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Sources of Corporate Financing and Economic Crisis in Korea

Micro-Evidence

Youngjae Lim

6.1 Introduction

Using a firm-level data set¹ in Korea during the 1992–2000 period, this paper attempts to examine the dynamic patterns in the allocation of credit across firms. Supposedly, in Korea, the economic crisis in 1997 had a significant impact on the pattern in the allocation of credit across firms. In particular, this paper aims to examine these dynamic patterns across large and small firms after the crisis.

Corporate financing issues are intimately related to the cause of the Korean crisis. For instance, the indebtedness of *chaebol* to banks is viewed as having contributed much to the crisis.² Among others, Krueger and Yoo (2001) demonstrate that *chaebol* indebtedness is indeed the chief culprit of the crisis. In this regard, since the outbreak of the financial crisis in 1997, the government has undertaken various reform measures to restructure the financial and corporate sectors.³ The new regulatory system is now underway to induce the financial institutions to change their imprudent lending practices, and the capital market began to force the *chaebol* to correct their incentive structure. Supposedly, these postcrisis developments in Korea have caused the *chaebol* and financial institutions to change their previously imprudent (borrowing and lending) practices.

The paper suggests that large firms, to some extent, are leaving banks

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1. The data set covers most of the Korean firms except for extra-small ones.

2. The failure of the corporate governance of *chaebol* exacerbated the situation. For the failure of *chaebol* corporate governance before the crisis, see Joh (2003).

3. Bankruptcy policy reform was one of the essential elements in these structural reforms. Lim (2002) studies empirically the post-crisis bankruptcy policy reform in Korea.

and going to the capital market for their financing after the crisis.⁴ The paper also suggests that profitable small firms are gaining easier access to credit from financial institutions after the crisis. There has been a shift in the allocation of bank credit from large firms to small firms. Is this shift due to lenders' choice or due to borrowers' changed incentives? The paper suggests that the improved lending practices of banks contributed at least partially to this shift of bank credit from large firms to small firms.⁵

This paper is organized as follows. Section 6.2 provides the aggregate data on the corporate financing sources in Korea during the 1992–2000 period. Section 6.3 explains the firm-level data set. Section 6.4 examines the dynamic patterns in the allocation of credit across firms, and section 6.5 concludes the paper with agenda for future research.

6.2 Aggregate Patterns in the Corporate Financing Sources

Table 6.1 shows the aggregate data for the sources of corporate financing before and after the economic crisis. The numbers in table 6.1 are calculated from the information given in various publications by the Bank of Korea.⁶

The main reason we present this table is that it decomposes indirect finance further into detailed sources—commercial banks, insurance companies (including pension funds), short-term finance companies (e.g., merchant banks), and other nonbank financial intermediaries. Another point concerning the table is that it has been constructed by aggregating all the financial transactions for all the firms in the Korean economy. Hence, we could use this table to check the consistency in the firm-level data, for example, whether there is any systematic bias in the firm-level data due to the exclusion of extra-small firms.

After the crisis, in 1998–1999, the share of external finance in the total finance sharply declines to 50 percent from about 70 percent, throughout the 1990s until 1997.⁷

In 1998, as expected, the crisis completely changes the table for

4. Shortly after the crisis, the corporate bond market took off with the weak regulatory infrastructure. This immature expansion led to liquidity crises in 1999 and 2001. See Lim (2002) as well as Oh and Rhee (2002).

5. Borensztein and Lee (2002) examine the microdata on Korean listed firms in 1996–1998. They suggest that *chaebol*-affiliated firms lost the preferential access to credit and that credit was reallocated in favor of more efficient firms.

6. The *Economic Statistics Yearbook*, *Flow of Funds*, *Monthly Bulletin*, and Web site (www.bok.or.kr).

7. Although not shown in the table, the share of external finance in the total finance declined steadily throughout the 1970s and 1980s, and until 1988. During this period (except for the period of oil shocks), overseas export markets, together with emerging domestic markets, helped Korean firms to realize large profits. The ratio of internal finance to total finance was less than 20 percent in 1975, but it continued to grow to a level of more than 40 percent in 1988.

Table 6.1 Sources of Corporate Financing (flows) for All Firms in the Korean Economy, 1992-2000 (%)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total finance	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	—
Retained earnings	28.7	30.0	27.3	27.9	22.6	27.1	50.0	49.4	—
External finance	71.3	70.0	72.7	72.1	77.4	72.9	50.0	50.6	—
External finance	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Indirect finance	36.3	31.4	44.5	31.8	28.0	36.8	-57.3	4.1	17.1
Commercial banks	15.1	13.1	20.7	14.9	14.0	12.9	2.5	29.2	35.2
Insurance companies	3.9	3.1	2.4	2.7	2.8	2.3	-20.8	0.5	3.1
Short-term finance companies									
(e.g., merchant banks)	-0.4	2.4	4.3	0.5	-0.4	1.8	-22.4	-2.6	-6.8
Other nonbank financial intermediaries	17.7	12.8	17.1	13.7	11.5	19.8	-16.7	-22.9	-14.4
Direct finance	38.9	49.1	36.5	48.1	47.2	37.4	178.9	46.8	28.6
Government bonds	3.3	3.4	0.4	-0.9	0.3	0.5	2.0	0.0	-2.2
Commercial paper	7.6	13.9	4.9	16.1	17.5	3.7	-42.2	-30.4	-1.7
Corporate bonds	12.1	14.5	14.2	15.3	17.9	23.3	165.9	-5.3	-3.2
Equity	15.9	17.3	17.0	17.6	11.6	9.9	53.2	82.6	35.6
Foreign borrowing	7.1	1.5	6.6	8.4	10.4	5.6	-35.5	24.1	23.7
Borrowing from government	1.0	-0.2	0.2	0.2	-0.2	1.4	5.8	3.6	7.4
Interfirm credit	8.9	9.0	6.9	5.0	6.8	10.6	-27.2	10.2	6.8
Other	7.9	9.2	5.3	6.5	7.8	8.4	35.3	11.1	16.5

Source: Author's own calculations from the information in the various publications by the Bank of Korea (*Economic Statistics Yearbook, Flow of Funds*, and *Monthly Bulletin* [various issues of each]), and Web site www.bok.or.kr.

Note: Dashes indicate the data are not yet available.

corporate financing sources. However, in 2000, when the crisis phases out, the table for corporate financing sources takes a somewhat different composition compared to before the crisis.

First of all, the share of indirect finance does not recover the level before the crisis. A look into the components of indirect finance is necessary. The nonbank financial intermediaries, except for insurance companies, lose their share significantly, compared with before the crisis. On the other hand, the share of commercial banks increases to almost double the average level before the crisis. Second, in 2000, the composition of direct finance changes compared to before the crisis. Equity takes away the share of the borrowing from financial markets (commercial paper, bonds, etc). Finally, foreign borrowing increases its share significantly.

6.3 The Firm-Level Data

This study uses detailed financial information on the firms that have external audit reports. According to the Act on External Audit of Joint-Stock Corporations, a firm with assets of 7 billion won or more must issue audited financial statements. The data thus include all the firms with assets of 7 billion won or more. The total number of firms in the data is about 11,000.

The Financial Supervisory Commission is responsible for establishing accounting and auditing standards, and the Securities and Futures Commission is then responsible for the review of the audited financial statements issued by firms. Finally, National Information and Credit Evaluation, Inc. (NICE) codes this public information into its database after checking the consistency of the reported financial statements.

From the NICE data, we can estimate only the borrowing from all financial intermediaries, not the borrowings from the detailed components of indirect finance. However, table 6.2 shows that after the crisis, most of the new lending by financial intermediaries is, in fact, from commercial banks, not from nonbank financial institutions.

Table 6.2 Summary Statistics of Firm-Level Data (simple mean, %)

	All Firms in the Sample		
	1992–1996	1997–1998	1999–2000
EBIT/Asset	6.61578	3.79944	4.62773
Borrowing/Asset	0.38655	0.43713	0.37910
Loans from financial institutions/Borrowing	0.76436	0.80880	0.83345
Bond financing/Borrowing	0.07573	0.07605	0.05752

Note: Number of observations in sample is 11,026.

6.3.1 Summary Statistics

Table 6.2 presents sample means for the key variables in the empirical analysis. It divides the sample period into the three subperiods around the crisis: 1992–1996, 1997–1998, and 1999–2000. Note that the financial crisis broke out in 1997 and that the economy began to recover in 1999 after the crisis. Profitability is measured by earnings before interest and tax payments (EBIT) divided by total assets. After the crisis, the share of loans in asset increases compared with the precrisis period; on the other hand, the weight of bond financing decreases.

The financing pattern varies according to the size of firms. For example, the empirical distribution of the loans' share in total asset has a different shape according to the size of firms. For this reason, we divide all individual firms into ten groups based on the distribution of asset size, and select three representative size cohorts for presenting the empirical results. The results are robust to minor changes in the thresholds. We employ the following three size cohorts: (1) the largest firms (top 1 percent in asset size),⁸ (2) the medium-sized firms (middle 10 percent in asset size), and (3) the smallest firms (bottom 10 percent in asset size).

For the three size cohorts, table 6.3 provides sample means for the key variables in the empirical analysis. It also divides the sample period into the three subperiods around the crisis.

The statistics in table 6.3 present a different picture compared to the one in table 6.2. The aggregate numbers in table 6.2 do not fully capture the changes in the financing pattern experienced by heterogeneous firms during this period. Profitability evolves differently according to size groups. Profitability worsens for large and small firms, whereas it rebounds for medium-sized firms. While the share of loans in asset decreases for large firms, the opposite is the case for the other groups. After the crisis, large firms finance more in the bond market, but the other groups have more limited access to the bond market compared to the precrisis period.

6.3.2 Firm Size Distribution

Figure 6.1 shows the yearly firm-size distributions for all the firms in the sample before and after the crisis. Before the crisis, the distribution shifts to the right-hand side—implying on average an increase in firm size. The shape of the distribution gets skewed to the right gradually over time until 1997. We find relatively fewer small firms over time in the yearly distributions.

After the crisis, it is hard to find a clear pattern in the shift of the

8. For the case of large firms, we present the results using this particular cohort, but defining the largest firms differently (e.g., the top 5 percent, or top 10 percent) does not change the qualitative results of the paper.

Table 6.3 Summary Statistics for the Three Size Cohorts in Firm-Level Data (simple mean, %)

	Large Firms (top 1% in asset size, $N = 81$)			Medium-Sized Firms (middle 10% in asset size, $N = 1,039$)			Small Firms (bottom 10% in asset size, $N = 1,967$)		
	1992-1996	1997-1998	1999-2000	1992-1996	1997-1998	1999-2000	1992-1996	1997-1998	1999-2000
	Asset	3,111.022	5,552.276	6,424.852	12.114	16.539	18.960	3.986	5.636
EBIT/Asset	7.15573	3.31644	1.83426	6.84442	5.62404	7.34264	4.50535	-0.02398	-4.61268
Borrowing/Asset	0.493031	0.575053	0.471116	0.409815	0.430318	0.376597	0.274567	0.437087	0.340989
Loans from financial institutions/Borrowing	0.644068	0.559247	0.495934	0.805886	0.831305	0.864931	0.646217	0.848398	0.846132
Bond financing/Borrowing	0.2922	0.4305	0.4808	0.0372	0.0416	0.0214	0.0137	0.0218	0.0174

Note: Asset in billions of won. $N =$ no. of observations.

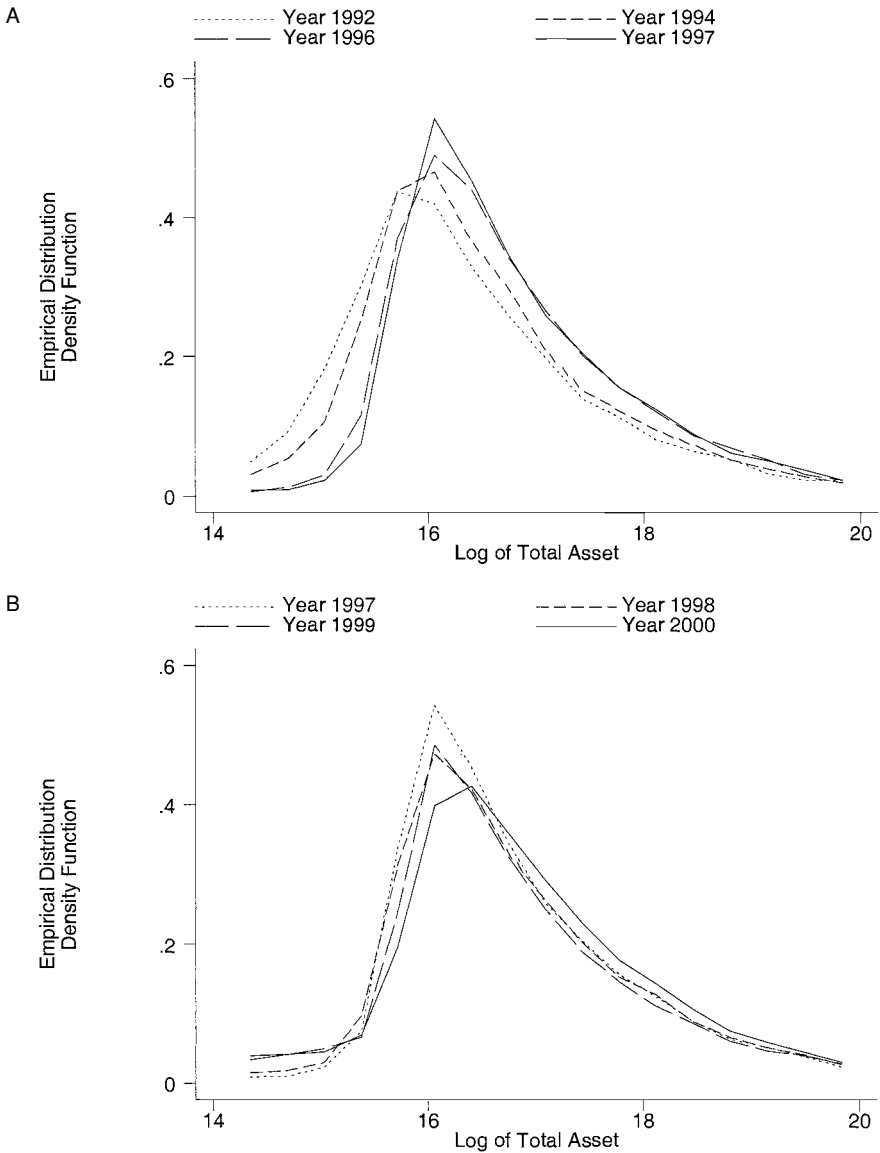


Fig. 6.1 All sample firms, log of total asset: *A*, before the crisis, 1992–1997; *B*, after the crisis, 1997–2000

Source: Author's calculation for all the firms in the NICE data.

distribution itself. However, the left-hand tail of the distribution—the smallest firms in the sample—becomes thicker after the crisis. The relative frequency of the smallest firms in the sample increases after the crisis. This thicker left tail could occur either from an increased number of new entrants or from the inclusion of extra-small firms that were previously excluded from the sample. Note that we observe the opposite before the crisis—the left-hand tail of the distribution getting thinner.

6.3.3 Firm Profitability Distribution

Figure 6.2 presents the yearly profitability distributions for all the firms in the sample before and after the crisis. The yearly distributions remain the same before the crisis. The crisis significantly affects the profitability distribution in 1997, indicating, on average, a decrease in firm profitability. After the crisis, the profitability distribution shifts much to the right or left depending on the macroeconomic situation. In fact, after the crisis, the magnitude of the business cycle becomes larger than compared to the pre-crisis period.⁹

Figure 6.3 shows that the small and medium-sized firms have more dispersed distributions in 1992–2000. Since this pattern remains the same in the sample period, we do not present the yearly distributions here. Large firms are more homogeneous in terms of profitability compared to the other size cohorts.

Figure 6.4 shows that the crisis had an impact on the shape of profitability for small firms. After the crisis (1997–2000), the distribution gets more dispersed over time. After the crisis small firms become a more heterogeneous group compared to the precrisis period.

6.4 Financing Pattern and the Crisis: Micro-Evidence

In section 6.3.1, the summary statistics of key financing variables hint that the heterogeneity of firms is important in understanding the evolution of the financing pattern after the crisis. The sample means of key financing variables also hint at the following pattern around the crisis: the largest firms are leaving financial intermediaries and switching directly to the financial markets for their financing, whereas the small and medium-sized firms are increasing their dependency on financial intermediaries for financing. In this section, we test these hypotheses rigorously. To get genuine cross-sectional results, we must control for the effect of the business cycles.

The empirical distributions of key financing variables have different shapes according to the size of firms and evolve differently after the crisis.

9. The annual growth rates of GDP after the crisis are 5.0 percent (1997), –6.7 percent (1998), 10.9 percent (1999), and 8.8 percent (2000), whereas, before the crisis, the difference between the high and low peak years does not exceed 4 percent.

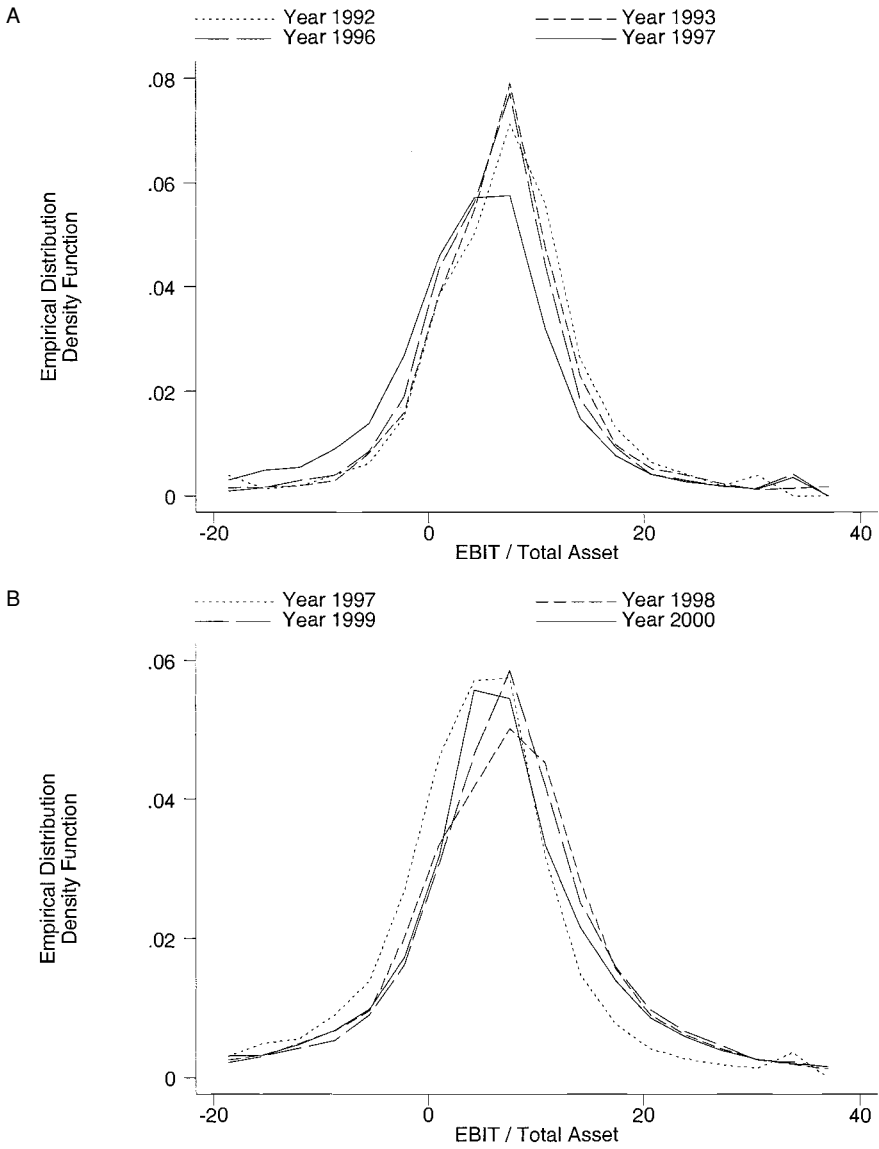


Fig. 6.2 All sample firms, EBIT/total asset: *A*, before the crisis, 1992–1997; *B*, after the crisis, 1997–2000

Source: Author's calculation for all the firms in the NICE data.

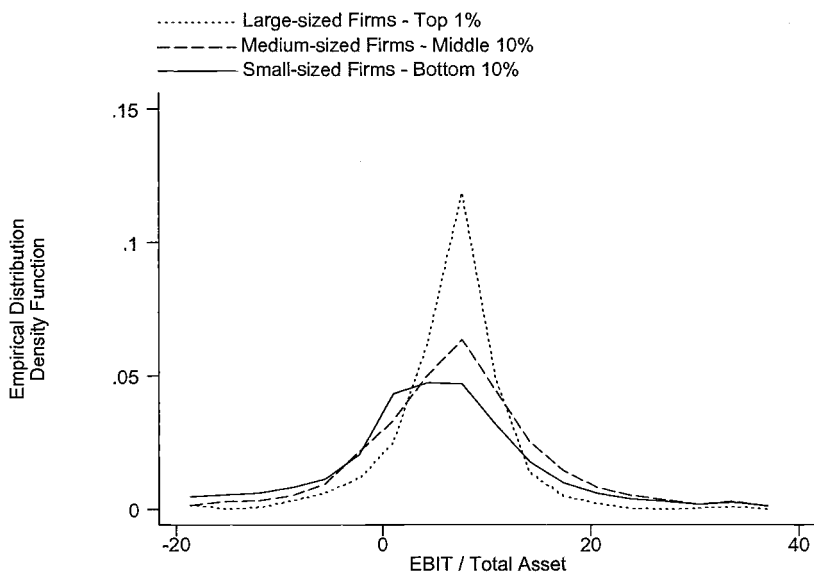


Fig. 6.3 All sample firms, EBIT/total asset: sample period, 1992–2000

Source: Author's calculation for all the firms in the NICE data.

In this section, therefore, we also present the result from comparing the empirical distributions of key financing variables.

6.4.1 Loans from Financial Institutions

Table 6.4 shows the regressions of the loan-borrowing ratio (defined as the borrowing from financial intermediaries divided by total borrowing) on the dummy variables denoting the size cohort interacted with year dummies and on the macrovariables (growth rate of gross domestic product [GDP], interest rate). The macrovariables control for the effect of the business cycles. In table 6.4, therefore, the reported coefficient for the specific year indicates the loan-borrowing ratio's difference between the size cohort in that specific year and all the other firms in the whole sample period. Table 6.4 shows the regression results for the three size cohorts (top 1 percent, middle 10 percent, bottom 10 percent).

After the crisis (in 1998–2000), the largest firms significantly decrease the share of loans in total borrowing. The coefficients for 1998–2000 are larger than 0.3 (all significant), whereas the coefficients for 1992–1997 are smaller than 0.2 (also all significant). That is, after the crisis, the largest firms are leaving financial intermediaries for their financing.

For the small firms this share jumps to a higher number from 1995 and stays more or less there even after the crisis. The coefficients for 1992–1994 are smaller than -0.2 (all significant), whereas the coefficients for

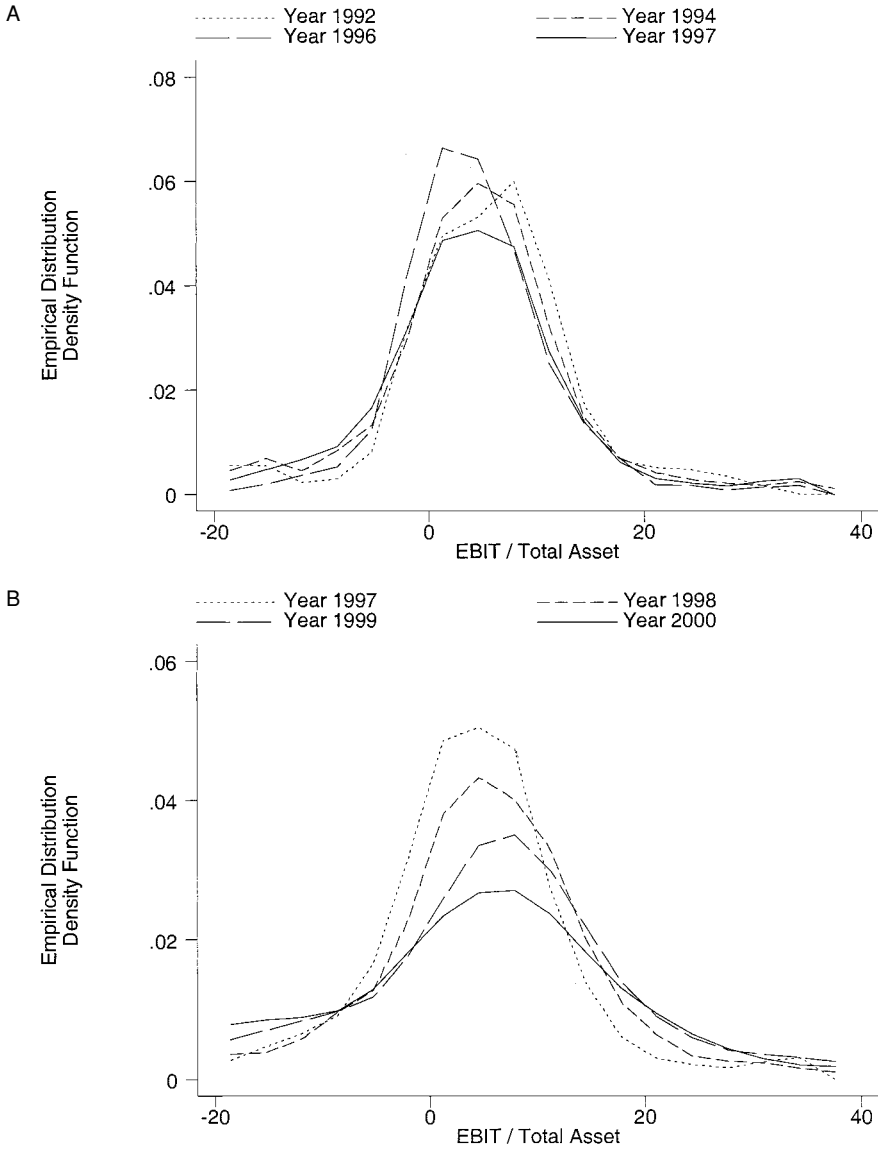


Fig. 6.4 Small-sized firms (bottom 10%), EBIT/total asset: **A**, before the crisis; **B**, after the crisis

Source: Author's calculation for all the firms in the NICE data.

Table 6.4 The Effect of the Crisis on the Loan-Borrowing Ratio for Each Size Cohort

Independent Variable ^a	Dependent Variable ^b		
	Large Firms (top 1% in asset size)	Medium-Sized Firms (middle 10% in asset size)	Small Firms (bottom 10% in asset size)
1992	-0.092114** (-2.62)	0.038763** (2.87)	-0.238474** (-13.00)
1993	-0.158658** (-4.55)	-0.023511* (-1.84)	-0.290327** (-18.11)
1994	-0.142179** (-4.14)	0.025618** (2.16)	-0.228863** (-14.64)
1995	-0.129324** (-3.79)	0.059797** (5.29)	-0.030198** (-1.99)
1996	-0.167552** (-4.91)	0.030885** (2.77)	0.053789** (3.42)
1997	-0.167804** (-4.96)	0.044728** (4.27)	0.045980** (4.15)
1998	-0.301641** (-8.87)	0.042048** (3.67)	0.070248** (5.88)
1999	-0.321025** (-9.54)	0.057508** (5.51)	0.044566** (4.97)
2000	-0.329379** (-9.84)	0.045512** (4.06)	0.012498 (1.21)
GDP growth rate	-0.003067** (-10.53)	-0.003040** (-9.93)	-0.002224** (-7.36)
Yields to corporate bonds	-0.016176** (-20.77)	-0.015893** (-19.42)	-0.013788** (-17.11)
No. of observations	56,990	56,990	56,990

Notes: Numbers in parenthesis are *t*-values. Loan-borrowing ratio refers to the borrowing from financial markets divided by total borrowing.

^aDummy variable denoting a specific cohort interacted with year dummies.

^bBorrowing from financial intermediaries/total borrowing.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

1996–2000 are larger than zero (in 1995, -0.03); these coefficients are all significant except in 2000. The small firms did not have much access to financial intermediaries in 1992–1994, but they have better access to the loans from financial intermediaries afterward.

For the medium-sized firms, the share of loans in total borrowing does not show any marked trend around the crisis. Note that the summary statistics in section 6.3.1 suggested a different interpretation for the behavior of medium-sized firms.

Empirical Distribution of Loans for Different Cohorts

Figure 6.5 shows the distribution of the loan-borrowing ratio for the largest cohort (top 1 percent of firms in asset size) before and after the cri-

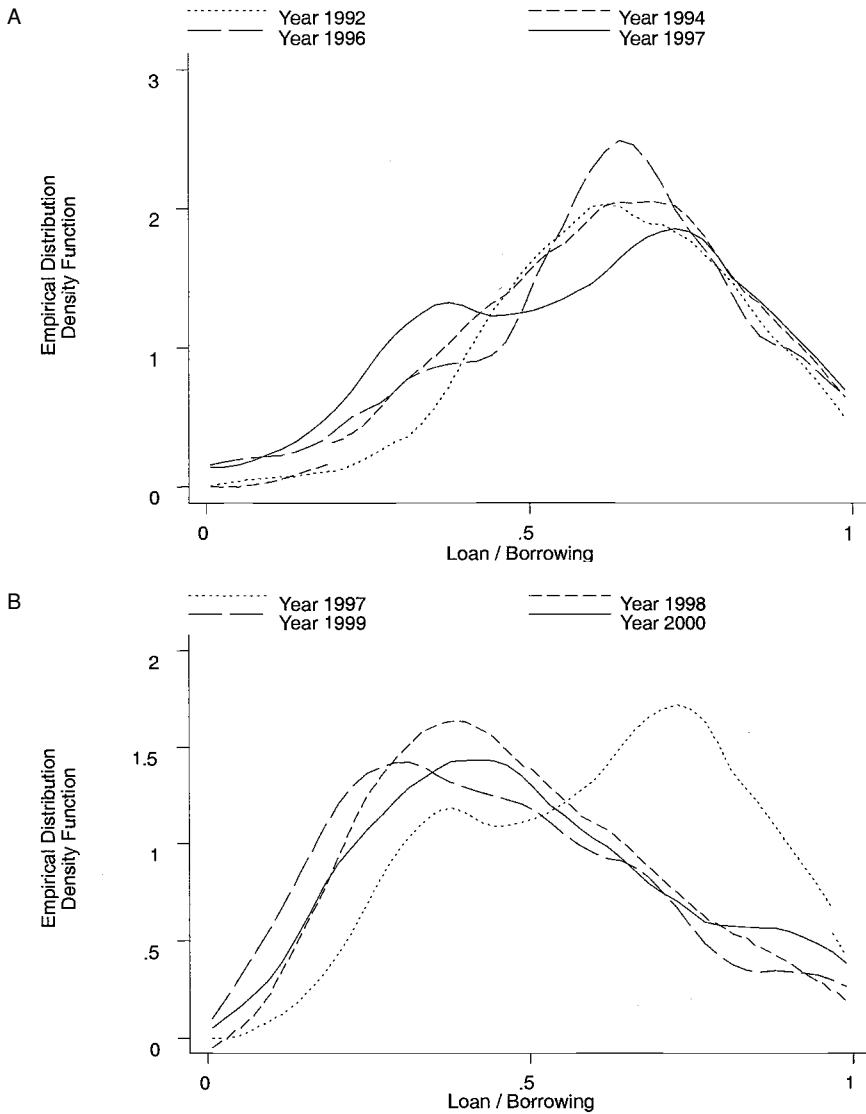


Fig. 6.5 Largest firms (top 1%), loan/borrowing: *A*, before the crisis; *B*, after the crisis

Source: Author's calculation for all the firms in the NICE data.

sis. After the crisis (in 1998–2000), the loan-borrowing ratio distribution for the largest firms clearly shifts leftward, as seen in panel B. This leftward shift starts partly in 1997 during the crisis.

For the small firms (bottom 10 percent firms in asset size) the distribution of the loan-borrowing ratio shifts to the right markedly in 1996 (actu-

ally in 1995, although not shown in the paper) and maintains more or less this pattern even after the crisis (fig. 6.6).

In figure 6.6, panel A, we note that, until 1994, a certain portion of the firms in our database lacks access to financial intermediaries for their corporate financing. One could see a certain density around zero. However, after 1994, this pattern changes: the density around zero continues to disappear until 1997, and, after the crisis, appears again, but on a much smaller scale than before 1995. Panels A and B in figure 6.6 make another interesting point. After 1994, we continue to see a peak at 1 and a certain mass around 1, which indicates that these firms depend (or do not depend) completely on the loans from financial intermediaries for their borrowing.

For the medium-sized firms, the share of loans in total borrowing does not show any marked changes before or after the crisis, except that, after the crisis, we could see more cluster around 1 (fig. 6.7).

6.4.2 Determinants of the Changes in the Allocation of Loans

Why do we observe such shifts in the allocation of loans by financial institutions as documented in section 6.4.1? Are they reflecting the firms' spontaneous choice for financing sources as a result of corporate restructuring, or did the financial reform cause financial institutions to shift their lending patterns? To see whether this is the case, we attempt to test the effect of individual firm profitability on the shift in allocation of loans by financial institutions.

Table 6.5 shows the regressions of the change in loans on firm profitability (interacted with year dummy) for small firms. We also test the effect of the affiliation with *chaebol* on the access to loans. The *chaebol* dummy distinguishes the top thirty *chaebol* from the others.

Table 6.5 suggests the interpretation that, for the small firms, profitability is an important factor in determining access to loans by financial institutions after the crisis.¹⁰ Financial institutions actively search for profitable small firms to provide loans after the crisis. In section 6.3.4, we pointed out that the crisis had an impact on the shape of the profitability for small firms. The profitability distribution becomes more dispersed after the crisis. It means that selecting efficient small firms became more difficult after the crisis.

Before the crisis, profitability was not a factor in the access of small firms to loans; on the contrary, inefficient small firms did have more access to loans by financial institutions. This reflects the fact that small firms were protected through various regulations by the government before the crisis. Note that the affiliation with *chaebol* has a negative effect on access to loans. In Korea, small firms affiliated with *chaebol* usually do not get

10. For medium-sized and large firms, the regression of the change in loans on firm profitability did not produce meaningful results.

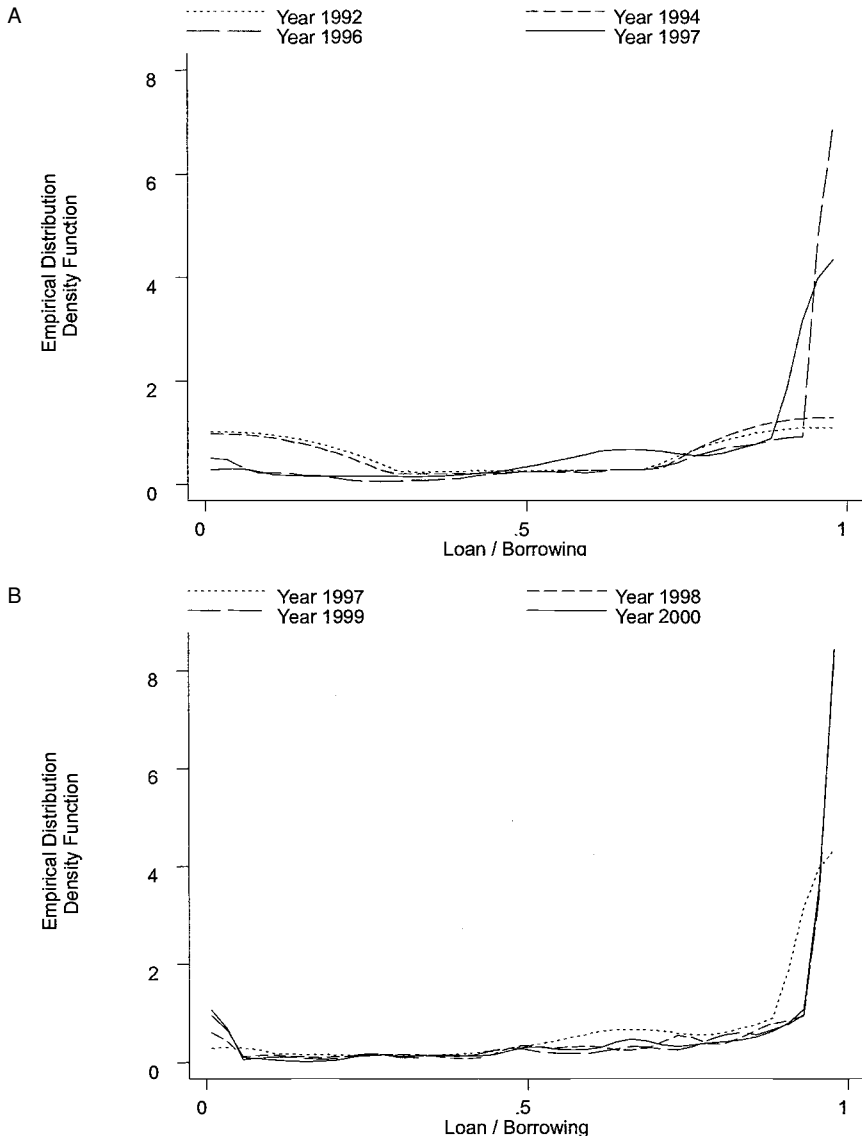


Fig. 6.6 Small-sized firms (bottom 10%), loan/borrowing: A, before the crisis; B, after the crisis

Source: Author's calculation for all the firms in the NICE data.

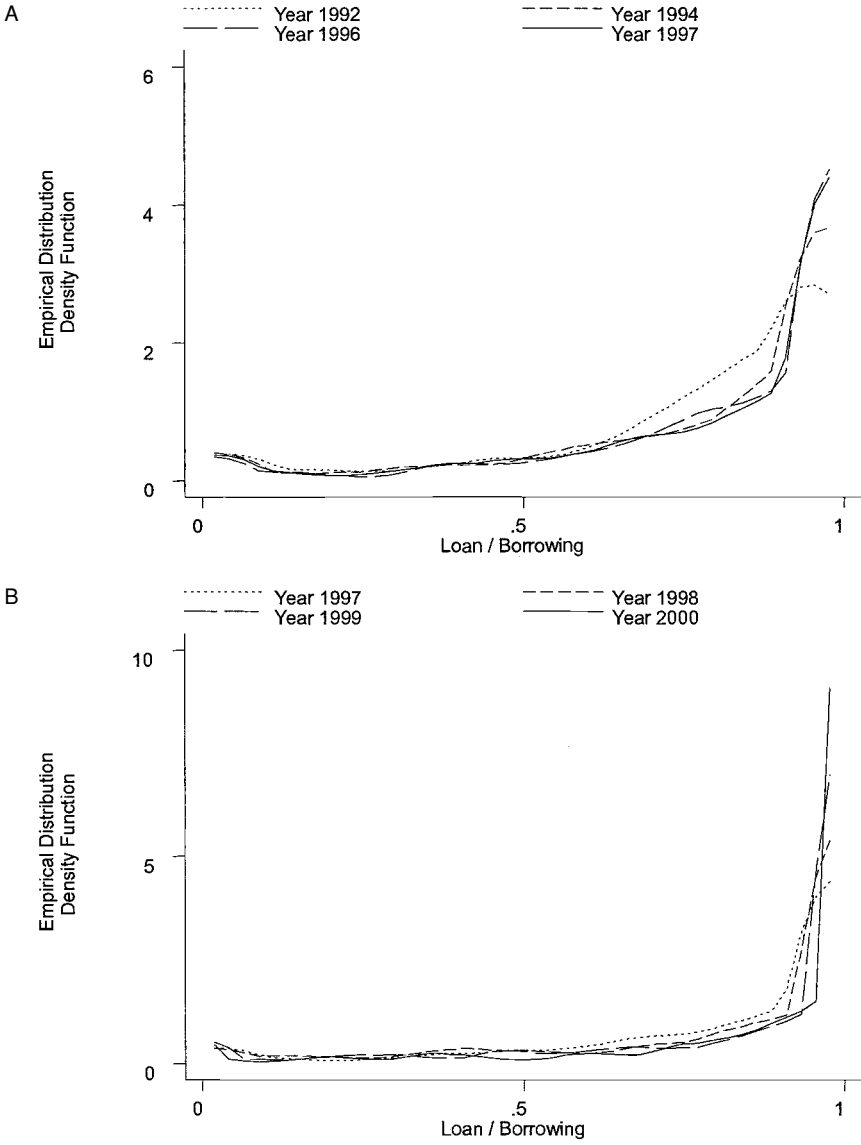


Fig. 6.7 Medium-sized firms (middle 10%), loan/borrowing: *A*, before the crisis; *B*, after the crisis

Source: Author's calculation for all the firms in the NICE data.

Table 6.5 Determinant of Loans for Small Firms

Independent Variable	Dependent Variable ^a
Profitability · 1993 Dummy	-6.27416** (-4.87)
Profitability · 1994 Dummy	-4.56897** (-4.23)
Profitability · 1995 Dummy	-2.20905** (-2.03)
Profitability · 1996 Dummy	-2.24397** (-2.00)
<i>Profitability · 1997 Dummy</i>	<i>3.39365**</i> <i>(3.36)</i>
Profitability · 1998 Dummy	-1.68222** (-2.41)
Profitability · 1999 Dummy	1.09281** (2.76)
Profitability · 1000 Dummy	1.01871** (2.84)
<i>Chaebol Dummy · (1993–1997) Dummy</i>	<i>-86.47024**</i> <i>(-2.37)</i>
<i>Chaebol Dummy · (1998–2000) Dummy</i>	<i>-85.39975*</i> <i>(-1.73)</i>
GDP growth rate	-4.84860** (-5.33)
Yield to corporate bonds	2.47850 (0.93)
No. of observations	4,388

Notes: Unit of loans = 10 million won. Numbers in parentheses are *t*-values. Profitability refers to the EBIT divided by total assets.

^aChange in loans.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

protection but rather face tight regulations to the effect of protecting other independent small firms. This kind of regulation has been gradually shrinking since the crisis.

6.4.3 Total Borrowing

In section 6.4.1, it is suggested that the largest firms are leaving financial intermediaries for their corporate financing after the crisis. Then, the question arises: do the large firms decrease investment and scale down their business? Otherwise, do they find other sources of financing after the crisis? To check this, we look at total borrowing before and after the crisis.

Table 6.6 shows the regressions of the borrowing-dependency ratio (defined as total borrowing divided by total assets) on the dummy variables denoting the size cohort interacted with year dummies and on the macro-

Table 6.6 Test of Borrowing-Dependency Ratio for Size Cohorts

Independent Variable ^a	Dependent Variable ^b		
	Large Firms (top 1% in asset size)	Medium-Sized Firms (middle 10% in asset size)	Small Firms (bottom 10% in asset size)
1992	0.065951* (1.83)	0.002772 (0.20)	-0.147234** (-9.24)
1993	0.087718** (2.46)	0.000540 (0.04)	-0.131432** (-9.44)
1994	0.100312** (2.82)	0.008327 (0.71)	-0.149869** (-11.53)
1995	0.098005** (2.77)	0.023694** (2.08)	-0.108633** (-8.28)
1996	0.133107** (3.76)	0.032537** (2.92)	-0.108653** (-8.22)
1997	0.194158** (5.57)	0.054186** (5.16)	0.041092** (3.72)
1998	0.132828** (3.79)	-0.021260* (-1.86)	0.001323 (0.11)
1999	0.077798** (2.21)	0.002175 (0.20)	-0.009230** (-9.72)
2000	0.099435** (2.84)	-0.015028 (-1.29)	-0.104478** (32.23)
GDP growth rate	-0.001729** (-5.93)	-0.002001** (-6.53)	-0.001364** (-4.49)
Yields to corporate bonds	0.002870** (3.64)	0.002403** (2.91)	0.002480** (3.03)
No. of observations	61,732	61,732	61,732

Notes: Numbers in parentheses are *t*-values. Borrowing-dependency ratio refers to the total borrowing divided by total assets.

^aDummy variable denoting a specific cohort interacted with year dummies.

^bTotal borrowing/total asset.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

variables (growth rate of GDP, interest rate). In table 6.6, the reported coefficient for the specific year indicates the borrowing-dependency differences between the size cohort in that specific year and all the other firms in the whole sample period. Table 6.6 shows the regression results for the three size cohorts (top 1 percent, middle 10 percent, bottom 10 percent).

The crisis affected the borrowing-dependency ratio of all the cohorts only during the crisis. When the crisis died out, the borrowing-asset ratio returned to the previous trend. The share of borrowing in total assets went up much more for small firms during the crisis than for the other size cohorts. Unlike the others, small firms had no other cushions (e.g., equity, retained earnings) to absorb the adverse effect of the crisis.

Table 6.7 The Effect of the Crisis on the Bond-Borrowing Ratio for Each Size Cohort

Independent Variable ^a	Dependent Variable ^b		
	Large Firms (top 1% in asset size)	Top 6–10% in Asset Size	Top 11–20% in Asset Size
1992	0.160692** (2.62)	0.103350** (11.35)	0.047441** (6.94)
1993	0.185830** (4.55)	0.132925** (14.98)	0.073764** (11.17)
1994	0.245725** (4.14)	0.150490** (17.09)	0.077310** (11.96)
1995	0.248630** (3.79)	0.156919** (17.78)	0.075703** (11.76)
1996	0.266046** (4.91)	0.172363** (19.57)	0.084974** (13.27)
1997	0.297227** (4.96)	0.171449** (19.65)	0.087462** (13.98)
1998	0.421412** (8.87)	0.178142** (19.35)	0.067650** (9.98)
1999	0.446375** (9.54)	0.196404** (21.32)	0.049279** (7.50)
2000	0.393401** (9.84)	0.160074** (17.17)	0.033200** (4.79)
GDP growth rate	0.000144** (-10.53)	0.000067 (0.39)	-0.000009 (-0.05)
Yields to corporate bonds	0.003134** (-20.77)	0.002853** (6.21)	0.002246** (4.67)
No. of observations	56,990	56,990	56,990

Notes: Numbers in parentheses are *t*-values. Bond-borrowing ratio refers to the borrowing from financial markets divided by total borrowing.

^aDummy variable denoting a specific cohort interacted with year dummies.

^bBorrowing from financial markets/total borrowing.

**Significant at the 5 percent level.

6.4.4 Financing in the Bond Market

The above result implies that the large firms moved to some other sources of financing after the crisis. This section will show that the large firms went to the bond market to compensate for the decrease in loans by financial institutions. This was hinted in section 6.2.1. We test it formally in the following.

Table 6.7 shows the regressions of the bond-borrowing ratio (defined as the borrowing from financial markets divided by total borrowing) on the dummy variables denoting the size cohort interacted with year dummies and on the macrovariables (growth rate of GDP, interest rate). In table 6.7, the reported coefficient for the specific year indicates the bond-borrowing

ratio's differences between the size cohort in that specific year and all the other firms in the whole sample period. Table 6.7 shows the regression results for the three size cohorts (top 1 percent, top 6–10 percent, top 11–20 percent). The reason for choosing a different set of cohorts for table 6.5 is that, for the sample period, the small and medium-sized firms (the cohorts we used in the regression analysis before) do not have access to borrowing from financial markets.

After the crisis (in 1998–2000), the largest firms markedly increase the share of bond financing in total borrowing. The coefficients for 1998–2000 are around 0.4 (all significant), whereas the coefficients for 1992–1997 are smaller than 0.3 (also all significant).

For all the size cohorts, the share of bond financing in total asset increases gradually from 1992 to 1996. This is due to the financial liberalization policy gradually taken by the government since the early 1990s. During this period the size of the bond market in Korea gradually expanded. The bond market developed more rapidly with the speed-up of financial liberalization policy after the crisis.

Empirical Distribution of Bond Financing for Different Cohorts

Figure 6.8 shows the bond-borrowing ratio distributions before and after the crisis for the largest cohort. After the crisis (in 1998–2000), the bond-borrowing ratio distribution for the largest firms shifts clearly to the right (panel B).

In figure 6.9 we show the similar figures for another size cohort (top 11–20 percent of firms in asset size). This cohort includes, in fact, the smallest firms to have any access to the bond market at all in the sample period. For this cohort, the bond-borrowing ratio distribution shifts to the right marginally before the crisis. After the crisis, however, the distribution shifts back to the left. There is a large peak around zero in 1999 and the distribution becomes degenerate in 2000 (i.e., this cohort does not have any access to the bond market). A large proportion of the bonds that were issued during the crisis were at risk of default, especially after the demise of the Daewoo group (one of the top four *chaebol* at that time in Korea) in 1999. This, in turn, put the whole market for corporate bonds into a state of malfunction in 1999 and in 2000.

6.5 Concluding Remarks

The paper documents that large firms, to some extent, are leaving banks and going to the capital market for their financing after the crisis.¹¹ The

11. Clearly, the liberalization of financial markets, which happened at an accelerating rate after the crisis, contributed to broaden the supply base of various corporate financing sources. But, for further deepening of the supply base of various corporate financing sources, Korea needs better protection of investors' rights.

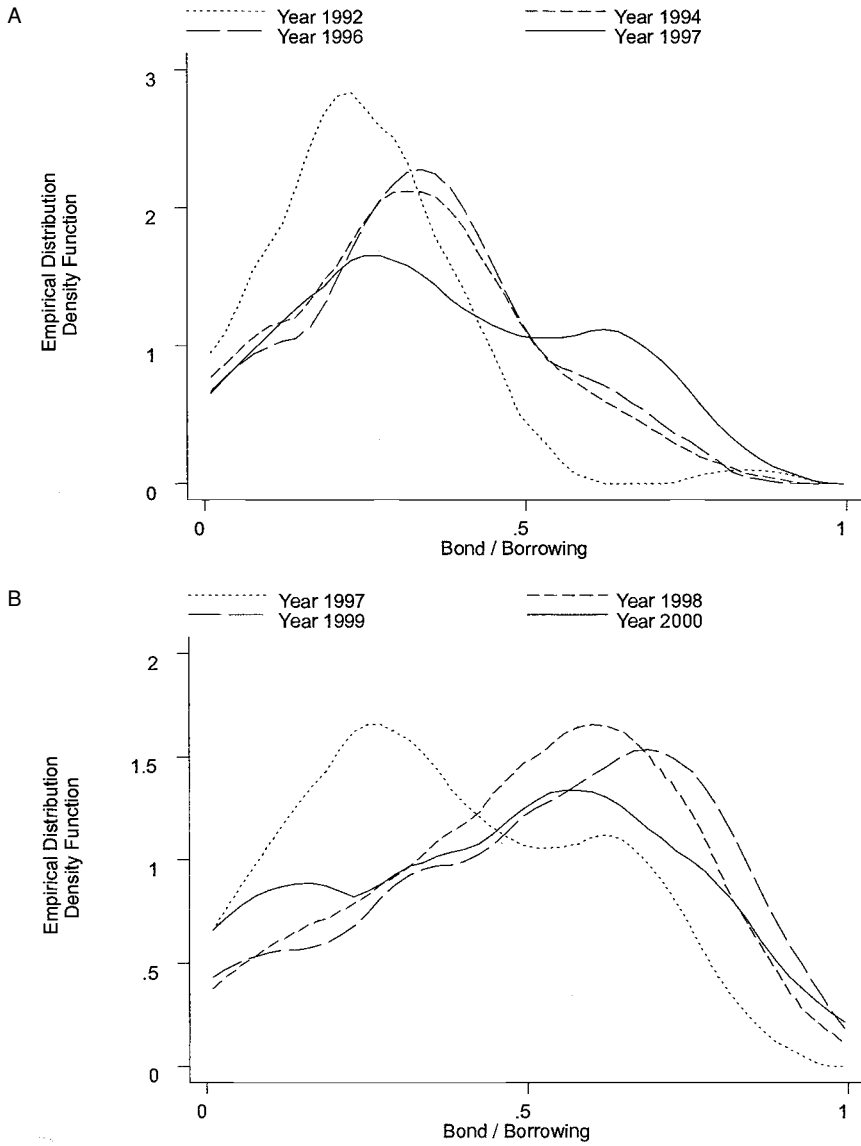


Fig. 6.8 Large-sized firms (top 1%), bond/borrowing: A, before the crisis; B, after the crisis

Source: Author's calculation for all the firms in the NICE data.

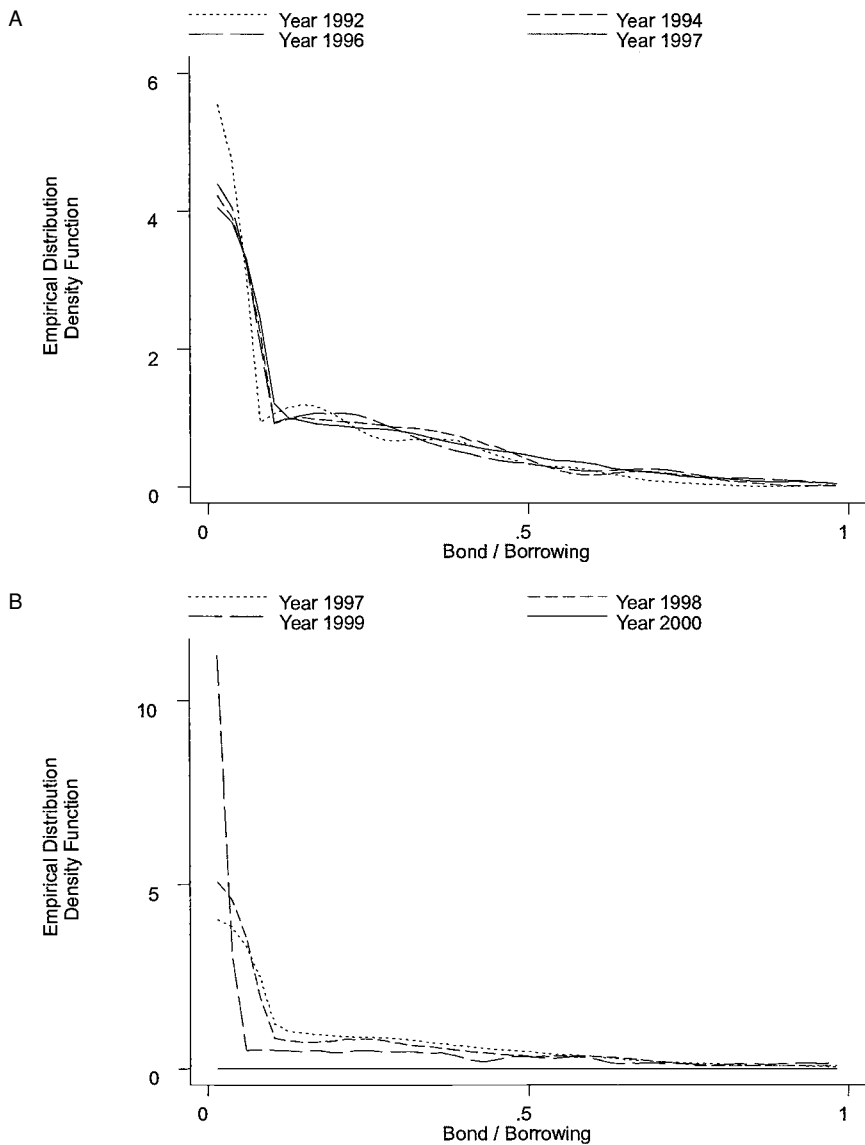


Fig. 6.9 Large firms (top 10%–top 20%), bond/borrowing: *A*, before the crisis; *B*, after the crisis

Source: Author's calculation for all the firms in the NICE data.

paper also shows that profitable small firms are gaining easier access to credit by financial institutions after the crisis. Financial institutions are re-allocating their credit from large firms to small firms after the crisis. Why do we observe such shifts in the allocation of loans by financial institutions? Are they reflecting the firms' spontaneous choice for financing sources as a result of corporate restructuring? Otherwise, did the financial reform cause financial institutions to change their lending practices? The paper suggests that the banks' improved lending practices contributed at least partially to this shift.

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Comment Francis T. Lui

The Asian financial crisis of 1997 and 1998 has caused such enormous losses for the economies involved that it is important for them to learn from what has happened so that similar mistakes can be avoided in the future.

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Among the many possible causes of the crisis, imprudent lending to corporations, induced by various kinds of moral hazard behavior, often has been regarded as a main culprit. Arguably, this turned on the whole chain of events that started in Thailand. In Korea, where *chaebol* indebtedness was also a big issue, the economy quickly was affected by the crisis.

With this background, it is natural for economists to ask some compelling questions. What was the nature of corporate financing before the crisis? How did corporations finance their investments? How did the corporate financial structures change after the crisis? How did the size of the firms affect their profits and financial structures? What lessons can we learn from the events? These questions should be addressed both empirically and theoretically. Youngjae Lim's paper, using a large database on Korean firms, is an attempt to answer some of these questions from an empirical perspective. Specifically, it focuses on what happened to the sources of corporate financing of firms of different sizes. Since papers of this kind can provide us with useful information on what actually happened, they should be very much welcome by the profession.

The approach used in the paper basically involves the following. First, with occasional minor deviations, it classifies firms into three major categories: the largest firms, those of medium size, and the smallest ones. Second, it examines the sources of financing of each of these firm categories in different years from 1992 to 2000. The comparison therefore can be done both cross-sectionally and longitudinally. Sources of funds being studied include borrowing from financial intermediaries and borrowing from financial markets. The paper also compares profitability of the three categories of firms over time.

Three methods are used to organize the data. First, descriptive statistics, including the means and standard deviations of the variables involved, are presented for every category of firm before, during, and after the Asian financial crisis. The main variables are "borrowing from financial intermediaries" and "borrowing from financial markets," each divided by total borrowing. Second, the density functions of these variables for different types of firms in different years are presented. Readers can inspect the graphs to arrive at their conclusions. Third, a more formal statistical approach involving different sources of financing or profitability as dependent variables is used. The main explanatory variables are dummies representing different types of firms in different years. In addition, GDP growth rates and yields to corporate bonds are used to isolate the effects of business cycles.

These three ways of organizing the data essentially yield the same results. To some extent, there is redundancy in employing all three methods in the paper. Since the first two cannot control for the influences of business cycles, which obscure the effects of the crisis on the financial structure, they are inferior to the third, which is already sufficient to tell the main stories

of this paper. Readers can go through it much more efficiently by just paying attention to the part on statistical tests.

One may complain that the reliance on many dummy variables may introduce too much arbitrariness in the regression model. There are various ways to reduce the number of dummies. For example, one can construct continuous variables based on the sizes of the firms, as measured by the values of their assets. This probably will not generate major improvements, but the author may know better how robust his results are.

Another drawback of the paper is the short time-series of data, which last from 1992 to 2000, just a couple of years after the Asian financial crisis. Although there is an attempt to control for business cycles, it is not clear that the duration of the data is long enough to tell whether the post-crisis changes in financial structures are permanent or transitory. This problem cannot be resolved until more data are available over time.

What are the main findings of the paper? After the crisis, the largest firms have big declines in their borrowing from financial intermediaries. There is, however, no major change in total borrowing. The declines in loans by intermediaries are compensated for by sizable increases in corporate bond financing. While there are no obvious changes in the sources of financing for medium-sized firms, new patterns for the smallest ones have emerged. Before the crisis, small firms were less dependent than medium firms on loans by financial intermediaries. However, after the crisis, their borrowing from intermediaries exhibits significant increases. Because of the small size of these firms, they typically have no access to financing through corporate bonds. It should also be noted that the profitability of the small firms has been declining over time. The distributions of profits both across the entire sample of firms, and across the smallest firms, appears to be widening after the crisis. The small firms seem to have become both riskier and less profitable.

These results, while valuable for their own sake, are descriptive in nature. They tell us what happened, but not the reason it happened. Hence it is rather difficult to directly infer any major lessons from them. In a sense, they raise more questions than have been answered. For instance, the paper does not let us know whether the decline in loans provided by financial intermediaries to large corporations is due to the reluctance of these intermediaries to lend them money, or due to the voluntary choice of the firms to choose other means of financing. Has the cost of financing by intermediaries been raised enough to correct for moral hazard? Do financial markets in Korea possess better information than banks, so that the former can provide cheaper loans to the large firms? Is it true that bond financing has become more important only because the financial markets in Korea are now more developed? Is the Asian financial crisis just a historical coincidence, having nothing to do with the changing financial structures for the large firms? As for the small firms, is it true that intermediaries are more

willing than before to lend them money? Are the decline in profitability and the increase in risks caused by worsening of the investment environment? Alternatively, are these simply due to the entry of many inexperienced small firms? The last question can be answered partially if data on the number of newly registered firms are available.

One can continue to lengthen the list of questions related to the changes in sources of corporate financing in Korea. Clearly, no one author is responsible for answering all the questions. This being said, the paper would make a better contribution had the author been able to provide more institutional details on the Korean financial markets and to offer coherent explanations for his descriptive empirical findings. There is need for more theoretical papers in this area.