks (panel data from t+1 to t+4)

dummy if a bank was intervened =1	-5.370*** (1.390)				
guarantee		- 7.061*** (1.411)			
liquidity			-2.831 (1.756)		
national				-3.933** (1.572)	
Merger					1.778 (1.455)
AMC					-3.837*** (1.374)
R2	0.132	0.103	0.106	0.098	0.110
N	751	751	751	751	751

Government intervention and risk-taking of banks (zscore at t+4)

dummy if bank was intervened =1	-3.907*** (1.456)				
guarantee		-7.001*** (1.549)			
liquidity			-0.166 (1.796)		
national				-4.756*** (1.726)	
merger					1.954 (1.582)
AMC					-3.469** (1.555)
R2	0.117	0.144	0.093	0.116	0.098	0.108
N	182	182	182	182	182	182

Risk-taking in time-series perspective

Government intervention and bank risk-taking (interaction of intervention policy with the time horizon)									
guarantee		**liquidity**		**national**		**merger**		**amc**	
guarantee*(t+1)	**-8.880***	liquidity*(t+1)	**-5.447**	national*(t+1)	**-5.613**	merger*(t+1)	3.582	amc*(t+1)	**-5.236***
	(2.887)		(2.765)		(2.716)		(2.716)		(2.779)
guarantee*(t+2)	**-7.129***	liquidity*(t+2)	**-4.451**	national*(t+2)	**-2.687**	merger*(t+2)	-0.084	amc*(t+2)	**-3.455***
	(1.696)		(1.922)		(2.760)		(2.760)		(1.928)
guarantee*(t+3)	**-7.053***	liquidity*(t+3)	-1.301	national*(t+3)	**-3.900**	merger*(t+3)	1..948	amc*(t+3)	**-4.055***
	(1.319)		(1.783)		(1.735)		(1.735)		(1.329)
guarantee*(t+4)	**-5.432***	liquidity*(t+4)	-0.577	national*(t+4)	**-3.606**	merger*(t+4)	2..371	amc*(t+4)	**-2.641***
	(1.465)		(1.827)		(1.726)		(1.726)		(1.506)
R2	0.137		0.114		0.106		0.104		0.113
N	751		751		751		751		751

Simultanous effects of government invervention measures on risk-taking behavior of banks

Simultanous effects of government interventions (zscore at t+4)

guarantee		**-6.352***	**-6.292**	**-7.337***	-6.443
		(1.887)	(1.897)	(1.543)	(1.851)
liquidity	1.806		1.628	1.154	1.556
	(2.163)		(2.001)	(1.735)	(1.713)
national	-3.665	-2.672	-2.644		-2.546
	(2.396)	(2.340)	(2.297)		(1.870)
merger				2.163	2.035
				(1.490)	(1.480)
amc	-2.470	0.682	**-0.107**		
R2	0.121	0.149	0.152	0.151	0.157
N	182	182	182	182	182

Government intervention measures, risk-taking behavior and country characteristics

- Banking sector development (Beck et al, 2004)

- Rule of law (Kaufman et al., 2003)

- Capital requirements (Barth et al., 2003)

- Power of supervisory authority (Barth et al., 2003)

- Level of creditors' protection (Djankov et al, 2003)

- Private monitoring (Barth et al., 2003)

- Deposit insurance scheme (Demirguc-Kunt et al., 2005)

Government invetrvention measures and banking sector development

	guarantee	liquidity	national	merger	amc
Government intervention policy, risk-taking of banks, and banking sector development (zscore at t+3)					
resolution policy	**-7.798***	-0.604	-0.462	0.837	**-3.161***
	(2.007)	(2.781)	(2.493)	(1.831)	**(1.803)**
resolution policy*bankdepgdp	**0.011**	0.031	**-0.040****	0.027	0.014
	(0.023)	(0.075)	**(0.020)**	(0.021)	(0.021)
bankdepgdp	0.013	-0.013	-0.002	-0.014	-0.013
R2	0.211	0.162	0.171	0.172	0.168
N	207	207	207	207	207

Government invetrvention measures, risk taking of banks and level of banking sector development

	Government intervention policy, risk-taking of banks, and banking sector development (loan loss reserves measure at t+4)				
	guarantee	liquidity	national	merger	amc
resolution policy	**7.319**	**-2.363**	**-3.120**	**2.884**	**-0.280**
	(3.137)	(2.631)	(2.392)	(2.326)	(2.902)
resolution policy*bankdepgdp	**-0.061**	**0.020**	**0.019**	**-0.047**	**-0.020**
	(0.031)	(0.042)	(0.023)	(0.028)	(0.032)
bankdepgdp	**-0.030**	-0.031	**-0.030**	-0.022	**-0.029**
	(0.048)	(0.045)	(0.046)	(0.046)	(0.047)
R2	0.436	0.417	0.419	0.420	0.416
N	163	163	163	163	163

Government invetrvention measures, risk-taking of banks and creditor rights' protection

Government resolution policy and risk-taking of banks, and creditor rights (zscore at t+4)					
	guarantee	liquidity	national	merger	amc
resolution policy	**1.188**	**-2.107**	**-6.971**	**0.124**	**-2.715**
	(4.385)	(3.499)	(5.452)	(3.281)	(3.697)
resolution policy*creditor rights	**-4.207****	**1.280**	**0.913**	**0.943**	**-0.586**
	(1.872)	(2.208)	(2.745)	(1.730)	(1.960)
creditor rights	0.731	0.308	0.636	0.405	1.960
	(1.357)	(1.367)	(1.291)	(1.386)	(1.344)
R2	0.161	0.097	0.119	0.100	0.113
N	176	176	176	176	176

Government intervention measures, risk-taking of banks, and rule of law

Government intervention policy, risk-taking of banks based, and on rule of law (Kaufmann et al.) (zscore measure at t+4)

	guarantee	liquidity	national	merger	amc
resolution policy	-7.554***	0.055	-4.617**	1.722	-3.750**
	(1.600)	(1.744)	(1.825)	(1.538)	(1.563)
resolution policy*ruleoflaw	3.156	3.911**	2.882	1.176	2.787
	(1.935)	(2.019)	(1.895)	(2.055)	(1.712)
rule of law	-1.198	-0.577	-0.517	0.328	-0.380
	(2.346)	(2.244)	(2.239)	(2.108)	(2.255)
R2	0.154	0.107	0.122	0.122	0.117
N	182	182	182	182	182

Government intetrvention measures, risk-taking of banks and deposit insurance coverage

Government resolution policy and risk-taking of banks, and deposit insurance coverage (zscore at t+4)					
	guarantee	**liquidity**	**national**	**merger**	**amc**
resolution policy	**-11.166*****	**-1.956**	**-2.338**	**-4.565****	**-1.806**
	(2.213)	(2.615)	(1.611)	(2.007)	(1.998)
resolution policy*deposit coverage	**4.138***	**2.615**	**-1.304**	**8.038*****	**-2.028**
	(2.446)	(2.615)	(2.573)	(2.622)	(2.504)
deposit coverage	1.517	0.217	1.086	-0.935	0.932
	(1.947)	(2.101)	(1.925)	(2.028)	(2.106)
R2	0.189	0.141	0.151	0.153	0.156
N	182	182	182	182	182

Government intetrvention measures, risk-taking of banks and power of supervisory

Government intervention policy, risk-taking of banks, and power of supervisory (zscore at t+4)					
	guarantee	liquidity	national	merger	amc
resolution policy	**18.025**	**13.826***	**-10.062**	**19.507***	**6.200**
	(12.390)	(7.442)	(10.915)	(11.462)	(5.101)
resolution policy*power of supervisory	**-2.899***	**-2.050***	**1.100**	**-2.402***	**-1.173**
	(1.461)	(0.943)	(1.397)	(1.379)	(1.172)
power of supervisory	1.117	1.358	0.783	1.542	1.215
	(0.932)	(0.971)	(0.884)	(0.985)	(1.172)
R2	0.108	0.106	0.087	0.101	0.155
N	143	143	143	143	143

Robustness Check

Alternatively to the z-score we use:

- loan loss provisions to total assets

- non-performing loans to total loans

- standard devation of return on equity

- equity to total asset

- return on assets

Robustness Check

Government resolution policy and risk-taking of banks - Robustness Check (loan loss provisions to total loans as dependent variable at t+4)

	guarantee	liquidity	national	merger	amc
resolution policy	**4.334***	**1.040**	**3.901**	**-0.320**	**2.424**
	(1.626)	(1.407)	(1.899)	(1.436)	(1.564)
R2	0.202	0.169	0.194	0.167	0.181
N	173	173	173	173	173

Government resolution policy and risk-taking of banks (standard deviation as dependent variable at t+4)

	guarantee	liquidity	national	merger	amc
resolution policy	**-6.803***	**-0.065**	**-2.007**	**2.161**	**-3.370**
	(2.125)	(1.880)	(1.839)	(1.633)	(1.552)
R2	0.144	0.093	0.151	0.098	0.114
N	182	182	182	182	182

Robustness Check

Government resolution policy and risk-taking of banks (equity to total asset as dependent variable at t+4)

	guarantee	liquidity	national	merger	amc
resolution policy	-2.301***	-0.238	-0.523	1.232	-0.422
	(0.880)	(1.048)	(1.157)	(1.700)	(1.007)
R2	0.193	0.184	0.184	0.187	0.184
N	182	182	182	182	182

Conclusions

We do find that :

- Government interventions are associated with greater risk in the banking sector in the future

- Especially, offering blanket guarantees and political involvment in the management of banking institutions increase this risk

- The magnitue of these effects depends also on the country characteristics, such as level of the banking sector development, creditor rights' protection and legal infrastructure

- We also do find evidences that granting more power to the supervisory authorities increases the risk of moral hazard even higher. The result is consistent with Beck et al. (2006)

Policy Implications

- The policymakers should not intervene in the same way all over the world. They should consider the differences in the countries, especially in their level of development, institutional infrastructure, and regulatory mechanisms.

- We do not think that granting more power to the supervisory authorities will reduce the risk of moral hazard. Our results find the opposit.

- We think that regulatory authorities in more developed countries should rely on market forces in intervening in the banking sector, however in the developing countries the government interventions should be accompanied by better corporate governance.