Forgiveness versus Financing:
The determinants and impact of SME debt forbearance in Japan

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Research question

- ***Does debt forbearance improve borrower performance?***
  - Important research and policy question
    - E.g., The HAMP in the U.S. (Agarwal et al. 2017)
  - **Yes**: Resolving a debt overhang problem in which the benefits of good borrower performance largely go to the lender
    - Theory: Krugman (1998), Myers (1977)
    - Empirics: Giroud et al. (2011), Kroszner (1998)
  - **No**: Debt forbearance may generate moral hazards on the part of borrowers and/or lenders
    - Empirics: Kanz (2016), Inoue et al. (2010)

This paper

- Examining the impact of Japan's debt forbearance policy stipulated in **the SME Financing Facilitation Act**, based on theoretical predictions of **Krugman's (1988) "Financing vs. forgiving a debt overhang"**
  - Two types of debt forbearance
  - "**Financing**": Refinancing of a firm's existing debts including the extension of borrowing terms and the deferral of debt repayment (payment delay)
  - "**Debt forgiveness**": Reduction in the amount of principal and/or interests (payment relief)

This paper

- Theoretical insights of Krugman (1988)
  - **"Financing"** gives lenders an option value; full repayment if the debtor performs well in the future
  - However, financing may distort the debtor's incentive (**debt overhang problem**). **"Debt forgiveness**" may resolve the problem
  - A **tradeoff** for lenders: inducing the borrower to make an effort vs. the cost of writing down existing claims

What we do

- Using a unique firm survey on debt forbearance after the SME Financing Facilitation Act in Japan, we examine:
  - (i) **determinants** of debt forgiveness vs. financing
    - Probit estimation
  - (ii) **effects** of debt forgiveness vs. financing on a firm's access to new loans and ex-post performance
    - Propensity score matching estimation with difference-in-differences strategy (PSM-DID approach)

What we do

- Using a unique firm survey on debt forbearance after the SME Financing Facilitation Act in Japan, we examine:
  - (iii) **impacts of public credit guarantees (PCG)**, which may aggravate the moral hazard problem on the part of lenders
    - If loans are covered by PCG and lenders bear little credit risk, PCG would increase lenders' option value for "financing" and depress lenders' incentives to urge business restructuring by firms

What we find

- Our findings are mostly **consistent with the theory of debt overhang**
- (i) Banks **choose debt forgiveness** for firms that are **more creditworthy and profitable**
  - However, firms' leverage does not affect the likelihood of receiving debt forgiveness
- (ii) **Firms that received debt forgiveness** had **better access to new loans and showed better ex-post performance** than firms that received financing

What we find

- (iii) The effectiveness of debt forbearance is **adversely affected by the PCG**
  - Compared to firms that had not received any debt forbearance,
    - firms that had received **financing** were more leveraged and exhibited **worse ex-post performance**, especially **when forborne loans were covered by PCG**
    - firms that received **debt forgiveness exhibited better performance**, especially those **without PCG**

Outline of this presentation

- Institutional background (Sec. 2 in the paper)
- Empirical hypotheses (Sec. 3)
  - Literature review (Sec. 3.2)
- Data, variables, and empirical approach (Sec. 4)
- Results (Sec. 5)
- Future works

Institutional background

SME Financing Facilitation Act

- SME Financing Facilitation Act
  - Period: Dec. 2009–Mar. 2013
    - Initially planned to end in Mar. 2011 but extended twice
  - It required financial institutions to make their best effort to respond positively to requests by client SME borrowers to amend loan contract terms
  - It allowed the amended loans to not be classified as nonperforming loans as long as borrowers made a credible business restructuring plan
  - # of applications: 4.37M, acceptance rate: 97.3%

Public credit guarantees

- Emergency Credit Guarantee (ECG) program
  - Period: Oct. 2008–Mar. 2011
  - The ratio of credit covered is 100%; banks bear no credit risk
    - **80–100%** for the regular programs
  - If loans are covered by credit guarantees and lenders bear little credit risk, lenders are likely to "finance" existing loans

Empirical hypotheses

Empirical hypotheses

- **Hypothesis 1** (Determinants of the type of debt forbearance): Lenders choose forgiving if debtor firms face a debt overhang and the expected present value of their businesses is positive.
- **Hypothesis 2** (Effects of debt forbearance): Firms that received debt forgiveness have better access to new loans and show better ex-post performance than firms that received financing.

Empirical hypotheses

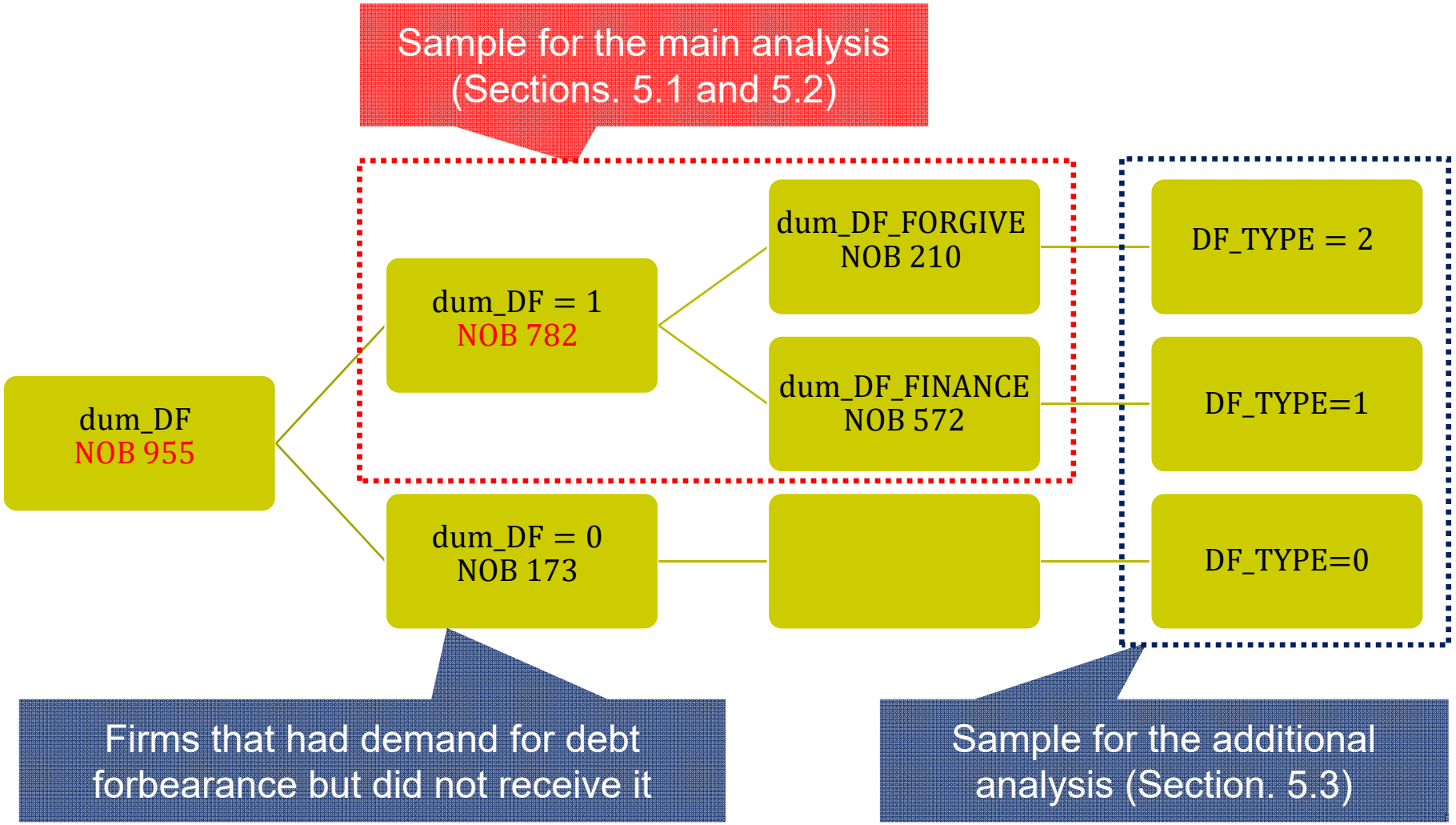
- **Hypothesis 3** (Determinants and effects of public credit guarantees): Lenders choose financing if a firm's existing debt is covered by public credit guarantees. Public credit guarantees adversely affect the availability of new loans for and the ex-post performance of firms, especially of those that received financing.

Data, variables, and empirical approach

Data

- Constructing firm-level dataset from two sources
- The RIETI survey
  - "Survey of Finance on the Aftermath of SME Financing Facilitation Act (金融円滑化法終了後における金融実態調査)," Oct. 2014
  - Survey questionnaire was sent to 20,000 SMEs, and 6,002 firms responded (response rate 30.0%)
- TSR database
  - Ex-ante (i.e., before the firm received debt forbearance) firm characteristics: 2008–2009
  - Ex-post firm characteristics: 2013–2014

Sample selection



Sample selection

- Sample for the main analysis (Sections 5.1 and 5.2): 782 firms
  - Firms that experienced debt forbearance, i.e., either debt forgiveness ($\mathrm{dum\_DF\_FORGIVE}$) or financing ($\mathrm{dum\_DF\_FINANCE}$)

- Expanded sample for further analysis (Section 5.3): 955 firms
  - In addition to firms that experienced debt forberance ($\mathrm{dum\_DF}=1$), we include 173 firms that **<u>had demand for but did not receive</u>** any debt forbearance ($\mathrm{dum\_DF}=0$)

Variables for debt forbearance

- Distribution of types of debt forbearance for firms that received debt forbearance (dum_DF=1)

	All obs. in the RIETI survey	Our sample
Number of obs.	1,468	782
1. Term extension of up to one year	24.9%	25.4%
2. Term extension of more than a year	29.8%	33.6%
3. Deferral of principal	37.9%	41.2%
4. Reduction of interest rate	16.3%	19.1%
5. Partial write-off	7.8%	7.7%
6. Debt-equity swap	0.1%	0.0%
7. Debt-debt swap (e.g., subordinated debt)	0.9%	0.9%
8. Other	8.4%	1.3%

dum_DF_FINANCE

Financing (payment delay)

Forgiving (payment relief)

dum_DF_FORGIVE

Note: This table presents the percentage shares of firms in terms of the type of debt forbearance they received (on the occasion of their first debt forbearance) between December 2009 and October 2014. Percentages add up to more than 100%, since firms may have received more than one type of debt forbearance for a particular loan.

Empirical approach: Determinants

- Examination of H1 and the first part of H3: Probit estimation

$$\Pr(\text{dum\_DF\_FORGIVE}) = \alpha + \beta_1 \text{dum\_PCG} + \beta_2 \text{LEVERAGE\_RATIO} + \beta_3 \text{SCORE} + \beta_4 \text{ROA} + \mathbf{X\beta} + \varepsilon_i$$

- Expected signs of coefficients
  - $\beta_2, \beta_3, \beta_4 > 0$: Banks select forgiving if a firm has a debt overhang problem and its expected present value of repayment is positive (H1)
  - $\beta_1 < 0$: Banks select financing if a firm received public credit guarantees (first part of H3)

Empirical approach: Effects

- Examination of H2: PSM-DID
  - (i) Match treatment firms (e.g., dum_DF_FORGIVE) with control firms (dum_DF_FINANCE) that have the closest propensity score
  - (ii) Compare the measures of credit availability and ex-post firm performance between the two groups
    - Use difference-in-differences (DID) to difference out time-invariant unobservable characteristics

Empirical approach: Effects

- Examination of H2: PSM-DID (cont'd)
  - Variables for credit availability: LENDING ATTITUDE (1−5; the larger the better), dum_NEWLOAN_REJECT
  - Variables for ex-post firm performance: dSCORE, dROA, dEMP, dTANGIBLERATIO
    - Prefix "d" stands for the difference b/w 2013–2014 and 2008–2009
- Examination of the second part of H3
  - Subsample (w/ and w/o PCG) analyses using PSM-DIM, where a common control group is firms with dum_DF=0
  - Variables for credit availability: dLEVERAGE_RATIO

Results

Probit estimation

- Table 4
- Consistent with H1, SCORE, ROA>0
  - Inconsistent with H1, LEVERAGE_RATIO is insignificant
- Consistent with the first part of H3, dum_PCG < 0

Estimation method: Probit	Entire sample		
Dependent variable: dum_DF_FORGIVE	dy/dx	Std. Err	z
dum_PCG	-0.197 ***	0.050	-4.25
LEVERAGE_RATIO	-0.062	0.056	-1.11
SCORE	0.007 *	0.004	1.71
ROA	0.472 **	0.188	2.49

PSM-DID (1): Credit availability

- Table 5
- Treated: Debt forgiveness, Controls: Financing
- Consistent with H2, lending attitude of the lender that provided debt forgiveness was better on average, while the loan rejection rate for firms that received debt forgiveness was lower

Entire sample							
Variable		Treated	Controls	Difference		S.E.	T-stat
LENDING_ATTITUDE	Unmatched	3.295	3.050	0.245	***	0.077	3.17
	ATT	3.291	3.115	0.176	*	0.110	1.59
dum_NEWLOAN_REJECT	Unmatched	0.162	0.365	-0.202	***	0.050	-4.09
	ATT	0.178	0.383	-0.206	***	0.073	-2.80

PSM-DID (1): Firm performance

- Table 5
- Treated: Debt forgiveness, Controls: Financing
- Consistent with H2, the difference in credit score is larger for firms receiving forgiving

Entire sample							
Variable		Treated	Controls	Difference		S.E.	T-stat
dSCORE	Unmatched	0.598	-0.856	1.454	***	0.357	4.07
	ATT	0.771	-0.936	1.707	***	0.533	3.21
dROA	Unmatched	0.036	0.069	-0.033	**	0.017	-1.97
	ATT	0.041	0.039	0.002		0.020	0.08
dEMP	Unmatched	-1.478	-5.728	4.250	*	2.265	1.88
	ATT	-1.577	-3.556	1.979		3.899	0.51
dTANGIBLERATIO	Unmatched	-0.009	-0.006	-0.003		0.011	-0.26
	ATT	-0.012	-0.004	-0.009		0.016	-0.54

PSM-DID (2): Effect of PCG

- Table 8: Subsamples of firms w/ and w/o PCG, using the expanded sample
  - Treated (Panel A): financing w/ and w/o PCG
  - Treated (Panel B): Debt forgiveness w/ and w/o PCG
  - Common control group: Firms that had demand for but did not receive any debt forbearance

PSM-DID (2): Effect of PCG

- Firms that received **financing w/ PCG** showed a greater increase in the leverage ratio, a greater decrease in credit score and number of employees
  - We do not find such effects for firms that received <u>financing w/o PCG</u>
- Firms that received **debt forgiveness w/o PCG** showed a greater increase in credit score
  - Firms that received <u>debt forgiveness w/ PCG</u> experienced a greater decrease in number of employees

PSM-DID (2): Effect of PCG for Financing

(b) Treated: dum_DF_FINANCE = 1&dum_PCG = 1, Control: dum_DF = 0

dum_PCG=1							
Variable		Treated	Controls	Difference		S.E.	T-stat
dLEVERAGE_RATIO	Unmatched	0.104	0.015	0.089	**	0.043	2.09
	ATT	0.108	-0.010	0.118	***	0.044	2.69
dLOAN_SHORT_RATIO	Unmatched	0.005	-0.015	0.020		0.219	0.89
	ATT	0.010	-0.031	0.041	**	0.021	1.98
dLOAN_LONG_RATIO	Unmatched	0.100	0.030	0.070	**	0.034	2.06
	ATT	0.097	0.021	0.076	**	0.036	2.13
dSCORE	Unmatched	-0.955	-0.058	-0.897	**	0.381	-2.35
	ATT	-0.968	0.186	-1.154	***	0.435	-2.65
dROA	Unmatched	0.075	0.039	0.036	**	0.020	1.81
	ATT	0.064	0.036	0.028		0.018	1.56
dEMP	Unmatched	-5.986	7.468	-13.454	***	4.390	-3.06
	ATT	-6.021	14.003	-20.024	*	10.248	-1.95
dTANGIBLERATIO	Unmatched	-0.008	-0.021	0.013		0.012	1.08
	ATT	-0.005	-0.020	0.015		0.012	1.24

PSM-DID (2): Effect of PCG for Financing

(c) Treated: dum_DF_FINANCE = 1&dum_PCG = 0, Control: dum_DF = 0

dum_PCG=0						
Variable		Treated	Controls	Difference	S.E.	T-stat
dLEVERAGE_RATIO	Unmatched	0.015	0.015	0.000	0.046	0.00
	ATT	0.015	-0.021	0.036	0.049	0.74
dLOAN_SHORT_RATIO	Unmatched	-0.006	-0.015	0.009	0.027	0.33
	ATT	-0.006	-0.021	0.014	0.033	0.43
dLOAN_LONG_RATIO	Unmatched	0.021	0.030	-0.009	0.039	-0.22
	ATT	0.021	0.000	0.022	0.042	0.52
dSCORE	Unmatched	-0.234	-0.058	-0.176	0.605	-0.29
	ATT	-0.234	-0.075	-0.159	0.744	-0.21
dROA	Unmatched	0.031	0.039	-0.008	0.025	-0.30
	ATT	0.031	0.041	-0.010	0.032	-0.31
dEMP	Unmatched	-4.104	7.468	-11.572	11.084	-1.04
	ATT	-4.104	15.379	-19.483	12.700	-1.53
dTANGIBLERATIO	Unmatched	0.005	-0.021	0.026 *	0.014	1.81
	ATT	0.005	-0.229	0.028 *	0.016	1.68

PSM-DID (2): Effect of PCG for Forgiving

(b) Treated: dum_DF_FORGIVE = 1&dum_PCG = 1, Control: dum_DF = 0

dum_PCG=1						
Variable		Treated	Controls	Difference	S.E.	T-stat
dLEVERAGE_RATIO	Unmatched	0.004	0.015	-0.011	0.042	-0.27
	ATT	-0.008	0.015	-0.023	0.042	-0.54
dLOAN_SHORT_RATIO	Unmatched	-0.029	-0.015	-0.014	0.021	-0.65
	ATT	-0.034	-0.009	-0.025	0.023	-1.11
dLOAN_LONG_RATIO	Unmatched	0.033	0.030	0.002	0.036	0.07
	ATT	0.026	0.024	0.002	0.037	0.07
dSCORE	Unmatched	0.514	-0.058	0.572	0.464	1.23
	ATT	0.628	-0.161	0.789	0.530	1.49
dROA	Unmatched	0.045	0.039	0.006	0.016	0.41
	ATT	0.045	0.032	0.013	0.015	0.88
dEMP	Unmatched	-3.043	7.468	-10.511	7.824	-1.34
	ATT	-3.292	14.054	-17.347 *	10.466	-1.66
dTANGIBLERATIO	Unmatched	-0.008	-0.021	0.013	0.013	1.03
	ATT	-0.010	-0.019	0.009	0.015	0.65

PSM-DID (2): Effect of PCG for Forgiving

(c) Treated: dum_DF_FORGIVE = 1&dum_PCG = 0, Control: dum_DF = 0

dum_PCG=0						
Variable		Treated	Controls	Difference	S.E.	T-stat
dLEVERAGE_RATIO	Unmatched	0.004	0.015	-0.011	0.048	-0.24
	ATT	-0.020	0.005	-0.025	0.040	-0.64
dLOAN_SHORT_RATIO	Unmatched	-0.003	-0.015	0.012	0.024	0.48
	ATT	-0.018	-0.018	0.000	0.025	0.01
dLOAN_LONG_RATIO	Unmatched	0.007	0.030	-0.023	0.040	-0.57
	ATT	-0.003	0.023	-0.026	0.036	-0.71
dSCORE	Unmatched	0.773	-0.058	0.830	0.550	1.51
	ATT	1.049	-0.191	1.240 *	0.648	1.91
dROA	Unmatched	0.017	0.039	-0.021	0.019	-1.11
	ATT	0.016	0.023	-0.007	0.017	-0.41
dEMP	Unmatched	1.818	7.468	-5.650	12.232	-0.46
	ATT	2.344	3.181	-0.837	9.444	-0.09
dTANGIBLERATIO	Unmatched	-0.011	-0.021	0.010	0.014	0.68
	ATT	-0.011	-0.015	0.004	0.017	0.24

Future works

Future works

- Addressing the possible selection bias problem
  - Need an exogenous factor that affects the choice of debt forgiveness
    - Unexpected snow for leveraged Austrian ski hotels (Girould et al. 2011)
    - Area of land pledged by indebted households prior to the debt relief policy in India (Kanz 2016)
- Exploiting the heterogeneity among lenders
  - Miyakawa and Ohashi (2016): Lenders' incentive to evergreen loans by restructuring existing debts temporarily differs depending on the strength of banks' balance sheet

END OF PRESENTATION
THANK YOU