“Zero-Zero” Loan Policy and Moral Hazard

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This Paper

- Zero-Zero Loan Policy: During the COVID-19 pandemic, the Japanese central government helped SMEs to receive bank loans.
  1. 100% loan guarantee for free.
  2. 100% reimbursement for interest payments (for 3 years).

  → Banks were able to obtain profits without any risks.

  → Interest rates varied and were set by prefectural governments.

- **Research Question: Distortions in allocating credits?**

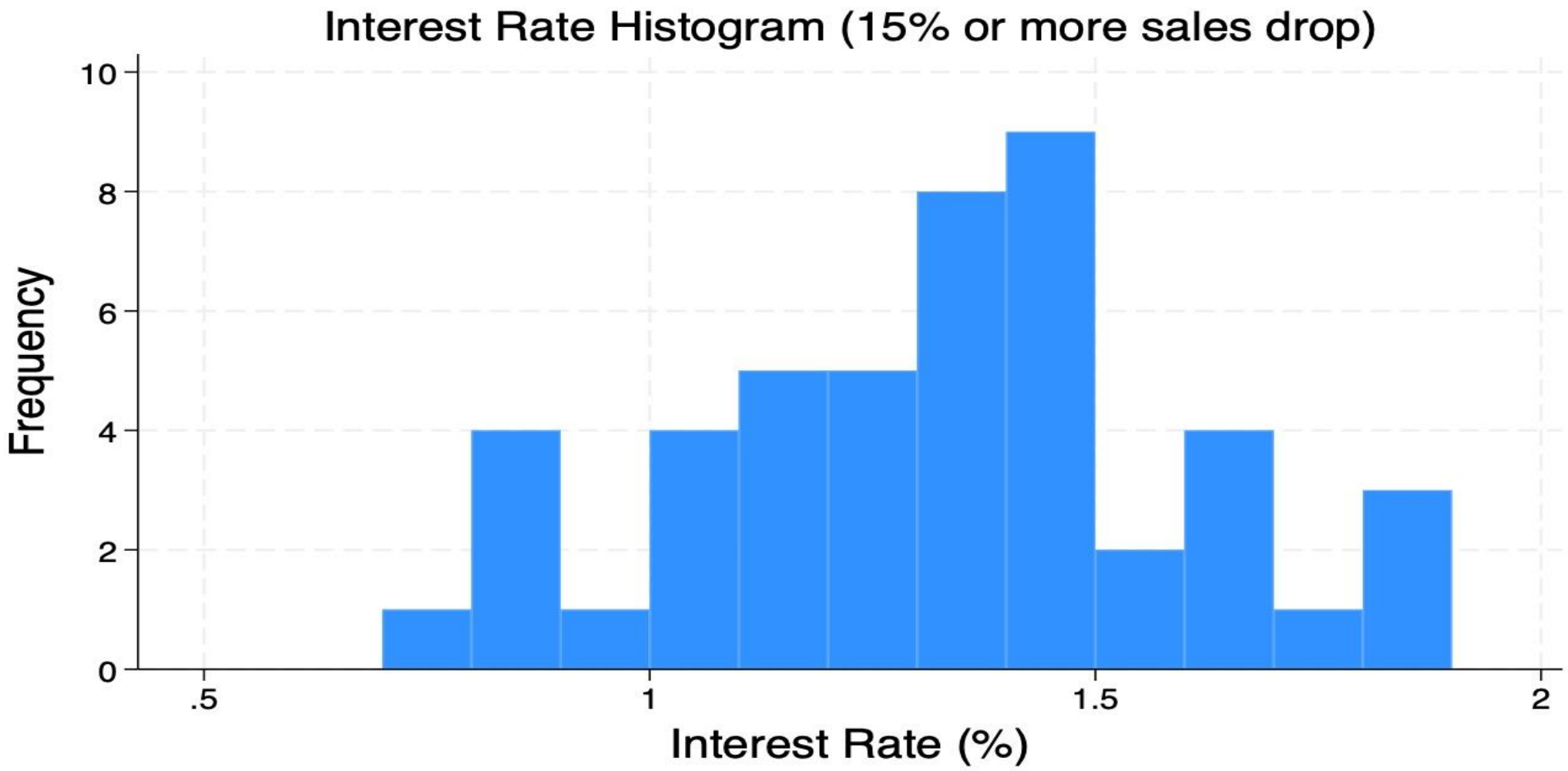
This Paper

- Examine how the interest rate variations influence bank behaviors.

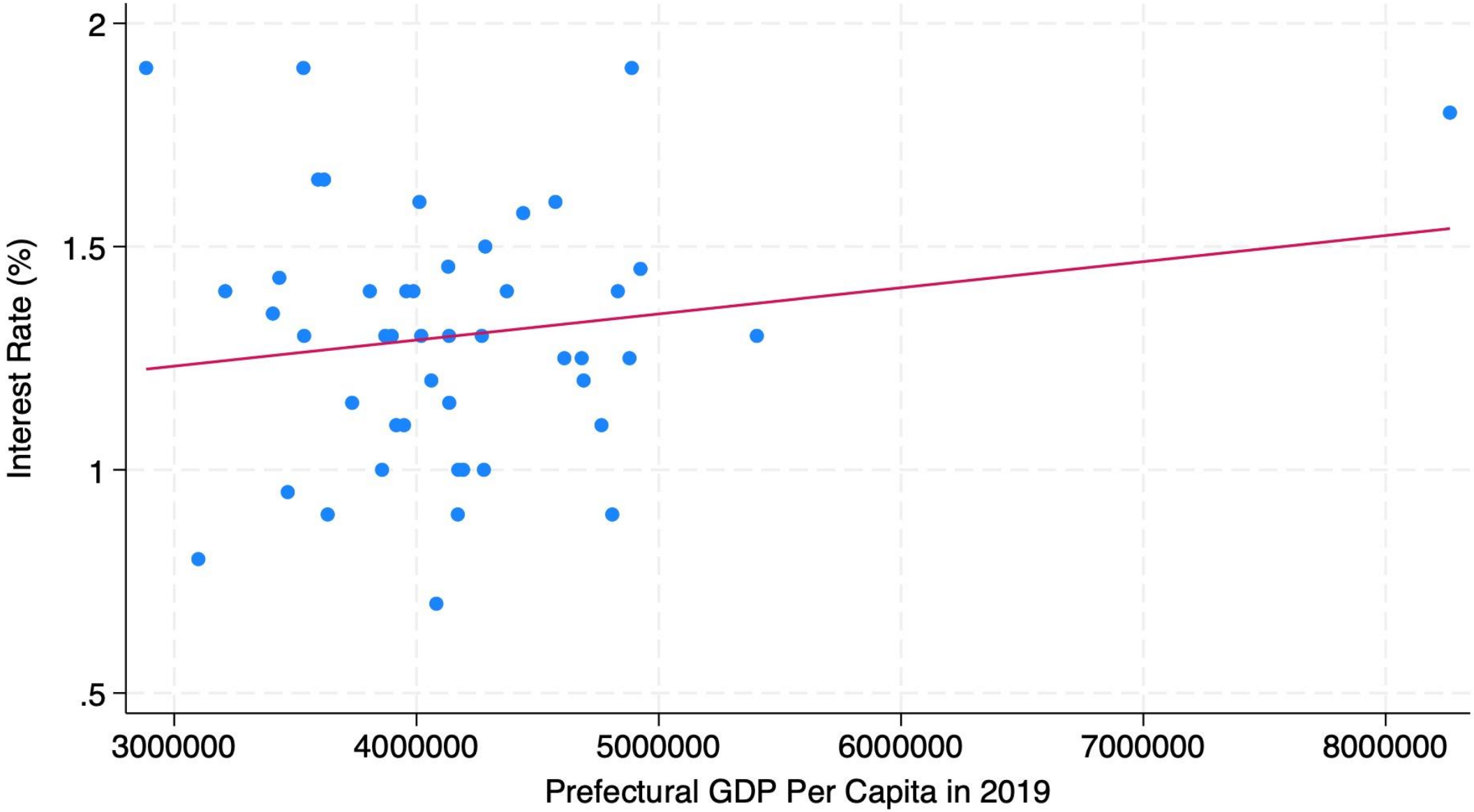
- Key results:

1. Moral hazard: Banks operating in multiple prefectures extend more loans in prefectures with higher interest rates.
2. Adverse selection: For high-risk SMEs, the result is opposite: Banks offer more loans in prefectures with low interest rates.

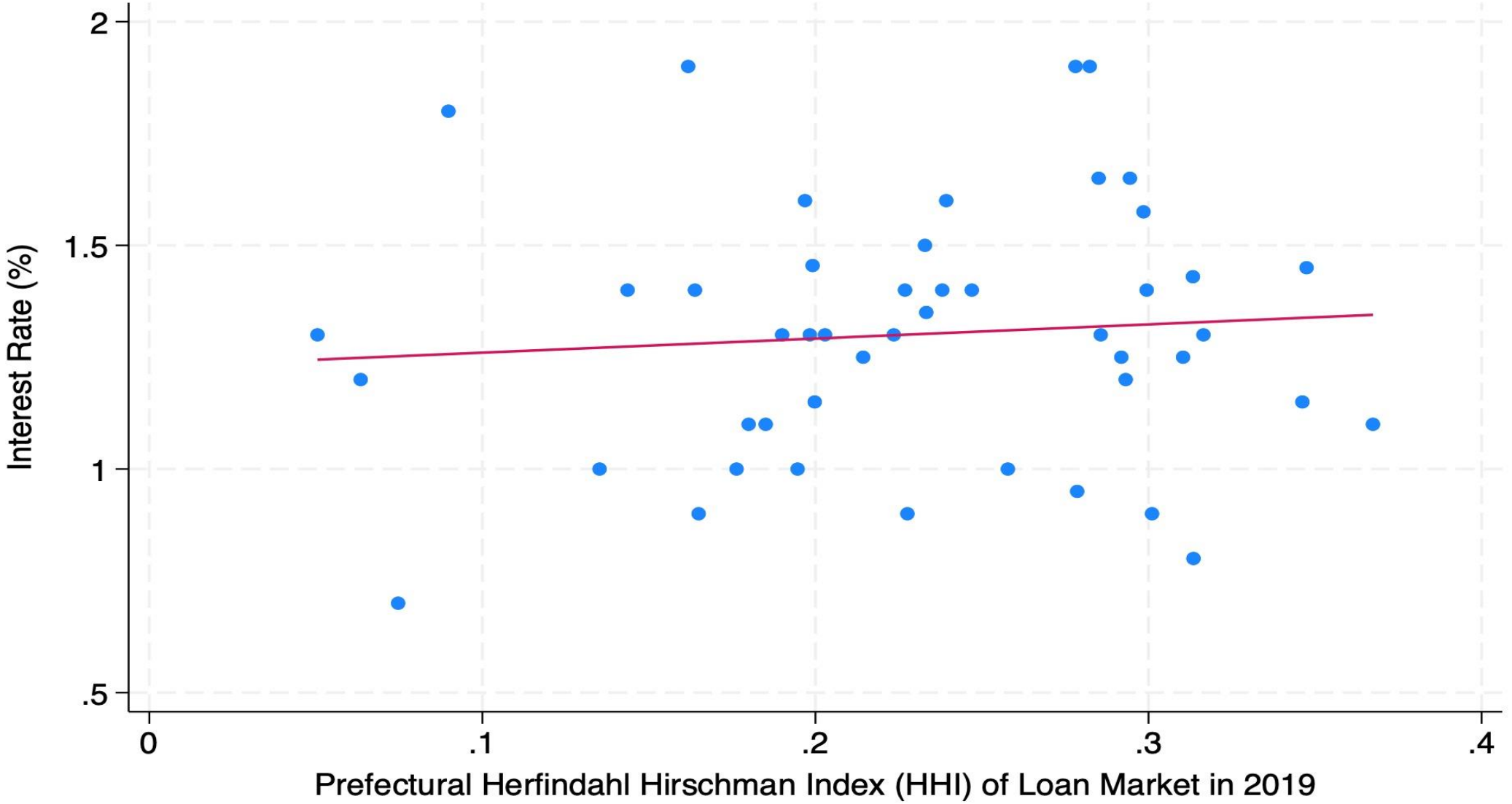
Interests Variations across Prefectures



Correlation between Interest Rate and GDP Per Capita



Correlation between Interest Rate and Herfindahl-Hirschman Index



Firm Data

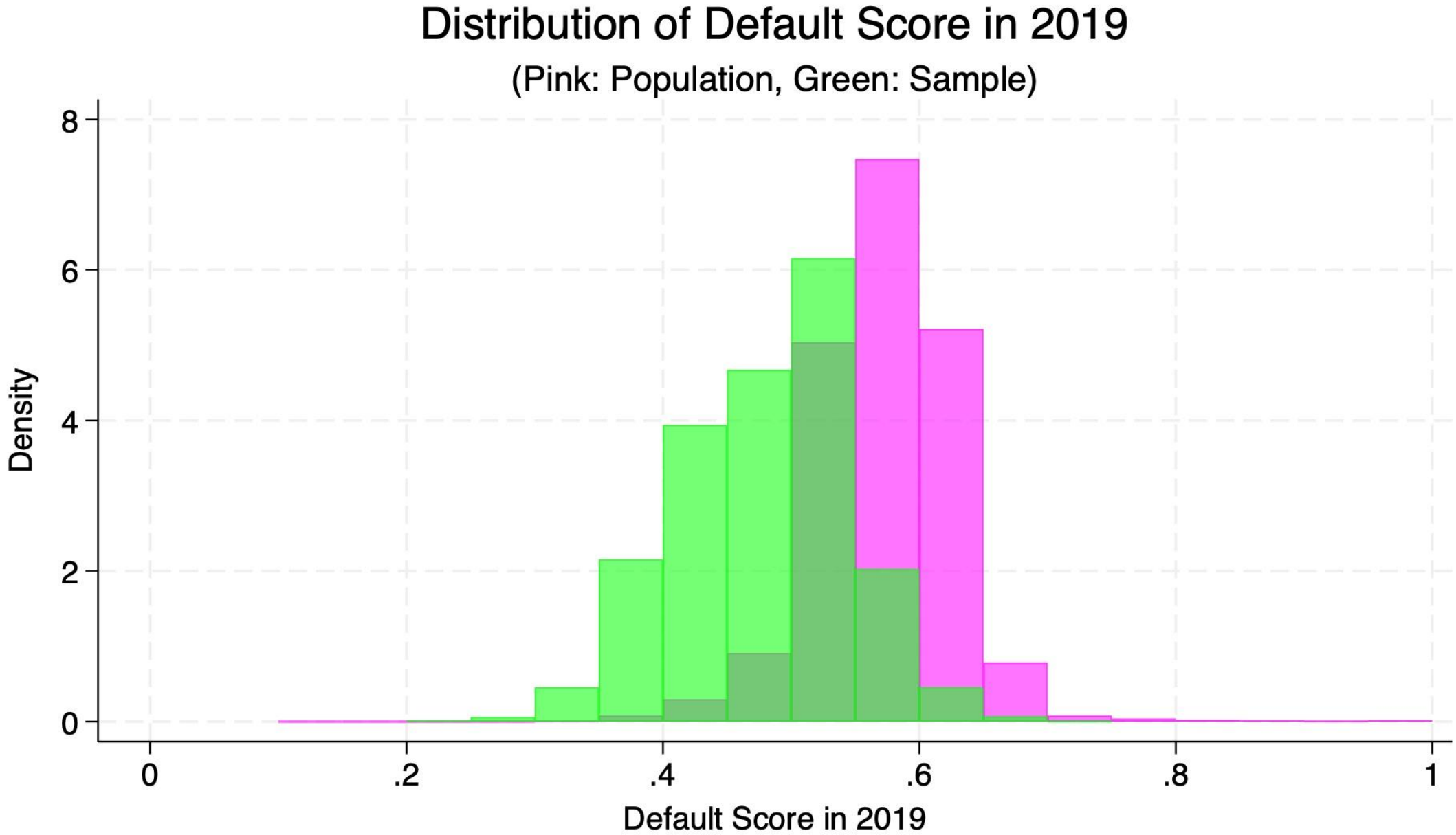
Joint survey conducted with Tokyo Shoko Research (TSR), a major credit rating agency in Japan.

1. Questionnaire survey in May 2024
   - Asked questions on applications and repayment status of the zero-zero loans, and the effects of COVID-19 on sales.
2. Combined with TSR firm-level financial data (annual data)
   - Sales, # of employees, credit score, main bank, etc.
   - Containing SMEs regardless of industry and prefecture.
3. Combined sample size: 1473 SMEs

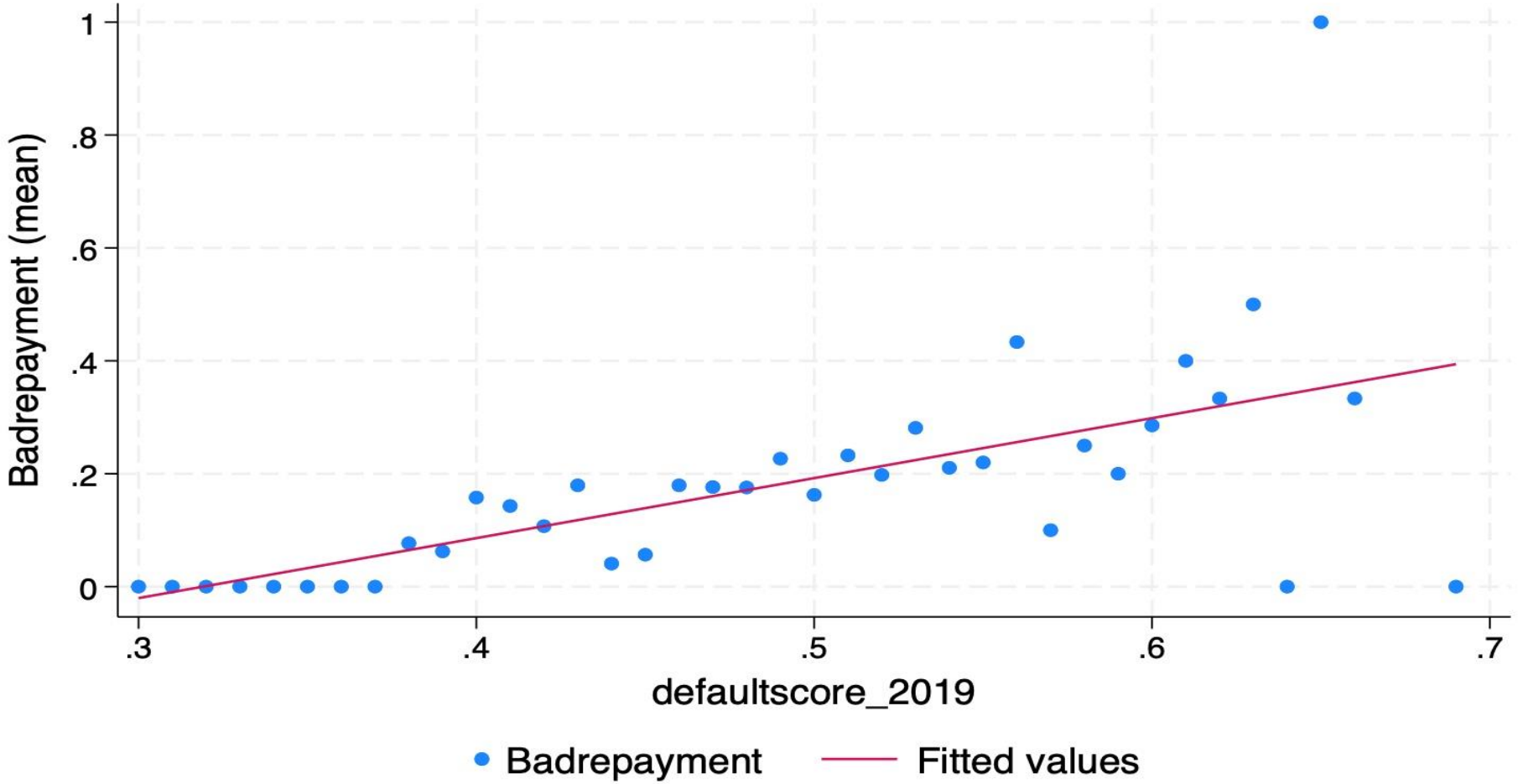
- Limit samples to SMEs with 15% or more sales—the threshold for full utilization of the zero-zero loan policy.

Descriptive Statistics

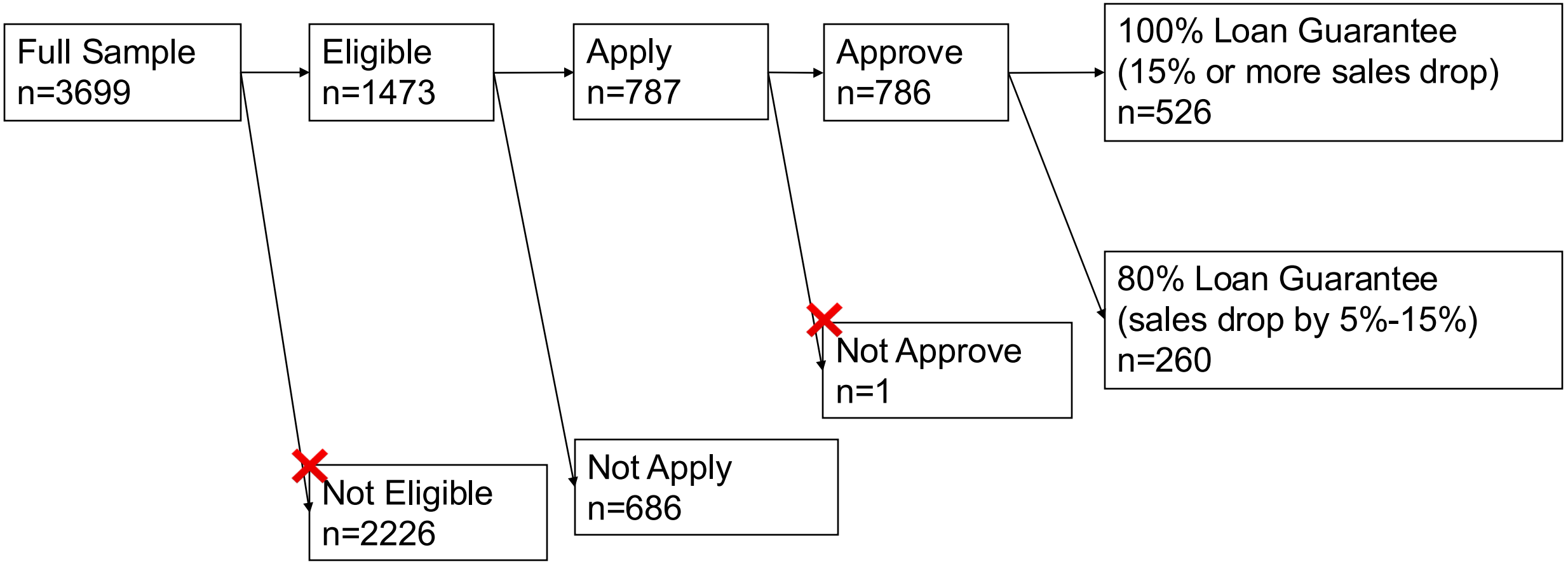
Variables	Explanation	N	mean	SD
Bankapprove	Binary variable that takes 1 if a firm was approved for “zero-zero” loan	1,471	0.533	0.499
Interest Rate	Interest rates of the “zero-zero” loan policy set in each prefecture. The median is taken if there is a range of interest rates	1,471	1.44	0.36
Defaultscore_2019	Credit score is the main product TSR offers. We calculate “100 - credit score” and normalize it to evaluate firms' risk in 2019. (Good 0.0 – Bad 1.0).	1,396	0.485	0.061
Sales Drop Dummy	Dummy variable that takes 1 if a firm’s largest monthly sales drop after COVID-19 was 15% or larger	1,471	0.644	0.479
Emp_19	The number of employees of a firm in 2019	1,394	49.169	127.3
Sales_19	Sales of a firm in 2019 (thousand yen)	1,367	2165533	8763081


Distribution of Default Score in 2019
(Pink: Population, Green: Sample)
Density
0
2
4
6
8
0
.2
.4
.6
.8
1
Default Score in 2019

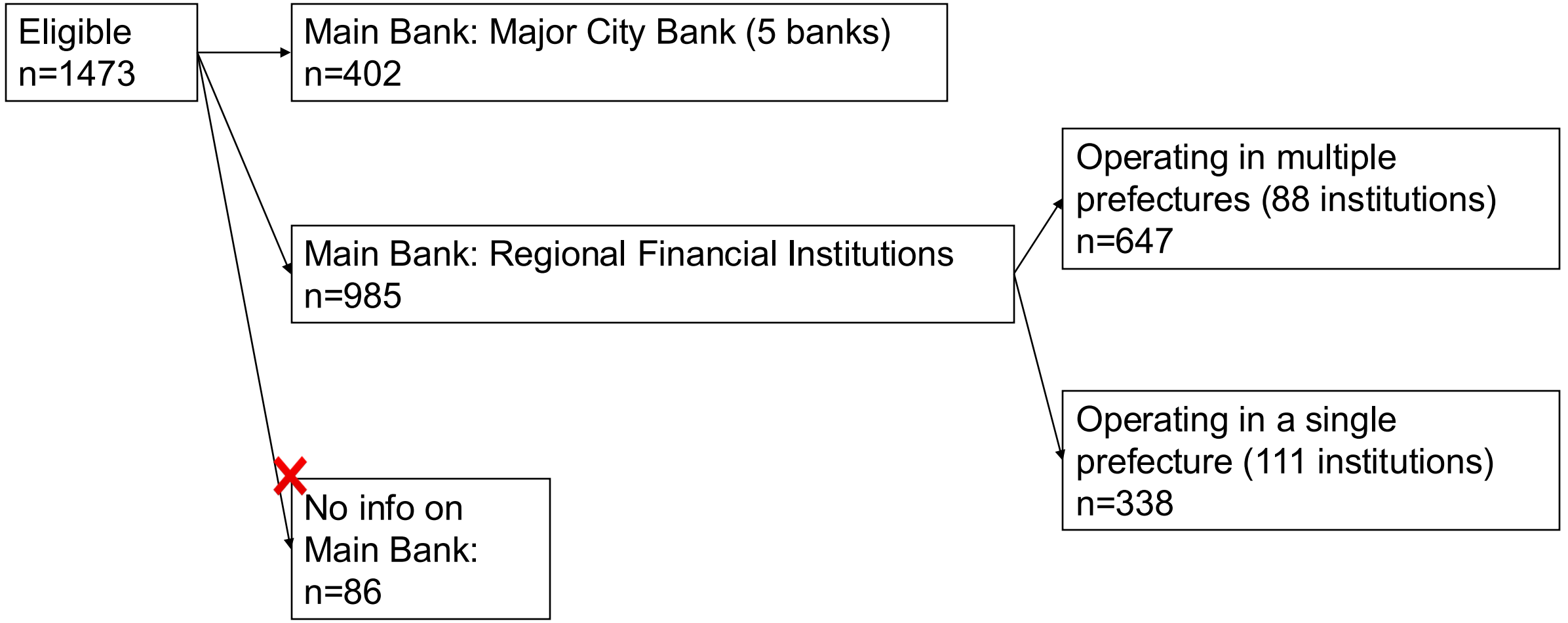
Default Score end-2019 and Repayment troubles in May 2024



Samples for Estimations



Samples for Estimation (Main Bank Classification)



Bank Approval of Zero-Zero Loan: Across prefectures

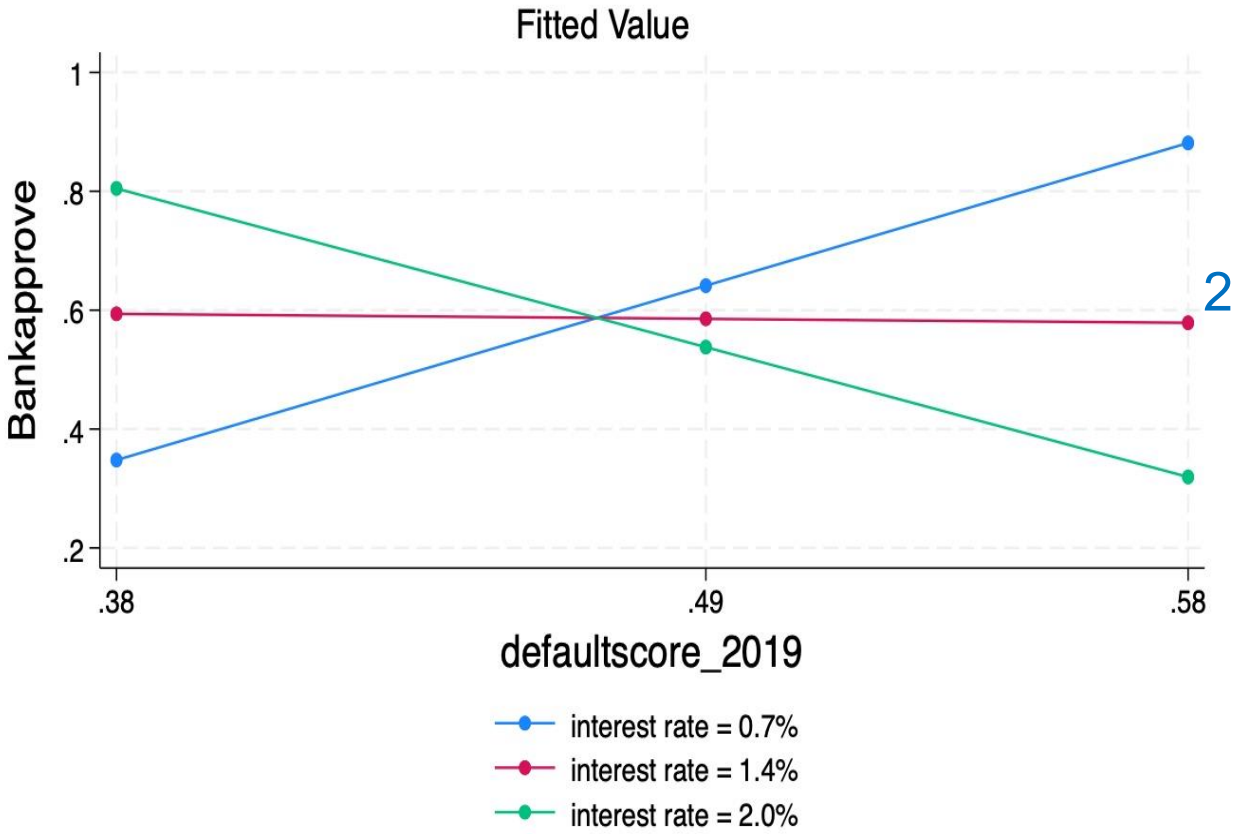
	(1) Single Prefecture	(2) Multiple Prefectures
interest rate	0.494	1.841***
	(1.334)	(0.574)
defaultscore_2019	4.365	5.411***
	(3.255)	(1.617)
interest rate * defaultscore_2019	-1.135	-3.919***
	(2.546)	(1.166)
Observations	143	555
Industry FE	YES	YES

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

- FE estimation using 3-digit industry classification.
- Use sales and # of employees in 2019 as control variables.
- Moral hazard (arbitrage): Banks operating in multiple prefectures extend more loans in prefectures with higher interest rates.
- (At least for good firms default score < 0.5. How to interpret the cross-term → Next page)

Heterogeneity within prefecture by multiple-pref banks (same FE result)



1. Offering more loans to low-risk SMEs in prefectures with high interest rates.
   - High interest rates = Earning more revenue (typical supply curve)

2. Offering more loans to high-risk SMEs in prefectures with low interest rates.
   - Risk still remains: 100% reimbursement of interest payment was not available from the fourth year.
   - Low interest rate = Smaller loss upon default.

   →Still, risk-loving supply curve is strange: Adverse selection

- Distortions occurred due to the design of the policy. (Moral Hazard & Adverse Selection)

Conclusion

- Find credit allocation distortions by the zero-zero loan policy.
  - Moral hazard: Across prefectures, banks operating in multiple prefectures extend more loans in prefectures with higher interest rates.
  - Adverse selection: Within prefecture, banks offer more loans to high-risk SMEs in prefectures with low interest rates.

- These distortions were derived from the design of the zero-zero loan policy.

Main Results

1. Did the “zero-zero” loan policy support SMEs severely affected by COVID-19? →YES
2. Did lending to SMEs with higher risk before COVID-19 increase? (as the risk of lending to those SMEs became lower.) →YES
3. There were various interest rate settings across prefectures. Did financial institutions lend more in prefectures with high interest rates? →YES

   → However, their lending behaviors were opposite for SMEs with high default risk before COVID-19.

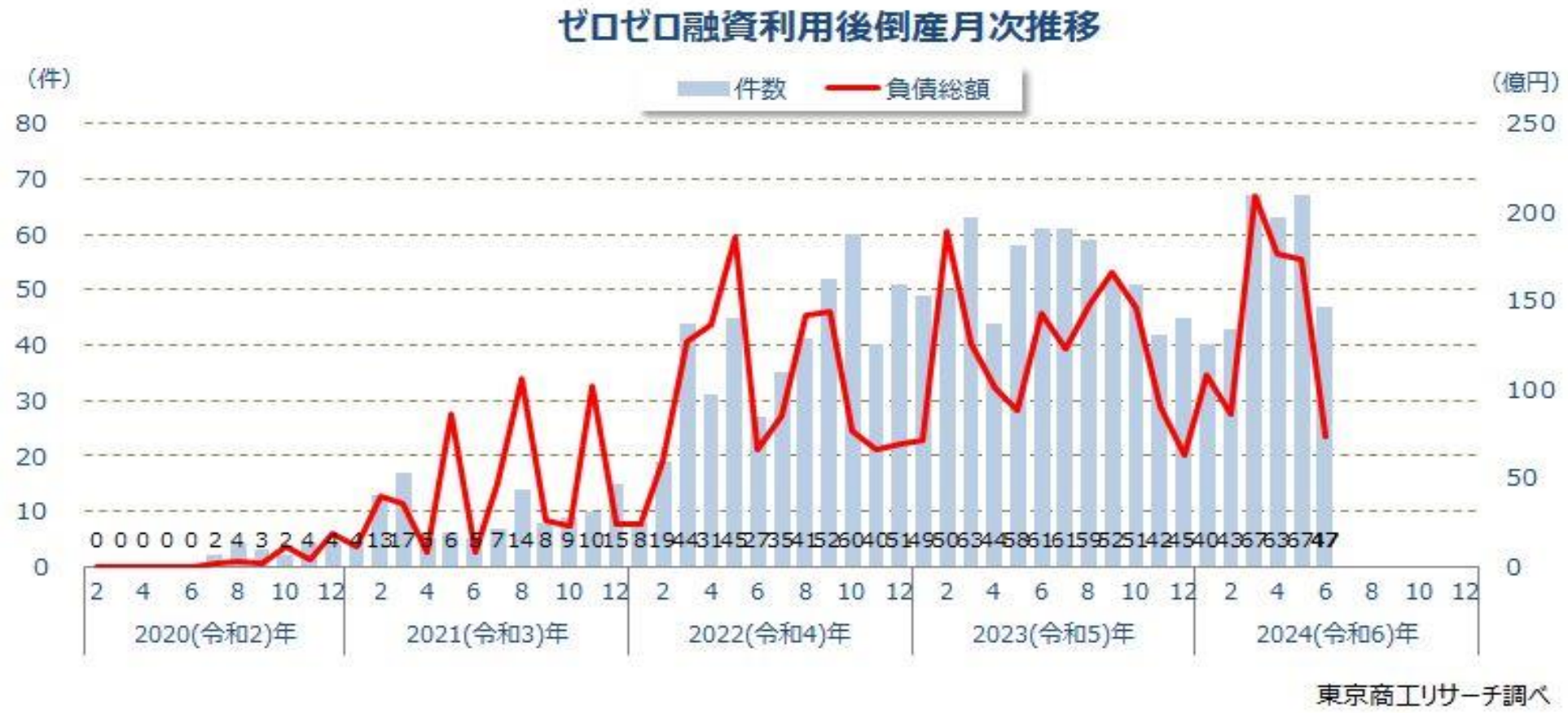
The “Zero-Zero” Loan Policy

- One of the major support programs for SMEs against COVID-19.
- Applications started from May 2020 and ended at the end of March 2021.
- SMEs with a 5% or more decline in monthly sales were eligible without collateral.

	Small Business with 15% or More Sales Drop	SMEs with 15% or More Sales Drop	Small Business with 5%-15% Sales Drop	SMEs with 5%-15% Sales Drop
Rate of Loan Guarantee	**100%**		80%	
Guarantee Fee	**Zero (For Free)**			Cut to a half
Reimbursement of Interest Payment	**100%**			Not Available

Table 1: Key Points of the “Zero-Zero” Loan Policy

民間金融機関によるゼロゼロ融資の概要



図：ゼロゼロ融資利用後の企業倒産に関する推移

Interest Rate Variations among Prefectures

- Interest rates varied among prefectures. Their settings were complicated.
- Interest rates and their setting were decided by prefectural governments. Financial institutions followed them in the prefecture where they lent.
- Interest rates for SMEs with 15% or more sales drop were smaller.
- Interest rates for loans with shorter terms were smaller.
- Variations among prefectures were summarized in the table below.

	common	only sales criteria (15% or more decline or not)	loan length criteria (less than 3 years etc.)	others	total
set constant rate	17	3	10	1	31
set range	9	4	3	0	16
total	26	7	13	1	47

Table 2: Interest Rates Setting Variations among Prefectures

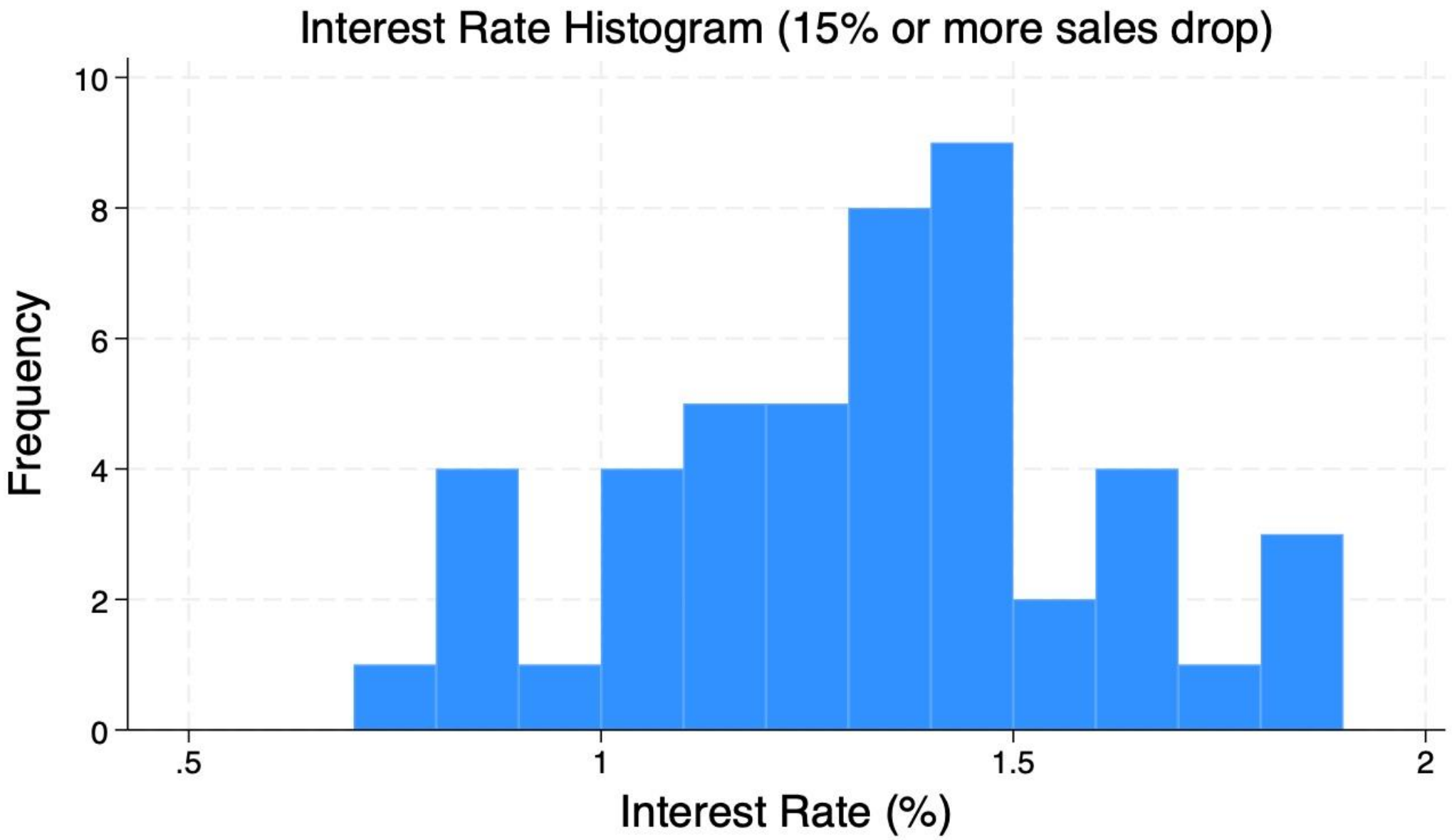


Figure 1: Interest Rate Variation across Prefectures

Data

Joint survey conducted with Tokyo Shoko Research (TSR), a major credit rating agency in Japan

1. Questionnaire survey data
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   - Conducted in May 2024.
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Emp_19	The number of employees of a firm in 2019	1,394	49.169	127.3
Sales_19	Sales of a firm in 2019. (thousand yen)	1,367	2165533	8763081

Table 3: Descriptive Statistics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Bankapprove	1.000							
(2) Badrepayment	0.325	1.000						
(3) Creditscore_2019	-0.068	-0.115	1.000					
(4) Defaultscore_2019	0.068	0.115	-1.000	1.000				
(5) Interest Rate (Median Setting)	-0.032	0.035	-0.070	0.070	1.000			
(6) Sales Drop Dummy	0.068	0.029	-0.026	0.026	0.008	1.000		
(7) Emp_19	-0.110	-0.075	0.368	-0.368	-0.069	-0.037	1.000	
(8) Sales_19	-0.145	-0.077	0.357	-0.357	-0.030	-0.060	0.738	1.000

Table 4: Correlation Table

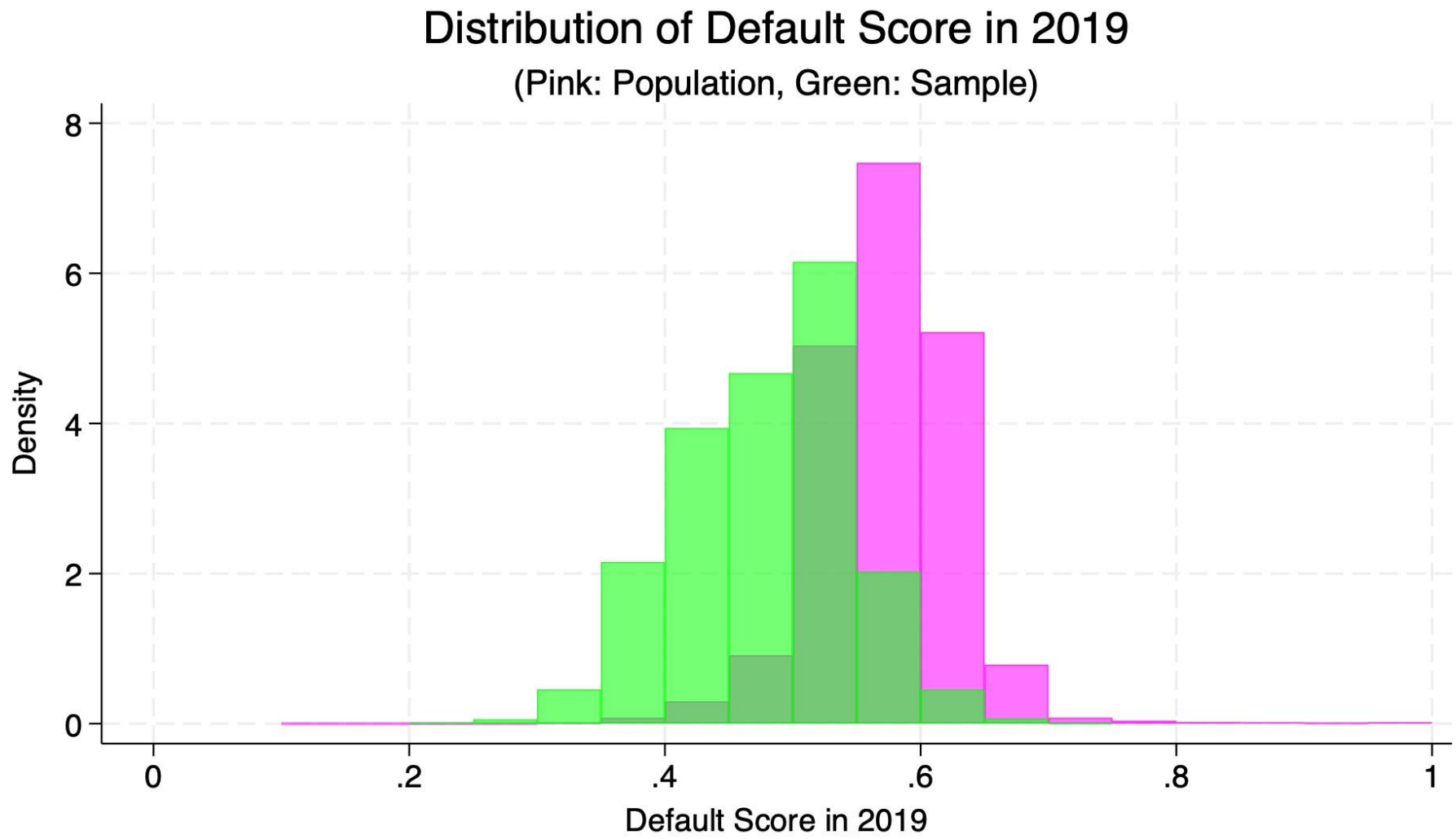


Figure 4: The Distribution of Default Score
(Green: Sample of This Study, Pink: Full Sample in TSR Financial Data)

Estimation Results

	(1) bank approve	(2) bank approve
interest rate	-0.013	0.966***
	(0.042)	(0.372)
defaultscore_2019	0.654**	3.639***
	(0.324)	(1.170)
SalesDropDummy	0.064**	0.392
	(0.032)	(0.261)
interest rate * defaultscore_2019		-1.942**
		(0.777)
defaultscore_2019 * SalesDropDummy		-0.557
		(0.512)
interest rate * SalesDropDummy		-0.041
		(0.094)
Observations	1256	1256

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

- FE estimation with full sample.
- Using 3-digit industry classifications.
- Sales and # of employees in 2019 are used as control variables.

1. Lending more to SMEs with severe sales drops due to COVID-19.
2. Lending more to SMEs with high risks before COVID-19.
3. Lending more in prefectures with high interest rates.

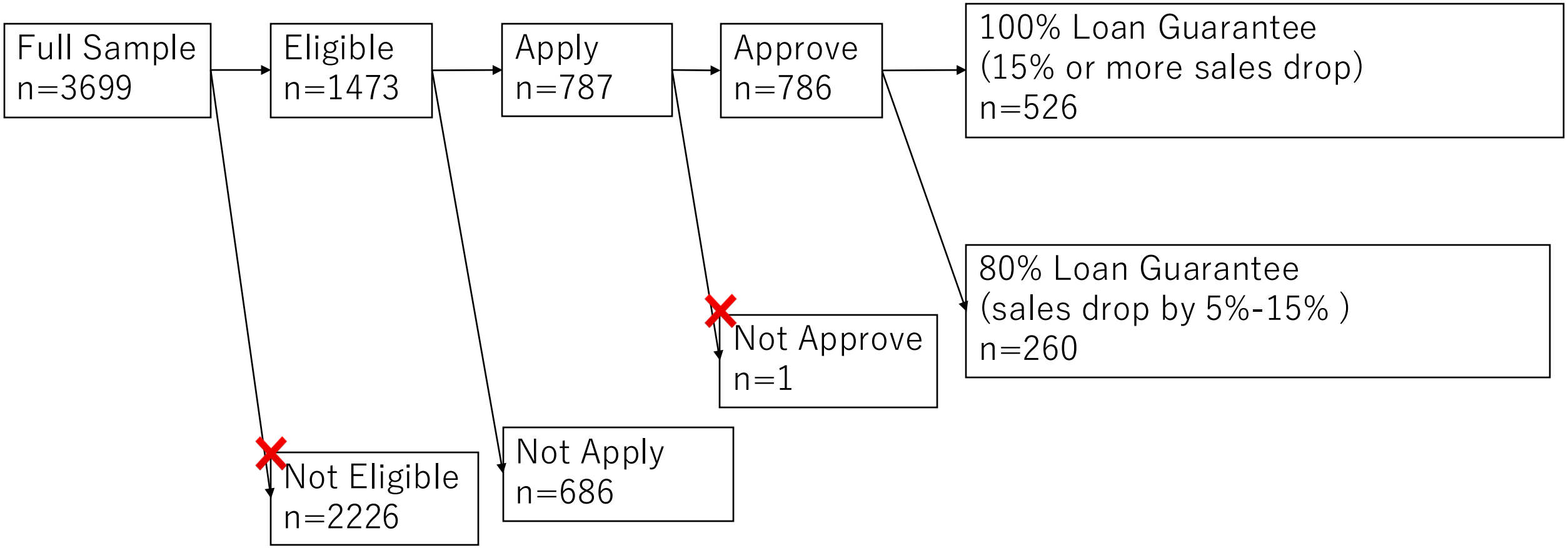
However, 2 and 3 are correlated.

Difference of Main Bank: operating in a single prefecture VS operating in multiple prefectures

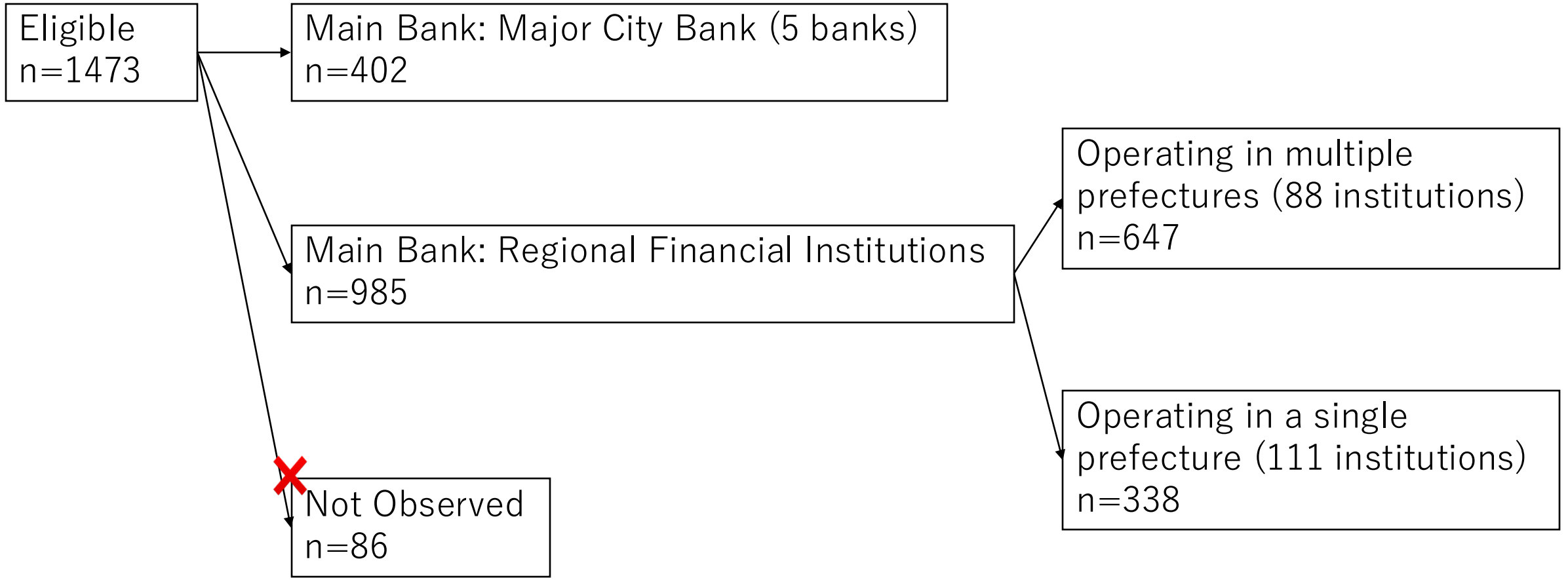
- Financial institutions operating in a single prefecture may have lent more to SMEs with high default risk before COVID-19.
- Financial institutions operating in multiple prefectures may have arbitraged across different interest rates.

- Examining these points by limiting samples to SMEs with 15% or more sales drop.

Samples for Estimations



Samples for Estimation (Main Bank Classification)



Estimation Results: Operating in A Single Prefecture Case

	(1) bank approve	(2) bank approve
interest rate	-0.090	0.494
	(0.133)	(1.334)
defaultscore_2019	2.939**	4.365
	(1.177)	(3.255)
interest rate * defaultscore_2019		-1.135
		(2.546)
Observations	143	143

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

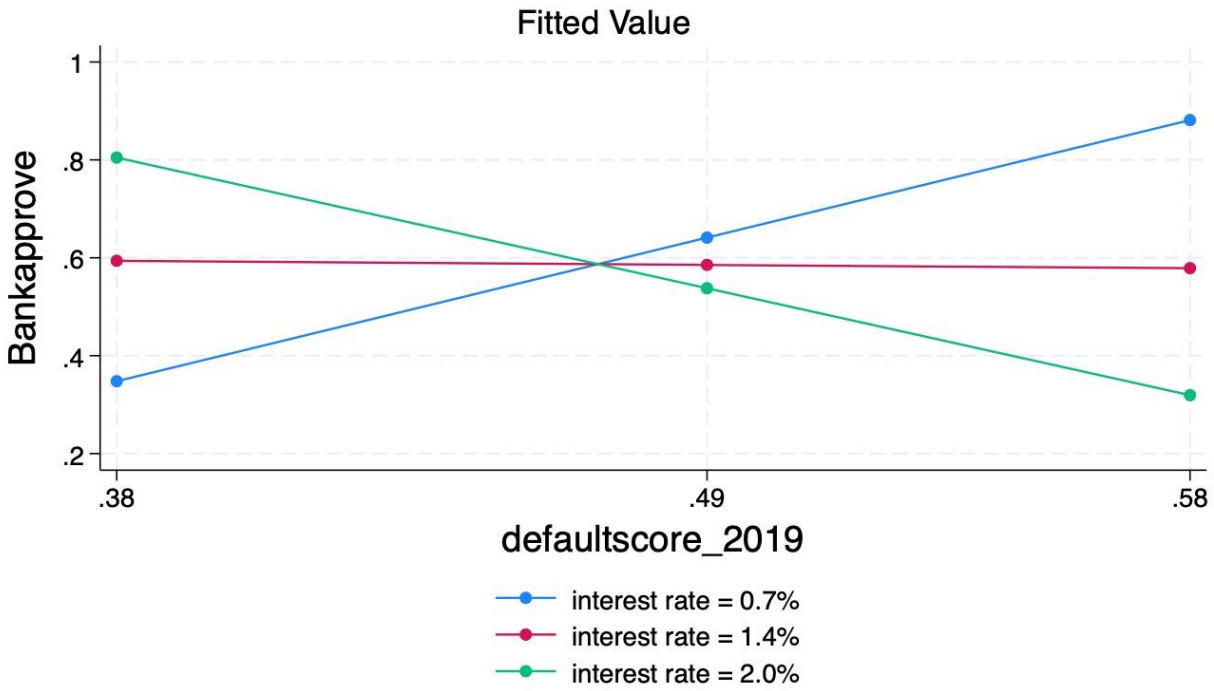
Estimation Results: Operating in Multiple Prefectures Case

	(1) bank approve	(2) bank approve
interest rate	-0.071	1.841***
	(0.068)	(0.574)
defaultscore_2019	0.086	5.411***
	(0.536)	(1.617)
interest rate * defaultscore_2019		-3.919***
		(1.166)
Observations	555	555

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Estimation Results: Operating in Multiple Prefectures Case



1. Offering more loans to low-risk SMEs in prefectures with high interest rates.
   - High interest rates → Earning more revenue.

2. Offering more loans to high-risk SMEs in prefectures with low interest rates.
   - 100% reimbursement of interest payment was not available from the fourth year.
   - Low interest rates → Smaller risk of default.

- Distortions occurred due to the design of the policy. (Moral Hazard & Adverse Selection)

返済状況分析結果:売上高減少率15%以上
メインバンク：単一県で事業を行う銀行

	(1) Badrepayment	(2) Badrepayment
defaultscore_2019	0.193	-0.393
	(1.258)	(4.110)
interest rate	22.949	-2.415
	(17.082)	(172.862)
defaultscore_2019 * interest rate		48.937
		(330.144)
Observations	75	75

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

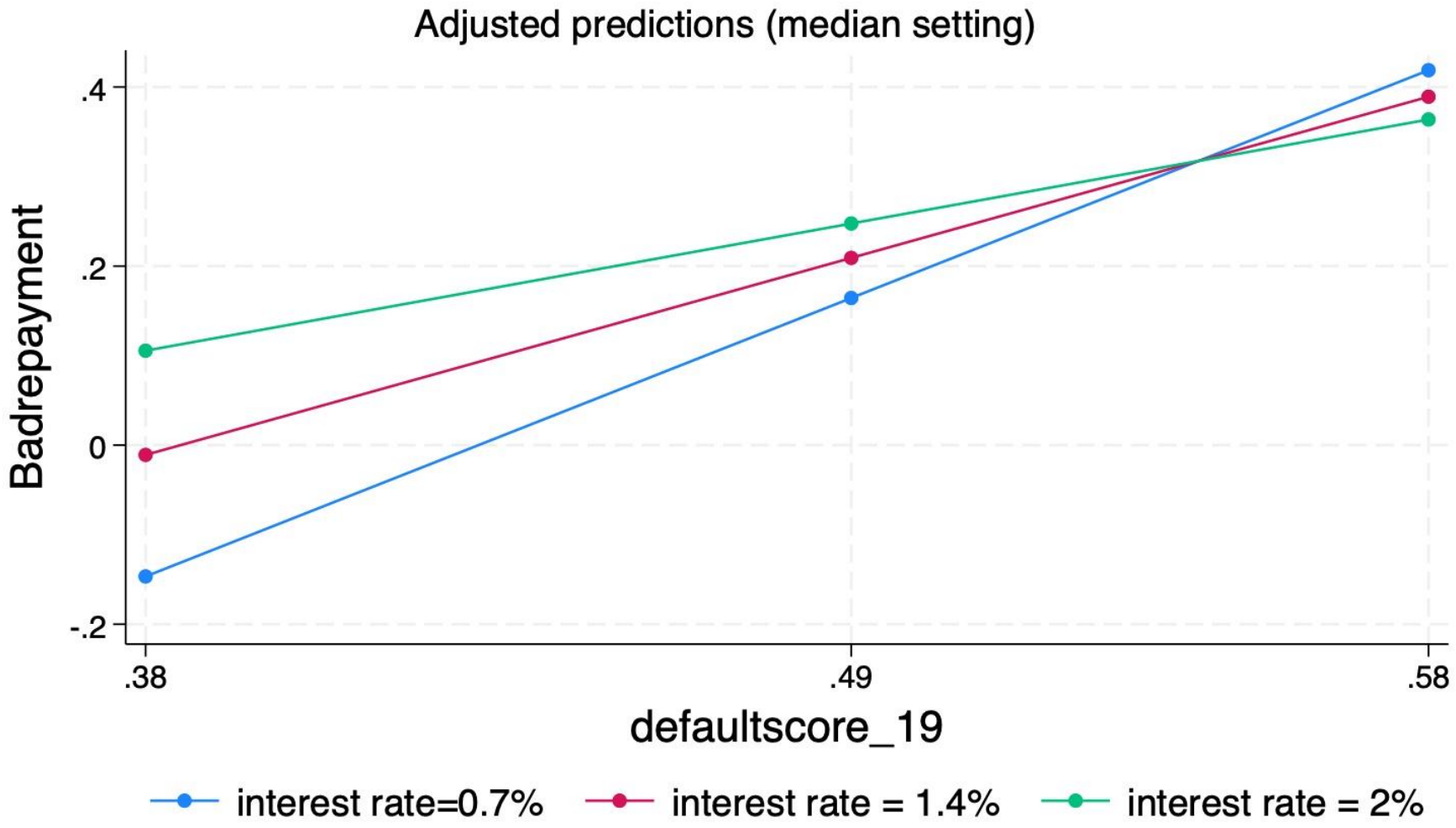
返済状況分析結果:売上高減少率15%以上
メインバンク：複数県で事業を行う銀行

	(1) Badrepayment	(2) Badrepayment
defaultscore_2019	2.021***	3.654
	(0.640)	(2.637)
interest rate	6.609	64.283
	(9.072)	(90.095)
defaultscore_2019 * interest rate		-118.126
		(189.501)
Observations	279	279

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

返済状況分析結果:売上高減少率15%以上
メインバンク：複数県で事業を行う銀行



金利が低い県ではよりハイリスク企業に貸し出していたが、それが返済状況に現れている

結論

① (政策の目的)コロナ禍で特に売上が急減した企業への支援か。→YES

② (政策の副作用)コロナ禍以前まで貸出が少なかったリスクの高い企業への融資が増えたか。→YES

③ (政策の副作用)都道府県ごとに銀行が得られる金利の制限が異なるが、金利の高い都道府県に資金が流れていたのでは。→YES

→ただし、これはコロナ禍以前にローリスク企業の場合

→ハイリスクな企業には逆で、金利が低い＝保護の県に資金が流れた

→実際の返済状況からも、金利が低い県での問題発生が多いこと確認

まとめれば、リスクとリターンを勘案しない融資制度の問題が現れた。