Examining the Effects of the Emergency Credit Guarantee Program on the Availability of Small Business Credit

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* The views and opinions expressed are those of the authors and do not necessarily reflect any of the institutions that we are affiliated with.

Motivations

- Are government credit guarantee programs really effective in increasing credit availability and improving ex-post performance of SMEs?
  - OECD(2009): 19 out of 23 member countries introduced/expanded credit guarantee programs after the current financial crisis
- Relationship lending as a contractual device to deal with informational frictions
  - But no literature has examined how relationships affect the impacts of credit guarantees

What we do

- Focus on the Emergency Credit Guarantee (ECG) program
  - One of the largest guarantee programs in the world
  - Effects on the credit availability and ex-post performance
  - Whether lending relationships enhance or dampen the effects of the program

- Employ firm-bank matched dataset
  - Amount of ECG loans and non-ECG loans for each firm-bank relationship
  - Distinction between main bank and non-main bank
  - Firms' ex-post performance one year later

Government Credit Guarantee Programs in Japan

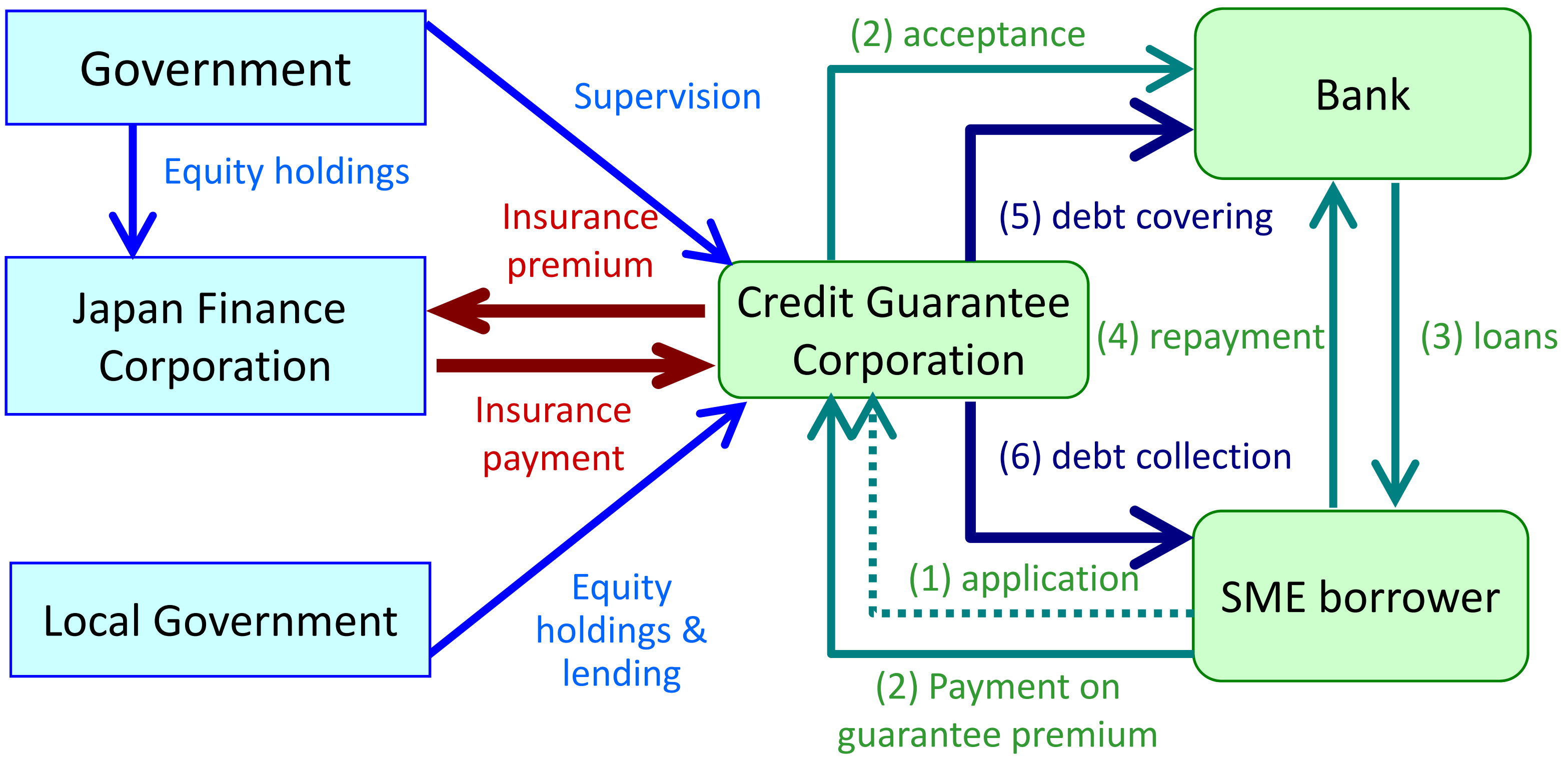
Government credit guarantee system

- Widely used in the world, especially in Japan
  - More frequently employed after the current financial crisis
  - Facilitates the flow of funds to small and medium enterprises (SMEs)
  - 40% of SMEs obtain guaranteed loans in Japan
  - 13% of SME loans is backed by credit guarantees

- Current coverage ratio (debt relief share) is 80%
  - Used to be 100% until October 2007

- Guarantee premium paid by users
  - Flexible premium rate between 0.5 and 2.2%
  - Used to be fixed rate until April 2006

Government credit guarantee system



Note: (1) application of credit guarantees are often filed by bank (as agents)
(2) the average guarantee premium is 1.35%
(5) debt covering and (6) debt collection occur when a borrower SME is unable to repay the debt

Emergency Credit Guarantee Program

- ECGP: temporary program to deal with the current crisis
  - Period: End of Oct. 2008 - March 2011
  - Program amount: ¥36 trillion
  - Coverage ratio: 100% (80% for the regular program)
  - Maximum duration: 10 years (7 years)
  - Premiums: Less than 0.8% (1.35% on average)
  - Basel II risk-weight: 0% (10%)
- Comparison with the Special Credit Guarantee Program (1998-2001)
  - 100% coverage ratio & no collateral requirement in both programs
  - More strict screening policies
  - Maximum duration and loan size are longer and larger

Empirical Hypotheses

The effects of credit guarantees

- Theoretical literature
  - Undersupply of credit to projects w/ positive NPV (Stiglitz and Weiss (1981))

    Credit guarantees contribute to funding projects w/ positive NPV
  - "Too much investment" by low quality borrowers (de Meza and Webb (1987))

    Guarantees exacerbate the problem
- Empirical literature
  - Rather limited due to data availability
  - Mostly positive for credit availability but mixed for ex-post performance (Oh et al. (2009) and Uesugi, Sakai, and Yamashiro (2010))

The effects of credit guarantees

Hypothesis 1

For users of credit guaranteed loans:

– Credit availability increases

– Ex-post performance improves if increased credit is used for profitable projects with positive net present values

– Alternatively, the performance deteriorates if increased credit exacerbates over-investment and/or induces moral hazard

Bank-firm relationships and the effects of credit guarantees

- Lending relationships improve the availability of credit (Petersen and Rajan (1994), Cole (1998), Jiangli, Unal, and Yom (2008))

- Lending relationships and credit guarantees are:
  - complementary in helping borrowers in temporary distress
  - substitute if a relationship lender exploits its informational advantages and transfer credit risks of deteriorating firms to the guarantee program

Bank-firm relationships and the effects of credit guarantees

Hypothesis 2

For users of guaranteed loans that are extended by relationship lenders:

– Credit availability and ex-post performance improve if the lender uses the program in order to support firms in difficulties

– Alternatively, they deteriorate if the lender exploits its informational advantages to identify low quality firms, substitutes guaranteed loans for non-guaranteed loans, and transfers firms' credit risks to the guarantee program

Data and Empirical Approach

Dataset

- 2,498 firm-bank matched observations with 1,502 for firm-main bank matches and 998 for firm-non-main bank matches
- RIETI surveys (Surveys on Transactions with Firms and Financial Institutions, February 2008 and February 2009)

  For each firm-bank match, we identify status of the bank (main/non-main), amount of a ECG loan, amount of loans by the bank, amount of total loans extended by all the banks, and other firm-bank relationship variables
- TSR(Tokyo Shoko Research) database for firm characteristics
- NIKKEI FQ, annual reports of individual banks, and FSA website for bank characteristics

Empirical approach

- A simple comparison of ECG program users and non-users is not appropriate due to possible selection bias
- We employ the matching estimation approach

Step 1: Implement a probit estimation that models the probability of a firm’s using the program

Step 2: For each treatment observation (ECG user), identify matched observations from the non-user observations.

Step 3: Compare the yearly difference in the availability and ex-post performance variables of the treatment and the control group

Major Variables

Determinants of the ECG use

- ECG_DUM: ECG loan dummy
- LOAN_ENQUIRY: Dummy for a firm making enquiry for a loan
- B_REGIONAL: Dummy for regional bank, second regional bank, or Shinkin bank
- BIS: Capital asset ratio based on the Basel capital framework
- B_MAIN: Dummy for the main bank

Availability (divided by total assets in year 2008)

- ECG_LOAN_RATIO: Amount of ECG loans extended to firm i by bank j
- dB_LOAN_RATIO: Changes in total loans outstanding extended to firm i by bank j
- dB_TLOAN_RATIO: Changes in total loans outstanding extended to firm i by all banks

Ex-Post performance

- dROA (= dSALESRATIO – dCOSTRATIO): Changes in firms' profitability
- dSCORE: Changes in TSR credit score
- dCASHRATIO, dTANGIBLERATIO: Changes in cash holdings and fixed tangible capital stock

Summary Statistics for ECG determinants

		B_MAIN=1 (Firm - main bank matches)			B_MAIN=0 (Firm - non-main bank matches)		
		All N=1502	ECG_DUM=1 =318	ECG_DUM=0 =1184	All (N=996) N=996	ECG_DUM=1 =47	ECG_DUM=0 =949
Characteristics of credit guarantees							
RCG_DUM	Dummy for regular credit guarantees	0.426	0.783	0.330	0.345	0.617	0.332
		(0.495)	(0.413)	(0.470)	(0.476)	(0.491)	(0.471)
Firm characteristics							
LOAN_ENQUIRY	Dummy for a firm making enquiry for a loan	0.397	0.506	0.368	0.286	0.170	0.292
		(0.490)	(0.501)	(0.483)	(0.452)	(0.380)	(0.455)
SHARPERATIO	ROA/ std. of ROA	0.052	-0.189	0.117	0.114	-0.041	0.122
		(1.040)	(0.897)	(1.066)	(1.013)	(1.077)	(1.010)
SCORE	TSR credit score	55.147	51.116	56.230	55.408	53.298	55.512
		(6.469)	(4.411)	(6.507)	(6.598)	(4.242)	(6.678)
CAPRATIO_NG	Dummy for negative capital ratio	0.051	0.088	0.041	0.043	0.021	0.044
		(0.221)	(0.284)	(0.199)	(0.203)	(0.146)	(0.206)
LOANRATIO	Total loans outstanding/Total assets	0.394	0.555	0.350	0.392	0.489	0.387
		(0.271)	(0.242)	(0.262)	(0.258)	(0.224)	(0.258)
lnSALES	ln(sales)	7.435	6.676	7.639	7.559	7.041	7.585
		(1.642)	(1.212)	(1.682)	(1.666)	(1.195)	(1.682)
lnFIRMAGE	ln(firm age)	3.642	3.542	3.669	3.630	3.495	3.637
		(0.517)	(0.515)	(0.514)	(0.515)	(0.590)	(0.510)
Bank characteristics							
B_REGIONAL	Dummy for regional financial institutions	0.744	0.874	0.709	0.673	0.660	0.673
		(0.436)	(0.332)	(0.454)	(0.469)	(0.479)	(0.469)
BIS	Capital asset ratio based on Basel framework	11.151	11.063	11.174	11.055	11.120	11.052
		(3.181)	(3.078)	(3.208)	(3.576)	(2.162)	(3.633)
BANKSHARE	Bank's share of branches in a prefecture of a	0.158	0.169	0.155	0.102	0.100	0.103
	borrowing firm	(0.120)	(0.123)	(0.120)	(0.094)	(0.082)	(0.095)
HHI	Herfindahl index for bank branches	0.112	0.117	0.110	0.099	0.083	0.100
		(0.067)	(0.069)	(0.066)	(0.063)	(0.054)	(0.063)
Characteristics of bank-firm relationship							
B_CONTACT	Index for contact frequency with higher value for	3.607	3.522	3.630	4.103	3.851	4.116
	lower frequency	(1.295)	(1.255)	(1.305)	(1.319)	(1.063)	(1.329)

Results and Conclusion

Probit estimation

- Coefficient for RCG_DUM is positive.
- LOAN_ENQUIRY (proxy for loan demand) is positive for the main bank matched sample, while negative for the non-main bank matched sample
- SCORE is negative (less creditworthy firms more likely to use the program) but CAPRATIO_NG is also negative (if above certain threshold, less creditworthy firms may not use it).
- Small and loan dependent firms are likely to use the program.
- Firms that transact with city banks with low BIS tend to use the program.

Probit estimation on determinants of using ECG loans

Estimation method: Probit				
Dependent variable: ECG_DUM	Entire sample			
	Coeff.	Std. Err	z-value	P>|z|
Characteristics of credit guarantees				
RCG_DUM	0.621	0.080	7.730	***
Firm characteristics				
LOAN_ENQUIRY	-0.439	0.190	-2.300	**
B_MAIN*ENQUIRY	0.663	0.205	3.230	***
SHARPERATIO	-0.039	0.040	-0.990	
SCORE	-0.035	0.009	-3.920	***
CAPRATIO_NG	-0.612	0.163	-3.750	***
LOANRATIO	0.769	0.159	4.830	***
lnSALES	-0.079	0.031	-2.530	**
lnFIRMAGE	-0.074	0.076	-0.970	
Bank characteristics				
B_REGIONAL	-3.292	0.964	-3.410	***
B_REGIONAL*BIS	0.294	0.085	3.460	***
BIS	-0.292	0.084	-3.470	***
BANKSHARE	0.833	0.431	1.930	*
HHI	-1.894	0.786	-2.410	**
Characteristics of bank-firm relationship				
B_MAIN	0.645	0.103	6.270	***
B_CONTACT	-0.064	0.029	-2.200	**
constant	3.899	1.140	3.420	***
Industry Dummies	yes			
NOB	2498			
LRchi2	501.73			
Prob > chi2	0			
Pseudo R2	0.2415			
Log likelihood	-788.09			

Treatment effect estimation

Entire sample (results not reported) and main bank matched subsample

ECG loans equivalent to 10.7 percentage to total assets

Significant improvements in loan availability

A sizable gap between ECG_LOAN and dB_LOAN, indicating substitution between ECG and non-ECG loans extended by the main bank

Significant deterioration of firm performance in dSCORE and dSALESRATIO

Consistent with the second part of Hypothesis 2, which is, the main bank exploits informational advantage

Non-main bank matched subsample

A smaller gap between ECG_LOAN and dB_LOAN, indicating a smaller degree of substitution between ECG and non-ECG loans extended by the non-main bank

But no significant increase of loan availability for firms. Firms might want to repay loans rather than to borrow more from the non-main bank.

No significant impact on firm performance

Treatment effect estimation for using ECG loans

	B_MAIN=1				B_MAIN=0			
Variables	Treated	Controls	Difference		Treated	Controls	Difference	
ECG_LOAN_RATIO	0.107	0.000	0.107	***	0.072	0.000	0.072	***
dB_LOAN_RATIO	0.049	-0.002	0.050	***	0.057	0.004	0.053	***
dB_TLOAN_RATIO	0.044	0.003	0.041	***	0.023	0.009	0.014	
dLOAN_RATIO	0.024	-0.010	0.034	***	0.034	0.001	0.033	*
dSHORT_RATIO	-0.015	-0.014	-0.001		-0.001	-0.018	0.017	
dLONG_RATIO	0.039	0.005	0.034	***	0.035	0.019	0.016	
dRATE	-0.002	-0.001	-0.001		-0.011	0.000	-0.011	
dCASHRATIO	0.015	0.003	0.011	*	0.007	0.007	0.000	
dTANGIBLERATIO	-0.004	-0.002	-0.002		-0.021	-0.002	-0.019	**
dROA	-0.020	-0.005	-0.015		-0.021	-0.023	0.001	
dSALESRATIO	-0.151	-0.013	-0.138	***	-0.074	-0.051	-0.023	
dCOSTRATIO	-0.131	-0.008	-0.123	***	-0.053	-0.028	-0.024	
dSCORE	-1.140	-0.506	-0.634	***	-1.069	-0.944	-0.125	
dlnEMP	-0.023	-0.020	-0.003		-0.051	-0.024	-0.027	

Conclusion

- ECG program improves the credit availability of program users.
- No supportive evidence that ECG loans facilitate further investment or employment activities
- Negative impact on the ex-post (one year later) creditworthiness of ECG users

- The effect of ECG program differs depending on the extent of firm-bank relationships
- Exploitation of information advantage among main bank matches, while no such things observed among non-main bank matches

Implications

- Both of credit guarantees and lending relationships are beneficial in improving access to credit.

- But once they coexist, a relationship lender may exploit its informational advantage, substitutes guaranteed loans for non-guaranteed loans, and transfers borrowers’ credit risk to the guarantee program.

- Measures to circumvent the misuse of guarantee programs
  - Differentiate lenders based on the ex-post performance of guaranteed loans (e.g. Preferred lender program in the US)
  - Limiting eligible firms to those that do not establish stable relationships with banks (e.g. SFLGS in the UK)