# The Role of Collateral and Personal Guarantees in Relationship Lending: Evidence from Japan's Small Business Loan Market

**Presentation at RIETI Policy Symposium**
**"Japan's Financial System: Revisiting the Relationship between Corporations and Financial Institutions"**

**February 16, 2006**


**Mizuho Research Institute**
**Arito Ono**


Arito Ono and Iichiro Uesugi, "The Role of Collateral and Personal Guarantees in Relationship Lending: Evidence from Japan's Small Business Loan Market," RIETI Discussion Paper Series 05-E-027, November 2005 (http://www.rieti.go.jp/jp/publications/dp/05e027.pdf)

# 1. Motivation

- Investigating the determinants of collateral and personal guarantees in Japan’s small business lending
- Examining three conventional theories
  - Riskier borrowing firms pledge collateral and personal guarantees more often in order to mitigate debtor moral hazard
  - Banks perform less screening and monitoring of borrowers if their loans are secured by collateral and personal guarantees (“lazy bank” hypothesis)
  - Collateral and personal guarantees are less likely to be pledged if the borrower establishes solid “relationship” with its main bank (they are substitutes)
- Data: SME Agency “Survey of Financial Environment” (2002, 2001) , Tokyo Shoko Research (TSR) Database

## 2. Data

- Firms with collateral or personal guarantees are “typical” SMEs
- Firms without collateral and personal guarantees are relatively larger and lower-risk (higher TSR credit scores)
- Firms receiving credit guarantees are relatively smaller and riskier (lower TSR credit scores)

| | No. of samples (share, %) | Capital (thousands of yen) | No. of employees | Gross sales (thousands of yen) | TSR Credit Scores | Interest rate (0.1 basis point) | profit margin | Capital/ asset ratio |
|---|---|---|---|---|---|---|---|---|
| With Collateral | 4,834 (73.9) | 197,509 | 38 | 1,299,848 | 55 | 2000 | 0.0139 | 0.2009 |
| With Personal Guarantee | 4,984 (76.2) | 161,017 | 32 | 1,079,825 | 55 | 2100 | 0.0133 | 0.1991 |
| With Credit Guarantee | 3,381 (51.7) | 96,277 | 26 | 873,705 | 53 | 2375 | 0.0120 | 0.1588 |
| With Collateral and Personal Guarantee | | | | | | | | |
| And With Credit Guarantee | 2,819 (43.1) | 104,015 | 28 | 931,178 | 53 | 2400 | 0.0122 | 0.1537 |
| And Without Credit Guarantee | 1,413 (21.6) | 417,121 | 52 | 1,939,796 | 59 | 1750 | 0.0160 | 0.2966 |
| Without Collateral, Personal Guarantee, or Credit Guarantee | 889 (13.6) | 464,040 | 45 | 2,098,614 | 60 | 1375 | 0.0182 | 0.3860 |
| All Samples | 6,540 (100.0) | 207,012 | 36 | 1,290,303 | 56 | 2000 | 0.0143 | 0.2201 |
| (standard deviation) | | (1,797,737) | (155) | (5,837,277) | (7) | (1204) | (0.2506) | (0.3028) |

Note: As of 2002 hereinafter, unless otherwise stated. The figures are median.

## 2. Data

### Composition of Collateral

- Mostly real estate + financial assets for high-risk firms, machinery for low-risk firms
- Account receivables and inventories are rarely used

| | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| **Composition of Collateral (multiple answers allowed, %)** | | | | | | | |
| real estate | 95.9 | 95.8 | 96.0 | 95.5 | 95.9 | 96.8 | 95.5 |
| machinery | 5.4 | 6.3 | 4.6 | 5.0 | 5.8 | 4.8 | 10.5 |
| deposits | 22.8 | 29.2 | 28.4 | 24.4 | 16.5 | 12.2 | 12.0 |
| equity securities | 9.2 | 11.4 | 10.9 | 9.2 | 7.0 | 7.0 | 6.0 |
| commercial bills | 6.9 | 8.4 | 8.1 | 7.1 | 5.2 | 5.4 | 2.3 |
| other securities | 2.4 | 3.6 | 3.4 | 2.2 | 1.2 | 1.4 | 0.8 |
| proceeds of guarantee | 1.2 | 2.6 | 1.1 | 0.8 | 0.9 | 0.8 | 0.8 |
| accounts receivable | 0.8 | 0.8 | 0.8 | 0.4 | 0.9 | 1.3 | 0.8 |
| intellectual property | 0.1 | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| others | 1.9 | 1.4 | 2.1 | 1.5 | 2.6 | 1.3 | 3.8 |

Note: As of 2001.

# 2. Data

## Composition of Personal Guarantees

- Mostly by the representative + other directors, relatives for high-risk firms

| | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| **Composition of Personal Guarantee (multiple answers allowed, %)** | | | | | | | |
| Representative | 94.8 | 95.3 | 94.5 | 94.6 | 95.1 | 94.4 | 95.0 |
| Executives other than representative | 34.1 | 45.9 | 38.2 | 34.1 | 25.5 | 23.5 | 21.0 |
| Relatives of representative | 18.3 | 30.0 | 20.5 | 17.0 | 14.6 | 8.0 | 8.0 |
| Third party (individuals) | 2.4 | 6.4 | 2.5 | 2.0 | 0.7 | 0.2 | 0.0 |
| Enterprises with capital relationship | 6.3 | 7.4 | 6.9 | 5.9 | 5.9 | 5.0 | 4.0 |
| Enterprises without capital relationship | 0.6 | 1.3 | 0.5 | 0.7 | 0.0 | 0.2 | 0.0 |
| Others | 1.1 | 1.0 | 1.1 | 1.4 | 1.4 | 0.7 | 0.0 |

Note: As of 2001.

# 3. Riskiness of the Borrower

## Collateral, Guarantees, and the Riskiness of the Borrower

- The use rate of collateral and personal guarantees negatively correlate with the firm's credit risk (credit scores)
  - Consistent with the moral hazard hypothesis
  - Inconsistent with the adverse selection (signaling) hypothesis

| | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| No. Of Samples (Share, %) | 5,380 (100.0) | 868 (16.1) | 1,521 (28.3) | 1,366 (25.4) | 850 (15.8) | 663 (12.3) | 112 (2.1) |
| Collateral | | | | | | | |
| Percentage of Borrowers with Collateral | 79.7 | 85.1 | 82.0 | 80.7 | 76.5 | 71.5 | 69.6 |
| Average Interest Rate (with Collateral, 0.1 b.p.) | 2283 | 3073 | 2557 | 2069 | 1800 | 1636 | 1386 |
| Average Interest Rate (without Collateral, 0.1f b.p.) | 1842 | 2653 | 2224 | 1767 | 1552 | 1269 | 1157 |
| Personal Guarantees | | | | | | | |
| Percentage of Borrowers with Personal Guarantees | 81.8 | 90.6 | 87.2 | 83.7 | 73.6 | 67.1 | 64.3 |
| Average Interest Rate (with Personal Guarantees, 0.1 b.p.) | 2326 | 3080 | 2581 | 2088 | 1867 | 1648 | 1341 |
| Average Interest Rate (without Personal Guarantees, 0.1 b.p.) | 1600 | 2347 | 1919 | 1614 | 1392 | 1294 | 1272 |

# 3. Riskiness of the Borrower

## Comparison with the United States

- The use rate of collateral is the highest among "Low-Risk" firms
- Firms with collateral pay lower interest rates than those without

| | Total | D&B Credit Score (as of May, 1999) | | | | |
|---|---|---|---|---|---|---|
| | | High Risk | Significant Risk | Average Risk | Moderate Risk | Low Risk |
| Share Of Samples (%) | 100.0 | 10.9 | 21.8 | 32.3 | 28.1 | 6.9 |
| Collateral | | | | | | |
| Percentage of Borrowers with Collateral | 57.3 | 66.9 | 55.7 | 58.8 | 50.4 | 68.8 |
| Average Interest Rate (with Collateral, %) | 9.1 | 9.9 | 9.1 | 8.9 | 8.9 | 8.6 |
| Average Interest Rate (without Collateral, %) | 9.8 | 9.7 | 9.7 | 10.0 | 9.6 | 10.1 |
| Guarantee | | | | | | |
| Percentage of Borrowers with Guarantee | 53.4 | 53.4 | 59.9 | 50.9 | 53.9 | 45.9 |
| Average Interest Rate (with Guarantee, %) | 9.3 | 9.8 | 9.8 | 9.1 | 9.1 | 8.8 |
| Average Interest Rate (without Guarantee, %) | 9.4 | 9.9 | 8.9 | 9.6 | 9.5 | 9.3 |

Source: FRB, "1998 Survey of Small Business Finances"

# 4. Monitoring by the Main Bank

## Collateral, Guarantees, and Monitoring by the Main Bank

- Proxies for the monitoring activity: the frequency of contact, document submission
- Within the same risk category, the frequency of monitoring has a positive correlation with the use rate of collateral and guarantees
  - Inconsistent with the lazy bank hypothesis

| Frequency of Document Submission | Total | TSR Credit Scores -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
|---|---|---|---|---|---|---|---|
| **Percentage of Borrowers with Collateral** | | | | | | | |
| once every 1-2 months | 91.5 | 92.3 | 94.8 | 88.9 | 89.9 | 78.1 | 93.8 |
| quarterly | 87.6 | 88.1 | 88.6 | 89.3 | 83.5 | 83.6 | 75.0 |
| semi-annually | 75.9 | 78.8 | 77.7 | 77.2 | 73.7 | 70.9 | 72.4 |
| annually | 67.2 | 69.3 | 69.5 | 70.1 | 66.0 | 63.8 | 53.3 |
| **Percentage of Borrowers with Personal Guarantees** | | | | | | | |
| once every 1-2 months | 89.7 | 92.3 | 91.4 | 91.4 | 85.8 | 71.2 | 68.8 |
| quarterly | 88.4 | 91.1 | 93.6 | 91.9 | 77.6 | 69.1 | 50.0 |
| semi-annually | 70.9 | 82.7 | 80.4 | 73.8 | 59.2 | 56.3 | 62.1 |
| annually | 75.7 | 88.0 | 82.9 | 78.2 | 72.0 | 65.4 | 55.1 |

# 4. Monitoring by the Main Bank

## Why Monitoring and Collateral are Complements?

- Collateral is effective only if its value is monitored (Rajan and Winton, 1995)
  - Monitoring incentive is more extensive when the value of collateral varies depending upon business conditions (e.g. accounts receivables, inventories) than when the value of collateral is relatively stable (e.g. real estate)
  - Fragility of the real estate market since the 1990s might have enhanced the banks' monitoring incentives
- Collateral serves as an incentive device for investing in costly information production activities (Longhofer and Santos, 2000)
  - Taking collateral effectively raises the lender's priority
  - By making its loan senior to other creditor's claims, the bank can reap the benefits of the relationship-building investments
  - Main bank usually takes the first lien on collateral

# 5. Relationship between the Borrower and the Main Bank

## Collateral, Guarantees, and the Relationship

- Proxies for "relationship": duration, scope (number of financial products purchased), the number of banks in transactions
- Within the same risk category, the duration (scope) of relationship positively correlates with the use rate of collateral and guarantees
  - Inconsistent with the conventional theory (substitution)

| Duration of relationship with the main bank | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| **Percentage of Borrowers with Collateral** | | | | | | | |
| less than 15 years | 54.9 | 53.9 | 58.3 | 54.9 | 54.5 | 44.4 | 52.4 |
| 15-28 years | 73.9 | 84.1 | 80.5 | 73.2 | 65.2 | 59.0 | 49.8 |
| 28-40 years | 79.8 | 92.4 | 87.0 | 81.2 | 70.1 | 68.0 | 52.2 |
| 40 years or more | 82.8 | 92.7 | 89.2 | 86.2 | 80.1 | 72.2 | 57.5 |
| **Percentage of Borrowers with Personal Guarantees** | | | | | | | |
| less than 15 years | 71.2 | 76.8 | 78.8 | 71.8 | 60.4 | 45.5 | 42.9 |
| 15-28 years | 78.0 | 91.7 | 85.1 | 79.7 | 67.4 | 56.5 | 50.0 |
| 28-40 years | 78.2 | 92.0 | 88.8 | 79.3 | 67.1 | 61.5 | 50.0 |
| 40 years or more | 78.1 | 90.0 | 83.9 | 82.8 | 71.1 | 68.9 | 56.3 |

# 5. Relationship between the Borrower and the Main Bank

## Collateral, Guarantees, and the Relationship

- Firms establishing sole-relationships with their main banks pledge collateral and guarantees less often
  - *Inside* collateral (collateral owned by the borrower) defines the order of seniority among creditors. In the case of sole-banking, the need to define seniority among creditors would be less

| # of banks in transactions | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| **Percentage of Borrowers with Collateral** | | | | | | | |
| 1 | 52.0 | 67.1 | 56.9 | 52.9 | 43.7 | 42.9 | 29.2 |
| 2 | 73.6 | 79.7 | 71.9 | 69.4 | 74.7 | 73.9 | 84.6 |
| 3-4 | 79.7 | 82.7 | 83.9 | 81.2 | 76.4 | 71.8 | 63.8 |
| 5 or more | 82.5 | 88.2 | 88.1 | 84.7 | 79.4 | 69.3 | 58.8 |
| **Percentage of Borrowers with Personal Guarantees** | | | | | | | |
| 1 | 59.4 | 78.7 | 67.9 | 58.5 | 50.0 | 47.5 | 22.9 |
| 2 | 81.7 | 89.6 | 86.1 | 81.3 | 78.3 | 66.7 | 65.4 |
| 3-4 | 81.5 | 91.0 | 86.9 | 84.7 | 71.2 | 68.0 | 65.5 |
| 5 or more | 79.2 | 87.5 | 88.8 | 82.2 | 70.6 | 60.3 | 56.9 |

## 5. Relationship between the Borrower and the Main Bank

### Why Relationship and Collateral are Complements?

- "Hold-up" problem (Sharpe, 1990)
  - The bank exerts information monopoly by charging higher interest rates and/or requiring more collateral
- Mitigating the "soft-budget constraint" (Boot, 2000)
  - The possibility of renegotiation in relationship lending, when the borrowing firm faces difficulty, increases the firm's incentive to misbehave ex ante (soft-budget constraint problem)
  - Collateral will make the value of lender's claim less sensitive to the borrower's total net worth. Then, the bank can credibly threaten to call in the loan

# 5. Relationship between the Borrower and the Main Bank

## Why Relationship and Collateral are Complements?

- Interest rates are somewhat lower for borrowers with longer main bank relationships
  - Inconsistent with the hold-up hypothesis

| Duration of relationship with the main bank | Total | TSR Credit Scores | | | | | |
|---|---|---|---|---|---|---|---|
| | | -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
| **Average Interest Rate, 0.1 b.p.** | | | | | | | |
| less than 15 years | 2375 | 2987 | 2556 | 2047 | 1970 | 1769 | 1382 |
| 15-28 years | 2351 | 3118 | 2622 | 2112 | 1828 | 1636 | 1568 |
| 28-40 years | 2193 | 3079 | 2499 | 2050 | 1702 | 1530 | 1254 |
| 40 years or more | 1963 | 2857 | 2319 | 1870 | 1628 | 1410 | 1286 |

## 6. Robustness Check: Credit Guarantee Users and Non-users

- The use of government supported credit guarantees may distort the inferences above
  - Guaranteed percentage is 100% in most cases
  - The share of borrowers using credit guarantees is inversely related to the credit score
  - The share of borrowers pledging collateral is high among the credit guarantee users, irrespective of the credit score

| | Total | TSR Credit Scores -49 | 50 - 54 | 55 - 59 | 60 - 64 | 65 - 69 | 70 - |
|---|---|---|---|---|---|---|---|
| Percentage of borrowers using Credit Guarantees | 51.7 | 79.1 | 68.8 | 52.0 | 31.9 | 18.1 | 6.5 |
| **Users of Credit Guarantees** | | | | | | | |
| Percentage of Borrowers with Collateral | 86.9 | 86.2 | 86.0 | 87.1 | 89.3 | 90.4 | 100.0 |
| Percentage of Borrowers with Personal Guarantees | 94.6 | 94.4 | 95.2 | 94.2 | 94.2 | 93.6 | 91.7 |
| Average Interest Rate, 0.1 b.p. | 2592 | 3145 | 2692 | 2268 | 2061 | 1971 | 1788 |
| **Non-users of Credit Guarantees** | | | | | | | |
| Percentage of Borrowers with Collateral | 60.0 | 58.8 | 61.7 | 62.0 | 59.5 | 59.1 | 52.9 |
| Percentage of Borr/owers with Personal Guarantees | 56.6 | 59.3 | 59.0 | 61.1 | 54.3 | 53.1 | 48.8 |
| Average Interest Rate, 0.1 b.p. | 1673 | 2356 | 1984 | 1680 | 1561 | 1417 | 1260 |

## 6. Robustness Check: Credit Guarantee Users and Non-users

- However, the correlation between the use rate of collateral (guarantees) and the frequency of document submission, duration of the main-bank relationship are qualitatively the same even among the credit guarantee users

(%, bp)

| | With Credit Guarantee | | Without Credit Guarantee | |
|---|---|---|---|---|
| | Percentage of Borrowers with Collateral | Percentage of Borrowers with Guarantee | Percentage of Borrowers with Collateral | Percentage of Borrowers with Guarantee |
| **Frequency of Document Submission** | | | | |
| once every 1-2 months | 94.3 | 96.7 | 83.2 | 69.3 |
| quarterly | 92.8 | 95.9 | 76.7 | 72.8 |
| semi-annually | 88.3 | 94.1 | 64.7 | 50.2 |
| annually | 77.8 | 92.7 | 59.4 | 63.3 |
| **Duration of relationship with the main bank** | | | | |
| less than 15 years | 69.0 | 92.8 | 38.0 | 45.1 |
| 15-28 years | 88.7 | 96.1 | 54.0 | 53.6 |
| 28-40 years | 91.2 | 94.9 | 67.1 | 59.8 |
| 40 years or more | 95.4 | 94.6 | 72.6 | 64.8 |
| **# of banks in transactions** | | | | |
| 1 | 77.6 | 91.7 | 37.4 | 40.9 |
| 2 | 83.3 | 94.5 | 61.7 | 66.3 |
| 3-4 | 88.2 | 95.3 | 69.1 | 64.3 |
| 5 or more | 91.2 | 95.1 | 71.3 | 58.7 |

## 7. Conclusions

- Collateral and personal guarantees are useful in mitigating debtor moral hazard
- Even with collateral and personal guarantees, main banks closely monitor SMEs and establish solid relationships with borrowers
- Further issues to be addressed:
  - The sample SMEs are relatively large; “small” firms without tangible assets may face strict borrowing constraints
  - Need to examine ex-post performances of the borrowing firms in order to evaluate the magnitude of “bright” side of collateral and personal guarantees